



JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)
Ministry of Home Affairs, Provincial Councils and Local Government
Democratic Socialist Republic of Sri Lanka

THE STUDY ON IMPROVEMENT OF SOLID WASTE MANAGEMENT IN SECONDARY CITIES IN SRI LANKA

FINAL REPORT VOLUME II MAIN REPORT



DECEMBER 1990

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RESEARCH REPORT NO. 42/90

**JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)
Ministry of Home Affairs, Provincial Councils and Local Government
Democratic Socialist Republic of Sri Lanka**

**THE STUDY
ON IMPROVEMENT
OF SOLID WASTE MANAGEMENT
IN SECONDARY CITIES
IN SRI LANKA**

**FINAL REPORT
VOLUME II
MAIN REPORT**

DECEMBER 2003

KOKUSAI KOGYO CO., LTD.

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In this report, the project cost is estimated using the September 2003 prices and at an exchange rate of 1 US\$ = 117.02 Japanese Yen = 95.28 Rupees

PREFACE

In response to a request from the Government of the Democratic Socialist Republic of Sri Lanka, the Government of Japan decided to conduct a development study on Improvement of Solid Waste Management in Secondary Cities and entrusted the study to the Japan International Cooperation Agency (JICA).

JICA selected and dispatched a study team headed by Mr. Akira Doi, KOKUSAI KOGYO CO., LTD. to Sri Lanka three times between May 2002 and November 2003.

In addition, JICA set up an advisory committee headed by Dr. Isamu Yokota, a professor of Graduated School of Nutritional and Environmental Sciences, University of Shizuoka, between April 2002 and October 2003, which examined the study from specialist and technical point of view.

The team held discussions with the officials concerned of the Government of the Democratic Socialist Republic of Sri Lanka and conducted field surveys at the study area. Upon returning to Japan, the team conducted further studies and prepared this final report.

I hope that this report will contribute to the promotion of this project and to the enhancement of friendly relationship between our two countries.

Finally, I wish to express my sincere appreciation to the officials concerned of the Government of the Democratic Socialist Republic of Sri Lanka for their close cooperation extended to the Team

December, 2003
Kazuhisa Matsuoka
Vice President
Japan International Cooperation Agency

December, 2003

Mr. Kazuhisa Matsuoka
Vice President
Japan International Cooperation Agency

Letter of Transmittal

Dear Mr. Matsuoka,

We are pleased to submit to you the report on The Study on Improvement of Solid Waste Management in Secondary Cities in the Democratic Socialist Republic of Sri Lanka.

This study aimed to overcome waste related problems in the whole country. In the seven selected towns including Chilaw, Negombo, Gampaha, Matale, Kandy, Nuwara Eliya and Badulla, council staff and the Study Team jointly conducted the survey to understand the present conditions, formulated the action plans, and implemented the pilot projects in order to not only improve the problems but also develop their capacities. The many valuable lessons obtained through the series of operations were compiled in the solid waste management guideline to be utilized by many local authorities.

As for the national level, the Study recommended the central government to establish a National Solid Waste Management Support Centre for local authorities and to strengthen the financial scheme for solid waste management projects.

We would like to emphasize that the prompt implementation of the recommendations is essential to ensure Sri Lanka's sustainable development because the waste problems are getting more and more serious.

We wish to take this opportunity to express our sincere gratitude to your Agency, the Ministry of Foreign Affairs and the Ministry of Environment. We would also like to extend our sincere gratitude to the Government of Sri Lanka, the seven selected towns, the Embassy of Japan and the JICA Colombo office.

Finally, we hope that this report will help improve and enhance solid waste management in all towns in Sri Lanka.

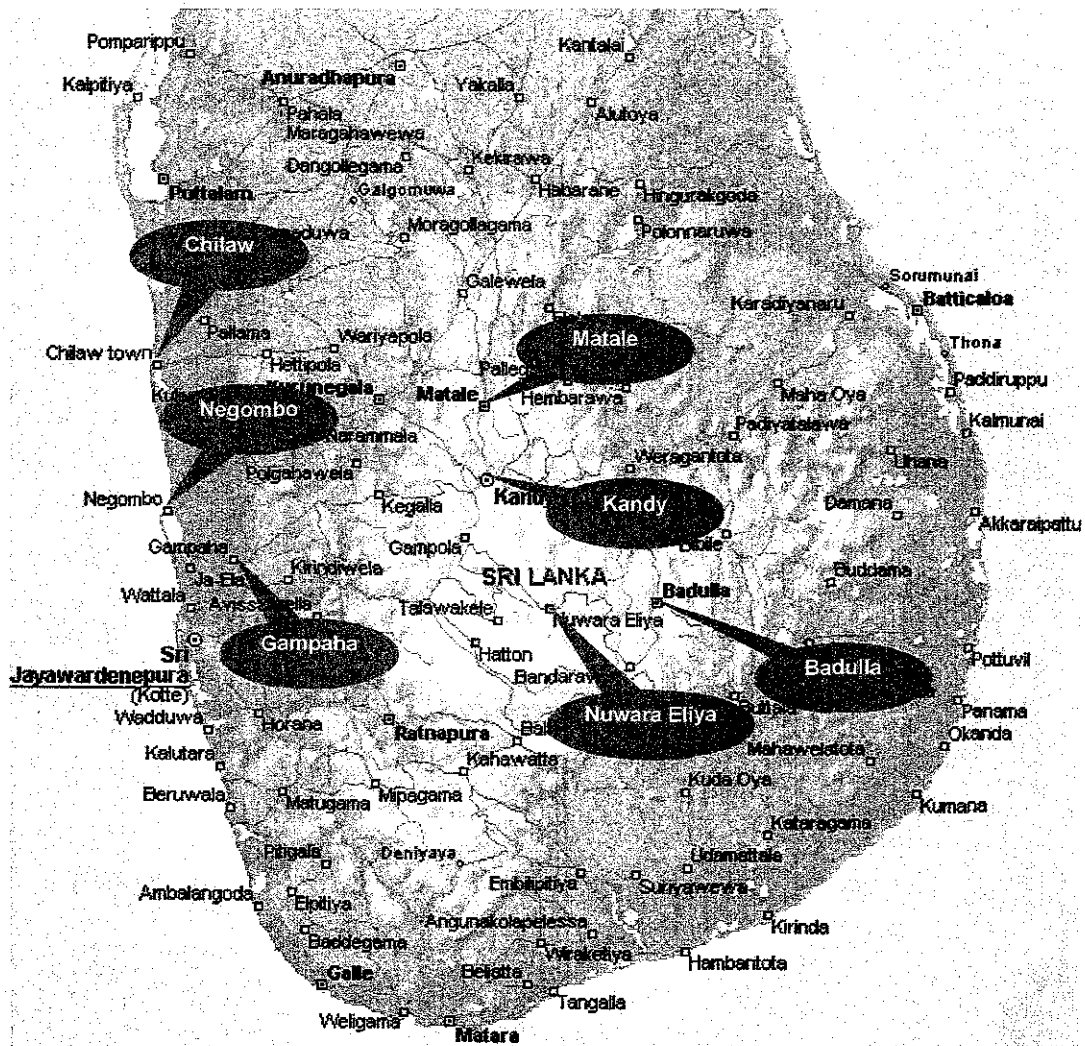
Respectfully,

Akira Doi
Team Leader

The Study on Improvement of Solid Waste Management in Secondary Cities



THE STUDY ON IMPROVEMENT
OF SOLID WASTE MANAGEMENT
IN SECONDARY CITIES
IN SRI LANKA



LOCATION MAP OF STUDY AREA

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Abbreviations

ADB	Asian Development Bank
BETL	Burns Environmental and Technologies (PVT) Ltd.
CBO	Community Based Organisation
CDA	Community Development Assistant
CDO	Community Development Officer
CEA	Central Environmental Authority
CGC	Ceylon Glass Company
CPHI	Chief Health Inspector
DEO	Divisional Environmental Officer
DF/R	Draft Final Report
EEC	Environmental Education Centre
EIA	Environmental Impact Assessment
EPL	Environmental Protection License
EPR	Extensive Producers Responsibilities
F/R	Final Report
F/S	Feasibility Study
GMC	Gampaha Municipal Council
HABITAT	The United Nations Centre for Human Settlements
HCW	Health Care Waste
HDPE	High Density Polyethylene
HHCW	Hazardous HCW = clinical waste, body parts, placentas),
HHHCW	Highly HHCW = highly infectious wastes and sharps.
HWM	Hazardous Waste Management
IC/R	Inception Report
IEE	Initial Environmental Examination
ITDG	Intermediate Technology Development Group
JBIC	Japan Bank for International Cooperation
JICA	Japan International Cooperation Agency
KMC	Kandy Municipal Council
LA	Local Authority
LDPE	Low Density Polyethylene
LLDF	Local Loans and Development Fund
MC	Municipal Council
MCB	Municipal Council of Badulla
MGTP	Management Plan
M/M	Minutes of Meeting
MMC	Matale Municipal Council
MOENR	Ministry of Environment and Natural Resources
MOH	Medical Officer of Health
MOHAPCLG	Ministry of Home Affairs, Provincial Councils, Local Government
MOHNW	Ministry of Health, Nutrition and Welfare
M/P	Master Plan
MSW	Municipal Solid Waste
MSWM	Municipal Solid Waste Management
NASD	National Agenda for Sustainable Development
NEA	National Environmental Act

NEMC	Nuwara Eliya Municipal Council
NERDC	National Engineering Research and Development Centre
NFPO	National Forum of People's Organisations
NGO	Non-Governmental Organisation
NIPHS	National Institute of Public Health and Science
NMC	Negombo Municipal Council
NPC	National Paper Corporation
NSSWM	National Strategy for Solid Waste Management
NSWMSC	National Solid Waste Management Support Centre
O&M	Operation and Maintenance
PAA	Project Approving Agency
PC	Provincial Council
PDM	Project Design Matrix
PHI	Public Health Inspector
POS	Public Opinion Survey
PP	Polypropylene
P/R	Progress Report
PS	Pradeshiya Sabha
Rs	Rupees
SLILG	Sri Lankan Institute of Local Governance
S/W	Scope of Work
SWM	Solid Waste Management
UC	Urban Council
UCC	Urban Council of Chilaw
UDA	Urban Development Authority
WTP	Willingness to Pay
3 Rs	Reduce, Reuse and Recycle

Chapter 1 Introduction

1.1 Background

In local towns in Sri Lanka, the problems related to health, sanitation and the environment caused by solid waste are getting more serious due to improper solid waste management (SWM). However, any improvement measures that incur a cost increase are too difficult to implement because the SWM expenditures in most local towns have overloaded the municipalities' budgets. Therefore, in terms of practicability and sustainability, the operation and maintenance (O&M) cost and the replacement cost of the improvement plans to be proposed must be affordable for the local governments. In order to satisfy the requirements, the proposed plans have to effectively utilise locally available materials, technologies, natural conditions, etc.

In addition, since SWM works are greatly influenced by the changes in social conditions, it is necessary that the SWM plans be flexible to adjust to the social changes and that the managerial capability of executing agencies is improved. A SWM manual, therefore, must be prepared.

Under these circumstances, the Government of Sri Lanka requested the Government of Japan to implement the Study in September 2000. In response to the request, the Government of Japan dispatched a Preparatory Study Team in September 2001 and the Team signed and exchanged the scope of work. JICA appointed Kokusai Kogyo Co., Ltd. as the consultant of the Study.

1.2 Main Scope of the Study and the Study Area

1.2.1 Objectives of the Study

The study had the following five objectives.

- 1) To formulate an appropriate and practical solid waste management action plan for each model town described in the study area and study waste.
- 2) To jointly implement pilot projects in model towns aiming at the actual improvement of some aspects of SWM.
- 3) To prepare guidelines for local authorities (LAs) for improvement of SWM.
- 4) To prepare policy recommendations for the central government.
- 5) To transfer technologies to the counterpart personnel in the course of the Study

1.2.2 Study Area

The model towns targeted by the Study were Negombo, Chilaw, Gampaha, Kandy, Matale, Nuwara Eliya and Badulla. Based on the study results in the seven model towns, the SWM improvement plan for the country was formulated.

1.2.3 Outline of the Study.

Main Study Items	Study Contents
a. Formulation of Action Plans	An action plan was prepared for each of the seven model towns. The Study coordinated with the relevant provincial governments as well.
b. Implementation of Pilot Projects	The pilot project sites were selected from the above mentioned towns after the first study work in Sri Lanka.
c. Formulation of the SWM Guideline for Local Government	It was formulated targeting all the local governments in Sri Lanka using the data collected in the first and second survey periods.
d. Formulation of the Policy Recommendation for the Central Government	It was formulated targeting the central governmental organisations related to SWM administration

1.2.4 Solid Waste Covered Under the Study

This study covered residential waste, business waste, public waste, medical waste and industrial waste. However, as for the study on industrial and medical waste, only policy suggestion was made. Although night soil was covered by the Study, only policy suggestions were made.

1.3 Study Schedule

The Study was executed according to the following two phases.

1st Phase (from May 2002 until Nov. 2002): Formulation of draft SWM action plans

2nd Phase (from Jan. 2003 until Nov. 2003): Implementation and operation of pilot projects

Study Phase	Phase 1												Phase 2											
	2002												2003											
	Month	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12		
Site investigation																								
Formulation of action plans	[Solid black bar from May to Nov 2002]																							
Formulation of pilot projects																								
Implementation of pilot projects																								
Finalization of action plans																								
Formulation of SWM guideline																								
Reporting																								
Seminars for SWM																								

1.4 Policies of the Study

- 1) The operation and maintenance in SWM projects is more important than the investment for equipment procurement and facility construction because its required cost is very large. The priority was, therefore, placed on the capacity development of the relevant institution and staff to improve the present condition and to ensure the success of the project to be executed.
- 2) The local authority of each model town took the initiative in the formulation of the action plan with technical assistance from the Study team, and was responsible for it.
- 3) The pilot projects have to be continuously executed to achieve actual improvement. Therefore, the counterparts were requested to actively implement the projects with technical assistance from the Study team in order to improve the processes.

1.5 Implementation Plan of the Study

a. Member of the JICA Advisory Committee

The member of the JICA Advisory Committee was as follows.

Chairman Ph.D. Isamu Yokota University of Shizuoka

b. Members of the Study Team

The members of the Study team were as follows.

Assignment	Expert
Leader	Mr. Akira Doi
Deputy leader (1) / Final Disposal	Mr. Naofumi Sato
Collection, Transport, Resource Recovery	Dr. Sean Finnigan
Public participation, Social consideration	Ms. Misa Oishi
Environmental education	Ms. Tomomi Kitajima
Deputy leader (2) / Institutional Plan	Mr. Susumu Shimura
Financial analysis	Mr. Kozo Baba
Recycle, processing & treatment	Mr. Tamotsu Suzuki
Geological Survey and Facility Plan	Dr. Lei Peifeng
Equipment plan / Cost estimation	Mr. Hiroshi Fujita
Financial System Plan	Mr. Hachiro Ida
Waste amount & composition	Mr. Takeshi Nakano

c. Counterpart Organizations

The Ministry of Home Affairs, Provincial Councils, and Local Government (MOHAPCLG) was the counterpart agency and the coordinating body of the Study in the Sri Lankan side and the staff in MOHAPCLG and seven model towns worked as the counterparts of the Study.

d. Members of the Steering Committee

The Government of Sri Lanka established a Steering Committee consisting of representatives of the following organisations under the chairmanship of the secretary of Ministry. The Steering Committee held the meetings occasionally.

- Ministry of Policy Development & Implementation
- Ministry of Health, Nutrition & Welfare
- Ministry of Housing and Plantation Infrastructure
- Ministry of Environment & Natural Resources
- Ministry of Home Affairs, Provincial Councils & Local Government

1.6 Technical Transfer

a. Seminars and Workshops

SWM technical seminar:	(2 times each at 7 model towns and Colombo)	16 times
Workshop for the formulation of SWM By-law		3 times
Seminar on Picture Book for DEO (Training of Trainers)		2 times
Seminar on SWM for PHI course		4 times
Seminar on SWM for Local NGOs		1 time
Seminar on Social Aspect of SWM to University Students and Staff		1 time
<u>Seminar on SWM for Politician and High Ranking Officers in Provinces:</u>		<u>6 times</u>
Total		33 times

b. Training

Forty-five training sessions and lectures altogether were conducted.

c. Counterpart Training

The following two personnel received the training in Japan.

- Mr. Wijetunga, Additional Secretary, Ministry of Home Affairs, Provincial Council and Local Government
- Mr. Namal Dhamika Dissanayake, Mechanical Engineer, Kandy Municipal Council

1.7 Reports

The list of final reports submitted to the Government of Sri Lanka by the Study team is as follows.

Reports	Language	No of Reports		
		JICA	Sri Lanka	Total
Action Plan for Model Towns				
for Badulla, Main Report	English and Sinhala	10	10	20
for Badulla, Supporting Report	English	10	5	15
for Chilaw, Main Report	English and Sinhala	10	10	20
for Chilaw, Supporting Report	English	10	5	15
for Gampaha, Main Report	English and Sinhala	10	10	20
for Gampaha, Supporting Report	English	10	5	15
for Kandy, Main Report	English and Sinhala	10	10	20
for Kandy, Supporting Report	English	10	5	15
for Matale, Main Report	English and Sinhala	10	10	20
for Matale, Supporting Report	English	10	5	15
for Negombo, Main Report	English and Sinhala	10	10	20
for Negombo, Supporting Report	English	10	5	15
for Nuwara Eliya, Main Report	English and Sinhala	10	10	20
for Nuwara Eliya, Supporting Report	English	10	5	15
Reports for the Central Government				
SWM Guideline for Local Governments	Guideline in English and Sinhala, Supporting data only in English	10	410	420
Summary	English	10	40	50
Main Report	English	10	40	50
Supporting Report	English	10	40	50

Chapter 2 Current Situation of SWM in Secondary Cities

2.1 Institutional and Organisational System

2.1.1 General Administration

a. General

There are nine provinces and 25 districts in Sri Lanka. The administration of Sri Lanka, however, consists of the following three levels:

- Central Government;
- Provincial Councils; and
- Local Authorities.

Under the 13th Amendment of the constitution in 1987 a sub-national level administration with legislative powers, the Provincial Council (PC), was introduced and the Local Authority itself became a subject under the Provincial Council. Prior to the introduction of the 13th Amendment, the Local Authority was a subject under a Central Government Ministry, combined with other subjects in such manner as Local Government and Health, Local Government and Social Services and lastly in 1987 as Local Government, Housing and Construction.

b. Central Government (Government)

In the Central Government, the elected President and Cabinet Ministers have broad executive powers. There are a large number of ministries. According to “the Government Notifications notified by the President’s Office on 28 February 2002”, there are 56 ministries. The number and subjects/functions of ministries, however, are subjected to frequent change. To complicate things more, there are ministers of the cabinet and non-cabinet ministers.

c. Provincial Council (PC)

The administrative and organizational structure of a provincial council is similar to that of the central government as shown in the figures.

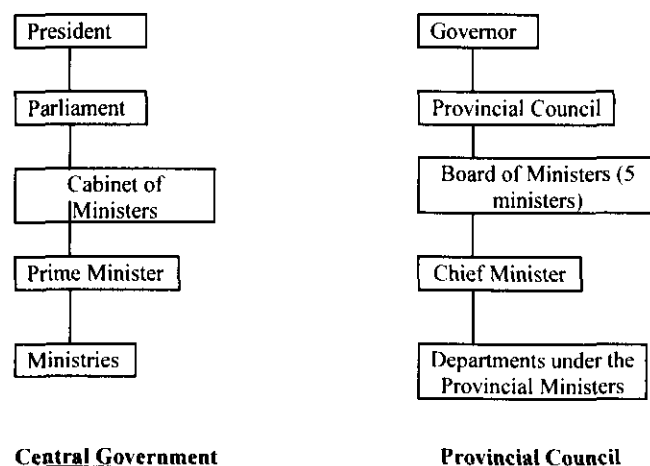


Figure 2-1: Administrative Structure of Central Government and Provincial Council

There are five ministers in a PC in accordance with law and they share responsibilities on administrative subjects.

In the case of Western Province, the Chief Secretary/Chief Accounting Officer is the top bureaucrat in the provincial council under the Chief Minister. There is a Minister's Secretary under each Minister including the Chief Minister's Secretary, and under him are the heads of the departments. The Senior Assistant Secretary and Commissioner of Local Government, under the Chief Minister's Secretary, is responsible for the affairs of LAs .

Regarding human resources, PC assigns top-level officers such as commissioners to LAs. Employees of a PC are categorized into the following three levels:

1. Top level officers for managerial service who are employed by the (National) Public Service Commission;
2. Middle level officers for combined service (22 grades of positions) who are employed by the Provincial Public Service Commission; and
3. Lower level officers for council service who are employed by PC.

The members of a provincial council are democratically elected. The Governor, the top of a provincial government, is appointed by the President. The Provincial Governments (Councils), of which there are nine, acquired their powers from the 13th Amendment of the Constitution in 1988. There are three schedules determining these powers as follows:

- Reserved List (for the Central Government);
- Provincial Council List (for the Provincial Government); and
- Concurrent List.

The Central Government may, with the agreement of the provincial council, exercise some or all of the powers contained in the Reserved and Concurrent Lists. Under the Constitution, the President also has the power to dissolve the provincial council and either call for an election, or assume the powers in concert with the Central Government. Though the provincial governments generate income from their assets through local levies and taxes, a significant portion of their budget comes from the Central Government. In terms of finance, the self-governing capability of a Provincial Council is considered to be only less than 20 % although 13 years have passed since their establishment.

d. Local Authority (LA)

Under the provincial government structure, there are the following three types of local authorities:

- Municipal Councils (MC);
- Urban Councils (UC); and
- Pradeshiya Sabha (PS).

There are 311 LAs (local authorities) in total in the country consisting of 18 MCs, 37 UCs, 256 PSs in 2003. Municipal and Urban Councils are related to the urban areas and Pradeshiya Sabha to the rural areas. The members of these councils are elected democratically.

As for the main difference of LAs, an MC is independent on decision making of its administration while a PS is less independent and for some decisions it has to get consent from the PC. In terms of independence, a UC is in the middle of an MC and PS. Maximum tax rates to assess MCs, UCs and PSs are 30%, 20% and 9%, respectively. However, the actual rate is far less than the maximum and the average rate of LAs is between 4 – 6%. The criteria for upgrading an LA are area, population density, economic development and social environment.

Municipal Councils are responsible for larger cities and exercise broader powers than the other units of local authority. In general, both the Municipal and Urban Councils handle most local authority functions including sewerage and storm water, solid waste disposal, road and fire fighting services. However, the Central Government has the power under the Constitution to define, and declare, the jurisdictional demarcation of each Council.

Although local authorities have their own income sources, most of the funds for their operations are disbursed through the provincial government.

2.1.2 Administration of SWM

The environment is considered to be a domain warranting the full, coordinated response of all Government agencies in Sri Lanka. Therefore, both the Central Government and Provincial Councils have the related powers and responsibilities below.

a. Central Government

a.1 Ministry of Home Affairs, Provincial Councils and Local Government (MOHAPCLG)

The MOHAPCLG is responsible for the implementation of policies, plans and programmes in respect of Provincial Councils and Local Authorities. The Secretary is the top bureaucrat in the Ministry. Under the Secretary, there are two additional secretaries and one senior assistant secretary. The additional secretary for PCs and LAs is responsible for administrative supports of PCs and LAs in whole country. The Senior Assistant Secretary for LAs under him is responsible for LAs. The Additional Secretary for Development is in charge of the implementation of projects, especially those under foreign aid including JICA.

Under the Secretary, there are the Local Loans and Development Fund (LLDF) and the Sri Lanka Institute of Local Governance (SLILG). The LLDF was established in 1916 and since 1999 it has been under the responsibility of the MOHAPCLG. In 2001, three SWM projects were financed by

the LLDF. The SLILG was established with the objective of enhancing the managerial capacities of PCs as well as LAs.

The National Coordinating Committee for implementation of the National Strategy for SWM has been established and co-chaired by the Secretary of MOHAPCLG and Ministry of Environment and Natural Resources (MOENR). The MOHAPCLG, MOENR, Ministry of Housing and Plantation Infrastructure, Ministry of Enterprise Development, Industrial Policy and Investment Promotion, UDA and Ministry of Industry are the members of the Committee.

a.2 Ministry of Environment and Natural Resources (MOENR)

The MOENR is the executing agency for the Central Government for SWM planning and policy. The MOENR has about 250 staff members. The Secretary is the top bureaucrat in the ministry and under him three Additional Secretaries manage seven departments. The Department of Pollution Management is responsible for SWM and it has quite many vacancies in the cadre.

a.3 Central Environmental Authority (CEA)

The CEA is a government appointed agency to work on the National Environment Act (NEA) within the MOENR, reporting to the President and the Government. It is responsible for regulatory control and management and for setting of national guidelines and standards, with its funds being allocated mainly by the Government.

The NEA defines the CEA as a “body corporate”, comprising three members appointed by the President, and with its own funding, derived from government allocations; other loans, donations, grants; and income earned through exercising of its powers, functions and duties (e.g. licence fees).

Regarding SWM, the role of the CEA is to assist the PCs and LAs to formulate strategies and plans for PCs and LAs and to provide implementation support for these plans and monitor achievement. The CEA also has legal powers to approve SW sanitary landfill sites and to admonish or issue directives to any LA disposing of waste in a harmful or inappropriate manner.

Basically, the CEA does not provide technical support to LAs directly. However, sometimes the CEA directly assists citizens at their request. When LAs ask for assistance, the CEA will introduce registered consultants. There are 49 specialists /consultants registered.

a.4 Ministry of Health, Nutrition and Welfare (MOHNS)

The MOHNS is responsible for monitoring and inspection on sanitary aspects in the country and preparation of a legal system including guidelines. For the control and supervision of SWM, MOH (Medical Officer of Health) and PHI (Public Health Inspector) are assigned to the LAs. A PHI is responsible for providing technical support on SWM to LAs.

a.5 Urban Development Authority (UDA)

The UDA is a national agency responsible for urban development in the country under the UDA Act. The UDA does not cover the whole country due to operational difficulties, but has full authority on all towns declared as UDA areas. There are 150 UDA areas in the country. However, some UCs are not UDA areas while some PSs are.

The UDA neither receives budget allocation from the Central Government nor treasury grants or funds. The UDA is a self-sufficient organization like a private company. The UDA seems to be a private developer that plans and develops properties (estates), and sells them with/through partners and gets a certain profit from all these developing activities.

The UDA provides the following assistances to the LAs:

- Technical assistance in the development of town planning;
- Enforcement of standards and regulations for development projects;
- Assistance for LAs to coordinate with other government authorities; and
- Project planning for smaller scale projects (even free of charge) and large scale ones (may impose a charge).

a.6 Ministry of Housing and Plantation Infrastructure (MOHPI)

The MOHNI has been involved in the following two projects related to SWM. The Management and Information System Division of Plan and Monitoring Department is in charge of the projects.

- Environmental Action One Project (EAOP) by World Bank Finance
- Sustainable City Programme (SCP) by UNDP

b. Provincial Council

In a Provincial Council, the Senior Assistant Secretary and Commissioner of Local Government, under the Chief Minister's Secretary, are responsible for the affairs of LAs including SWM.

For technical matters, since SWM is one of the major responsibilities of an LA and a serious issue in the Province, the Western Province Provincial Council (WPPC) established the Waste Management Authority (WMA) in 1999 to assist LAs in the management and control of all categories (municipal, hazardous and healthcare) of their waste collection, transportation, treatment and disposal needs. The Board of WMA consists of seven ex-officio members and eight appointed members including an officer from the MOENR (Ministry of Environment and Natural Resources). However, the WMA is not functioning well due to lack of full-time officers. This is due to the government restriction to increase the number in a cadre.

As for the inter-municipal landfills, the WMA identified several candidate sites within Western Province. However, for the project promotion a political decision is necessary.

2.1.3 Legislation on SWM

a. Waste Classification

In Sri Lanka, solid waste is categorized into the following three groups:

- Municipal solid waste (MSW);
- Health-care waste; and
- Hazardous waste.

Health-care waste (HCW) is further categorised into the following:

- Non-risk HCW (considered as MSW)
- Hazardous HCW (HHCW)
- Highly hazardous HCW (HHHCW)

Hazardous waste (HW) is classified into:

- Hazardous HCW and highly hazardous HCW;
- Industrial HW; and
- Domestic HW.

MSWM is under the responsibility of LAs. MOENR set up the NSSWM in 2000 and asked LAs to formulate SWM master plans. The CEA issues various directives to improve landfills of LAs.

Disposal and treatment of HW is the responsibility of the discharger, i.e. PPP: polluter-pay-principal, following the Basel Convention. The CEA is responsible for supervision of HWM.

b. Legislation

b.1 The National Environmental Act (NEA)

Legislation relating to SWM is embodied in the National Environmental Act (NEA), which was enacted in 1980 and subsequently amended in 1988 (Amendment Act No.56). The Act (including the amendment) provided for the establishment of the CEA and defined the powers, functions and duties of it, which in general terms related to providing for:

- Protection, management and enhancement of the environment;
- Regulation, maintenance and control of the quality on the environment;
- Prevention, abatement and control of pollution; and
- Other related matters.

The powers and role of the CEA is clearly spelt out in the Act. Under it, the CEA has wide reaching responsibilities for environmental safeguarding and broad discretionary powers relating to SWM and the management of other forms of pollution.

b.2 CEA Directives

In the last quarter of 2000, an NGO in Sri Lanka took the CEA to court for not taking action against LAs who failed to provide adequate SWM collection and disposal services. The CEA, in response to the court case against them, issued a directive in July 2001 to all LAs to notify the CEA of any proposed landfill site in their areas. The CEA would then inspect the site, and approve or reject its use for landfilling.

However, most of the LAs did not respond due to a lack of resources to obtain the necessary planning approvals and develop any potential landfill site, meaning LAs would consider such an exercise to be pointless.

As for MSW (Non-HW), the CEA asks the LA to obtain site clearance for MSW facilities including landfills. A facility that receives over 100 tons/day needs EIA approval while one that receives less than 100 tons/day needs an environmental recommendation from the CEA. The CEA has prepared some site identification guidelines for a MSW landfill, but it has still not functioned actually.

b.3 Hazardous Waste Regulations

The government of Sri Lanka developed regulations for the Management of Hazardous Waste in 1996 as an amendment to the National Environmental Regulations No.1 of 1990.

In 1999, the CEA and the then Ministry of Forestry and Environment, published "Guidelines for the Implementation of Hazardous Waste Management (HWM) Regulations". The guidelines are indicative only and intended to meet the needs of a wide range of government officials, industry managers and environmental protection associations, by providing information on the issues and methods of HWM relevant to various industrial sectors. However, the effective enforcement of HW regulations awaits the development of HW treatment and disposal facilities in Sri Lanka, which do not currently exist.

b.4 Environmental Protection Licence

The Amendment to the National Environmental Act (NEA) contained amendments designed to target high polluting industries, enhance the implementation of environmental laws and introduce a proper procedure for obtaining environmental protection licences. These amendments classify the activities requiring an environmental protection licence into two categories, "A" and "B". Category "A" refers to 80 high polluting activities, while category "B" refers to 45 small and medium polluting activities.

At present, solid waste and healthcare waste are not included in the list of activities requiring an environmental protection licence. This is primarily due to the lack of facilities for adequate

disposal of such wastes and the absence of soil standards, enabling site contamination criteria/standards to be developed.

2.1.4 National Policy on SWM

The policies, strategies and legal provisions for SWM currently in place in Sri Lanka provide the necessary basis for action leading to effective and sustainable improvement in the sector. The NEA of 1980 provides the enabling legislation for the regulation and control of SWM activities, the National Strategy for Solid Waste Management (NSSWM) provides guidance for tackling the problem on several different fronts, the National Agenda for Sustainable Development (NASD) addresses broader policy and guidance issues relating to environmental improvement and economic development, and a number of regulations and directives set out standards and appropriate provisions for different aspects of SWM. While there is room for improvement, the main challenges of the sector are the development of the resources necessary for implementation of appropriate SWM.

a. National Strategy for Solid Waste Management

In May 2000, the Government of Sri Lanka passed the National Strategy for Solid Waste Management. This recognised the need to manage SW from generation to final disposal through a broad range of strategies targeting waste minimisation at first, i.e. the 3Rs (reduction, reuse and recycling), and appropriate final disposal. Besides advocating responses by individual urban LAs, the strategy provided for central level actions, such as developing the market conditions for sale of recyclable waste and of the products made from recyclable materials.

b. National Agenda for Sustainable Development

The National Agenda for Sustainable Development incorporates environmental policy statements and specific action plans for a number of different sectors covering the period 2002 – 2006. The NASD sets out to strengthen the linkages between policy and action planning and is intended primarily as a guiding document for the MOENR. SWM issues are addressed under the sector entitled Health, Sanitation and Urban Development, although recommendations for other sectors also have direct implications for SWM.

c. Urban Sector Policy Action Plan (USPAP)

Developed in response to a national policy framework of decentralisation and devolution, the USPAP was last updated by the Government in 1996, and currently covers the period 1996 – 2015. It is aimed primarily at developing the capacity of urban LAs to acquire finance and manage the development of urban infrastructure and services. The USPAP also places an emphasis on environmental issues through ensuring such issues addressed in project preparation and by encouraging community involvement in the protection of the environment.

2.2 Financial System

2.2.1 National Level

a. Budgets of Organizations Related to SWM

Table 2-1 shows the budgets of ministries related to SWM in 2002.

Table 2-1: Summary of the Budget of Related Ministries

Ministries	2002			2001 revised
	Recurrent	Capital	Total	Total
Ministry of Home Affairs, Provincial Councils & Local Government	35,235	7,518	42,753	36,591
Ministry of Health, Nutrition & Welfare	3,118	5,091	8,209	6,569
Ministry of Environment & Natural Resources	579	1,317	1,896	1,320
Ministry of Housing & Plantation Infrastructure	244	7,681	7,925	9,960
Ministry of Western Region Development (Dept. of National Physical Planning)	139 (65)	1,446 (226)	1,585 (291)	1,028 (n.a.)

Source: Budget Estimates 2002, Department of National Budget, Ministry of Finance

The budgetary amount of the Ministry of Home Affairs, Provincial Councils & Local Government is the third largest among all ministries after the Ministry of Finance, Rs.62 billion, and Ministry of Defence, Rs.50 billion because it holds subsidies to be distributed to local governments.

b. Money Stream from the Central Government to Local Governments

The amendment of the constitution in 1987 transferred part of the authority held by the central government to provincial councils without incorporating the financial sources. The majority of expenditure of local governments is spent for the recurrent budget, which implies that the investment work is still held by the central government.

Table 2-2: Summary of the Budget of Provincial Councils in 2002

Provincial Councils	Receipts			Expenditure		
	Total	Own Revenue	(B/A) %	Total	Recurrent Expenditure	(E/D) %
	(A)	(B)	(C)	(D)	(E)	(F)
Western	10,826	5,851	54.0	10,826	10,213	94.3
Central	5,862	646	11.0	5,862	5,219	89.0
Uva	3,452	197	5.7	3,452	4,284	83.0
Southern	5,765	620	10.8	5,765	4,836	83.9
North-East	6,262	0	0.0	6,262	5,475	87.4
North Western	5,731	579	10.1	5,731	5,101	89.0
North Central	3,629	231	6.6	3,629	3,003	82.8
Sabaragamura	4,259	339	8.0	4,259	3,432	80.6

Source: Budget Estimates 2002, Department of National Budget, Ministry of Finance

The subsidies to provincial councils are classified into the following four types.

- Block Grants
- Criteria Based Grants
- Matching Grants
- Provincial Specific Development Grants

Block grants, which make up 84% of the total grants, are subsidies for the recurrent expenditure and its appropriation is in accordance with the approved cadre. Both criteria based grants and matching grants, of which the decision-making authority is held by the financial commission, are spent on investment. However, the total budget amount of criteria based grants and matching grants in 2002 makes up only 1% of the total budget for development, Rs.1,307 million. Provincial Specific Development Grants, which amounts to approximately 12% of the total grant budget are spent on specific programmes.

These subsidies are distributed to provincial councils through MOHAPCLG and each provincial council must submit reports periodically. The commissioner of the local government department in a provincial council is responsible for the appropriation of the budget to local governments.

c. Fund Accommodation System to Local Governments

As for the fund system for local governments, Local Loans and Development Fund (LLDF), has been used since 1916. In 1999, 40 million rupees with an annual interest of 9.25% was obtained from the General Treasury and 87.9 million rupees was financed by adding 37.8 million rupees which was deposited in the funding operation. The actual surplus after the cancellation of bad loans amounting to 2 million rupees was 7.4 million rupees. The appropriated budget for LLDF decreased to 10 million Rs. in 2002, which is one-tenth of it at the peak in 2000.

As for SWM projects, softer loan condition has been used than for other projects. For example, in 2001, two and a half million rupees was financed for the Katana compost plant under the conditions of a 6.5% yearly interest, 2-year grace period and 12-year repayment period. Compared to the common interest of 12%/year, it was very soft conditions in order to assist the composting project. As for the procurement of equipment, the loan conditions are a 5-year repayment period, 8% yearly interest and no grace period.

Despite the fact that 78 applications for the fund amounting to 409 million rupees were made, of which 57 million rupees were applied for the SWM in five towns in 2001.

d. Other Fund Systems

Although micro-credit systems has become popular in Sri Lanka, it is too difficult for people working in the recycling business to utilize them. One reason is that they are not valuable customers for financial organisations, and another reason is that they scarcely access these fund systems due to little information on financial conditions.

Existing financial organisations dealing with micro-credit are banks, cooperative banks, credit unions, saving banks, credit banks, mutual financing association.

The Central Bank of Sri Lanka's Annual Report - 2001 introduces the following three organisations.

- Samurdhi Development Credit Schemes (SBSs)
- Gami Pubuduwa Scheme
- Sarvodaya Economic Enterprise Development Services

The former two organisations are governmental micro credit organisations and SBSs is the largest saving and lending organisation holding more than 3 million members.

Table 2-3: Samurdhi Credit Programmes (Progress as of 31 Dec.2001)

Name of Programme	No. of Loans	Amount (Rs. Mn)	Recovery Rate
Loans granted by SBSs	813,334	5,553	107 %
SASANA	84,247	514	82 %
SAVANA	13,682	343	76 %
Leasing	740	169	51 %
Accelerated Samurdhi Animators/Credit Programmes	285,984	279	98 %
PANA	355	129	101 %
SABA'DA	506	53	102 %

Source: Central Bank of Sri Lanka Annual Report - 2001

SEEDs, the financing organisation operated by an NGO, owns approximately 5 hundred thousands members. The total amount of loaned money has reached 4,196 million rupees with a recovery rate of 93%. It targets village people, although the finance is also accommodated to non-members. The interest is currently 24% per year, 4% of which is allocated for village activities. Although there is no special allocation for the recycling business, they are ready to receive the proposal anytime.

2.2.2 Local Authorities

a. Budget of Seven Model Municipal Councils

Table 2-4 and Table 2-5 show revenues and expenditures of seven municipal councils.

Table 2-4: Revenue 2002

Code No.	Items	Recurrent Revenue (Rs.'000)						
		Matale	Kandy*	Nuwara Eliya*	Badulla	Negombo	Chilaw	Gampaha
310	Assessment Rates & Sales	8,650	74,860	15,900	11,135	26,487	4,222	8,495
320	Rent	9,179	41,804	10,906	2,420	8,577	7,037	4,507
330	Licenses	2,240	9,477	2,351	4,945	14,119	585	72
340	Charges for Services	4,471	14,762	1,158		4,066	50	3,374
350	Warrant Cost	685	7,935	315	6,800	6,170	76	2,611
360	Other Revenue	6,919	37,484	7,700	1,215	32,556	5,216	2,053
370	Revenue Grants (B)	35,386	137,927	31,991	36,345	30,160	14,828	17,070
380	Capital receipts		0		1,600			0
	Total (A)	67,530	324,249	70,320	64,460	122,135	32,013	38,182
	(B/A) %	52.4	42.5	45.5	56.4	24.7	46.3	44.7

Note: * excluding Water Supply

Table 2-5: Expenditure 2002

Code No.	Items	Recurrent Expenditure (Rs.'000)						
		Matale	Kandy*	Nuwara Eliya*	Badulla	Negombo	Chilaw	Gampaha
410	Salaries & wages	40,970	164,965	39,329	35,624	51,885	17,634	23,965
420	Tran. Exp.	1,152	2,276	842	1,238	1,487	234	476
430	Supply & Machinery	6,020	39,619	7,395	4,680	13,716	7,956	3,222
440	Rep. Fee of exp. Assets	1,415	2,194	3,296	2,596	5,242	1,588	3,818
450	Transport, Communication - essentials & others	5,736	24,258	4,967	6,308	18,244	2,003	2,780
460	Interest pymts. Dividends & bonuses	525	7,995	165	700	1,060	402	678
470	Grants subscriptions & relief payments	1,041	5,813	2,733	3,892	2,598	365	318
480	Pensions, Pensions bonuses & retirement benefits	4,445	21,407	4,265	2,824	4,581	1,515	1,535
	sub-total (D)	61,304	268,527	62,991	57,861	98,814	31,695	36,791
500	Capital outlay	21,805	223,955	15,080	6,550	23,240	4,014	1,389

The dependence rate of model towns on the subsidy ranges from 40% to 56% of LAs' budgets.

As for the recurrent expenditure, the salary makes up 53% to 67% of the total expenditure.

Their financial sources are divided into two: self-financing sources such as taxes and subsidies through provincial councils. Their dependence on the central government seems quite high, the municipal councils' dependence rate being 24% and the urban councils' dependence rate being 46% in 1998¹,

¹ Source: Statistical Abstract 2000, Department of Census and Statistics, Ministry of Finance and Planning

b. Present Collection Rates

b.1 Collection Rates of Taxes

The financial sources of local governments are mainly classified into assessment rates, trade licences, and rent. Table 2-6 shows the collection amounts and rates of these sources.

Table 2-6: Recovery of Revenue Collection in 2001

(Unit: Rs.'000)					
Town	Item	Assessment	Licence	Rent	Other charges
Kandy*	Recovered amount	35,082	7,600	12,279	60,195
	%	90.5	47.8	82.5	100.0
Matale*	Recovered amount	4,291	1,600	3,112	444
	%	62.6	89.8	88.8	46.4
Negombo	Recovered amount	14,564	11,444	6,000	4,783
	%	65.0	83.6	83.6	88.6
Gampaha	Recovered amount	5,133	4,217	416	2,139
	%	68.8	83.8	51.6	49.3
Chilaw	Recovered amount	3,998	598	1,512	n.a.
	%	93.2	100.0	88.5	n.a.
Nuwara Eliya	Recovered amount	30,545	1,472	5,805	1,293
	%**	107.6	62.6	53.2	79.0

Note: * 2000

** Calculated by the figures of the Revenue Account at the end of 2001 and the Budget for 2002

The collection rates of licences are higher than those of assessment rates except in Kandy and Nuwara Eliya. Licence rates are subject to assessment values in principle.

This implies that the collection rates of utility charges are not always higher than the tax collection rates.

c. Solid Waste Management Budget

The SWM budgets are generally not separately controlled under the present accounting system. The collection and disposal cost and the drain cleaning cost are separately controlled in the accounting system in Badulla, Negombo and Chilaw, however they are not separately controlled in other model towns. As for the cost of the workshop, it is only separately controlled in Matale, Kandy and Negombo M.C. The overall budgeting situation of each LA are shown in Table 2-7.

Table 2-7: Municipal Budget and SWM Expenditure in 2002

Programme code**	Population *	SWM Expenditure in 2002				Cost/person/year		Total Municipal budget	Share of SWM
		Collection	Drain cleaning	Workshop	Total	SWM cost	Collection cost		
		Rs.'000/y	Rs.'000/y	Rs.'000/y	Rs.'000/y	Rs./p/y	Rs./p/y		
Matale	36,352	11,531		1,850	13,381	368	317	61,304	21.8%
Kandy	110,049	49,302		11,831	61,133	556	448	269,915	22.6%
Nuwara Eliya	25,049	13,795			13,795	551	551	72,975	18.9%
Badulla	40,920	5,694	2,023		7,717	189	139	57,861	13.3%
Negombo	121,933	17,227	2,452	928	20,607	169	141	98,814	20.9%
Chilaw	24,105	9,937	999		10,936	454	412	31,695	34.5%
Gampaha	9,438	10,010			10,010	1,061	1,061	36,791	27.2%

Notes: Census of Population and Housing -2001

The SWM budget generally occupies a large percentage of the local governments' budgets. It is generally around 20% of the local governments' budgets except in Badulla where it is 13%. That of Chilaw U.C exceeds even 30%. This implies that SWM is very important work for local governments in terms of financial control.

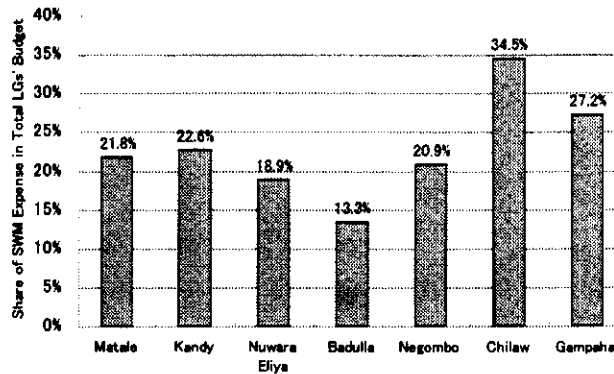


Figure 2-2: Share of SWM Expenses in LAs' Budgets

Figure 2-3 shows how the SWM budgets of Model Towns per capita in 2002 greatly vary depending on the town.

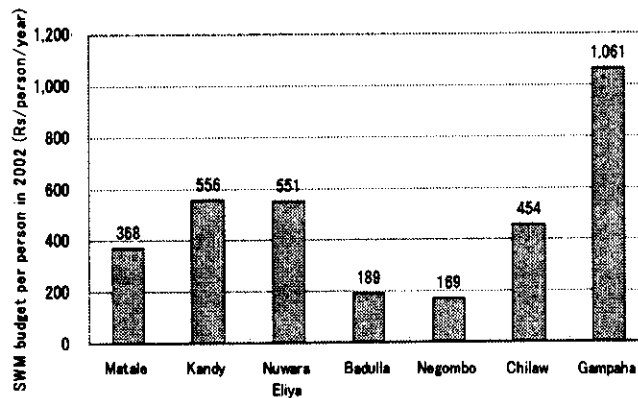


Figure 2-3: SWM Budget of Model Towns per Capita 2002

Figure 2-4 shows the large variation in the unit SWM costs of model towns, ranging from 1000 Rs/ton to 2,500 Rs/ton.

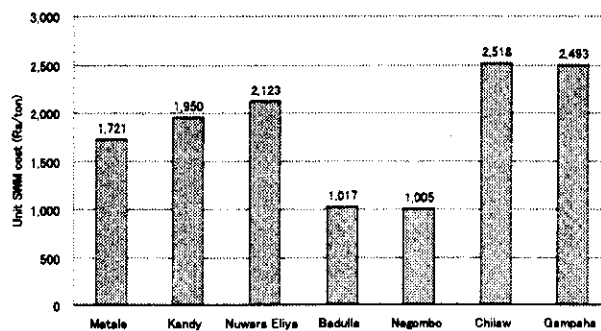


Figure 2-4: Unit SWM Cost

Table 2-8: Breakdown of SWM Expenditure in 2002

Unit: 1000 Rs.

Code No.	Items	Matale	Kandy	Nuwara Eliya	Badulla	Negombo	Chilaw	Gampaha
	Recurrent Expenditure							
410	Individual Salary	10,006	32,158	11,825	4,924	1,913	8,050	7,906
420	Transport fees	65	45	10	35	0	23	15
430	Supplies Equipment	590	3,665	715	170	428	615	1,450
440	Repair & maintenance of capital assets	230	50	350	40	2	675	400
450	Transport Communication, Necessities & Others	260	11,654	0	10	59	0	67
460	Payment of Interest	375	1,684	50	0	0	27	0
470	Grants Subscription & relief	5	46	235	40	0	7	16
480	Pension, pension bonuses & retirement benefits	0	0	610	475	51	540	156
	Total	11,531	49,302	13,795	5,694	2,452	9,937	10,010
500	Capital Expenditure	2,770	2,900	2,000	100	0	14	0

Note: * only for repayment of loan
Source: Programme Budget 2002 of Each Council

Figure 2-5 shows that about 80% of SWM expenditure is for salaries and wages. As for Kandy M.C., the percentage of salary is smaller than the other M.C.s because a part of the collection work is contracted out to a private company.

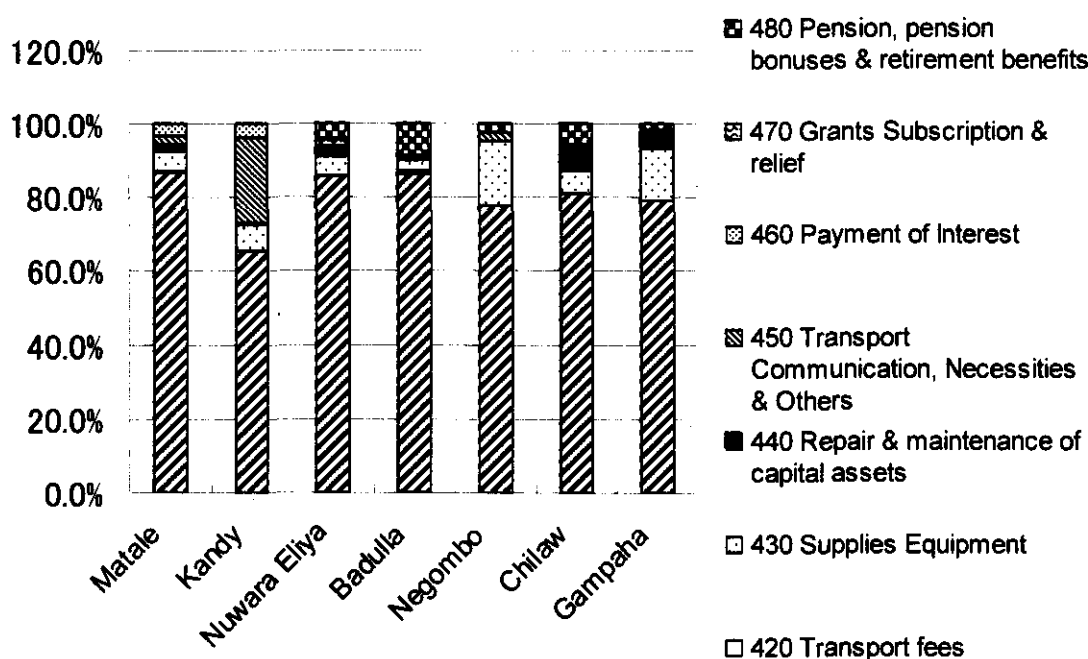


Figure 2-5: Breakdown of SWM Budgets

The salary is subsidized by the central government and the subsidy amount depends on the cadre. Therefore, there is no economic incentive for local governments toward the reduction of employees. Only after the waste amount greatly exceeds the amount that can be managed by the approved cadre, is the municipal staff able to perceive the importance of SWM works.

2.3 Technical System

2.3.1 Waste Amount and Composition

2.3.1.1 Waste Composition

Table 2-9 and Figure 2-6 show the physical composition data of the samples taken at the landfill sites in seven model towns.

Table 2-9: Physical Composition of Waste in Wet Base

Town	unit	Badulla	Chilaw	Gampaha	Kandy	Matale	Negombo	Nuwara Eliya
Physical composition								
Kitchen waste	%	64.3	36.6	57.3	58.2	61.3	45.6	71.6
Grass & wood	%	14.1	29.7	15.3	12.3	18.1	24.7	5.7
Paper	%	10.8	6.8	14.4	12.0	6.4	8.9	11.1
Textile	%	1.3	1.3	1.5	1.4	1.1	3.5	1.2
Soft plastic	%	3.1	3.1	6.5	7.3	3.9	4.0	5.4
Hard plastic	%	0.3	1.0	1.3	0.7	0.4	0.8	0.3
Leather & rubber	%	0.4	0.1	0.4	0.7	1.1	0.9	0.1
Metal	%	0.8	0.8	0.5	0.8	0.4	0.5	0.7
Glass	%	1.8	0.3	1.4	1.1	0.4	0.8	0.9
Ceramic & stone	%	2.8	12.1	1.2	5.1	6.6	8.4	2.6
Others	%	0.2	8.2	0.6	0.4	0.3	2.0	0.3
Total	%	100	100	100	100	100	100	100
Applicability								
Compostables	%	78.4	66.3	72.5	70.5	79.4	70.3	77.4
In-organic recyclables	%	18.2	13.3	25.4	23.3	12.6	18.4	19.7
Bulk density	kg/l	0.31	0.20	0.15	0.30	0.33	0.26	0.39

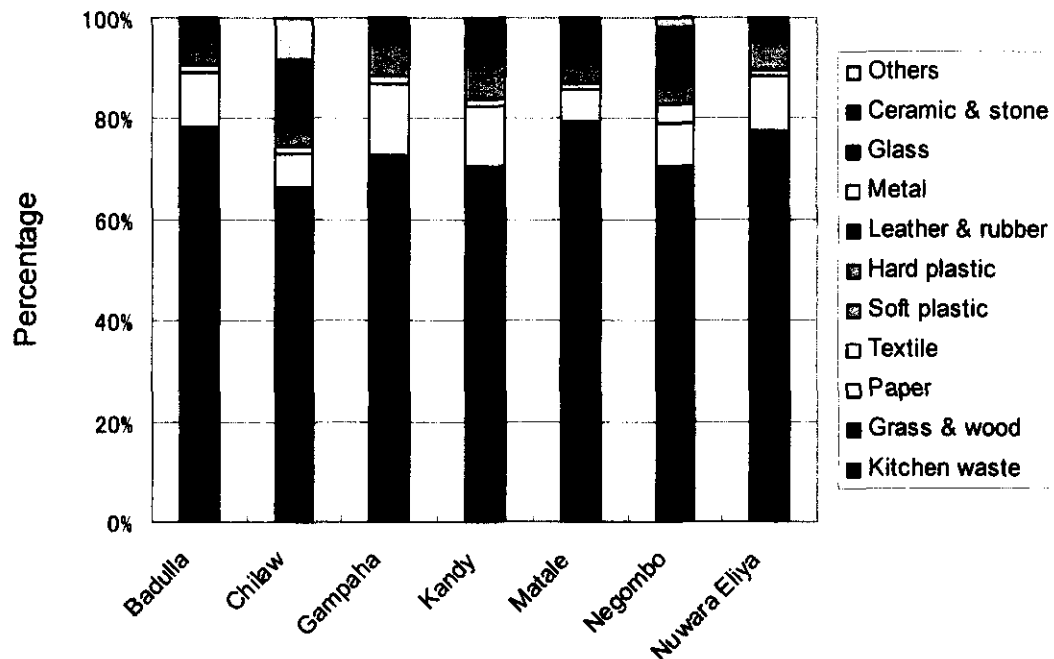


Figure 2-6: Physical Composition Data of Waste in Wet Base at Each Model Town in 2002

a. Compostable Ratio

- 1) Because the percentage of compostable contents in waste is very high, ranging from 70% to 80%, waste in local towns are suitable for compost in terms of waste quality.
- 2) The percentage of garden waste is high, which is one of the problems for waste collection and disposal in local towns. A large change in the generation amount of garden waste is not projected because the green in local towns are quite well protected.
- 3) The necessity of separation of compostable materials at generation sources is not considered to be so high because the separation of compostable materials at the plant can achieve high efficiency due to the high percentage of compostables. The difference in costs between the source separation method and the collective separation method should be carefully examined before introduction because the cost difference seems quite small. However, the source separation of hazardous wastes should be executed.
- 4) The compostable ratios of waste in Negombo and Chilaw are lower than those in other model towns. Although the cause cannot be clearly identified, it might be due to the difference in consumption and life pattern because they are relatively and newly developed towns relative to others.

b. In-organic Recyclables

- 1) The total percentage of in-organic recyclables including paper, textiles, plastics, metals and glass is rather small, ranging from 12% to 25%.
- 2) The percentages of hard plastics, metals and glass in particular, which can have relatively high profitability, are very low.
- 3) Most paper waste consists of used paper that had been reused or recycled.
- 4) As for the percentage of in-organic recyclables in waste, that in Gampaha located nearest to Colombo shows the highest of all model towns.

The above analysis suggests that there is a small amount of in-organic recyclables and that the 3 Rs are active.

c. Bulky Waste

Bulky waste such as furniture waste and electric appliances are scarcely disposed of at landfill sites. It is presumed that even parts of them are reused at present.

2.3.1.2 Waste Amount

a. Waste Discharge Rate Survey Results of Residential Wastes

The waste discharge rate data for residential waste, which was measured in Kandy and Matale, are shown in Table 2-10.

Table 2-10: Waste Discharge Rate Survey Results of Residential Wastes

Category	unit	Kandy	Matale
High Income	kg/p/d	0.667	0.447
Middle Income	kg/p/d	0.466	0.413
Low Income	kg/p/d	0.368	0.407
Average	kg/p/d	0.502	0.422

Note: kg/p/d means kilogram/person/day

Table 2-10 implies the following:

- 1) Richer people discharge more waste. This trend found in the survey fully complies with the principle of the waste discharge rate.
- 2) The waste discharge rate of residential waste is quite low.
- 3) However, the waste discharge rate of high income residences in Kandy, which is 1.8 times higher than that of low residences, has reached a similar range to that in developed countries.
- 4) A realistic target for the minimum residential waste discharge rate may be around 0.35 to 0.4 kg/p/d. It is, therefore, difficult to greatly reduce the waste discharge rate by the promotion of 3Rs.
- 5) The waste minimization plan should give priority to non-residential waste rather than residential waste because it can contribute more to waste reduction.

b. Discharge Rates of Municipal Waste

Figure 2-7 shows the waste generation rates and discharge rates of municipal waste. The waste generation rate ranges from 0.8 to 1.2 kg/p/day, while the waste discharge rate ranges from 0.15 to 0.84 kg/p/day. This implies the following:

- The 3 Rs are being carried out very actively.
- There is a large amount of potential waste which can be discharged if the 3Rs become weak.

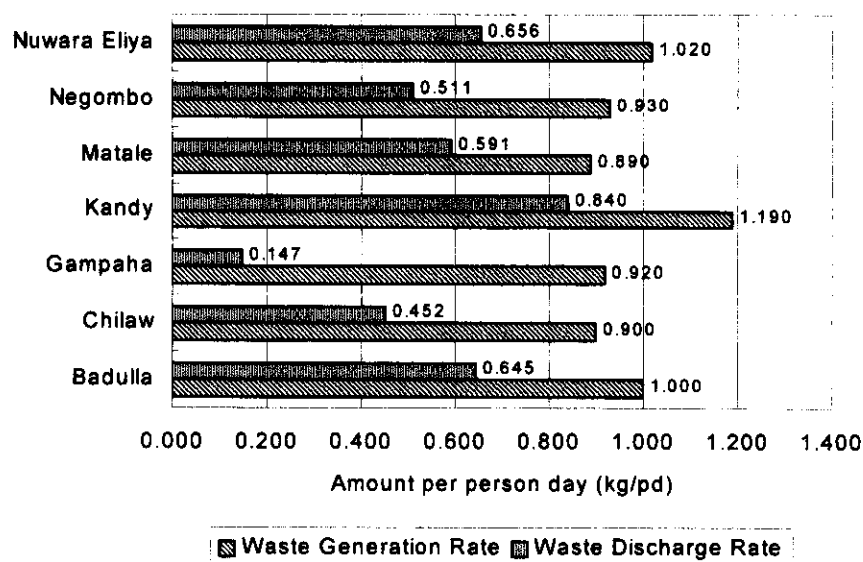


Figure 2-7: Waste Generation and Discharge Rates

c. Amount of Municipal Waste

The amounts of wastes at model towns are as follows.

Table 2-11: Waste Amounts by Model Town

Name of town	unit	Generation	Collection	Disposal
Badulla	T/D	41	21	21
Chilaw	T/D	22	12	11
Gampaha	T/D	54	11	9
Kandy	T/D	131	86	78
Matale	T/D	32	21	20
Negombo	T/D	136	56	54
Nuwara Eliya	T/D	29	18	17

2.3.1.3 Waste Stream

Figure 2-8 shows the typical waste stream in secondary cities in Sri Lanka.

Recycle at E in Figure 2-8 is divided into the following methods.

- Separate collection at generation sources such as private recyclers and direct selling to shops.
- Recovery of recyclables during waste collection work
- Recovery of recyclables by waste pickers at landfill sites
- Recovery of kitchen waste for piggeries.

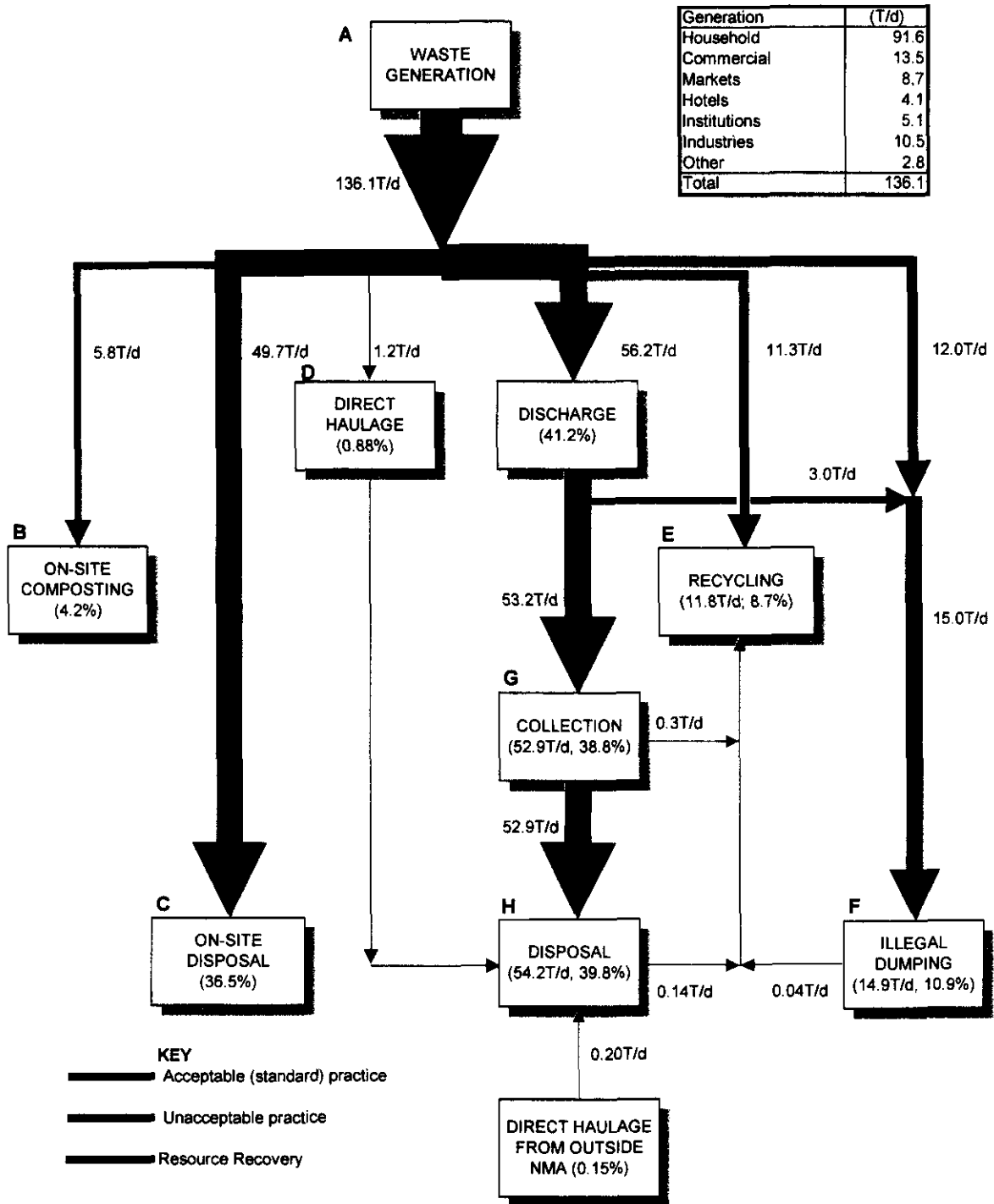


Figure 2-8: Typical Waste Stream at Secondary Cities in Sri Lanka (Example of Negombo, 2002)

Table 2-12 shows the waste stream at each model town which identified by the Study.

Table 2-12: Waste Amounts by Final Destination

Town	unit	Generation	Home compost	Self disposal	Direct Haulage	Recycle	Illegal dumping	Landfill
Badulla	T/D	41	2	8	1	6	5	21
	%	100%	5%	20%	3%	14%	11%	51%
Chilaw	T/D	22	0	5	0	1	4	11
	%	100%	0%	22%	0%	4%	20%	50%
Gampaha	T/D	54	1	29	0	10	4	9
	%	100%	1%	54%	0%	18%	8%	16%
Kandy	T/D	131	7	26	1	5	18	78
	%	100%	5%	20%	0%	4%	13%	60%
Matale	T/D	32	1	7	0	2	2	20
	%	100%	4%	22%	1%	7%	7%	61%
Negombo	T/D	136	6	50	1	12	15	54
	%	100%	4%	37%	1%	9%	11%	40%
Nuwara Eliya	T/D	29	2	4	1	2	4	17
	%	100%	8%	15%	3%	7%	13%	58%

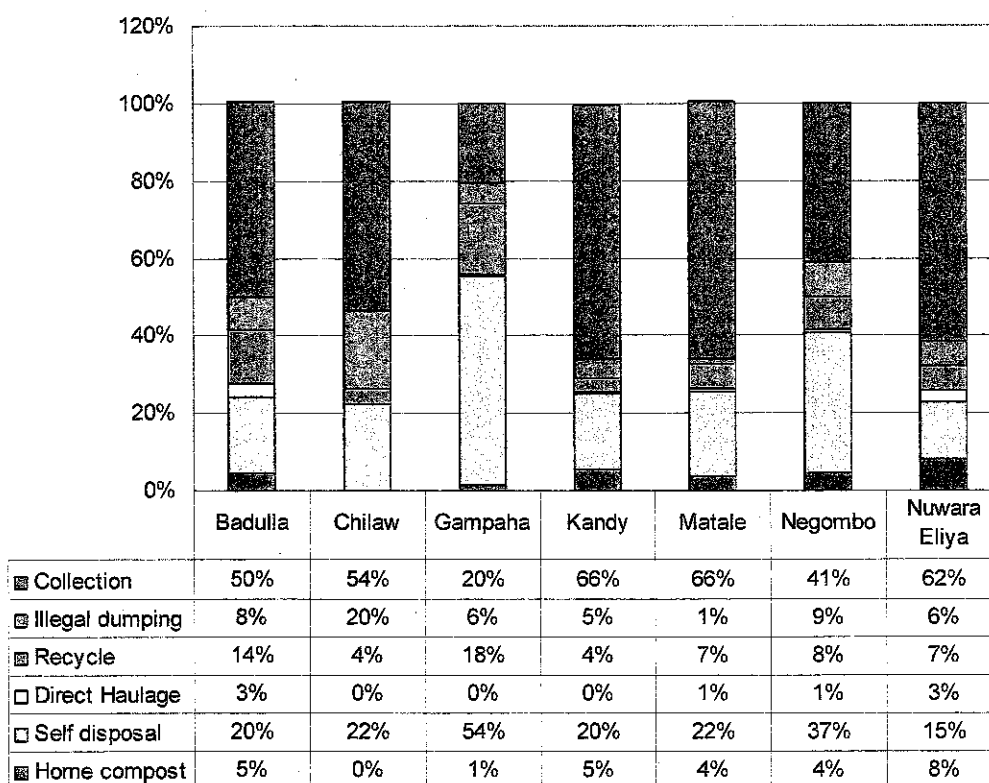


Figure 2-9: Waste Amount by Stream from Generation Sources

Waste streams implies the followings.

- The differences between the waste generation amounts and the waste collection amounts are generally very large. The waste collection rate ranges from 50% to 65% and is very low in Gampaha (only 20%) in particular. This implies that the self disposal amount and recycle amount at generation sources are large and the 3Rs are active. In other words, a decline in the current 3R activity could rapidly and greatly increase the waste discharge amount. Promotion of the 3 Rs is, therefore, essential to prevent a rapid increase in waste amount.

- Home composting is well performed in the inland area, ranging from 4% to 8%, while it can be further promoted at Negombo and Chilaw due to the present low performance.
- The self-disposal rate is high, ranging from 15% to as much as 54%. This is due to the generally large plot of land owned by each household.
- The recycling rate, ranging from 4% to 18%, is deemed very high, considering the fact that the percentage of in-organic recyclables in the waste generated is very low.

2.3.2 The 3 Rs (Reduce, Reuse, Recycle) at Generation Sources

2.3.2.1 Present System

a. Deposit System

The deposit system is widely used for soft drink bottles, beer bottles, local whisky bottles of Arrack, and containers of local yoghurt. The collection rate is very high because the deposit fee is quite expensive in the economy of Sri Lanka.

b. Recyclers

Traditional recyclers, which are called “bothal paththara karaya” in Sinhala, have been working throughout the country since long ago. Because they have been well utilized by citizens, they have been rooted into a part of the social system. A large amount of recyclables are still recovered by them as valuable materials. Recyclables are collected from residences often in return for money or plastic products. Citizens therefore regard in-organic recyclable waste as valuable materials and customarily separate these items at home. The collection of recyclables at generation sources by recyclers is, therefore, very active and this is the most important recovery route of recyclables.

The items which recyclers generally collect are mainly paper such as newspapers, notebooks, cardboard, cans, bottles, and metal. These are sold to middle men after collection.

The public consciousness survey in the Study shows that 80% of households receives recyclers' visits. However, in towns which are more urbanized like Negombo, the recyclers' visiting rate is decreasing. Gampaha, where recyclers are still active despite urbanisation, is an exceptional case. It is due to the fact that there are reprocessing plants and reception for recyclable waste near Gampaha.

The cause of decline of the recyclers' activity for residential waste with urbanization is mainly due to the increase in profitable recyclable waste which is discharged from industries and business entities. Recyclers are, therefore, busy collecting more homogeneous waste which can be recycled more easily than municipal waste. In such areas, the need to give an economic

incentive for the recovery of recyclables from municipal waste and to establish a new separate collection system is increasing.

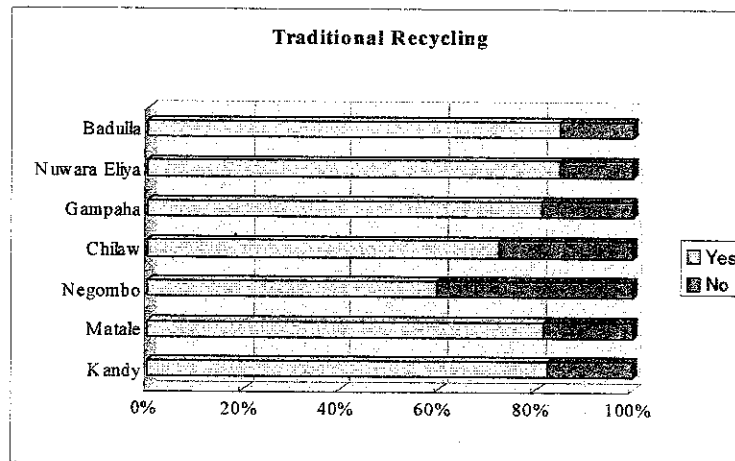


Figure 2-10: Percentage of households which recyclers visit for collection

c. Collection of Recyclables during Waste Collection Work

Waste collection workers often collect recyclable materials during waste collection work and sell it to middlemen. This practice is conducted widely in the country. However, the income from this is only enough for tea money for them.

d. Collection of Recyclables at Landfill Sites

Recyclables are collected by waste pickers at landfill sites, although this amount is not so large because there are not many waste pickers at landfill sites in Sri Lanka.

e. Collection of Kitchen Waste for Piggeries

Piggeries collect kitchen waste from hotels and restaurants in tourist towns such as Kandy and Negombo. In addition, the large hotel in Nuwara Eliya owns a piggery, which it feeds its kitchen waste to.

f. Others

- Many hotels and restaurants keep recyclables in their stores and sell them directly to middlemen.
- At many offices, cleaning workers and drivers collect recyclable separately to sell to middlemen.
- Many public offices and libraries keep unnecessary documents in the store room to sell to middlemen. The expected income from this is often included in the budget.

In Sri Lanka, because the reduction and reuse of wastes are very active, recycling cannot be so active due to the small amount of remaining recyclables. Figure 2-11 shows the typical 3Rs stream in secondary cities in Sri Lanka.