

**MINISTRY OF HOUSING AND LOCAL GOVERNMENT
MALAYSIA**

**THE STUDY ON
NATIONAL WASTE MINIMISATION
IN MALAYSIA**

FINAL REPORT

**Supporting Report – 1
Additional Information**

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The Study on National Waste Minimisation in Malaysia
Final Report

FINAL REPORT COMPOSITION

The Final Report is composed of the following:

1. Summary
2. Volume I – Main Report
3. Volume II – Guidelines
4. Volume III – Pilot Projects
5. **Supporting Report – 1 Additional Information**
6. Supporting Report – 2 Local Action Plan

This Report is “Supporting Report-1 Additional Information”.

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Abbreviations

AFSB	Alam Flora Sdn Bhd
A/P	Action Plan
CBO	Community Based Organisation
C/P	Counterpart
DB	Dewan Bandaraya (City Hall)
DBKL	Dewan Bandaraya Kuala Lumpur (Kuala Lumpur City Hall)
DBKU	Dewan Bandaraya Kuching Utara (Kuching North City Hall)
DSWM	Division of Solid Waste Management
EPU	Economic Planning Unit
G3RS	Guidelines for Enhancement of 3Rs Activities in School
IEC	Information, Education and Communication
IMS	Information Management System
JICA	Japan International Cooperation Agency
LA	Local Authority
LAP-WM	Local Action Plan on Waste Minimisation
LGD	Local Government Department
MB	Majlis Bandaraya (City Council)
MBJB	Majlis Bandaraya Johor Bahru (Johor Bahru City Council)
MBKS	Majlis Bandaraya Kuching Selatan (Kuching South City Council)
MBM	Majlis Bandaraya Miri (Miri City Council)
MBMB	Majlis Bandaraya Melaka Bersejarah (Melaka City Council)
MD	Majlis Daerah (District Council)
MDK	Majlis Daerah Kerian
MDKS	Majlis Daerah Kinta Selatan (South Kinta District Council)
MHLG	Ministry of Housing and Local Government
MIDA	Malaysian Industrial Development Authority
MITI	Ministry of International Trade and Industry
MOE	Ministry of Education
MONRE	Ministry of Natural Resources and Environment
MP	Majlis Perbandaran (Municipal Council)
MPK	Majlis Perbandaran Kuantan (Kuantan Municipal Council)
MPPP	Majlis Perbandaran Pulau Pinang (Pulau Pinang Municipal Council)
MPPJ	Majlis Perbandaran Petaling Jaya (Petaling Jaya Municipal Council)
MPSJ	Majlis Perbandaran Subang Jaya (Subang Jaya Municipal Council)
MSW	Municipal Solid Waste
NCP3R	National Children's Programme on 3Rs
NGO	Non Governmental Organisation
NRD	National Recycling Day
NRP	National Recycling Programme

NSP	National Strategic Plan on Solid Waste Management
OECD	Organisation for Economic Co-operation and Development
OPP3	Third Outline Perspective Plan
PDM	Project Design Matrix
PP	Pilot Project
PR	Public Relations
PWD	Public Works Department
RA	Residents Association
R&D	Research and Development
RIC	Recycling Information Centre
RM-8	Eighth Malaysian Plan
RM-9	Ninth Malaysian Plan
RNU	Recycling Networking Unit
SND	Stakeholders' Networking Database
SS	Source Separation
SW	Solid Waste
SWM	Solid Waste Management
SWM Act	Solid Waste Management Act
SWMD	Solid Waste Management Department
SWMSB	Southern Waste Management Sdn Bhd
TWG	Technical Working Group
WM	Waste Minimisation
WMU	Waste Minimisation Unit
WM-M/P	Waste Minimisation Master Plan
3RAG	3Rs Action Guide

Introduction

This Supporting Report 1 consist of the following seven (7) parts and mainly stated an additional information on Waste Minimisation Master Plan and Action Plan including JICA study activities during the last nineteen (19) months. Outlines of each Part are as shown below.

Part 1 Review of Existing Conditions of Waste Minimisation in Malaysia

Part 1 discusses the current practice of waste minimisation including recycling of major stakeholders; i.e. Ministry of Housing and Local Government (MHLG), state government, local authorities, concessionaires, NGOs, CBOs, manufactures associations and some other player. This part also stated the current legal and institutional framework on SWM including waste minimisation of each Federal, State and local government level.

Part 2 Waste and Material Flow at Present and Future

Part 2 outlined the waste and material flow at present and future in Malaysia estimated based on the surveys carried out during the Phase 1 study period as shown in Part 7 of this report.

Part 3 Additional Information for Federal Action Plan on Waste Minimisation

This part stated the background information of each six (6) of the Federal Action Plan on waste minimisation provided in Chapter 5, Volume 1-Main Report, and following information is attached.

- Proposed Program of National Children's Programme on 3Rs (NCP3R)
- Outline of "Recycling Wheel" in MPPP
- Outline of Information Management System (IMS) and Its Sustainability
- Contents of Local Action Plan on Waste Minimisation (LAP-WM)

In addition, leaflets for Waste Minimisation Master Plan and Action Plan, called "M22 Plan", are attached.

Part 4 Improvement of Website "kitarsemula.com"

Part 4 discusses the improvement of the website of "kitarsemula.com" which was set up by MHLG under the National Recycling Programme (NRP) in 2003 in order to raise public awareness on recycling.

Part 5 News Letters

The following three (3) newsletters provided during the study period are attached in this Part 5.

- *Vol.1/ September 2004*: Study outlines and 1st seminar are mainly stated.
- *Vol.2/ March 2005*: Event of National Recycling Day (18th Dec. 2004), introduction of model LAs selected, 3Rs experiences in Japan, etc. are stated.
- *Vol.3/ September 2005*: 3Rs activities in schools including guidelines preparation process, 2nd and 3rd seminars etc. are stated.

Part 6 Records of Seminar, Workshop and PCM Roundtable

In this part, records of three (3) seminars, three (3) workshops and four (4) PCM roundtables carried out during the study period are attached.

Part 7 Survey Procedures and Results

In this part, procedures and results of the following surveys are attached.

1. Survey on Waste Generation/ Composition of Households in Major Cities
2. Survey on Recycling of Business Entities and Households
3. Survey on Material Flow of Recycling in Malaysia

PART 1

REVIEW OF EXISTING CONDITIONS OF WASTE MINIMISATION

Part 1 Existing Conditions of Waste Minimisation in Malaysia

1.1 Existing Conditions of Waste Minimisation

1.1.1 General Conditions of Solid Waste Disposal and Recycling

Presently, approximately 95-97 per cent of wastes collected in Peninsular Malaysia are brought for disposal at disposal sites, while the remaining 3 to 5 per cent are sent for treatment at small incineration plants or are diverted to recyclers/re-processors or are dumped illegally. Waste at landfills is reported to comprise mainly food waste and other organics (47 per cent), and the remainder comprising paper (15 per cent), plastics (14 per cent), metals (4 per cent), glass (3 per cent), and other materials including textiles, wood and rubber. There is a lack of information regarding construction and demolition waste. In addition landfills are also known to receive hazardous wastes and bulky wastes including batteries, scrap electrical and electronic equipment, and scrap tyres.

Recyclables are usually brought to buy-back or collection centres set up by local authorities (LAs), concessionaires, NGOs and private organisations. They are then bought by re-processing factories or packed for sale overseas. Items such as clothing are exported or donated to charities, while books and toys are usually resold at charity shops and flea markets or donated. Furniture and other bulky items may also be donated if found to be working. Waste separation at source is practised only at a number of areas under various pilot projects. The waste components that are being separated at source from organic and biodegradable wastes include paper and cardboard, plastics, glass and metals (aluminium cans). So far composting of food and green waste has not been employed in Malaysia on a large scale. Some LAs for example Majlis Perbandaran Pulau Pinang (MPPP) have also begun collection and storage of electrical and electronic equipment and household hazardous waste such as used batteries and florescent tubes.

It appears that there is less emphasis on waste reduction at source as compared with reuse and recycling. Currently there are no legal or economic instruments that require manufacturers and households to reduce the amount of waste that they generate and subsequently dispose.

Generally, the public is now aware of the 3Rs particularly among those residing in the larger local authorities and those who have participated in pilot recycling projects. With regard to education on waste minimisation, it appears that there is little education, at any level. It is not part of the school curriculum and only a few universities offer the opportunity to take up courses related to this subject.

The normal mode for collecting recyclables from households is via kerbside collection by house-to-house collectors and middlemen buyers. Recyclables from industrial or commercial sources are normally sent direct to recycling plants/re-processors.

Integrated recycling where separated recyclables are collected at source at the same time as other wastes or at designated times, is practised only for specific items e.g. old newspapers or on a limited scale in conjunction with pilot projects or special campaigns.

The current rate of recovery of recyclables in Malaysia has been reported to range between 2 and 5 per cent and the MHLG has mentioned a rate of 3 per cent. A number of LAs has reported higher recycling rates for e.g. MPPP reported recycling rate of 9 per cent in 2002. However it is noted that the recycling rates refer to the recovery rate from post-consumer solid waste and does not include recyclables from the industrial sector that are sent directly to re-processing factories. It is reported that post-industry recycling is well established but statistics are not available. This is particularly so for the plastics, aluminium and glass industries, which utilise used materials as raw material feedstock.

There is a wide range of stakeholders involved in various aspects of the 3Rs. They represent organisations and individuals from the public and private sectors, and from NGOs and from learning institutions. The MHLG estimates that there are more than 1,500 players currently involved with 3Rs activities (See Table 1.1-1).

Table 1.1-1 Number of Key Players in 3Rs Activities, 2003

No.	Group of Players	Number
1	Local Authorities	95
2	Concessionaires	2
3	Associations	4
4	Collectors and Manufacturers	179
5	Private Sector	162
6	NGOs	60
7	CBOs/Residents Association	53
8	Learning Institutions	884
9	Others (hotel, hospitals, religious institutions)	152
Total		1,591

Source: MHLG, August 2003

1.1.2 Recycling Programme by Actors

The existing situation regarding the 3Rs or commonly referred to as recycling programmes in Malaysia can be reviewed according to the key players.

(1) Federal Government

1) Recycling Unit of MHLG

The MHLG set up a Recycling Unit under the Environmental Health Engineering Division (EHED) that is currently manned by three officers who are assisted by 6 personnel. They are responsible for formulating policies, budget allocation, coordination of recycling activities, and monitoring. This unit is responsible for providing recycling infrastructure, implementing awareness activities and carrying out studies related to recycling. The unit also performs duties as Recycling Secretariat, a one-stop centre for the public to get information on MHLG's recycling activities including location of bins and collection centres.

In terms of financial resources, the MHLG reported that 29 per cent (RM11 million) of the budget allocated for 2001-2003 for recycling programme had been used for infrastructure and 66 per cent (RM25 million) had been used for awareness programmes. The budget allocated for infrastructure was spent on procurement of

3-colour bins and recycling trucks, and construction of recycling centres. The budget for the awareness programmes was spent on printed and electronic media, and advertising on billboards, school buses, the creation on a mascot and participation in exhibitions and road shows.

2) National Recycling Programme (NRP)

(a) Background of NRP

In 1988 the MHLG drafted the “Action Plan for a Beautiful & Clean Malaysia” (ABC Plan) and this was followed with its first National Recycling Programme involving 23 LAs in 1993. The programme was considered partly successful for Majlis Perbandaran Petaling Jaya (MPPJ), Majlis Perbandaran Melaka (MP Melaka) and Dewan Bandaraya Kuching Utara (DBKU), which were able to sustain the programme. The programme could not be maintained at the other LAs and the MHLG attributed the weaknesses among others to lack of market for recyclables in certain parts of the country, diminished public confidence due to poor collection services, lack of public awareness and promotion programmes, lack of participation by stakeholders, lack of LA personnel dedicated to the programme, and lack of policy and master plan for recycling.

Subsequently, the MHLG set up a National Recycling Steering Committee chaired by the Minister and this represents the highest level of policy making in the country. The current recycling initiative by the MHLG is referred to as the National Recycling Programme (NRP), which was re-launched in December 2000. The primary objective of the NRP is to inculcate the habit of the 3Rs with the ultimate aim of recycling being to reduce usage of land for waste disposal, to reduce expenditure on solid waste management (40-70 % of total assessment spent on waste management) and to reduce importation of waste (e.g. Malaysia spends USD28 million/year importing waste paper). This time a target was set to achieve a one per cent annual increase of recycling until 2020.

(b) Outline of NRP

The programme was launched at 29 selected LAs that were deemed to be ready for programme implementation. Four items with a ready market were promoted i.e. paper, glass, metal (aluminium and steel cans) and plastics.

During the first phase, over 2,000 sets of 3-colour bins were distributed among the participating LAs. In addition, the MHLG encouraged the setting up of collection centres. Later, recycling bins were redesigned and the MHLG continued to encourage the setting up of more collection centres. Despite issuing guidelines and on locating and maintenance of bins, the MHLG found that the bins are too often misused and vandalised and has stopped issuing new bins. To date, the MHLG had placed 10,797 bins (240 and 360 litre) at public places and 3,950 bins (660 litre) at collection centres. In the meantime, the number of collection centres set up by the MHLG had increased from 173 in 2003 to 232 in 2004. In addition, 44 units of recycling bins (Silver box) sponsored by OMG Media had been placed in locations within DBKL, MPPJ and MPSJ. These collection centres are usually managed jointly with community-based organisations (CBOs) and NGOs.

During the second phase of implementation (from November 2001) the public awareness campaigns were intensified and the programme was made open to other LAs. 95 LAs (out of total 144) are participating in the 3Rs programme of the NRP. Incentives given to these LAs include the provision of new collection vehicles. Recycling bins were redesigned and the Ministry continued to encourage the setting up of more collection centres. More than 14,000 recycling bins have been issued to participating LAs. Despite issuing guidelines and on locating and maintenance of bins, the MHLG found that the bins are too often misused and vandalised and has taken a new approach to reduce the issuance of bins unless the relevant LA is believed to take good care of the bins.

In 2004, 95 LAs were registered as participants of the NRP, their distribution state-wise being as follows:

Table 1.1-2 Distribution of LAs Participating in NRP, 2004

No.	State	No. of LAs in NRP
1	Johor	14
2	Sarawak	14
3	Selangor	12
4	Pahang	11
5	Perak	10
6	Kedah	9
7	Sabah	8
8	Negeri Sembilan	5
9	Kelantan	3
10	Melaka	3
11	Pulau Pinang	2
12	Terengganu	2
13	Perlis	1
14	Wilayah Pesekutuan KL	1
Total		95

Source: EHED, MHLG, September 2004

(c) Raising Public Awareness

The MHLG designated 11 November as "National Recycling Day" and it was launched in 2001 at Bukit Jalil, Kuala Lumpur. The solid waste management (SWM) concessionaires and other organisations, including Ericsson, F&N, LTM Bio Industries, Malaysian Newsprint Industry (MNI), Malaysia Plastics Manufacturers Association (MPMA), WANITA MCA and World Wild Fund (WWF), sponsored the event, which included the collection of recyclables (paper, glass, aluminium & steel cans and plastic), and exchange of game tokens for Ericsson batteries.

MHLG also engaged a consultant to develop and implement public awareness campaigns. It was a joint programme with the two concessionaires; Alam Flora Sdn Bhd (AFSB) and Southern Waste Management Sdn. Bhd. (SWMSB). Posters, bulletins and leaflets are used as the main medium for public awareness programmes. The media of TV advertising and newspapers were used to the general public. At the school level, a group of local celebrities introduced "Fresh Friends & Mr. Waste". The

MHLG set up a website, www.kitarsemula.com. By accessing the website, the public are able to obtain information about recycling activities. But it is not updated because of completion of contract with service provider. Also used are the electronic media, school buses, billboards, participation in exhibitions and carnivals. Road shows in various towns were held at shopping malls and schools. The tagline “Think before you throw” was introduced.

The MHLG carried out public awareness survey (sampling surveys in urban areas) in 2002 and 2003. The survey results showed that awareness about recycling increased from 79 per cent in 2002 to 100 per cent in 2003 and that the practice of recycling had increased from 50 per cent to 80 per cent.

(d) Data Collection

The MHLG has been collecting information on recycling activities from LAs participating in the NRP since 2001. Only 31 of the 95 participating LAs have been sending reports to MHLG. Apart from LAs, other recycling partners who have submitted recycling reports are the two concessionaires AFSB and SWMSB, and private companies IKEA, IKANO Power centres and MNI. Despite a directive sent to LAs participating in the NRP in 2001, there has been neither uniform reporting nor regularity in reporting. It was also observed that there were no recycling activity reports from industries involved in recycling and recyclable re-processing activities. Only one NGO and one CBO submitted reports.

(2) State Government

1) Penang

In Penang, the Penang Environment Working Group (PEWOG), established by the State Government, serves as a consultative forum for local government. Through PEWOG, the state government is committed “to adopt recycling as a long term strategy for solid waste management” and “to transform the ‘throw-away’ culture to that of a conserving one”. They have published a recycling guidebook to increase knowledge about recycling and to encourage the public to be involved in recycling activities. The items that are promoted for recycling are paper, plastic, metals, glass and old clothes. The guidebook also describes what items are not collected. It is noted that the public is encouraged to donate items to charities.

On 12 October 2002, the Chief Minister launched the penang community recycling programme. This is a long-term programme for community involvement in recycling and reduction of waste generated in Penang, and sponsored by the LAs. Under the programme, a penang state recycling coordinator was appointed.

2) Sarawak

In Sarawak, the Natural Resources & Environment Board (NREB) that was established under the Natural Resources and Environment Ordinance 1993 works closely with LAs in connection with solid waste management (SWM). NREB handles policy, and standards and guidelines for environmental management e.g. guidelines for establishment and rehabilitation of landfills. With regard to the 3Rs, a pilot project for composting of kitchen waste was implemented. 60 households (VIPs &

volunteers) participated to compost kitchen waste using 360 litre bins provided. NREB is also involved in projects with international organisations e.g. DANIDA's project on Urban Environmental Management System for Kuching (North, South & Padawan).

(3) Local Authorities (LAs)

1) Majlis Perbandaran Pulau Pinang (MPPP) , Penang

In MPPP, recycling activities began in 1993 under the first-launched NRP. In 2002 MPPP started the 'vendor system' to network waste generators with recyclers and recycling agents. 24 companies including Malaysian Newsprint Industry (MNI), SPM and KL Glass from outside Penang are registered in the system. The recyclables collected are paper, cardboard boxes, aluminium cans, plastics and metal scraps (exclude bulky items e.g. cars). MPPP also began collecting household hazardous wastes (fluorescent tubes and batteries). These wastes are stored at the depot in Kampung Jawa. In 2004, they began collecting computers together with Majlis Perbandaran Seberang Perai (MPSP). In cooperation with Dell, computers are collected and those found to be workable are donated while those beyond repair are cannibalised and useable materials salvaged for recycling. In conjunction with National Recycling Day 2004, MPPP launched a 'waste separation programme' on 11 November. The area chosen is hillside, and involves 776 houses and 34 roads.

MPPP also implemented "Community Waste Recycling Program" under United Nations Development Programme - Public Private Partnership for the Urban Environment (UNDP-PPPUE), involving civil society and private sector.

2) Majlis Daerah Kerian (MDK) , Perak

Recycling activities are carried out by people/companies that do not participate in MDK's programmes. MDK has carried out waste minimisation activities mainly in line with LA 21's Sub-committee on Environment. They now have 15 collection centres, 6 of which are managed by Residents Associations (RA) and an NGO (KALAM, Kuala Gula).

3) Majlis Daerah Kinta Selatan (MDKS) , Perak

To increase awareness and public participation, MDKS has published leaflets, flyers and participated in campaigns and other public gatherings. Under the NRP, MDKS set up 15 collection centres. The operation of collection centre was handed over to an NGO, Xim Phou Moon (XPM) at no cost to MDKS. The main item brought in is paper and others are mainly old clothing. At the landfill, waste pickers are allowed to remove recyclables for sale to Koperasi Anggota. The main recyclables are paper, plastics and glass. Paper from shops and restaurants are collected by MDKS. 23 schools are also participating in the recycling programme.

4) Dean Bandaraya Kuala Lumpur (DBKL)

Most of the recycling activities at DBKL are organised by Alam Flora Sdn Bhd (AFSB). Recycling activities in Bangsar and Damansara are successful in KL area. Most of the recyclables are collected at Buy-back Centre in parking lobby of Mid Valley Mega-mall operated by AFSB. Environmental Protection Division of DBKL is

implementing Eco Partnership Programme funded by UNDP. Collection boxes of used batteries were installed in clinics, educational institutes, etc. under the programme. The Division has a research programme on disposal of batteries using bio-technology in cooperation with University of Technology Malaysia (UTM). Collected batteries under the Programme are stored and sent to UTM for the research, while those collected by AFSB are transported to Sungai Besi landfill site.

5) Majlis Perbandaran Kuantan (MPK) , Pahang

MPK has created a recycling unit that works closely with other government agencies e.g. Department of Environment, Alam Flora Sdn Bhd (AFSB), residents associations and NGOs. The main activities are setting up of collection centres and public awareness programmes, which include talks and school programmes. A recycling campaign was launched in April 2001 and priority is accorded to 'reduction at source, reuse & recycling' as opposed to disposal. Waste picking at landfill is not active in Kuantan. In 2004, the 'Kelab 25" programme was launched as part of the efforts to achieve 25 per cent recycling rate in Kuantan by year 2007.

6) Majlis Bandaraya Melaka Bersejarah (MBMB) , Melaka

Recycling activities at MBMB are confined to gotong royong clean-up campaigns that are carried out once a year in a particular area. Southern Waste Management Sdn Bhd (SWMSB), the concessionaire for the southern region, implements other programmes for waste minimisation.

7) Majlis Bandaraya Johor Bahru (MBJB) , Johor

Recycling activities at MBJB are confined to gotong royong clean-up campaigns that are carried out once a year in a particular area. The LA organises talks and visits e.g. to schools, and participate in exhibitions to promote recycling. Recycling is also promoted on radio talk shows (Suara Melaka). Most of the recycling activities are organised by SWMSB.

8) Dewan Bandaraya Kuching Utara (DBKU) , Sarawak

The concept for the 3Rs employed by DBKU for SWM is based on strategic partnership with nine recyclers/recycling agents and with vendors and NGOs. DBKU also gets cooperation of factories and housing estate and village community groups. The approach relies on market forces where DBKU acts as 'matchmaker' between waste generator and recycler, and there is no licensing system. DBKU issues a price list that change according to market forces. These 9 companies collect and mainly export recyclables to the Peninsula. DBKU has set up 16 collection centres in housing estates, shophouses, schools, markets and offices. 118 premises have been supplied with bins of various capacities. The main recyclables collected are old cardboard cartons, plastics, old newspapers followed by glass, scrap metal and wood. The recyclers buy items from the collection centres, which in turn normally obtain their recyclables free of charge from the public. DBKU started a pilot project for 'house-to-house' recyclable collection in 2004. It involved 4 areas (about 5,000 households) and two vendors (at no cost to DBKU).

9) Majlis Bandaraya Kuching Selatan (MBKS), Sarawak

The approach adopted by MBKS involves the cooperation of vendors/contractors, and the participation of NGOs, schools and petrol kiosks. Five (5) buy-back centres have been set up since 2002 and these are located in housing areas and/or near shopping complexes/market. The centres are open at specific times only. The centres are usually manned by MBKS staffs. The centres accept paper, plastics, metal (steel and aluminium cans) and used clothing. The centres also receive used car batteries, old computers and scrap iron. MBKS has modified MHLG's design of the centres in particular the addition of four (4) hoppers for the public to drop-off their recyclables according to the 4 types abovementioned. MBKS has also introduced an innovative system for exchange of recyclables. No cash is given but the public is given coupons within a point system. These coupons can be exchanged for household goods every last Sunday of the month. Old clothing is donated to charities. Recyclables are sorted and then sent to the Peninsula as there are no local re-processing facilities (only one small plastics factory). The contractors used by MBKS are selected based on best price, technology support, support in production of public awareness materials, and good relationship between the two parties.

10) Majlis Bandaraya Miri (MB Miri), Sarawak

The concept adopted for the 3Rs is to have a partnership with seven recyclers/recycling agents and with NGOs, CBOs, private sector and individuals. These 7 companies collect and mainly export recyclables to the Peninsula. MB Miri has set up four (4) collection centres. The recyclers buy items from the NGO or CBO-managed collection centres (including those set up under the LA 21 programme described below) that in turn normally obtain their recyclables free of charge from the public. Clothing is cleaned and sold, or otherwise donated to charities.

11) Dewan Bandaraya Kota Kinabalu (DBKK), Sabah

In DBKK, recycling activities began in 1993 under the first-launched NRP. In 1999, DBKK started Sustainable Urban Development Project (SUDP) in cooperation with Danish Cooperation for Environment and Development (DANCED) and formulated Integral Solid Waste management Strategic Plan. DBKK also set up website, "www.malaysiarecycle.net", for information exchange of recycling industry among stakeholders and raising public awareness under the SUDP. In 2001, DBKK started recycling and composting programme. 9 collection centres were constructed and operated by DBKK in cooperation with private collectors. School level recycling programme is also started in 2004. Training workshops for trainers and road shows are carried out in order to raise public awareness. DBKK set up the recycling target 15 per cent by year 2015.

(4) Local Agenda 21 (LA21)

Agenda 21, agreed during the Earth Summit at Rio de Janeiro, introduced a requirement on all signatory countries to develop and implement a programme of actions known as Agenda 21 plans - to achieve a more sustainable approach to development for the next century. In Malaysia, the LA21 programme that was first launched in 2000 includes reduction of waste generation, the reuse of products, the recycling of materials, resource recovery and the use of renewable fuels. Four LAs (Petaling Jaya, Miri, Kuantan and

Kerian) was selected as pilot sites on partnership among LAs, private sector and local communities in the process of planning and implementation for sustainable development activities, community participation and bottom-up approach in cooperation with UNDP. In contacts with LAs participating in LA21, only Miri has a separate account of the activities and achievements specific to LA21.

LA21 pilot project at Miri began in 2001 and an officer was assigned to coordinate activities. Three community-based issues were identified one of which was 'Solid Waste Reduction'. An Action Plan was formulated in 2002 and implemented. Two (2) collection centres have been set up and 3Rs bins distributed to schools, hotels, and service stations, shopping complexes, NGOs, Residents Associations, government departments, a church, club and private company. With sponsorship of MHLG, the Miri LA 21 Solid Waste Reduction Sub-committee published a booklet "EcoPack" in 2003, which contains much information on converting wastes into resources.

At Petaling Jaya, action plan for domestic solid waste management was drafted under the pilot project. Based on the action plan, recycling programme was introduced to 57 schools, new recycling centres were set up for community (residents association including Damansara Jaya Residents & Owners Association), and awareness of solid waste composting was promoted with NGOs.

(5) Concessionaires

1) Alam Flora Sdn. Bhd. (AFSB)

AFSB, whose service areas cover the Central and Eastern regions of Peninsular Malaysia has been promoting the 3Rs through school programme, community recycling programme, ICI (industrial, commercial and institutional) programmes and disposal facilities programme.

AFSB's schools programme is named "KitS" and is carried out at schools in all service areas in collaboration with Malaysian Newsprint Industries Sdn. Bhd. (MNI) and Genting Sanyen Paper Industries. The programme consists of talks on 3Rs, and student participation in recyclable collection activities (mostly newspapers). Incentives are provided to encourage the 3Rs in the form of money and a computer for the school if the volume of recyclables reaches the targeted amount. AFSB also organises competitions, talks and participates in seminars, exhibitions and appear regularly on radio talk shows.

The community programme involves AFSB co-operating with community associations to conduct 3Rs awareness programmes. The community programme is also aimed at promoting the establishment of collection centres, either fixed or mobile. To date 30 buy-back centres and 65 mobile recycling centres have been established in Kuala Lumpur, Selangor, Putrajaya and Pahang. Pahang records the highest number of recycling centres (65 per cent of total). The most successful collection centre is at headquarters (Wisma DRB-HICOM) that is open on the last Saturday of the month and may collect 1 tonne of recyclables during one session. Table 1.1-3 summarises AFSB's achievement in setting up recycling centres.

Table 1.1-3 Summary of AFSB's Recycling Centres, 2004

No.	State	Number of Buyback Centres	Number of Mobile Recycling Centres
1	W.P. Kuala Lumpur	5	7
2	W.P. Putrajaya	1	3
3	Selangor	14	3
4	Pahang	10	52
Total		30	65

Source: Alam Flora Sdn. Bhd.

The programme for ICI or "Waste-wise" is aimed toward industries and institutions. Under this programme, AFSB creates a partnership with institutions or industries on 3Rs efforts. In joining the programme, the partner is required to commit to implementing or expanding solid waste reduction, and a reuse and recycling programme in their work place, with the assistance of AFSB. There are three complementary components to the programme i.e. waste prevention, recyclables collection, and purchase of recyclables.

The recyclers' network is an informal organisation formed by AFSB and major players in the recycling industry such as MNI, Genting Sanyen Industrial Paper, Malaysian Plastics Manufacturers Association (MPMA) and KL Glass. The network keeps members informed of developments in 3Rs activities. Programmes for specific material recycling are conducted among network members. The network also provides AFSB with ready-buyers of recyclables.

The programme for waste recovery at landfills includes the interception of recoverable materials before being landfilled, and the composting of green waste. Waste is sorted at a special area within the landfill site and sorting is conducted in a controlled manner to ensure the safety of individuals involved.

Table 1.1-4 shows the performance of AFSB's 3Rs programmes.

Table 1.1-4 Summary of AFSB's 3Rs Programmes Until August 2004

Operation Area	Programme		
	KitS	Wastewise	Community
Kuala Lumpur	256	33	72
Selangor	389	75	82
Pahang	230	28	52
Total	875	136	206

Source: Alam Flora Sdn. Bhd.

2) Southern Waste Management Sdn. Bhd. (SWMSB)

In the southern region, Southern Waste Management Sdn. Bhd. (SWMSB) is the key player in promoting the 3Rs. The company has now taken over solid waste collection services in 27 LAs, 20 of which were taken over in 2003. SWMSB's recycling programmes in Johor began in 2001 therefore most activities have focussed in Johor Bahru.

SWMSB has placed more than 300 sets of recycling bins in schools, government offices and public areas. Three exchange centres, which also serve as recycling information centres have also been set up; one each at Taruka transfer station and Plaza Angsana in Johor Bahru and the other at the SWMSB Regional Office at Batu Berendam, Melaka.

SWMSB's public awareness programmes have targeted schools, industries and communities including talks, seminars, exhibitions and campaigns on recycling and waste minimisation. The company had also initiated school recycling programmes in the LAs taken over during interim takeover. About 160 secondary and primary schools in Johor and 45 in Melaka have participated in the programme. Recyclables collected by the schools are sold to recycling agents and the proceeds are returned to the schools.

Table 1.1-5 Distribution of Recycling Drop-Off Centres

Categories	2000	2001	2002	2003	2004
Residential			4	7	45
Office	1	1	1	1	1
Hotel				1	1
NGO's	1	1	1	2	2
Shopping Centre		1	2	2	3
Total	2	3	8	13	52

Source: Southern Waste Management Sdn. Bhd.

(6) NGOs and Community Based Organisations (CBOs)

1) NGOs

(a) Buddhist Tzu-Chi Merit Society (BTC)

BTC has been operating as a non-profit organisation in Malaysia since 1993. BTC's recycling activities began in 1996 under their charity programmes. BTC's motto is 'TURN TRASH TO GOLD'. In Malaysia, 3Rs activities began in KL, Petaling Jaya and Klang. BTC has set up mobile collection/drop-off centres (e.g. mainly in residential areas). To date 60 points have been selected and are operational in the Klang Valley. Each month about 500-600 volunteers work at these centres. Collection at mobile centres is carried out once a month on the third Sunday of the month. BTC collects paper, plastics (including PET bottles & bags), metals (including aluminium cans), glass (for reuse & recycling), and old clothing and textiles (sorted for emergency relief, charity homes & for resale). BTC also accepts other recyclables including car batteries, furniture, and electrical and electronic items. Recyclables are sorted and collected by recyclers or transported to recyclers (usually free of charge by voluntary transporters).

BTC collaborates with SWMSB in Melaka where they have a collection centre at the Branch office. In Melaka, BTC also carries out door-to-door collection there.

Revenue from sale of recyclables is donated for various charity purposes. BTC operates free clinics in Melaka and Klang and a dialysis centre in Penang. They also operate kindergartens. BTC also maintains a list of potential bone marrow donors (25 million names) and volunteers also offer free surgery e.g. in Indonesia.

BTC's public awareness programmes form a very important aspect of their work and involve explaining the public's duty and purpose of recycling. This is achieved through tea-talks and sessions with schools and other groups e.g. residents in a particular area. BTC also organises training sessions for volunteers before they serve at recycling centres.

(b) National Committee of Women's Organisation (NCWO)

Environment Commission of NCWO started a community recycling buyback centre in 2001 to serve as a collection centre for recyclables (paper, glass, plastics and aluminium cans) in the community. This centre was established in cooperation with Alam Flora(AFSB) and MPPJ.

(c) Xim Phou Moon Welfare Society Malaysia (XPM)

XPM has been operating as non-profit organisation since 1996 and recycling activities have been carried out by the Women's wing, an affiliate of XPM. 3Rs activities are carried out in cooperation with supermarkets and shopping complexes. XPM has set up a network of drop-off centres (e.g. at shopping complexes), and mobile collection centres for recyclables. Collection at mobile collection centres is carried out once, twice or four times a month. XPM accepts all recyclables including toys, furniture and electrical & electronic items. Recyclables are sorted and stored at a large warehouse in Taming Jaya, Balakong. Books collected are sold at a shop at Leisure Mall, Cheras. Revenue from sale of recyclables is donated to various charities at home and abroad. Items are paid per kg and price varies according to market demand. Workers at XPM are paid by the Loong Sang Group that is owned by XPM's founder, Y.Bhg. Dato' Loong Sang. XPM's public awareness programmes include talks and distribution of flyers and publicity in Chinese newspapers. Banners are hung at mobile collection centres and XPM workers also spread the recycling message during these sessions. XPM's motto is "Love Malaysia, Recycle for Community Service". XPM would like to expand activities to the whole country (presently also operates in Penang and Kuching).

(d) Treat Every Environment Special Sdn Bhd (TrEES)

TrEES carries out the following environmental education programmes to inspire and activate environmentally sustainable habits among Malaysians.

a. Community recycling programme

TrEES is operating buy-back centre and provides incentives to the public to promote practice of recycling. TrEES also works with the LAs, private companies, charitable organisations and retail outlets for community recycling programme.

b. Environment programme for schools

TrEES has an environment programme for schools in cooperation with the local authorities, Department of Education, schools, other NGOs' and private companies. Contents of the programme are as follows:

- Answering the students' questions of where our rubbish goes, how materials are recycled
- Providing the students with access to environmentally sound alternatives
- Providing the students with projects that they can participate in such as the recycling campaign
- Producing educational materials in the local context

c. Education and public awareness programme

TrEES has the following awareness programmes.

- Exhibition and talks
- Networking with various media groups to increase coverage of our community recycling programme
- Distribution of leaflets and posters
- Seminars and training workshops

2) Residents Associations (CBOs)

(a) Bandar Sri Damansara Residents Association (BSDRA)

BSDRA operates in a permanent office built on land donated by the developer L&G. There are about 14,000 households in the area. Community activities including recycling were began about 3 years ago. The current BSDRA committee operates a collection centre that is open once a month. For the convenience of residents, BSDRA has just completed building a drop-off bay with hopper. Volunteers sort wastes into paper, aluminum cans, glass, plastics and metals. Recyclables are transported to recycling centres by contractors and sometimes by transporters who volunteer their services. Public awareness programmes are carried out through word of mouth, school programme (with AFSB) and through printed materials e.g. Berita BSDRA.

(b) Damansara Jaya Residents and Owners Association (DJROA)

DJROA established community recycling centre under the Local Agenda 21 pilot project in MPPJ funded by UNDP. The centre was operated as a buy-back centre every Sunday by resident volunteers. AFSB is providing advisory services and some material support to assist operation of the centre.

(7) Manufacturers Associations

1) Paper and Pulp Manufacturers Association of Malaysia

There are twenty paper mills in Malaysia and only one mill in Sabah which uses virgin pulp. The rest are using waste paper as their raw material. Malaysian Newsprint

Industries Sdn. Bhd. (MNI), one of the members of Paper and Pulp Manufacturers Association of Malaysia, carries out paper recycling programme at schools, offices and communities. Their recycling programmes provide storage containers to encourage waste paper segregation, hassle-free collection, and recycling education. In school programme waste paper can be exchanged for cash and computers.

2) Malaysia Plastics Manufacturers Association (MPMA)

A Plastic Waste Management Task Force (PWMTF) was set up in MPMA based on the dialogue between the Ministry of Science, Technology and Environment and MPMA. The members of the Task force are resin manufacturers, resin importers, converters, recyclers, AFSB, the Department of Environment (DOE) and the MHLG. The activities undertaken by PWMTF are 1) Education and awareness campaign to educate on the 2Ds (Don't litter/Dispose properly) and the 2Rs (Reuse/Recycle), 2) Plastics coding system to identify and separate plastics for recycling, and 3) Feasibility study on the options of plastics waste management in Malaysia. Malaysian Plastics Waste Management Feasibility Study was carried out in cooperation with Canadian International Development Agency (CIDA).

3) Federation of Malaysian Manufacturers (FMM)

Environment protection and management is a key objective in the FMM Strategic Action Plan 2001/2004. In line with the action plan, FMM is promoting waste exchange among FMM members by using internet registry system "FMM Waste Exchange Registry". Target waste is solid and scheduled waste.

(8) Other Players

1) Supermarkets/Shopping Complexes

(a) IKEA, Mutiara Damansara

Recycling activities at IKEA began when the store opened in August 2003. Facilities for solid waste management were designed in the planning of the store incorporating storage bays for waste containers/compactor and proper storage facilities. The company charges different rates for different types of recyclables and according to type of container and frequency of collection. Paper and cardboard is compacted or stored in 1 tonne container. There is also a manual baler. Items collected are cardboard, plastics, metal, wood and other materials. Wood is shredded and used in boiler. Other initiatives include the use of biodegradable plastic bags (imported) and rainwater harvesting for use in flushing toilets. Solar panels are also used to supplement electricity.

(b) IKANO Power Centre, Mutiara Damansara

At IKANO Power Centre where there many tenants including F&B outlets, solid waste is separated into wet and dry waste. Two storage areas are provided; wet waste in an enclosed and ventilated area.

Dry waste is transported to the storage area where wastes are separated according to type; polystyrene, plastic straps, paper, cardboard, aluminum and metals, and glass

bottles. Polystyrene is compacted using a Taiwanese machine before being collected by a vendor. A baler is used for compressing plastic straps.

2) Research Organisation

(a) Socio-Economic and Environmental Research Institute (SERI)

SERI was established by the Penang State Government as the “think tank” of Penang to formulate strategic planning and policy recommendations. SERI’s activities are funded by the Penang State Government and donors e.g. UNDP. Apart from research activities SERI is also engaged in training of community members in organizing community projects. They have produced a manual for this purpose. They have also established a recycling network. SERI also acts as secretariat to the Penang Environmental Working Group (PEWOG). Activities include matchmaking generator and recycler, and management of e-wastes.

SERI was also appointed as project holder and secretariat to the UNDP project on solid waste (UNDP-PPPUE Community Waste Recycling Program). The project involves partnerships from the government (MPPP), civil society (residents associations and CBOs) and private sectors (recycling agents and industries, developers, etc.). Three demonstration sites were chosen for the pilot phase. They are Weld Quay (clan jetties residents), Alor Vista Flats (high density low cost housing) and Kampung Seronok (a traditional malay village).

A new project for treatment of organic waste has been proposed with Asian Productivity Organisation (APO). SERI is also keen on public awareness and education on waste minimisation and separation at source.

1.1.3 Lessons and Issues Arising from Recycling Experience

Generally, the public is now more aware of the 3Rs particularly among those residing in the larger local authorities and those who have participated in pilot recycling projects and NGO/CBO programmes. The key findings are as follows.

(1) Public-Private Partnership

Public-private sector partnership has been instrumental in the success of recycling programmes e.g. MPPP. Communication and interaction among players in recycling is vital to ensure economies of scale, matchmaking of recyclables, and healthy competition. Champions act a catalyst whether at state level e.g. the chief minister in Penang or at community level e.g. Dato’ Loong Sang (Xim Phou Moon). In areas taken over by concessionaires, recycling programmes have fared better with cooperation of relevant government agencies. Most LAs perform a ‘facilitating role’ instead of actual day-to-day running of operations e.g. MB Miri. Efforts are more focused when target had been set e.g. in MPK, a target of 25% recycling rate by 2007 was set. The maturity of the local recycling industry in a particular area is a factor in ensuring success of recycling programmes e.g. MPPP, MPK (recyclers collect from outside Kuantan). Targets need to be agreed upon by type of waste and source.

LAs and other recycling initiators would benefit from sharing of experience and ideas i.e. better networking. The creativity of initiators of recycling programmes is an important factor in rallying support and making progress in recycling e.g. MPPP,

MBKS. NGO/CBO programmes have benefited from participation of senior citizens e.g. MPPJ Community Centre. Low revenue from sale has discouraged NGO/CBO participation and survival. Thus, adequate resources must be allocated in order to have a successful recycling programme.

Uncertainties regarding the SWM Act, privatisation, and other instruments e.g. EPR need to be resolved in order for programmes to be relevant and in line with government policy. High cost of disposal at landfills can motivate recycling e.g. Commercial premises in DBKU. It is noted that at the same time, surveillance to prevent illegal dumping and stiffer penalties are needed.

(2) Awareness and Information

Commitment of public and key players is crucial for recycling to succeed. The public or community is interested to know what is done with revenue collected from sale of recyclables and do not mind donating for charitable causes. It is also important that the community can see 3Rs activities being carried out. Also the public are discouraged when they see collectors mixing separated items in collection vehicles. In some cases, 3Rs efforts have not worked because of attitude-‘couldn’t care less’. The perception that recycling is ‘dirty’ work therefore to be avoided needs to be changed. Therefore, public awareness programmes including MHLG’s media campaigns need to be reviewed and enhanced, timely, continuous, the content relevant and easily identifiable in order to be effective. All over the country, schools have been receptive of recycling particularly for old newspapers. They represent a large catchment for tapping recovery potential and this has been taken advantage by local paper manufacturers. Recycling activities have had better results when integrated with education and charity e.g. XPM and BTC. People involved in recycling programmes (trainers) need to undergo basic training to enable them to convince the public to participate and to provide the proper answers to queries.

The public often complain of lack of information. When there is information, it should not be misleading. For instance, recovery of recyclables should be accompanied by promotion of ‘wise buying’ or avoidance of waste e.g. DBKU. On the other hand, data collection also needs immediate attention to ensure good decision-making. There should be clear guidelines on what parameters to monitor in order to evaluate performance of recycling programmes. In connection with monitoring and evaluation, players should agree on set of performance indicators for evaluation and reporting purposes. Definitions e.g. waste, recyclables, recycling rate that are associated with recycling need to be decided and publicised so that players are clear about what they are dealing with and to plan strategies and programmes. Hazardous household waste remains a ‘grey’ area and most players do not know what to do particularly in the interim when there are no laws and guidelines yet.

(3) Collection of Recyclables

Incentives have motivated participation e.g. buy-back or exchange of recyclables for tokens for household goods e.g. MB Kuching Selatan. Collection of marketable items e.g. aluminium cans and paper has been better compared to items like PET bottles. There should be some mechanism for handling market instability of recyclables and ensure that investments in the industry do not suffer unduly.

Collection rates are better when one centre accepts all recyclables including books, furniture and electrical goods. Safe storage of recyclables vary; some housing areas e.g. in Miri are safe enough for collection centre to be unmanned and unlocked while others have suffered theft of marketable goods e.g. BSDRA. Peak collection of recyclables has been observed to coincide with festivals e.g. clothing at Chinese New Year. Location, design, management, functions and safety aspects of collection centres and bins need to be considered. Proper guidelines could be drawn up to ensure minimum standards and allow for flexibility to cater to local conditions. Community recycling can work without special bins & bags e.g. MBKS. Vehicles for transportation of recyclables also need to be properly designed and their use monitored. As transport costs are high, this factor must be considered in planning any recycling programme as some may involve trans-boundary movement (between LAs/states).

During the interim period recovery of recyclables at landfills by waste pickers (with proper controls) is good e.g. MBKS, AFSB. Waste pickers have and still play a role in recovery of recyclables. Different LAs/concessionaires presently handle them differently. There should be guidelines on their management in the interim and on full privatisation.

1.2 Legal And Institutional Aspect Review

1.2.1 Introduction

Solid Waste Management (SWM), sewerage service and public cleansing are the three essential components of public health services traditionally provided by LAs within each of their area of jurisdiction. In Malaysia however, largely due to the financial and institutional limitations of most LAs, some of these services have been or are proposed to be privatised. Sewerage services for example has since been federalised and privatised. Privatisation was undertaken by the Federal Government, which also became responsible for the regulation and control of these services.

In line with the above, the Federal Government has also initiated the privatisation of the provision of solid waste (SW) collection and disposal services. Three major private concessionaires, namely Alam Flora Sdn. Bhd., Southern Wastes Management Sdn. Bhd. and Environment Idaman Sdn. Bhd. have been given approvals pending the formalisation of concession agreements. These concessionaires have been assigned pre-defined areas of operation and are supposed to be responsible for the collection and transport of wastes, while treatment and disposal of solid wastes as well as public cleansing are to be open to other private contractors. In order to better manage these concessionaires it has been proposed that federal legislation be passed in the form of the Solid Waste Management Act.

Waste minimisation, which is taken to include the components of reduce, reuse and recycle (the 3Rs), is an important aspect of SWM and which the MHLG has been giving emphasis. The need to promote the 3Rs is widely accepted as a means to optimise use of resources and to protect the environment from pollution. This emphasis is not only important in the context of SWM but also in all aspects of human activities. Waste minimisation is not legislated in the country but is promoted under various schemes and by various authorities.

1.2.2 Related Legal Provisions for SWM

(1) Introduction

In addressing issues related to this area, the laws pertinent to the following issues were examined:

- a) The planning, operations, maintenance and management of solid wastes;
- b) The regulation and control of SWM;
- c) Environmental aspects of SWM;
- d) Municipal administration which is under the authority of the state authority/local government; and
- e) Waste minimisation in relation to SWM.

Other issues such as Federal/State/LAs relationships, constitutional jurisdiction, and the rights and participation of stakeholders are given due consideration.

(2) Constitutional Position

This review is confined to the position of SWM and public cleansing under the Constitution. Public cleansing would include refuse collection and maintenance of all public spaces in terms of cleansing, which would include sweeping, washing, weed control and general maintenance. Public spaces would include open spaces, parks, footways, back-lanes, public drains and streets.

1) Federal Jurisdiction

The Ninth Schedule, List 1 (the Federal List), of the Federal Constitution states the areas of jurisdiction of the Federal Government and these include matters relating to “trade, commerce and industry and include - production, supply and distribution of goods; price control and food control, imports and exports, industries and industrial undertakings, dangerous trades, and dangerous and inflammable substances”. Federal jurisdiction also includes the area of “medicine and health including sanitation in the Federal territories”. These provisions seem to indicate that federal jurisdiction for waste management may be regulated by way of control over trade, commerce and industry and control over health and sanitation.

Under the Ninth Schedule, List 1 (the Federal List), Item 6 of the Constitution jurisdiction covers “The machinery of Government, subject to the State List, but including – “Federal services including the establishment of services common to the Federation and the States; services common to two or more States”.

The above appears to provide the Federal Government with powers to establish common services especially where such services are common to the Federation and two or more States. This would mean that the Federal Government could, for example, create an entity, such as a commission or department, to provide a common service to all the States. Examples of such services would be town and country planning, sewerage services and drainage and irrigation.

However the establishment of any such service is subject to the State List. This means that the Federal Government cannot take over any matter in the State List and establish a service which usurps the State’s powers under the Constitution. Matters pertaining to “land” for example are State matters, but the Federal Government has used the existing administrative service to conduct matters pertaining to land throughout the country. Officers in this service, though drawn from the Federal Service, when stationed at the state or district level, perform their duties strictly according to the dictates of the State and not the Federal Government. In the event the Federal Government needs to introduce laws and other coordinating guidelines to promote uniformity throughout the country on such matters, it has to use established constitutional channels prior to such actions, such as the National Land Council (Article 91 of the Constitution) or the National Council for Local Government (Article 95A). These are consultative councils which are represented by both by the Federal and the State governments.

2) State Jurisdiction

The Federal List contains no mention of any Local Government services, with the possible exception of item 14 – “Medicine and health including sanitation in the

Federal Capital”. “Health” may be interpreted to include public health, as “sanitation” is mentioned in the same sentence for the Federal capital. However the specific inclusion of “public health” under the Concurrent List indicates that such matters were not intended to be included in the Federal List.

Pursuant to List II (the State List) of the Ninth Schedule, Item 4, “Local Government” outside the Federal Territories, including local government services, local administration, local rates, obnoxious trades and public nuisances in LA areas, are under the jurisdiction of the State. LAs, which are sub-sets of State Governments, have traditionally been the providers of these services within their jurisdiction. Such services have included SWM, sewerage services and public cleansing. Local rates (called assessment rates) have been imposed and collected by the authorities to fund the services provided.

As mentioned earlier, Article 95A establishes the National Council for Local Government (comprised of Federal and State representatives chaired by the Minister) which formulates national policies “for the promotion, development and control of Local Government throughout the Federation and for the administration of any laws relating thereto...”. The Federal and State Governments shall implement the policy so formulated. It is also the duty of the Federal and State Governments to consult the Council in respect of any proposed legislation dealing with Local Government. LAs play a crucial role in determining the quality of life of a community within its area of jurisdiction and any measure that changes that role may affect its normal function.

3) Powers Under The Concurrent List

The Concurrent List – List III, contains items on which both the Federal and State Governments may make laws (Article 74). Of relevance to this study are “Town and Country planning” and “Public health, sanitation... and the prevention of diseases” in the List. The exercise of powers by the State or Federal Government under the Concurrent List is subject to several provisions in the Constitution. Article 75 provides that Federal Law shall supersede any State law that conflicts or is inconsistent with Federal laws. The Federal Government may exercise its executive authority on any matter enumerated in the Concurrent List provided it is supported by law. It may do so to the exclusion of the State.

Using these constitutional provisions (including Article 76(1)(b) – see subparagraph (f) below) it appears that the Federal Government has set a precedent in the provision of sanitation services by taking over sewerage services and enacting the Sewerage Services Act 1993 (SSA). This was a service that was traditionally provided by the LAs and appropriately covered by the State List under the term “Local Authority services”. Several laws giving powers to the LA still exist such as the Street, Drainage and Building Act 1974. These were all enacted prior to the Sewerage Services Act. It is arguable that SWM may also be similarly considered. Certainly SWM, or the lack of it, has sanitation and public health implications.

4) Other Federal Powers

Parliament (in essence, the Federal Government) may, in certain circumstances, make laws with respect to any matter within the State jurisdiction. Specifically the Federal Government may under the Constitution, “for the purpose of promoting uniformity of

the laws of two or more States”, make laws related to any matter in the State List (Article 76(1)(b)). Such laws include the National Land Code 1965 (NLC), Local Government Act 1976 (LGA) and the Street, Drainage and Building Act 1974 (SDBA). All these laws undergo extensive consultations between the Federal and State Governments prior to adoption. Such a law shall come into operation in any State only after it is adopted by the legislature of the State. Thereafter it shall be considered a State law.

The Federal Government also has commitments to meet various international agreements, such as the UN Framework Convention on Climate Change 1992, Vienna Convention for the Protection of the Ozone Layer 1985, Basel Convention on the Control of Trans-boundary Movement of Hazardous Wastes and their Disposal 1989, and the ASEAN Agreement on the Conservation of Nature and Natural Resources 1985. Under Article 76(1) (a) of the Constitution, the Federal Government may make laws for the implementation of its obligations under these international conventions even if the matters fall under the State List.

(3) Environmental Management

In many countries SWM is an integral part of environmental management. There is no direct reference to the control and regulation of environmental pollution in the Constitution, as concern for the environment and control of pollution are relatively new issues.

In the Federal List, Item 8 "Trade, commerce and industry" - sub-item (k), which relates to "factories, boilers, machinery, and dangerous trades" and sub-item (l) relating to "dangerous and inflammable substances" are the only specific items which may be inferred to impinge on environmental issues.

There are however more items under the State List. Item 2 which relates to "land, land improvement and soil conservation;" Item 4 which relates to "Local Government, including obnoxious trades and public nuisances in LA areas and local administration;" Item 6 which relates to "water, control of silt and riparian rights;" and Item 12 which relates to "turtles and riverine fishing" all of which may, by inference, relate to environmental concerns.

The Concurrent List also includes similar provisions. Item 3 for "the protection of wild animals and birds including national parks;" Item 5 for "town and country planning;" Item 7 includes "public health, sanitation and the prevention of diseases;" Item 9 includes "the rehabilitation of mining land and land which has suffered soil erosion;" and Item 8, which relates to drainage and irrigation. All of the above may, in their particular areas, be inferred to include environmental concerns.

It would therefore appear that both the Federal and State Governments have power over environmental matters depending upon the subject matter under consideration. It has been established that any environmental law which is to be applied depends on the specific subject matter to which it applies and whether the State or Federal Government had powers on the matter. Environmental matters related to land, water and municipal services, for example, would be under the State Government.

The major by-laws related to SWM are the ***Refuse Collection, Removal and Disposal By-law***. This common by-law has been adopted by most LAs and applied for the management of solid wastes. The types of wastes identified in the by-law include commercial waste, garden refuse, household refuse, industrial waste, waste building material, and waste matter (this being related to by-products or rejects from manufacturing).

Within the Refuse Collection, Removal and Disposal By-law there is no specific provision relating to waste minimisation (reduce, reuse and recycle). The By-law, however, regulates the manner in which household refuse is to be stored and maintained (by-law 3), where wastes may be disposed (by-law 6 and 7), prohibits the removal or spillage of refuse (by-law 8), prohibits the burning of waste material which may cause nuisance or annoyance (by-law 9), and prescribes the fees for providing such services (by-law 11).

The other by-law, relevant to solid waste, which is made under the LGA, is the ***Anti-litter By-Law*** which is also a common law adopted by most LAs. This law empowers the LAs to prosecute any member of the public who litters public places or allows litter to accumulate within the LA area (by-law 3). The By-law also provides for buildings, markets, public houses and entertainment places to be maintained in good condition and to be kept clean (by-law 6, 7 and 8). By-law 10 gives powers to LAs to prosecute offenders who cause obstruction within any public place, street or footway.

(2) Local Authorities Ordinance, 1996 (Sarawak)

The Local Authority Ordinance 1996 (LAO) of Sarawak is similar in many respects to the Local Government Act, 1976 that is applied to states in Peninsular Malaysia. The general provisions for solid waste management are provided for under sanitation and public health. The main difference is that the provision of sewerage services is retained within the LA function although this has been deleted from the LGA with the enforcement of the Sewerage Services Act, 1993 in the Peninsula.

Section 91 of the Ordinance provides wide powers to LAs to make by-laws relating to such matters that are desirable for the maintenance of the health, safety, quality of life and well-being of the public and includes “to maintain cleanliness and the disposal of waste” (sub-section (u)). Section 105 of the Ordinance provides powers to LAs to make by-laws on sanitation and cleanliness and include powers:

- a. To establish, maintain and compel the use of any services for the removal or destruction of or dealing with, night-soil, slops, rubbish, litter, dead animals and all kinds of waste, refuse and effluent (sub-section (a)(i));
- b. To keep public places clean and free from filth, rubbish, litter or refuse and to prohibit the throwing, dropping or depositing of any filth, rubbish, litter, glass, tins and other containers, paper, dead animals, waste or flushing water or other refuse, liquid or solid, on or in any stream, channel, or other water-course (sub-section (a)(ii)); and
- c. To prohibit, remove, abate and prevent the occurrence of nuisances (sub-section (a)(iii)).

1.2.3 Review of Existing Legislation

Consistent with the constitutional position whereby State Governments appear to have jurisdiction over SWM, management of solid waste is covered by several State laws. Federal legislation that is specific for solid waste management is generally absent except in relation to environmental protection and management.

(1) Local Government Act, 1976 (LGA)

Local government administration is about providing essential services to the public. Such services include sanitation, solid waste management and public cleansing. In return for such services citizens pay rates to fund the activities of the authorities. The provision of such services and the collection of rates are governed by various laws. The principal legislation is the Local Government Act, 1976 (LGA). The LGA is a federally initiated legislation but adopted by the States and implemented by the LAs. This is intended to ensure that a uniform law is applied and adopted by all states.

The LGA applies throughout Peninsular Malaysia, while Sabah and Sarawak have their own separate legislation. It provides for the formation of LAs and governs their administration, operations, areas of control and regulation and financing. It also allows specific regulations to be enacted by the LAs to regulate specific matters such as to establish, maintain and compel the use of services set up for solid waste removal and public cleansing.

The LGA provides for the control of activities or nuisance within any LA area. The provisions of the Act that are relevant to solid wastes include:

- a) Maintain public health through the carrying out of sanitary services such as the removal of night soil, slops, rubbish, litter and all kinds of refuse and effluents;
- b) Keep public places clean and to prevent littering or depositing of any waste or filth;
- c) Prevent any waste from being allowed to flow into or discharge into drains or watercourses;
- d) Prohibit, abate, remove and prevent the occurrence of any nuisances;
- e) Preserve public health;
- f) Collect rates (either consolidated or separate) from any holding within the LA area to cover for services and other duties performed under the Act;
- g) Regulate various activities through the issue of licenses; and
- h) Enforce the provisions of the Act and its by-laws.

Sections 73 and 102 of the Act provide powers to LAs to make various by-laws to regulate specific activities. Most major LAs have enacted by-laws relating to the collection and disposal of refuse and wastes, including anti-litter provisions. However, there are no provisions within the LGA which relate specifically to waste minimisation.

Under provisions of sections 91, 93 and 105 of the Ordinance, the ***Local Authorities (Cleanliness) By-Law***, 1999 has been made which consolidates other by-laws that have been previously used by LAs in the State of Sarawak. These By-Laws are much more comprehensive than the Refuse Collection, Removal and Disposal By-law adopted by states in Peninsular Malaysia. The former By-law includes provisions for the collection and removal of wastes besides other provisions in respect to cleanliness and littering.

Definitions are given for “animal waste”, “garden waste”, “industrial waste”, “toxic industrial waste”, as well as “waste” in general. Part III of the By-law relates to the collection and removal of refuse and waste by the LA. By-law 9 provides for the LAs to determine, establish or maintain a system for the collection, removal and disposal of waste of every kind and the owners of premises within the LA are required to use these services and pay for them (by-law 10).

Although there is no specific mention of “waste minimisation”, it is implied that this can be made a requirement under by-law 9(4)(a) of the By-law which provides for the LA to “issue to owners or occupiers of premises under its area of jurisdiction, directions, on the manner in which waste from the premises should be handled, prepared or deposited for collection and removal”. Under these provisions, directives for waste separation and recycle can be made a requirement.

An interesting feature of the By-law is the power for LA to “require the occupier or any work place or premise to ***recycle or treat any industrial waste*** found or produced in these work place or premise at his own expense before it is brought to any disposal facility for disposal” (by-law 48). By-law 49 further states that “no toxic industrial waste or the residue from the treatment shall be brought to any public disposal facility for disposal or treatment without the written permission of the LA”.

(3) Local Government Ordinance 1961 (Sabah)

The Local Government Ordinance 1961 (LGO) of Sabah is not unlike the LGA which is applicable for Peninsular Malaysia and the LAO for the State of Sarawak. The provisions of the legislation allow the setting up of LAs and provide authority to LAs over a wide range of functions. These functions are spelled out in Part V (section 49(1)) of the LGO and include:

- a. Keep clean streets, bridges, squares, playing fields and other open or closed public places in the (LA) area (section 49(1)(39));
- b. Require any owner or occupier of land to keep such land in a clean condition (section 49(1)(41));
- c. License and control (including dealers in scrap metal) (section 49(1)(46)(v)).

Section 38 of the LGO also determines that the function of the LA include the “Control and care of public places, streets, etc., in urban areas”. However, there is no specified provision that relates to the provision of waste collection, treatment or disposal services to owners or occupiers of premises, unlike that in the LGA (section 73(1)(a)(i)). The closest provision relates to “keep clean streets, bridges, squares, playing fields and other open or closed public places”, as mentioned above.

A review of information for the Dewan Bandaraya Kota Kinabalu (DBKK) has shown that Anti-litter By-laws relating to littering and disposal of refuse in public places has been enforced. There is no by-law that relates to the collection, treatment and disposal of wastes from household, commercial or other premises. The management of municipal solid waste is undertaken by the Health and Urban Services Department of the DBKK, and it includes “manage services for the collection of refuse and enhance the management of solid wastes in DBKK”. It is presently unclear under which provisions of the Ordinance is management of solid wastes (including waste minimisation), undertaken in the state. By-laws relating to this function are also not available.

(4) Street, Drainage and Building Act, 1974 (SDBA)

The carrying out of any works for streets, buildings or drains is controlled under the Street, Drainage and Building Act, 1974 (SDBA). The SDBA provides power to LAs to control the deposition of any refuse, wastes or unwanted material onto any street, building or drains. The deposition of any thing or article on to streets such as to cause an obstruction is prohibited. In fact frontages of streets have an obligation to keep the adjoining street clean (section 44).

The construction of any building on ground which has been used as a landfill is prohibited (section 76). Building and Earthworks By-laws have been made by most LAs or State authorities to control the carrying out of works. These By-laws contain provisions to control the effects of construction, and disposal of wastes arising from such activities.

(5) Environmental Quality Act, 1974 (EQA)

The EQA, a Federal law, is the principal legislation pertaining to environmental protection. Various sections of the EQA provide controls over air, water, soil and noise pollution. Section 21 provides powers for the Minister (of Natural Resources and the Environment) to specify the acceptable conditions for emission or discharge of waste, pollutants or noise into any area of the environment while Section 51 provides powers for the Minister to make regulations for various purposes. Pursuant to these provisions, several regulations have been enacted.

The Environmental Quality (Licensing) Regulations 1977 provides for licensing of prescribed premises or any premises that emit or discharge wastes or noise (greater than the prescribed volumes, intensity or quality) into the environment. The Environmental Quality (Sewage and Industrial Effluents) Regulations 1979 regulate effluent discharges from domestic, industrial and other point sources of pollution (such as leachate from sanitary landfills).

The Environmental Quality (Scheduled Waste) Regulations 1989 imposes controls on “Scheduled Wastes”, which are generally classified as toxic and hazardous, and include mainly wastes from industry but also some wastes from domestic sources (also known as hazardous household wastes and include items such as batteries, fluorescent lamps, pesticide containers, and others). The different categories of wastes subject to the law are spelled out in Part I and Part II of the First Schedule of the Regulations. The list does not differentiate between wastes that are of domestic, institutional, commercial or industrial sources. For example, used or off-spec inks, paints and solvents, contaminated

containers (pesticide, glues, solvents, etc), contaminated rags and other absorbent material are scheduled wastes. Clinical wastes that are generated from hospitals, clinics and other medical facilities fall within the same classification.

Section 34(A) of the EQA provides for environmental impact assessment of prescribed activities. The Environmental Quality (Prescribed Activities) (Environmental Impact Assessment) Order 1987 prescribes various activities, for which an assessment of the environmental impacts be undertaken and a report submitted to the Director General of Environment for approval. Activities related to waste treatment and disposal of toxic and hazardous wastes and municipal solid wastes are regulated by this Order. Construction of incineration, composting and recovery/recycling plants and all landfills require an EIA to be undertaken.

The EIA requirement is a preventive measure to ensure that project proponents give due consideration to environmental matters in the planning and implementation of proposed projects. All new facilities for solid waste disposal and treatment are subject to the process of an EIA. The EIA process consists of two major procedures, namely the preparation of a preliminary EIA or a detailed EIA report, and the Review of the report. Whilst all prescribed projects undergo the preliminary EIA process, the Department of Environment (DOE) may require a detailed EIA to be undertaken where it is deemed that the activity is likely to have major impacts to the environment. In both the preliminary and detailed EIA process, the EIA report has to be approved by the Director General of DOE. The approval is then forwarded to the relevant project approving authorities, which may be a State or Federal authority, for decision on its implementation. Project monitoring, enforcement and auditing are the responsibility of both the DOE and the respective implementation agencies.

Amendments introduced in 1996 make provision for encouraging recycling of products. Section 30A enables the Minister to prescribe any substance as hazardous and require the substance “to be reduced, recycled, recovered or regulated” in a manner to be prescribed by the Minister. Furthermore, any product may be required to contain a minimum content of recycled substances. Section 30B allows the Minister to specify guidelines and procedures on deposit and rebate schemes for the disposal of products that are considered to be “environmentally unfriendly or causing an adverse constraint on the environment” so that the products may be recycled or disposed off in a sound manner. These provisions are far reaching and would enable the DOE and the nation to step into an era where products are designed with environmental friendly disposal in mind. These provisions have not been implemented as yet.

(6) Natural Resources and Environment (Amendment) Ordinance, 2001

The Natural Resources and Environment (Amendment) Ordinance, 2001, or NREO, is a state legislation applicable for the State of Sarawak. The legislation although specific for the conservation of natural resources, nevertheless makes reference to management of municipal wastes.

Section 18(s)(i) of the NREO provides for the state authority to make rules relating to the regulation and control of the construction, management and the operation of landfill for municipal wastes or any site or area used or be used for the storage, disposal, treatment, recycling or decomposition of municipal wastes. Sub-section (z) of section 18 also allows the authority to prescribe incentives for carrying out measures which are

necessary to protect and conserve natural resources for the protection and enhancement of the environment. The above provisions are meaningful for the promotion of waste minimisation as often such activities require incentives where market forces are not entirely favourable for purely private initiatives.

(7) Other Legislation

There are other legislations that have implications to waste management and this includes those that the Police enforce. Based on information from the Police website, it has been indicated that dealing with second hand goods requires a licence to be obtained and this has to be made using form POL. 292. However, it is unclear under what provisions of the law such a licence is issued. Similarly, the collection of scrap and other used products also require that a licence be obtained from the Police. While mention has been made that this comes under the Used Materials Act, 1946, it was not possible to obtain a copy of this legislation for confirmation.

A new *Solid Waste Management Act* (SWM Act) has been proposed to be adopted which will be more comprehensive compared to current legislation. Presently no details of the legislation have been made available to the study to review. It has been indicated that various classification of wastes types and their definition is included in the legislation. The waste categories defined within the SWM Act include “solid waste, industrial solid waste, and construction solid waste”. The scope of the law does not include scheduled wastes prescribed under the Environmental Quality Act 1974 or sewage under the Sewerage Services Act 1993. It is unclear if the law includes hazardous household wastes that may be considered “scheduled”. It is also unclear if specific provisions for waste minimisation and for waste reduction, reuse and recycle are identified within the proposed Act.

(8) SWM and Waste Minimisation

As mentioned earlier, solid waste management (SWM) and public cleansing, traditionally, have been Local Government services. SWM legislation in the Peninsula is currently largely based on the LGA and the SDBA, which are federally initiated laws adopted by the States and implemented by the LAs (which are the responsibility of State Governments). There is currently an absence of a significant role for the Federal Government in the control and regulation of SWM. However, the Federal Government has given significant amounts of loans and grants, either on an annual basis or on a project basis, to state and local governments for activities and facilities for SWM.

Within the State of Sarawak and the State of Sabah, the Local Authorities Ordinance 1996 (LAO) and the Local Government Ordinance 1961 (LGO), are state legislations that apply to the two states respectively. The LAO is the more comprehensive of the two legislations and is comparable to the LGA. However, there is currently no Federal or State legislation that deals comprehensively with all aspects of SWM including waste minimisation.

The LGA and SDBA lack sufficient depth and coverage to manage SWM in a more efficient manner. The Refuse Collection, Removal and Disposal By-law, deals only with the manner of disposal of waste by households and commercial/industrial establishments and its collection. The definition of waste within the by-law does not clearly define the scope of what this waste is and there are no provisions for waste

segregation or minimisation. It is only in the Local Authorities (Cleanliness) By-laws 1999 made under the LAO which has provisions for possible implementation of the requirements for waste separation at source and hence recycle of materials. All other existing by-laws under the LGA and the LGO do not have such provisions. However, it is presumed that waste segregation and waste recycle can be made a requirement by way of guidelines issued by LAs but this can be ignored by households and occupiers of premises.

Currently the Concessionaires for SWM enter into annual interim contracts with various LAs where they provide their services. The relationship between the LA and Concessionaire is largely contractual (in the provision of collection services mainly), and based on a standard interim agreement drawn up by the MHLG and the Economic Planning Unit (EPU) of the Prime Minister's Department. A regulatory role for the overall control of private operators is currently lacking due to the absence of comprehensive legislation for SWM.

The continuing interim nature of the relationship between the concessionaires and the LAs has also imposed severe constraints on planning and development of SWM services in all LAs. The Concessionaires and other SWM operators rely on the LA for enforcement in terms of anti-littering measures and solid wastes collection. The operators have no legal backing and little or no incentive to undertake enforcement or other matters such as waste minimisation.

The rates collected by LAs to pay for SWM are presently a consolidated rate for all services provided by the authority and are sanctioned under the LGA or the respective state ordinances. The rates are generally based on the valuation of holdings within the LA and not on the cost of services provided by the latter. Enforcing the "user pays principle" for SWM and direct collection by the operators to cover for the cost of services will require changes to the LGA and the LGO but this is not the case for the LAO where the present by-law allows for the collection of such fees, rates or charges as the LA may determine for the services provided (see by-law (9)(2) of the Local Authorities (Cleanliness) By-law 1999).

It would appear that stakeholder participation in SWM is not provided for in the legislation that has been reviewed. Legal provision would need to be made to ensure/encourage the participation of stakeholders, which would be essential for the future success of solid waste management in the country. This is especially so for waste minimisation as there are no legal provisions or incentives for the public and other waste generators to adopt waste minimisation.

The Federal Government has initiated the privatisation of SWM on a national basis and the formulation of a new Solid Waste Management Act. Until the new Act is in place, rationalisation of SWM services and the promotion of waste minimisation in the country will face difficulties. Within this new law the provisions for waste recycling and minimisation will need to be given due attention as experience in other countries have shown that comprehensive legislation and guidelines will need to be given for waste minimisation to succeed. The adoption of the "stick and carrot" approach is likely to be the means to meet the targets of waste minimisation of 22% set for 2020.

1.2.4 Institutional Structure for SWM

(1) Introduction

The present management of solid waste may appropriately be divided according to the major players involved at various levels and their degree of involvement. The major players are the Federal and State/Local Governments and the private/commercial operators. Local governments (or authorities), which are responsible for management of local affairs, are the lowest level of government within the structure of the government system in the country. Except for the Federal Territories and Putrajaya, LAs (LA) are subservient to the State Government.

At the operating level there would be numerous stakeholders. This would include the concessionaires or privatised main service providers (Alam Flora, Southern Waste, Environment Edaman, Trineken (in Sarawak)), subcontractors, transport operators, disposal and or landfill site operators, recycling vendors, equipment and chemical manufacturers, R&D institutions, industry associations, and others. The main federal and state agencies relevant to solid waste management are provided in Table 1.2-1 and Table 1.2-2.

Table 1.2-1 Federal Ministries and Agencies Relevant to SWM

Agencies	Current Functions in SWM	Relevant Legislation
1. Federal Ministries and Agencies		
Ministry of Housing and Local Government (Dept. of Local Government)	<ol style="list-style-type: none"> 1. National policies on SWM and Secretariat to the National Council for Local Government 2. Provision of technical assistance to LAs 3. Establishment of LAs 4. Funding of some local government projects and services 5. Planning, coordination and monitoring of federally funded SWM projects 6. Planning of cleanliness and beautification programmes for LAs 7. Planning and promotion of recycling activities 	(LGA, SDBA)
Economic Planning Unit, Prime Minister's Department	<ol style="list-style-type: none"> 1. Development planning (5-year development plans) 2. Privatisation of SWM 3. Approval of Federal funded projects for SWM 	
Ministry of Finance	<ol style="list-style-type: none"> 1. Approval and provision of funds for local government projects and services 	
Ministry of Natural Resources and the Environment (Dept. of Environment)	<ol style="list-style-type: none"> 1. Enforcement of the EQA 2. Review of EIA for landfills, incinerators, composting, recovery and recycle facilities 3. Determination of environmental standards 4. Promotion of waste recycling and waste minimisation. 	EQA and subsidiary regulations
Ministry of Health (Engineering Services Division)	<ol style="list-style-type: none"> 1. Technical advice and promotion of public health and sanitation programmes 2. Promotion of SWM in rural areas 	LGA
Ministry of Intern. Trade and Industry (including Malaysian Industrial Dev. Authority –MIDA)	<ol style="list-style-type: none"> 1. Promotion of local and foreign investment in manufacturing and related services sector 2. Evaluation of applications for licences and incentives 3. Planning for industrial development 	Industrial Coordination Act, 1975, Promotion of Investment Act, 1986
Ministry of Domestic Trade and Consumer Affairs	<ol style="list-style-type: none"> 1. Regulate prices of essential commodities 2. Licensing and control of essential commodities 3. Consumer protection 	Various (10) consumer regulations
Ministry of Energy, Water & Communication (Energy Commission)	<ol style="list-style-type: none"> 1. Promote the development of renewable energy including municipal wastes 2. Increase in energy efficiency 3. Minimisation of negative impacts due to energy production, utilisation and consumption 	

Table 1.2-2 State Government and Agencies Relevant to SWM

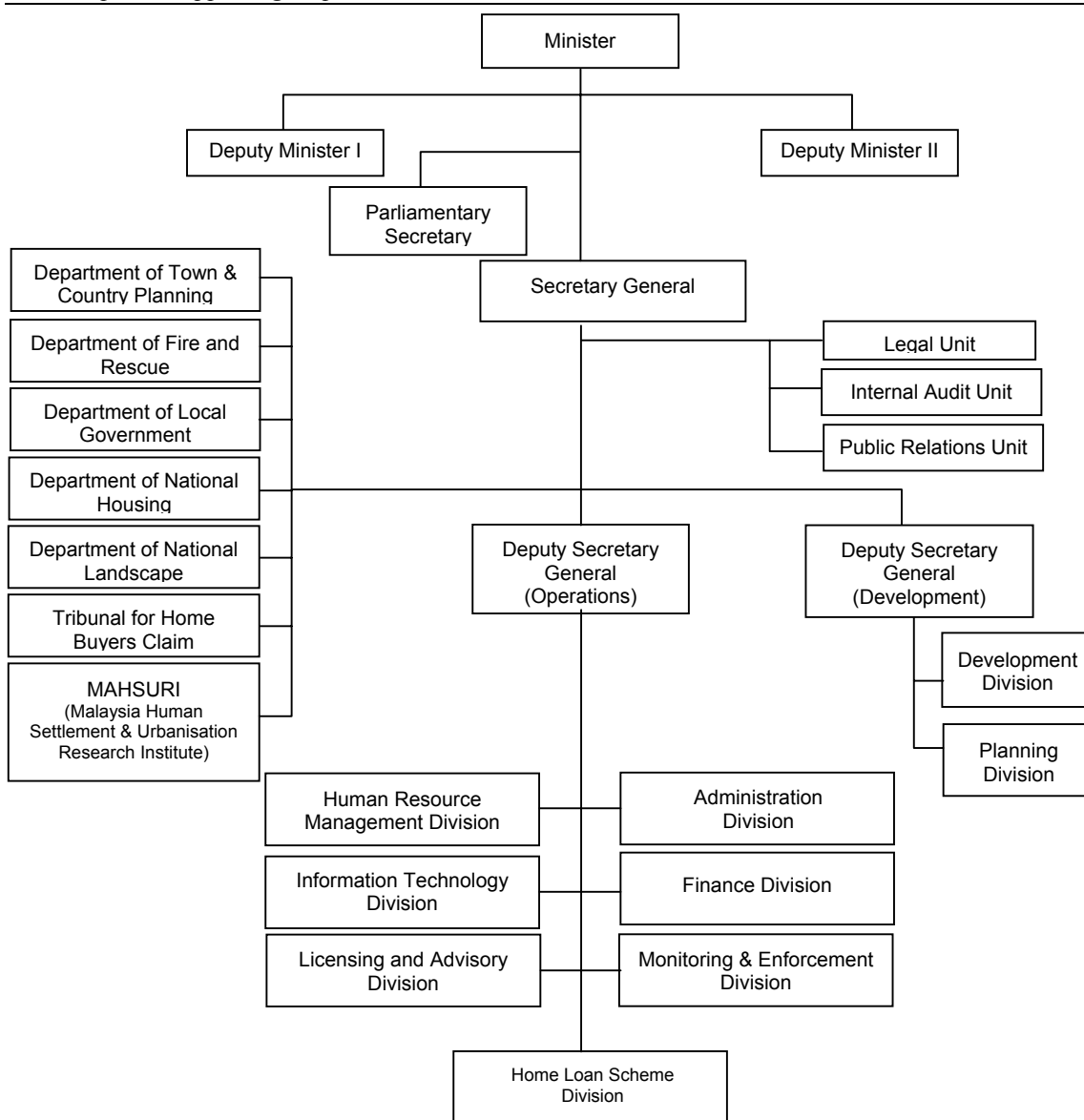
Agencies	Current Functions in SWM	Relevant Legislation
2. State Governments and Agencies		
State Government	<ol style="list-style-type: none"> 1. Establishment of LAs 2. Approval/gazetting of projects and by-laws of LAs 3. Monitor, coordinate and set policy directions for LAs 4. State funding of SWM 5. Approval/ allocation of land for SWM facilities 	LGA, LAO, LGO, SDBA
State Economic Planning Unit	<ol style="list-style-type: none"> 1. Planning coordination within state 	
Dept. of Environment	<ol style="list-style-type: none"> 1. Enforcement and monitoring of environmental quality and compliance to environmental regulations 	EQA and subsidiary regulations
Dept. of Health	<ol style="list-style-type: none"> 1. Provision of public health services 	
Dept. of Town & Country Planning	<ol style="list-style-type: none"> 1. Land use and development planning control and approval 	Town and Country Planning Act, 1976
3. LAs		
City, Municipal & District Councils	<ol style="list-style-type: none"> 1. Planning, development and management of all SWM facilities and services 2. Appointment/ licensing of contractors for services or provide the services directly. 3. Monitoring and enforcement of the laws on SWM and cleanliness 4. Collection /disbursement of fees, rates or charges 	LGA, LAO, LGO, SDBA and by-laws.

(2) Federal Government Agencies

1) Ministry of Housing and Local Government (MHLG)

Local government is a State matter in the Constitution. However, despite the constitutional position, the Federal Government has taken upon itself the responsibility to ensure that effective local government services are provided to the general public. This responsibility is channelled through the MHLG, the organisation of which is shown in Figure 1.2-1. Within the MHLG, the Department of Local Government handles all related matters pertaining to this issue.

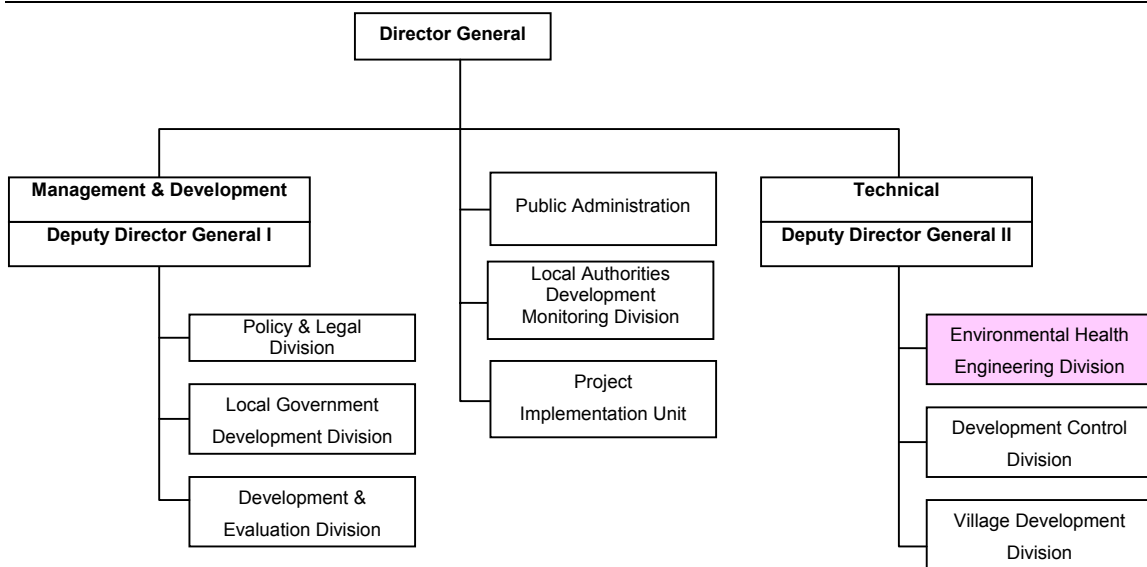
The MHLG is responsible for the development of national policies related to local government. It plays a coordinating role pertaining to the development, financing and operations of LAs. All LA applications for Federal Government financial and development assistance are channelled through the Ministry for consideration before it is forwarded to the central agencies for approval. Issues such as privatisation of SWM services, the proposed SWM Act, as well as the National Recycling Programme are matters that have been directly under the purview of this Ministry.



Source: MHLG

Figure 1.2-1 Organisation Chart – Ministry of Housing and Local Government

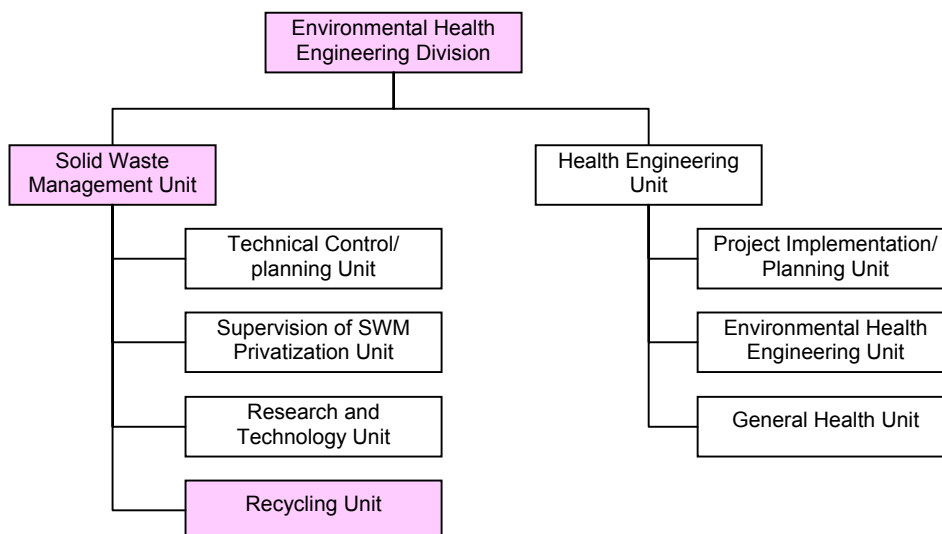
The Department of Local Government (see Figure 1.2-2) is the implementing arm of the Ministry and has been active in developing uniform standards, by-laws and guidelines for use by LAs as well as the National Recycling Programme. The Department is also the Secretariat for the National Council for Local Government, which is the supreme body for the coordination of all policies and laws related to LAs. Any move to change existing laws or introduce new laws related to local government is required to be submitted for consideration by this Council.



Source: MHLG

Figure 1.2-2 Organisation Chart – Department of Local Government

The Environmental Health Engineering Division is the main arm of the Department which has responsibilities for matters relating to solid waste management. Its functions include the promotion of recycling activities under the National Recycling Programme besides the other functions of providing technical assistance to LAs in SWM. Recycling Unit is responsible for enhancement of 3Rs activities in the Division.



Source: MHLG,2006

Figure 1.2-3 Organisation Chart – Environmental Health Engineering Div.

Traditionally, the Public Works Department (PWD) is the government agency in charge of planning, construction, supervision and maintenance of public works such as infrastructure, buildings, water supply and other facilities. These include projects undertaken by the federal, state or local governments. However in the area of SWM, this function has been taken over by the Department of Local Government which has

set up a special unit for implementation of projects. This unit is referred to as the Project Implementation Unit (PIU) and its main function is to plan, manage and supervise waste treatment and disposal projects.

2) Economic Planning Unit, Prime Minister's Department

The EPU is one of the central agencies of the Government for planning. Specifically it is charged with charting the economic development of the nation. National development plans are produced by the EPU every five years and this will include matters pertaining to SWM. Financial allocations for development projects are largely determined in accordance with the five-year plans.

The EPU is also responsible for privatisation programmes. The appointment of the concessionaires for the management of solid wastes was undertaken by the EPU. Major capital investments in solid waste management facilities such as incinerators or sanitary landfills, particularly where it involves federal funding, would generally require the approval of the EPU.

3) Ministry of Finance

The Ministry of Finance is also a central agency. It is the approving agency for all budgetary and financial allocations to government agencies. Annual allocations are approved by this Ministry. Allocations of grants or loans to LAs would require the approval of this Ministry.

4) Ministry of Natural Resources and Environment (MNRE) - Department of Environment (DOE)

The DOE within the Ministry is the principal agency charged with the responsibility for the prevention, control and regulation of environmental pollution. It is the main implementing agency for the EQA.

In relation to wastes management, the DOE's emphasis is on the control and regulation of scheduled wastes, while control on the management of non-scheduled solid (municipal and industrial) wastes rests with the LAs. The DOE however has powers to impose controls on SWM facilities particularly where it involves incinerators, landfills or waste recycling facilities, through the EIA provisions. The DOE has issued the EIA Guidelines for Municipal Solid Waste, Sewage and Disposal Projects. This code and the other existing regulations provide advice to the LAs on the development and siting of landfills and incinerators.

Though the EQA provides for measures to encourage recycling the DOE has not embarked on programmes related to this matter on a national scale. However, in the area of scheduled wastes it promotes waste minimisation and recycling among industries and this is undertaken by way of licences. Further promotion of waste minimisation should be considered in the future for new and existing projects and activities approved by the DOE.

5) Ministry of Health – Engineering Services Division

The Ministry of Health (MOH) is responsible for public health in the country. Its role in SWM however is, at this juncture, confined to ensuring that solid wastes are

disposed off in a hygienic way in areas where no LA has jurisdiction. Such areas are largely rural areas. However it appears that much of the expertise related to SWM rests with the MOH, more specifically within the Engineering Services Division. Staff from this division has traditionally been seconded to MHLG to meet the needs of the Ministry. Thus, when sewerage services were taken over by the Federal Government, the new agency created was staffed by officers from this Division.

The MOH's outreach programme through the Public Health Assistants and the Public Health Inspectors is effective in managing public health at most LA areas. Courses conducted at the Public Health Institute endow these officers with the necessary competence to undertake such programmes. The Ministry also has an ongoing public awareness programme to promote health via the media and by direct community participation.

6) Ministry of International Trade and Industry

The Ministry, also known as MITI, is not directly involved in SWM but plays the role of promoting local and foreign investment in manufacturing and related services sector. This function is mainly undertaken by the Malaysian Industrial Development Authority (MIDA). It is taken that services sector investments include projects that utilise or recycle wastes. Various incentives can be obtained which can benefit such investments.

Licences issued by MITI to manufacturing industries are often subject to various conditions of approval. However, waste minimisation is presently not a feature in the conditions of approval for such projects although it is felt that such conditions can be imposed in the future. The requirement for new industries to commit to waste minimisation is a positive approach to enhance waste reduction, reuse and recycling. Incentives to promote this can also be introduced other than those that are already in place (such as pioneer status, tax breaks, and others).

MIDA offers incentives for waste recycling activities. Companies undertaking waste recycling activities that are high value-added and use high technology are eligible for the following tax exemptions/allowances.

- (i) Income tax exemption on 70% of statutory income for 5 years, or
- (ii) Investment tax allowance of 60% of capital expenditure incurred within a period of 5 years to be set off against 70% of the statutory income in the assessment year

Those activities include the recycling of agricultural wastes or agricultural by-products, recycling of chemicals and the production of reconstituted wood-based panel boards or products.

7) Ministry of Domestic Trade and Consumer Affairs

The Ministry, like MITI, is not directly involved in SWM but has its main function to regulate the availability and prices of essential commodities. Its other role is in the protection of consumers and this will be by way of ensuring that consumer rights are protected. There is presently no active role of the Ministry in the promotion and control of waste minimisation especially among suppliers and retailers. It is possible

that the Ministry can play a lead role in promoting more environment friendly products such as the use of degradable plastics, reduction of product wrapping, increase use of recyclable materials and other means in consumer products.

8) Ministry of Energy, Water and Communications

The Energy Commission under the Ministry has an active programme to promote energy efficiency and the development of renewable energy sources, such as municipal solid wastes. The objective is to intensify the development of renewable energy (RE) as the fifth fuel resource and reduce dependency on traditional fossil fuels. It is targeted that RE will contribute 5% of the country's total electricity demand by the year 2005. However, many obstacles hinder the achievement of this target and foremost of this is the poor returns on investments for RE projects. A re-examination of these obstacles will certainly enhance the development of RE and promote the utilization of wastes.

(3) State Agencies

1) State Government

As highlighted in the earlier part of this review, States under the Constitution, are empowered to look after local government outside of Federal Territories and these include local administration, local government services, local rates, obnoxious trades, public nuisances and other related matters in LA areas. LAs are established by the State and are subservient to it. In general the policy direction of LAs is set by the State, which also provides funding, although there is some degree of independence of LAs in making decisions relating to projects and developments within the LA.

2) State Economic Planning Unit

The State Economic Planning Unit (SEPU) is an extension of the Federal EPU and is responsible for the planning of all socio-economic development programmes in the States. It services all preparation of the programme submitted by the various state agencies and finalises them before submission for inclusion in the Malaysia Plan. These generally relate to projects that are proposed by LAs and these are forwarded to the States for approval. In relation to SWM the SEPU only plays an indirect role and facilitates projects for SWM but the final decision often rests with the EPU under the Prime Minister's Department.

3) State Town and Country Planning Department

The State Town and Country Planning Department is responsible for the development control and policies of land uses, the preparation of structure and local plans for residential, commercial, industrial, and other land uses. The department also assists the LAs in the preparation of local plans of a specific local planning area. Its role in SWM is minor and indirect, such as assistance in determining suitable areas for waste treatment and disposal.

4) State Department of Environment

The functions of the state DOE include:

- Enforcement of regulations and compliance checking;
- Review of EIA reports;
- Review of applications for sitting of new industries/development projects not subject to EIA;
- Licensing of prescribed premises and contravention licence;
- Awareness programmes.

The role of the State DOE is indirect and is more relevant to the management of scheduled wastes. It does not involve itself in municipal solid waste management but advises on the selection of sites for the development of waste management facilities, such as landfills, incineration plants, recovery plants, and other treatment facilities.

5) The State Health Department

The State Health Department is responsible for the overall protection of public health against food, water and environment-related diseases. The department is involved in the protection of public health at all state and district levels. It does not play a direct role in SWM at the state level but actively promotes cleanliness and good public health practices.

(4) LAs

1) Local Authority Functions

LAs operate as a city council, municipal council or district council administering a pre-defined local administrative area. The powers of LAs are vested in the Local Government Act 1976 (LGA), and the Street, Drainage and Building Act, 1974 (SDBA). In addition, LAs have also been vested with powers to implement the Town and Country Planning Act 1976 (TCPA).

City councils are established for those large urban areas which have been conferred city status (generally an area having a very large population). Municipal councils are established for areas with more than (100,000) population. District councils are administered by District officers who are also in charge of the overall administration of the district. These districts may be largely rural in nature with very small urban conurbations. All these councils are created by the State Governments in consultation with the MHLG and are established by virtue of the provisions of the LGA.

It is to be noted that there are areas within a state that do not fall within the jurisdiction of any LA. These areas are rural with small communities, more often referred to as villages. Such areas fall within the jurisdiction of District Administrations under the purview of a District officer appointed by the state.

The functions of the LAs can be categorised in terms of their activities. These activities include the following:

- a) Determination of local policy or broad guidelines for action;

- b) Planning and budgeting for the five-year socio-economic development programmes and annual programmes within the policy framework (directed and approved by the State Government in respect of the municipalities and LAs) given the financial and administrative constraints;
- c) Control or regulation of new development and activities that could create a public nuisance or be injurious to health;
- d) Provision of services, which can be broken down into sub-activities such as programme planning, development and operation;
- e) Monitoring of the social and physical environment, including aspects of environmental quality and health; and
- f) Financial management including determining tariff and assessment rates.

LAs have heavy responsibilities since they look after largely urbanised areas where developmental activities are the most intense and rapid. The LAs are the local planning authority. They have an important role in implementation of decisions on land use determined within Structure and Local plans approved by the State, as well as the approval of building plans and the development of urban drainage, utilities and road infrastructure. The control of developmental activities that have potential to impact the physical, biological and human environment as a result of earthworks is also an important function of LAs.

In relation to matters concerning LAs, the powers of the State over LAs, include:

- Accept or otherwise any legislation relating to LAs that is formulated by Parliament,
- Control changes to boundary, incorporation of new areas and approve the status of a LA,
- Appoint Council Members, Mayor or the President of a LA,
- Approve expenditure of LA (Federal territories are excluded),
- Approve appointments of LAs (Federal territories are excluded), and confirm by-laws made by LAs.

As mentioned earlier, LAs are subservient to the States and hence cannot act independently on most matters. The importance of the State Government in SWM cannot be ignored and needs to be given due attention in the formulation of any programme for waste minimisation.

2) Organisation and Administration

The general organisations of LAs are quite different depending on the size and the status of each LA. In general all LAs are headed by a Mayor for city councils and a President for either municipality or district councils. Each LA is advised by a Council, or in some cases a Board, which comprises of members appointed by the State. The

Council is more advisory but has the responsibility to approve development and operational expenditure of the LA.

Most LAs organisations consist of a corporate section that deals with administration, finance, human resources management, property management and public relations. There is also a planning section that has the role to prepare and monitor the implementation of local, structure or developments plans, and approval of planning permission for projects submitted to the council. The development section of most council would include those that deal with engineering and architectural development works, valuation and assessment, tenders and contracts and other related matters.

SWM represents one of the services within the functions of the services section of most LAs. Other services which are within the responsibilities of LAs include enforcement, licensing, public cleansing, maintenance of markets and public places, landscape, and those that deal with the control of traffic and parking. In LAs in Sabah and Sarawak, the function of sewerage services is still maintained as such services have not been federalised for the two states.

SWM within an LA is generally the function of the health, urban services, or cleansing departments within the organisation (Table 1.2-3 and Table 1.2-4). These departments are also expected to be responsible for waste minimisation and recycling programmes that are to be implemented. Where waste collection and disposal services function have been taken over by the Concessionaires, man-power within such LAs have been significantly reduced, since most of the field staff have been taken over by the Concessionaires. In such cases only skeletal staff is left to monitor and to oversee the performance of the Concessionaires and to respond to complains from the public.

It is also noted that the financial position of most LAs is weak and this is a result of the limited sources of finance that LAs have at their disposal. The main source comes from assessment tax with other sources from parking charges, planning and licence fees, and charges from the use of some public facilities. There is limited funding from the state and federal authorities and most of these are for development purposes. The weak financial situation of LAs limits the number of professional and technical personnel that can be employed particularly for those departments that deal with engineering works, planning and urban services.

Table 1.2-3 Summary of LAs in Peninsular Malaysia

No.	LAs	Department for SWM	Manpower	Legislation
1	Dewan Bandaraya Kuala Lumpur	Garden & Urban Cleansing Control	NA	Undang-undang Kecil Pemungutan, Pembuangan dan Pelupusan Sampah-sarap (Wilayah Persekutuan) 1982
2	Majlis Bandaraya Ipoh	Urban Services	1065*	NA
3	Majlis Bandaraya Johor Bahru	Public Health	NA	NA
4	Majlis Bandaraya Melaka Bersejarah	Urban Beautification	98	NA
5	Perbadanan Putrajaya	City Services	NA	Local Government (Compounding of Offences) (Perbadanan Putrajaya) By-Laws 2000
6	Majlis Perbandaran Klang	Health & Licensing	NA	NA
7	Majlis Perbandaran Kluang	Development	NA	Undang-undang Kecil Pemungutan, Pembuangan dan Pelupusan Sampah-sarap 1985
8	Majlis Perbandaran Kuala Terengganu	Licensing, Urban Services & Public Services	NA	Undang-undang Kecil (Kebersihan Awam) Majlis Perbandaran Kuala Terengganu 1979 - Tr.P.U 11/81
9	Majlis Perbandaran Kuantan	Cleansing & Health Control	11*	Undang-undang Kecil Pemungutan, Pembuangan dan Pelupusan Sampah-sarap (MPK) 1983
10	Majlis Daerah Hilir Perak	Cleansing	235	Undang-undang Kecil Pemungutan, Pembuangan dan Pelupusan Sampah-sarap (MDHP) 1991
11	Majlis Daerah Segamat	Health	200	Undang-undang Kecil Pemungutan, Pembuangan dan Pelupusan Sampah 1985
12	Majlis Daerah Bachok	Health & Licensing	NA	Undang-undang Kecil Pemungutan, Pembuangan dan Pelupusan Sampah
13	Majlis Daerah Baling	Urban Services	84	Undang-undang Kecil Pelupusan Sampah PBTNK, 1983

Note: NA means Not Available or not stated in the respective websites.

* means data extracted from Solid Waste Management Study.

For Kuantan, only 11 officers are left monitoring the solid waste collection; 456 workers are now paid by Alam Flora.

Table 1.2-4 Summary of LAs in Sarawak and Sabah

No.	LAs	Department for SWM	Manpower	Legislation
Sarawak State				
1	Majlis Bandaraya Kuching Selatan	Public Health	NA	NA
2	Dewan Bandaraya Kuching Utara	Public Health	NA	Undang-undang Kecil PBT (Kebersihan), 1999
3	Majlis Perbandaran Miri	Public Services & Maintenance	NA	Undang-undang Kecil Majlis Perbandaran Miri
4	Majlis Perbandaran Sibiu	Public Health	NA	Undang-undang Kecil Majlis Perbandaran Sibiu
5	Majlis Daerah Lawas	Public Health	NA	NA
Sabah State				
1	Dewan Bandaraya Kota Kinabalu	Health & Urban Services	NA	Undang-undang Kecil Majlis Perbandaran Kota Kinabalu (Anti Sampah-sarap) 1984 Undang-undang Kecil Majlis Perbandaran Kota Kinabalu (Pengekalan dan Kesihatan) 1984
2	Majlis Perbandaran Tawau	Operation & Enforcement	NA	Undang-undang Kecil Majlis Daerah Tawau (Anti Sampah-sarap) 1980
3	Majlis Daerah Keningau	Urban Cleansing Services	NA	Undang-undang Kecil Majlis Daerah Keningau (Anti Sampah-sarap) 1984

Note: NA means Not Available or not stated in the respective websites.

The closed nature of LA organisations also means that there is a limited career opportunity for those who join them. Further, except for the large LAs (city councils), most are headed by nominated administrators who may be transferred at any time, while in most District councils these are headed by the District Officer who has multiple functions and responsibilities. This situation does not auger well for the development of the smaller LAs and the role that they can play in SWM, particularly in waste minimisation, has to be reviewed if the latter is to succeed.

(5) National Councils

The National Councils are national level sectoral councils which report directly to the Federal Ministerial Cabinet and advise the Federal and State Governments on sectoral policies and guidelines. Presently, the Councils that have relevance for solid waste management include:

- a) National Land Council (NLC),
- b) National Council for Local Government (NCLG), and
- c) Environmental Quality Council (EQC).

The NLC and the NCLG are policy bodies that are represented by the relevant Federal Ministries and all the State Governments and are chaired normally by the Prime Minister or his Deputy. These are consultative bodies which also formulate policies to be adopted by all states. These bodies thus act to create uniformity in land and local government matters that are common to all states.

The NLC is responsible for matters relating to land and plays an indirect role in SWM. The NCLG is an important body responsible for matters relevant to planning and local government functions. It is entrusted to formulate from time to time a national policy for the promotion, development and control of local government throughout the country and for the administration of any law relating to this (Article 95A(5)). The Federal and State governments are required to follow such policies that are adopted. It is also stipulated within the Constitution that the Federal and State governments are required to consult the NCLG in respect of any legislation dealing with local government and it shall be the duty of the NGLC to advise those governments (Article 95A(6)).

The EQC on the other hand is a body appointed by the Minister of Natural Resources and the Environment to advise him on matters relating to the provisions of the Environmental Quality Act. The EQC consists of members from Federal Ministries and Departments as well as non-governmental organisations and is chaired by an independent person appointed by the Minister. The EQC plays a non active role, except when called to discuss a matter referred to it, and does not normally engage in matters relating to SWM.

(6) Non-Governmental Stakeholders

There are several groups in the private sector that are stakeholders in solid waste management. They include the following:

- i. Solid Waste Concessionaires

These are the companies that have been “awarded” the concession in December 1995, based on a regional basis in the Peninsula. The two that are currently operating are:

- Alam Flora Sdn Bhd (central region), and
- Southern Waste Management Sdn Bhd (southern region).

Environment Idaman Sdn Bhd is the third company that is granted the concession for the northern region of the Peninsula but have yet to take over SWM for any of the LAs.

ii. Solid Waste Contractors

These are the companies that were given contracts for solid waste collection services and/or public cleansing. These may be appointed by the “Concessionaires” in the concession areas or by the LAs in the respective LA areas where solid waste services have not been taken over. For example, Alam Flora has about 650 contractors working in their concession areas.

iii. Waste Recyclers

These are the companies that are involved in the collection and use of recyclable materials (recyclates) from households and commercial premises. The main recyclables used by industrial recyclers are paper, plastic, glass aluminium, and steel. Some of the major players which utilise recyclables in their manufacturing process include:

- Malaysian Newsprint Industries Sdn Bhd – Paper
- Genting Sanyen Industrial Paper Sdn Bhd – Paper
- KL Glass Manufacturers Sdn Bhd – Glass
- Malaysian Sheet Glass Sdn Bhd – Glass
- May Plastic Industries Sdn Bhd – Plastic
- Amalgamated Aluminium & Alloy Sdn Bhd – Aluminium
- Various steel mills (such as Amsteel, Megasteel, Malayawata, Southern Steel, Antara Steel, and others) – Steel

iv. Small Business Waste Collectors and Recyclers

These are a mixed group of collectors and buyers who mainly purchase recyclables from households, recycling centres, as well as from solid waste collection vehicles (tailgate recycling). The main items collected consist of newspaper, cardboard, magazines, car batteries, metals, plastic and glass.

Alam Flora also acts as a middleman buyer through its 3Rs programme with the setting up of buy-back centres at strategic locations in its area.

v. Solid Waste Recycling Partners

This group represent non-government organisations (NGOs), community based organisations (CBOs), charitable organisations and other public interest groups that operate on their own or in cooperate with the government or even businesses in promoting and implementing recycling activities.

The NGOs who have a direct or indirect role in solid waste management include environmental organisations, social and residents associations, manufacturers' associations, consumer associations, the construction industry, property developers and professional associations. Some of the key NGOs actively engaged in SWM are provided in Table 1.2-5. Besides, resident and social associations in particular have been very active in the promotion of waste recycling within their residential area or among the public.

It is also to be noted that various shopping centres, supermarket groups, hotels, petrol stations, and other businesses have also been actively participating in recycling activities. These groups also need to be recognised.

Table 1.2-5 Key NGOs and Industrial Associations Actively Engaged in SWM

No.	Organisation	Activities
1	Persatuan Kebajikan Xim Phou Moon Malaysia	A volunteer organisation that collects recyclables at collection centre in many supermarkets throughout the country.
2	Malaysian Plastic Manufacturers Association (MPMA)	Association of major plastic manufacturers involved with recycling programmes and promotion. Also a partner in National Recycling Day 2001.
3	World Wide Fund for Nature Malaysia (WWF)	Conducts nature, wildlife and environmental conservation research. Also a partner in National Recycling Day 2001.
4	Malaysian Pulp & Paper Manufacturers Association	Association of major paper manufacturers involved with recycling programmes and promotion.
5	Treat Every Environment Special (TREES)	A volunteer organisation that collects recyclables at collection centre in many supermarkets mainly in the Klang Valley.
6	Consumer Association of Penang (CAP)	Represents the interest of businesses and the public in Penang, including environmental issues.
7	Resident Associations	Various resident associations in the country.

(7) Research Institutions and Universities

The stakeholders from research institutions and universities provide an important link by carrying out studies related to solid waste and contributing to the database on solid waste. They also provide technical expertise to assist the government in assessing waste management technologies. Some of these organisations provide laboratory facilities for analytical purposes e.g. for waste composition and characterisation. Those that are active in the field of solid waste management include:

- Universiti Putra Malaysia (UPM) – Member of Technical Committee to advise Minister of Housing & Local Government

- Universiti Teknologi Malaysia (UTM) – Member of Technical Committee to advise Minister of Housing & Local Government
- Universiti Malaya (UM)
- Malaysia Institute for Nuclear Technology Research (MINT) – Member of Technical Committee to advise Minister of Housing & Local Government

1.3 Comparison of Recycling Activities and Achievement between OECD Countries and Malaysia

As Malaysia draws closer to the status of a fully developed nation, Malaysia will be expected to achieve the same levels of waste minimisation as other developed countries. The table below compares the recycling rates of major recyclable materials in main OECD countries and those in Malaysia.

Table 1.3-1 Recycling Rates of Major Recyclable Materials in OECD Countries

	Malaysia	Japan	UK	Germany	France
Papers and boards	42.2%	61.5%	65.2%	80.7%	69.3%
Glass bottles	3.0%	82.0%	37.5%	85.9%	56.8%
Aluminium cans	51.4%	82.8%	24.9%	71.2%	34.6%
Plastic containers	4.7%	40.0%	17.9%	52.8%	16.1%

Malaysia’s current achievement in recycling is competitive enough in papers and boards and aluminium cans while the rates for glass bottles and plastic containers are still far below the level of the developed countries mentioned above.

In the OECD countries, various institutional mechanisms are established and introduced to promote recycling of the major recyclable items. The key institutional mechanisms that are established in these countries are illustrated in the table below.

Table 1.3-2 Recycling Rates of Major Recyclable Materials in OECD Countries

Country	Key institutional mechanism for recycling
Japan	<ul style="list-style-type: none"> ▪ Basic law for establishing the recycling-based society ▪ Waste management and public cleansing law ▪ Law for promotion of effective utilization of resources ▪ Container and packaging recycling law ▪ Electric household appliance recycling law ▪ Construction material recycling act ▪ Food recycling law ▪ Law on promoting green purchasing
UK	<ul style="list-style-type: none"> ▪ EC Directive on Waste Electrical and Electronic Equipment (WEEE) (proposal for implementation of the WEEE Directive) ▪ The Producer Responsibility Obligations (Packaging Waste) Regulations 2005 ▪ End-of-Life Vehicles Regulations 2003 ▪ Batteries Directive ▪ Waste Minimisation Act 1998

	<ul style="list-style-type: none"> ▪ Landfill tax regulations ▪ Waste implementation programme (WIP) ▪ Waste resources and action programme (WRAP) ▪ Business resources efficiency and waste (BREW) programme
Germany	<ul style="list-style-type: none"> ▪ Closed substance cycle and waste management act (1996) ▪ End-of-life vehicle act (2002) ▪ Act on the disposal of information, office and communications technology equipment (2005) ▪ Battery ordinance ▪ Ordinance on bio-waste (1998) ▪ Packaging ordinance (1991)
Malaysia	<ul style="list-style-type: none"> ▪ National strategic plan for solid waster management ▪ National recycling programme ▪ Incentive for waste recycling activities

In Japan, obligation of source separation and responsibilities of producers for collecting and recycling of packages and containers including the associated costs (provided by Package and Containers Recycling Law) are mentioned in the laws.

In the UK, Waste Implementation Programme (WIP) is carried out to increase awareness of waste issues, support LAs both financially through schemes such as the waste minimisation and recycling fund and through best practice advice, sponsor research into waste minimisation methods, and sponsor the work of the Waste Resources and Actions Programme (WRAP). WRAP aims to accelerate resources efficiency by creating efficient markets for recycled materials and products, while removing barriers to waste minimisation, reuse and recycling. Landfill tax is designed to encourage business to produce less waste and use alternative forms of waste management. Producers' responsibility for collection and recycling of package and containers is provided by the Producer Responsibility Obligations (Packaging Waste) Regulations 2005. BREW programme aims to help business become more efficient with their resources and make the most out of their waste. Revenue form the landfill tax is used to provide new support to business that specifically targets waste minimisation, diversion of waste away from landfill and improvements in resource efficiency.

In Germany, source separation of packages and containers is promoted. Obligation manufacturers and distributors to participate in collection and recycling of packages and containers is regulated in the Packaging ordinance (1991). DSR system for disposable drink containers is forced. Closed substance cycle and waste management act (1996) mentioned basic obligations with respect to safe and high quality recycling and management as well as product responsibility, manufacturing of products geared towards effective and environmentally sound waste management and recycling, and return, recovery and disposal obligation by the manufacturers. EPR is also introduced to promote 3Rs consideration in product design and production stages.

Some form of source separation of packages and containers is conducted in all of the above countries. Moreover, collection and recycling of packages and containers are basically carried out under the responsibility of producers. Source separation and introduction of producers' responsibility for collection and recycling of packages and

containers are the key institutional issues to increase recycling of packages and containers.

In Malaysia, National Recycling Programme (NRP) is carried out in cooperation with LAs, concessionaires, private sectors, NGOs/CBOs. However, there are no laws/regulations which provide obligation or role of stakeholders to promote waste minimisation. Although there is an incentive for waste recycling activities which aims to promote waste recycling activities, any measures to encourage producing less waste are not taken for waste minimisation. Therefore, Malaysia should consider institutional mechanisms to provide obligations of stakeholders and further promote waste minimisation from view point of source separation and producing less waste.

PART 2

WASTE AND MATERIAL FLOW AT PRESENT AND FUTURE

Part 2 Waste and Material Flow at Present and Future

2.1 Existing Recycling Systems in Malaysia

Generally, the recyclable materials generated from sources (households, industries or business entities) are collected by the waste collectors (truck workers, street collectors etc) or sold to middlemen who collect the recyclable materials from door to door. Some of the waste generators also retain the recyclable materials at source and bring them to recycling centres, buy back centres or drop off centres nearby. The general collection system of recyclable materials can be summarised in Figure 2.1-1.

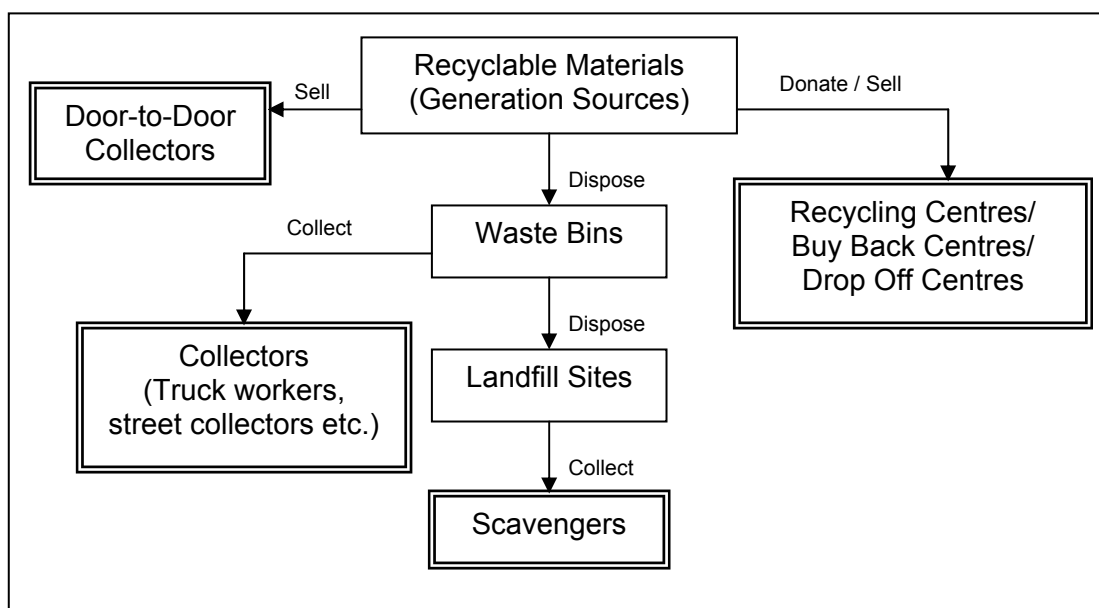


Figure 2.1-1 The Collection System of Recyclable Materials

The trading activities of recyclable materials in the markets are quite established and have a long history. Some traders were found to be involved in the business for more than 20 years and types of common recyclable materials being traded include glass, papers, scrap iron and other non-ferrous metals. However, it was also found that there are new categories of recyclable materials that are being collected for recycling; mainly electrical and electronic wastes, plastics, scrap computer, etc.

The trading of recyclable materials takes part right from the collection of recyclable materials by the waste pickers, scavengers, street collectors etc until the end users of the materials or industries. The trading process sometimes involves several levels of middlemen and the industries or end users of the recyclable materials can be both domestic and foreign countries. Nevertheless, there are also cases where the recyclable materials are sold to the end users directly without going through any middlemen especially if the end users such as industries are willing to accept the recyclable materials directly from the waste generators or general public. The trading process of the recyclable materials in the markets can be summarised in Figure 2.1-2.

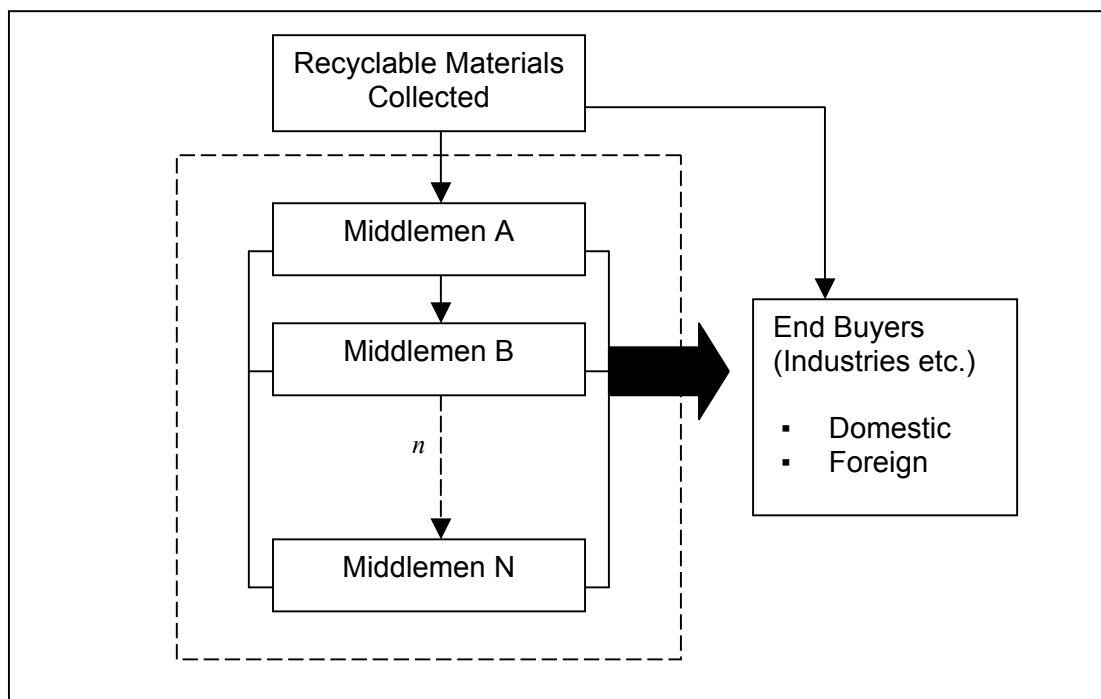


Figure 2.1-2 The Trading System of Recyclable Materials

The reuse and recycling activity at industries in particular, is one of the major driving forces supporting recycling in the current markets. The recyclable materials are normally sold to the industries by the middlemen in raw form without any pre-treatment. Pre-treatment of the recyclable materials collected such as crushing or sterilising processes in the industries is normally considered as part of the manufacturing activities. However, there are also cases where the pre-treatment process is handled by the middlemen such as crushing or compacting the plastic bottles before selling the recyclable materials to the industries.

The recyclable materials that are sold to the industries are either used as raw materials in their own manufacturing processes or some of them are exported to other industries both in Malaysia and overseas. Instead of recycling the materials, some of the industries are reusing them after the pre-treatment process such as cleansing and sterilising the glass bottles for reuse.

In general, the reuse and recycling activities of the recyclable materials can be summarised in Figure 2.1-3.

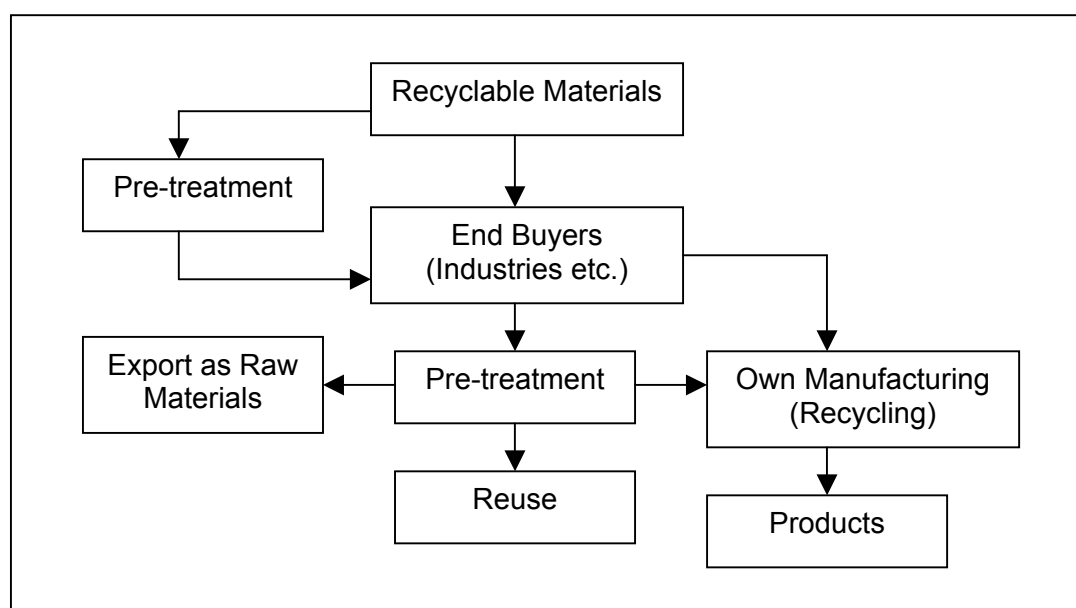


Figure 2.1-3 Reuse and Recycling of Recyclable Materials

The prices for recyclable materials show large variations depending on the fluctuations in market demand. In addition, the prices also vary at different levels where different players charge different prices right from the primary collection until the materials are sold to the end users or industries.

The price ranges (as of December 2004) for recyclable materials sold by waste pickers, street collectors or scavengers, recycling centres, middlemen and traders are shown in Table 2.1-1 to 2.1-3 below:

Table 2.1-1 Range of Prices for Recyclable Materials Sold by Waste Pickers / Street Collectors / Scavengers

No	Recyclable Materials	Selling Prices
1	Aluminium cans	RM0.35 - 5.50/kg
2	Carton boxes (cardboards)	RM0.07 - 0.40/kg
3	Glass Bottles	RM0.10/kg or RM0.16/pc
4	Mixed Papers	RM0.10 - 0.30/kg
5	Old Newspaper	RM0.10 - 0.49/kg
6	Paper (Magazine, Book)	RM0.20 - 0.30/kg
7	Paper (Computer)	RM0.20 - 0.30/kg
8	Mixed Plastics	RM0.10 - 0.70/kg
9	Scrap Metals	RM0.15 - 6.00/kg

Table 2.1-2 Buying and Selling Price Range of Recyclable for Recycling Centres

No	Recyclable Materials	Buying Prices	Selling Prices
1	Aluminium cans	RM1.00 - 3.30/kg	RM1.70 - 5.00/kg
2	Carton boxes (cardboards)	RM0.04 - 0.80/kg	RM0.10 - 0.85/kg
3	Glass Bottles	RM0.02 - 0.05/kg	RM0.03 - 0.05/kg
4	Mixed Papers	RM0.04 - 0.35/kg	RM0.07 - 0.50/kg
5	Old Newspaper	RM0.05 - 0.20/kg	RM0.10 - 0.35/kg
6	Paper (Computer)	RM0.10 - 0.30/kg	RM0.20 - 0.45/kg
7	Paper (Magazine, Book)	RM0.15/kg	RM0.05 - 0.50/kg
8	Mixed Plastics	RM0.03 - 0.40/kg	RM0.04 - 0.90/kg
9	Scrap Metals	RM0.08 - 0.50/kg	RM0.10 - 0.70/kg

Note:

- 1) The buying prices shown are those for recyclable materials collected mainly by the buy back centres since there are some recycling centres that are operating on a charity basis with all materials collected free of charge (FOC)
- 2) Out of 84 recycling / buy back centres surveyed, 51 are collecting recyclable materials on FOC basis, 33 are paying for the recyclable materials.

Table 2.1-3 Buying and Selling Price Range of Recyclable for Traders / Junkshops / Middlemen

No	Recyclable Materials	Buying Prices	Selling Prices
1	Aluminium cans	RM1.10 - 5.50/kg	RM1.50 - 5.20/kg
2	Carton boxes (cardboards)	RM0.02 - 0.33/kg	RM0.07 - 0.80/kg
3	Glass Bottles	RM0.05 - 0.20/kg	RM0.05 - 3.00/kg
4	Mixed Papers	RM0.04 - 0.50/kg	RM0.09- 0.70/kg
5	Old Newspaper	RM0.04 - 0.33/kg	RM0.08 - 0.42/kg
6	Paper (Computer)	RM0.10 - 0.60/kg	RM0.20 - 0.60/kg
7	Paper (Magazine, Book)	RM0.15 - 0.20/kg	Unknown
8	Mixed Plastics	RM0.10 - 1.20/kg	RM0.18 - 1.10/kg
9	Scrap Metals	RM0.08 - 6.50/kg*	RM0.18 - 0.90/kg

Note: * The high upper price range of scrap metals is due to the mixed scrap metals reported including the copper, stainless steels, etc.

The higher range of the selling price by middlemen and traders is assumed to be the final selling price to the end users or industries since the information obtained from the recycling industries on the prices of recyclable materials is very limited.

The range of prices are further summarised in Table 2.1-4 in order to make a comparison of price ranges for recyclable materials at different levels of recycling. The table clearly shows that there is a wide range in the selling prices of the recyclable materials in the market.

Table 2.1-4 Comparison of Price Range for Recyclable Materials at Different Levels of Recycling

No	Recyclable Materials	Selling Prices		
		Primary Collectors	Recycling Centres	Middlemen / Trader
1	Aluminium cans	RM0.35 - 5.50/kg	RM1.70 - 5.00/kg	RM1.50 - 5.20/kg
2	Carton boxes (cardboards)	RM0.07 - 0.40/kg	RM0.10 - 0.85/kg	RM0.07 - 0.80/kg
3	Glass Bottles	RM0.10/kg or RM0.16/pc	RM0.03 - 0.05/kg	RM0.05 - 3.00/kg
4	Other Papers	RM0.10 - 0.30/kg	RM0.07 - 0.50/kg	RM0.09 - 0.70/kg
5	Old Newspaper	RM0.10 - 0.49/kg	RM0.10 - 0.35/kg	RM0.08 - 0.42/kg
6	Paper (Computer)	RM0.20 - 0.30/kg	RM0.20 - 0.45/kg	RM0.20 - 0.60/kg
7	Paper (Magazine Book)	RM0.20 - 0.30/kg	RM0.05 - 0.50/kg	NA
8	Waste Plastics	RM0.10 - 0.70/kg	RM0.04 - 0.90/kg	RM0.18 - 1.10/kg
9	Scrap Metals	RM0.15 - 6.00/kg	RM0.10 - 0.70/kg	RM0.18 - 0.90/kg

Note: NA - Not Available; FOC - Free of charge;

Depending - price depending on the quality and conditions of the items

Based on the prices shown above, some typical values for the selling prices of recyclable materials at different levels of recycling are shown in Table 2.1-5.

Table 2.1-5 Typical Selling Prices for Major Recyclable Materials at Different Levels of Recycling

No	Recyclable Materials	Selling Prices		
		Primary Collectors	Recycling Centres	Middlemen / Trader
1	Aluminium cans	RM2.50/kg	RM2.50/kg	RM3.50/kg
2	Glass Bottles	RM0.10/kg	RM0.075/kg	RM0.175/kg
3	Waste Papers	RM0.25/kg	RM0.15/kg	RM0.45/kg
4	Waste Plastics	RM0.20/kg	RM0.15/kg	RM0.25/kg
5	Scrap Metals	RM0.35/kg	RM0.10/kg	RM0.75/kg

It should be noted that the selling prices shown above do not represent the flow of the materials from primary collectors to recycling centres and finally to the middlemen/traders, because many of the primary collectors are selling the recyclable materials directly to the middlemen/traders. Furthermore, there at times there are different levels of middlemen/traders involved in between the recycling centres and collectors before the materials are finally sold to the recycling industries.

Therefore, the profit margins of recyclable materials are also subject to the same situation, i.e. depending on destinations of the materials, whether they are sold to different levels of middlemen/traders or directly to the one single middleman/trader. In addition, the profit margin also depends on whether the business nature of the recycling players, for example a drop off centre will have totally different profit margin as compared with the buy back centre.

2.2 Material Flows of Main Recyclables

In general, the material flow of the main recyclable materials in Malaysia is similar, because most of the small scale recyclable collectors are collecting almost all types of recyclable materials, before they are sold to bigger scale traders and middlemen who collect single types of recyclable material. The detailed flow for the main recyclables is illustrated in Figure 2.2-1.

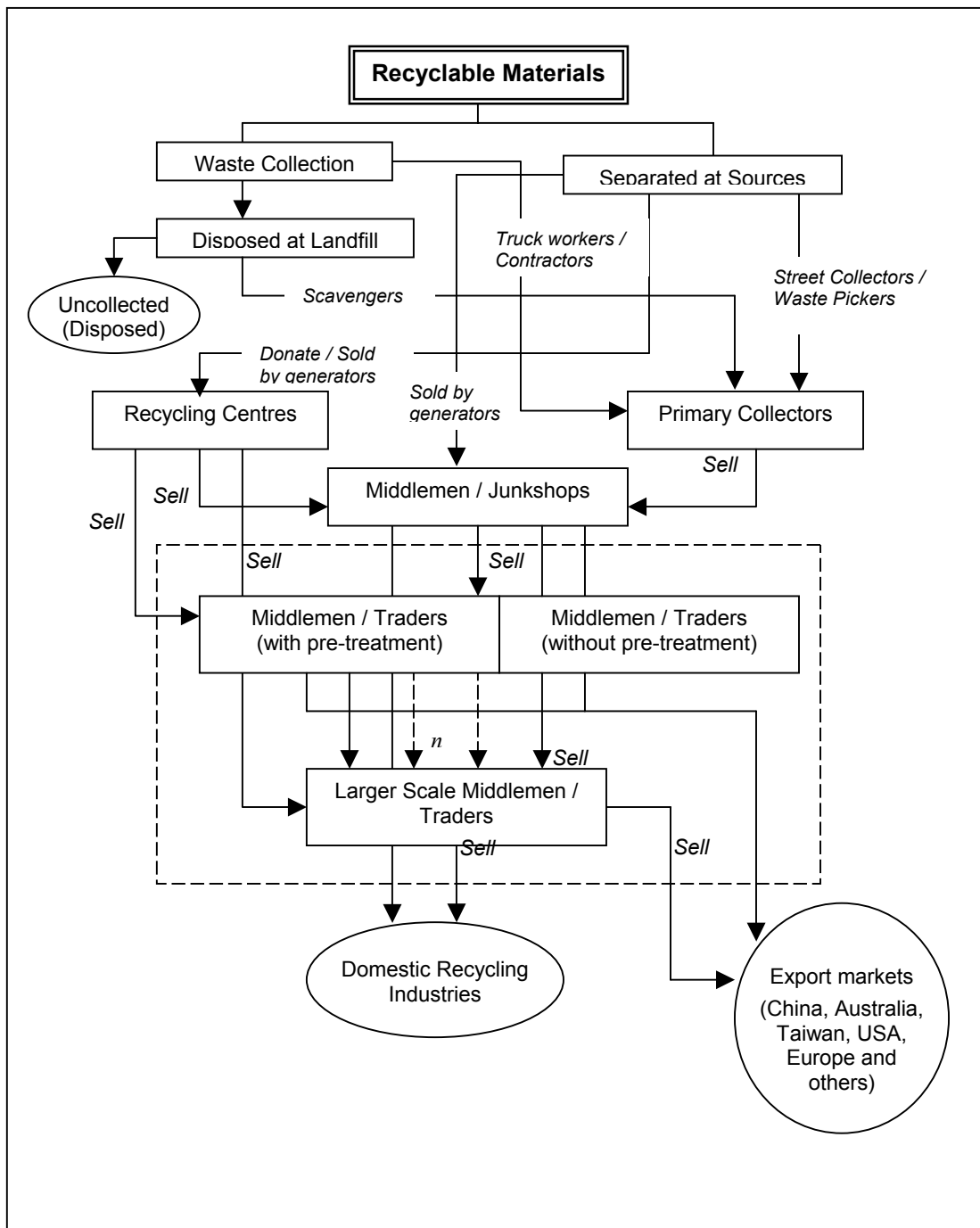


Figure 2.2-1 Material Flow for Recyclables

Details on the current situation and material flow of the main recyclable materials are summarised in the following sections.

(1) Paper

There is a wide range of paper being collected for recycling in the market; this includes pure white paper, black and white paper, brown paper, old newspapers, magazines/books, cardboards etc.

Data on the country's paper production can be obtained from major paper manufacturers and newsprints companies in the country. There are about 20 paper manufacturers in Malaysia (Malaysia Pulp and Paper Manufacturers Association, 2003):

Table 2.2-1 Paper Production in Malaysia

No	Company	Production / yr (tonnes)	No.	Company	Production / yr (tonnes)
1	Cita Peuchoon	24,000	11	Kimberly Clark	35,000
2	Johmewah	8,000	12	See Hua Paper	10,800
3	Genting Sanyen	260,000	13	Taiping Paper	2,400
4	Muda Paper (Kajang)	108,000	14	Theen Seng Paper	11,500
5	Muda Paper (S. Prai)	72,000	15	Trio Paper	23,000
6	Malaysia Newsprint	250,000	16	Union Paper	6,000
7	Nibong Tebal	60,000	17	United Paper Board	75,000
8	Pascorp Paper	135,000	18	Yeong Chaur Shing	3,600
9	Pembuatan Kertas	3,000	19	Le Kok Paper	NA
10	Sabah Forest	165,000	20	Hai Ming Paper	NA
TOTAL: 1,252,300 tonnes/year (Approximately 1.26 million tonnes/year)					

Overall, self-sufficiency in 2001 and 2002 = 60%; and self-sufficiency in 2003 = 77% (estimated consumption was about 1.64 million tonnes/year).

Table 2.2-2 Self-Sufficiency of Raw Material Supply by Major Paper Industries

No	Paper types	Self Sufficiency (%)		
		2001	2002	2003
1	Newsprint (Only by Malaysia Newsprint Industries Sdn Bhd in Mentakab)	63	55	62
2	Writing and printing (Only by Sabah Forest Industries Sdn Bhd in Sabah)	40	41	76
3	Toilet / facial tissue	95	82	180
4	Craft / corrugating medium etc	58	68	77
5	Joss papers	91	97	100
6	Cigarette papers	0	0	0
Overall		60	60	77

Table 2.2-3 Malaysia waste paper recovery rate (1997 – 2001)

Year	Recovery rate (%)
1997	41
1998	34
1999	33
2000	44
2001	40

Source: Muda Paper / Central Malaya Paper Sdn Bhd (2005)

Note: The figures obtained were calculated based on amount of yearly recycled paper collected divided by the total paper production

The export of paper from Malaysia is low, with only 1,186 tonnes/year in 1999, 550 tonnes/year in 2000, 229,488 tonnes/year in 2001, 1,387 tonnes /year in 2002 and 186,916 tonnes/year in 2003. On the other hand, records for 2003 indicate that 1,278 tonnes/year of waste paper was exported from Malaysia that year.

Current recycling system of paper is illustrated as shown in Figure 2.2-2.

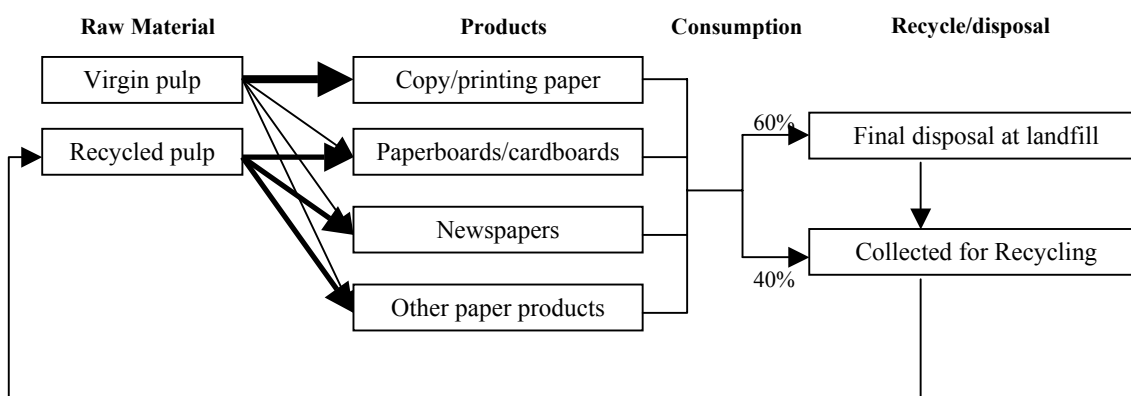


Figure 2.2-2 Current Recycling System of Papers

Some characteristics of paper recycling in Malaysia are:

- The waste papers currently recycled are mostly collected at source; from households (old newspapers, magazines), offices (computer papers) and commercial premises (mainly cardboards).
- Waste papers that are discharged into the waste stream are normally not recovered by the waste pickers and scavengers except for a small amount of cardboard which is in good condition.
- The waste papers collected are normally traded through several levels of agents or middlemen before they are finally sold to the paper industries such as Malaysia Newsprint Industries Sdn Bhd (old newspapers) and others.
- Most of the collected waste papers are recycled as raw material for producing paperboards/ cardboards and other low-graded paper products, except for the case of newspaper that are used for reproducing newspapers.

Current issues of paper recycling in Malaysia are:

- The separation of paper at source is practised but is focussed on certain paper categories such as old newspapers, magazines, computer papers and cardboards etc.
- Non-separated waste papers when mixed with other wastes (especially food wastes) will be contaminated and difficult to be recycled.
- High cost for collection of waste paper from source. Collection efficiency needs to be improved by more effective and improved separation of waste paper at source.
- Copy and printing paper are 100% manufactured from virgin pulp; in other words, recycled pulp is not used as raw material in their manufacturing process.

(2) Plastics

There is a wide range of plastics being collected for recycling in the market especially recently as the plastics price has increased and many new plastic players have emerged. This includes PET bottles, HDPE, PE, PP and various kinds of plastics containers and other materials.

The actual amount of yearly plastic products produced in Malaysia is difficult to be identified due to the very wide range of products and the large number of small and medium size players. However, overall it was estimated that the current recycling rate of plastics in Malaysia is about 4 – 7%.

Some waste plastic was reported to be exported overseas especially when the demand and prices overseas were better than in the domestic markets.

The current recycling system of plastic bottles, packages and containers is illustrated as shown in Figure 2.2-3.

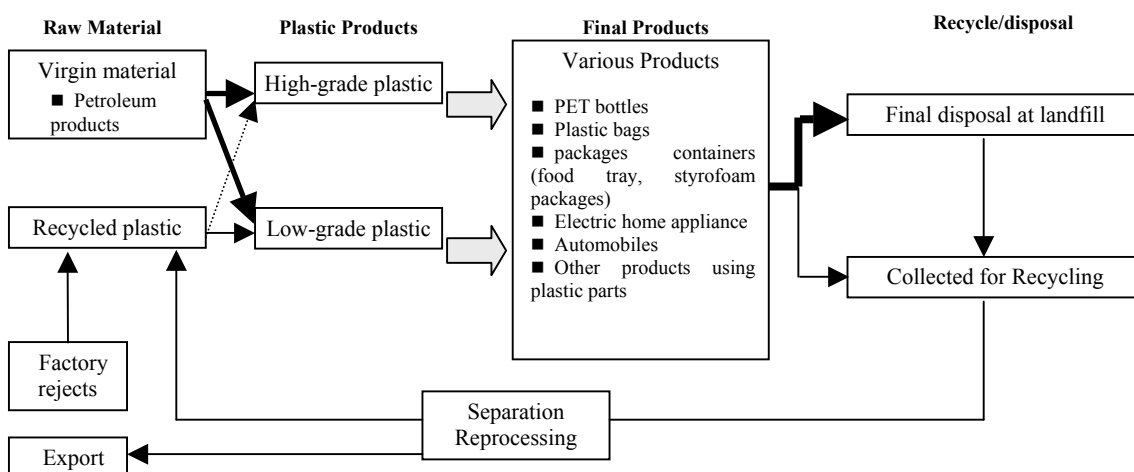


Figure 2.2-3 Current Recycling System of Plastics

The main characteristics of plastic recycling in Malaysia are:

- Most of the waste plastics are not separated at source because of the low awareness and reluctance on the part of generators to retain plastic bottles or

containers at source because they are bulky and light in weight. However, in some commercial premises such as restaurants and hotels, separation of plastic bottles is practised (mainly PET bottles).

- Waste plastics that are discharged into the waste stream are mostly recovered by the waste pickers and scavengers.
- The waste plastics collected are normally also traded through several levels of agents or middlemen before they are finally sold to the plastics industries or plastic processing plants.
- Some middlemen or agents are running simple pre-processing of the plastics collected such as compacting and crushing into plastic pellets.

Current issues / problems of plastics recycling in Malaysia are:

- Low rate of plastic recycling.
- Low collection rate of plastics.
- The separation of plastics at source is still very low (due to low awareness). Manual sorting of the many different types of plastics is essential before recycling.
- Non-separated waste plastics when mixed with other wastes (especially food wastes) will be dirty and contaminated.
- Lack of knowledge / education on proper handling of waste plastics before recycling (such as rinsing, compacting etc.). This has made the waste plastics bulky and requiring large storage space.
- High collection cost of waste plastics from source due to its bulkiness.
- Limited use of recycled plastics mainly as low-grade materials.
- The collection of plastics is highly dependant on the market price of plastics, which fluctuates from time to time.

(3) Glass

The types of glass being recycled in the market are:

- Glass bottles (beer, juice, wine, sauces containers)
- Glass jars (food, powder containers)
- Coloured or clear glass

The types of glass that cannot be recycled are:

- Light bulbs
- Ceramic plates, cups, vases
- Laboratory and medical glass
- Sheet glass (such as window panes)

Data on Malaysia's glass production can be obtained from major glass bottles manufacturers such as KL Glass Manufacturers Sdn Bhd (Kuala Lumpur) and Malaya Glass Products Sdn Bhd (Johor).

It was reported that out of 170,000 tonnes of glass bottles disposed in 2004, only about 17,000 tonnes were recovered for recycling (10%). Out of this, 70% of the glass recycled is flint glass, 25% amber glass and 5% green glass.

About 30% of the glass production in Malaysia is using recycled cullet, of which 20% is comes from rejects from the factory itself or imports from overseas.

The current recycling system of glass bottles is illustrated as shown in Figure 2.2-4.

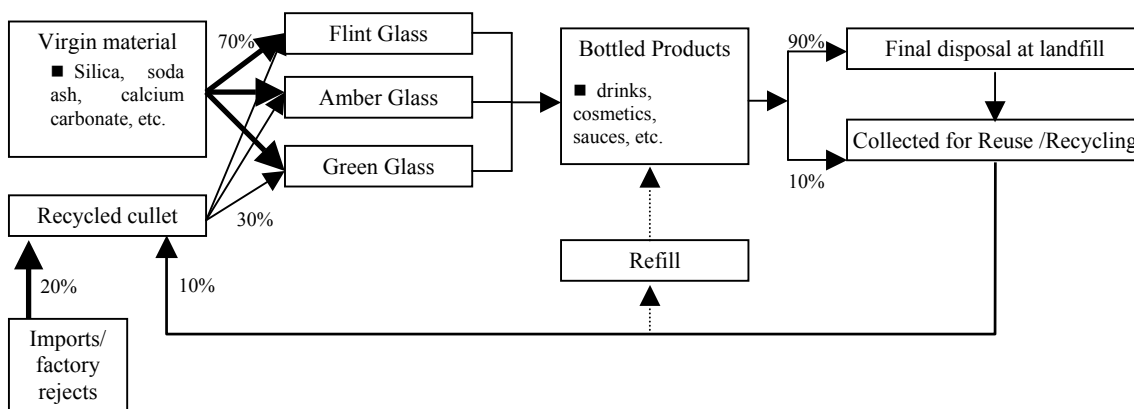


Figure 2.2-4 Current Recycling System of Glass Bottles

Some characteristics of the existing glass recycling system in Malaysia are as follows:

- Glass bottles are collected mainly by the recycling centres and waste collectors along with some other recyclable materials collection. Only whole bottles and jars are collected, broken ones are not collected.
- Collected glass bottles are normally sent to cullet operators to make glass cullet before selling to the glass bottle manufacturers. Some glass bottles are also sent directly to the glass bottle manufacturers by recyclable collectors, recycling centres or even consumers.
- On the other hand, instead of recycling, some glass bottles are collected to be reused especially by the manufacturers of soft drinks, beers and bottles for sauces etc.
- Low rate of domestic recycled cullet used by glass bottle manufactures.

The current issues / problems of glass recycling in Malaysia are:

- Low rate of glass bottle recycling
- The separation of glass at source is still low (low awareness) and people are reluctant to store used glass because they are heavy and breakable.
- Low price of recycled glass bottles.

- Lack of knowledge / education on proper handling of waste glass bottles (such as rinsing), in some cases dirty bottles cannot be recycled.
- High collection cost of glass from source because of their heavy weight and bulkiness.
- Returnable bottle mechanism works only partially between producers and large-scale users.
- In some areas of Malaysia, especially rural areas and in East Malaysia (Sabah and Sarawak), there is no collection for glass because there is no glass manufacturer and it is not feasible to transport or ship the recycled glass to the manufacturers. In such case, only very low amount of glass bottles are collected for reuse and not for recycling.

(4) Aluminium

There are generally 2 types of aluminium products in the markets, namely the aluminium cans (drinks) and other aluminium products (such as aluminium doors, windows, etc.).

Aluminium cans in Malaysia are mainly produced by two companies, i.e. approximately 70% by KJM Aluminium Can Sdn Bhd (Kian Joo Group of Companies) and 30% by Carnaud Metalbox Bevcan Sdn Bhd.

The estimated current recycling rate for aluminium cans in Malaysia is about 51% for households and 69% for business entities. At some commercial premises such as restaurants and hotels, the recycling rate of aluminium cans is expected to be much higher at more than 90%.

Some description on the existing recycling of aluminium in Malaysia is as follows:

- Due to relatively high price of the waste aluminium cans, many are retained at source such as households, offices and commercial premises to be sold to recyclable collectors.
- The waste aluminium cans collected are normally also traded through several levels of agents or middlemen before they are finally sold to the aluminium processing industries to produce other aluminium products.
- Aluminium can manufacturers in Malaysia are not using recycled aluminium cans for their production because of the strict control of quality for the aluminium cans produced.
- The recycling of aluminium cans in Malaysia is relatively high and market-driven. Therefore participation in public recycling (such as the 3 colours bin) for aluminium cans can be very low.

(5) Scrap Ferrous Metals

There is a wide range of ferrous metal products in the markets. The actual amount of yearly production of ferrous metal products in Malaysia is difficult to identify due to the very wide range of products and large number of small and medium size players.

However, overall it was estimated that the current recycling rate of ferrous metals in Malaysia is about 25% due to the relatively high price of the scrap ferrous metals. At some commercial and industrial premises, the recycling rate of ferrous metals is expected to be much higher.

Some descriptions on the existing recycling of ferrous metals in Malaysia is as follows:

- Due to relatively high price of the waste ferrous metals, a large amount is sold to recyclable collectors.
- The waste ferrous metals collected are normally also traded through several levels of agents or middlemen before they are finally sold to the ferrous metals processing industries to produce other ferrous metals products.
- Some scrap ferrous metals were reported to be exported to overseas markets especially when the overseas prices and demand is higher than those offered by the domestic markets.
- The recycling of ferrous metals in Malaysia is money-driven. Due to high price and weight of the materials, ferrous metals are an attractive target for many recyclable collectors. Therefore participation in public recycling for ferrous metals could be very low.

2.3 Quantity of Waste and Recyclable Material Flow

Based on the population of 25,580,900 (year 2004) and per capita generation rate of 0.897 kg/cap/day, the total waste generated in Malaysia was estimated to be about 22,941 tonnes per day. About 86.3% was discharged from the sources for collection and the remaining 13.7% was not discarded from sources, either being retained at generation sources or lost to other destinations.

The estimated quantity of the waste and recyclable flow on daily basis is illustrated in Figure 2.3-1. It is clear that the wastes that are retained could be for recycling use or any other unknown purpose and the information on this is very limited. On the other hand, small amount of recyclables are recovered from the wastes by collection truck workers, scavengers and other waste pickers.

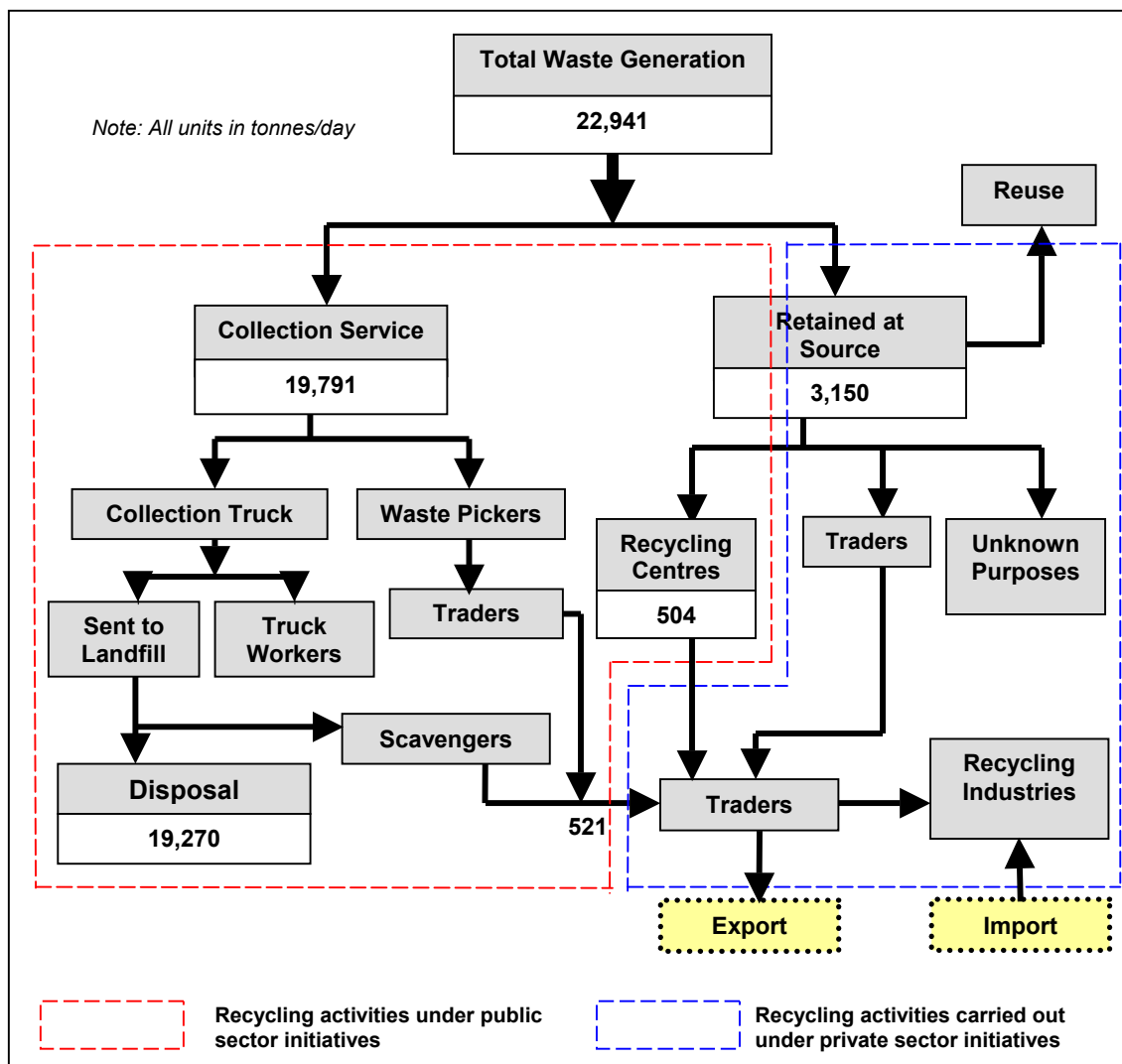


Figure 2.3-1 Quantity of Waste and Recyclables Flow in Malaysia

2.4 Future Projection of Waste Stream and Recyclable Materials

(1) Total Waste Generation

Projection of future waste generation in Malaysia from both households and business entities (BEs) was done based on the following data:

- Population in 2004: 25,580,900
- Population Growth Rate: 1.3% / year
- Per Capita Household Waste Generation Rate: 0.628 kg/cap/day
- Waste Growth rate (Household): 2% / year
- Per Capita Business Entities Waste Generation Rate: 0.269 kg/cap/day
- Waste Growth rate (BEs): 4% / year

On the assumptions that there are no significant changes in lifestyle and other factors, the projection of total waste generation in Malaysia from years 2005 to 2020 is calculated as follows (Table 2.4-1 and Figure 2.4-1):

Table 2.4-1 Projection of Waste Generation in Malaysia (2005 – 2020)

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012
	Unit in tonnes/year								
Households	6,058,679	6,260,191	6,468,405	6,683,544	6,905,838	7,135,527	7,372,854	7,618,075	6,058,679
B. Entities	2,646,085	2,787,703	2,936,901	3,094,084	3,259,679	3,434,137	3,617,932	3,811,564	2,646,085
Total	8,704,764	9,047,894	9,405,306	9,777,628	10,165,518	10,569,664	10,990,787	11,429,640	8,704,764

Year	2013	2014	2015	2016	2017	2018	2019	2020
	Unit in tonnes/year							
Households	7,871,453	8,133,257	8,403,769	8,683,279	8,972,084	9,270,496	9,578,833	9,897,425
B. Entities	4,015,559	4,230,472	4,456,887	4,695,419	4,946,718	5,211,466	5,490,384	5,784,230
Total	11,887,012	12,363,729	12,860,656	13,378,698	13,918,803	14,481,962	15,069,217	15,681,654

Source: JICA Study 2005

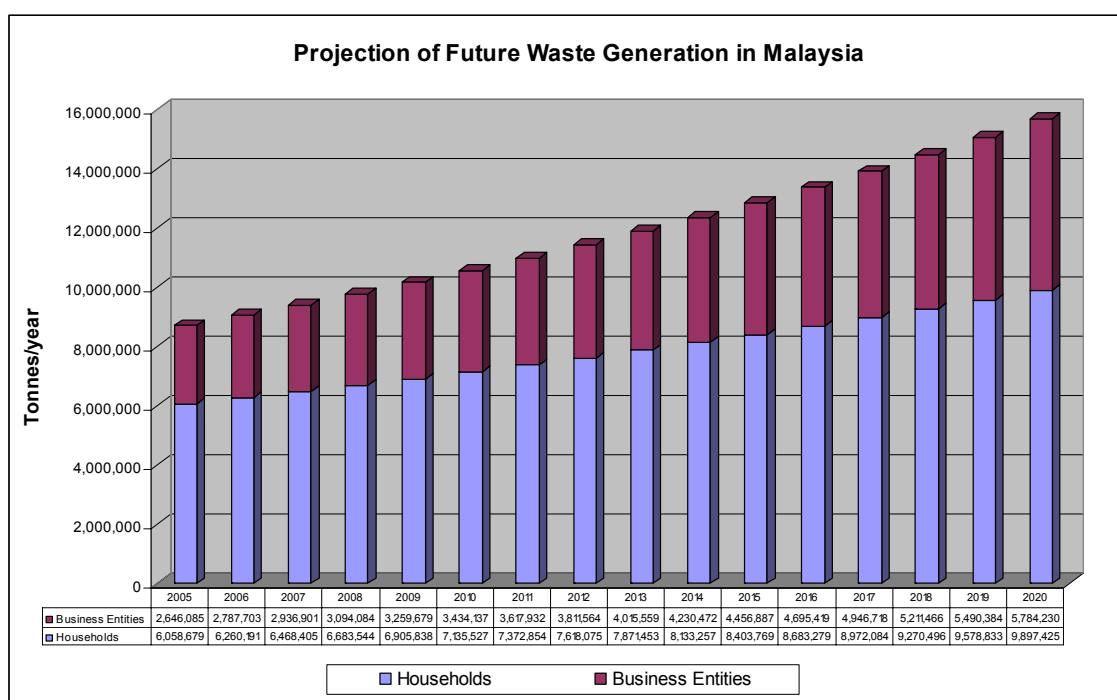


Figure 2.4-1 Projection of Waste Generation in Malaysia (2005 – 2020)

(2) Recyclable Materials Generation

On the other hand, the projection of recyclables generation in Malaysia was also estimated as shown in Figure 2.4-2 and Table 2.4-2. It is commonly recognised that projection of waste composition is rather difficult, i.e. no standards exist for this issue.

Based on this understanding, for the projection of generation amount of each recyclable material, the same growth rates adopted for household/ business entities was used.

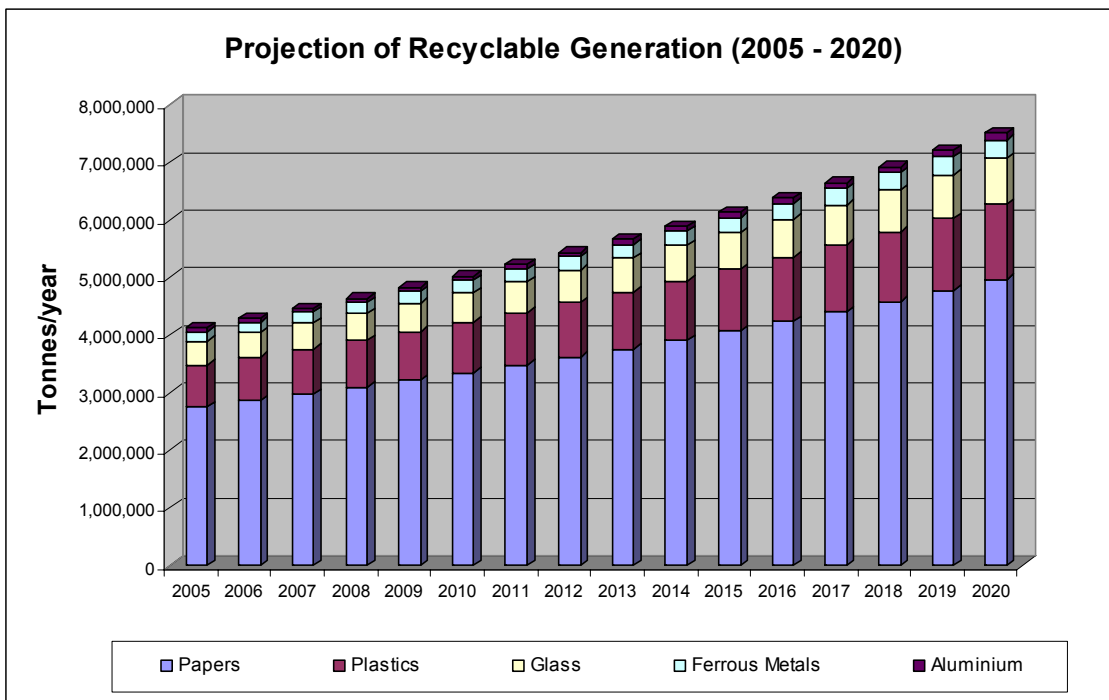


Figure 2.4-2 Projection of Recyclable Generation (2005 – 2020)

Table 2.4-2 Projection of Recyclable Materials Generation in Malaysia (Until 2020)

Composition	Sources	2004	2005	2006	2007	2008	2009	2010	2011
Food Waste	Household	2,327,871	2,405,296	2,485,296	2,567,957	2,653,367	2,741,618	2,832,804	2,927,023
	Business Entity	454,611	478,941	504,574	531,579	560,029	590,002	621,579	654,846
	Total	2,782,481	2,884,237	2,989,870	3,099,536	3,213,396	3,331,620	3,454,383	3,581,869
Papers	Household	1,829,460	1,890,308	1,953,179	2,018,142	2,085,266	2,154,622	2,226,284	2,300,331
	Business Entity	813,778	857,331	903,216	951,556	1,002,483	1,056,136	1,112,661	1,172,210
	Total	2,643,238	2,747,639	2,856,395	2,969,698	3,087,749	3,210,758	3,338,945	3,472,541
Plastics	Household	474,956	490,753	507,075	523,946	541,367	559,373	577,978	597,201
	Business Entity	221,026	232,855	245,318	258,447	272,279	286,852	302,204	318,378
	Total	695,982	723,608	752,393	782,388	813,646	846,225	880,182	915,579
Glass	Household	205,228	212,054	219,107	226,394	233,924	241,704	249,743	258,050
	Business Entity	193,398	203,749	214,653	226,141	238,244	250,995	264,429	278,581
	Total	398,626	415,802	433,760	452,536	472,169	492,700	514,172	536,631
Ferrous Metals	Household	93,818	96,939	100,163	103,494	106,937	110,493	114,168	117,966
	Business Entity	72,838	76,736	80,843	85,170	89,728	94,531	99,590	104,920
	Total	166,657	173,675	181,006	188,665	196,665	205,024	213,758	222,886
Aluminium	Household	35,182	36,352	37,561	38,810	40,101	41,435	42,813	44,237
	Business Entity	22,605	23,815	25,089	26,432	27,847	29,337	30,907	32,561
	Total	57,787	60,167	62,650	65,243	67,948	70,772	73,720	76,799
Others (Non-recyclable)	Household	897,139	926,978	957,809	989,666	1,022,582	1,056,593	1,091,736	1,128,047
	Business Entity	733,405	772,657	814,009	857,575	903,473	951,826	1,002,768	1,056,436
	Total	1,630,544	1,699,635	1,771,819	1,847,241	1,926,055	2,008,420	2,094,504	2,184,483
Food Waste	Household	3,024,376	3,124,967	3,228,903	3,336,296	3,447,262	3,561,918	3,680,387	3,802,797
	Business Entity	689,893	726,816	765,715	806,696	849,871	895,356	943,275	993,760
	Total	3,714,269	3,851,783	3,994,618	4,142,993	4,297,132	4,457,273	4,623,662	4,796,556
Papers	Household	2,376,840	2,455,893	2,537,576	2,621,976	2,709,183	2,799,290	2,892,395	2,988,596
	Business Entity	1,234,947	1,301,041	1,370,673	1,444,031	1,521,316	1,602,737	1,688,515	1,778,884
	Total	3,611,786	3,756,934	3,908,249	4,066,007	4,230,499	4,402,027	4,580,910	4,767,480
Plastics	Household	617,064	637,588	658,794	680,705	703,346	726,739	750,910	775,885
	Business Entity	335,418	353,369	372,282	392,206	413,197	435,311	458,609	483,154
	Total	952,482	990,957	1,031,075	1,072,911	1,116,542	1,162,050	1,209,519	1,259,039
Glass	Household	266,633	275,501	284,664	294,132	303,915	314,023	324,467	335,259
	Business Entity	293,490	309,198	325,746	343,180	361,547	380,897	401,283	422,760
	Total	560,123	584,699	610,410	637,312	665,462	694,920	725,750	758,019
Ferrous Metals	Household	121,889	125,943	130,132	134,460	138,932	143,553	148,328	153,261
	Business Entity	110,535	116,451	122,684	129,250	136,167	143,455	151,133	159,221
	Total	232,425	242,394	252,816	263,710	275,100	287,008	299,460	312,482
Aluminium	Household	45,708	47,229	48,800	50,423	52,100	53,833	55,623	57,473
	Business Entity	34,304	36,140	38,074	40,112	42,259	44,520	46,903	49,413
	Total	80,013	83,369	86,874	90,535	94,358	98,353	102,526	106,886
Others (Non-recyclable)	Household	1,165,566	1,204,332	1,244,388	1,285,777	1,328,542	1,372,729	1,418,386	1,465,561
	Business Entity	1,112,977	1,172,543	1,235,298	1,301,411	1,371,062	1,444,442	1,521,748	1,603,192
	Total	2,278,542	2,376,876	2,479,686	2,587,188	2,699,604	2,817,171	2,940,134	3,068,754

Table 2.4-3 Generation, Import and Export of Recyclable Materials in Malaysia (2004)

Items	Generation *) (ton/year)	Import (ton/year)	Export (ton/year)
Papers	2,643,328	320,313	6,384
Plastics	695,982	62,214	86,014
Glass	398,626	24,966	385
Ferrous metal	166,657	11,167,701	493,020
Aluminium	57,787	288,327	4,065

Source: World Trade Atlas, *): Estimation of JICA study team

Table 2.4-3 shows generation, import and export of major recyclable materials in 2004. Imported amount of ferrous metal and aluminium is very large compared with the estimated generation amount. It means that ferrous metal and aluminium are in great demand as recyclable materials in Malaysia and supply to demand is highly dependent on import from overseas. On the other hand, export is also large for ferrous metal compared with the other items. As for plastics, export of plastics exceeds import. Demand for domestic use is relatively low compared with the other items. It means that recovery of plastics collected in Malaysia is dependent on overseas market and is affected by the conditions of overseas demand. It is also necessary for plastics to improve the conditions of domestic market.

2.5 Existing Recycling Rate

The existing recycling activities in Malaysia are generally divided into two categories:

- Recycling activities under public sector initiatives (such as recycling centres of LAs, MHLG, NGOs and recycling activities by concessionaire companies etc.)
- Recycling activities under private business initiatives (such as private recyclable traders, middlemen, agents and junkshops etc.)

There is no obligation so far to report or register recycling activities carried out under private business initiatives to, or with MHLG or the LAs. Therefore, information on the recycling activities by these private businesses is very limited. Information available is mostly related to the recycling activities carried out under public sector initiatives such as reported by the waste concessionaire companies, NGOs, LAs etc. The boundaries of recycling activities carried out under private business and public sector initiatives are shown in the previous Figure 2.3-1.

Based on the estimated figures shown in Figure above, it was found that the recycling rate in Malaysia for wastes discharged from generation sources is still very low, i.e.

$$\begin{aligned} \text{Recycling Rate} &= \frac{(521 + 504)}{22,941} \times 100\% \\ &= 4.5\% \end{aligned}$$

where;

$$\text{Recycling rate (\%)} = \frac{\text{Total Recyclables Collected (TRC)} \times 100 \%}{\text{Waste Amount Generated (WAG)}}$$

$$\begin{aligned} \text{WAG} &= \text{TRC} + \text{Total Waste Disposed (TWD)} + \text{Others} \\ \text{or} \\ &= \text{Unit Generation Rate (kg/capita/day)} \times \text{population} \end{aligned}$$

("Others" include open burnt, illegal dump, waste treated or other waste losses.)

This is in line with the Recycling Rate reported previously reported by the Government as well as other sources which states that the existing Recycling Rate in Malaysia is around 3 – 5%.

In terms of recycling activities carried out under private business initiatives in Malaysia, the information available is very limited and there is no clear indication on the destinations of recyclables. Monitoring and investigation on these activities are also limited by various constraints such as confidentiality of business information, too wide a range of business activities etc.

2.6 Target Recycling Rate

The current flow of recyclable materials in Malaysia is illustrated in Figure 2.6-1, from the (A) process of raw material input and up to the (B) final disposal.

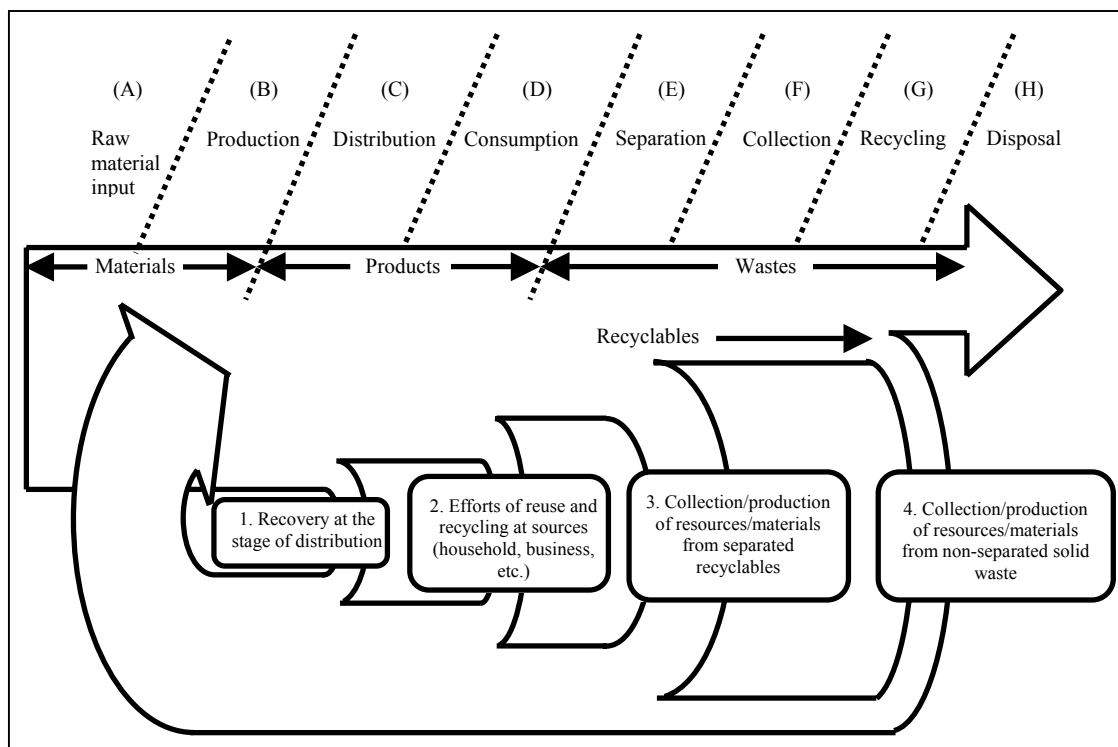


Figure 2.6-1 Current Outline Flow of Recyclable Materials in Malaysia

Under the existing situation, MHLG is dealing with the used materials discharged as wastes from the generation sources (Point F). The recycling activities after this point are carried out mostly under public sector initiatives that contribute to the current 4.5% recycling rate. Based on this understanding and considering the difficulty in capturing recycling amounts under the private sector initiatives, in terms of *values*, the target recycling rate in this Master Plan is focused on the public sector initiatives, where 22% of target recycling rate is set for year 2020. 22% of target recycling rate in 2020 was set by the *National Strategic Plan for Solid Waste Management*, based on approximately 1% increase yearly from year 2005 to 2020.

The yearly targeted recycling rate to be achieved is shown in Table 2.6-1 and Figure 2.6-2.

Table 2.6-1 Yearly Target Recycling Rate

Year	2004	2005	2010	2015	2020
Recycling Rate (%)	4.5	5.6	11.1	16.5	22.0

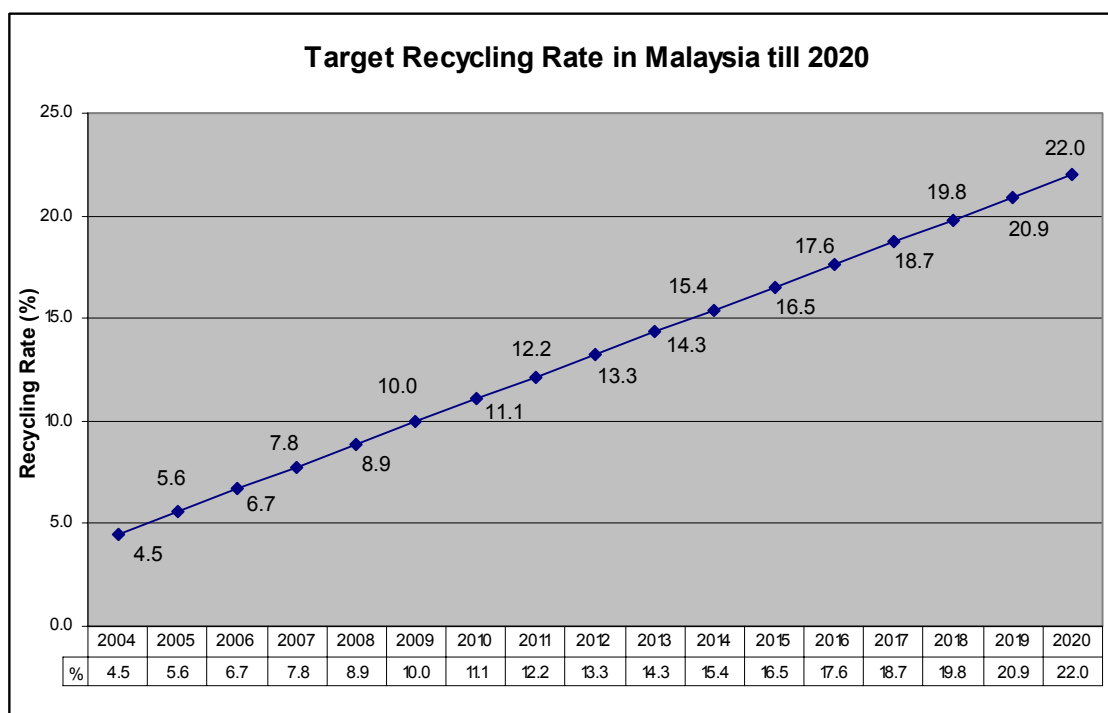


Figure 2.6-2 Target Recycling Rate in Malaysia (Up to 2020)

The recycling activities under private sector initiatives are difficult to be fully captured, and these private businesses are unpredictable depending on the market prices of the recyclables, therefore the target recycling rate is focused on the public sector initiatives following the approaches as illustrated in Figure 2.6-3.

The increase of recycling rate from 4.5% to 22% in year 2020 is mainly focusing on the increase of source separation, recycle centres and participation in recycling activities under public sector initiatives.

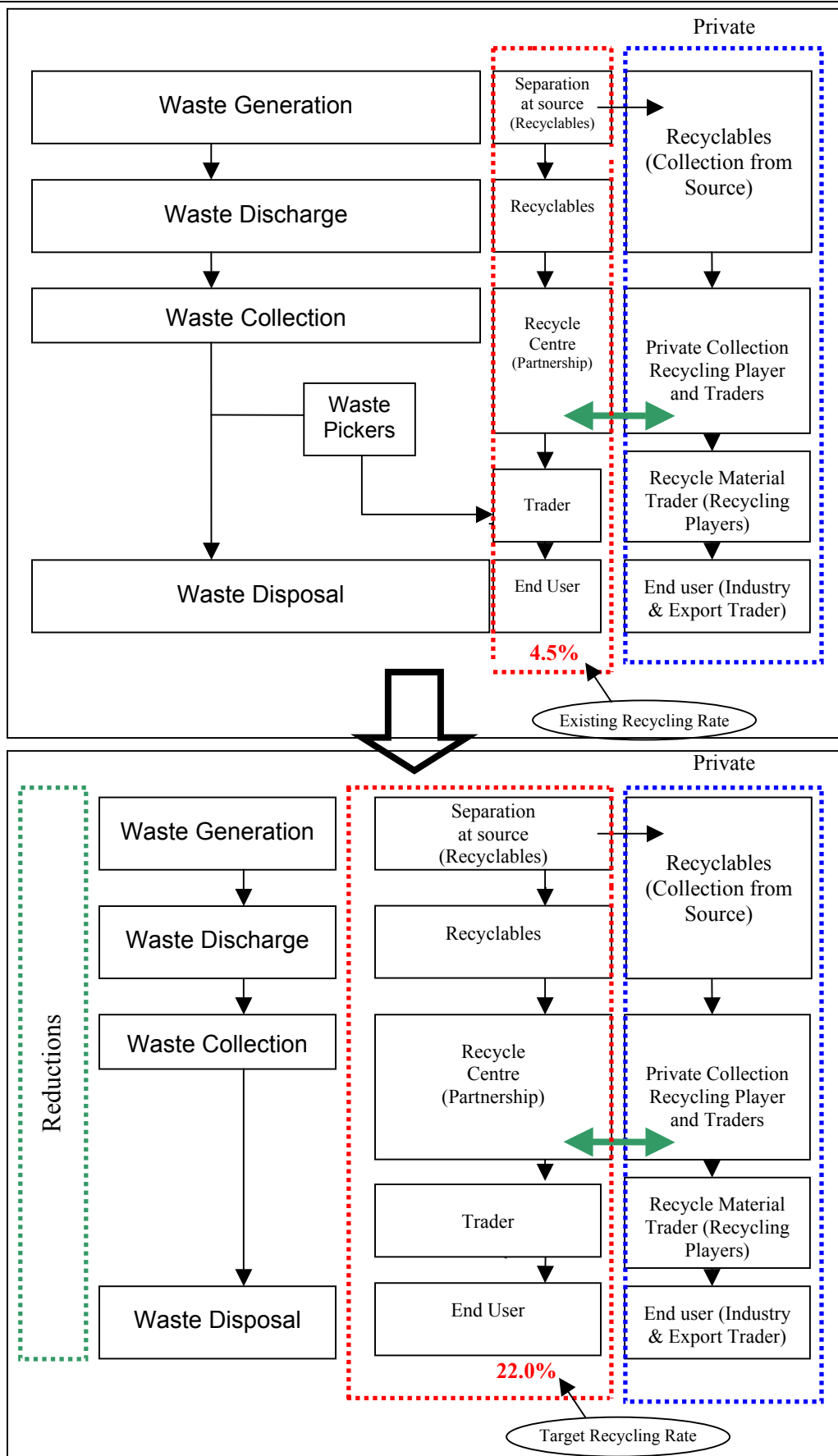


Figure 2.6-3 Boundaries of Existing and Target Recycling Rates

2.7 Recycling Potential for Recyclable Materials

The existing recycling rates for each particular recyclable material in several developing and developed countries are shown in Table 2.7-1 and Figure 2.7-1, respectively.

Table 2.7-1 Comparison of Recycling Rates with Several Countries

Country	Existing Recycling Rate (%)				
	Papers	Plastics	Glass	Ferrous metal	Aluminium
Malaysia	42.2%	4.7%	3.0%	25.0%	51.4%
Thailand	27.6%	13.6%	18.4%	N.A.	N.A.
China	20.0%	25.0%	13.0%	N.A.	85.0%
UK	65.2%	17.9%	37.5%	25.0%	24.9%
France	69.3%	16.1%	56.8%	47.0%	34.6%
Japan	61.5%	40.0%	82.0%	84.2%	82.8%
Germany	71.0%	52.8%	85.9%	81.0%	71.2%

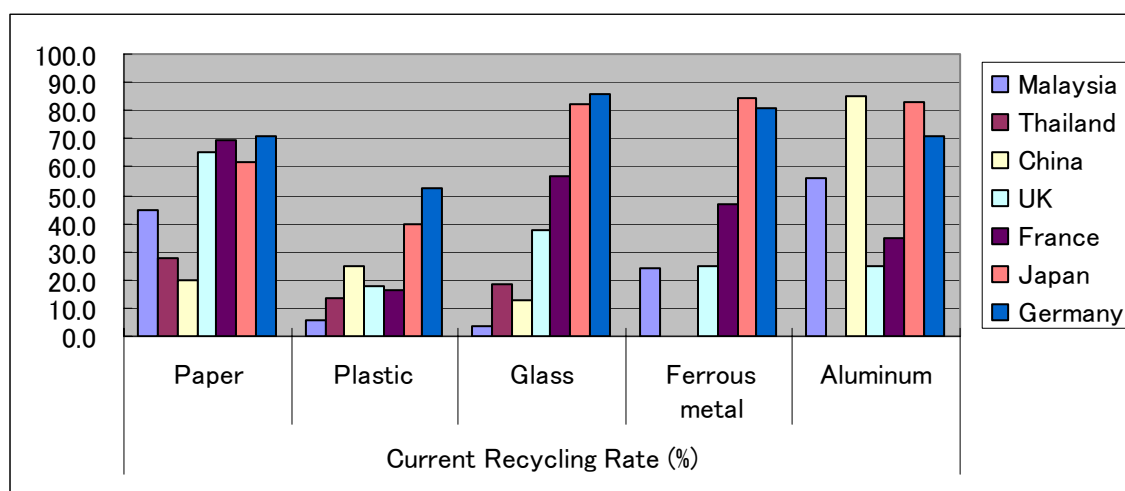


Figure 2.7-1 Comparison of Recycling Rates with Several Countries

Considering the current recycling activities in Malaysia, recycling target in year 2020 in Malaysia and actual recycling rates achieved in several developing and developed countries, the target recycling rates for each recyclable material in the year 2020 can be set as shown below:

Table 2.7-2 Recycling Potential for Recyclables in Malaysia

Recyclables	Recycling Rate	
	Existing (%) in 2004	Target (%) in 2020
Papers	42.2	55
Plastics	4.7	25
Glass	3.0	20
Ferrous metal	25.0	50
Aluminium	51.4	65

APPENDIX

CALCULATION OF PER CAPITA GENERATION AND RECYCLING RATES IN MALAYSIA

a) Calculation of Waste Generation, Recovery and Disposed Rates

In Phase 1 of this study, field studies were carried out to determine some background data on per capita waste generation rates in selected areas within Kuala Lumpur. The waste generation rates from different sources of generation were identified including the low, medium and high income households, as well as the business entities. The results of the findings are summarised in Table 1 as follows:

Table 1: Summary Results on Per Capita Generation Rate from Phase 1 of the Study

No	Descriptions	Generation Rate (kg/cap/day)
1	Per capita Generation Rate of High/Medium Income (Households)	0.710
2	Per capita Generation Rate of Low Income (Households)	0.502
3	Per Capita Generation Rate of Business Entities	0.304
4	Average Per Capita Waste Recovery Rate	0.111

Due to the fact that the Phase 1 studies were carried out mainly in Kuala Lumpur areas, some extrapolations had to be done in order to produce figures that are more representative for the overall per capita generation rates in the country. The major concern on the results of studies carried out in Kuala Lumpur area as compared with other areas is the difference in terms of peoples' standards of living in these places, which is considered to directly affect the amount of solid waste generation.

Some useful information for the extrapolation was obtained from various sources as summarised below:

i) Percentage of Urban vs Rural in Malaysia:

1991 – Urban (51.05%) : Rural (48.95%)
2000 – Urban (61.99%) : Rural (38.01%)
2004 – Urban (66.86%) : Rural (33.14%)

Source: Statistic Yearbook 2004 (Department of Statistic Malaysia)

ii) Population in Malaysia (2004) : 25,580,900
Urban population (66.86%) : 17,103,390
Rural population (33.14%) : 8,477,510

Source: Statistic Yearbook 2004 (Department of Statistic Malaysia)

iii) Statistics on Expenditure:

Urban expenditure	:	RM1,943.00 per month
Rural expenditure	:	RM 1,270.00 per month
Ratio (Urban vs Rural)	:	60.47% vs 39.53%
	:	1 : 0.65

Source: Household Expenditure Survey 98/99 (Department of Statistic Malaysia)

Based on this information and results obtained from Phase 1 of the studies, the estimation for the waste generation, recovery and disposal was carried under the following key assumptions:

- Waste generation rate for medium/ high income households in Phase 1 of the studies was taken to represent URBAN households
- Waste generation rate for RURAL was calculated based on the ratio of Urban : Rural published by EPU, i.e. 1 : 0.65), assuming that the waste generation is proportional with level of expenditure
- Per Capita Waste Recovery Rate from phase 1 of the studies was taken to represent URBAN
- Waste Recovery Rate for RURAL was assumed to be 50% of URBAN
- Waste Disposal Rate = Waste Generation Rate - Waste Retained Rate
- Assumption that the waste loss at other destinations is insignificant

Therefore, the total waste generation, recovery and disposal from households and business entities was calculated as follows:

Waste Generation:

i) For Households

Urban (per capita generation rate)	= 0.710 kg/cap/day
Rural (per capita generation rate)	= 0.710 kg/cap/day x 0.65 = 0.464 kg/cap/day
Total wastes generated from Urban	= 17,103,390 x 0.710 kg/cap/day = 12,135 tones/day
Total wastes generated from Rural	= 8,477,510 x 0.464 kg/cap/day = 3,931 tones/day
Total wastes generated	= 16,066 tones/day
Average per capita generation rate	= 0.628 kg/cap/day

ii) For Business Entities	
Urban (per capita generation rate)	= 0.304 kg/cap/day
Rural (per capita generation rate)	= 0.304 kg/cap/day x 0.65 = 0.198 kg/cap/day
Total wastes generated from Urban	= 17,103,390 x 0.304 kg/cap/day = 5,193 tonnes/day
Total wastes generated from Rural	= 8,477,510 x 0.198 kg/cap/day = 1,682 tonnes/day
Total wastes generated	= 6,875 tonnes/day
Average per capita generation rate	= 0.269 kg/cap/day

Based on these calculations, the total wastes generated in Malaysia was then estimated to be (16,066 + 6,875) tonnes/day, or **22,941 tonnes/day**. This is equivalent to about **0.897 kg/cap/day**.

Waste Recovery:

i) For Households	
Urban (per capita recovery rate)	= 0.111 kg/cap/day
Rural (per capita recovery rate)	= 0.111 kg/cap/day x 0.5 = 0.055 kg/cap/day
Total wastes recovered from Urban	= 17,103,390 x 0.111 kg/cap/day = 1,896 tonnes/day
Total wastes recovered from Rural	= 8,477,510 x 0.055 kg/cap/day = 470 tonnes/day
Total wastes recovered	= 2,365 tonnes/day
Average per capita recovery rate	= 0.092 kg/cap/day

ii) For Business Entities	
Urban (per capita recovery rate)	= 0.061 kg/cap/day
Rural (per capita recovery rate)	= 0.061 kg/cap/day x 0.5 = 0.031 kg/cap/day
Total wastes recovered from Urban	= 17,103,390 x 0.061 kg/cap/day = 1,047 tonnes/day
Total wastes recovered from Rural	= 8,477,510 x 0.031 kg/cap/day = 259 tonnes/day
Total wastes recovered	= 1,306 tonnes/day
Average per capita recovered rate	= 0.051 kg/cap/day

Based on these calculations, the total wastes recovered in Malaysia was then estimated to be (2,365+ 1,306) tones/day, or **3,671 tones/day**. This is equivalent to about **0.144 kg/cap/day**.

Waste Disposal:

i) For Households		
Per capita disposal rate	= (0.628 – 0.092) kg/cap/day	= 0.536 kg/cap/day
Total wastes disposed from households	= (16,066 – 2,365) tones/day	= 13,701 tones/day

ii) For Business Entities		
Per capita disposal rate	= (0.269 – 0.051) kg/cap/day	= 0.218 kg/cap/day
Total wastes disposed from b. entities	= (6,875 – 1,306) tones/day	= 5,569 tones/day

Based on these calculations, the total wastes recovered in Malaysia was then estimated to be (13,701+ 5,569) tones/day, or **19,270 tones/day**. This is equivalent to about **0.753 kg/cap/day**.

In summary, the overall waste generation, recovery and disposal rates estimated for Malaysia are summarised in Table 2 as follows:

Table 2: Summary of Overall Waste Generation, Recovery and Disposal Rates in Malaysia

Descriptions	Unit in kg/cap/day		
	Households	B. Entities	Total
Per Capita Generation Rate	0.628	0.269	0.897
Per Capita Recovery Rate	0.092	0.051	0.144
Per Capita Disposal Rate	0.536	0.218	0.753
	Unit in tones/day		
	Households	B. Entities	Total
Total Waste Generated	16,066	6,875	22,941
Total Waste Recovered	2,365	1,306	3,671
Total Waste Disposed	13,701	5,569	19,270

PART 3

ADDITIONAL INFORMATION FOR FEDERAL ACTION PLAN ON WASTE MINIMISATION

Part 3 Additional Information for Federal Action Plan on Waste Minimisation

As described in “Chapter 5 Action Plan at the Federal Level, Volume I (Main Report)”, six (6) actions have been categorised under three strategies of the Waste Minimisation Master Plan. Table 3-1 shows the relation between the master plan strategies and the Federal Action Plan.

Table 3-1 Master plan Strategies and Federal Action Plan

M/P Strategies	Federal Action Plan
1. Enhancement of Awareness on Waste Minimisation	Action-1: Enhancement of awareness raising activities under the National Recycling Programme (NRP)
	Action-2: 3Rs activities in schools
2. Strengthening of Partnership for 3Rs Activities	Action-3: Formulation of stakeholders’ networking and development of partnership activities on 3Rs
3. Enhancement of Institution to Strengthen Government Policies on Waste Minimisation	Action-4: Strengthening of legal, regulatory and financial mechanism
	Action-5: Improvement of information management
	Action-6: Provision of guidance to LAs on LAP-WM

In this Part 3, Section 3.1 describes background information for the preparation of each action plan (A/P), while, Section 3.2 describes some useful information related to the A/Ps.

3.1 Background of Each Federal Action Plan

3.1.1 Enhancement of Awareness

Action 1: Enhancement of Awareness Raising Activities under the National Recycling Programme (NRP)

Background Information

The National Recycling Programme (NRP) has been re-launched in December 2000. The primary objective of the NRP is to inculcate the general public with the habits of the 3Rs with the ultimate aim of recycling being to reduce usage of land for waste disposal, to reduce expenditure on solid waste management and to reduce importation of waste. The major components of the NRP are providing recycling facilities (recycle centres, 3 colour bins and recycle trucks), raising public awareness and SWM data collection/ management.

In order to enhance the awareness of the general public on 3Rs, awareness raising campaign is currently carried out under the NRP lead by MHLG. In the campaign, public awareness on 3Rs is promoted by various media and tools; such as printed materials (poster, pamphlet, flyer, bulletins, etc.), electronic media (TV, radio and website), mascot for children, advertisement on school buses and other transportation modes, billboard, exhibitions/road shows, talks and so on.

In order to establish an “Environmentally Sustainable Society”, promotion of using recycled/ environment-friendly products and/or green purchasing is also important

together with practice of 3Rs. Consumers should know which products are recycled and environment-friendly and which companies are dealing with them.

In this Federal Action Plan, in line with the waste minimisation master plan, tools and programme of the NRP including events of the National Recycling Day shall be reviewed and be continuously implemented.

Action 2: 3Rs Activities in Schools

Background Information

The philosophy of conservation of resources through sustainable waste minimisation practices and habits should be inculcated into our younger generation via their education in the schools and in their co-curricular activities.

One way to be successful in educating the general public in waste minimisation is to instil awareness from a young age. By doing so, it is hoped that the children will grow up to be citizens who practise waste minimisation as part of daily life and not something which is done when there is a special campaign. In the process, the children will indirectly “educate” their parents and siblings as well.

In the JICA study, pilot projects on 3Rs activities in schools have been implemented in Johor state (6 schools) and MB Miri (11 schools) with the following objectives.

- Awareness about 3Rs among teachers and pupils is improved.
- Teachers and pupils have better access to information about 3Rs activities.
- 3Rs programmes are streamlined.
- Performance is monitored to allow evaluation and improvement.
- Information from reports adds value to MHLG’s 3Rs website
- Networking with local communities (including LA) is established or improved.

In this Federal Action Plan, in line with the waste minimisation master plan, 3Rs activities in schools shall be introduced and expanded upon based on the “Guidelines for the Enhancement of 3Rs Activities in Schools” prepared by the JICA study.

3.1.2 Strengthening of Partnership for 3Rs Activities

Action 3: Formulation of Stakeholders’ Networking and Development of Partnership Activities on 3Rs

Background Information

(1) Stakeholders’ Networking

Under the National Recycling Programme, all participating Local Authorities (LAs) were requested by MHLG to set up and develop their individual recycling (3R) programme to promote and enhance the recycling activities within the boundaries of the LA. There are many stakeholders involved in waste minimisation and recycling

activities, however, the relationship among them is not clear and therefore recycling networks should be established and led by the respective LAs to spearhead the effective recycling activities and to promote MSW minimisation.

Based on the above understanding, pilot projects to form the stakeholder's network have been implemented in the LAs of MPPP, MPSJ and MB Miri. As the first step, inventory survey of recycle related stakeholders was carried out and the result was compiled into "Directory of Stakeholders" in each LAs.

Stakeholder's networking has already been organised and operated in MPPP since the year 2001. Penang Environmental Working Group (PEWOG) set up by the State Local Government Committee of Penang is the key agency to handle this networking. Stakeholders' networking in MPPP goes under the name of "Recycling Wheel" as shown in Figure 3-1.

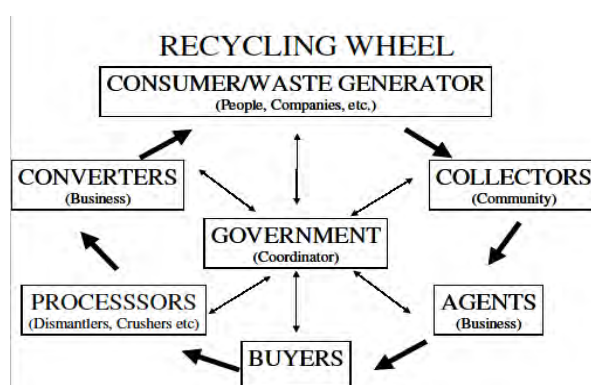


Figure 3-1 Diagram of Recycling Wheel in Penang

In this Federal Action Plan, the networking system practised by the stakeholders in MPPP will be introduced and widely spread to other LAs.

(2) Source Separation

Source separation leads first to the reduction of disposed waste amount at landfill sites and secondly to the smooth introduction of 3Rs activities.

The introduction of source separation of municipal solid waste (MSW) is the main activity of waste minimisation. Such activities have been previously introduced on trial basis in Petaling Jaya, Putrajaya and Subang Jaya. However, in order to enhance such activity and to achieve the target of waste minimisation, a suitable and comprehensive waste minimisation management system should be implemented to include source separation, collection of separated recyclables and delivery of the recyclables to the intended processors/ recyclers.

In the JICA study, source separation has been implemented as a pilot project in MPPP, MPSJ and MB Miri. Target groups for each pilot project are shown in Table 3-2.

Table 3-2 Target Group of Source Separation Pilot Projects

LA	Target groups of source separation pilot project
MPPP	Households, shops
MPSJ	Residential apartment, office buildings, markets
MB Miri	Households, hotels

In this Federal Action Plan, based on the experience of the pilot projects, and in line with the waste minimisation master plan, source separation practices in MPPP, MPSJ and MB Miri shall be expanded within their respective administrative areas and widely introduced to other LAs.

It is noted that source separation and 3Rs activities implemented under the partnership of stakeholders shall coexist with private recycle systems as shown in Figure 3-2.

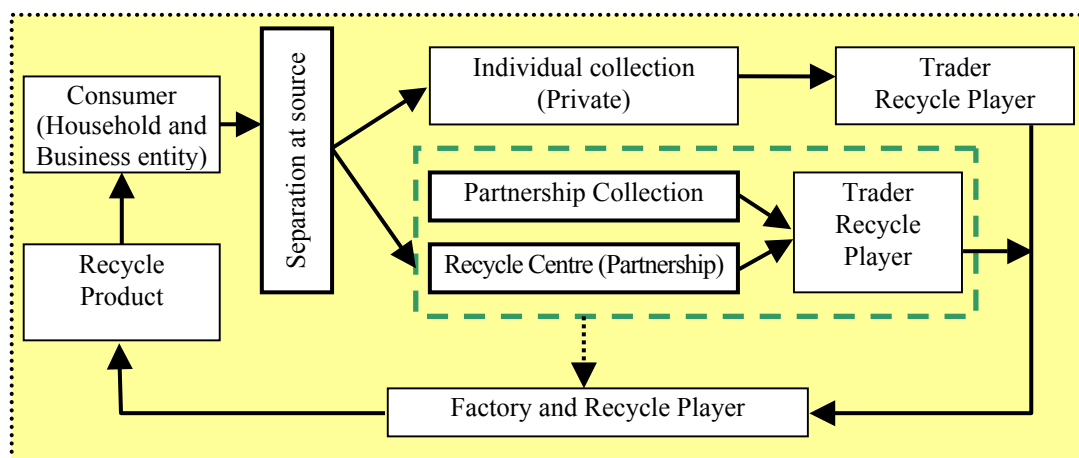


Figure 3-2 Partnership Collection of Recyclables and Recycle Centre

(3) Partnership Activities of NGOs/ CBOs on 3Rs

It is also clear that NGOs/ CBOs have been playing an important role for promoting 3Rs activities, including operation of recycle centres, organising charity bazaars and flea markets, etc. This Federal Action Plan focuses on assisting the 3Rs activities of the NGOs/ CBOs.

3.1.3 Development of Institutional Mechanism

Action 4: Strengthening Legal, Regulatory and Financial Mechanism

Background Information

(1) Solid Waste Management

The “Solid Waste Management Act (SWM Act)” is now being prepared and examined by related government agencies. The Act shall include the following subjects relating to waste minimisation and should be enacted in due time.

1) Clear definition of waste and category (Definition of solid waste by sources)

Municipal solid waste, Institutional waste, Industrial Waste, Construction Waste and Scheduled waste

2) Clear definition of SWM activities

Generation, Source segregation, Discard (discharge), Collection, Transportation, Recycling, Treatment, and Disposal

3) Clear definition on the roles and responsibilities of relevant stakeholders in solid waste management.

< Stakeholders >

Federal government, State government, LAs, Concessionaires, Business entities (Offices, Commercial Activities, Services, and Industries), NGOs and CBOs, SW service providers, Recyclers and General public

< Clarifying the mandate of federal/local authorities in solid waste management by types >

Municipal Solid Waste, Institutional Waste, Industrial Waste, and Construction Waste

(2) Amendment Model By-Law

LAs presently have By-Laws to regulate the solid waste activities within their borders. In order to promote waste minimisation activities amendments to these By-Laws are needed after the enactment of the new Solid Waste Management Bill. MHLG shall prepare an Amendment Model By-Law for the LAs which includes the following subjects.

1) Proper management of waste at sources of generation (Obligations of waste generators)

- Anti-littering of solid waste
- No discharge of waste at areas other than those designated by law (no discharging on streets, drains, rivers and watercourses, vacant lands, etc.)
- Proper packaging and/or use of waste bins
- Segregation of recyclables at sources
- Segregation of hazardous materials

2) Proper collection of Solid Waste (Obligations of SW collectors, i.e. concessionaires, contracted collectors)

- Provision of proper collection facilities and equipment (vehicles, containers, transfer stations, vehicles maintenance workshop, etc.)
- Punctual and stable provision of collection services
- Registration at Federal/local government
- Keeping and periodical (monthly) reporting of collection records (quantity of waste collected, vehicles' trips, maintenance records, O/M cost, etc.)

3) Proper disposal of solid waste (Obligations of SW disposal landfill operators)

- Standards for final disposal landfill of solid waste
- Operation and maintenance standards for final disposal landfill of solid waste
- Registration of SW Collectors at Federal government

- Keeping and periodical (monthly) reporting of disposal records (quantity of solid waste disposal, O/M cost of landfill, etc.)

4) Proper recycling of solid waste (Obligations of recyclers)

- Definition of players in recycling (collectors, traders, and recyclers)
- Registration and licensing system
- Keeping and periodical (monthly) reporting of recycling records (quantity of recyclable items collected, traded, and recycled).
- Standards for recycling facilities and their operations

5) On-site inspection by the authorities

- Inspection of SWM and recycling facilities by the relevant authorities
- Issuance of the orders for improvement/actions and revocation of permits/licenses

6) Penal Provisions

- Fines, Imprisonment, Damage compensation, Restoration orders, etc.

<i>Action 5: Improvement of Information Management</i>

Background Information

The Federal Government will be the focal point of all information and data on 3Rs so that it can always identify the current status of waste management and recycling of municipal solid waste. MHLG currently established the “Recycling Information Centre” (RIC) within the Ministry. This Centre will take the main role of the following activities in relation to information management of 3Rs activities.

Accordingly a pilot project has been carried out by the JICA study in order to establish a data management system on solid waste management and 3Rs at the national level. Eleven (11) LAs were the target for this pilot project. In this Federal Action Plan, data management system established in the pilot project will be introduced/ expanded to all the LAs in Malaysia.

(1) Data management of municipal solid waste (MSW) and 3Rs on national level

1) Information Management System (IMS)

The main purpose of the IMS is to create a database of the recyclables collection data that have been submitted by the LAs, in electronic format. With the system in place; key data can easily be accessed, re-searched, tabulated and presented in chart forms for easier review, analysis and presentations.

In order for the IMS to be effective, the recyclable collection data must be submitted in electronic format. At present, the proposed method of the data file transmittal is via email attachments, addressed to MHLG. In the future, the transmittal system shall be included in their recycling website.

The development of the IMS for the recyclables collection data shall be extended from the initial Level B data of receivers and Traders to Level A data of recyclers and end users as shown in Figure 3-3, since the number of collectors at Level C and generators at Level D are too large to be collected.

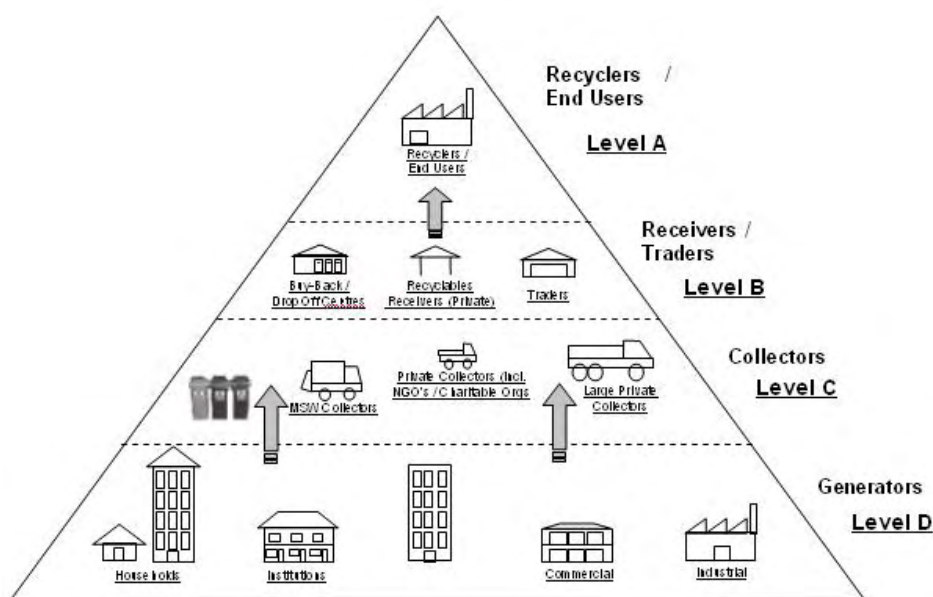


Figure 3-3 Recyclables Flow Pyramid

2) Stakeholders' Networking Database (SND)

The Stakeholders' Networking Database is basically a directory of the players involved in recycling throughout the country. Such players, also known as stakeholders, include the Federal Government bodies, LAs, Professional Associations and Organisations, Non-Governmental Organisations (NGOs), Charitable/Welfare Organisations, Educational Institutions, Community Based Organisations (CBOs), Residents Associations, recyclables collectors, traders, recyclers, and the general public.

The database shall consist of basic information of the stakeholders such as name, correspondences/operations addresses, contacts details, and most important of all, a summary of what they do. The database can be either printed as a directory booklet or published on the website for references. This will allow the information to be searched, transmitted and shared.

At present, the MHLG has accumulated a database of some of the stakeholders and recently they have also launched a nationwide newspaper advertising campaign, entitled "Notice to Parties Involved in Recycling Activities", to invite the players to register their companies or themselves with the Ministry and to be included in the new directory.

3) Waste Minimisation Unit in LAs

At present, there are few specific organisations to handle information and data on 3Rs in the LAs. Considering this condition of LAs, in order to carry out the following tasks of the pilot project, Waste Minimisation Unit (WMU) was temporarily established in each model LA.

- Enhancement of awareness on 3Rs by the general public together with MHLG
- Formulation of recycling players' networking at the local level
- Planning, coordinating and monitoring the source separation activities
- Operation of information management system (IMS) on SWM and recycling
- Base for the dissemination and sharing of information on 3Rs

After the PP activities, and based on the recognition of the necessity of the unit, all three model LAs decided to establish the WMU as a permanent organisation handling 3Rs. Further, through the workshop discussion on guidelines on March 1st & 2nd 2006, it was clarified amongst participants including MHLG, LAs etc. that WMU should be established in each LA as a focal agency to handle 3Rs.

4) Research and Development Information (R&D Information)

R&D activities on solid waste management in Malaysia are carried out focusing on various aspects, particularly on the solid waste generation and characteristics, wastes treatment, disposal technologies as well as socio-economy aspects. In general, these R&D activities are carried out by three different parties and the R&D information shall be accumulated and disseminated to all the stakeholders:

(a) Public universities or research institutions

- Universities such as UPM, UKM, UM, USM etc.
- Research institutes such as MINT, SERI etc.

(b) Non-governmental Organisations (NGOs) such as Centre for Environment, Technology and Development Malaysia (CETDEM)

(c) Private entities – Waste treatment, consultancy as well as concessionaire companies

(2) Website operation of National Recycling Programme

MHLG has a website for public awareness, “www.kitarsemula.com”. The website provides information on recyclable items to be collected, contact information of stakeholders, how to start recycling at home/office, etc. Information, opinions, and questions on recycling activities are exchanged in the message board of the website. Use of the website helps disseminate information on how to practise 3Rs, how to participate in recycling activities, who can support collection of recyclables, etc. and also raise public awareness in order to increase rates of waste minimisation at source. Therefore, the website should be updated for further enhancement of “practice of 3Rs”.

(3) Dissemination of information

1) Information Database

Three databases abovementioned (IMS, SND and R&D Information) shall be open to the public through internet access to the recycling website of the MHLG.

2) Recycling Website

Recycling website “www.kitarsemula.com” shall be open to the public through internet access and renewed periodically to incorporate the latest data and information.

3) Publication of Reports

Annual report including the statistical data of SWM and waste minimisation and latest recycling rate of the country, quarterly newsletter “Buletin Kitar Semula” featuring the new 3Rs activities will be published and circulated to the relevant stakeholders.

4) E-mail News

E-mail news will be sent regularly for those who are registered in the Stakeholders’ Networking Database and R&D Information, and members of the general public who apply through the recycling website.

Action 6: Provision of Guidance to LAs on LAP-WM

Background Information

In Malaysia, about 6 million tonnes of solid waste is generated every year (2003) and this figure is expected to increase tremendously to about 9 million tonnes/ year in 2020. It is therefore crucial to take some preventive measures against the waste problem especially in terms of decreasing the financial burden to LAs resulting from increased disposal costs.

Each LA is directly playing an important role in promoting recycling and waste minimisation among the communities within its boundaries. The LA should lead, monitor and work together with various local stakeholders on recycling to ensure successful and sustainable recycling programmes. MHLG will guide LAs in the proper direction, in terms of preparation and implementation of Local Action Plan on Waste Minimisation (LAP-WM).

(1) Formulation, Expansion, and Promoting the LAP-WM

The LAP-WM serves as a guideline for the LA to effectively implement waste minimisation and recycling programmes with focuses on respective circumstances of waste generation sources, such as residential households, commercial enterprises, offices, hotels, restaurants and manufacturers specific to the authority. Some targets are set in this LAP-WM and performance indicators are recommended for monitoring purposes. Some possible actions to be taken to achieve the targets are short-listed in the plan based on the local conditions of the LA’s areas.

Currently the LAPs-WM were formulated in four selected authorities (model LAs) for providing all the relevant 3Rs players clear targets to achieve and actions to be taken. Guidelines for the other LAs were prepared based on these model LAPs-WM.

Contents of the LAP-WM in line with the strategies of the Waste Minimisation Master Plan, following five (5) actions were formulated.

(2) Implementation of LAP-WM

The LAP-WM formulated by and for the LA concerned shall be implemented properly and monitored by both the LA and the Ministry.

(3) Sharing knowledge and experience through workshop, training and documentation

In order to share the knowledge and experiences in the course of formulation and implementation of LAP-WM, MHLG shall organise workshops, training and seminars of waste minimisation from time to time. Participants shall be selected from the various stakeholders.

3.2 Additional Information related to Federal Action Plan

Additional information related to the Federal Action Plan on Waste Minimisation described in this section is as follows.

- Proposed Programme of National Children's Programme on 3Rs (NCP3R)
- Outline of "Recycling Wheel" in MPPP
- Outline of Information Management System (IMS) and Its Sustainability
- Contents of LAP-WM

3.2.1 Proposed Programme of National Children's Programme on 3Rs (NCP3R)

(1) Introduction

"National Children's Programme on 3Rs" is proposed to complement the "National Recycling Programme" and the "Recycling Programme for Children" recently implemented by MHLG. Data from MHLG indicate that the number of schools participating in the NRP has increased. It appears that there is potential for enhancing the existing programmes by introduction of new activities, better coordination and monitoring and evaluation (through selection of appropriate indicators). This will result in more effective and beneficial programmes in the short and long terms.

(2) Objective

To promote greater 3Rs education and activities in the primary and secondary schools through conducting more 3Rs activities and promotion of greater participation of the pupils by offering awards and incentives.

(3) Outline of NCP3R

Outline of the proposed NSP3Rs is as shown in the Table below.

Table 3-3 Outline of NCP3R

Items	Contents
Target groups	School children both at primary and secondary school levels <ul style="list-style-type: none"> • Number of Primary schools: 7,557 (3,044,797 schoolchildren) • Number of secondary schools: 1,997 (2,110,546 schoolchildren) (Source: Ministry of Education, 2003)
Date of event	11 November (on the National Recycling Day)
Contents of event	(Selected schools from each State participate in the NCP3R.) <ul style="list-style-type: none"> • Exhibition/presentation of activities by schools • Panel discussion among schools (exchange opinions) • Exhibition/talks by MHLG, MOE, manufactures, NGOs, etc. • Evaluation (voting by participants) • Award by the organiser
Schools selection procedure	As described in Figure 3-4.

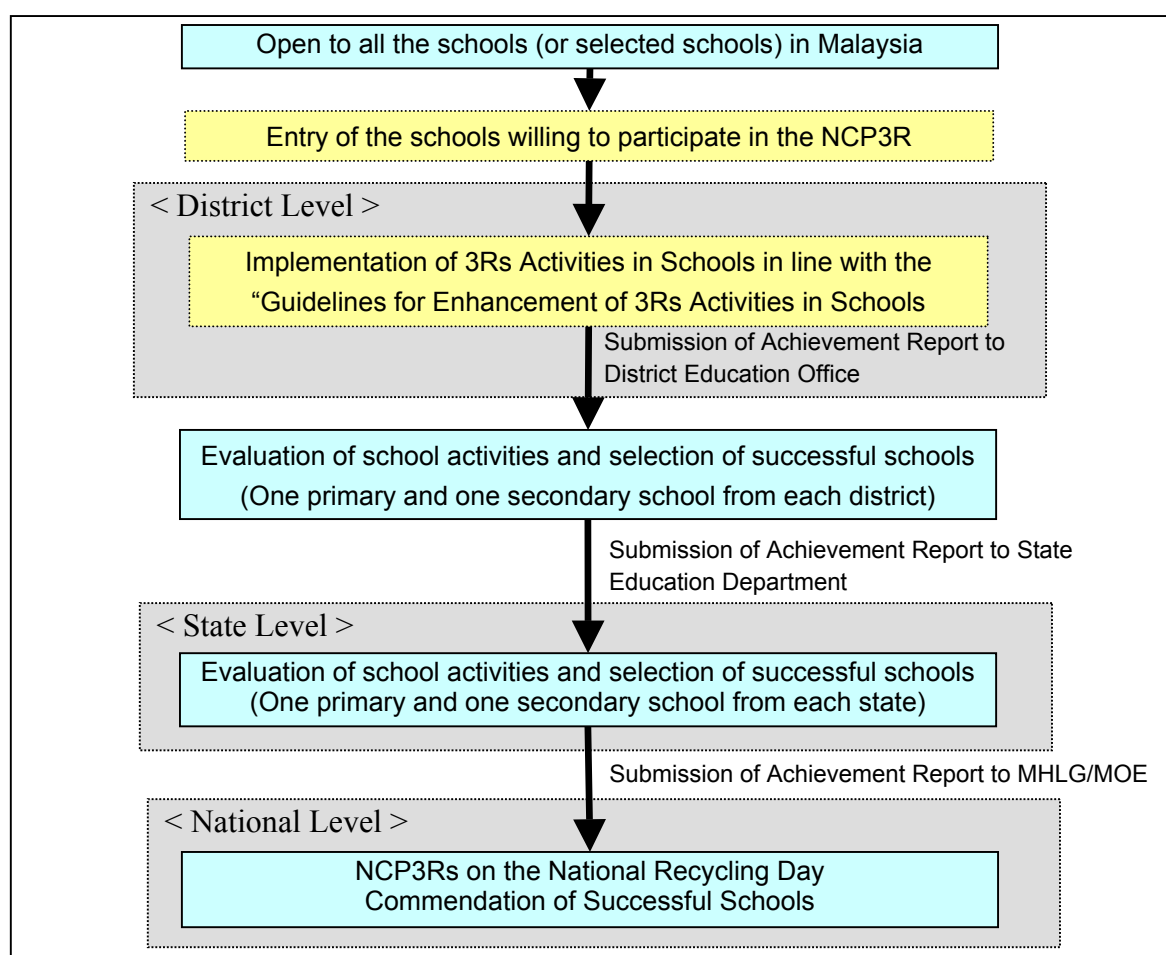


Figure 3-4 Selection Process of Pertaining Schools for NCP3R

(4) Implementation Schedule of NCP3R

Proposed implementation schedule of NCP3Rs is as follows:

Table 3-4 Implementation Schedule of NCP3R

Item	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov
1. Preparation of NCP3Rs Programme											
2. Enter schools desiring to participate in the award programme											
3. Implementation of recycling activities in each school											
4. Submission of achievement report											
5. Evaluation of school activities in each district and selection of schools											
6. Evaluation of school activities in each state and selection of schools											
7. Preparation of Presentation/Exhibition for NCP3Rs by schools											
8. Launching of the NCP3R											▲

(5) Undertakings amongst the Players

Table 3-5 Undertakings amongst the Players

Activities	MHLG	MOE	LAs/ District	Schools
Establishment of secretariat for the conference	XX	XX		
Preparation of detail programme of NCP3R	XX	XX		
Open participation in the NCP3Rs to all the schools	X	X	XX	
Entry to the NCP3R			X	XX
Guidance to the schools (if necessary)		X	XX	
Implementation of school activities			X	XX
Evaluation and reporting of school activities			X	XX
Evaluation of activities carried out by the schools, and selection of successful schools in District Level	X	X	XX	
Notification of evaluation result to the participating schools		X	XX	
Preparation of evaluation report and submit to State Education Department			XX	
Evaluation of activities carried out by the schools, and selection of successful schools at State Level		XX	X	
Notification of evaluation result to the selected schools		X	XX	
Preparation of evaluation report and submit to the secretariat for the conference		XX		
Invitation letter of school children to NCP3R	X	XX	XX	
Preparation of presentation/exhibition materials by schools			X	XX
Booking and preparation of the venue	XX	XX		
Arrangement of accommodation, travelling, pocket money and insurance for children, members of PTA, teachers and officials of LAs	XX	XX		
Preparation of prizes	XX	XX		
Printing of handouts, preparation of stationeries for the conference and gift for VIPs	XX	XX		
Preparation and holding of reception	XX	XX		
Launching of the NCP3R	XX	XX		

Note: XX – main task, X – supporting task

3.2.2 Outline of “Recycling Wheel” in MPPP

MPPP has launched the recycling programme since 1993. Based on past experience, it was decided that a strategy involving the forging of a partnership among four key parties would address most of the problems faced earlier in sustaining recycling programmes. The key partners are NGOs, Penang Environmental Working Group (PEWOG), the private sectors and MPPP.

The strategy is comprised of 3 approaches;

1. Direct Approach
2. Vendors Approach
3. Networking Approach

With these approaches, MPPP has succeeded in formulating a network among those partners, called the “Recycling Wheel.”

(1) Direct Approach: (A package: Talks + Recycle Bin Supply)

MPPP conducted its own campaigns directly with the target group through talks, briefings and exhibitions. Target groups are normally Schools, Higher Learning Institutions, Kindergartens, Organisations, Factories, Private Firms, Hospitals, Government Agencies, Associations, NGOs etc.

Target groups were taught in detail the Dos and Don'ts and what material can be recycled and what cannot be recycled.

Public education campaigns were conducted through KAP (Knowledge, Attitude, Practice), 3 P (Passion, Patience, Patient) 3 R (Reduce, Reuse, Recycle)

Audio-visual aids (AVA) were widely used in this approach. Samples and displays were very essential tools.

(2) Vendors Approach:

The Vendor System was introduced to the community to ensure a sustainable and more systematic collection. By harnessing the experience and interests of the vendors, MPPP was free to focus on future planning and implementation of other environmental programmes. Currently, 24 companies are listed as recycling vendors. Vendors list was given to public/ community normally after the recycling talks. The public was given the freedom to choose whichever company (vendor) they felt comfortable to work with.

(3) Networking Approach:

a) Vendors Networking:

Vendors Networking concept was introduced to all the listed vendors through workshops or meetings. Vendors are required to collect all kind of recyclables with no exceptions. They were introduced to each other during workshops or meetings. Vendors are required to state their preferences and speciality in the items they collect e.g. glass, plastic, e-waste etc. Vendors are then able to either exchange their recyclables or trade with each other.

b) Public - Private Networking:

Public-Private sector networking is implemented using a structure introduced by United Nation Development Programme (UNDP) which is known as PPPUE (Public Private Partnership for Urban Environment).

c) PEWOG Networking:

PEWOG was established under the Penang Local Government Consultative Forum (PLGCF) by the Penang State Government. Members of PEWOG – MPPP, MPSP, DOE, NGOs, Environmental Activists, CAP, MNS, National Poison Centre, Recycle Companies, and individuals. Strategies are planned and implemented through this networking taking into consideration the comments and demands by the public.

PEWOG has also organised awareness campaigns, seminars, workshops and exhibitions to promote recycling. Appreciation Certificates have also been awarded to recycling agents, organisations and individuals who are active in recycling in the State.

Through PEWOG’s Awareness Campaign, about 150 communities and other bodies have started their recycling programmes with or without assistance from the government. Major programmes implemented by PEWOG are as follows;

- Household Hazardous Waste Collection
- Voluntary Computer Recycling
- Community Composting
- Publishing of Recycling Guide Book 1st and 2nd editions
- Publishing of Composting Guide book
- Training of Trainer Workshop
- Recycling Workshop
- Waste Workshop
- Stakeholders Workshop and other useful workshops

3.2.3 Issues and Measures for the Introduction of IMS

(1) Outline of IMS

Objectives: Information management system (IMS) on solid waste management including recycling amount and activities in national level is established. Outline of the IMS is as described below;

Table 3-6 Outline of IMS

Items	Description	
Collect & compiled data	Basic SWM data; collection and disposal amount of SW	
	Recyclables; paper, glass, plastic, metals, clothing/textiles, rubber, others	
	Recycling activities by various players	
Role of players	MHLG	<ul style="list-style-type: none"> • Collect above data/ information from LAs • Compile & maintain a database (Microsoft Access) <ul style="list-style-type: none"> - <i>LAs information database on SWM</i> - <i>Stakeholders networking database</i> • Publicise MHLG’s report on national recycling activities
	LAs	<ul style="list-style-type: none"> • Collect data/ information from related players <ul style="list-style-type: none"> - <i>Recyclables collection data form (new)</i> • Submit report to MHLG by e-mail

	SW collectors, Concessionaires, Landfill operators, Recyclers, etc.	<ul style="list-style-type: none"> • Submit data/ information on SW collection/ disposal to LAs • Submit data/ information on recycle amount and activities to LAs
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Flow diagram of IMS is as shown in Figure 3-5 below.

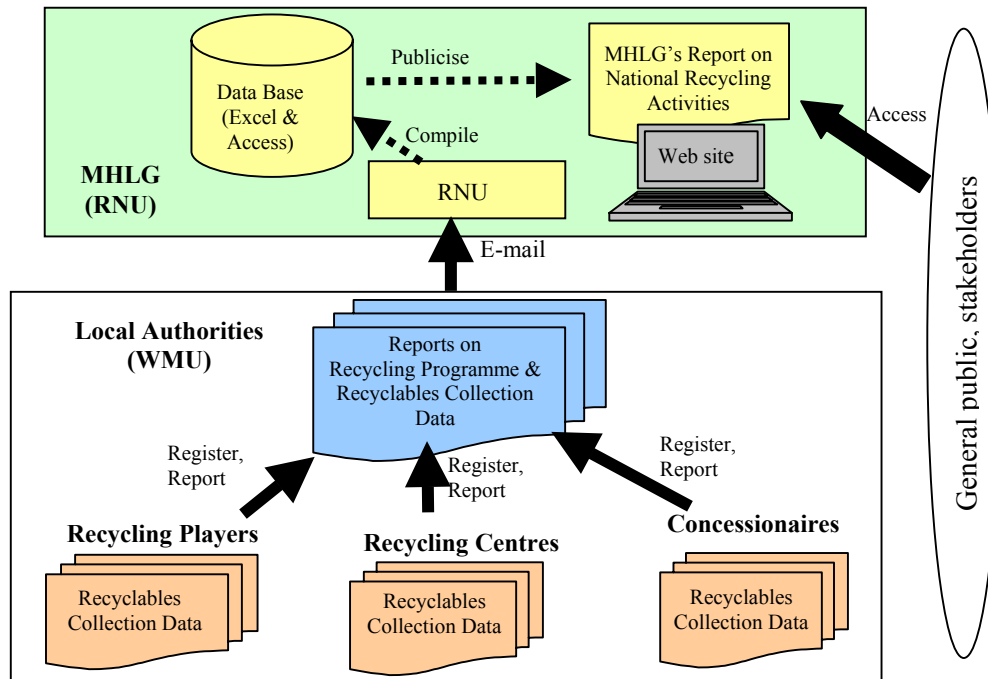


Figure 3-5 Flow Diagram of IMS

(2) Lessons Learnt for the Introduction of Sustainable IMS

The trial of IMS carried out by the pilot project (PP-I) of the JICA Study showed that only 4 out of 10 LAs managed to submit their reports. This could be an indication of the problem faced in the LAs; namely, manpower and/or capacity of officers, budget and equipment, or the short PP period limited to only about three months.

Through the pilot project experiences, key items identified to sustain the IMS will be as follows.

- i. In line with the strategies of the Waste Minimisation Master Plan, MHLG and LAs should realise the importance of collecting related information and data on recycling, even through it may be more work for them. Commitment of top-management of the LAs is highly required.
- ii. LAs should allocate budget and assign suitable personnel to maintain the IMS system.
- iii. Waste Minimisation Unit (WMU) shall be established in each LA as a focal point to manage IMS and to carry out other several roles on waste minimisation.
- iv. The databases are only useful when they are constantly monitored and updated. Such tasks should be carried out periodically and MHLG should ensure that the

LAs and the other stakeholders submit new information of changes and updates regularly.

- v. MHLG should establish an updating reminder system to remind LAs to provide their updated information.
- vi. It is commonly found that the officers of the LAs lack the expertise and experiences in issues related to waste minimisation and recycling. MHLG should organise and carry out more capacity building and training programmes for the LAs officers on waste minimisation and recycling issues including IMS.
- vii. Involvement of other stakeholders in the operation of IMS is important; however, experiences in the Model LAs show that cooperation from the stakeholders was sometimes low. In this matter, LAs play a very important role to explain clearly to the stakeholders about the benefits and purpose of IMS.

For more detail of the IMS and lessons learnt and recommendations to introduce sustainable IMS, refer to Chapter 5 Pilot Project I, Volume 3 of the Draft Final Report (2nd Edition).

3.2.4 Contents of Local Action Plan on Waste Minimisation (LAP-WM)

TABLE OF CONTENTS of LAP-WM	
Preface	
Fact Sheet of <u>LA</u>	
Abbreviations	
Key Definitions	
Chapter 1	INTRODUCTION
1.1	Background and Objectives
1.2	Scope of the A/P
1.3	Organisation Framework for the Plan Formulation
Chapter 2	SOLID WASTE MANAGEMENT & RECYCLING IN <u>LA</u>
2.1	Solid Waste Management in General
2.1.1	Institutional Framework for SWM
2.1.2	Service Area
2.1.3	Solid Waste Generation and Composition
2.1.4	Waste Storage and Collection
2.1.5	Waste Treatment and Disposal
2.2	Recycling of Municipal Solid Waste
2.2.1	Type and Amount of Recyclable Materials
2.2.2	Partners in Recycling Network
2.2.3	Current Recycling Performance
2.2.4	Issues on Recycling
Chapter 3	TARGETS OF WASTE MINIMISATION and RECYCLING
3.1	Projection of Future Waste Generation
3.2	Setting of Waste Minimisation and Recycling Targets
3.3	Summary of Key Figures on SWM and Recycling
Chapter 4	ACTIONS TO ACHIEVE THE TARGETS
4.1	Strategy
4.2	Approaches to Achieve Targets
4.3	Tools to Achieve Targets
4.4	Costs Implications
Chapter 5	MONITORING & EVALUATION
5.1	Monitoring and Evaluating the Performance
5.2	Periodical Reporting
5.2	Implementation Schedule of A/P

3.3 Leaflet of Master Plan and Action Plan on Waste Minimisation

Leaflet of Master Plan and Action Plan are attached.

Waste Minimisation Master Plan

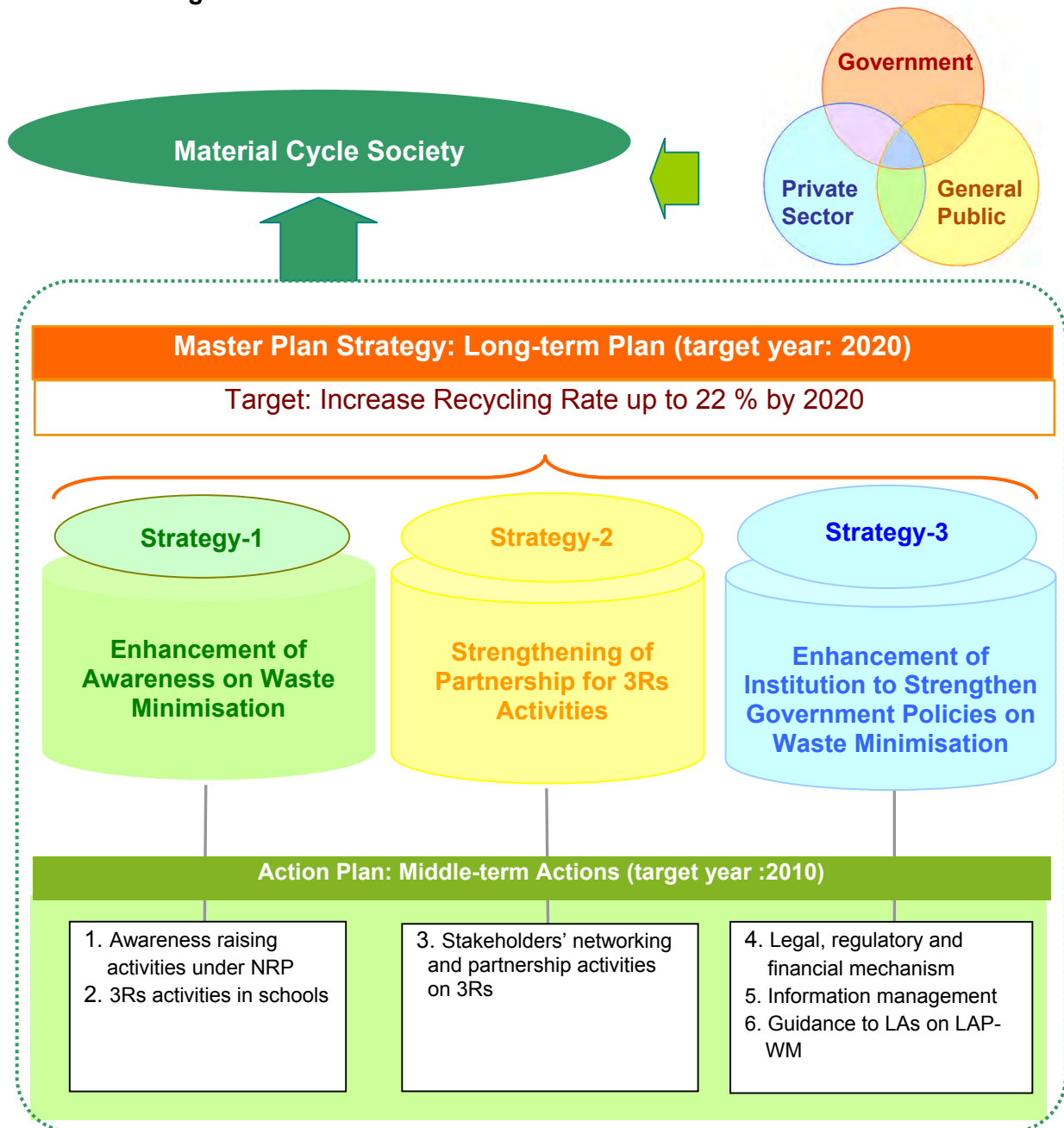


"M22 Plan"



This Plan aims to establish a "Material Cycle Society" in Malaysia through 3Rs activities.

Overall Diagram of "M22 Plan"



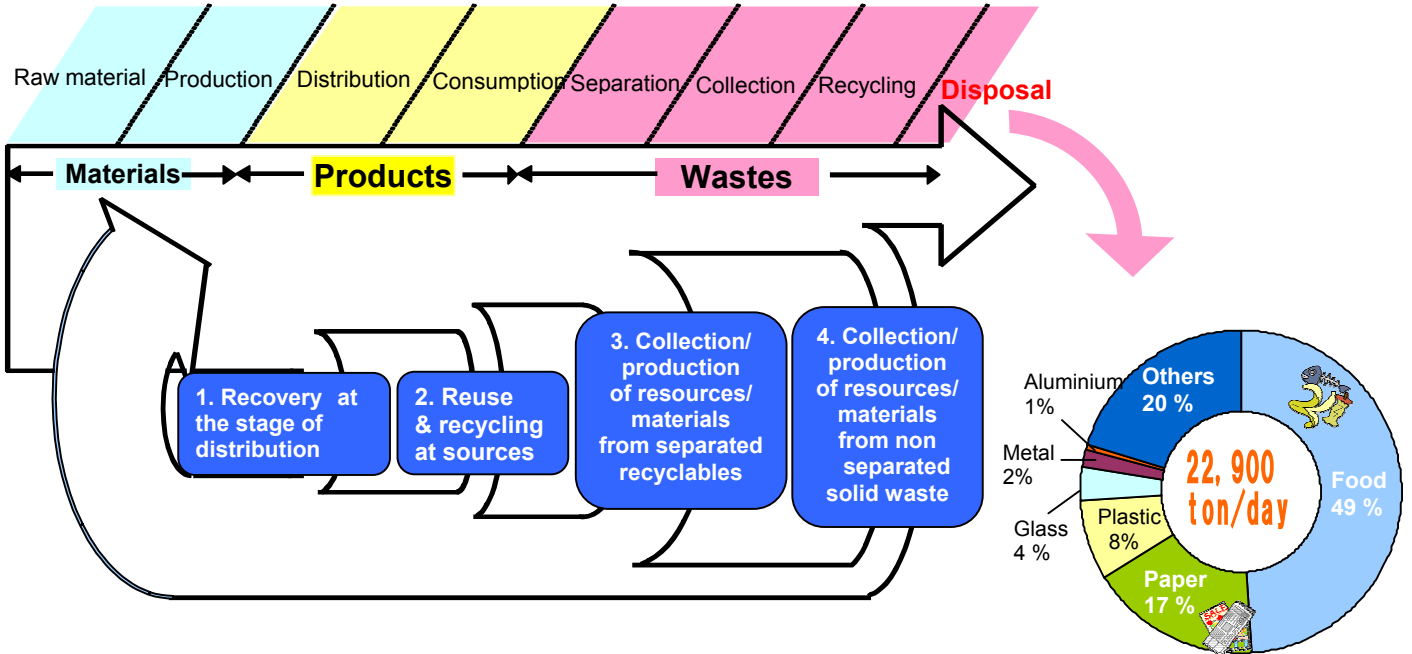
The title, "M22 Plan" means;

M: Represents M for **M**alaysia, **M**inimisation.

22: Represents target year of **2020**, and the target recycling rate **22** %.

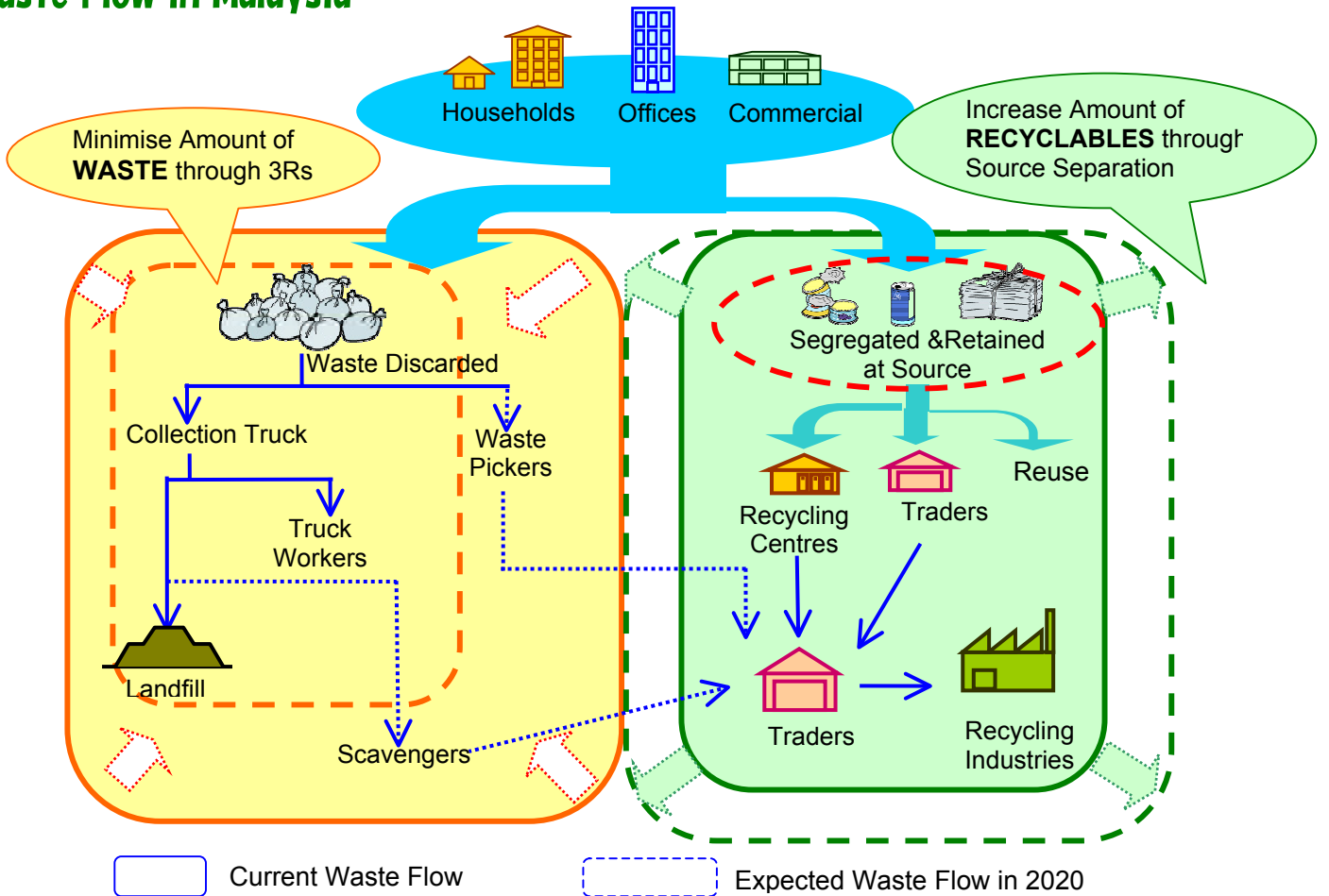
Current Status in Malaysia

Material Flow in Malaysia



Amount of Waste Generated in Malaysia in One day

Waste Flow in Malaysia

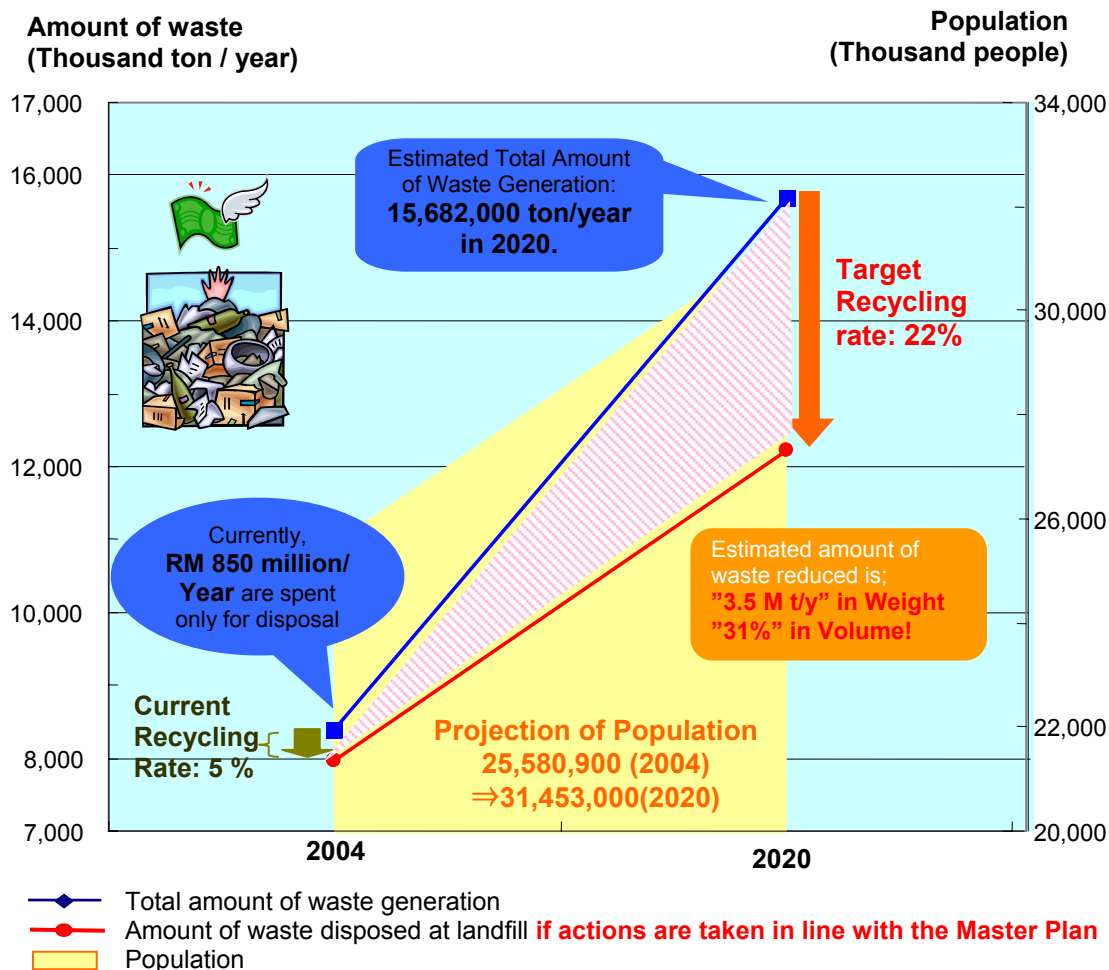


Realisation of “Material Cycle Society”

Where waste minimisation activities are systemised and sufficiently enrooted in the behaviour of Malaysian people. Through;

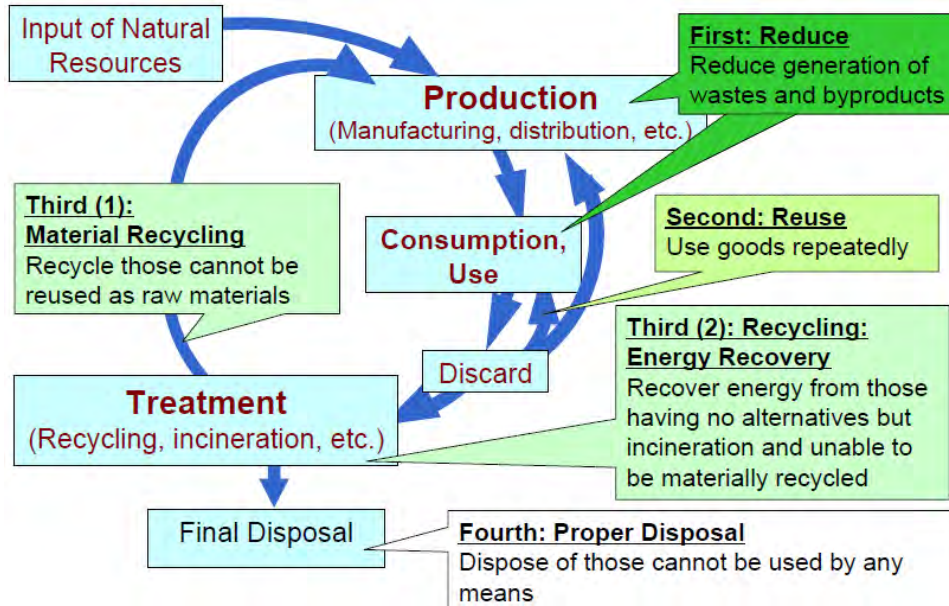
1. A deeply rooted **AWARENESS** within the Malaysian society on the importance of waste minimisation
2. A mechanism of waste minimisation based on the **PARTNERSHIP** of government, private sector, and general public and participation of stakeholders from all levels of the Malaysian community
3. Proper recognition and practice of waste minimisation that can be sustained by market mechanism and with **GOVERNMENT INVOLVEMENT** in the development of an environment that encourages all participants to implement the 3Rs (Reduce, Reuse, and Recycle); and
4. Practice of waste minimisation in accordance with the **hierarchy of 3Rs**.

With & Without the Waste Minimisation Plan



Partnership to Realise Material Cycle Society

With the partnership of "government", "private sector" and the "general public", we will realise a "Material Cycle Society".



Concept of 3Rs

Role of each stakeholder

Stakeholders		Roles
Government	Federal Government	<ul style="list-style-type: none"> Formulation and promulgation of the basic policy on national waste minimisation Promotion of supervising roles through information/ data collection & management Provision of incentives to promote 3Rs activities by stakeholders
	State/Local Government	<ul style="list-style-type: none"> Collection of data and Information on SWM and 3Rs and reporting to Federal Government Formulation of Local Action Plan, and policy implementation through LAP Coordination among relevant stakeholders Creation of opportunities for exchange of information among the LAs
Private Sector	Business Entities/ Institutions	<ul style="list-style-type: none"> Reduction of waste as waste generator by cleaner production Segregation of recyclable materials at sources Promotion of use of reusable/refillable containers Examination on voluntary taking-back of packages & containers based on EPR Establishment of the organisation to certify eco-friendly products Information sharing and awareness raising on 3Rs through its network
	Concessionaires	<ul style="list-style-type: none"> Establishment of their own recycling system Information sharing and raising awareness on 3Rs
	Recycling players	<ul style="list-style-type: none"> Cooperation in community-based collection of recyclable materials Registration as recyclers, if required by legislation
	Endusers	<ul style="list-style-type: none"> Efforts of receiving and utilisation of recycled materials Provision of information and establishment of linkage with recycling players
General Public	General Public	<ul style="list-style-type: none"> Refusing of waste as conscious consumer Reduction of waste as waste generator
	NGOs/CBOs and RAs	<ul style="list-style-type: none"> Bridging community with the relevant stakeholders Leading role in awareness raising and organising communities for 3Rs such as proper source segregation of recyclable materials



Waste Minimisation Action Plan



"M22 Action Plan"

What is the M22 Action Plan?

The Ministry of Housing and Local Government sets the target of waste minimisation in Malaysia;

“Increase Recycling Rate to 22 % by the Year of 2020”

To achieve the target, the Ministry established the Federal Action Plan to implement in first 5 years. Action Plan comprises 5 actions:



5 Actions for Waste Minimisation

Master Plan Strategies (Target Year :2020)	Action Plan (Target Year :2010)
Enhancement of Awareness on Waste Minimisation	Action-1 Enhancement of Awareness Raising Activities under the National Recycling Programme (NRP)
	Action-2 Enhancement of 3R Activities in Schools
Strengthening of Partnership for 3Rs Activities	Action-3 Formulation of Stakeholders' Networking and Development of Partnership Activities on 3Rs
Enhancement of Institution to Strengthen Government Policies on Waste Minimisation	Action-4 Strengthening Legal, Regulatory and Financial Mechanism
	Action-5 Improvement of Information Management
	Action-6 Provision of Guidance to LAs on LAP-WM

Learn 3Rs

Actions to Enhance Awareness

Action 1: Awareness Raising Activities

In order to raise public awareness on waste minimisation and promote practice of 3Rs, the Ministry will enhance Awareness Raising Activities as follows.

- Improvement of National Recycling Programme
- Implementation of Nation-wide Awareness Campaign on Source Separation
- Development and Training of Leaders
- Promotion of Green Purchasing and Waste Reduction at Source



National Recycling Day in 2004

Action 2: 3R Activities In Schools

One way to be successful in educating the general public in waste minimisation is to instill awareness from a young age. To enhance awareness on 3Rs for school children, the Ministry will encourage schools to;

- Disseminate “Guidelines for the Enhancement of 3Rs Activities in Schools”
- Formulate 3Rs Award Programme
- Implement and Monitor 3Rs Activities in Schools

<Target LAs and States>

MPPP, MPSJ, MPPJ, MPK, MDK, MBMB, MBJB, MP Langkawi,

MB Miri, MBKS <Total: 10 LAs>

DBKL, Penang, Johor, Sarawak <Total: 4 States/ FT>



Collecting Activities at School in Miri



School Team Present Recommendation for Enhancing the 3Rs



Craft made of Used Paper

Practise 3Rs

Actions to Develop Partnership for 3Rs Activities

Action 3: Formulation of Stakeholders' Networking and Development of Partnership Activities on 3Rs

To increase amount of recyclables collected, which will lead reduction of waste disposal amount, the Ministry will expand separation of waste at source activities at households, institutions and business entities.

For effective and sustainable activities, the Ministry will encourage LAs to establish collection system of various types of recyclables in partnership with related stakeholders by;

- Formulating National Annual Plan for the Formulation of Stakeholders Networking and Implementation of Source Separation (by MHLG)
- Formulating Stakeholders Networking
- Implementing Pilot 3Rs Activities
- Developing Partnership Activities on 3Rs by NGOs/CBOs

< Target Area until 2010 >

MPPP, MPSJ, MB Miri, Putrajaya, MPPJ, MDKS, MBMB, MBBJ, MBKS < Total: 9 LAs >

Penang, DBKL < Total: 2 States/ FT >



Explanatory Meeting for Residents in MPPP



Collection of Recyclables at Condominium in MPSJ



Stakeholders Workshop in MPPP



Recycling Centre in MPPP

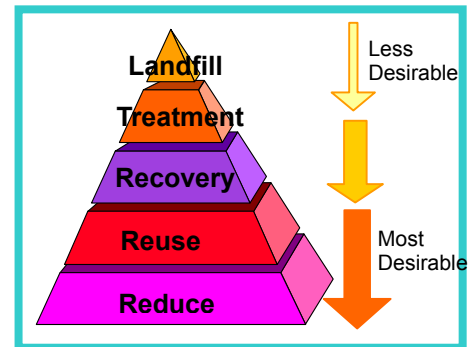
Formulate System for 3Rs

Actions to Enhance Institution to Strengthen Government Policies

Action 4: Strengthening of Legal and Regulatory and Financial Mechanism

To encourage 3Rs activities among stakeholders and to promote waste minimisation systematically, the Ministry will strengthen legal, regulatory and financial mechanism by;

- Preparation of Rules and Regulations under Solid Waste Management Act
- Authorisation and Implementation of Waste Minimisation Master Plan
- Amendment of By-Laws on Waste Management
- Financial Support to LAs for Formulation and Implementation of Local Action Plan on Waste Minimisation



Action 5: Improvement of Information Management

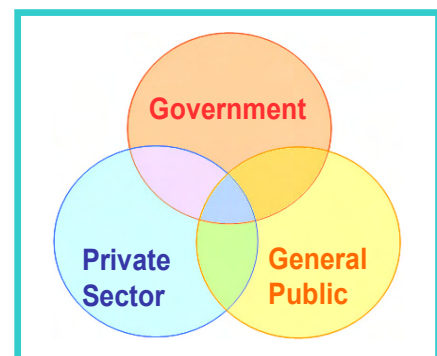
To promote waste management and minimisation, the Ministry will improve information management as follows;

- Establishing information management system (IMS)
- Implementing and Monitoring of IMS

Action 6: Provision of Guidance to LAs on LAP-WM

In order to achieve the target of waste minimisation, local-level actions led by LAs are essential. The Ministry will support LA's initiatives by;

- Formulating National Annual Plan for Local Action Plans on Waste Minimisation (LAPs-WM)
- Disseminating guidelines to formulate and implement LAPs-WM
- Establishing Waste Minimisation Unit in LAs
- Formulating, implementing and monitoring LAPs-WM



For Further Information, Please Contact;
Solid Waste Management Unit
Ministry of Housing and Local Government
Website: <http://www.kitarsemula.com>

PART 4

IMPROVEMENT OF WEBSITE “KITARSEMULA.COM”

Part 4 Improvement of website “kitarsemula.com”

4.1 Introduction

The website of kitarsemula.com which was set up under National Recycling Programme (NRP) in 2003 was to raise public awareness on recycling. The information shown on the website was mainly related to recycling activities such as the location of the recycling bins that can be found based on Local Authorities areas, key stakeholders involved in recycling industries, items to be recycled, tips for recycling at home and office, games for kids, etc. The information on the website has not been updated and as such, we feel that it is necessary to upgrade the website in line with the policies and strategies that the government has initiated. The website will be a good means of disseminating information to the public, and will act as a platform for exchanging experiences or lessons learnt in order to enhance waste minimisation activities in Malaysia. The scope of the website should be broadened to include all of the 3Rs (reduce, reuse and recycle). Hence, we feel that revamp of the website kitarsemula.com is necessary to provide a more knowledgeable and useful website for the public to refer to.

4.2 Contents of Website

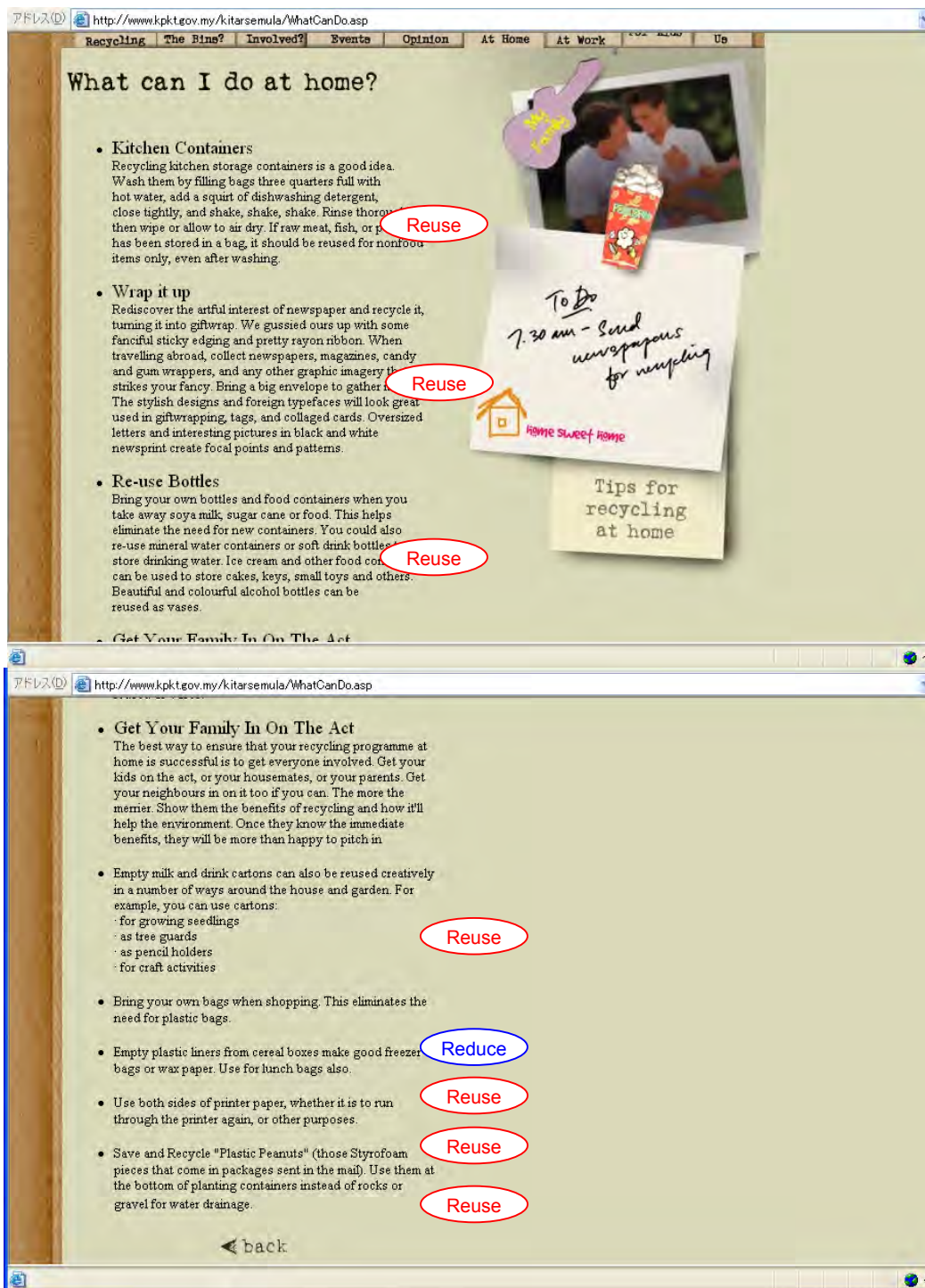
4.2.1 Update and disclosure

Since the inception of the website in 2003 an increased number of players have become involved in the NRP, and in consequence the range and type of activities have developed. This information should be included in the kitarsemula.com for sharing and exchanging ideas, lessons or experiences among the stakeholders. Updating of the website should be carried out periodically to provide recent news or events that are happening in the communities.

4.2.2 Organisation of information shown in the website

The kitarsemula.com introduces tips for recycling at home and office. It also includes the action for reduction and reuse as well as recycling. Figure 4-1 shows the contents of “recycling at home” at kitarsemula.com. The page introduces tips for practice of “Reducing and reusing at home as well as recycling at home. For example, the followings are actions for practice of “Reduce” and “Reuse”.

- To Turn newspaper into gift wrap (Reuse)
- To use beautiful and colourful alcohol bottles as vases (Reuse)
- To bring your own bags when shopping (Reduce)



Source: www.kitarsemula.com

Figure 4-1 Tips for Recycling at Home

Hence these mixed information should be sorted out into actions for practice of 3Rs accordance to the definition of reduce, reuse and recycling in the Waste Minimisation Master Plan. Figure 4-2 shows the sample of USEPA's site on the actions for practice of 3Rs as well as definition of 3Rs.



Source: www.epa.gov

Figure 4-2 Explanation of 3Rs in the U.S. Environmental Protection Agency's Site

4.2.3 URL

The name of URL "kitarsemula" stands for "Recycling". It can be used even after renewal because the URL has been already disseminated to the public through medium for raising public awareness and existing activities initiated by MHLG.

4.2.4 Recommendation of the contents

Recommendations on the contents for kitarsemula.com are as follows:

(1) Policies/Laws/Programmes

Policies

The kitarsemula.com has not included policy or vision related to the waste minimisation. These should be included in the website so that the general public will know the approach and strategy of the Government. With the disclosed of such information to the public, the public can understand further what the government is doing and thus can also contribute towards the vision. Summary information can be included in the website from such policy documents as:

- National Strategic Plan (NSP)
- Master Plan on Waste Minimisation
- National Action Plans on Waste Minimisation

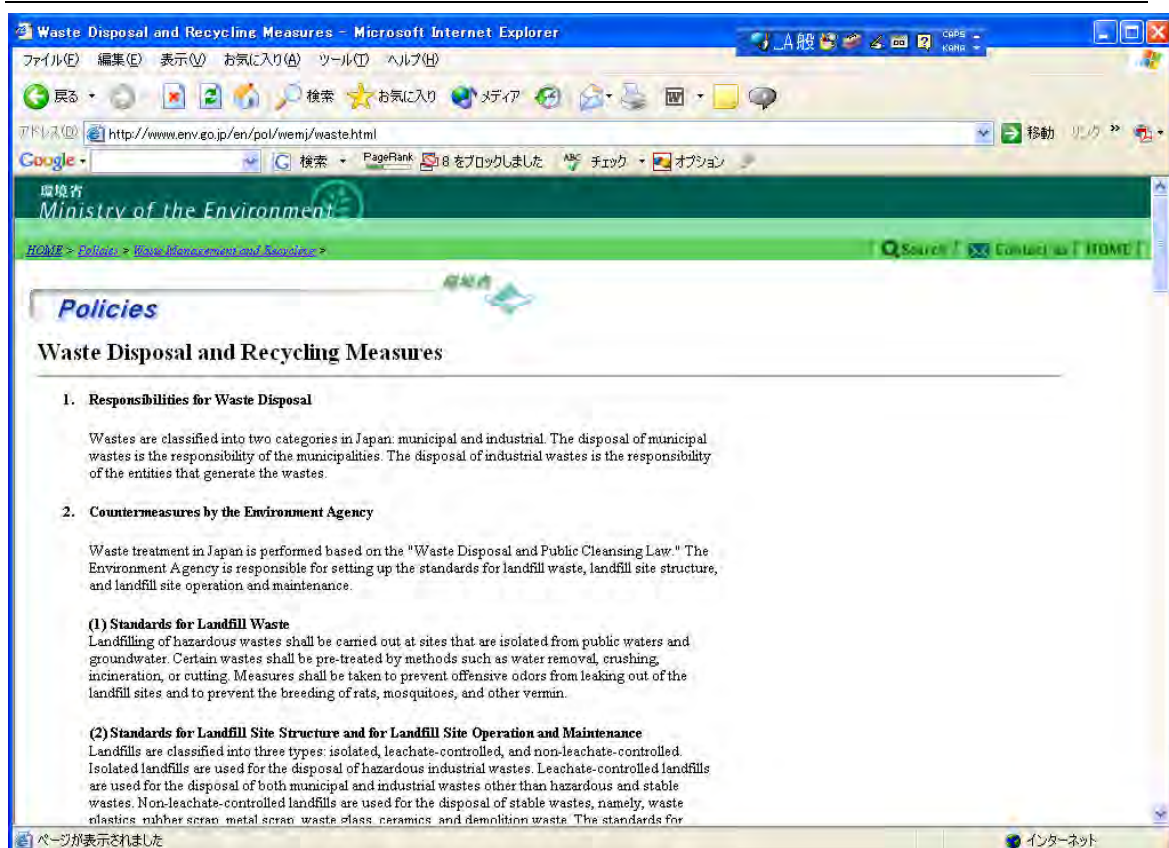
In kitarsemula.com, the reason on recycling need to be promoted is introduced as shown in Figure 4-3. The site do not mention about the goal or the society that will be aimed to achieve. Policy, strategies or vision toward waste minimisation should be shown as a message to the public from the Ministry.



Source: www.kitarsemula.com

Figure 4-3 Web page on the needs of Recycling

Figure 4-4 shows the website of the Ministry of the Environment, Japan. In the page, policies for waste disposal and recycling measures are introduced.



Source: www.env.go.jp

Figure 4-4 Sample from Ministry of the Environment, Japan

Laws

The solid waste act in Malaysia can be included into the website once it enters the Statute books proposed. Input such as the items listed below (as an example from Ministry of the Environment, Japan) regarding laws and regulations on solid waste management and 3Rs, can be included into the kitarsemula.com. As an example from the Ministry of the Environment, Japan, the list of laws and regulations are:

- Waste Management and Public Cleansing Law
- Basic Law for Establishing the Recycling-Based Society
- Law for Promotion of Effective Utilisation of Resources
- Containers and Packaging Recycling Law
- Home Appliances Recycling Law
- Construction Materials Recycling Law
- Food Recycling Law
- Law on Promoting Green Purchasing

A sample of the website on Laws and Regulations from the Ministry of the Environment, Japan is shown in Figure 4-5.



Source: www.env.go.jp

Figure 4-5 Sample from Ministry of the Environment, Japan

Programmes

Programmes such as National Recycling Programme (NRP) which been conducted in Malaysia can be included in the website [kitarsemula.com](http://www.kitarsemula.com). The Ministry has conducted various activities to raise the public awareness and enhance recycling activities. The website is a good medium to showcase what programmes have been conducted so that the public can understand and learn what is happening in their community. By listing such programmes showing its objectives, aims and steps taken, the public can also assist in taking part in the programmes. In the [kitarsemula.com](http://www.kitarsemula.com) website, the first page on the website mention all about recycling. It is a good effort but should also mention who initiating and it was under the NRP and when it started to kick-off and the time frame if there are any should be included (Figure 4-6). Small programme conducted such as the *Recycling Programme for Children* is put under the web page “Who Is Involved?” which shown the objectives and aims of the government towards the children group as a society (Figure 4-7). The link *Recycling Programmes for Children* should be put in a page where you can have a web page called “Programmes”.



Source: www.kitarsemula.com

Figure 4-6 The First Page of www.kitarsemula.com

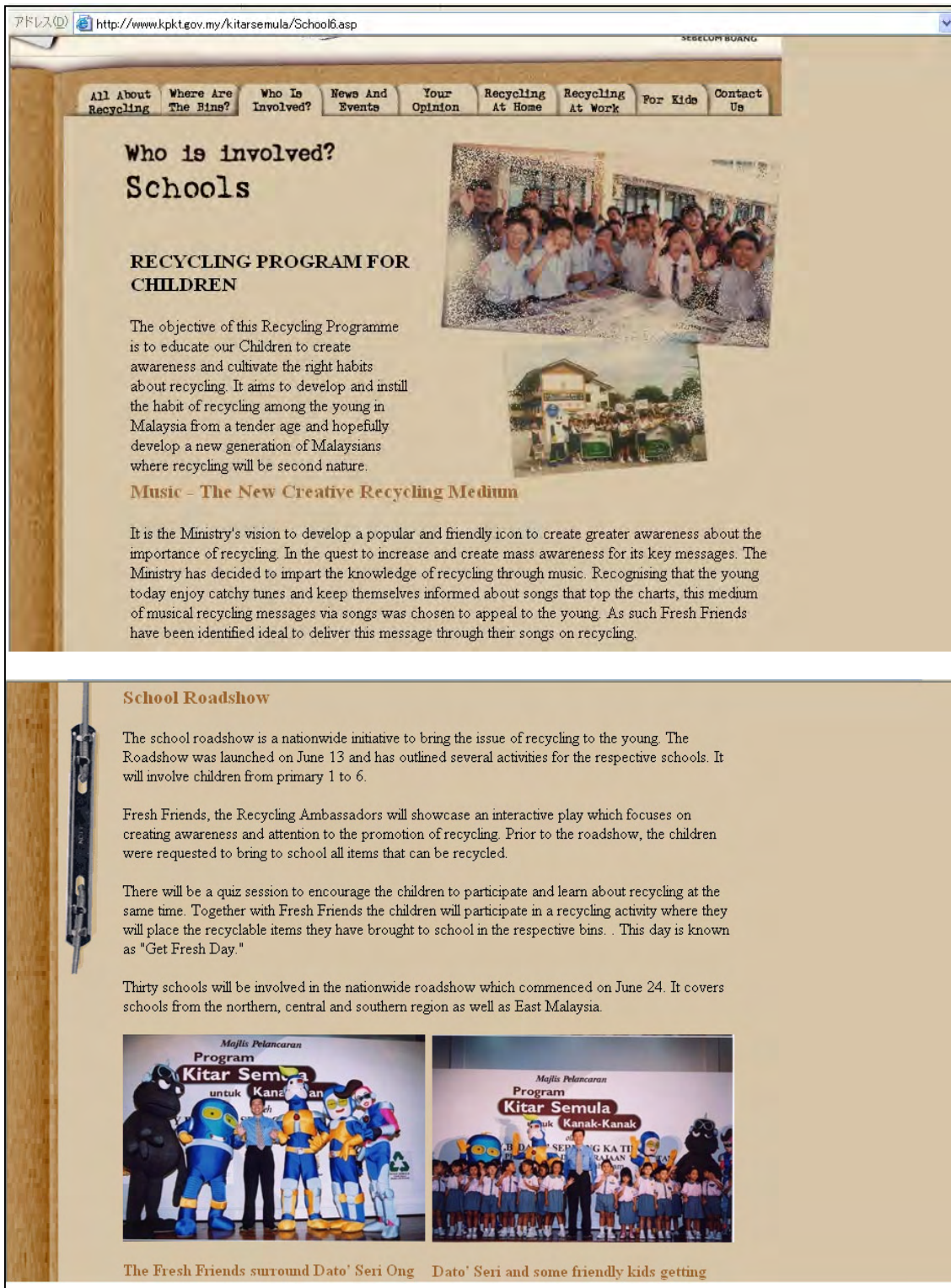


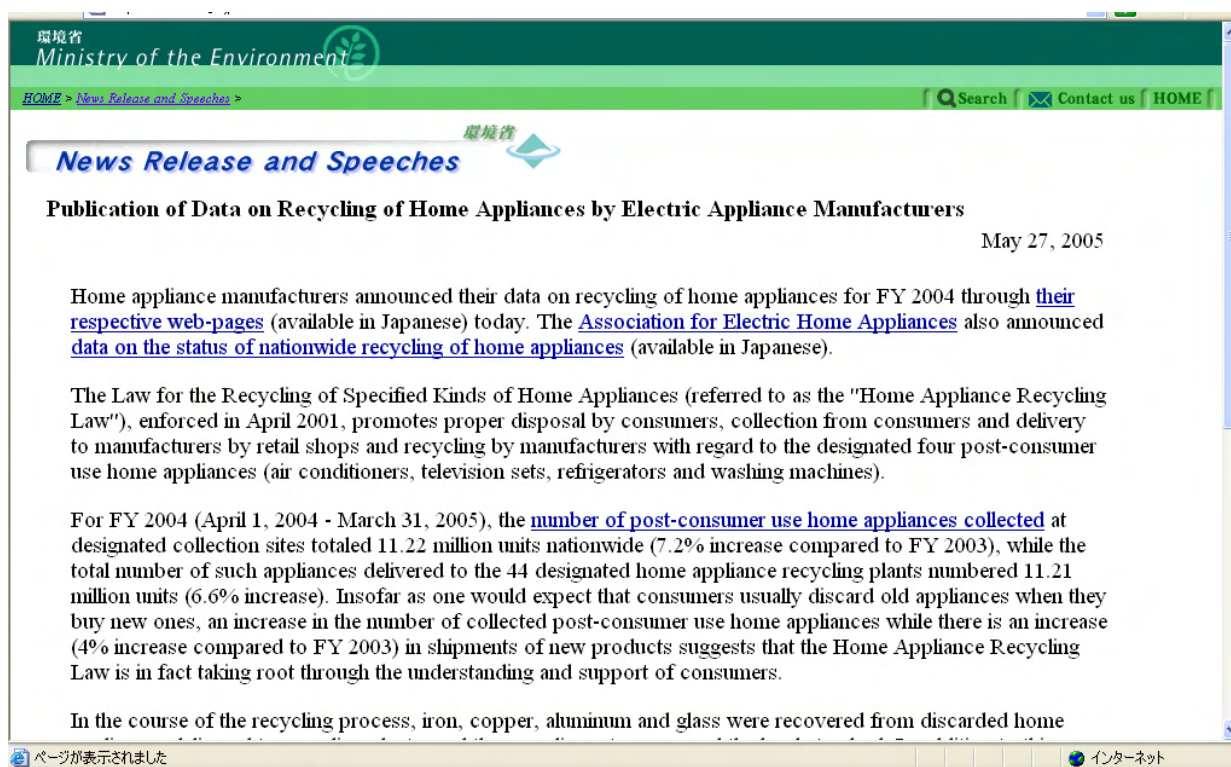
Figure 4-7 The Recycling Programme for Children webpage under “Who Is Involved?” in Kitarsemula.com

(2) Studies/Surveys

Reports of studies or surveys that have been conducted are useful to disseminate the result/performance of such activities. These studies/surveys if shown in the website can help the public to understand the performance of the studies/surveys that been conducted. The studies/surveys that can be inserted in the website are projects that been carried out by MHLG, JICA, EPU or anything other organisations that are related and relevant such as:

- Awareness survey (MHLG)
- Pilot Project of source separation in Putrajaya, (MHLG)
- JICA Study (Seminar and workshop materials, newsletters, banner exhibited on national recycling day, etc.)
- Material flow survey (carried out by JST)

As an example taken here is the website from Ministry of the Environment, Japan where it shows the release of data on recycling at home based on surveys done by the electric appliance manufacturers. It was shown on the site as under 'News Release and Speeches' as showed in Figure 4-8(a) and 4-8(b).



Source: www.env.go.jp

Figure 4-8 (a) Sample from the Ministry of the Environment, Japan on News Release and Speeches Site

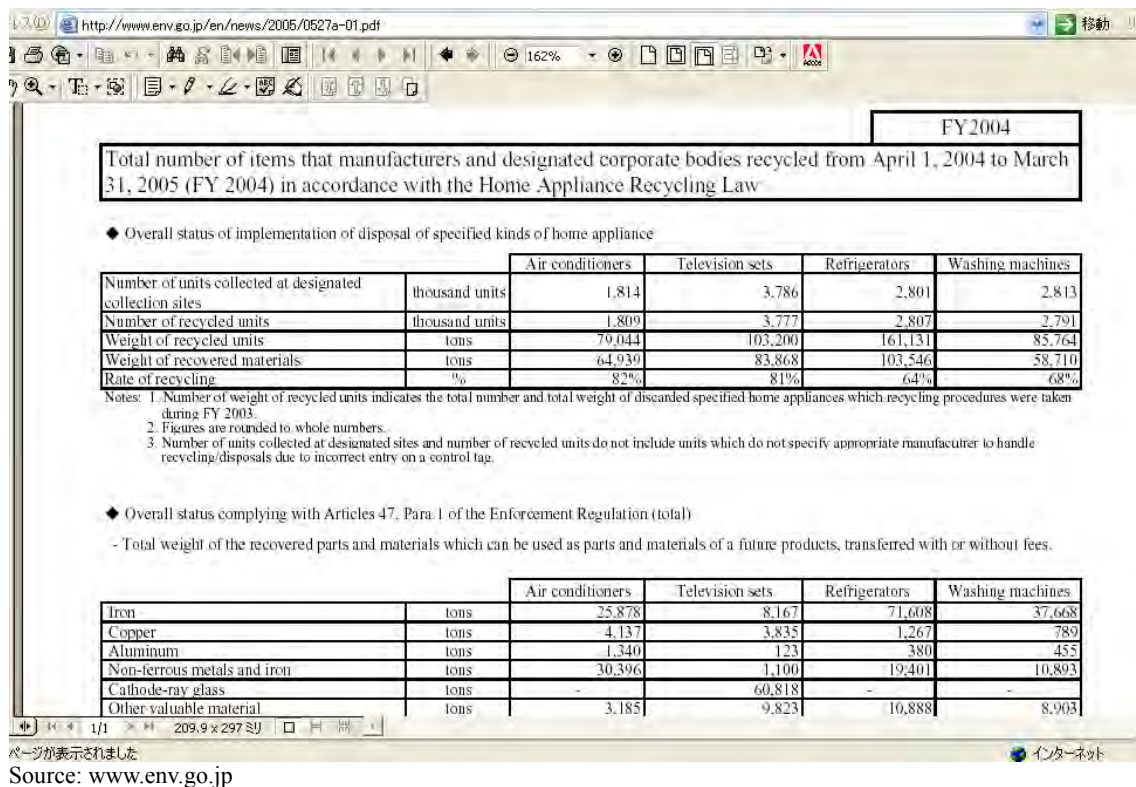


Figure 4-8(b) Sample from Ministry of the Environment, Japan on the Original Reports/Data Site.

(3) Fact sheets

Fact sheets of existing activities for promoting collection of recyclables in community, source separation or making recycling network are useful for those who are going to start similar activities on 3Rs. Website can play a role of knowledge database on waste minimisation for all the stakeholders.

- Source separation and recycling network (Experience of JICA pilot projects) - MP Pulau Pinang, MP Subang Jaya, and MB Miri
- Existing activities initiated by key players in Malaysia

Figure 4-9 and 4-10 show samples of fact sheets.

Recycling Programme of Majlis Bandaraya Kuching Selatan (MBKS)

1. Introduction

The approach adopted by MBKS involves the cooperation of vendors/contractors, and the participation of NGOs, schools and petrol kiosks. Five (5) buy-back centres have been set up since 2002 and these are located in housing areas and/or near shopping complexes/market. The centres are open at specific times only (Monday-Friday 3.00-5.00 pm) and Sunday & Public Holidays 10.00 a.m.-12.00 p.m.). The centre is usually manned by one MBKS staff. The centre accepts paper, plastics, metal (steel & Al cans) and used clothing. The centre also receives used car batteries, old computers and scrap iron.

MBKS has modified MHLG's design of the centres in particular the addition of four (4) hoppers for the public to drop-off their recyclables according to the 4 types mentioned in 1.4 above. The height of the hoppers is raised to about 1 m off the ground to deter children from climbing inside.



Plate Collection Centre in MBKS

	Items	Points/kg	Campaign Points/kg
1	Old corrugated carton box	0.2 point	0.4 point
2	Old newspaper	0.25 point	0.5 point
3	Mixed paper	0.2 point	0.4 point
4	Black & white	0.5 point	1 point
5	Steel	2.5 point	5 points
6	Scrap iron	0.45 point	0.9 point
7	PET bottles	0.5 point	1 point
8	Aluminum can	6 points	12 points
9	Old battery (passenger car)	5 points	10 points
10	Copper	7.5 points	15 points

20 cents per point

Table List of Items and Points

2. Point System for buy back centre

MBKS has also introduced an innovative system for exchange of recyclables. No cash is given but the public is given coupons within a point system. These coupons can be exchanged for household goods every last Sunday of the month.

Figure 4-9 Sample of Fact Sheet on Recycling Programme of MBKS

Recycling Activities of Buddhist Tzu-Chi Merit

"Turn Trash Into Gold"

In 1990, Tzu-Chi started a campaign to know good fortune, appreciate good fortune and recreate good fortune, recycle waste paper to rescue forests. Since then, Tzu-Chi has set up more than 140 recycling centres throughout central and southern part of peninsular Malaysia and East Malaysia.

Over the past 10 years, Tzu-Chi had collected a total of 1,020,997 kg of waste paper for recycling. With sheer determination, the Tzu-Chi members would go all way out to carry out recycling work regardless of their positions or social status. Hence, it is not a surprising sight to witness parents and children, grandmothers and grandchildren, teachers and students, or even factory supervisors and employees bending their backs tirelessly sorting out trashes.



Plate 1 Collection Centre of Tzu-chi

2. Training Program

In 1996, KL Branch began to form up Recycling Group in Kuala Lumpur, Petaling Jaya and Klang. According to this activity, Tzu-Chi hopes to teach all recipients about what is recycled and how to practice it in the life. Fund from our recycle activities use for charity used. Tzu-chi is also actively in creating awareness among Malaysians on the benefits of recycling through training program and community gathering for recycling tea talk.



Plate 2 Training Program by Tzu-chi

Figure 4-10 Sample of Fact Sheet on Recycling Activities of Buddhist Tzu-Chi Merit

(4) Events and Publications

Introduction of events such as seminars, workshops, national recycling day, pilot projects, contests/competitions or others will help those who like to join or participate in the coming events on 3Rs activities. Although event information was introduced in the website (see Figure 4-11), detailed information, handouts, presentation materials were not available in the page. Information or contents of the previous events are also useful for references and people who browse through the page will understand further on what is happening.



Figure 4-11 News and Events

Newsletters that contained events news which been produced under JICA Study Team can also be included in the website (

Figure 4- 12).

2nd Seminar at INTAN on 17th March 2005

During Phase I of the Study, JICA Study Team prepared draft master plan and action plans of waste minimisation in Malaysia, and prepared pilot projects together with three model Local Authorities. In order to disseminate the information to the stakeholders, the 2nd seminar aimed 1) to introduce draft master plan, 2) to discuss target rate for waste minimisation, 3) to brief findings of material flow survey, and 4) to introduce federal and local action plans. JICA Study Team explained waste minimisation targets and goals, main policies in national waste minimisation. Three model LAs (MP Pulau Pinang, MP Subang Jaya and MB Miri) also made a presentation on progress of formulation of local action plans.



3rd Seminar at Armada Hotel at Hotel Armada on 16th June 2005



From June 2005, pilot projects for source separation, recycling network and 3Rs activities in schools were commenced in three model Local Authorities (MP Pulau Pinang, MP Subang Jaya and MB Miri). This seminar was held to launch the pilot projects officially and introduce the concept of source separation to Malaysia. JICA Study Team introduced source separation of solid waste and recycling in various countries and stakeholders discussed about introduction of source separation concept. From user side of collected paper, glass and plastics, the manufacturers explained recycling process, current situation and issues of recycling. In the seminar, three model LAs introduced pilot projects of source separation and recycling network in each LA. JICA Study Team introduced concept of 3Rs programme in schools.

Figure 4- 12 Sample of Newsletter (prepared by JICA Study Team)

National recycling day and ceremony for installation of equipment are also initiated by MHLG (see Figures 4-13 and 4-14). These activities are good opportunities for MHLG to disseminate the policy, vision or strategies on waste minimisation.



Figure 4-13 National Recycling Day



Figure 4-14 Ceremony for Delivery of Recycling Trucks

Other materials that can be uploaded are as follows:

- Bulletin Kitar Semula
- Pamphlet/brochure/leaflet
- Guidelines

Some other recommendations that can be input into the website are:

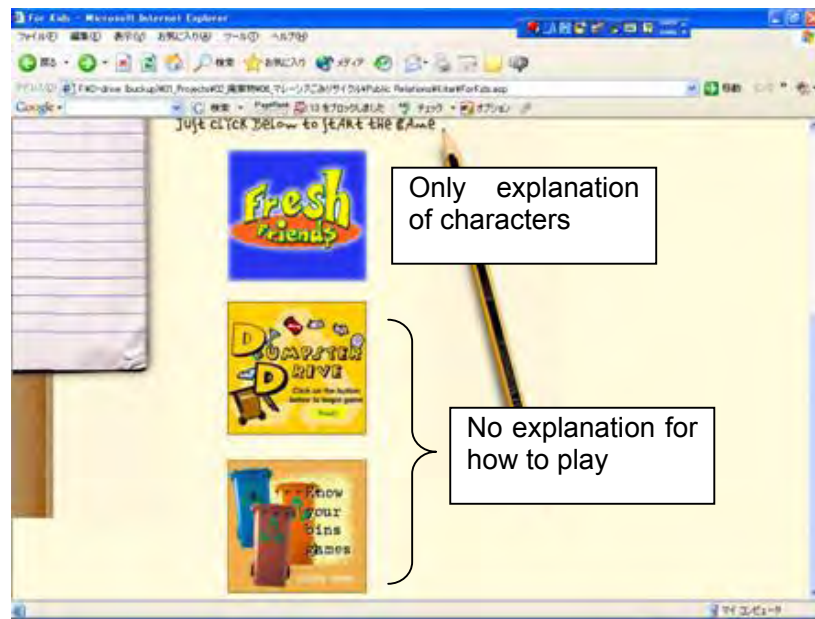
- Introduction of information centre (ground floor of Block K, MHLG)
The information centre should be introduced with photos and map in the website showing how to get there, who can enter the centre, what is exhibited, and so on.
- Introduction of poster competition
MHLG had a poster competition and the selected ones are put on the wall in the information centre. Introduction of such events is good information for school children and teachers. Coming events as such can be announced in the website. To add on to that, calendar of the events with the selected posters which can be made by Microsoft Word, Publisher, etc., can be uploaded on the website so that the readers of the website can download it easily, print out and put it on a wall.
- Design contest of recycling centres
In the pilot project in Miri, good pictures were drawn on a wall of recycling centre. It is very good for the public to make the centres attractive and familiar. Design contest of recycling centres is good event for raising public awareness, especially for school children, so that it can open to the public and the winning results also can be put in the website.



- Recorded audio of school teachers initiating 3Rs school programmes
Experiences of existing activities in schools provided by schools teachers that excel and able to sustain 3Rs may have a good impact to listener to encourage them to start 3Rs in schools that have not started or just started in 3Rs activities. These audio recorded from interviewing the school teachers can be added in the website.

(5) For Kids

Games and rap songs for kids are available in the page for kids. However, there is no instruction to play the games (see Figure 4-15). Although recycling mascots are also introduced in the page, it is only explanation of each character. Those mascots make the website more attractive, but the purpose of putting the mascots in the website is unknown. Maybe there is a story to tell from the mascots which is not in the website. Games and songs are good as tools to help children to learn separation of waste and recyclables so that it will have the lasting impacts on their minds.



Source: www.kitarsemula.com

Figure 4-15 The webpage “For Kids”.

Children at school levels and teachers can also gain some information on 3Rs activities. It is recommended that contents for the schools children and teachers on a website include:

- History of 3Rs
- Database of schools with 3Rs
- Existing activities of 3Rs in schools
- Guidelines and Info Kit
- Case Study
- Recycling Process
- Contact Us

