



National 3R Strategy Development

- A progress report
on seven countries
in Asia
from 2005 to 2009 -

**United Nations Centre for Regional Development
United Nations Environmental Programme /
Regional Resource Centre in Asia and the Pacific
Institute for Global Environmental Strategies**

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Preface

The Programme of National 3R Strategy Development was initiated as one of the outcomes of the Ministerial Conference on the 3R Initiative held in Tokyo, Japan, in March 2005. The project was funded by the Ministry of the Environment of Japan and the Asian Development Bank (for Viet Nam only) and jointly implemented by the United Nations Centre for Regional Development (UNCRD), the United Nations Environmental Programme / Regional Resource Centre in Asia and the Pacific (AIT/UNEP RRC.AP), and the Institute for Global Environmental Strategies (IGES).

In anticipation of Asia's serious waste and resource-related challenges together with the region's rapid economic development, the project has aimed to disseminate and raise awareness on the 3R concept and to foster strong political leadership for the 3R implementation in Asian countries.

Until 2009, the project provided support to the following six countries: Bangladesh, Cambodia, Indonesia, Philippines, Thailand, and Viet Nam. This report also includes the status of Malaysia to learn about its experience in developing a National Strategic Plan for Solid Waste Management which was initiated in 2006.

This report summarises the current situation of waste management and 3R activities in each country, existing systems and regulatory frameworks for waste management and the 3Rs, the current progress of National 3R Strategy Development (as of August 2009), suggested focus of National 3R Strategies and future challenges.

We hope this report will contribute to the development of strategies and policies for better waste management, the 3Rs, and the formation of a more resource efficient society in Asia, as well as elsewhere in the world.

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List of Abbreviations and Acronyms

3R	Reduce, Reuse and Recycle
3RKH	3R Knowledge Hub
AC	air conditioner
ADB	Asian Development Bank
ADIPURA	Clean and Green Cities Program
AIT	Asian Institute of Technology
AO	administrative order
APEIS	Asia-Pacific Environmental Innovation Strategy Project
ASEAN	Association of Southeast Asian Nations
AusAID	Australian Government Overseas Aid Program
AWGESC	ASEAN Working Group on Environmentally Sustainable Cities
AWMAP	Advanced Waste Management for Asia and the Pacific
BCI	Biodiversity Conservation Corridors Initiative
CDM	Clean Development Mechanism
CEA	Cambodia Environmental Association
CEC	Commission for Environmental Cooperation
CEP	Core Environment Program
CESTT	Centre for Environmentally Sound Technology Transfer
CETEC	Centre for Environmental Technologies
CIDA	Canadian International Development Agency
COMPED	Cambodian Education and Waste Management Organization
CP	cleaner production
CSARO	Community Sanitation and Recycling Organization
CSN	Catajunan-Soc-oc-Navais
DANCED	Danish Cooperation for Environment and Development
DAO	DENR Administrative Order
DCC	Dhaka City Corporation
DENR	Department of Environment and Natural Resources
FASPO	Foreign Assisted and Special Projects
DepED	Department of Education of the Philippines
DoE	Department of Environment-Bangladesh
DOH	Department of Health
DOST	Department of Science and Technology
DSWD	Department of Social Welfare and Development

DTI	Department of Trade and Industry
ECA	Environmental Conservation Act
ECO ASIA	Environment Congress for Asia and the Pacific
EIA	Environmental Impact Assessment
EMB	Environment Management Bureau
EPR	Extended Producer Responsibility
EPU	Economy Planning Unit
ETV	Environmental Technology Verification
E-waste	electronic and electric waste
G8	Group of Eight
GAP	Green Aid Plan
GHG	Greenhouse Gas
GMS	Greater Mekong Sub-region
GPDI	Genuine Progress Development Indicators
GTZ	German Technical Cooperation
HRD	Human Resource Development
IBRD	International Bank for Reconstruction and Development
ICIMODO	International Centre for Integrated Mountain Development
ICSC	International Centre for Sustainable Cities
IDE-JETRO	Institute of Developing Economies, Japan External Trade Organization
IDRC	International Development Research Centre
IEPC	Industrial Efficiency and Pollution Control Project
IGES	Institute for Global Environmental Strategies
IOs	international organizations
ISO	International Organization for Standardization
ISPONRE	Institute for Strategy and Policy of Natural Resources and Environment
IWBs	itinerant waste buyers
IWEP	Industrial Waste Exchange Program
JICA	Japan International Cooperation Agency
JPOI	Johannesburg Plan of Implementation
KoC	Kingdom of Cambodia
KSNP-SPP	National Policy and Strategy of Rubbish Management System Development of Indonesia
LABs	lead-acid batteries
LAs	local authorities
LANGIT	Blue Sky Programme

BIRU	
LCA	Life Cycle Analysis
LCP	League of Cities of the Philippines
LGED	Local Government Engineering Department
LGUs	local government units
MARD	Ministry of Agriculture and Rural Development
MDGs	Millennium Development Goals
METI	Ministry of Economy, Trade, and Industry
MHLG	Ministry of Housing and Local Government
MLGRDC	Ministry of Local Government, Rural Development and Cooperatives
MoA	Ministry of Agriculture
MoEd	Ministry of the Education
MoE	Ministry of the Environment
MoEF	Ministry of Environment and Forest-Bangladesh
MOEJ	Ministry of the Environment of Japan
MoH	Ministry of Health
MOH	Ministry of Public Health
MoInd	Ministry of Industry
MoInt	Ministry of Interior
MONRE	Ministry of Natural Resources and the Environment
MRC	Mekong River Commission
MRFs	materials recovery facilities
MSW	municipal solid waste
NAFTA	The North America Free Trade Agreement
NCPCs	National Cleaner Production Centres
NEDA	National Economic Development Authority
NEMAP	National Environmental Management Action Plan
NGOs	non-governmental organizations
NSPK	Norms Standard Procedures and Criteria
NSWMC	National Solid Waste Management Commission
NWMP	National Waste Management Plan
OECD	Organisation for Economic Co-operation and Development
PBE	Philippine Business for the Environment
PCD	Pollution Control Department
PD	presidential decree
PET	polyethylene teraphthalate

PHP	Philippine Peso
PRSP	Poverty Reduction Strategy Paper
PU	Ministry of Public Works
PIC	prior informed consent
PPM	Phnom Penh
PROKASIH	Clean River Programme
PROPER	Company Environment Performance Programme
R.A.	Republic Act
R&D	research and development
RGC	Royal Government of Cambodia
RISPO	Research on Innovative and Strategic Policy Options
RRC.AP	Regional Resource Centre for Regional Development
SAARC	South Asian Association for Regional Cooperation
SACEP	South Asia Co-operative Environment Programme
SC	Steering Committee
SCG	Siam Cement Group
SEALSWIP	South East Asia Local Solid Waste Improvement Project
SEMP	Sustainable Environment Management Programme
SIDA	Swedish International Development Cooperation Agency
SLHI	Status of Indonesia Environment
SMART	Self Monitoring and Reporting Programme
SMEs	small and medium enterprises
SMRRS	Smokey Mountain Resource Recovery System
SOM	Senior Officials Meeting
SPC	Sustainable Production and Consumption
SPM	Sustainable Project Management
SSWM	Sub-Decree on Solid Waste Management
STIFPP	Secondary Towns Integrated Flood Protection Project
SU/SCC	Special Unit for South-South Cooperation
SWPC	Sub-decree on Water Pollution Control
TEI	Thailand Environment Institute
TESDA	Technical Education and Skills Development Authority
TWG	Thematic Working Group
UDHA	Urban Development and Housing Act
ULABs	used lead-acid batteries
UN	United Nations

UNCHS	United Nations Centre for Human Settlements
UNCRD	United Nations Centre for Regional Development
UNDP	United Nations Development Programme
UNEP	United Nations Environmental Programme
UNEP/DTIE	United Nations Environmental Programme/Division of Technology, Industry and Economics
UNESCAP	United Nations Economic and Social Commission for Asia and the Pacific
UNIDO	United Nations Industrial Development Organization
URENCO	urban environment company
US	United States of America
US-AEP	United States-Asia Environmental Partnership
USAID	United States Agency for International Development
USD	United States dollar
WACS	Waste Amount and Composition Survey
WG	Working Group
WSSD	World Summit on Sustainable Development
ZBO	Zero Basura Olympcis

1. Towards Strategic Implementation of the 3Rs in Asia

An Introduction

Asia's economic development and waste and resources related challenges¹

Asia, which is home to a number of countries that are experiencing rapid economic growth, has some of the highest concentrations of production bases in the entire world. In Asia, signs that indicate progress towards modernisation are appearing at a rapid rate, including population concentrations in urban areas, increased production of manufactured products, greater international trade in goods, and increased demand for natural resources. These changes have led to the emergence of issues such as increased volumes and varieties of solid waste, qualitative diversification of solid waste, transboundary movement of wastes and secondary materials, and environmental impacts from resource extraction, production, informal resource recovery activities, and uncontrolled waste dumping.

In many developing countries, open dumping is the most common practice for waste disposal, which often leads to water contamination, foul odours, and other environmental, health and hygiene problems. There is a wide spectrum of challenges related with these practices, including heavy metal contamination of soil and water due to inadequate segregation, increasing levels of hazardous substances in industrial waste, mixing of infectious waste with municipal waste, and adverse health and environmental impacts due to improper resource recovery practices. Ideally, while it is far preferable not to have toxic/hazardous waste or waste containing valuable materials dumped at landfill sites, in practice this is not the case. Furthermore, the methane gas generated from dump sites contributes significantly to the greenhouse effect. As mentioned above, many countries and local governments lack an integrated solid waste management strategy and are held back by other institutional constraints, insufficient human resources, and budgetary limitations. Part of the problem is that solid waste management and resource recovery are seldom high priority in national policy.

In order to achieve sustainable development in Asia, there is a pressing need to realise more efficient use of resources and materials and to reduce the environmental impact of consumption and production activities. In this respect, the “three Rs (3Rs)” (reduce, reuse, and recycle) is an approach that promotes the efficient use of resources, harmonising both environmental and

¹ This section is based on Ministry of Environment (Japan) & Institute for Global Environmental Strategies. (2006). Issues Paper, *Asia 3R Conference, 30 October-1 November, 2006*. Tokyo, Japan.

economic concerns through efforts to reduce, reuse, and recycle materials and wastes. Promotion of the 3Rs, through the integration of policies on waste management and resource management, is one of the keys to realise sustainable production and consumption in Asia.

The progress of the 3R Initiative in Asia

The 3R Initiative was proposed at the G8's Sea Island Summit in 2004 to promote increased efforts based on the 3R principles, and was formally launched at the Ministerial Conference on the 3R Initiative in 2005. The necessity of efforts to improve the resource productivity of each member country and to work toward constructing an international sound material cycle society through the 3R Initiative has been reaffirmed at succeeding G8 Summits.

The necessity of additional efforts in the following areas has been discussed at the two Senior Officials Meeting on the 3R Initiative in March 2006 in Tokyo, Japan, and October 2007 in Bonn, Germany: (1) promotion of the 3Rs in each country; (2) reduction of barriers to the international flow of goods and materials; (3) promotion of international cooperation between developed and developing countries; (4) promotion of cooperation between stakeholders; and (5) promotion of science and technological development for the 3Rs.

Activities of the 3R Initiative in Asia have included a series of intergovernmental meetings and expert meetings, organised to share the progress of the strategic promotion of the 3Rs in each country and by international organisations, and to discuss priority issues for Asian countries to implement the 3Rs both domestically and internationally.

Through these dialogues, there has emerged a shared understanding on the importance of constructing a sound material cycle society through the 3Rs at the regional level in Asia. For example, at the 15th Environment Congress for Asia and the Pacific (ECO Asia 2007) held in September 2007, the importance of constructing a sound material cycle society at the national as well as regional level in Asia and the Pacific was widely recognised. Keeping the necessity of creating a regional policy vision in mind, it was agreed that there is a need to promote further policy dialogue among national governments, additional efforts to share information on policy and technologies, and to identify and replicate good practices.

The progress of the 3R Initiative is reflected in the adoption of the Kobe 3R Action Plan, which was formally agreed on by the G8's Environmental Ministers in May 2008. The Action Plan states that the G8 countries "(r)equst that bilateral and multilateral aid agencies reflect the

concept of the 3Rs in development projects and that private investors promote 3Rs in developing countries” and recognise that “prioritizing the 3Rs in national development strategies in developing countries can facilitate the G8’s support for endeavours to promote the 3Rs.”

The National 3R Strategy Development Programme is an effort which aims at prioritising the 3Rs and integrating the 3Rs principle into national policy. This initiative, which is supported by the Ministry of the Environment of Japan (MOEJ), the United Nations Centre for Regional Development (UNCRD), the United Nations Programme (UNEP), the Asian Development Bank (ADB) and the Institute for Global Environmental Strategies (IGES) has been a key activity in promoting the 3Rs domestically in several Asian countries in relation to the 3R Initiative in Asia.

Needs for strategic promotion of the 3Rs in developing Asia

Developing countries share a need to raise the priority of environmental policies as a whole, including policies promoting environmentally sound waste management. To meet this need, the institutional capacities of central and local governments should be enhanced, especially in terms of improved coordination of financing the 3R-related projects, stakeholders, and infrastructures for smooth and effective transition from the stages of policy making into policy implementation. To raise the priority of such issues effectively, it is necessary to also keep social and economical impacts in mind when incorporating the concepts of the 3Rs into national environmental and developmental policies, and ensure that the effective utilisation of resources, as well as environmentally sound waste management, are high on the agenda.

The development of national policy frameworks or strategies on the 3Rs is expected to be a key step in the prioritisation of environmentally sound waste management and the 3Rs as well as integrated policy development and implementation. The exercise of developing frameworks and strategies is expected to promote better knowledge of the current situation and estimations of future waste and resource related challenges, help to set national standards and targets for proper waste management and resource saving, set clearer mandates for central and local governments, and facilitate inter-agency and multi-stakeholder collaboration, for example.

In Asia, there are a few examples of development and implementation of national policy framework and strategies on the 3Rs. One well-known example would be Japan’s Fundamental Plan for Sound Material-Cycle Society. Another typical example would be China’s Circular

Economy Policy.

Japan's Fundamental Plan for Sound Material-Cycle Society

As a country with few natural resources, Japan is highly dependent on imports of most major raw materials. It also faces a shortage of land suitable for final disposal of waste. The Japanese government therefore puts strong emphasis on increasing resource efficiency and is focusing on creating a "Sound Material-Cycle Society." An important step to this end was the establishment of the Fundamental Law for Establishing a Sound Material-Cycle Society in 2000. This law sets out the main principles of resource circulation and sound waste disposal and defines the roles of main actors in relation to the establishment of a more resource efficient society. A key element in the implementation of this law is its associated plan, the 1st Fundamental Plan for Establishing a Sound Material-Cycle Society, in 2003, which sets numerical targets on resource efficiency and waste management, ideal models for sound material cycle societies, and the role of different stakeholders to implement plans. The fundamental plan took almost two years from April 2001-March 2003 to be developed. During this period, seventeen meetings of the Working Group of Central Environmental Council were held to discuss the draft. Nine public hearings were also held in local cities in Japan to gather ideas and opinions on the draft from businesses, non-governmental organisations (NGOs) and local governments. For the final draft, the Minister of the Environment was in charge of finalising the Fundamental Plan based on the recommendations from the Central Environmental Council. The plan was approved by a meeting of the Cabinet and submitted to the Diet. Every year, the Central Environmental Council monitors the progress of the plan, in addition to a public hearing process. In total, there were 50 meetings held to monitor progress, in addition to 15 public hearings from April 2001 to February 2009. The plan is reviewed every five years based on the outcomes of this monitoring process. The first review resulted in the approval of the 2nd Fundamental Plan in March 2008.

China's Circular Economy Policy²

Since the late 1990s, realising the concept of a Circular Economy has been one of the major focuses of developmental and environmental policies in China. Through the concept of the Circular Economy, China has tried to shift its strategies for environmental management from the end-of-pipe approach to integrated life cycle management. Since late 2005, a number of pilot projects such as Eco-Industrial Parks were initiated nationwide to demonstrate the concept of the Circular Economy. The Chinese government started to promote the Circular Economy Policy through legislation, policy-making, regional planning, pilot projects and other methods.

² On China's Circular Economy Policy, the authors referred to: Wang, X. and Kummer Piery, K. (to be published). "Circular Economy and EPR Mechanism in China – Current Situation and Perspectives", a commissioned paper by the Institute for Global Environmental Strategies to be published in a pending IGES report.

One of the most important steps in promoting this policy is the Circular Economy Promotion Law (CEPL) which was adopted by the Standing Committee of the National People's Congress on 29 August 2008, and went into effect on 11 January 2009. The Circular Economy Promotion Law is a basic law to integrate the 3Rs into lifecycle management of products and wastes.

National 3R Strategy

The National 3R Strategy Support Programme, which was mentioned above, has been implemented as a collaborative capacity development programme in six developing Asian countries. To meet the challenges related with the continuous increase in waste generation and resource demand in Asia, the programme intends to raise the priority of environmentally sound waste management and resource efficiency, as well as increase institutional capacity for policy implementation in these countries. As of August 2009, the programme has been implemented in Indonesia, Viet Nam, Bangladesh, Thailand, Philippines, and Cambodia with expert advice and financial support. The activities carried out include surveys and needs assessments, drafting of National 3R Strategies, and national consultations with major stakeholders. Malaysia was also selected as a target country, however, only an initial study was carried out since the country already has a National Strategic Plan for Solid Waste Management which was approved in 2005.

Table 1-1 summarises the status and main features of the National 3R Strategy Development in these countries as of January 2009. Major implementing agencies for this programme are ministries in charge of environmental policies other than Malaysia³. In addition, the Philippines already has a government-wide coordinating body for national waste management issues called National Solid Waste Management Commission in place which is in charge of developing the National Ecological Solid Waste Management Act. International organisations and IGES have been involved in extending financial support and expert advice for project implementation. Through the processes of the National 3R Strategy Development, a series of national consultation meetings were held to coordinate different ministries and reflect the myriad views of stakeholders. Main features of the Strategy tend to cover overall waste management strategies with some consideration given to resource circulation. In Bangladesh, the central government and a non-governmental organisation called Waste Concern have closely collaborated to develop a strategy to replicate the good practices of collection and treatment of municipal solid waste and other wastes in urban areas originally implemented in Dhaka by Waste Concern. In the case of Philippines, since a regulatory framework for waste management and the 3Rs, The Ecological Solid Waste Management Act of 2000, as well as a coordinating institution called the National Solid Waste Management commission, do exist, their focus is to develop a strategy to deal with the more concrete challenge of the informal sector's engagement in waste businesses and to integrate this into the Ecological Solid Waste Management Act. Once the framework policy or strategies are developed, the next step is to implement policies to deal with waste

³ Malaysian Plan was developed by Ministry of Housing and Local Government.

streams, specific challenges such as the informal sector, collection mechanisms, and better collaboration between local and central governments. Also, if the strategy sets a national target, the policy tools to achieve such targets or the development of waste management and 3R infrastructure to sustain efforts to achieve such targets should be examined and implemented.

Table 1-1. Progress of National 3R Strategy Development in Bangladesh, Cambodia, Indonesia, Malaysia, Philippines, Thailand, and Viet Nam (as of January 2009)

	Major Implementing Agencies and Supporting Agencies	Status as of January 2009	Main Features of the Strategy	Collaboration with Other International Development Projects
Bangladesh	Department of Environment (DoE), Ministry of Environment and Forest (MoEF)-Bangladesh; Waste Concern; UNCRD; IGES	<ul style="list-style-type: none"> - Organisation of Inception Workshop in Dhaka on 24 Dec 2008. Process officially started in Dec 2008. - Start of pilot project on composting in Dhaka in collaboration with Waste Concern. 	The Strategy is expected to address policy, strategy, and action plan together with an operational plan covering municipal solid waste, industrial waste, medical waste (reduction aspects only), agricultural waste, commercial sector waste, and emphasise greenhouse gas (GHG) emission reduction and potential financial (Clean Development Mechanism (CDM), carbon credits) and employment benefits of the 3Rs.	<ul style="list-style-type: none"> - Expected to establish good collaboration with local Japan International Cooperation Agency (JICA) offices and German Technical Cooperation (GTZ)-Bangladesh - Possible collaboration with ADB in implementation of strategies and dissemination of the experience to other areas.
Cambodia	Ministry of Environment Cambodia; Cambodia Environmental Association (CEA); AIT/UNEP RRC.AP; IGES	- Drafting of the National 3R Strategy for Cambodia.	The National Strategy on the 3Rs for waste management in Cambodia covers urban waste, industrial waste and health care waste management in achieving the 3R Strategy for waste management relative to environmental sustainability and for an efficient solid waste management system, taking into consideration environmental, economic and social dimensions through full stakeholders' participation at national and local levels.	

	Major Implementing Agencies and Supporting Agencies	Status as of January 2009	Main Features of the Strategy	Collaboration with Other International Development Projects
Indonesia	Ministry of the Environment (MoE)-Indonesia; Bandung Institute of Technology; UNCRD; IGES	<ul style="list-style-type: none"> - Revision of the 3rd Draft. - Preparation of the Final In-house Consultation Meeting in March 2009. 	Focusing on municipal solid waste (MSW), industrial solid waste, including agro-industries sector, and management of e-waste, the 3R Strategy is expected to provide synergy with existing policies and programmes for cleaner cities, e.g., the ADIPURA (i.e., green and clean town programme under which cities are awarded or black listed), PROKASIH (Clean River Programme), PROGRAM LANGIT BIRU (Blue Sky Programme), and PROPER (Company Environment Performance Programme) in Indonesia.	<ul style="list-style-type: none"> - Collaboration with the Kitakyushu Initiative, JICA and Ministry of Public Works (PU) to develop and implement a new project to link national strategy implementation and dissemination of good practices of local environmental management, such as a composting project in Surabaya (Possible collaboration with ADB on this aspect.)
Malaysia	Ministry of Housing and Local Government; AIT/UNEP RRC.AP; IGES	<ul style="list-style-type: none"> - Ministry of Housing and Local Government developed Master Plan for waste minimisation including promotion of the 3Rs in collaboration with JICA. - National 3R Strategy Workshop organised in February 2009. 	The strategy on waste minimisation covers households, commercial, institutional, industrial and construction waste types through awareness raising, partnerships and institutional arrangements with the full cooperation and participation of the government, private sector and the public at large throughout Malaysia.	JICA

	Major Implementing Agencies and Supporting Agencies	Status as of January 2009	Main Features of the Strategy	Collaboration with Other International Development Projects
Philippines	National Solid Waste Management Commission; Environmental Management Bureau, Department of Environment and Natural Resources; and Solid Waste Management Association of the Philippines; AIT/UNEP RRC.AP; IGES	- Drafted report of the National Framework for the Management of the Informal Waste Sector.	The National Framework for the Informal Waste Sector focuses on the involvement of the informal sector (itinerant waste buyers, junkshops, waste pickers, etc.) in the SWM system with the provision of a favourable policy environment, skills development and access to secured livelihood and social services. This strategy will be built through political, institutional, economic, technological and socio-cultural dimensions, taking into account critical actors and partners in the SWM system. The framework will be integrated into the existing National Ecological Solid Waste Management Act.	GTZ - Philippines
Thailand	Waste and Hazardous Substances Management Bureau; Pollution Control Department, Ministry of Natural Resources and Environment; En & Earth Consultant Co., Ltd.; AIT/UNEP RRC.AP; IGES	- A series of four consultative Thailand 3R Conferences were held back to back with the 3Rs in Phitsanulok, Khon Kaen, Songkla and Nonthaburi on 8-9 January, 15-16 January, 22-23 January and 29-30 January respectively, covering all four regions throughout Thailand. - The final Thailand National 3R Conference shall be held in Bangkok sometime middle of 2009.	The draft 3R National Strategy of Thailand covers municipal waste, medical waste, and industrial waste (e-waste). Waste management is divided into four steps: production, distribution, consumption and recycling, treatment and disposal. The 3Rs strategies include promotion of resource-efficiency, sustainable consumption, waste reduction and recycling, as well as technical-based treatment and disposal.	Some regions in Thailand are supported by GTZ in terms of waste management technology and community based waste management activities.

	Major Implementing Agencies and Supporting Agencies	Status as of January 2009	Main Features of the Strategy	Collaboration with Other International Development Projects
Viet Nam	Institute for Strategy and Policy of Natural Resource and Environment (ISPONRE), Ministry of Natural Resources and Environment (MONRE)-Viet Nam; UNCRD; ADB; IGES; MOEJ	<ul style="list-style-type: none"> - Revised the 3rd Draft in order to prepare the 4th draft. - Prepared for the Donor Consultation Meeting in March 2009. 	The Strategy is expected serve as a model case for other GMS countries. Emphasising the decentralized role of multi-stakeholders—communities, the private sector, and line ministries and agencies, the Strategy aims to promote community participation, 3R infrastructure development, Extended Producer Responsibility (EPR), green procurement, establishment of environmentally friendly industrial facilities industrial parks, reduction of production and service wastes, reuse of household, production and service wastes, development of waste markets, recycling industries, and establishment of recycling funds.	<ul style="list-style-type: none"> - Collaboration with JICA 3R Hanoi Project. - Collaboration with ADB to disseminate the project to GMS countries.

Through the activities of the National 3R Strategy Development process in these seven countries, this report identified that there are several challenges present when addressing national institutional capacity for the strategic and effective implementation of the 3Rs. The promotion of the 3R concept as well as increasing international interests over material resources have raised the priority of recycling policies in some developing Asian countries such as China. In the region, there are countries with comprehensive set of legislations in relation to the waste management and 3R policies such as Japan, Republic of Korea or China. The seven countries covered in this report has also started to develop the 3Rs as well as waste management-related legislation. Through the implementation of National 3R Strategy Development activities, several additional elements for policy consideration have emerged to further prioritise and efficiently implement the 3Rs. In the field of international collaborative programmes, to fulfill the capacity gaps mentioned above in general, the highest priority is currently allocated to climate mitigation/adaptation. Thus, seeking climate co-benefits of the 3Rs can be one the keys to make the 3Rs a priority issue. However, enforcement and implementation is still very weak. In conclusion, this report summarises the major challenges and priorities towards the strategic implementation of the 3Rs.

The following are the some examples of the expected effects and challenges associated with National 3R Strategy Development in developing Asia.

Clear policy goals and its follow-up through target setting

Introduction of the 3R National Strategy will help to shift the focus of waste and recycling policies from the mere focus on sanitary management of waste into integrated activities with attention on the life cycle of products such as recycling, green purchasing, and design for the environment. Therefore, the policy agenda of waste and recycling related issues would shift from proper management of “garbage” to socio-economic reform aiming at the efficient use of resources.

Development of National Strategy would help national governments track the progress of policy implementation by setting up short- as well as mid- to long-term policy goals and related quantitative indicators such as recycling rates. Such follow-up activities will help to reform and revise strategies and policies in accordance with the progress (or delay) of the policy implementation.

As we can observe from the cases of Japan’s Sound Material Cycle Society policies or China’s Circular Economy Policy, such shifts in the emphasis of waste and recycling policies will help prioritise the 3Rs under the overall policy agenda of the governments in the long run.

Prioritisation of waste related policies and inter-ministerial coordination

In general in developing Asia, responsibility for waste management policies and the 3Rs is spread

among the different ministries. Ministries in charge of local governance or health issues are in charge of municipal solid waste management. The ministry of the environment is in charge of hazardous waste and transboundary movement of wastes. The ministry of industry may be in charge of emission control and resource efficiency of the industrial sector, including industrial waste management; and ministries in charge of national development tend to oversee the development of waste management facilities. Therefore, there should be a better-coordination within the central government itself. The development of the National Strategy would help to situate waste-related legislation and policy in the wider context of national environmental policy. By doing so, the process of National Strategy Development is expected to raise awareness in challenges of waste management related to role sharing among governmental ministries and agencies, and local governments. Also, by connecting waste-related issues with resource-related issues through the 3R concept, waste and recycling-related policies will be prioritised as a part of the work of the central government in addition to the conventional responsibility of waste management held by local governments.

In addition, to raise the priority of the 3Rs at the national level, it is necessary to establish consistent and conducive legal and regulatory frameworks in relation to waste management and the 3Rs. For this purpose, linking with other policy agendas such as mainstream development programmes or energy programmes would be effective. For example, proper implementation and enforcement of environmental regulation and standards is necessary at local level for environmentally sound 3R activities. Such regulation shall be coordinated with other prioritised agendas of development and industrial policy.

Appropriate planning at local and national levels

The most highlighted issue is related to the role and capacity of the central government and local governments in waste management and recycling policies. One of the typical challenges faced by these countries is that the main responsibility of solid waste management lies with the local government. Despite this allocation of responsibility, with rapidly increasing amounts and changing components of solid waste as well as low political priorities for waste-related problems, local governments often face financial and institutional difficulties to collect and handle solid waste in an environmentally sound manner. Thus, residents often commit open and illegal dumping of waste.

As is often pointed out by policy makers and experts, many countries in the region have a lack of data and information in relation to waste generation, waste streams, waste compositions, and recycling rates, for example, both at the national and local level. This makes it difficult for both central and local governments to plan efficient and cost-effective management mechanisms for

recyclables and wastes. Thus, even with a National 3R Strategy with numerical targets, the lack of data and information would cause a serious problem in proper planning with an estimation of cost-effectiveness for certain implementation activities of the 3Rs.

Faced with a lack of financial and institutional capacity, one efficient way to implement the 3Rs would be a more flexible and consensual approach with central government playing a coordination role with different stakeholders including local governments, the private sectors, NGOs and international organisations. Socio-entrepreneurial non-governmental actors in collaboration with central and local governments, as seen in the case of Waste Concern in Bangladesh, can play a significant role in this area.

Stakeholders' involvement

Partnership and cooperation among central and local governments, residents, NGOs, business enterprises, and other stakeholders is an indispensable factor in the promotion of the 3Rs because it involves the entire product lifecycle from production, distribution and consumption to disposal. For example, the case of Bangladesh is intended to replicate the good practices of non-governmental stakeholders in waste management and recycling at the national level. By doing so, the national government can secure the concreteness as well as implementability at the local level. Cooperation among stakeholders contributes greatly to the improved sustainability of solid waste management systems and recycling systems. Thus, involving stakeholders in the development process of the National Strategy will contribute to awareness raising and clearer role sharing among stakeholders.

Other points need also to be taken into account to turn the 3Rs into an environmentally sound practice. For example, the proper treatment of residues from recycling will require further collaboration with the private sector. Materials industries, in particular, can be a key in establishing formal recycling activities as resource saving practices. Materials industries such as the cement industry, metal refinery or plastic recycling industry are essential for the development and implementation of successful and environmentally sound resource recovery practices. Therefore, it is essential to identify of the private sector including key industries, such as cement industries, hazardous waste management facilities, or non-ferrous metal refinery, which have the capacities and technologies to be fine-tuned for 3R practices. Collaboration among the private sector and central and local governments shall also be considered in the efficient collection and treatment of used products which contain hazardous substances.

The informal sector is primarily responsible for many positive environmental benefits of waste management due to the major role it plays in the 3R activities of several countries. It handles large volumes of waste materials at no or marginal costs to the municipal government or taxpayers, while their activities contribute to moderating the overall costs of management of solid waste and

recyclables. Evaluating the role of informal recycling collaborating with other informal sector activities remains a challenge. In the case of the Philippines, the informal sector is not formally recognised by any governmental accreditation, licensing or regulating agency. Although some sectors work for licensed waste-related enterprises, they are not legally employed by the owner of the enterprise. They have neither social nor economic security, work under substandard and unhealthy work conditions, and have limited access to basic services and needs such as electricity/energy, water, food and sanitation. With the view of alleviating poverty, it is crucial to develop an empowered informal waste sector that is recognised as a partner of public and private institutions, organisations and corporations in the promotion and implementation of the 3Rs in solid waste management. One way is to establish an organizational framework to support this sector. Additionally, as most of the countries in Asia do not include the informal waste sector in their policies, integrating the informal sector in the SWM system in terms of providing them with a favourable policy environment, skills development and access to a secured livelihood, employment and social services would be beneficial to effectively enforce and implement a holistic policy for the 3Rs and the solid waste management system. Currently the report on the national framework for the informal sector in SWM developed by National Solid Waste Management Commission of the Philippines is being circulated and disseminated to local authorities in the Philippines. The report serves as a framework for Local Government Units developing policies for the informal sector at the local level. Other developing Asian countries could replicate this practice of information dissemination and awareness raising in the integration of the informal sector in SWM.

One additional method is to integrate the informal sector into the formal sector as seen in the case of the Waste Concern in Bangladesh or in the Philippines. Policy response is needed to address the activities of waste pickers at interim waste collection points and final disposal sites. Such collaboration/integration of informal sectors should not become a barrier for efficient waste collection and segregation systems.

The promotion of waste segregation at source can contribute to more efficient recycling and environmentally sound practices. It can also help to raise awareness on this issue at the resident and local governmental level. For successful separation of waste at source, collaboration with residents as well as businesses is vital. However, it is sometimes observed that segregated waste would be mixed again and be disposed of at dumpsites. To prevent such inefficient practices, “appropriate planning at local and national levels” and “involvement of the private sector including key industries” are a key focus. Thus, active participation by residents would put

pressure on national and local governments to plan 3R activities in an efficient and environmentally sound manner.

Secure appropriate infrastructure and running costs

Nevertheless, waste-related issues are fundamentally those of external economy, environmental costs which are not reflected properly into the market mechanism, caused by resource use and consumption. Without legislation and enforcement, the environmental and financial cost of waste management would not be internalised into the economies of developing Asia. For this reason, along with the development of the National 3R Strategy, related legislation and mechanisms shall take financial cost-issues into consideration. This is essential for the creation of new and formal markets, businesses, and employment. Enforcement of environmental standards and legislation would assist formal private actors, which engaged in legal and environmentally sound business practices, in the market. Improved coordination of legislation, stakeholders, and infrastructure through the strategic planning of the 3Rs both at local and national levels will help to secure appropriate infrastructure and running costs.

Structure of the report

This report intends to share the experience and information from the following seven countries with policy makers both in national and local governments, NGOs and researchers regarding the progress of National 3R Strategy Development: Bangladesh, Cambodia, Indonesia, Malaysia, Philippines, Thailand, and Viet Nam. By doing so, this report puts forth lessons learned for other countries both within and outside the region which are attempting to initiate similar initiatives. The report also tries to identify priorities in the strategic implementation of the 3Rs in the future.

This report consists of the following two parts: 1) needs assessment for cooperation between developed and developing countries in promotion of the 3Rs, and 2) country reports.

The first part, entitled “Cooperation between developed and developing countries in the promotion of the 3Rs”, assesses the needs of developing countries in international cooperation for capacity development in 3R-related policy development. This chapter is based on a report published by UNCRD in 2006.

Each of the Country Reports (Bangladesh, Cambodia, Indonesia, Malaysia, Philippines, Thailand and Viet Nam) in the second section introduces a) the current situation of waste management and 3R activities in the country, b) existing systems and regulatory frameworks for waste management

and the 3Rs, c) the current progress of National 3R Strategy Development (as of August 2009), d) suggested focus of the National 3R Strategy and e) future challenges, based on the survey conducted by AIT/UNEP RRC.AP and UNCRD.

2. Cooperation between Developed and Developing Countries in the Promotion of the 3Rs: A needs assessment for capacity development in developing Asia⁴

2.1 Introduction

Preface

Rapid economic development and population growth have led to a proliferation in the resource consumption and waste generation of cities in developed and developing countries, along with a diversification of their waste streams. In response to these trends, many national and regional governments and international organisations have taken action to promote the 3Rs (reduce, reuse, recycle) through policy development, capacity-building, awareness-raising, and technological interventions.

This article examines trends in international discussion and collaboration towards the 3Rs between developed and developing countries. The objectives are to look into policy barriers, gaps, and opportunities facing international cooperation towards sustainable production and consumption, with an emphasis on cooperation between developed and developing countries in the process of promoting and implementing viable 3R policies.

In order to address the issues and needs, the 3R Initiative, an international platform for the advancement of the 3Rs as described later in this section, was established in Japan in April 2005 at a ministerial conference attended by the G8 countries, twelve developing countries, and four international organisations. It was recognised that collaboration between developed and developing countries is essential for achieving the objectives of the 3Rs, both at national and international levels. Therefore, it is timely to address opportunities and barriers for successful international cooperation, and explore strategic approaches to facilitate effective cooperation in 3R areas.

The article is divided into four sections. Section one provides a background to international cooperation in the 3Rs. Section two describes gaps and barriers to effective national and international 3R promotion, describes trends in current efforts in international cooperation, and identifies challenges facing international cooperation for realisation of the 3Rs. Section three identifies opportunities to further promote international cooperation and key issues and options for decision-makers to consider. Section four outlines a strategic approach to address the solutions and

⁴ This article was originally published as Makiya *et. al.*, "Cooperation between Developed and Developing Countries in Promotion of 3R," *Regional Development Dialogue (RDD)* 27 (Spring 2006): 152-76. It has been reprinted here in its entirety with the permission of the authors and UNCRD. The minor language editing was made for improved readability.

opportunities identified in section three. The need for effective, participatory collaboration and information-sharing to create awareness and capacity is reemphasised throughout the article, and the linkages to other thematic objectives of the 3R initiative are also discussed.

Background

The need for 3R action is emphasised in many agendas and in a number of action plans. Chapter 4 of Agenda 21 highlights the importance of developing national policies and strategies to alter unsustainable production and consumption patterns. The Johannesburg Plan of Implementation (JPOI), adopted at the 2002 World Summit on Sustainable Development (Johannesburg, South Africa), stipulated that all countries should promote sustainable consumption and production to facilitate global sustainable development, and encouraged them to develop a ten-year framework of programmes in the 3Rs. Chapter 3, Paragraph 22 of the JPOI indicates that countries should follow the principles of the 3Rs with the participation of government authorities and all stakeholders and that the international community should provide financial, technical, and other assistance to developing countries.

Additionally, it is recognised that 3R policies have important linkages to the UN’s Millennium Development Goals (MDGs) (see table 2-1). The MDGs emphasise the need for more efficient uses of natural resources, resource use, and waste management, which have a strong linkage to social equity.

TABLE 2-1. THE 3Rs AND THE MILLENNIUM DEVELOPMENT GOALS (MDGs)

MDGs	
1. Eradicate extreme poverty and hunger	The 3Rs would promote systematic efforts and programmes on waste collection, waste recycling, and marketing of recyclable products, which would ultimately help generate employment, industrial activities, transportation, commerce, international trade, and other benefits.
2. Achieve universal primary education	The 3Rs would promote systematic reduction and gradual abolition of informal and unhealthy waste picking or collection practices, which has engaged millions of children world wide depriving them of opportunities for primary education.
3. Promote gender equality and empower women	Women disproportionately take care of many household activities such as cooking, childcare, shopping, domestic waste separation and disposal, etc. Appropriately

	<p>advocated 3R awareness programmes would motivate their families to share the burden in waste sorting, separation, and disposal in an appropriate manner to achieve a recycle-based society. The time saved could be more productively used by women to take part in social and economic activities.</p>
4. Reduce child mortality	<p>Lack of access to clean land, clean water, and clean air is linked to child mortality in many developing countries. Systematic and efficient 3R programmes will ensure clean land, clean water, and clean air — the fundamental rights of children and citizens.</p>
5. Improve maternal health	<p>Women are disproportionately affected by waste problems and living conditions with lack of access to clean land, clean water, and clean air, all of which contribute to poor maternal health conditions in both urban and rural areas of many developing countries. Systematic and efficient 3R programmes will ensure clean land, clean water, and clean air — the fundamental rights of every citizen.</p>
6. Combat HIV/AIDS, malaria, and other diseases	<p>Effective and efficient waste management programmes coupled with systematic 3R programmes at local levels will help ensure a healthy living environment in terms of clean water, air and land, which are essential to combat diseases like malaria and respiratory infections.</p>
7. Ensure environmental sustainability	<p>Unsustainable production and consumption patterns coupled with insignificant recycling capability to replace raw materials/natural resources, have contributed to many adverse impacts on the environment (land, water, biodiversity, coastal and marine, atmosphere and climate, etc.), natural resources and human health. Effective and efficient 3R programmes are vital to reverse these trends of environmental unsustainability.</p>

<p>8. Develop a global partnership for development</p>	<p>The Johannesburg Plan of Implementation (JPOI) adopted at 2002 WSSD, and subsequently, the thirtieth G8 Summit at Sea Island, Georgia, US (8-10 June 2004) and the follow-up 3R Ministerial Meeting in Tokyo (April 2005), have directly or indirectly emphasised the critical need for reorienting production and consumption patterns through the effective implementation of 3R principles. These initiatives have recognised that the major cause of the continued deterioration of the global environment is the unsustainable pattern of consumption and production and have called upon countries to realise a globally sound material-cycle society through enhanced cooperation among various stakeholders (central governments, local governments, the private sector, NGOs, and communities), including voluntary and market-based activities, and through the promotion of science and technology suitable for the 3Rs and international trade of recyclables.</p>
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Source: UNCRD, Sustainable Production and Consumption (SPC)/3R Website. Available from <http://www.uncrd.or.jp/env/spc/>; accessed 2006.

The 3R Initiative towards a sound material-cycle society was formally launched at the Ministerial Conference on the 3R Initiative in Tokyo, held in April 2005 to help foster capacity to change global consumption and production patterns to maintain the carrying capacity of the environment. Prior to this, Chapter 4 of Agenda 21 (1992), the 1999 United Nations *Guideline of Consumer Protection*, and the thirtieth G8 Summit at Sea Island in the United States (8-10 June 2004) had also emphasised the need to change national and international production and consumption patterns through effective implementation of 3R principles. At the Sea Island Summit, G8 countries agreed to launch the 3R Initiative in 2005 with the objectives of reducing barriers to the international flow of goods and materials for recycling and remanufacturing, and building capacity for the 3Rs in developing countries. The outcome of this ministerial conference highlighted the following key recommendations with respect to the promotion of international cooperation for the 3Rs:

- (1) Countries should make efforts to improve resource efficiency and prevent environmental pollution from wastes.
- (2) International cooperation among developed and developing countries may start with the sharing of experiences, joint research, and capacity-building activities.

- (3) Regarding capacity-building, issue-specific and country-driven approaches are especially recommended. Possible priority areas for capacity-building include (a) the establishment/improvement of legal frameworks, (b) the development of national strategies, and (c) the sharing of best practices undertaken in developed and developing countries.
- (4) Transfer of technologies could be efficiently promoted through a regional centre approach.
- (5) Promotion of the 3Rs could also contribute to addressing climate change issues.
- (6) Regional cooperation, especially South-South cooperation, should be facilitated.
- (7) Importance of economic instruments and other incentives should be made more prominent in order to promote 3R activities in a more economically efficient manner.
- (8) International cooperation to share information and to build understanding on common priorities and opportunities for more innovation in product eco-design is needed.

It was also agreed that further strengthening of international cooperation to promote the 3Rs would be necessary, that a report on progress in the 3Rs would be submitted to the G8 Summit in Gleneagles, Scotland held on 6-8 July 2005, and that a senior official follow-up meeting would be held in Japan (6-8 March 2006) to further discuss pertinent issues and measures. At the same time, there are several barriers that need to be addressed in order to improve cooperation between developed and developing countries, as outlined in subsequent sections.

Objectives of the 3R Initiative

In order to respond to international concerns, the ministerial conference on the 3Rs highlighted five objectives for the 3R Initiative:

- (1) to reduce waste and to reuse and recycle resources and products to the extent economically feasible;
- (2) to reduce barriers to the international flow of goods and materials for recycling and remanufacturing, recycled and remanufactured products, and cleaner, more efficient technologies, consistent with existing environmental and trade obligations and frameworks;
- (3) to encourage cooperation among various stakeholders (central governments, local governments, the private sector, NGOs, and communities), including voluntary and market-based activities;
- (4) to promote science and technology appropriate to the 3Rs; and
- (5) to cooperate with developing countries in such areas as capacity-building, raising public awareness, human resource development (HRD) and implementation of recycling projects.

The last objective emphasises the importance of establishing closer ties and cooperation between developing and developed countries in the promotion of 3R activities. The areas for prospective joint efforts were identified as the development of 3R-related policies and institutions, the development of 3R technology, systems and facilities, awareness-raising on the 3Rs, and sound material-cycle business.

2.2 Current Status, Barriers, and Gaps

In recent years, waste generation has grown in tandem with rapid economic growth and the increase in urban populations, especially in Asian cities. According to a UN estimate, by 2007, about half of the total world population will live in urban areas. To address the issues of sustainable consumption, production, and waste minimisation, the 3R approach has started to gain more attention.

On the other hand, since the 1990s the demand for recyclable goods and materials has been on the rise in Asian countries to meet the demands for resources for economic growth. Accordingly, international trade in recyclable goods and materials has been increasing in the region. In the following section, the current status and the barriers and gaps will be discussed in the context of the two aspects of national 3R promotion and international trade of recyclables.

Progress and Issues with Regard to National 3R Promotion

A number of countries have initiated efforts to promote the 3Rs to realise sound waste management and more efficient resource utilisation. For example, in the Republic of Korea, the rate of recycled waste to the total discharged municipal waste increased to 44 per cent in 2003 from 29 per cent in 1997. Similarly in Singapore, the rate of recycled waste increased to 48 per cent in 2003 from 44 per cent in 2001.

Although these trends are observed, in most countries the focus of waste management is not on improving the recycling rate but on how to manage the disposal of generated waste. The current recycling system in developing countries, which are mainly carried out by informal sectors through picking and selecting waste at collection and dump sites create health risks and environmental pollution. This is deeply rooted in poverty issues, which requires systematic policy interventions by local and central governments and the cooperation of all relevant formal sectors.

In addition, the lack of information and insufficient awareness of decision-makers and stakeholders in the 3Rs are considered to be another barrier in 3R promotion. On the other hand, a

number of countries, including Japan, China, and the Republic of Korea, have established legal frameworks to promote recycling (see box 2-1, Japan's legal framework).

Small and medium-sized enterprises (SMEs) in developing countries account for a substantial share of national industrial activities. SMEs also potentially have a big impact on the environment in their operations because of the lack of technical capacity and inadequate financial resources to employ environmentally-friendly technologies.

Box 2-1. Legislative Framework on the 3Rs in Japan

Basic framework laws

- Basic Environmental Law
- Basic Law for Establishing a Sound Material-Cycle Society

Laws for establishing general systems on waste management and recycling

- Waste Management and Public Cleansing Law
- Law for Promotion of Effective Utilization of Resources

Laws for regulating and promoting products according to the characteristics

- Container and Packaging Recycling Law
- Home Appliances Recycling Law
- Construction Materials Recycling Law
- Food Recycling Law
- End-of life Vehicles Recycling Law

Law for promotion of environmentally-friendly procurement

- Law on Promoting Green Purchasing

Source: Ministry of Environment, Government of Japan. Available from <http://www.env.go.jp/en/>; accessed 2006.

At the April 2005 3R ministerial conference, it was recognised that a systematic approach by administrative bodies, a clear legal framework, establishment of partnerships among key stakeholders, expansion of a market for environmentally-sound products, awareness-raising, technological development, capacity-building, and development of appropriate infrastructure for the promotion of the 3Rs are all important.

Current Status and Related Problems of the International Trade of Recycling Goods and Materials

The international trade of goods and materials for recycling and recycled products has been increasing. In Asia, such transboundary movement has expanded to cover most of the region. This has been occurring not only from developed countries to developing countries, but also from developing countries to developed countries and among developing countries (see box 2-2).

Box 2-2. Increase in the International Trade of Recyclable Goods and Materials

In Asian countries the import of recyclable goods and materials such as waste paper, scrap iron, and plastics has increased greatly to meet the demands of economic development. The imported recycled products are then exported again within Asia, and also to United States and Europe. For example, China's import of waste plastic amounted to 3.024 million tons in 2003 from 24,000 tons in 1990. The import of scrap iron, 183,000 tons in 1990, grew to 9.293 million tons in 2003.

IMPORTS OF RECYCLABLE MATERIALS IN ASIAN COUNTRIES

(Unit: Thousand tons)

Type of recyclables	China		Thailand		Malaysia		Indonesia	
	1990	2003	1990	2003	1990	2003	1990	2003
Plastic	24	3,024	0.8	0.8	17 10	27	28	4
Paper	423	9,382	214	1,098	734 4	229	462	2,014
Iron	183 5	9,293	1,101	1,279		5,136	946	9645
Aluminium		653	2	22		n.r.	0.1	

Note: n.r. (not reported).

Notes: Extracted from Michikazu Kojima, ed., *International Trade of Recyclable Resources in Asia* (Tokyo: Institute of Development Economies (IDE-JETRO), May 2005).

Source: Kojima, ed., *International Trade of Recyclable Resources in Asia*.

Since efficient utilisation of resources achieved through international trade is one important aspect of the 3Rs, the barriers to international flows, whether tariff or non-tariff, should be reduced or eliminated so that the recyclable resources do not become waste.

On the other hand, attention should be paid to emerging problems such as the export of “disguised wastes” and environment pollution caused by recycled materials’ residue. Concerning such incidents in importing countries, it should be pointed out that the knowledge, information, and technologies for proper recycling are lacking, and the mechanism for tracking and controlling the

entire recycling path is insufficient.

Regarding legal frameworks to deal with the international trade of hazardous waste, the parties to the Basel Convention have legislation in place to manage the hazardous waste subject to the convention, but institutional and implementing capacities at the national level are still lacking. Furthermore, regarding waste that cannot be clearly defined as waste that may or may not be subject to the Basel Convention, national policy and its implementation need to be improved and internationally-coordinated in order to ensure environmental protection as well as the efficient international trade of recyclables.

Current Status of the International Cooperation on the 3Rs between Developed and Developing Countries ⁵

The ministerial conference on the 3Rs identified the priority areas for capacity-building as follows: (a) the establishment and improvement of legal frameworks; (b) the development of national strategies; and (c) the sharing of best practices undertaken in developing countries as well as developed countries. It emphasized specifically to those for reduction of barriers to the international flow of goods and materials, improvement of monitoring of transboundary movements of recyclables and wastes and their environment, and exchange of information and sharing of best practices on a regional and global basis. Table 2 summarises some of the selected international cooperation schemes and efforts in relation to 3R promotion.

International cooperation for national 3R promotion

Examples of international cooperation for capacity-building on national 3R promotion include: (a) as a practice relating to “Reduce” in industrial sectors, Regional Centres for Cleaner Production have been established in many countries including China and Viet Nam under the leadership of the United Nations Industrial Development Organization (UNIDO)/United Nations Environment Programme (UNEP) (see box 2-3 below); (b) as a practice of utilising information to promote “Recycling,” information centres for collecting and disseminating information have been established and are operated in developing countries aiming to interchange sources of recyclables and eligible recyclers with the assistance of Japan, the US, and Canada (box 2-4 below); (c) as a practice of utilising economic incentives, the Canadian International Development Agency (CIDA) has initiated a “Solid Waste Bank” project in which recyclables collected by community members are stored, sold, and cashed back in the community in Udon Thani, Thailand. Such economic incentives were valued for their contribution to job creation (see box 2-5 below); and UNCRD has initiated projects in Viet Nam and Indonesia in order to develop national 3R strategies in line with

⁵ This section shows the status as of March 2006.

the outcomes of the 3R ministerial conference.

Problematic areas for which international cooperation could be solicited are as follows: (a) local governments focus too much on waste disposal rather than waste reduction and minimisation through the 3Rs; (b) lack of public awareness on the 3Rs; (c) insufficient capacity of local governments in introducing and implementing 3R policies; (d) lack of effective follow-up of pilot projects; and (e) absence of clear national strategies on the 3Rs.

Cooperation to promote international networking

Several programmes of international cooperation on the 3Rs have been initiated. For instance, the Project on the Environmentally Sound Management of E-Waste for the Asia-Pacific Region was launched in 2005 under the leadership of the Secretariat of the Basel Convention to take action on electronic and electrical waste (e-waste). The project activities in the short-term include inventory of e-waste, and developing information systems and training guidance manuals for national plans. The North America Free Trade Agreement (NAFTA) has been attempting to establish a tracking system of hazardous waste among member countries by methods such as equipping waste with an electronic system and creating a harmonised means of information exchange (see box 2-6 below). In 2003, Japan established the “Asian Network for Prevention of Illegal Transboundary Movement of Hazardous Wastes” with the participation of eleven countries in Asia. This network aims to share information on the status of illegal transboundary movements of hazardous waste, and develop a common approach for such movements by creating an Internet-based information system and facilitating day-to-day communication among relevant authorities.

TABLE 2-2. INTERNATIONAL COOPERATION ACTIVITIES RELATING TO THE 3Rs

Country	National legal framework, Policy, Strategy	Information-sharing, Training, Awareness	Public	Pilot Project				
				Reduce	Recycling			
					Economic incentives	Informational method	Others	
Brazil				National Cleaner Production Centre (UNIDO/UNEP) ^{1/}				
China	Studies on “Legal Framework for the Circular Economy in China” and “Policies and Regulations for Promoting Development of Circular Economy in China” (Italy, World Bank) ^{2/}	Establishing an Environmentally Sound Technology Transfer Centre (ADB) ^{3/}		Green Aid Plan (Japan) ^{4/}	ADB Technical Assistance Cluster: Promotion of Clean Technology (ADB) ^{3/}			
India				Green Aid Plan (Japan) ^{4/}	National Cleaner Production Centre (UNIDO/UNEP) ^{1/}			
Indonesia	3R National Strategy Formulation (UNCRD) ^{5/}			Green Aid Plan (Japan) ^{4/}	Produksi H Project (GTZ) ^{6/}	Industrial Efficiency and Pollution Control Project (Germany) ^{7/}	Waste-to-Product Partnership Program (US-AEP) ^{8/}	Tsunami Waste Management Programme (UNDP) ^{9/}
Malaysia				Green Aid Plan (Japan) ^{4/}				
Mexico					National Cleaner Production Centre (UNIDO/UNEP) ^{1/}			
Philippines				Green Aid Plan (Japan) ^{4/}	Industrial Environmental Management Project (US-AID) ^{10/}		Industrial Waste Exchange Program (Canada, US-AEP) ^{8/}	Private Sector Participation in Managing the Environment (UNDP) ^{11/}

Thailand	Construction and Demolition Waste Management System (GTZ) ^{10/} Packaging Waste Project (GTZ) ^{10/}	Green Aid Plan (Japan) ^{4/}	Promotion of Cleaner Technology in Thai Industries (DANCED) ^{12/}	Solid Waste Bank (CIDA) ^{13/}		Green Manufacturing Technical Assistance Program (Japan) ^{10/} Fluorescent Lamp Partnership Program (Japan) ^{10/}
Viet Nam	3R National Strategy Formulation (UNCRD) ^{5/}	Green Aid Plan (Japan) ^{4/} Viet Nam-Canada Environment Project (CIDA) ^{10/}	National Cleaner Production Centre (UNIDO/UNEP) ^{1/}	Making Waste Work for the Economy (CIDA) ^{14/}		Source Separation and composting of Municipal Waste (AusAID) ^{14/}

Sources: 1/ United Nations Industrial Development Organization (UNIDO) Cleaner Production Homepage, available from <http://www.unido.org/doc/4460> (accessed 10 February 2006).

2/ World Bank, Supporting Environmental Management in China, available from <http://web.worldbank.org/WBSITE/EXTERNAL/COUNTRIES/EASTASIAPACIFICEXT/EXTEAPREGTOPENVIRONMENT/0,,contentMDK:20515211~menuPK:502915~pagePK:34004173~piPK:34003707~theSitePK:502886,00.html#circular> (accessed 10 February 2006).

3/ Centre for Environmentally Sound Technology Transfer (CESTT), available from <http://www.cestt.org.cn/English/index.htm> (accessed 3 February 2006).

4/ METI, Overview of GAP (in Japanese), available from http://www.meti.go.jp/policy/recycle/main/3r_policy/policy/pdf/grobal/ref_23.pdf (accessed 1 February 2006).

5/ UNCRD, Environment Group Web page, available from <http://www.uncrd.or.jp/env/> (accessed 10 February 2006).

6/ UNEP DTIE, Cleaner Production Global Status 2002 Report, available from http://www.uneptie.org/pc/cp/library/catalogue/regional_reports.htm#cpgs2002 (accessed 5 February 2006).

7/ UNESCAP, Indonesia: Industrial Efficiency and Pollution Control Project (IEPC-project), available from http://www.unescap.org/drpad/vc/conference/ex_id_45_iep.htm (accessed 10 February 2006).

8/ Michikazu Kojima, "The Present Condition of the Measure of 3R in Asia" (in Japanese), Environmental Research Quarterly, (136, 2005):99-104, (Tokyo: The Hitachi Environment Foundation, March 2005)

9/ Relief Web, available from <http://www.reliefweb.int/rw/dbc.nsf/doc100?OpenForm> (accessed 30 January 2006).

10/ 3R Portfolio from the Ministerial Conference on the 3R Initiative (Tokyo, 2005), available from <http://www.env.go.jp/earth/3r/en/info.html> (accessed 10 February 2006).

11/ UNEP DTIE, Ibid; UNDP Philippines, available from http://www.undp.org.ph/sus_sector.htm (accessed 28 January 2006).

12/ Thailand Environmental Institute, available from <http://www.tei.or.th/> (accessed 25 January 2006).

13/ SEALSWIP homepage, available from <http://www.icsc.ca/sealswip/index.html> (accessed 4 February 2006). 14/ International Bank for Reconstruction and Development (IBRD), MONRE, CIDA, Viet Nam *Environmental Monitor 2004: Solid Waste* (2004):62.

Box 2-3. National Cleaner Production Centres (NCPCs)

In 1994 UNIDO/UNEP initiated efforts to set up National Cleaner Production Centres (NCPCs) in developing countries. Since then, thirty-one National Cleaner Production Centres and Programmes have been established. To enhance environmental and social responsibility, competitiveness and export-potential of enterprises, the centres offer five interrelated core services, namely: (a) technical assistance and in-plant assessments, (b) training, (c) CP technology and investment promotion, (d) information dissemination, and (e) CP policy advice.

Sources: UNIDO Cleaner Production Homepage. Available from <http://www.unido.org/doc/4460>; accessed on 9 February 2006; and UNEP Production and Consumption branch, National Cleaner Production Centres. Available from <http://www.uneptie.org/pc/cp/ncpc/home.htm>; accessed on 10 February 2006.

Box 2-4. Industrial Waste Exchange Programme in the Philippines

In 1987 the Industrial Waste Exchange Program (IWEP) was started as a pilot project assisted by the International Development Research Centre (IDRC) and conducted by the Department of Environment and Natural Resources (DENR). IDRC is a Canadian public corporation created by the Canadian parliament. In 1998, DENR transferred the IWEP to the Philippine Business for the Environment (PBE) and PBE disseminated the information regarding the activities of IWEP. PBE is a non-profit organisation, which assists Philippine businesses to address its environmental issues and concerns. The United States-Asia Environmental Partnership (US-AEP) had also supported the PBE's projects.

IWEP maintains a database of waste generators and waste buyers/recyclers and releases the information through the PBE publication "Business and Environment Magazine" and IEM Knowledge Network. The IWEP contains the following information for each waste item registered: volume of waste, frequency of generation, industrial process that generated the waste, classification of waste, physical state and current handling of waste (packaging). Each product is assigned a code and technical information, such as pH and any contaminants. However, company identity and location remain confidential at this moment. When two companies come to an agreement, producers and users start to negotiate all agreements directly. More than 130 companies have registered in IWEP and 1,153 recyclable materials and waste that are either for sale or wanted have been registered.

Sources: Philippine Business for Environment (PBE), available from <http://www.pbe.org.ph/> (accessed 10 February 2006); United Nations Department of Social and Economic Affairs (UN-DESA), "Success stories from the Philippines", Earth Summit +5, Special Session of the General Assembly to Review and Appraise the Implementation of Agenda 21, available from <http://www.un.org/esa/earthsummit/waste.htm> (accessed 10 February 2006); United States-Asia Environmental Partnership, Philippines Accomplishments, available from <http://www.usaep.org/accomplishments/philippines.htm#5> (accessed 10 February 2006); Good Practices Inventory, Asia-Pacific Environmental Innovation Strategies (APEIS), Research on Innovative and Strategic Policy Options (RISPO), Industrial Waste Exchange Program (IWEP), Philippine Business for the Environment (PBE), <http://www.iges.or.jp/APEIS/RISPO/inventory/db/index.html>, (accessed 10 February 2006); and Personal communication through Email with the staff of PBE (10 Feb 2006).

2.3 Solutions and Opportunities

Points to Consider in Promoting International Cooperation

(1) International cooperation through a bottom-up process building on the basis of national 3R activities

The ultimate goal of the 3R Initiative is to establish a sound material-cycling society in the twenty-first century where sustainable consumption and production are realised. To accomplish this, countries need to strive to expand the 3Rs from the national to regional level and eventually globally, seeking to both maximise resource efficiency and minimise environment pollution, as the ministerial conference of April 2005 noted.

To date, the progress and interest in the 3Rs vary greatly from country to country. Some countries are just beginning efforts to promote national 3R activities while several other countries already have systematic policy and legislation for national 3R promotion, for instance in Japan (see box 2-1 above). On the other hand, many countries are facing increased international flows of goods and materials for recycling and remanufacturing, which requires that they deal with the associated problems.

Box 2-5. Solid Waste Bank in Thailand

In Udon Thani, Thailand, a community Solid Waste Bank was set up as part of the Southeast Asia Local Solid Waste Improvement Project (SEALWIP). SEALWIP was conducted by the International Centre for Sustainable Cities (ICSC) and supported by the Canadian International Development Agency (CIDA) and local governments. ICSC is a Canadian organisation founded as a partnership between three levels of government, the private sector and civil society organizations. The role of ICSC was to facilitate a collaborative process to increase both the project management abilities and the solid waste management expertise and to provide the funding for demonstration projects related to municipal solid waste management. ICSC also provided technical assistance to the stakeholder groups.

The Solid Waste Bank is a collection deposit where community members bring their recyclable goods. Community members are issued a passbook to record the amount of recyclable waste deposited in the Solid Waste Bank. When recyclable materials are sold to a community broker, the community members receive a share of the proceeds. The Solid Waste Bank keeps 15 percent of the money to cover its maintenance and operating costs. Therefore, Solid Waste Banks create income-generation especially for the poor. In addition, community members can learn about waste separation and waste reduction through Solid Waste Banks.

SEALWIP was selected as an Ambassador project at the Stockholm Awards (an international competition in honour of the 30th anniversary of the founding of UNEP) and UN Habitat's Best Practices. It was also selected

as one of ten projects to have site visits for a Global Development Award.

Sources: SEALSWIP homepage, available from <http://www.icsc.ca/sealswip/index.html> (accessed 4 February 2006); and International Centre for Sustainable Cities (ICSC) homepage, available from <http://www.icsc.ca>, (accessed 10 February 2006).

There seems to be a growing consensus that the international flow of goods and materials for recycling and remanufacturing can take place only when environmental protection in importing countries is fully addressed.

Accordingly, in planning international cooperation activities, capacity-building programmes should be prioritised to enhance the national 3R capacity as the first step, taking into account developing countries' current status. At the same time, for those countries involved in the transboundary movement of recyclables, programmes and activities should be promoted to help build capacity for preventing environment pollution and reducing the barriers to the international flow of recycled material and products.

In planning and implementing capacity-building, the broad and long-term effect of the 3Rs should be emphasised, as they would be the drivers for the promotion of the 3Rs:

The 3Rs contributes to economic development through poverty eradication and more efficient production by providing opportunities to create a virtuous cycle where environment and economy are mutually reinforcing.

The 3Rs provide the firm basis for sustainable development by improving waste management and addressing environmental problems such as soil and water contamination.

(2) Priorities for national 3R promotion and the international trade of recyclables

Many developing countries are making efforts to improve waste management by making it more sanitary and environmentally sound. In this regard, the compelling necessities for developing countries are to reduce the risk of human health and environmental pollution caused by inappropriate recycling activities which may occur in promoting national 3Rs and international flows of recyclables.

Box 2-6. Electronic Waste Tracking in North America

In 2003, the NAFTA-based Commission for Environmental Cooperation (CEC) recommended that electronic transborder hazardous waste tracking be implemented in North America, through the development of standard procedures for electronic reporting among the United States, Canada, and Mexico. This would enable the electronic exchange of waste transfer approval notices and waste manifest data, and is expected to improve

the accuracy and timeliness of the data transferred, even though a single tri-national system will not be created.

According to the report entitled "Crossing the Border," since the creation of NAFTA (North American Free Trade Agreement) in 1994, transborder hazardous waste tracking in North America has encountered several difficulties. Border security is inconsistent and insufficiently integrated, there are limitations on the availability of data to support environmental management, and administrative burdens and costs among the government agencies responsible for regulating and enforcing transboundary waste shipments make information transfer difficult and not cost effective. As a result, hazardous waste data is often incomplete and agencies have difficulty accessing and sharing information in a timely manner. Currently, each country has data management systems to support portions of its regulatory requirements to track transboundary hazardous waste shipments. However, national environmental agencies and customs agencies in each country have separate stand-alone systems and processes that rely on paper transactions, and effective mechanisms to link the shipment approval process and the border inspection process do not exist. This weakens compliance, which is a shared responsibility of customs and environmental agencies.

As proposed by the CEC, a phased, two-track approach for implementing harmonised electronic data exchange would require multilateral cooperation to:

- Automate country-to-country notice and approval processes, by creating and pilot-testing data standards, application codes, and security protocols for government-to-government notices, industry-to-government notices, and notices between environmental agencies and customer service agencies. To do this, agreements must be obtained to streamline various business practices and develop electronic reporting mechanisms with all involved stakeholders and organisations.
- Research technologies and systems currently being considered for electronic hazardous waste tracking in North America, identify obstacles to the interoperability of these systems, and develop systems and technologies for electronic information transfer.

Electronic reporting of transborder hazardous waste shipments has significant potential for addressing environmental goals and border security challenges. This scheme illustrates the potential benefits of standardised electronic tracking in North America. Creating such a system in the Asia-Pacific region would require substantial administrative effort and financial commitment, and a phased approach with manageable timelines.

Source: Commission for Environmental Cooperation, *Crossing the Border: Opportunities to Improve Hazardous Waste Tracking in North America* (Working Draft Report) (Montreal: Commission for Environmental Cooperation, November 2003).

In pursuing the common goal of sound material-cycling, on a global scale it is particularly important to reduce barriers to international flows of goods and materials for recycling and manufacturing, recycled and remanufactured products, and cleaner, more efficient technologies. Therefore, activities for reducing the risk to health and of environmental pollution associated with improper recycling, and activities to reduce barriers to international trade flows should both be a focus for international cooperation between developed and developing countries.

(3) Country-driven and issue-specific approach

When considering specific capacity-building activities, a country-driven and issue-specific approach should be noted, as was pointed out at the ministerial conference.

Since countries have different rates of progress and varying circumstances, including cultures, tradition, and lifestyles, the needs and priorities of each developing country should be taken into account. Capacity-building activities for national 3R promotion would be common for those of transboundary movements of recyclables for the most part, while such activities are characteristic solely to transboundary movements as an international tracing system of hazardous waste. Capacity-building for a particular country should depend on the nature of its economic activities, major components of waste streams (e.g., e-waste, plastic, organic, agricultural, industrial), and potential marketing opportunities for recycled products. As a good example, box 2-7 illustrates that opportunities exist for capacity-building to promote the 3Rs in craft villages in Viet Nam (see box 2-7 below).

(4) Enhancing international cooperation on the 3Rs through multi-stakeholder participation

Private sector. International cooperation and partnerships give opportunities to small, medium, and large organisations, in both the public and private sectors, to explore potential economic benefits of cooperation. Many international business partnerships have grown successfully as a result of the choice of specific branded products and goods by the consumers. With companies finding it easier in such cases to trade with the international community, they are able to establish links with local authorities in foreign countries, so as to take advantage of the opportunity to promote eco-friendly businesses embodying 3R principles, energy efficiency measures, cleaner production and waste minimisation techniques, and resource recovery and recycling techniques. Thus, through ensuring resource efficiency in the production, packaging, delivery and marketing processes, they can motivate more and more green consumers at the international level.

Box 2-7. Opportunities for Establishing the 3Rs in Craft Villages in Viet Nam
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Craft villages are rural villages in which activities include nonagricultural craft industries, with at least 30 percent of total households involved in the craft activities, contributing to at least 50 per cent of the total income of the village. There are about 1,450 craft villages in Viet Nam, engaged in activities such as silk and textile production, dyeing, leather tanning, food processing, waste recycling, handicraft and construction materials production. While these craft villages contribute to job creation and increases in income, they also create negative environmental and health impacts.

Solid waste management is a major problem in these craft villages, which generate 770,000 tons of solid waste each year. The waste composition and characteristics of the waste in the craft villages vary depending on the type of production activities carried out. Hazardous waste is also generated, primarily in villages engaged in forging and waste recycling industries. Solid waste generated in the craft villages has caused problems of soil pollution and degradation, loss of cultivation capacity, and air and water pollution. As a result of environmental degradation, negative impacts on public health have also been observed.

There are ample opportunities to apply 3R principles to these craft villages in Viet Nam, especially for those involved in food processing, waste recycling, and handicraft production. Some of the waste prevention/minimisation, re-use, and recycling principles which may be applied include: (a) procuring quality materials and inputs, (b) improving production processes to raise productivity and reduce material loss, (c) promoting re-use and recycling of products and residuals, and (d) enhancing public awareness on the environment. However, efforts to introduce 3R principles and technologies must be accompanied by a public awareness/education programme and comprehensive planning process tailored to meet the needs of the craft villages.

Source: Dang Kim Chi, "Solid waste in craft villages in Viet Nam- challenges and opportunities for applying 3R" (Paper presented at the National 3R Workshop for Viet Nam, Organized by UNCRD and DoE-Viet Nam, Hanoi, December 2005).

Central government. In order to promote and institutionalise effective 3R policies, laws and legislation, central governments must provide an appropriate political and economic platform in line with the needs and demands of the local community, businesses, and the private sector. International cooperation and partnerships can contribute directly to the 3R vision and work programmes of the central government by giving the relevant government agencies the opportunity to collaborate with counterparts overseas and to share information on 3R best practices, tools, and technologies, and also experience in a number of 3R promotional activities. For instance, a country could benefit through cooperation with another country in formulating 3R strategies and work programmes.

Provincial governments. Provincial governments can promote international cooperation for the 3Rs by collaborating with international partners to introduce 3R principles and practices to the public, private, and civil sector organizations at the provincial level. The provincial government

could implement the national 3R policies, laws, and legislation by initiating a range of projects and activities in collaboration with international partners and donors. Furthermore, they can support the creation of a market for recyclables at the provincial level, by educating residents and providing businesses with the appropriate tools and technology, with the assistance of bilateral/multilateral donors.

Donor communities. Bilateral/multilateral donors can provide both financial and technical resources to promote international cooperation for the 3Rs, by supporting a wide range of 3R-related projects, pilot and demonstration projects, as explained in section 2-3. Multilateral donors can also provide a regional/international forum or mechanism under which relevant stakeholders can share their experiences in promoting the 3Rs and undertake joint programmes and activities towards the promotion of the 3Rs.

Scientific, research, and academic institutions. Scientific, research, and academic institutions could foster international collaborative research programmes to develop and transfer environmentally-sound technologies for the 3Rs. They could play the leading role in introducing and disseminating cleaner production technologies to industries, governments and communities through training, education programmes, and other extension or outreach programmes. Furthering the development of technologies and systems for tracing international trade of recyclables would provide an excellent interface for international cooperation.

NGOs and local communities. NGOs can be effective implementing agencies for 3R projects that are supported by international donors. In addition, NGOs can act as advocates who help disseminate the voices of the local communities and SMEs to the international community and donors who ultimately integrate these needs and priorities in their projects and work programmes. The consent and participation of the local communities is also crucial for successful 3R international cooperation because the community members whose ground-based activities range from systematic waste separation and collection to green purchasing will contribute towards the achievement of 3R objectives at the international level.

Needs and priorities of international cooperation. There are many different needs and priorities in developing countries for which developed countries could provide assistance. The needs assessment mission conducted by UNCRD's Environmental Group personnel in 2004, for instance, identified a range of needs and priorities from simple training activities to pilot demonstration projects and technology transfer in the areas of sustainable production and consumption, clearer production, and 3R areas (table 2-3 below).

(1) Information collection and dissemination, and awareness-raising

The most pressing issue that developing countries have regarding waste management policy is the sanitary disposal of a growing amount of waste. Recycling, which has, to a certain extent, been conducted by informal sectors at collection and landfill sites is considered likely to be moved under the responsibility of the formal sector. However, recycling is still not sufficiently recognised as an effective option for sound waste disposal, mainly due to the lack of basic information and awareness. Such statistics as the quantity, type, and source of waste are poorly established to operate recycling and waste disposal efficiently.

These problems are obstacles in establishing and implementing a national 3R policy as well as for monitoring and controlling transboundary movements of recyclables. To overcome them, national statistics, inventories, and information-base on waste management is essential, and specifically for monitoring and controlling transboundary movements, the regional and global exchange and coordination of such information is necessary.

In summary, countries' priorities should be (a) to establish the statistical base and inventory on the 3Rs, (b) to collect and disseminate good practices and tools on capacity building, and (c) to collect and coordinate information to be utilised for the management of transboundary movements of wastes and recyclables.

(2) Legal framework, national strategy, and policy

Many countries have pointed out that international cooperation is necessary to build capacity for establishing a legal framework and developing a National 3R Strategy and policy. This should be in line with the recommendation of the ministerial conference that administrative bodies should adopt a systematic approach to address the legal framework of existing issues such as the health and environmental problems associated with improper recycling practices by informal sectors, disguised waste exports and imports, and reduction of barriers on the international flow of goods and materials.

(3) Pilot projects

Countries have expressed the need for various types of pilot projects as a means to raise awareness in 3R areas. Pilot and demonstration projects could play a significant role in complementing the national 3R strategies and policies by motivating the general public, the private sector, and other key stakeholders on the beneficial aspects and impacts of the 3Rs. The pilot and demonstration projects could also constitute a significant means of technology transfer from developed to developing countries.

Economic instruments can play an important role in promoting the 3Rs. Developing countries should apply appropriate economic instruments with the intention of integrating the 3Rs into their economic development policies including poverty eradication and employment generation. Good practices are available in which economic incentives are successfully utilised to collect recyclables in a community (see box 2-5 above). Most developing countries have shown an interest in technology transfer projects.

TABLE 2-3. NEEDS AND PRIORITIES IN 3R RELATED AREAS (AS IDENTIFIED BY THE UNCRD NEEDS ASSESSMENT MISSION)

Country	Formulation of a Strategy for Waste Minimisation	Training Programme on 3R/SPC (Sustainable Production and Consumption) tools	Training Programme on LCA (Life Cycle Assessment)	Regional Networking/South-South Cooperation	Media Sensitisation Programmes	Awareness/ Training Programmes for SMEs	Training on Eco-label Development	Promotion of Energy-efficient Appliances	Demonstration/ Pilot Projects	Others
Cambodia	Strategy-cum-Action Plan to promote the 3Rs/ sustainable production & consumption towards waste minimisation	Training on ISO (International Standardization Organization) certification	Training programmes on LCA for govt. officials, NGOs, private sector, and research institutions			Environmental performance assessment of SMEs	Development of criteria for eco-labels		Demonstration projects on recycling/disposal of hazardous batteries	
Laos	Strategy for waste minimisation through sustainable consumption/production and LCA approach	Training programmes on Green Procurement	Training programmes on LCA	Regional workshop to exchange best practices on the 3Rs/SPC		Awareness/Training Programmes on the 3Rs/SPC for SMEs	Training on Eco-label Development			
Viet Nam	Strategy-cum-Action Plan for Waste Minimisation through Sustainable Consumption & Life Cycle Approach	Training Programme on ISO certification and waste minimisation /source reduction techniques	Training programmes on LCA	Promotion of South-South Co-operation		Awareness/Training Programmes for SMEs in specific industries (pulp, chemical, mining, steel, food-processing, etc)				
Thailand	National strategy for minimising, recycling, and reducing plastic waste		Training of trainers on LCA	Regional information hub to promote sustainable consumption	Study visits/workshops for the media				Demonstration projects on minimisation of plastic waste, mobile phone battery management,	

									R&D of natural products and indigenous knowledge	
Indonesia	National strategy for promoting minimising/recycling/reduce plastic waste	Training programme on CP audit/assessment for SMEs		Developing a Network of LCA centres in Asia		Promotion of Cleaner Production within SMEs — textiles, chemical, tannery, food, and metal industries	South-South Cooperation on eco-label development Development of energy-efficiency labelling	Development of energy-efficiency labelling for household appliances	Pilot project in promoting community based the 3Rs in urban areas	Revitalisation of CP centres
India			LCA Training Programmes at the state/province and municipal levels	Dissemination and transfer of Indian experience, knowledge, and technology to other Asian countries in producing eco-friendly herbal products, bio-pesticides, organic farming, etc.						
Pakistan	National strategy for the management of electronic/electric waste (e-waste)	Training for specific industries		South-South Cooperation for the dissemination /replication of SMART software			National workshop on green labelling & accreditation		Demonstration projects on biodegradable plastic bags, pesticide disposal, hazardous waste management, recycling of nickel used in vegetable oil processing	

Bangladesh	Establishment of a specific cell on SPC matters to promote inter-ministerial coordination	Training programmes on the 3Rs/SPC tools for ministries, industries, stakeholders on the 3Rs/SPC tools		Networking on solid waste management best practices in South Asian countries					Demonstration projects on environmental cost internalization, environmental performance evaluation of tanneries and textile industries, and medical waste management	
Nepal		Training for local municipalities (major cities outside Kathmandu)		Information network and database on Cleaner Technology	Media campaigns focusing on the tourism industry				Demonstration projects on lead-acid batteries management, medical waste management, recycling of tannery waste	Development of guidelines for hazardous waste management
Sri Lanka		Training of auditors to conduct CP audits (for the hotel and other industries)			Media sensitisation on various aspects of the 3Rs/SPC		Eco-label development for specific industries		Demonstration projects on plastics recycling and eco-village	

Source: UNCRD (2004). "Promoting Sustainable Production and Consumption at Local and Regional Level in Asian Countries through Participatory Process".

Cleaner and economically more efficient production is recognised as an important tool to achieve sustainable development. Several countries have had accumulated experience on cleaner production projects with assistance of UNIDO/UNEP and other organisations. To deal with environmental pollution incidents that often occur due to improper recycling practices, technical assistance for capacity-building is necessary to improve the operation of repair, refurbishment, and recycling. For instance, a needs assessment conducted by UNCRD revealed some of the areas where developing countries in Asia had sought technology transfer such as recycling and safe disposal of mobile phone batteries, recycling of lead-acid batteries, waste minimisation techniques, optimisation of dyeing (colour) agents in textile industries, and recycling of plastics (see table 2-3 above). The secretariat of the Basel Convention, for example, addressed the need for Cambodia to create an inventory of lead-acid batteries for possible recycling strategies and formulate an action plan (box 2-8).

Box 2-8. Recycling and Disposal of Used Lead-Acid Batteries in Cambodia

While lead-acid batteries (LABs) are one of the most commonly used rechargeable batteries worldwide, their inappropriate disposal can cause serious environmental and health concerns. In Cambodia, the project “Environmentally Sound Management of Used Lead-Acid Batteries (ULABs)” was initiated in 2003 with the support of UNEP and the Secretariat of the Basel Convention. As part of this project, an inventory on ULABs was conducted in order to identify for the first time the current domestic status of ULABs, and some of its key outcomes include the following:

- 55 per cent of households in rural areas use LABs for domestic electric supply
- 90 per cent of households sell their ULABs instead of throwing them away
- 7,143 units of LABs were estimated to be recycled in Cambodia in the year 2002.
- Mainly due to lack of awareness, workers working for disposal or recycling of ULABs often suffer from health problems such as respiratory illnesses and chronic coughing
- Improper disposal and recycling practices are causing soil and water pollution

Based on this inventory, the “Action Plan for the Environmentally Sound Management of Used Lead-Acid Batteries” was published in January 2005, which was prepared by the study team for implementation of the Basel Convention and the Ministry of Environment, Cambodia. Key elements in the action plan include:

- Conducting of training courses on the Environmentally Sound Management of ULABs for workers involved in handling LABs
- Development of guidelines and a Strategic Plan for managing ULABs in an appropriate manner
- Introduction of educational programmes on ULABs in schools
- Creation of incentive programme for appropriate collection of ULABs

- Organizing of national workshops for information dissemination and awareness-raising

This case demonstrates how international cooperation can help developing countries in formulating action plans or strategies for promoting the 3Rs.

Sources: "National Workshop's Report on the Inventory of Used Lead-Acid Batteries in Cambodia", 2004, available from <http://www.basel.int/stratplan/oewg1/projdocs/cambodia/Final%20Report.pdf> (accessed 31 January 2006); "National Seminar's Report on The Dissemination of the Project Operational Outcomes on the Environmentally Sound Management of Used Lead-Acid Batteries in the Kingdom of Cambodia" 2005, available from <http://www.basel.int/stratplan/oewg1/projdocs/cambodia/nsr.pdf> (accessed 10 February 2006); The Used Lead-Acid Battery's Study Team for Implementation of the Basel Convention and Department of Environmental Pollution Control, Ministry of Environment, "Action Plan for the Environmentally Sound Management of Used Lead-Acid Batteries", 2005, available from <http://www.basel.int/stratplan/oewg1/projdocs/cambodia/nap.pdf> (accessed 2 February 2006); and Project Team Department of Environmental Pollution Control, Ministry of Environment, Technical Report "Status of Used Lead-Acid Battery Management in Kingdom of Cambodia", Phnom Penh, 2004, available from <http://www.basel.int/stratplan/oewg1/projdocs/cambodia/tr.pdf> (accessed 2 February 2006).

Pilot projects making the best use of information regarding eco-labelling schemes, 3R tools and technologies, best practices, policy instruments, and business marketing opportunities could be given high priority. A regional information hub or centre covering these aspects could benefit developing countries.

(4) International cooperation to address transboundary movements of goods and materials for recycling

To address transboundary movements of goods and materials for proper recycling, countries need required capacity such as national legislation including appropriate regulation to prevent environment pollution, data and information, and recycling and disposal technologies, most of which should form part of the national 3R promotion. Some of the capacities that are specifically necessary to deal with transboundary movements of goods and materials for recycling could include:

Capacity-building for environmental protection in importing countries: (a) development of legal frameworks for environmentally sound management of imported recyclables; (b) data and information system such as the inventory of imported/exported recyclables and recycled products; and (c) information exchange and training on technologies for appropriate governmental agencies and customs to manage the entire process of import and export, domestic, transport, storage, and treatment in an environmentally friendly manner.

Capacity-building and information exchange for the reduction of barriers to international trade in importing/exporting countries: (a) improved classification between recyclables and non-recyclables; (b) compliance with the Basel Convention and the Rotterdam Convention on prior informed consent (PIC)^{7/} for trade of hazardous chemicals; (c) information exchange among

the countries' competent authorities of enforcement and customs; and (d) information management system for tracing the movement of recyclables. The senior official meeting (SOM) on the 3R Initiative held in Tokyo on 6-8 March 2006 made several suggestions and recommendations with regard to international cooperation in 3R promotion. Some of these include:

- Promotion of high level 3R policy dialogues at the subregional, regional, and international levels;
- Fostering international collaborative activities including those facilitated by bilateral aid agencies, UN and other international and regional organizations such as the Secretariat of the Basel Convention, UNCRD, UNEP, ADB, UN ESCAP, and others;
- Supporting OECD research on material flows and resource productivity and indicators;
- Establishing regional and international networks on the 3Rs (e.g., knowledge and technology, basic information, internet-based knowledge transfer, e.g., an ADB and UNEP initiative on eKH — e-Knowledge Hub in Asia, training workshops);
- Public-Private Partnership (PPP) on 3R areas within and beyond borders;
- Close association of 3R activities with sustainable production and consumption (SCP) Task Forces with significant links to EPR (extended producers responsibility) and product design;
- Strengthening of data and information regarding international trade and recycling goods in order to facilitate proper environmental assessment or impacts;
- Encouraging government-to-government and business-to-business communications and dialogues on 3R technology transfer and international trade of recyclables;
- Encouraging day-to-day communication among customs, port, and maritime authorities to monitor transboundary movements of waste and to prevent illegal movements; and
- Developing an international waste observatory to compile and analyse information regarding transboundary movements of recyclables, markets, for recyclables, and appropriate technologies for treatment and recycling. This is partially met by the Basel Convention, which has set up knowledge hubs on hazardous wastes in China and Indonesia.^{8/}

2.4 Strategic Approach

In this section, recommendations are made on how countries and the international community could effectively address the solutions and opportunities for the 3Rs as discussed in section 2-3.

Community-based Approach for National 3R Promotion

In most countries, responsible bodies for waste management services are local governments. In some cases, parts of services are borne by communities. Without cooperation of the communities, improvement of waste management may not be sufficiently accomplished. In addition, as

decentralisation in solid waste management has made progress, it has been gradually acknowledged that capacity-building for local governments and communities is a key factor. So far, international cooperation programmes have been principally targeted at the central government level, but capacity-building for local communities should gain more momentum as well. For instance, JICA, through one of its pilot projects in Metro Manila, Philippines in 1997-99, promoted the community-based approach. In the pilot project conducted in two *barangays* (the smallest administrative unit in the Philippines), source separation, collection and sale of recyclables were carried out through the conduct of workshops attended by *barangay* chairpersons and residents, structuring a core group of the activities, and construction of recycling centres. The community-based approach was succeeded by the Scandinavian International Development Agency (SIDA), ADB and UNDP in their recycling projects carried out in Metro Manila. Recently, UNCRD has entered into a dialogue with Waste Concern, a local NGO, and the Department of Environment in Bangladesh to replicate a community-driven pilot composting project in selected provinces (see box 2-9 below).

Box 2-9. Promotion of Community-based Composting in Dhaka, Bangladesh

Organic waste is a major constituent in the waste composition of developing countries. In Dhaka, the capital of Bangladesh, a local NGO called Waste Concern has successfully implemented a community-based composting scheme through partnership among the public, private, and civil sectors.

The Dhaka City Corporation (DCC), with an estimated population of 6.5 million, generates 3000-3500 tons of garbage every day, of which only 42 percent is collected and disposed of in open crude landfill sites. The uncollected waste lies on roadsides, open drains, and low-lying areas, thus contributing to the deteriorating quality of life and environment of the city. Moreover, DCC spends approximately US\$38 per ton to manage the waste, which covers costs for collection, transportation, and crude disposal of waste.

In 1995, Waste Concern initiated its first community-based decentralised composting project, using simple, low-cost and labour intensive technology, taking into consideration that 80 percent of the municipal waste in Dhaka is organic, with suitable moisture content. A door-to-door solid waste collection system was introduced to collect domestic organic waste from households, after which the organic waste was converted into compost with aerobic composting technology at community-based composting plants and sold to farmers to fertilise their soil. The project has generated numerous positive impacts such as the reduction of the volume of waste to be managed by the DCC, reduction of the need for landfill space, overall improvement of the environment, increased community awareness on solid waste issues, employment generation for the poor, and promotion of organic farming.

The project has also fostered a partnership among the stakeholders involved, in the sense that the local government provides land free of cost, the private sector markets the compost produced, and the community

participates in the door-to-door waste collection system and composting programme. Since then, this community-based decentralised composting model has been replicated in several communities in Dhaka as well as in other Bangladeshi cities with the initiatives of the government, NGOs, and private entrepreneurs. UNCRD is also in discussion with Waste Concern to introduce this community-based composting model to Kushtia Municipality in Bangladesh.

Source: Waste Concern website: <http://www.wasteconcern.org> (accessed 12 February 2006).

Collaboration with Existing International Activities and Programmes

Countries should develop required platforms to collaborate with existing international initiatives and programmes focusing on 3R areas. International collaboration should also be based on sound mechanisms, which take into account the actual needs of developing countries from both economic development and environmental perspectives.

For instance, by joining the Network for Preventing Illegal Dumping of Hazardous Waste under the Basel Convention, which began activities in 2004, countries could contribute to the exchange and dissemination of information on transboundary movements of hazardous wastes and selected used products. At the same time, countries could also get from the network required technical assistance to formulate appropriate legislative response to such movements.

Another example of existing international initiatives is the UNEP Division of Technology, Industry, and Economics (UNEP DTIE). The UNEP DTIE strategy for promoting 3R related issues such as cleaner production, sustainable consumption, and waste management, is to influence informed decision-making through partnerships with other international organisations, governmental authorities, businesses and industry, and non-governmental organisations; support implementation of conventions; and build capacity in developing countries.

Regional Approach for Addressing International Flows of Goods and Materials

International trade in recyclables and recycled products has been expanding regionally and globally. Keeping in mind the future trend and growth of trade or flow of recyclables, each region could establish regional 3R cooperative mechanisms in order to share and disseminate best practices, tools, technologies, and policy instruments contributing to the 3Rs as well as the international flow of materials. For instance in Asia, the key international, regional, and subregional organisations such as the Asian Development Bank (ADB), UNEP, UNIDO, the Economic and Social Commission for the Asian Pacific (ESCAP), United Nations Development Programme (UNDP), UNCRD, the World Bank, Association of Southeast Asian Nations

(ASEAN), Mekong River Commission (MRC), South Asia Co-operative Environment Programme (SACEP), South Asian Association for Regional Cooperation (SAARC), and International Centre for Integrated Mountain Management (ICIMOD) could effectively coordinate and implement 3R-related activities, projects, pilot and demonstration projects under a regional mechanism. The regional mechanism could also help with harmonising the classification of recyclables and non-recyclables to improve the international flow of goods and materials. Good practices in regional cooperation, for instance, include efforts to formulate a regional action plan on environmentally-sound management of e-waste (electronic and electrical waste) in the Asia-Pacific region. This is a part of a four-year programme under the Basel Convention and was launched at the Asia-Pacific Regional Inception Workshop on the Environmentally Sound Management of Electronic and Electrical Wastes held in November 2005 in Tokyo.

South-South Cooperation and Inter-City Cooperation

Municipal waste management is in most cases conducted by local governments. In planning and operation of waste recycling and disposal, the local conditions and circumstances such as temperature and humidity, the type and composition of waste, the status of economic development, and the social and cultural background are key considerations. In this regard, cooperation among cities with similar conditions would be mutually beneficial (see box 2-10 below).

2.5 Conclusion and Recommendations

As mentioned in the opening section, rapid economic growth in many regions has led to significant growth in consumption of finite natural resources, and waste management has become a critical issue in both developed and developing countries. Under the circumstances, promotion of the 3Rs is regarded as an indispensable measure to cope with these challenges. On the other hand, as globalisation progresses, transboundary movement of commodities and materials including recyclables has increased dramatically, thereby necessitating enhanced international cooperation to track the movement of recyclables and to address issues associated in relation to the Basel Convention and WTO guidelines.

Box 2-10. South-South Cooperation and Intercity Cooperation

For the promotion of the 3Rs in developing countries/regions, South-South cooperation is regarded as very effective because of the similarities in economic, social and climatic conditions.

The Africa-Asia Eco-partnership Programme is conducted under the initiative of the United Nations Development Programme (UNDP), which has initiated various projects to promote South-South cooperation represented by establishing the Special Unit for South-South Cooperation (SU/SSC) and publishing the

Cooperate South Journal.

The purpose of this project, which was launched in October 2002, is to establish an institutional partnership to promote the building of ecologically sound societies by sharing experiences among African (Accra, Addis Ababa, Dar Es Salaam, Lagos, Nairobi) and Asian cities (Bangkok, Jakarta, Kuala Lumpur, Marikina, Phnom Penh, Tokyo) in areas such as solid waste management, air pollution control and wastewater management.

The other example is the Association of Southeast Asia Nations (ASEAN) Working Group on Environmentally Sustainable Cities (AWGESc), which was formed in June 2003 to drive programmes and activities for clean air, clean water, and clean land. The working group helps Asian cities in identifying capacity needs and technical assistance in implementing the overall objectives under the Framework for Environmentally Sustainable Cities. The working group is also engaged in assisting Asian cities to develop performance indicators for monitoring the progress in achieving clean air, clean water, and clean land. The working group attempts to harmonise the core set of performance indicators that addresses 3R aspects.

Source: UNDP, Technical Cooperation among Developing Countries (TCDC) Website. Available from <http://tcdc.undp.org> (accessed 8 February 2006). ASEAN Website. Available from <http://www.aseansec.org/awgesc.htm> (accessed 8 February 2006).

Whereas actions to promote the 3Rs are required both in developed and developing countries, developing countries lack the required capacity, knowledge, technology, and policy frameworks. Fundamental issues in most of the developing countries include inadequate 3R orientation of environment and industrial policies, limited public and media awareness, limited corporate awareness specifically among SMEs, and lack of a robust knowledge base on the 3Rs.

In order to address these needs and issues, the 3R Initiative of Japan and other G8 countries is noteworthy. The fundamental and strategic areas that could be considered as a part of the international cooperation under the 3R Initiative could address the following:

- Strengthening **monitoring capabilities** of developing countries in order to bridge the data and information gap for informed decision-making in their areas of generation and composition of waste (MSW, industrial waste, agricultural waste, etc), systematic classification and inventory of recyclables, and trade of recyclables.

- Bridging the **technological gap** in developing countries through transfer of appropriate tools, technologies, training, and most importantly, conducting issue based pilot and demonstration projects in 3R areas

- Improved **environmental governance** through establishing sound institutional mechanisms, awareness programmes, regulatory and legislative framework on the 3Rs

- Improved **environmental performance** of industries and private sectors, including SMEs, through international cooperation (private-private cooperation, private-government cooperation, government-government cooperation) At the same time, international cooperation should also take into account the following mechanisms:

- **Community-based approach** to implement activities with the cooperation of local government, residents, private sectors, and NGOs.

- **Build on existing international activities and programmes** focusing on the 3Rs.

- **Regional approach** for strengthening ties among countries to address the international flow of recyclables and associated issues.

- **South-South cooperation and Inter-City cooperation** focusing on the similarities in the conditions and circumstances relating to the 3Rs.

NOTES

1/ Ministry of the Environment, Government of Japan, *Issues Paper — Ministerial Conference on the 3R Initiative* (Tokyo, 2005).

2/ United Nations, Population Division, *World Population Prospectus: The 2002 Revision, Volume III: Analytical Report* (New York: United Nations, 2004).

3/ Yong-Chil Seo, “Expectation on the Network Waste Management Experts in Asia-Pacific Region and the State of Waste Management in Korea” (Expert Meeting on Solid Waste Management in Asia and Pacific Islands, 28-29 October (undated), Tokyo Japan).

4/ Website of the Ministry of the Environment and Water Resources of Singapore. Available from <http://app.nea.gov.sg/cms/htdocs/article.asp?pid=1469>; accessed 2006.

5/ UNCRD, “Promoting Sustainable Production and Consumption at Local and Regional Level in Asian Countries through Participatory Process” (Nagoya, 2004).

6/ K. Seimaru, “Establishment of the Asian Network for Prevention of Illegal Transboundary Movements of Hazardous Wastes,” *Kankyo Kenkyu (Environmental Research Quarterly)* 136 (2005).

7/ The *Rotterdam Convention* is: ...a multilateral environmental agreement designed to promote shared responsibility and cooperative efforts among Parties in the international trade of certain hazardous chemicals, in order to protect human health and the environment from potential harm and to contribute to their environmentally sound use by facilitating information exchange about their characteristics, providing for a national decision-making process on their import and export and disseminating these decisions to Parties.” Rotterdam Convention Website. Available from <http://www.pic.int/en/ViewPage.asp?id=392>; accessed 5 February 2006.

8/ Compiled from the Chairman’s Summary of SOM on the 3R Initiative, 6-8 March 2006, Tokyo.

9/ UNEP DTIE Website. Available from <http://www.unep.fr/en/branches/index.htm>; accessed 2006.

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- _____ *Indonesia Environment Monitor 2003 — Special Focus: Reducing Pollution, Vol. 1 of 1* (2004) available from World Bank website at <http://www-wds.worldbank.org/>
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3. Country Reports

3.1 Bangladesh⁶

3.1.1 Current situation of waste management and the 3Rs

Wastes have been defined in Bangladesh under the Environmental Conservation Act of 1995, as “any solid, liquid, gaseous, radioactive substance or the discharge, disposal and dumping of which may cause harmful change to the environment.” Hazardous substances are defined under the same Act as “a substance, the chemical or biochemical properties of which are that its manufacture, storage, discharge or unregulated transportation can be harmful to the environment.” There is no clear legal definition or categorisation of wastes such as household waste and/or municipal solid waste, and industrial waste.

According to a study by Waste Concern in 2005⁷, it is estimated that approximately 13,332.89 tons of waste is produced per day in the urban areas of Bangladesh, which, when calculated, is over 4.86 million tons annually. It is projected that this amount will rise to 47,000 tons/day and close to 17.2 million tons per year by 2025, due to both the growth in population and the increase in per capita waste generation. The waste collection rate ranges from 44.30 to 76.47 percent in major urban cities, and in Dhaka City, the capital, it is estimated to be around 43.5%⁸. Meanwhile, there is a large and active informal sector that is involved in recycling activities. The proportion of inorganic wastes recycled by the informal sector in urban cities/towns range between 3.89 to 15 percent, and approximately USD15.29 million is estimated to save national waste management costs annually in Bangladesh through such recycling activities. In Dhaka alone, approximately 120,000 of the urban poor are involved in the recycling trade chain⁹.

While there is no consolidated data on industrial wastes in Bangladesh, a recent study by the Department of Environment-Bangladesh, Waste Concern and ADB estimates that the annual production of waste from the textile sector is 113,720 tons/year (sludge), tannery sector is 22,500 tons/year (solid waste), pesticide sector is 53.58 tons/year (solid waste), fertiliser sector is 277 tons/year (solid waste), and oil refinery sector is 4,000 litres/year. These figures are projected to increase to over 36 million tons/year (textile sector), 34,212 tons/year (tannery sector), 68 tons/year (pesticides sector), and 334 tons/year (fertiliser sector) by 2012, while waste from oil

⁶ This section is has been prepared with substantial input from Waste Concern at the “Inception Workshop on Formulation of National Strategy on 3R in Bangladesh,” organised by DoE-MOEF Bangladesh and UNCRD on 24 December 2008.

⁷ Enayetullah, I; Sinha, A. H. Md. M and Khan, S. S. A., 2005. *Urban Solid Waste Management Scenario of Bangladesh: Problems and Prospects*.

⁸ Japan International Cooperation Agency, 2005. *The Study on the Solid Waste Management in Dhaka City, Final Report Vol. 1., Summary*.

⁹ Same as Footnote 2.

refineries is projected to remain unchanged¹⁰.

Table 3.1.1. Current Situation of Wastes in Bangladesh – at a Glance

Category	Statistics	Data Source
TOTAL VOLUME OF WASTES (tons/year)		
Total Volume of Wastes in Urban Areas	4,866,505 (2005) = 13,332.89 tons/day x 365 3,000 tons/day in Dhaka (2005)	Waste Concern, 2005 JICA, 2005
Hazardous Medical Waste	12,045 (2007)	Waste Concern, 2008 ¹¹
WASTE PER CAPITA (kg/pers/day)		
	Urban: 0.41 (2005) Dhaka City: 0.56 (2005)	Waste Concern, 2008 JICA, 2005
FUTURE WASTE PROJECTIONS (Total Waste Generation)		
By 2025	17,155,000 tons/year = 47,000 tons/day x 365 0.60 kg/pers/day in Urban Areas	UMP, 1999, as cited by Waste Concern, 2008
SOLID WASTE MANAGEMENT		
Collection of waste (% of waste generated)	44.30% - 76.47% in major urban cities 43.5% for Dhaka City	Waste Concern, 2005 JICA, 2005
Solid waste disposal facilities	Mainly uncontrolled land-filling (except for the sanitary landfill at Matuail site in Dhaka, supported by JICA)	Waste Concern, 2008 and Dhaka City Corporation and JICA, 2007 ¹²
E-WASTES		
Use of electronic goods in 2006	Mobile phones: 22,000,000 Personal computers: 600,000 Televisions: 1,252,000	Waste Concern, 2008
Policy development	Work has been initiated by the Government of Bangladesh to prepare the Hazardous Waste Management Policy	Waste Concern, 2008
RECYCLE		
Informal Sector	- 120,000 urban poor from the informal sector are involved in the recycling trade chain of Dhaka City. - 15 percent of the total generated waste in Dhaka (mainly inorganic waste) amounting to 475 tons/day are recycled daily.	Waste Concern, 2005

Source: Prepared by UNCRD (data sources are indicated in the table).

3.1.2 Existing systems and regulatory framework for waste management and the 3Rs

Major policies, acts, rules, and other regulatory and guiding documents on waste management are listed in table 3.1.2. There is no specific policy for solid waste management in Bangladesh; however, several rules and policies are being drafted for specific types of wastes. For example, the Handling Rule for Solid Waste Management (draft), in which 3R principles have been incorporated, was formulated in 2005. Medical Waste Management Handling Rules, which came

¹⁰ DoE-Bangladesh, Waste Concern and ADB, 2008. *A Study of Hazardous Waste Management in Bangladesh*.

¹¹ Enayetullah, I, 2008. PowerPoint Presentation made at "Inception Workshop on Formulation of National Strategy on Waste Reduce, Reuse and Recycle (3R) for Bangladesh," 24 December 2008 in Dhaka, Bangladesh.

¹² Dhaka City Corporation and Japan International Cooperation Agency, 2007. *Clean Dhaka Project Newsletter No. 3, November 2007*.

in to effect in November 2008, have also been developed by the Ministry of Environment and Forests. A process has also been initiated to prepare the Hazardous Waste Management Policy for the country. In the recently organised “Inception Workshop on Formulation of National Strategy for the 3Rs in Bangladesh,” the critical gaps were highlighted in terms of laws/policies on industrial wastes and e-wastes, and heightened needs were expressed for integrating 3R concepts into existing laws/policies (municipal acts, rules, regulations, other), including the Environment Conservation Rule of 1997.

Table 3.1.2. Main Policies, Laws and Regulations related to Waste Management and the 3Rs in Bangladesh

Date	Title
Policy	
2006	Draft National Urban Policy <ul style="list-style-type: none"> CDM and recycling has been emphasised in this policy.
1998	National Policy for Water Supply and Sanitation <ul style="list-style-type: none"> According to this policy, the government shall take measures to recycle waste to the extent possible and use organic waste materials for compost and bio-gas production.
1998	Urban Management Policy Statement <ul style="list-style-type: none"> Recommendations provided to municipalities regarding the privatisation of services, as well as giving priority to facilities for slum dwellers including provisions of water supply, sanitation and solid waste disposal.
Act	
2006	Fertiliser Act <ul style="list-style-type: none"> Under this act, compost practices have been promoted and standards for compost have been set by the government in 2008.
1995	The Bangladesh Environmental Conservation Act (ECA)
Rules	
2008	Medical Waste Management Rules <ul style="list-style-type: none"> Under these rules, new standards for management of medical waste have been set by the government.
2006	Lead-Acid Battery Recycling and Management Rules <ul style="list-style-type: none"> Under these rules, the collection and recycling of lead-acid batteries have been improved.
2005	Draft National Solid Waste Management Handling Rule <ul style="list-style-type: none"> 3R principal has been incorporated into these rules.
1997	Bangladesh Environmental Conservation Rules
Strategy	
2005	Poverty Reduction Strategy Paper (PRSP) <ul style="list-style-type: none"> Here, EMS has been promoted. To improve the solid waste management situation, special focus is given to segregation of waste at source along with the promotion of recycle, reduce and reuse of industrial and other solid waste.
2005	National Sanitation Strategy <ul style="list-style-type: none"> This strategy’s goal is to achieve 100 percent sanitation coverage by 2010. Here, an emphasis on resource recovery and recycling has been listed as top priority to improve the urban sanitation situation instead of disposal.
Action Plan	
2005	Dhaka Environment Management Plan <ul style="list-style-type: none"> Waste recycling has been promoted, less land filling encouraged, Environment Management System (EMS) promoted among industries.
2005	Solid Waste Management Action Plan for Eight Secondary Towns in Bangladesh <ul style="list-style-type: none"> Under the Secondary Towns Integrated Flood Protection (Phase 2) Project of the Local Government Engineering Department, Government of Bangladesh (GoB), this action plan is based on the 4R

	principle, i.e. reduce, reuse, recycle and recover waste.
1995	National Environmental Management Action Plan (NEMAP) <ul style="list-style-type: none"> This is a plan of the GoB, prepared by the Ministry of Environment and Forest (MoEF) in consultation with people from all walks of life. The 3Rs is being promoted under the Sustainable Environment Management Programme (SEMP) of the National Environmental Management Action Plan (NEMAP).
Other	
2008	Circular to Promote Compost by the Ministry of Agriculture (MoA) on 23 April 2008
2004	Dhaka Declaration on Waste Management by South Asian Association of Regional Cooperation (SAARC) countries on 10–12 October 2004 <ul style="list-style-type: none"> SAARC countries agree to encourage NGOs and private companies to establish community based composting, segregation of waste at source, and separate collection and resource recovery from wastes with particular focus on composting.

Source: Waste Concern (2008), DoE-Bangladesh et. al. (2004)

Since the responsibilities of solid waste management are under the jurisdiction of local government bodies (city corporations and municipalities), including such tasks as removal and disposal of municipal solid waste, these local governing bodies must be guided appropriately in order to make practical improvements/changes on the ground. Currently, however, the six City Corporation Ordinances and Pourshava Ordinance 1977 are the only local laws that provide some idea about the disposal of municipal waste¹³. This is another critical area in terms of laws and regulations that needs improvement.

3.1.3 Current progress of National 3R Strategy Development (as of August 2009)

When UNCRD visited Dhaka in 2005, the Department of Environment (DoE-Bangladesh) expressed a strong interest in initiating 3R promotion activities, and as a first step in their efforts, proposed to organise a two-day national workshop with the participation of relevant government ministries/agencies, NGOs, the private sector, international organisations, and resource institutions from Japan. The workshop was successfully implemented in Dhaka in February 2007, with an objective to raise nationwide awareness on the 3Rs and to share best practices. In parallel with the National 3R Workshop, UNCRD has been collaborating with DoE-Bangladesh and Waste Concern, a local NGO in Bangladesh, to carry out the physical construction of a pilot composting plant in Kushtia Municipality.



¹³ Department of Environment, Waste Concern, ITN-BUET, 2004. *Country Paper Bangladesh for the SAARC Workshop on Solid Waste Management*, October 10-12, 2004 in Dhaka, Bangladesh.

Having successfully initiated activities both at the policy and field level, the formulation process of the National 3R Strategy was initiated. A Pre-inception Meeting was held in April 2008, and the Strategy formulation process was formally launched with the organisation of the Inception Workshop in December 2008. It has been agreed that Waste Concern will act as the National Collaborating Centre, who will assist DoE-Bangladesh and take the lead role in drafting the Strategy. The proposed schedule of activities for developing the Strategy is shown in figure 3.1.1. In parallel to the Strategy formulation process, awareness raising/capacity building efforts for local practitioners are also progressing. As an example, UNCRD is engaging Waste Concern to prepare the 3R Modules targeting local governments and the private sector. The Modules will be finalised by early 2009.

Figure 3.1.1. National 3R Strategy Formulation Process in Bangladesh - Timeframe

Items	2008	2009				2010			
	10-12	1-3	4-6	7-9	10-12	1-3	4-6	7-9	10-12
Inception Meeting	24 Dec ○								
Preparation of the 1st draft		Jan - May							
Submission of 1st Draft, National Consultation (1)			June ○						
Revision → 2nd Draft				Jul - Sept					
Regional Consultation (2)					○ Oct				
Revision → 3rd Draft					Nov-Jan				
Experts Consultation (3)						Feb ○			
Revision → Final Draft						Mar-May			
In-house consultation							Jun/Jul		
Endorsement by Government								Aug/Sept	
Printing and Distribution									○ Oct

Brackets indicate the opportunities of consultation workshops

3.1.4 Suggested focus of National 3R Strategy

The proposed contents of the National 3R Strategy of Bangladesh, which has been discussed and endorsed at the Inception Workshop, are as follows (table 3.1.3).

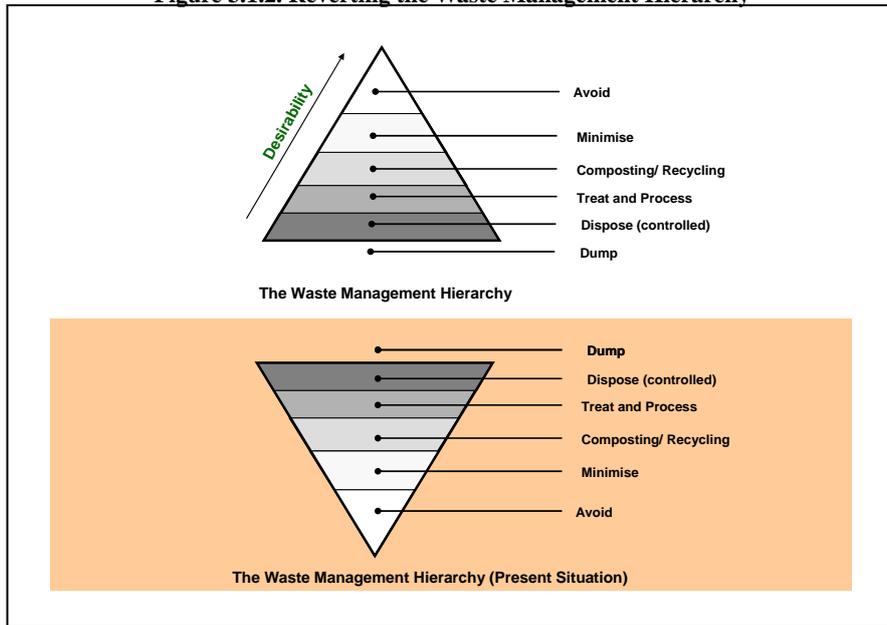
The National 3R Strategy of Bangladesh is expected to adopt the following guiding principles: (1) that waste is a resource; (2) that waste should be separated at source; (3) that technology selected should be appropriate and affordable; (4) that there should be investment by the private sector; (5) that technology should reduce the emission of greenhouse gas (GHG); (6) that the Strategy have a gender sensitive approach; (7) that it supports the informal sector; (8) that the Strategy incorporate Public-Private Partnership/ Polluters Pay Principle/Cleaner Production/EMS; and (9) that it provides standards for recyclable materials. By emphasising these principles, the Strategy will aim to revert the waste management hierarchy, so that strong emphasis is given to the principles of avoiding the generation of waste, minimising, composting/recycling, treating/processing, disposing, and finally, dumping of waste (figure 3.1.2).

The major sectors that will be the focus in the National 3R Strategy will be municipal solid waste, industrial waste, bio-medical waste, commercial waste and institutional waste, and hotel and tourism industry waste. In view of the major industrial sectors in Bangladesh and also with consideration of the wastes' impact on the people and environment, the industrial waste focus will address mainly textile and dyeing, tannery, pesticides, oil refineries, fertilisers and e-waste.

Table 3.1.3. National 3R Strategy of Bangladesh – Proposed contents

1.	Baseline Information on Waste Management
2.	Guiding Principles of the Strategy <ul style="list-style-type: none"> - Waste is a resource - Source separation of waste - Selection of appropriate and affordable technology - Private sector investment - Technology should reduce greenhouse gas emissions - Gender sensitive approach - Supporting Informal Sector - Public-Private Partnership/ Polluters Pay Principle/Cleaner Production/EMS - Standard for recyclable materials
3.	Major Issues Related to Waste Sector <ul style="list-style-type: none"> - Municipal solid waste - Industrial waste (textile and dyeing, tannery, pesticides, oil refinery, fertiliser and e-waste) - Bio-medical waste - Commercial waste and institutional waste - Hotel and tourism industry
4.	Relevant Policies on Waste Sector
5.	Existing Best Practices in Waste Sector
6.	Strategies for Promotion of 3Rs in Different Sectors <ul style="list-style-type: none"> - Technologies to be used for management of waste - Institutional arrangement for the implementation of 3Rs - Media campaigns - Economic/policy incentives - Strategies for monitoring and evaluation of 3R strategy - Monitoring protocol.
7.	Targets for Implementation of the Strategy

Figure 3.1.2. Reverting the Waste Management Hierarchy



Source: Waste Concern, 2008

3.1.5 Future challenges

As mentioned earlier, responsibility for solid waste management is in the hands of urban local government bodies. These local governing bodies, which often have weak institutional capacity and limited financial resources, must be strengthened in order to make practical changes on the ground. While the way forward might be for the government to take more of a facilitating role and contract with the private sector to carry out solid waste management, it is still necessary to empower/strengthen local governments to carry out proper monitoring and to provide whatever services remain as their responsibility.

It is worth noting that a number of international organisations and donors have been actively involved in the waste management sector in Bangladesh, including the Asian Development Bank (ADB), United Nations Development Programme (UNDP), and the Japan International Cooperation Agency (JICA). Presently, ADB is supporting a loan for “Urban Governance and Infrastructure Improvement (Sector),” which includes activities in the area of water supply, sanitation and waste management. ADB has also provided an additional loan for “Secondary Towns Integrated Flood Protection Project Phase 2 (STIFPP Phase 2),” and one of the components of this loan is urban environmental improvement, which includes solid waste management (sanitary landfill sites and composting facilities). Further, ADB is currently preparing a loan on the “Urban Public and Environment Health Sector Development Programme,” which will be processed in 2010 and is expected to involve investment/activities aiming at strengthening the

management of solid waste and hospital wastes (ADB, 2007). JICA is implementing a Technical Cooperation Project for Strengthening of Solid Waste Management in Dhaka City (2007-2011), aiming for the overall improvement of the solid waste management services of Dhaka City Corporation.

The executing agencies, or the focal point government ministries/departments of these internationally supported projects, vary; for example, the focal point for the ADB Secondary Towns Integrated Flood Protection Project (STIFPP) Phase 2 is the Local Government Engineering Department (LGED) under the Ministry of Local Government, Rural Development and Cooperatives (MLGRDC), and the Local Government Division, MLGRDC for the ADB Urban Public and Environment Health Sector Development Programme. The counterpart organisation for the JICA project is Dhaka City Corporation. For the National 3R Strategy to become a truly meaningful and workable strategy, an immense challenge lies with the Department of Environment to coordinate with these central and local government bodies, to ensure that the Strategy can provide an overall framework for 3R promotion in Bangladesh.

It is also worth noting that there are a number of innovative, local initiatives being undertaken in Bangladesh in the area of waste management and the 3Rs. For example, Waste Concern has been active in promoting participatory waste management (e.g., slum waste recycling using compost barrels), and recently, has initiated a CDM Project “Composting of Organic Waste in Dhaka” in the outskirts of Dhaka City. The plant has a capacity to handle 700 tons of organic waste a day and produce 50,000 tons of compost annually, and is creating job opportunities for some 800 urban poor. The CDM project will reduce annual emission of 4,300 tons of CH₄ (equivalent to 89,000 tons of CO₂). These examples provide insight on potential paths forward in improving waste management and promoting the 3Rs in Bangladesh, and in other developing countries as well. The challenge lies with the question of how to expand and/or replicate these pilot cases on a larger scale to extend the benefits to a larger population.

3.2 Cambodia¹⁴

3.2.1 Current Situation of Waste Management and the 3Rs

Based on domestic and global experiences, the Royal Government of Cambodia (RGC) has taken action step by step to improve existing waste management practices through policy and strategy development, capacity building, legal instruments and awareness raising, all of which include a part of the 3R (reduce, reuse, and recycle) principles. However, solid waste management in Cambodia is commonly confronted with major constraints in administrative and technical aspects. Accordingly, Cambodia firmly requires a specific policy of the 3Rs and waste management to be linked with existing environmental regulations in order to minimise and eliminate any harmful impacts on human health and the environment. This is a key tool towards poverty alleviation—the priority policy of the RGC.

Although the 3R concept is still new in urban areas and towns, Cambodia has long been involved in waste management and the 3R Initiative. It is also actively participating in international 3R meetings and conferences to join the international community in promoting the 3R principles in line with the Johannesburg Plan of Implementation adopted at the 2002 World Summit on Sustainable Development, for the promotion of sustainable consumption and production in the facilitation of global sustainable development.

It was reported that waste collection, transportation and disposal are normally carried out by the private sector in urban/town areas like Phnom Penh Municipality, Siem Reap Province and Sihanoukville City. These are done under the supervision of local authorities and responsible institutions. But gaps in terms of efficiency remain. For example, in those areas mentioned above, huge piles of solid waste still exist at public, residential and low-land areas. Managing waste collection, transportation and disposal remains a problem. There is also an observed lack of participation of communities perhaps due to limited public dissemination and weak implementation of environmental regulations at the local level. These pose serious impacts to the surrounding environment, including that of urban/town aesthetics.

In most cities and provinces, solid waste generated from houses, commercial centres, hospitals, and industrial handicrafts were disposed and burned at dumpsites. Notably, existing dumpsites of the cities and provinces in Cambodia are open and uncontrolled, where domestic animals or

¹⁴ This section has been prepared with substantial input provided by Ministry of Environment, Cambodia at the National Workshop on Advanced Waste Management in the Kingdom of Cambodia organized by MoE, Cambodia

scavengers can access freely. Nonetheless, it should be noted that local authorities and national agencies give proper waste management the main concern and the importance it ought to have.

Solid waste in Cambodia is generated from residential areas, industry, and hospital and agriculture sources. Industrial wastes in Phnom Penh (PPM) and the adjacent province of Kandal are disposed at designated dumpsites separate from domestic wastes, while medical wastes (sharp and infectious wastes, other) are incinerated in hospital premises.

Currently, the Kingdom of Cambodia (KoC) has no available data and record of waste generation at the national level. The Ministry of Environment (MoE) has a plan to compile statistics towards waste generation throughout the country in order to evaluate waste management. This is reflected in the Environmental Strategic Plan 2004-2008. But, due to inadequate information and data at the provincial level the objectives stated in the plan have not been accomplished. Only Phnom Penh has available data and information with regard to waste generation.

Domestic waste is composed of plastic bags, boxes/bottles, cardboard, iron, glass, rags, and other organic wastes. Domestic wastes in Phnom Penh amounted to approximately 5,987 tons in 2005 and increased nearly two times in 2006 (10,028 tons). It was reported that there are no waste segregation practices for these wastes prior to disposal. The country also lacks awareness on waste minimisation practices.

Currently, no data is available on domestic waste generation for the whole country, except in Phnom Penh. It was reported that the amount of 324,159 tons of domestic waste at dumpsites in 2006 increased yearly in Phnom Penh. While collected wastes in 2004 was less than five percent compared to 2003, this increased to 10.76 percent and 34.58 percent in 2005 and 2006, respectively¹⁵.

In 2003, JICA reported that domestic waste generated in Phnom Penh is composed of a high amount of kitchen wastes and plastics from residential areas, which are 63.3 percent and 15.50 percent, respectively. Metal and rubber/leather comprised 0.60 percent and 0.10 percent, respectively.

According to the MoE Cambodia report, industrial solid wastes are manageable in some industrial premises. Waste separation is concentrated between general wastes and wastes occurring from production processes. General industrial waste is similar to domestic wastes in terms of

¹⁵ Cambodia Environmental Association. August 2008. Report on Advanced Waste Management in Asia and the Pacific: Cambodia Case Study. Phnom Penh, Cambodia.

composition although there are variations according to the types of waste, which takes place in the production process (e.g., metals, chemicals/chemical compounds, sludge from wastewater treatment process, other).

General wastes are normally collected and disposed at domestic dumpsites, with the exception of hazardous wastes which must be safely stored, transported and disposed at designated safe dumpsites (for industries located in Phnom Penh and adjacent provinces). However, some factories do not practice waste separation at source prior to disposal. For instance, some garment factories sell pieces of scrap clothing materials illegally to local communities to be used as fuel materials for cooking, power, and other purposes because it is cheap and easily acquired, without recognising the negative environmental consequences and health risks. Six waste incinerators are in operation in Phnom Penh (MoE report, August 2004) of which five incinerators are for incinerating scrap clothing materials from garment factories (249.60 tons annually), and the other incinerator for other industrial wastes (3,276 tons annually). The total amount of solid waste burned is about 3,525.60 tons annually. Consequently, the onsite incinerators are operated with low technology—without air pollution control systems (APCS). There are also no reports addressing pollutant loads of the emission.

The local authority in the city where industrial dumpsites are located revealed that industrial solid wastes normally increase annually corresponding to the high growth of the industrial sector. Industries are mostly located in Phnom Penh and Kandal province, where the economy and trade is concentrated, and especially since these areas have existing road and transportation systems, water and electricity supply.

Medical waste in the KoC is divided into two types: (i) general wastes from offices and kitchens, and (ii) sharp, infectious, pathological, pharmaceutical, radioactive wastes. Infectious, pathological and other medical wastes are considered to be properly managed at the generated and storage areas and final disposal. While the private waste collector collects and disposes general wastes at urban dumpsites, sharp/infectious wastes are specially treated/managed and burned in incinerators within hospital premises. Concern in medical waste management is focused on the emission of toxic fumes (including by-products, e.g. dioxins and furans). In some cases, sharp/infectious wastes are illegally disposed of in domestic waste dumpsites.

Problems such as insufficient medical waste infrastructure, e.g. transport/treatment facilities, are very apparent, including a lack of awareness from various stakeholders involved in the medical sector. At present, there is no available data and information on medical waste generation for the whole country, except in Phnom Penh. According to JICA, medical waste generation per day

amounts to 10,680.30 kg, and is comprised of general waste and sharp/infectious wastes of about 9,719 kg and 961.30 kg, respectively (Kokusai Kogyo Co., LTD, 2005). This estimated amount of waste will continue to rise due to high population growth and the health industry infrastructure.

In hospitals, clinics and healthcare centres, hazardous wastes are separately sorted from general wastes. Sharp and infectious wastes are disposed in designated marked/coloured boxes. These hazardous wastes are burned by means of incinerator(s) in hospital or healthcare centre premises. Residues occurring from incineration are usually disposed and buried in areas close to the incinerator.

The Ministry of Health (MoH) reported that in 2003, 75 percent of national hospitals used safety boxes for healthcare wastes but the remainder did not. For referral hospitals (hospital in a district), about 36 percent used safety boxes and 64 percent did not.

Table 3.2.1. Current Situation of Wastes in Cambodia – at a Glance

Category	Statistics	Data Source
TOTAL VOLUME OF WASTES (tons/year)		
Total Volume of Wastes in Urban Areas (Phnom Penh)	324,159 (2006)	CEA, 2006 ¹⁶
Hazardous Medical Waste (in Phnom Penh)	10,680.30 kg per day General waste: 9,719 kg/day Sharp/infectious wastes: 961.30 kg/day	Kokusai Kogyo Co., LTD, 2005 cited in CEA, 2008 ¹⁷
WASTE PER CAPITA (kg/capita/day)		
Municipal waste	0.67 kg/capita/day (Phnom Penh)	Draft Municipal Waste Report, Waste TWG Secretariat, 2008
SOLID WASTE MANAGEMENT		
Collection of waste (% of waste generated)	Rural: 48.2% Urban: 90.7% Total: 73.3%	JICA, 2005 ¹⁸
RECYCLE		
	15% (Recycled in Phnom Penh)	UNCHS, 2003 ¹⁹

3.2.2 Existing systems and regulatory framework for waste management and the 3Rs

A number of key regulations and/or laws directly or indirectly related to waste management and aimed at managing wastes based on environmentally sound technology, exist in Cambodia. These

¹⁶ Same as footnote 13

¹⁷ Same as footnote 13

¹⁸ JICA, 2005. The study on solid waste management in the municipality of Phnom Penh in the Kingdom of Cambodia final report : summary.

¹⁹ UNCHS (2003). The Challenge of Slums, Global Report on Human Settlements, United Nations Human Settlements Programme.

regulations and/or laws are briefly illustrated in table 3.2.2.

Table 3.2.2. Main Policies, Laws and Regulations related to Waste Management and the 3Rs in Cambodia

Date	Title
Laws/Sub-Decrees	
1996	<p>The Law on Environmental Protection and Natural Resources Management</p> <p>The law stipulates the protection and management of environmental and natural resources. The scope of the Law clarifies any kind of wastes, and their management, including hazardous wastes as elaborated and identified in the Sub-decree.</p>
1999	<p>Sub-Decree on Solid Waste Management (SSWM)</p> <p>The SSWM is aimed at regulating solid waste and garbage, and managing hazardous waste based on proper technical and safe ways to ensure the protection of human health and the conservation of biodiversity and ecosystems</p>
1999	<p>Sub-Decree on Water Pollution Control</p> <p>Under the sub-degree section is the restriction of inappropriate disposal of solid waste/garbage, which leads to the deterioration of the water environment and of human health, including the ecosystem.</p>
	<p>Sub-Decree on EIA Process</p> <p>The Sub-decree provides restriction for improper waste management during and after the operation of a project in compliance with the environment.</p>
Guidelines and regulations	
1999	<p>Guideline for improving the implementation of SSWM</p> <p>The Guideline objective aims at strengthening the implementation of SSWM for ensuring clean water, clean air and clean land.</p>
1999	<p>Guideline for improving SWPC</p> <p>To strengthen the following up and protection of water quality through the setting up of specific regulations and monitoring/controlling pollution that impair water sources.</p>
1999	Directive on Water Pollution Control, August 20, 1999.
2000	Directive on Industrial Hazardous Waste Management, May 26, 2000.
2000	Directive on Industrial Sludge Management, October 9, 2000.
2001	Directive on Water Pollution Control at various Pollution Sources in Cities and Provinces, July 4, 2001.
	<p>The Joint <i>Prakas</i> between the MoE and the Ministry of Interior (MoI) on Solid Waste Management in Cities and Provinces</p> <p>This is a new MoE regulation which aims to properly manage solid wastes and garbage in cities and provinces for the protection of public health, aesthetics, environmental quality and biodiversity.</p>

Source: Cambodia Environmental Association, 2008

As mentioned in SSWM, the provincial and local government manage solid wastes and garbage in accordance with the technical guideline developed by the MoE. The private company contracted for solid waste collection and disposal is under the direct monitoring of local authorities and the MoE as well.

In the context of decentralisation, the local government and relevant agencies are delegated to take full responsibility in carrying out tasks under the supervision and monitoring of the central office, especially in terms of environmental pollution and abatement. Through the process of decentralisation, the Environmental Department in the respective provinces/cities and the local government got an authority of a decision permitted from the MoE.

MoE, in collaboration with the Cambodian Education and Waste Management Organization (COMPED) and with the guidance of international experts, established the Environmental Guideline on Solid Waste Management in the Kingdom of Cambodia, in order to implement the application of existing environmental regulations as well as to increase awareness and knowledge of stakeholders, including private sectors. The guideline focused on preparing a clear action plan for the reuse, recycling and safety storage/disposal of solid wastes. Its major aim is to: (i) prepare a solid waste management programme with short, medium and long-term plans; (ii) prepare, process and manage dumpsites; (iii) establish a composting process; (iv) manage medical waste and hazardous waste; and (v) carry out environmental education for the public. However, while the Environmental Guideline on Solid Waste Management in the Kingdom of Cambodia has already been established, it has not been disseminated among stakeholders.

Besides the development of the guideline, COMPED asked for guidance and cooperation with the MoE in implementing composting using domestic organic wastes at selected areas, using the 3C principle (clean water, clean air and clean land), as well as in promoting the use of compost for fertile soil improvement.

Besides COMPED, the MoE also cooperates with the Community Sanitation and Recycling Organization (CSARO) in terms of solid waste management activities in selected communities. A pilot project in solid waste management in selected provinces and cities is conducted by CSARO through community/public awareness raising for home composting, waste separation and disposal. It was observed that both local NGOs received strong support from the MoE.

3.2.3 Suggested focus of 3R National Strategy

Essential strategies are taken toward improving waste management in Cambodia to (i) ensure that they are in line and appropriate with the current environmental law and its related statutes; (ii) fill the gaps in existing waste management practices in cities and provinces; and (iii) be parallel with the progress of science and technology in waste management based on the environmental sound 3R Initiative. The strategies²⁰ include the following:

- *Strategy 1: Development of policy and regulations for 3R principles in waste management at the national and local levels.* This strategy aims to develop 3R policy and regulations for effective waste management at the household and industrial sectors.
- *Strategy 2: Common perceptions on 3R principles in waste management and capacity building and improvement among government officials.* This strategy aims to develop and promote the technical capacity of responsible officers including institutional strengthening to deal with the application of 3R principles and practices in waste management.
- *Strategy 3: Achievement of 3R principles and practices through appropriate pilot projects focusing on household waste management at selected urban areas.* This strategy provides opportunities to apply the 3R initiative to available selected wastes as examples of effective waste management.
- *Strategy 4: Dissemination and application of 3R policy and regulations in public and private sectors.* This strategy focuses on 3R initiative promotion and applies it to specific targets.
- *Strategy 5: Integration of the 3Rs into the national policy development.* This strategy aims to integrate the 3Rs into the national development policy to meet the requirements for environmental sustainability.

The proposed draft action plan to achieve the formulated five strategies can be achieved in five years: short-term (one to two years), medium-term (one to three years) and long-term (one to five years). The application of the proposed action plan will be led by the MoE in the Steering Committee (SC) and Working Group (WG), which is composed of representatives from line ministries and agencies, including NGOs. Cambodia set a target toward environmentally sound management of solid waste, especially through the 3R methodology. However, it requires technical and financial support from international organisations, the international community and other

²⁰ Cambodia Environmental Association, August 2008. Proceedings of the National Workshop on Advanced Waste Management in the Kingdom of Cambodia.

donor countries, since the national budget is limited.

3.2.4 Current progress of 3R National Strategy Development (as of August 2009)

Two consultative workshops were conducted for the development of National 3R Strategy. These two workshop consultations were held in Sihanoukville City and Phnom Penh, Cambodia on 8 August and 28 October 2008, respectively. Various stakeholders and/or participants coming from inter-ministries, concerned departments and institutions at the provincial level, NGOs, academe, local authorities and the private sector who are engaged with waste collection and management services, participated in the workshop. The workshops were successfully held raising awareness of relevant stakeholders on the reduce, reuse and recycle (3Rs) principle. The workshops also disseminated a report on Advanced Waste Management in Asia and the Pacific: Cambodia Case Study, and explored inputs, feedback and comments from participants in solidifying the draft proposed strategies and action plan. In addition, the National 3R Strategy will be an input to the development of Solid Waste Management guidelines relative to the 3Rs for Cambodia.

Furthermore, the workshop provided an opportunity for participants to discuss various weaknesses and strengths relating to the existing situation of Cambodia's waste



management policies. The outcome of the Study on Advance Waste Management in the Kingdom of Cambodia was presented. Challenges facing Cambodia in terms of waste management include lack of public participation, low public awareness, lack of waste management techniques, inadequate infrastructure, e.g. trash bins at public areas, and small dumping sites.

The findings indicated that some activities dealing with waste management, particularly the practice of 3R principles, are carried out by the private sector and NGOs, and have spread to the public in selected urban areas in the country. The relevant practices are described below.

Improper management of used lead-acid batteries is reported in the country. A lack of institutional arrangement in managing used lead-acid batteries (ULAB) in respective institutions was observed. It was reported that the main environmental and health threats arising from current practices are the release of hazardous materials from ULAB, flammable and obnoxious gas emissions. The

materials released into the environment include lead oxides, lead sulfates and dilute sulfuric acid. These materials are released during various stages in the life cycle of the lead-acid battery (LAB), including recharging, ineffective and inefficient ULAB recycling and residue disposal. Such cases which happened during LAB recharging and ULAB recycling, storage of ULAB in homes, workplaces and children's playground areas, have contributed to the release of large amounts of lead and accumulation of acidic substances—which is readily accessible to young children and worker's families in the vicinity, posing health risks.

Reuse and recycling practices are evident for ULAB in most parts of Cambodia. These wastes are not for disposal as they still have a valuable aspect for the informal sectors like scavengers and waste pickers. The informal sector normally sells the ULAB to recyclers and/or ULAB merchants for export to other countries. However, evidence of the practice of ULAB low recycling technology with inappropriate facilities and operation in some areas of Cambodia lead to health and environmental risks. The ULAB informal sector is practicing this kind of work which generally has limited awareness and knowledge of environmental protection and health risks. There is no specific legislation on the management of ULAB; however, it is integrated in related statutes such as Law on Environmental Protection and Natural Resources Management, Sub-Decree on Water Pollution Control (SWPC), and the SSWM²¹.

No report indicates the existence of recycling of plastic wastes and/or recycling methods, including operational sites. It was reported that small scale pre-recycling sites of plastic wastes/materials use conventional methods without considering the environmental and health occupational risks.

The impacts mentioned explicitly imply the informal practice of 3R principles in some parts of Cambodia. Although the people already are practicing 3R related activities, a lack of dissemination of the 3R concept to the people by the local authority and other responsible institutions is evident. The 3R concept is still emerging as new strategy to remedy the waste management problems in the country.

Investment in the textile/garment industry is rapidly developing in some provinces and cities in PPM, Kandal Province, Kampong Speu Province, Kampong Cham Province and Sihanoukville City. However, the textile/garment industry has generated a large amount of waste, especially scrap cloth materials in pre-production and during the production process. Normally, scrap cloth material were either illegally sold or given to adjacent inhabitants by factory owners or managers as fuel for cooking, boiling, etc. This practice poses risks, contributing to local air pollution and at

²¹ Same as footnote 13.

the same time contributing to global climate change. With the intervention of MoE, in 2002, MoE issued licenses for private companies, like Sarom Trading Co. Ltd, to construct a safe dumpsite for industrial waste disposal. The company is authorised to collect industrial wastes from all factories in PPM and Kandal Province.

The Cambodia Environmental Association (CEA) reported that used electric and electronic equipments (UEEE) at households, offices, buyers and repair shops in selected municipalities in Cambodia (PPM, Sihanoukville, Kandal, Battambang, Kampong Cham, and Svay Rieng Provinces) revealed the high risks which e-waste poses to the environment and human health. The current e-waste problems in Cambodia require intervention by decision-makers as well as full public participation. UEEE types are TVs, mobile phones, personal computers, air conditioners, refrigerators and washing machines.

In Cambodia, a small number of NGOs play important roles in disseminating education and raising awareness on solid waste management problems to local communities for the protection of the environment and public health. The application of bio-fertiliser has been successfully undertaken at target areas in PPM by COMPED, a local NGO. COMPED is the largest bio-fertiliser producer from urban organic wastes collected from Stung Meanchey dumpsite and Phsar Demkor market. Regular production through composting is carried out by COMPED in PPM.

In regards to environmental education and awareness, Siem Reap Province has initiated a School Recycling Program which focuses on the dissemination of garbage management schemes. The schools major activities were waste recycling, school gardening, and circulation of environmental brochures/leaflets to stakeholders. The programme implementing organisation consists of staff from the Environmental Department of Siem Reap Province, JICA study team, JICA volunteers, and directors of primary schools. Programme participants include school teachers, primary school pupils, and parents.

Waste segregation at school, such as plastic bottle/shopping plastic bags are carried out for recycling. This aspect aims to promote school and domestic sanitation among students/pupils and parents.

The major positive impacts in relevance with the 3R related practices in Cambodia are as follows:

- Created job opportunities for local communities and workers.
- Promoted waste separation of recyclable wastes for purchase by waste pickers/junkshop.

- Promoted the practice of the 3Rs in every household and other waste sources for the reduction of hazardous wastes at dumpsites as well as to prevent environmental and health risks.
- Created the concept to reuse dispose or recycle plastic products/wastes reflecting local demands, or carried out pre-recycling as plastic raw materials to market to domestic and external recyclers.

3.4.5 Future challenges

The urban solid waste management in the Kingdom of Cambodia is generally acceptable for the short and medium-term. There are noticeable gaps in managing waste collection, transportation and disposal. Since the 3R concept is new for most people in Cambodia and for many local government units, there is limited awareness and knowledge among stakeholders with regard to environmentally sound management of solid wastes. The country is also confronted with inadequate financial resources in operating and managing their disposal facilities.

It is evident that Cambodia has limited or no available data and information at the local and national level, e.g. annual waste generation. There is also weak enforcement of laws on solid waste management. For instance, there is no separation of solid waste from households or business centres. Also, there is a limited market for recyclables so that most of the recyclables and organic wastes are normally disposed together with urban wastes at dumpsites. Cambodia's practice of 3R principles is not carried out by most waste generators, except in some industrial and hospital wastes, where a number of industrial firms have established guidelines on solid waste management.

In order to tackle the solid waste management problems in Cambodia, government institutions, especially those institutions and local authorities mandated to manage solid wastes should take appropriate actions to utilise recyclables and/or organic wastes for the development of the local and national economy. The capacity of environmental officers in these offices must be strengthened especially in terms of the concept of the 3Rs. The 3Rs and composting must also be promoted to various LGUs and provinces, since a high percentage of waste comes from organic/kitchen waste. People and communities must also be educated and made aware about solid waste management and the 3R principles so that they can participate more actively and contribute to effective and efficient solid waste management using environmentally sound technology. Additional challenges facing Cambodia include the following:

- Pre-recycling and recycling activities were often carried out with constraints in both technology and operational facilities. Furthermore, local recycling products are lower in

quality compared with imported plastic products. Hence, local recycling may not be sustainable, unless existing practices are improved.

- Minor attention to and promotion of the 3R application is undertaken by responsible institutions including local NGOs.
- The management of residues generated from the recycling process, pre-recycling and/or recycling service improvement (e.g. more production but less pollution to the environment and public health), technology transfer, networking and the like are not effectively managed by do not get any effective action responsible institutions.
- Awareness and participation of stakeholders, especially the private sector toward the application of the 3R principle, to be lower compared with other countries in the region.

3.3 Indonesia²²

3.3.1 Current situation of waste management and the 3Rs

Wastes have been defined under the Environment Management Act of 1997 and also under the recently enacted Waste Management Act (2008), as described in table 3.3.1 below.

Table 3.3.1. Definitions of Wastes in Indonesia

Term	Description	Source
Waste	<ul style="list-style-type: none"> Residue of a business and/or activity. (1) Remnant of people's daily activities and/or natural processed in solid form. Includes a) household waste, b) like household waste, and c) specific waste. (2) 	(1) (2)
Household Waste	<ul style="list-style-type: none"> Waste that comes from daily activities in households, excluding human waste and specific waste. 	(2)
Household-like Waste	<ul style="list-style-type: none"> Waste that comes from commercial areas, industrial areas, special areas, social facilities, public facilities, and/or other facilities. 	(2)
Specific Waste	<ul style="list-style-type: none"> Includes a) Waste with hazardous and toxic materials, b) Waste with hazardous and toxic waste, c) Waste generated during disasters, d) Building wreckage, e) Waste that cannot be processed technologically, and f) Waste that not periodically occurred. 	(2)
Hazardous and Toxic Waste (B3)	<ul style="list-style-type: none"> Residue of a business and/or activity that contains hazardous and/or toxic material which due to its nature and/or concentration and/or amount, directly as well as indirectly, can pollute and/or damage the environment, and/or endanger the environment, health, the continuation of human life and of other living creatures. 	(1)
Waste Management	<ul style="list-style-type: none"> Systematic, thorough, and sustainable activities including decreasing and handling waste. 	(2)

Source: (1) Environmental Management Act (No.23/1997), (2) Waste Management Act (No.18/2008).

According to the Indonesia Domestic Solid Waste Statistics (2008), it is calculated that approximately 38.5 million tons of municipal solid waste (MSW) are generated in Indonesia every year. On a per capita basis, 0.43 kg of MSW is generated every year; however, this figure is much higher at 0.96 kg in metropolitan/large cities, which is quite close to the statistics from developing countries.²³ It is estimated that MSW generation is increasing at an annual rate of two to four percent.

As for hazardous wastes from the industries, the 521 companies that participated in the Company Environmental Performance (PROPER) Programme in 2006 generated approximately 7.02 million tons of hazardous wastes.²⁴ A large proportion of this comes from the basic and chemical industry (45%), followed by the energy sector (20%).²⁵

²² This section is has been prepared based on information available in the Indonesia National 3R Strategy (Draft No. 3 of Sept. 2008), prepared by the Ministry of Environment - Indonesia.

²³ For example in Japan, the figure is 1.116 kg/capita/year for general wastes (2006).

²⁴ Indonesian Environment Status (2006). PROPER is a programme that ranks company performances in Indonesia and which measures the compliance level of a company based on environmental regulations.

²⁵ For details, refer to the Ministry of Environment – Indonesia, 2008. *Indonesia National 3R Strategy (Draft No.3 of*

Table 3.3.2. Current Situation of Wastes in Indonesia – at a Glance

Category	Statistics	Data Source
TOTAL VOLUME OF WASTES (tons/year)		
Municipal Solid Waste (MSW)	38,500,000 (2006) Increasing by two to four percent per year	Indonesia Domestic Solid Waste Statistics (2008) State of the Environment in Indonesia 2004
Hazardous Waste	7,020,000 (companies participating in the Company Environmental Performance Programme (PROPER))	SLHI, 2006 (cited in the draft National 3R Strategy)
Medical Waste	3,895 (2003)	Indonesia Environmental Health Country Profile (WHO, 2004)
MSW PER CAPITA (kg/pers/day)		
	National: 0.43 Metropolitan/large cities (26 cities): 0.96 (2006)	Indonesia Domestic Solid Waste Statistics (2008)
FUTURE WASTE PROJECTIONS		
By 2010	MSW per capita: 2.1 (urban)	Indonesian Environment Status 2006
SOLID WASTE MANAGEMENT		
Collection of waste (% of waste generated)	Approximately 50% nationwide Up to 75% in urban cities	World Bank, Indonesia Environment Monitor 2003
	Estimated total population served by waste management authority: 56% of total population (2006)	Indonesia Domestic Solid Waste Statistics (2008)
No. of solid waste disposal facilities	Open dumping: 62, Sanitary landfills: 1 Approximately 85% of small cities and 53% of medium-sized cities officially dispose of wastes in open dumps.	Cited in IDE-JETRO, 2007
	98% of all <i>kota/kabupaten</i> ²⁶ have one final disposal site (2006).	Indonesia Domestic Solid Waste Statistics (2008)
Waste entering into final disposal site	13.6 million tons/year, or approximately 35% of total wastes generated (2006).	Indonesia Domestic Solid Waste Statistics (2008)
SCAVENGERS		
Number of scavengers	14,538 persons in the 116 <i>kota/kabupaten</i> that answered the questionnaire (total population of 85 million, data for 2006).	Indonesia Domestic Solid Waste Statistics (2008)
RECYCLE		
Municipalities	- 57% of municipalities conduct some kind of 3R programme (2006). - Recycle rate is 2.26% at source, 2.01% at temporary disposal site, and 1.6% at final disposal site.	Indonesia Domestic Solid Waste Statistics (2008)

Source: Prepared by UNCRD (data sources are indicated in the table).

With population growth, enhancing economic levels, changing lifestyles and consumption patterns,

Sept. 2008), Table 2.6.

²⁶ The Unitary State of the Republic of Indonesia is divided into provinces and a province is divided into kabupaten and kota, with each province, kabupaten and kota having its own regional administration, regulated by law. Kota refers to city areas and kabupaten as non-city areas.

the amount and variety of goods consumption, as well as the exploitation of natural resources, are on the rise in Indonesia, resulting in increasing quantity and types of solid waste from daily activities. However, waste management has not been conducted properly; open burning of garbage is still practised, illegal solid waste disposal continues, and solid wastes are deposited in disposal site without prior processing. This type of improper solid waste management is causing serious environmental and health risks to people; one such example is the disaster that occurred in Leuwigajah, Bandung in February 2005 when garbage piles in the final disposal site collapsed and caused the deaths of 143 people.

The amount of non-hazardous wastes, hazardous waste and electronic waste (e-waste) that are produced within Indonesia and from abroad are both increasing. The growing amount of recyclable/second-hand product trading at the international scale, for products such as computers, printers, monitors, air conditioners (AC), mobile phones, TVs, radio/tape recorders, refrigerators, is affecting the country. E-waste has major economic potential, but has to be treated carefully as it contains heavy metal such as lead, mercury, cadmium, and chromium. Presently, e-waste has been handled mostly by the informal sector that reutilises the metal contents from scrap materials. However such practices are not conducted with appropriate considerations to health, safety and the environment. The final disposal of e-waste is also not well monitored.

3.3.2 Existing systems and regulatory framework for waste management and the 3Rs

The main policies, laws and regulations related to waste management and the 3Rs are listed in table 3.3.3. The Environment Management Act, No. 23/1997 sets the foundations of the various related legislations in the area of the 3Rs/waste management. The concept of the 3Rs is stated in Article 10 which reads “In the scheme of environmental management the Government must... (e) develop and apply pre-emptive, preventive, and proactive instruments in the efforts to prevent decreases in environmental supportive and carrying capacity.”

With regards to municipal solid wastes, the Waste Management Act was recently enacted (No. 18, 2008). The Law acknowledges the economic value of waste and its potential as an energy source, in addition to the traditional views of bringing attention from health and environmental perspectives (Article 3 and 4). Further, the Law stipulates that the management of household waste and household-like waste is comprised of: (a) reduction of waste (which includes reduce, reuse and recycle); and (b) waste handling (Article 19). According to the Law, local governments must close final waste processing sites with open dumping systems within five years after the enactment of the Act (i.e. by 2013). Relevant governmental regulations and ministerial decrees to facilitate the implementation of the Act will have been promulgated at the latest by May 2009.

A number of regulations have been issued to provide the basic framework for the management of hazardous waste (referred to as B3 wastes in Indonesia) since 1994. One of the problems observed regarding the laws and regulations concerning hazardous waste are that some wastes with 3R potential are listed as “hazardous waste” under government regulations (e.g., fly ash). If the government is to promote the 3Rs, existing laws and regulations need to be reviewed carefully so that such hindrances can be avoided. Also, clear definitions as well as management requirements of non-hazardous industrial waste must be provided through new/revised regulations.

Table 3.3.3. Main Policies, Laws and Regulations related to Waste Management and the 3Rs in Indonesia

Type	No./Date	Title
Overall		
Law	No. 23 of 1997	Environment Management Act
Regulation	No. 21/PRT/M/2006	Regulation of the Minister of Public Works on National Policy and Strategy of Rubbish Management System Development (KSNP-SPP)
Law	No. 18 of 2008	Waste Management Act
Hazardous Wastes		
Regulation	No. 18 of 1999	Waste management of hazardous and toxic materials.
Regulation	No. 68 of 1994	Procedures on how to apply for a permit for the storage, collection, and operation of processing equipment, management and the final discharge of hazardous and toxic substances.
Regulation	No. 85 of 1999	Waste management of hazardous and toxic materials, amending Regulation No. 18 of 1999.
Regulation	No. 74 of 2001	Hazardous substance management
Regulation	No. 02 of 2008	Concerning Toxic and Hazardous Waste Utilization
Head of EIMA (Environmental Impact Management Agency) Decree	No. 1 – No. 5 of 1995	Hazardous waste management (Technical guidance on storage and collection; manifest documents; technical standards on waste treatment; management measures, storage locations, disposal; labelling).
Head of EIMA Decree	No. 2 – No. 4 1998	Instructions on implementing hazardous waste management; hazardous waste management programme; priority regions.
Ministerial Decree	No. 3 of 2007	Hazardous waste collection and storage facilities in port areas.
Solid Wastes		
Regulation	No. 16/2007	Defines MSW as residue from daily activities which cannot be reused and therefore must be disposed.
Movements of Wastes		
Minister of Industry & Trade Decree	No. 230/MPP/Kep/7/97 of 1997	Regulation on Import Goods
Minister of Industry & Trade Decree	No. 231/MPP/Kep/7/97 of 1997	Waste Import Procedures
Presidential Decree	No. 61 of 1993	Ratification of Basel Convention
Presidential Decree	No. 47 of 2005	Ratification of Ban Amendment

Source: Prepared by UNCRD based on: (1) legal documents available on Internet; (2) IDE/JETRO, 2007. *Information on Industrial Wastes and Recycle Policies of Asian Countries (Japanese)*; and on (3) Ohno et al, 2008. *Shigen kankyou taisaku, Vol. 44, No.1.*

3.3.3 Current progress of 3R National Strategy Development (as of August 2009)

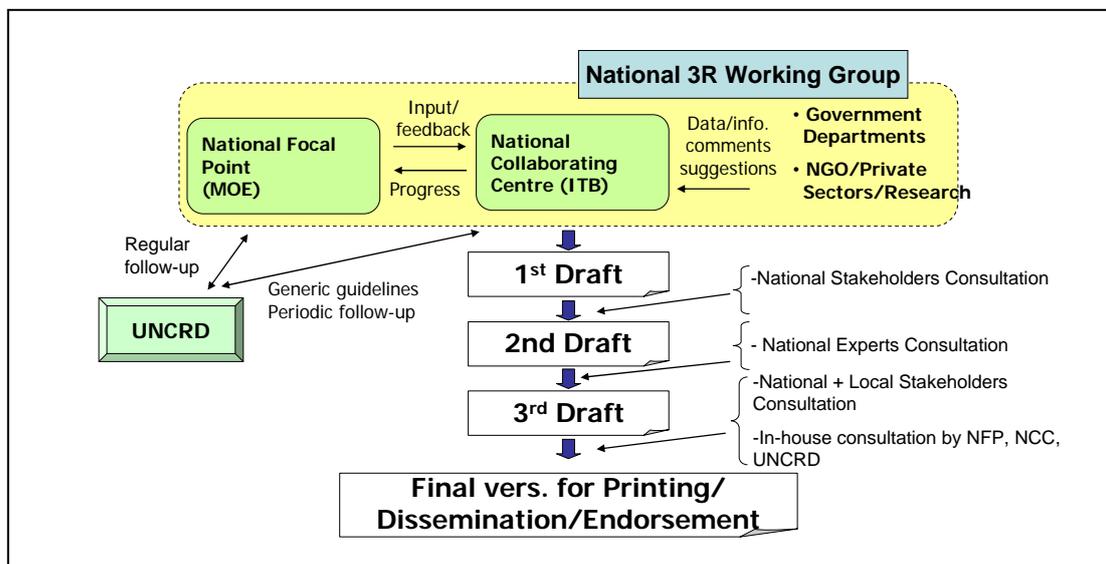
The National 3R Strategy formulation process dates back to the needs assessment mission conducted by UNCRD in 2004 (Please refer to Section 2 of this report.) During this mission, the following priorities were identified: (1) National Strategy for minimising, recycling, and reducing plastic waste, (2) promoting South-South cooperation in developing criteria for eco-labels, (3) developing a network of life cycle assessment (LCA) centres in Asia, (4) community-based initiatives to promote sustainable production and consumption, (5) energy efficiency labelling for household appliances, and (6) promotion of cleaner production (CP) within small- and medium-sized enterprises.

Subsequently, a consultation meeting was held in Jakarta, Indonesia in January 2006, during which the formulation process of the National 3R Strategy of Indonesia was discussed in detail. The Strategy formulation process was formally initiated with the organisation of the Inception Meeting in September 2006 in Jakarta, Indonesia.



The meeting was organised with the objectives to: (a) identify and agree on national priorities to be covered under the National 3R Strategy, (b) define the structure and agree on the conceptual guidelines of the Strategy, and (c) discuss institutional arrangements for the formulation of the Strategy, including the composition of the National 3R Working Group. As an outcome of the meeting, the draft outline of the National 3R Strategy for Indonesia and the proposed institutional arrangements were agreed upon (figure 3.3.1).

Figure 3.3.1. National 3R Strategy Formulation Process in Indonesia



The formulation of the National 3R Strategy is being implemented in line with the overall structure and the process as described above. Table 3.3.4 summarises the formulation process to date. By the end of March 2009, the pre-final draft will be prepared, which will be tabled at the in-house consultation. It is anticipated that the final draft will be officially endorsed through a Ministerial Decree in 2009, and that the Strategy will be printed and disseminated in early 2010.

Table 3.3.4. National 3R Strategy Formulation Process to March 2009

Date	Activity
September 2007	▪ First Draft National 3R Strategy was developed.
September 2007	▪ First National Stakeholders' Consultation Meeting was held. ▪ Over 50 participants were invited, including the relevant ministries of the central government, local government, academia, NGO, and private sector.
April 2008	▪ Second Draft National 3R Strategy was developed.
April 2008	▪ Second Consultation Meeting (Experts' Consultation) was held.
September 2008	▪ Third Draft National 3R Strategy was developed.
October 2008	▪ Third Consultation Meeting was held to get feedback from local governments.
March 2009	▪ Pre-final draft ready for in-house consultation.
March 2009	▪ In-house consultation by MoE, Bandung Institute of Technology, UNCRD, etc.

Source: Prepared by UNCRD.

3.3.4 Suggested focus of 3R National Strategy

The Indonesia National 3R Strategy covers the following areas: (1) Municipal solid waste management, (2) industrial solid waste management (manufacture and agro industries sector), (3) management of industrial solid waste from small- and medium-sized enterprises (SMEs), and (4)

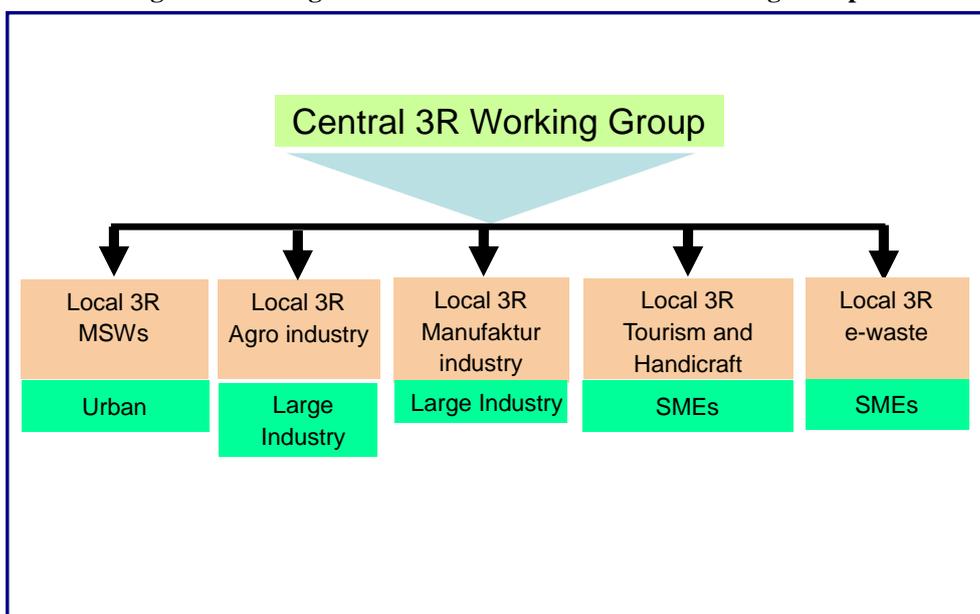
management of e-waste originating from domestic activities.

The Objectives of the 3R National Strategy is to:

- integrate implementation of municipal solid waste and industrial solid waste 3R programme comprehensively, inter-institutionally, and sustainably with measurable targeted achievement;
- give direction on implementation of solid waste 3R, by means of considering the utilisation of waste’s economic potential, natural resources availability, and environmental conservation;
- decrease municipal and industrial solid waste generation, through the preparation of a 3R implementation framework, for short-term, middle-term and long-term scales; and to
- prepare municipal and industrial solid waste management effectively and efficiently, in order to achieve natural resource conservation, and to increase environmental quality.

Indonesia is a country with the world’s largest number of islands. As such, its natural and socioeconomic conditions are diverse, and the levels of urbanisation as well as the dominating industries vary significantly within the country by location. In view of these unique conditions, it is proposed that a number of pilot provinces should be identified to focus on specific types of wastes and then to expand the activities into other provinces, rather than trying to introduce a uniform programme. New institutions or strengthened existing institutions in the form of working groups will be established, including the central 3R working group and five local 3R working groups at the provincial level (figure 3.3.2). These institutions would consist of related departments, complemented with members from company associations, industrial and trade groups, NGOs, the university community, and research institutions. The tasks of the working group would eventually be transferred to related existing institutions after several years once the 3R activities are running smoothly.

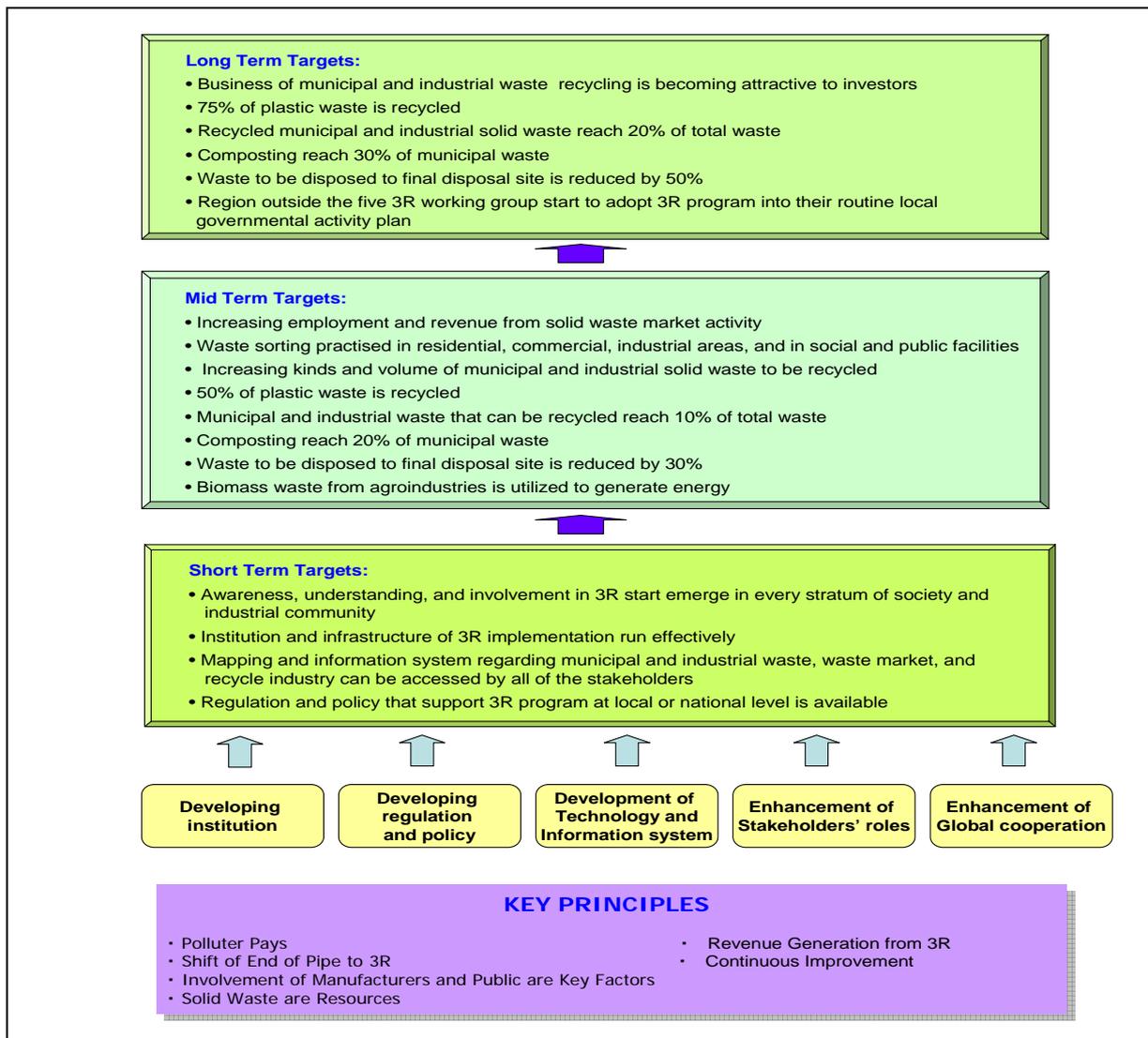
Figure 3.3.2. Organisational Structure of the 3R Working Groups



The central 3R working group will focus on composing national 3R policy, preparing supporting infrastructure, and determining national attitude regarding transboundary waste trade and traffic, and treatment of e-waste, since this type of waste is a new emerging issue involving national and international activities. At the beginning, local 3R working groups will focus on a dominant industry in certain local regions. In the long-term, it is expected that the working group would transfer and share information and experiences to enrich and complement each other. Eventually, it is expected that the experiences and expertise accumulated by the local 3R working groups would trigger other local governments to adopt and promote 3R activities.

The objectives of the Indonesia National 3R Strategy, its focus, and the proposed programmes are summarised below.

Figure 3.3.3. The Objectives/Targets and Major Contents of the Strategy



As can be seen in figure 3.3.3 and table 3.3.5, the Strategy is structured with five core approaches, i.e., (1) developing institutions; (2) developing regulations and policy; (3) developing technology and information systems; (4) enhancement of stakeholders' roles; and (5) enhancement of global cooperation. Under each approach, a set of programme activities have been proposed for the short, medium, and long-terms.

Table 3.3.5. Action Plans under the Indonesia National 3R Strategy

#	Programmes
Short-Term (Year 1 - 3)	
<i>Institution</i>	
1	Establishment of 3R institutions at national and local levels.
2	Set up of norms standard procedures and criteria (NSPK) related to the 3Rs.
3	Coordinating and synchronising inter institutional policy regarding e-waste and second hand goods.
4	Mapping of solid waste generation, scavenger activity, waste market, recycling plant, MSW, agro industry, manufacture industry, tourism and handicraft industry, e-waste.
5	Identifying the potency of CDM projects on industrial and municipal solid waste sector.
6	Composing information system for the 3Rs.
7	Conducting evaluation and monitoring on existing 3R programme.
<i>Regulation and Policy</i>	
1	Carrying out study on laws and regulations which motivate or hinder 3R implementation.
2	Carrying out study of policy and regulations on utilisation of food and beverage packaging and disposal containers.
3	Development of local government regulations to motivate 3R implementation.
4	Carrying out study on application of economical instruments to motivate 3R implementation.
5	Development and control of production process standards and quality of recycled and reused products.
6	Preparing regulations and guidelines for EPR implementation in industries, particularly the producer of non biodegradable products and packaging.
7	Carrying out study on regulations and guidelines to anticipate illegal import of e-waste from abroad and handling of domestic e-waste.
<i>Development of Technology</i>	
1	Conducting and collecting research, expertise, technology, standards, and best practices on the 3Rs carried out by research institutions, universities, NGOs, and industries.
2	Development of technology on production of environmental friendly products and packaging.
3	Study of efficiency and effectiveness of existing 3R technology and developing new technology on the 3Rs.
<i>Increasing Role of Stakeholders</i>	
1	Continuous 3R socialisation for all stakeholders.
2	Composing lesson materials on the 3Rs for elementary school to university students.
<i>Global Cooperation</i>	
1	Building international cooperation related to information sharing on 3R technology.
2	Conducting training of trainers on 3R technology especially related to e-waste, hazardous waste and CDM projects.
3	Seeking international funding to encourage 3R implementation, for example through CDM projects.
Medium-Term (Year 4 - 6)	
<i>Institution</i>	
1	Conducting evaluation on short-term 3R programme.

2	Carrying out socialisation of 3R programme in local governments outside of working area of local 3R WG.
<i>Regulation and Policy</i>	
1	Widening coverage of participating industries in the PROPER programme and increasing scoring parameters.
2	Increasing the parameters of scoring for the Adipura Award.
3	Providing financial subsidies for selected wastes with low economical value.
<i>Development of Technology</i>	
1	Conducting and collecting research, expertise, technology, standards, and best practices on the 3Rs carried out by research institutions, universities, NGOs, and industries.
2	Composing training programme for scavenger groups, waste collectors, recycling industries, agro and manufacturing industry, handicraft SMEs, and e-waste recycling industry.
3	Conducting training programme or technical guidance for scavengers, waste collectors, recycling industry, agro and manufacturing industry, handicraft SMEs, and e-waste recycling industry.
4	Development of environmental friendly products and packaging.
<i>Increasing Role of Stakeholders</i>	
1	Carrying out programme on Independent Community Based Waste Management.
2	Promoting a programme on waste sorting at source to government institutions, state/local government-owned companies, educational institutions, residential areas, apartments, and hotels (as models).
3	Conducting composting pilot project in institutions, such as villages, schools, industries, governmental institutions, and state-owned/local government-owned companies.
4	Encouraging governmental institutions and state-owned/local government-owned companies to use environmental friendly goods or ecolabel certified goods, such as paper for daily activities.
5	Determining compost marketing strategy by involving other parties, such as Department of Agriculture, Department of Forestry, and local governments.
6	Empowering scavengers using financial subsidies, recycling equipment subsidies, facilities near final disposal site, technical assistance on occupational health and safety as well as environmental conservation, soft loans.
7	Placing 3R programme on community development into one of the highest priority programmes under company's CSR framework.
8	Encouraging agro and manufacturing industry to utilise EPR for their products and packaging, in particular for those that cannot or have difficulty decaying by natural processes, such as food packaging.
9	Encouraging production of environmental friendly goods and eco-label certification.
<i>Global Cooperation</i>	
1	Building international cooperation related to information sharing on 3R technology.
2	Seeking international funding to motivate 3R implementation .
Long-Term (Year 7 - 9)	
1	Monitoring and evaluation of mid-term programmes.
2	Continuing mid-term programmes in collaboration with local governments in local 3R Working Group region.
3	Socialisation of 3R system to all local governments other than local 3R Working Group region.
4	Building international cooperation and seeking international funding to motivate 3R implementation.

Source: MoE-Indonesia (2008). *Indonesia National 3R Strategy Draft No. 3 of 2008*. The original table includes columns on leading sector/facilitator and the targets.

3.3.5 Future challenges

The main comments from stakeholders, 3R/waste management experts in Indonesia, and Japanese experts during the Strategy formulation process are summarised in table 3.3.6. Some comments have been reflected in the latest draft; nonetheless, these issues remain as key future challenges that must be kept in mind during the implementation phase. Among the wide range of comments received, the following two aspects were pointed out by many experts and stakeholders and should be given due attention: (1) roles and responsibilities of various stakeholders; and (2) establishment

of a mechanism where the materials will flow, taking into consideration every step in sequence.

The need to clearly state the roles and responsibilities of various stakeholders at national and sub-national levels were pointed out by a number of stakeholders and experts. Since the 3R practices would require close collaboration and proactive involvement of different line ministries at the central level, and local authorities, the private sector, and local communities in the day-to-day implementation, the roles and responsibilities of the respective stakeholders must be clarified, understood, and agreed among those concerned. This will be a major challenge in implementing the Strategy. Additional concern was expressed on the capacity of local authorities (provinces and towns) which may vary significantly from region to region, and from town to town. Given the vast area and the socioeconomic diversity that characterises the nation, one uniform approach may not function effectively. Pilot initiatives that are operated on a small scale must be carefully applied/expanded taking into consideration such differences, with some room for modifications to suit the local conditions.

Table 3.3.6. Comments received from Stakeholders and Experts (not exclusive)

	Comments
Definitions	<ul style="list-style-type: none"> Definition of key terms (reduce, reuse, recycle, waste, municipal solid waste, hazardous waste, etc.) should be provided in Chapter 1. How such terms are defined should also be mentioned (e.g., as per Environmental Management Act (No.23/1997), Waste Management Act (No.18/2008), etc.).
Laws and Regulations	<ul style="list-style-type: none"> Aspects of law enforcement should be included/strengthened in the Strategy. The Strategy should be endorsed by the Ministerial Decree.
Objectives/Targets	<ul style="list-style-type: none"> Sector-wise targets for waste reduction could be considered (Chapter 5).
Scope/Programmes	<ul style="list-style-type: none"> Data/information collection is critical in the short-term action plan, based on which priorities can be set in the medium and long-term action plans. More emphasis/elaboration is needed on “Reduce” aspect. A mechanism is needed where the materials would go through the formal channels of industries. The mechanism needs to include all steps of the chain up to waste treatment. Local government should provide incentives to residents for at-source waste sorting. In order to ensure that the Strategy is widely accepted in Indonesia, the “end users” of wastes (resources) must be clearly identified. In this context, it is very important to show who is using the wastes (resources) for what purpose. Providing this information to the residents would encourage them to put efforts in at source separation. Mapping of treatment facilities is critically needed, to know what can be treated where. Then, goods that can be treated domestically should be collected and treated appropriately. Those that cannot be treated must be exported.
Roles and Responsibilities of Stakeholders	<ul style="list-style-type: none"> The 3R Working Group should be set up with clear roles and responsibilities, and should be sufficiently powerful in order to lead implementation of the Strategy. While the establishment of the 3R Working Group is explained to be ad hoc (temporal), there is also a need for a long-term institutional arrangement. Role sharing of sectors/stakeholders is not clearly mentioned in the draft. <ul style="list-style-type: none"> Role of municipal authorities should be clarified and strengthened. Specify the roles and responsibilities of individual line ministries, e.g., Ministry of Environment, Ministry of Public Works, BAPPENAS (National Development Planning Agency), Ministry of Industry, Ministry of Trade, Ministry of Agriculture, Ministry of Education, Ministry of Finance, etc.

	<ul style="list-style-type: none"> ▪ Recyclers associations should be formed/strengthened, so that they can take an essential role in liaising with local governments and communities. ▪ Improved coordination is critical at local and central level.
Financial Issues	<ul style="list-style-type: none"> ▪ Government may wish to consider setting up subsidies to promote the development of recycle industry. ▪ Financial mechanisms should be clearly spelled out for the implementation of National 3R Strategy (Chapter 5). ▪ Action plan should indicate the source of budget (e.g., government, local government, grant, etc.) and a rough cost estimate.

Source: Extracted from the comments received from the Regional Consultations (October 2008) and the Japanese Experts' Meeting (September 2008).

Other comments were made on the need to develop a mechanism in which the materials would go through the formal channels of industries. The mechanism needs to include all steps of the chain up to waste treatment, and include materials industries that use recycled resources as raw materials. In order to make this circular mechanism function, cooperation with materials industries is necessary. Thus, materials industries with relatively large scale operations (such as the cement industry, steel industry, metal refinery, etc.) should be identified, and then voluntary efforts or policies need to be employed to use recycled resources as inputs to these industries. The government could play a critical role by encouraging the industries to move in this direction by applying relevant policy tools.

In relation to the above, and as the waste begins to flow more through the formal channels of industries, the government must consider how it will deal with scavengers (informal sector) who are currently playing a substantial role in waste management. To this end, there is a programme proposed in the medium-term action plan, which focuses on scavenger empowerment. Improving their technical and other capability and integrating them into the formal sector will be a challenging task, which has to be addressed from social, economic, and environmental perspectives.

The Government of Indonesia must also identify ways to finance the implementation of the Strategy, by means of its national budget and through support from the international community. The Action Plan must be carefully restructured so that the actions are clearly linked with the objectives, and that the priority programmes are identified.

3.4 Malaysia

3.4.1 Current Situation of Waste Management and the 3Rs

At present, the per capita generation of solid waste in Malaysia varies from 0.45 to 1.44 kg/day depending on the economic status of the area. Municipal solid wastes from households, business entities and institutions are managed by private waste management service contractors. At present, about 95 to 97 percent of wastes collected in Peninsular Malaysia are brought for final disposal at landfills while the remaining three to five percent are diverted to recyclers or self treated²⁷. Malaysian solid wastes contain very high organic waste and consequently high moisture content and a bulk density of above 200 kg/m³. A recent study in Kuala Lumpur revealed that the amount of organic wastes for residential areas range from 62 to 72 percent of total waste, representing a central issue for waste management. Disposal of solid waste is done almost every time through landfill infrastructure. The amount of solid waste generated in Malaysia increased from 16,200 tons/day in the year 2001 to 19,100 tons/day in 2005. Since the mid 1980s, solid waste generated in the urban areas of Malaysia has been increasing year by year due to rapid urbanisation and diversified lifestyles. As a result, problems with increasing waste management costs and securing landfill sites have arisen in the country. The national average waste generation is found to range between 0.5-0.8 kg/person/day, but in the cities it has escalated to 1.7 kg/person/day. On average, about 2,500 tons of municipal solid waste is collected and dumped everyday in the city of Kuala Lumpur alone.

Table 3.4.1. Current Situation of Wastes in Malaysia – at a Glance

Category	Statistics	Data Source
TOTAL VOLUME OF WASTES (tons/year)		
Total Volume of Wastes	8.7 million tons of MW (Estimated in 2004) 19,100 tons/day (2005)	JICA, 2006 Ministry of Housing and Local Government (MHLG), 2008 ²⁸
Hazardous Medical Waste		
WASTE PER CAPITA (kg/capita/day)		
	0.80 kg/capita/day	MHLG 2008, Waste TWG Secretariat, 2008
FUTURE WASTE PROJECTIONS (Total Waste Generation)		

²⁷ Japan International Cooperation Agency (JICA), 2006. *The Study on Waste Minimization in Malaysia*, Yachiyo Engineering : Japan.

²⁸ Department of National Solid Waste Management/Ministry of Housing and Local Government (2008). Power point presentation at the Second Meeting of the Thematic Working Group on Solid and Hazardous Waste organised by UNEP RRC.AP in cooperation with the Ministry of Environment, Cambodia through the support of MOEJ which was held in Siem Reap, Cambodia in 2-3 December 2008.

By 2015	15.7 million tons	JICA, 2006
2020	30 tons/day	MHLG 2008, Waste TWG Secretariat, 2008
SOLID WASTE MANAGEMENT		
Collection of waste (% of waste generated)	95 – 97 % collection	JICA, 2006
Solid waste disposal facilities	Sanitary landfill: 10 sites are operational Landfill: 140 sites	JICA, 2006
RECYCLE		
	5% recycled Target in 2020: 20 % (to be recycled)	MHLG, 2008
EXPENDITURES		
	USD260 million	JICA, 2006

Since the lifespan of many landfills has already expired, the city council built transfer stations as a temporary solution, and put these into operation in 2001 to facilitate the transfer of the waste. Evidently, solid waste management in the urban centres is a priority issue requiring immediate attention. Considering the need, the city council started looking at an integrated approach to solid waste management as an alternative to the old concept of only dumping all the waste that is generated. This new outlook by the city council has brought about activities such as waste recycling and recovery followed by incinerating the waste to recover the energy with only the final inert material being considered for land filling. Thus, the aim to reduce the burden on the landfill also opened opportunities for new technologies in treating Municipal Solid Waste (MSW).²⁹ The long-term strategy of solid waste management in Malaysia involves inculcating the habit of recycling among the population. Ultimately the government aims to reduce operation costs of solid waste management, minimise waste disposed in landfills, and reduce the use of raw materials.

In 2004, it was estimated that 8.7 million tons of municipal waste had been generated in only one year. Barring any improvement in waste minimisation and considering the projected population and economic growth, the waste amount in 2020 is expected to reach 15.7 million tons. Presently, USD260 million is spent annually, only for final disposal of waste, and this is estimated to almost double to USD470 million by 2020, unless urgent measures are taken to reduce the disposed waste amounts.³⁰ Malaysia is fully committed to the basic principles of the 3R strategy as well as the Basel Convention and the Ban Agreement, and the national legislation to control and monitor importation and exportation of hazardous waste have already been implemented and enforced within the various enforcement agencies.³¹

²⁹3R Knowledge Hub (3RKH), 2007. *3R in Malaysia – Country Report*, www.3rkh.net.

³⁰ Same as footnote 25

³¹ Asian Development Bank, 2006. *Reuse, Reduce and Recycle – The 3Rs in Asia and the Pacific and ADB's*

Currently, most waste is disposed in landfills. But due to rapid development and lack of space for new landfills, major cities in Malaysia have been switching to incineration. The main components of the waste were found to be food, paper and plastic, which make up almost 80 percent of the waste by weight.

The Government of Malaysia (GOM) has privatised SWM and adopted an integrated waste management system in efforts to minimise environmental degradation. Under the privatisation exercise, four companies—Alam Flora Sdn Bhd (AFSB), Southern Waste Management Sdn Bhd, Northern Waste sdn Bhd and MMC—were awarded with contracts from the GOM in December 1995 to manage solid waste. These concessionaires are responsible for infrastructure and service.

3.4.2 Existing systems and regulatory framework for waste management and the 3Rs

Waste is defined in the Environmental Quality Act of Malaysia, 1974, as “any matter prescribed to be scheduled waste or any matter whether in a solid, semi-solid or liquid form, or in the form of a gas or vapor, which is emitted, discharged or deposited in the environment in such volume, composition or manner as to cause pollution.”

Under the Malaysian Scheduled Waste Regulations, “Scheduled Waste” is defined as “any waste falling within the categories of waste listed in the first schedule.” Therefore a waste needs to be classified before it can be scheduled.

The Malaysian government is introducing a new law on solid waste management. The principal options available and that are recognised as a hierarchy for integrated waste management are listed as follows: waste minimisation, reuse, material recycling, energy recovery and landfill. The Economic Planning Unit of Malaysia states that new technologies with regard to waste treatment facilities such as transfer stations, thermal treatment plants and waste to energy would become an alternative treatment for solid waste in the near future.³²

Policies and regulations related to Waste Management and the 3Rs in Malaysia are summarised in table 3.4.2.

Contributions, Working Paper by RSERS and RSDD, ADB.

³⁰The Consumers' Association of Penang, 2001. *Malaysia Country Report – Waste Not Asia*, Taipei, Taiwan.

Table 3.4.2. Main Policies, Laws and Regulations related to Waste Management and the 3Rs in Malaysia

Date	Title
Policy and regulations	
2007	Solid Waste and Public Cleansing Management Act 2007 [Act 672]; Gazetted on 30 August 2007 Give executive power to the Federal Government (Department of National Solid Waste Management) to manage solid waste instead of local authorities.
2006	National Solid Waste Management Policy Approved on 13 September 2006. Needs to be updated in line with Act 672.
2005	National Strategic Plan on Solid Waste Management Approved on 20 July 2005. Needs to be updated in line with Act 672.
1989	Environmental Quality (Scheduled Wastes) Regulations under the Environmental Quality Act 1989.
1998	Private Healthcare Facilities and Services Act 1998 Environmental Quality (Scheduled Wastes) Regulations.
1993	Management Guidelines of Clinical and related Wastes in Hospitals and Healthcare Establishments 1993
1993	Action Plan for Waste Management in Hospitals and Healthcare Establishment 1993

Source: Ministry of Housing and Local Government, Malaysia 2008

3.4.3 Suggested focus of 3R National Strategy

Malaysia is determined to put in place a solid waste management system which is holistic, integrated, cost effective, sustainable and acceptable to the community, and also emphasises the conservation of the environment, selection of affordable technology and concern for public health. The plan will also be based on waste hierarchy, which emphasises waste minimisation through the 3Rs, intermediate treatment and final disposal. Measures are being undertaken to review existing institutions, legislation and regulations pertaining to the management of solid waste as well as to improve infrastructure and facilities. Since the 8th Malaysia Plan, the government has placed emphasis on sustainable development and waste management as one of the main components to look into.³³

There are three levels of government which are in charge of waste management in Malaysia. First, the Federal Government, which includes the Ministry of Housing and Local Government (MHLG), the Economy Planning Unit (EPU), the Prime Minister's Department, the Department of Environment (DoE) and the Ministry of Health (MoH). Second, waste management is coordinated by state governments and finally, local authorities (LAs) are in charge of municipal wastes. Local

³¹ Malaysian-Danish Energy and Environmental Forum, 2007. www.ambkualalumpur.um.dk.

authorities are the implementing agencies and have direct responsibility over solid waste collection, treatment and disposal.

While there are some large industries dealing entirely in recyclables such as papers, ferrous metals, plastics, and glass in Kuala Lumpur, recyclable materials are commonly purchased by street peddlers, who in turn sell to small and larger dealers and wholesalers.

A policy framework for the 3Rs in Malaysia is generally in place. Table 3.4.3 presents the Master Plan Strategies and Federal Action Plan supported by JICA.

Table 3.4.3: Master Plan Strategies and Federal Action Plan (JICA, 2006).

<i>M/P Strategies</i>	<i>Federal Action Plan</i>
Strategy 1: Enhancement of Awareness on Waste Minimisation	Action 1: Enhancement of Awareness Raising Activities under the National Recycling Programme
	Action 2: 3R Activities in Schools
Strategy 2: Strengthening of Partnership for 3Rs Activities	Action 3: Formulation of Stakeholders' Networking and Development of Partnership Activities on the 3Rs
Strategy 3: Enhancement of Institutions to Strengthen Government Policies on Waste Minimisation	Action 4: Strengthening of Legal, Regulatory and Financial Mechanisms
	Action 5: Improvement of Information Management
	Action 6: Provision of Guidance to LAs on LAP-WM (Local Action Plan-Waste Minimisation)

3.4.4 Current progress of 3R National Strategy Development as of August 2009)

The Government of Japan decided to conduct a study at the request of the Government of Malaysia on “The Study on National Waste Minimisation in Malaysia,” and entrusted the study to the Japan International Cooperation Agency (JICA) for the duration of two years from 2004 to 2006. The report deals with the present conditions of solid waste minimisation and the 3Rs in Malaysia and presents the Master Plan and Action Plan on Waste Minimisation, as well as a set of guidelines on waste minimisation for all related players. The report also includes comments made by the Ministry of Housing and Local Government and related authorities in Malaysia.

The government is considering the adoption of a comprehensive waste management policy including the installation of incinerators for the safe and efficient disposal of waste, as well as the formulation of strategies for waste reduction, reuse and recycling.

The Parliament passed a bill in July 2007 to confer executive authority to the Federal Government for matters relating to solid waste through Article 74 (1) and Article 80 (2) Federal Constitution Provisions of the Solid Waste and Public Cleansing Management Act 2007. This include a wide range of instruments including powers to establish take-back systems and deposit-refund systems and powers to require manufacturers to use recycled materials to restrict the use of certain materials and reduce waste generation. The Act also provides for the implementation of coding and labelling systems for any product or material as a mechanism to promote recycling.³⁴

Capacity building through workshops on the promotion of the 3Rs was commissioned and implemented in Malaysia with the support of the Ministry of the Environment of Japan and the Institute for Global Environmental Strategies through AIT/UNEP RRC.AP of the Advanced Waste Management for Asia and the Pacific (AWMAP) project for Malaysia.

The small scale national workshop was conducted on 5 April 2005 to gather the views and recommendations of various stakeholders in waste management. The workshop was organised in coordination with the Centre for Environmental Technologies (CETEC). About 30 people from civil society comprising the government, industry, the private sector, academia and communities participated in a one-day workshop. The key issues pointed out in the workshop include i) a lack of holistic planning—no vision, mission, strategy and direction; ii) lack of will in implementing action amongst all stakeholders; iii) lack of coordination/cooperation among stakeholders (institutional framework); and that vi) the first two Rs (Reduce and Reuse) are not being sufficiently addressed by consumers and purchasing needs to be reduced to influence production by retailers/manufacturers.

A workshop was conducted on 24 February 2009 which brought together the two government agencies responsible for waste management, namely the Department of Environment (DoE) and the Department of National Solid Waste Management/Ministry of Housing and Local Government (MHLG) in the implementation of the existing and/or formulated National 3R Strategy, including other private sectors and NGO stakeholders. The “Workshop on the Promotion of 3Rs (Reduce, Reuse & Recycle) Program at the School Level in Klang Valley” showcased best practices on 3R activities in schools and other success stories from local governments.

3.4.5 Future challenges

A national strategic plan for solid waste management has been implemented under the 9th Malaysia Plan. Local authorities carry out solid waste management, considered to be a sanitation issue and

³⁴ Same as footnote 25.

under the Current List of the Ninth Schedule of Malaysia. Upgrading of unsanitary landfills as well as the construction of new sanitary landfills and transfer stations with integrated material recovery facilities are the main plan of action to develop solid waste management. In addition, legislation to streamline strategies and measures in the Strategic Plan will be enacted. The Department of National Solid Waste Management has been established to implement these measures and to administer solid waste policy, planning and management in a holistic manner. The government will consider the adoption of a comprehensive waste management policy including the installation of incinerators for safe and efficient disposal of waste, as well as to formulate strategies for waste reduction, reuse and recycling (the 3Rs). There is a need to formulate a strong Integrated National Policy on Solid Waste Management that presents the materials flow concept by addressing controlled production of goods, controlled purchasing and a re-examination of the GDP goals of the nation to reflect Genuine Progress Development Indicators (GPDI).

In order to achieve the intended targets of the overall solid waste management plan, the private sector has to be actively involved in the entire process of the delivery of services, right from the storage, collection, transportation and to some extent the management of waste treatment until the final stage of the disposal of the waste. It is imperative that the private sector achieve the new standards of waste disposal in a most cost-effective manner. In Malaysia, community expectations on standards with regard to efficient solid waste management is on the rise and they are becoming less tolerant of earlier practices of the waste disposal system that ignore the long-term sustainability relative to the environment. The Government has to constantly strike a balance between efficiency and cost-effectiveness in providing quality and high standards of waste management without imposing excessive, new financial burdens on taxpayers as better waste management requires massive and higher capital outlay.

Essentially, the role of the Government is to create an environment conducive to guiding and encouraging private business in the pursuit of best practices for the well being of the community. It is not the Government's intention to take over the private sector's role or reduce their relevance in solid waste management. The Government will determine policies, rules and regulations, draw up measures, allocate finance, issue licenses and permits, and provide the necessary information and support to facilitate industry players.³⁵

Greater participation by the general public and stakeholders is also promoted as the development of positive public attitudes and is a crucial and essential foundation for the success of solid waste management. For example, the spirit and the rationale of the 3Rs and the sustainable waste management concept have to be fully appreciated by the public and acted upon before any

³⁵ Same as footnote 26.

meaningful results can be achieved.

The GOM is intensifying its efforts towards improving the quality of solid waste management services in the country, which at this moment is being provided by local authorities as one of its statutory functions. The Government is aware that the scope of activities in solid waste management is ultra-varied and the cost of upgrading the present level of services to an acceptable level is exorbitant. Hence, it requires the strategic deployment of existing resources with strategic plans in order to meet the overall targets and objectives in the long run. Under the National Solid Waste Management Strategic Plan, the Federal Government assumes a more active role in ensuring a more sustainable method of solid waste management.

Malaysia is in the process of bringing the responsibility for solid waste management under the direct supervision of the Federal Government with the ultimate aim to upgrade services through an integrated planning process to improve solid waste management in the country as a whole. A specific entity is being proposed at the National level to execute matters relating to solid waste management. This responsibility is provided by the relevant legislation which has already been enacted on July 2007. . The new law will provide a legal framework for the establishment of standard and sustainable practices on future solid waste management in the communities. The new law will also provide leverage for the authority to streamline and organise management of the various types of solid waste generated from different operations. There is a need for the country to foster greater awareness and public acceptance in terms of recycling. In order to improve awareness on the 3Rs amongst schools and teachers, the “Guideline for the Enhancement of the 3Rs Activities in Schools” should be disseminated nationwide by both the Ministry of Housing and Local Government (MHLG, in charge of the promotion and establishment of recycling systems) and the Ministry of Education (MoE). Nationwide seminars, workshops and dissemination should be developed to promote the understanding of the need for 3R strategies.³⁶

³⁶ Same as footnote 22.

3.5 The Philippines³⁷

3.5.1 Current Situation of Waste Management and the 3Rs

The National Solid Waste Management Commission estimates that waste generation in the Philippines will increase to more than 10 million tons annually by 2010. The volume of municipal wastes generated nationwide is 30,000 tons per day.³⁸ Of this, 73 percent is from household waste, 26 percent from commercial establishments, industrial and manufacturing institutions, and less than one percent from health care wastes.

Currently, an average Filipino generates 0.3 and 0.7 kg of municipal solid waste each day in rural and urban areas, respectively. In terms of composition, 41 percent of the solid waste is organic, 19 percent is paper, 14 percent is plastic, 26 percent is glass, five percent is metal, and the remaining percentage is comprised of other wastes. Household waste accounts for 50 percent of the total waste source, yard waste (including grass, leaves, branches, decaying fruits and vegetables) accounts for 20 percent, whereas wet markets, commercial and institutional waste account for another 30 percent.

The number of registered hazardous waste generators from January to December 2005 was 5,657 (DENR-EMB, 2007). Estimates of two million units of used lead-acid batteries (ULABs) are discarded each year. Discarded each year are 26,000 metric tons of lead and four million litres of used sulfuric acid electrolyte, not to mention the great volume of plastic that can be recycled.³⁹

Hospitals on the other hand generate 10,293 tons of medical waste annually, which is less than one percent of the total volume of waste. In 2003, it was estimated that about 47 tons of medical waste was generated daily in Metro Manila alone, of which 27 tons was infectious waste. Classifications of waste were adopted by the Department of Health (Environmental Health Service) and disseminated as guidelines (Manual on Hospital Waste Management) for all hospitals and other health care facilities so that 90 percent of the hospitals practice colour-coding in storing wastes, while the remaining 10 percent do not practice this waste segregation aspect.

³⁷ This section has been prepared with substantial input provided by the National Solid Waste Management Commission (NSWMC), Environmental Management Bureau, Department of National Resources and Environment (EMB-DENR), the Philippines at the “Consultative Workshop for the Development of the National Framework for the Management of the Informal Sector in SWM ” organised by NSWMC/EMB-DENR.

³⁸ NSWMC, 2008. Power point presentation of NSWMC entitled “National and Local Initiatives on Solid Waste Management and Implementation of 3Rs in the Philippines” during the ADB Urban Day 2008: Environment and Livable Cities. Manila, Philippines.

³⁹ Garcia, D. (2006). Final Report: Promoting 3R Initiatives in the Philippines.

DAO-94-2⁴⁰ (Interim Guidelines for the Importation of Recyclable Materials Containing Hazardous Substances) includes electronic assemblies and scrap as items allowed to be imported and exported. Formal recovery of electronic wastes is currently being done by only one company in the Philippines although there are many illegal outfits that also dismantle and recover materials from e-waste, resulting in environmental and health hazards. Electronic appliances are repaired and refurbished and sold to the HMR commercial outlets in the Philippines or exported to other countries. Otherwise, the various components recovered are again used as raw materials.

Solid wastes are often segregated into biodegradable, compostable and reusable wastes at the *barangay* level (smallest unit of government), while the collection of non-recyclable and special wastes are administered by the respective municipality or city.

Table 3.5.1. Current Situation of Wastes in the Philippines – at a Glance

Category	Statistics	Data Source
TOTAL VOLUME OF WASTES (tons/year)		
Total Volume of Wastes in Urban Areas	30 tons/day of MW nationwide 7,200 metric tons per day of waste in Metro Manila	NSWMC, 2008 ⁴¹ NSWMC, 2008 ⁴²
Hazardous Waste	26,000 metric tons of discarded lead (from estimated two million used lead-acid batteries (ULABs))	Recycling industries in the Philippines
Hazardous Medical Waste	10,293 tons/year Medical waste: Estimate of 47 tons/day (2003) in Metro Manila Infectious waste: 27 tons/day	DENR-EMB, 2007
WASTE PER CAPITA (kg/pers/day)		
Municipal waste	0.34 kg/capita/day	Municipal Waste Report, Waste TWG Secretariat:AIT/UNEP RRC.AP, 2008
FUTURE WASTE PROJECTIONS (Total Waste Generation)		
By 2010	>10 million tons	NSWMC, 2008
SOLID WASTE MANAGEMENT		
Collection of waste (% of waste generated)	>99% in Quezon City (2005) 40 % in cities in political area (2005)	League of Cities of the Philippines, 2006 ⁴³
Solid waste disposal facilities	Material Recovery Facility: 2361 sites Sanitary landfill: 19 operational sites Open dumpsites: 826 sites Controlled landfill: 273 sites	NSWMC, 2008
E-WASTES		
	25 million units (span of 10 years, from 1995 to 2005) in total	Peralta et al., 2004 ⁴⁴

⁴⁰ DAO is the acronym for DENR Administrative Order.

⁴¹ Same as footnote 35.

⁴² Same as footnote 36.

⁴³ League of Cities of the Philippines (2006). Environment unit of the League of Cities of the Philippines (LCP). Manila. Available at: <http://www.lcp.org.ph/eu>.

⁴⁴ Peralta GL, Fontanos PM. (2004). E-waste Issues and Measures in the Philippines. Department of Chemical Engineering and Environment Engineering Graduate Program. University of the Philippines.

RECYCLE		
	25% in 2007 in Metro Manila	NSWMC, 2008
EXPENDITURES		
	USD76 million for garbage collection and disposal in Metro Manila	AIT, 2008 ⁴⁵

In a study conducted at five Metro Manila cities under the Metro Manila Solid Waste Management Project, it is identified that of the sampled MSW, 61 percent is biodegradable, 19 percent is considered as recyclables, 18 percent are residuals and two percent is considered as hazardous or special waste.

Collection frequencies in cities range between three to five days per week and about 30 percent of households have access to this at varying frequencies.

The annual spending for the collection and disposal of MSW in Metro Manila is estimated to account for over PHP3.5 billion (USD76 million).

A survey in July 2005 by the League of Cities of the Philippines reveals that garbage collection efficiency in cities average at 40 percent in terms of political area where about 56 percent of the cities' population is served. Quezon City has reported a collection efficiency of 99 percent in 2005. It also reported that around 90 percent of the cities operate their own waste collection fleets while 10 percent contracts this to private haulers.

Solid waste in the country is generally characterised as highly organic and recyclable. Based on an ADB study in 2003, yard, wood and kitchen waste account for 50 percent and recyclable wastes is 45 percent of the total waste composition generated in Metro-Manila. A 2006 joint study conducted by the Department of Environment and Natural Resources (DENR) and the United States Agency for International Development (USAID) on selected urban municipalities in Mindanao showed that 80 percent of the waste streams are biodegradable and 20 percent are recyclable.

Non-biodegradable or recyclables consist of cans/metals, bottles/glass, paper, plastic, styrofoam, tires, hard shells, rocks, shells/bones, and rubber. In Metro Manila, paper waste tops the list of recyclables and constitutes 16 percent of the waste volume or about 1,100 tons per day. Plastic and glass/wood make up 15 percent and 16 percent or about 1,000 and 603 tons per day, respectively.

⁴⁵ Asian Institute of Technology (2007). 3R in Asia: Gap Analysis Report. Thailand.

It is estimated that an average of 30,750 metric tons of polyethylene terephthalate (PET) is used for domestic purposes annually. PET is non-biodegradable and usually ends up in the landfill if not properly collected and segregated. Based on recent studies, about PHP791 million is spent annually for the hauling of PET. Millions more are spent in clearing waterways and road repairs. However, recent Waste Amount and Composition Survey (WACS) studies in the country have shown that PET bottles are seldom, if not at all, present in the waste collected by garbage trucks. This can be attributed to the efficiency of existing junkshops since there is a market for used PET.

The country generated a total of 576 metric tons of industrial waste in 2001. Practices followed in dealing with this type of waste include selling to scrap buyers, remixing with virgin materials, selling directly to exporters/consolidators and recycling it back into bottles.

About three percent of the total waste generated is made up of glass, most of which finds its way to junkshops. In the junkshop, sorters separate the bottles that can be sold to soft drinks firms and local fish sauce industries. Some sorters also wash these bottles in the streets before selling them. Only breakages go into the cullet bin to be collected by merchants and delivered to glass/bottle manufacturers like San Miguel. The cullet is again sorted, melted and moulded into bottles.

About 2.3 million metric tons of hazardous waste is generated by industries every year. By 2004, 3,015 hazardous waste generators had been registered with the Environmental Management Bureau (EMB). Oil, immobilized waste, containers, and plating waste make up more than half (55 percent) of registered hazardous waste in the country.

3.5.2 Existing systems and regulatory framework for waste management and the 3Rs

The Ecological Solid Waste Management Act of 2000 or Republic Act 9003 (R.A. 9003) is one of the existing system and regulatory frameworks for waste management and the 3Rs in the Philippines. The Act promotes a paradigm that waste is a resource that can be recovered, and places source reduction and minimisation of wastes generated at source and resource recovery, recycling and reuse of wastes as the most preferred options of solid waste management. The Act also placed legislated mandatory targets for solid waste diversion to 25 percent in the first three years of the Act and increased every three years thereafter. While local government units are the primary institutional mechanisms for implementing R.A. 9003, the Act promotes active collaboration between local government units and the private sector and encourages partnership with cooperatives and associations working on solid waste management. On the other hand, it is

the National Solid Waste Management Commission/Environmental Management Bureau that is the major agency responsible for the implementation of R.A. 9003.

R.A. 9003 sets guidelines and targets for solid waste avoidance and volume reduction through source reduction and waste minimisation measures including composting, recycling, reuse, recovery, green charcoal process and others prior to collection, treatment and disposal in appropriate and environmentally sound solid waste management facilities (NSWMC, 2008).

The following list of laws and regulatory issuances form part of the legislative framework affecting SWM in the country.

Table 3.5.2. Main Policies, Laws and Regulations related to Waste Management and the 3Rs in the Philippines

Date	Title
Laws and Regulations	
2000	<p>Ecological Solid Waste Management Act of 2000, R.A. (Republic Act) 9003</p> <p>An Act which is systematic, comprehensive and is an ecological solid waste management programme; the first law on SWM related to the 3Rs.</p>
1999	<p>Philippine Clean Air Act, R.A. 8749</p> <p>An Act banning incineration. LGUs are mandated to promote, encourage and implement ecological waste management including waste segregation, recycling and composting</p>
1994	<p>Memorandum Circular No. 39A, Amending MC No. 39A, Dated January 19, 1988, By Reconstituting the Presidential Task Force on Waste Management, 1994</p>
1991	<p>The Local Government Code of 1991</p> <p>Section 17, vital functions related with basic services and facilities on SWM from the national government to LGUs from the provincial level down to the <i>barangay</i>, or community, the smallest unit of governance in the country.</p>
	<p>Presidential Decree (PD) No. 1150, Investing in <i>Barangay</i> Captains To Enforce Pollution and Environmental Control Laws</p>
1997	<p>PD No. 825</p> <p>Provides penalties for Improper Disposal of Garbage and Other Forms of Uncleanliness and for Other Purposes.</p>
1976	<p>PD No. 856, Code on Sanitation</p> <p>Provides measures for compliance to hygiene and sanitation from water supply to hotels, parlours (small</p>

	shops and stalls) and vermin control.
1974	PD No. 600, Prevention and Control of Marine Pollution A national policy to prevent and control the pollution of the seas by the dumping of wastes and other matters.
1990	An Act to Control Toxic Substances & Hazardous & Nuclear Wastes, Providing Penalties for Violations Thereof, & for Other Purposes, R.A. 6969
1938	Commonwealth Act No. 383, An Act to Punish Dumping in Any River of Refuse, Waste Matter or Substances This is one of the earliest legislations that address environmental pollution in the country.
Guidelines	
2006	Joint DENR-DOST Administrative Order No. 2006-001 An Environmental Technology Verification (ETV) Protocol to cover technology review and verification process of new and modified technologies, e.g., use of technology in treatment, storage and disposal of wastes.
2003	DENR Administrative Order No. 2003-14 Provides incentive schemes of the national government to industries (Philippine Environment Partnership Program).
1998	DENR Administrative Order No. 50 Adopting the Landfill Site Identification and Screening Criteria for Municipal Solid Waste Disposal Facilities, Series of 1998.
1998	DENR Administrative Order No. 98-49 Provide Technical Guidelines for Municipal Solid Waste Disposal.
1993	DENR AO No. 90, Series of 1993 Creating a Project Management Office on SWM Under the Presidential Task Force on Waste Management.

Source: NSWMC/EMB-DENR, 2008. Final Report No.:6 Laws and Regulations, 2003.

Some of the national initiatives include the 300 Days Zero Basura Olympics (ZBO) Project along with the implementation of the Closure and Rehabilitation of Dumpsites initiative launched on 20 June 2008.

R.A. 9003 is premised on source segregation being a pre-requisite for waste recovery. However, the 2008 JICA Recycling Industry Development Project in the Philippines shows that most households and business entities give mixed wastes to municipal garbage collectors and that the separation ratio ranges from a high of 71.62 percent for high value materials such as aluminium to a low of 20.61 percent for other metals. The rate of separation is dictated by the price of the material in the market.⁴⁶

⁴⁶ JICA, 2008. The Study on Recycling Industry Development in the Republic of the Philippines. Makati City.

R.A. 9003 mandates segregated collection and prohibits waste picking in disposal facilities. Yet, mixed wastes collection is still being practiced and waste picking or waste reclaiming in disposal facilities predominates as the main method of waste recovery. For instance, at the Payatas disposal facility, the 2,000 waste pickers organised into eight associations are able to recover 11 percent of recyclables from incoming waste. Next to waste picking separation, waste recovery is implemented by the itinerant waste buyers who are either attached to junkshop dealers or are eco-aides employed by LGU or NGO materials recovery facilities. Final sorting and separation of recyclable waste materials are done by junkshops. Consolidators then bring the recyclable waste materials to domestic recycling industries or export these materials to foreign markets, with China as the dominant market.

Moreover, the Act requires that *barangays* take the lead in materials recovery and diversion through their materials recovery facilities. The National Solid Waste Management Commission (NSWMC) 2008 figures show that there are only 2,428 material recovery facilities (MRFs) that employ eco-aides and are serving 2,701 *barangays* out of more than 40,000 *barangays* (2005). As a result of the weak LGU performance, current waste diversion of recyclable waste materials is mainly dominated by the waste pickers in the dumpsites, jumpers⁴⁷ and *paleros*⁴⁸ who recover materials from garbage trucks, itinerant waste buyers, and the junkshops (some of which operate illegally). But this sector, with only a few exceptions, labours under insecure and unsafe working conditions.

Under R.A. 9003, *barangay* units are mandated to manage biodegradable wastes. The NSWMC initiated *barangay* SWM contests show that winning *barangays* have initiated strategies to recover biodegradable wastes either through the promotion of backyard composting or by establishing composting facilities.

Some municipal government units have also established composting facilities to process biodegradable wastes from public markets and urban centres. Some composting facilities have also been initiated by the private sector in upscale housing projects and commercial establishments.

Informal sector involvement in the diversion of the biodegradable wastes from final disposal can be seen through the recovery of left-over food from food establishments in highly urbanised areas. Left-over food is consumed or sold to informal food vendors to be cooked again and sold to the

⁴⁷ *Jumpers* at collection trucks are unauthorized persons (usually young men) who live near disposal facilities, and climb the garbage trucks to recover the recyclables before it reaches the disposal facility. Source: NSWMC, 2009

⁴⁸ *Paleros* is a Filipino term which means “garbage crew.”

public. Some individuals also collect food wastes for reuse as animal feed.

Despite the above developments, the diversion of biodegradable wastes from final disposal is not as well-established compared to recyclables waste recovery. Only a few municipal and city governments have established composting facilities. The prevailing practice, especially for biodegradable wastes generated in urban areas, is still disposal at solid waste disposal facilities.

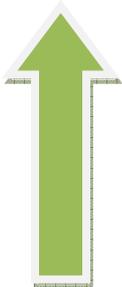
3.5.3 Suggested focus of 3R National Strategy

The informal waste sector may be defined as individuals, families, groups or small enterprises that are engaged in the recovery of waste materials with revenue generation as the motivation, either on a full-time or part-time basis. They have no social and economic security and work under substandard and unhealthy work conditions, with limited access to basic services.

The development for the National Framework for the Management of the Informal Sector in SWM follow the scope as categorised into five major areas (details in table 3.5.4): policy, institutional, economic, social and operational/technical dimensions.

The hierarchy of the recycling chain is shown in table 3, from the least paid and vulnerable to those who benefit the most in economic terms:

Table 3.5.3. Hierarchy of Informal Waste Sector Recycling⁴⁹

 <p>Highest Value</p> <p>Lowest Value</p>	Importers of recyclable materials
	Recycling industries
	Brokers, wholesalers/consolidators
	Large junkshops
	Small and medium junkshops
	Itinerant waste buyers
	Garbage crew or <i>paleros</i>
	Jumpers
	Waste pickers

The initial inventory of the informal waste sector shows that most of the organised groups are

⁴⁹ SWAPP, 2008. Development of National Framework for the Management of the Informal Sector in SWM. Quezon City, Philippines.

present mainly in Metro-Manila. In Mindanao, there are only three recorded junkshop associations.

The second biggest organised group is the waste pickers of the Payatas Disposal Facility in Quezon City composed of 2,000 waste pickers organized into eight associations and one multi-purpose cooperative. Similarly, waste pickers in the Rodriguez, Navotas and Antipolo disposal facilities and Pier 18 are organised into associations. Waste pickers in the Baguio City disposal facility are also organised as a cooperative through the joint efforts of the Jaime V. Ongpin Foundation and the city government. Sanitary landfills in Metro-Clark, Norzagaray and Batangas City also have partnerships with waste pickers through waste pickers' cooperatives and associations. Outside Luzon, waste pickers in Calbayog City, Dumaguete City, Iloilo City and Davao City are also organised into associations.

The only national agency that is currently and directly involved in the development of the informal waste sector is the DENR-Environment Management Bureau (EMB) through the NSWMC. Other national agencies that are mandated to serve the poor or may be tapped for their support include the Department of Social Welfare and Development, Department of Education, National Housing Authority, Presidential Commission for the Urban Poor, Department of Labor and Employment, Department of Agriculture, Technology Resource Center, and the Technical Education and Skills Development (TESDA).

National government agencies and various non-governmental organisations have also worked and established programmes with waste pickers as target beneficiaries. One initiative is the establishment of the Smokey Mountain Resource Recovery System (SMRRS) and the SMP Multi-purpose Cooperative by the parish (small community church). The programme aims to provide additional options for livelihood (e.g. handicraft-making, composting, and production of ornamental plants) while advocating for on-site development. Some waste pickers are now employed in the cooperative.

Another NGO working with Smokey Mountain waste pickers since 1988 is the Mithing Pangarap Educational Foundation which has programmes designed for out-of-school youth and pre-schoolers to enter into formal education.

The Foundation provides the scavengers with training in product management and design, as well as assistance in selling their products through participation in trade fairs/exhibits.

In Iloilo City, the Catajunan-Soc-oc-Navais (CSN) Association is a newly established organisation

of waste reclaimers living at the Calajunan dumpsite. The association was established in 2006 as part of the Social Development Program implemented by the City of Iloilo with the German Technical Cooperation (GTZ). The CSN is currently being assisted in the development of businesses and alternative livelihoods. Private institutions such as the Zonto Club of Iloilo City, the Rotary Club of Iloilo City and the Designers Guild and the Young Designers of Iloilo City help and support the activities of the CSN.

Table 3.5.4. Scope of the Framework/Current Interventions/Proposed Interventions and Strategies/Critical Actors and Partners

Scope of the Framework	Current Interventions	Proposed Interventions and Strategies	Critical Actors and Partners
POLICY	Local government ordinances regulating and accrediting IWBs, junkshops and waste pickers	Formulation of National Guidelines on Industry Standards or Code of Practice for Junkshops Formulation of national guidelines on the accreditation/integration of informal waste sector in the SWM system Formulation of guidelines on transfer and transport of recyclable materials to avoid harassment of transporters of recyclable materials and facilitate efficient movement of materials	DENR, LGUs, DTI
INSTITUTIONAL	LGUs organising junkshops, waste pickers	Make an inventory of the informal waste sector Formulation of national guidelines on the accreditation/integration of informal waste sector in the SWM system Organising of informal waste sector into associations or cooperatives	LGUs, DENR, Cooperatives Development Authority
	Inclusion of junkshop owners in <i>barangay</i> SWM committees	Inclusion of the informal waste sector through its associations or cooperatives in the planning and monitoring of SWM systems	DENR, NSWMC LGUs, NGOs

Scope of the Framework	Current Interventions	Proposed Interventions and Strategies	Critical Actors and Partners
	<p>Some LGUs implement accreditation of junkshops as MRFs and joint selection of eco-aides by the local government and junkshops</p>	<p>Inclusion of an informal sector waste management plan in the Ten Year Strategic SWM Plan and Yearly Action Plans of LGUs</p> <p>Capacity building of LGUs in integrating the informal waste sector in their SWM planning process</p>	
<p>ECONOMIC</p>	<p>Waste markets; Recycling collection events</p> <p>Private sector-junkshop partnership in Ayala properties in Makati</p> <p>Integration of waste pickers as segregators in the Metro Clark Sanitary Landfill's Materials Recovery Facilities</p>	<p>Integration of informal waste sector in the materials recovery facilities of LGUs</p> <p>Provision of business incentives for junkshops/consolidators</p> <p>Link informal waste sector to microfinance institutions</p> <p>Conduct entrepreneurship trainings</p> <p>Tapping of informal waste sector in commercial scale composting projects</p> <p>Facilitate linkages between informal waste sector and industries so that the former can have access to recyclable materials</p> <p>Facilitate linkages of informal sector and recycling cooperatives to professionals with expertise in product design</p> <p>Provision of market support such as information</p>	<p>LGUs, Export Processing Authority, TESDA</p>

Scope of the Framework	Current Interventions	Proposed Interventions and Strategies	Critical Actors and Partners
		Organizing job fairs for the informal sector	
SOCIAL	Preparation of waste pickers for alternative employment and livelihood generation	Linking to Kalahi-CIDDS program of DSWD	DSWD, TESDA, DepED, LGUs
	Housing programme for scavengers, e.g. Payatas programme Smokey Mountain	Include informal sector: scavengers and waste pickers as priority recipients of governmental housing programmes or facilitate linkages with non-government housing programmes for the poor	LGUs, UDHA
		Prohibition of unsafe practices such as dismantling of materials with toxic and hazardous waste materials	LGUs, DENR-EMB
	Child labour banning in waste picking activities in some disposal facilities, e.g. Payatas	Ban child labour in itinerant waste buying activities	DSWD, LGUs
		Facilitate scholarship programmes or access to alternative learning system programmes	DepED
		Establish day care and health care facilities for the informal sector and organise medical missions Conduct health monitoring studies to assess the health impact of their waste recovery and processing activities	LGUs, DOH
OPERATIONAL/ TECHNICAL		Provide skills training on value adding strategies/low cost technologies in waste recovery and recycling	DOST, TESDA

3.5.4 Current progress of 3R National Strategy Development (as of August 2009)

The AIT/UNEP RRC.AP supported the development of a National Framework on the Management of the Informal Waste Sector under the Advanced Waste Management Project funded by the Japanese Government and the Institute for Global Environmental Strategies, Japan.

Three consultation workshops were conducted. The first workshop was given for the Luzon group, the second for Visayas/Mindanao group and the third for national government agencies and civil society groups. The first two workshops focused on the key stakeholders: junkshop operators and waste



pickers, as well as local government units. The purpose of these consultations was to identify the important elements of the framework including options on how best to manage the informal sector in the delivery of sustainable solid waste services.

The Metro-Clark Development Corporation, Payatas Operations Group, SPM in Smokey Mountain and Dumaguete City shared their experiences about the informal waste sector during these consultations. Lessons from these experiences were included in the framework.

The third consultation aimed to determine the roles and functions as well as the programmes of national agencies and civil society groups in relation to the informal waste sector.

Prior to the consultation process, primary data gathering on the existing situation of the informal waste sector was conducted. The gathering of baseline information about the informal waste sector is important in developing the framework. A rapid survey of waste pickers and junkshops in Metro Manila was conducted for this purpose.

Together with the consultation, an initial inventory of local junkshops and waste picker associations was developed. This inventory aimed to create an initial list of existing informal waste associations including the number of members, addresses and contact persons.

A review of existing local and international studies was undertaken and used in conceptualising various strategies in the management of the informal waste sector.

The strategy shall be built through political, institutional, economic, technological and socio-cultural dimensions taking into account critical actors and partners in the SWM system. It will be integrated to the existing National Ecological Solid Waste Management Act.

3.5.5 Future challenges

The country receives technical assistance and has foreign-assisted projects on SWM and the 3Rs. These include: i) a pilot project on environmental education supported by UNDP, Mainstreaming Environmental Education in the Philippine Educational System, in which five pilot schools were selected from among three cities in Manila for the implementation of 3R concepts and/or practices in schools; ii) programme of replication which is composed of projects such as the DENR-Foreign Assisted and Special Projects (FASPO) Special Project and Toyota Auto Parts, Inc. School-Based SWM Program – A Corporate Social Responsibility Project, Solid Waste Management for Boracay Island and the Municipality of Malay, Aklan (JICA); Introduction of Solid Waste Management in 3 Model Sites in the Philippines (JICA) covering Sagay City, Calbayog City and Davao City; Support Program for Solid Waste Management for LGUs in the Visayas/Phase 2 (GTZ) covering LGUs in Regions 6, 7, 8, 13 and the Philippine Environmental Governance 2 Project covering 7 LGUs in Region 2; iii) Development of a Framework for the Management of the Informal Sector programme in collaboration with IGES, MOEJ and AIT/UNEP RRC.AP; Recycling Industry Development (JICA) where Board of Investments of the Department of Trade and Industry (BOI-DTI) is tasked as the implementing agency; and the iv) Solid Waste Management Consensus Building Study for the Subsidy Framework supported by the World Bank, where NSWMC and the National Economic Development Authority (NEDA) are tasked as implementing agencies, and the Green Choice Program where NSWMC, EMB-DENR are part of the Thematic Working Group for Eco-labeling.⁵⁰

Current interventions also show that there are opportunities for integrating the informal waste sector in the solid waste management system through value-adding economic activities or integrating them in LGU programmes for materials recovery and processes or through partnerships with industries.

Despite the abovementioned initiatives, challenges still exist.

⁵⁰ Same as footnote 36.

For example, the SWM at the national/local level often lacks proper segregation of recyclable/recoverable waste material at source resulting to low recycling ratios and low quality recyclable materials. This is aggravated by fragmented information and networks for optimising the flow of recyclable/recoverable materials from generators to the final users. There is also limited technological and financial capacity of the domestic recycling industry and the outflow of recyclables to big international markets such as China. Also, there is a strong dependence on collection and trading of recyclable/recoverable materials due to price fluctuations based on market mechanisms and unstable domestic supply of recyclables.

On the other hand, the role of the informal waste sector is perceived to have low status and is not included in the SWM policy making and planning processes of the government. Their dominant role in waste recovery and diversion from final disposal is not recognised formally by the government and the society. Most of those in the sector live in make-shift shelters within or near the disposal facilities or in informal communities where they have no security of tenure. They are exposed to unsafe and unhealthy working conditions and have very limited access to health and other social services due to their economic conditions. Among the ranks of the informal waste sector are child labourers. Because of the income derived from recyclables, children are forced to help their parents augment the meagre income of the family by scavenging in the dumpsite. With the passage of the Act requiring the closure of all open and controlled dumpsites, there is likely displacement of thousands of these waste pickers throughout the country.

Higher in the informal waste recycling chain are the junkshops. They too are confronted by many challenges such as the unregulated proliferation of junkshops which gives rise to steep competition for materials, high cost of transporting goods and fluctuations in market demand and prices.

3.6 Thailand⁵¹

3.6.1 Current Situation of Waste Management and the 3Rs

During the past decade, the amount of waste has drastically increased. In 1997, the overall waste in Thailand was 37,102 tons per day or 13.54 million tons, which increased to 40,012 tons per day or 14.6 million tons in 2006 (excluding the amount of waste prior to disposal). Wastes within the municipality, including Patthaya, comprise 32 percent (12,912 tons per day) of the garbage while wastes outside municipalities constitute 47 percent (18,697 tons per day) of garbage, respectively.

The average rate of solid waste generation in 2006 was 0.63 kg/capita/day, from which the highest generated solid waste goes to Bangkok, Patthaya municipality and outside Patthaya with 1.5, 1.0, and 0.4 kg/capita/day, respectively.

The compositions of solid waste in every municipality in four regions are roughly the same. Organic and food wastes are the highest with 63.57 percent while plastics, papers, glasses, metals, clothes, wood, rubbish followed respectively.⁵² Table 3.6.1 illustrates the current state of wastes in Thailand.

Table 3.6.1: Current Situation of Wastes in Thailand – at a Glance

Category	Statistics	Data Source
TOTAL VOLUME OF WASTES (tons/year)		
Total Volume of Wastes in Urban Areas	14.6 million tons (2006) or 40,012 tons per day 8,403 tons/day in Bangkok (21% of the whole of Thailand) (2006)	PCD, 2008 Data from Environmental Center, Bangkok (2007)
Hazardous Medical Waste	Total Infectious Waste: 24,000 tons/yr (22% of the total hazardous medical waste) 69% general waste, 8% recycled waste and 1% hazardous waste	MOH and PCD, 2008
WASTE PER CAPITA (kg/person/day)		
Municipal waste	0.64 kg/capita/day	Municipal Waste Report, Waste TWG Secretariat, 2008
SOLID WASTE MANAGEMENT		
Collection of waste (% of waste generated)	>95% in Bangkok 86% in medium-sized cities	The 3Rs in Asia: Gap Analysis, AIT 2008
Solid waste disposal facilities	Sanitary landfill: 91 operational sites Under construction/rehabilitation: 20 sites Incinerator: 3 sites	PCD, 2008
E-WASTES		

⁵¹ This section has been prepared with substantial input provided by Pollution Control Department (PCD), Thailand at the “Thailand 3Rs Conferences” organised by PCD on January 2009.

⁵² Pollution Control Office, 2004. The Study Report of Local Municipalities’ Waste Composition Analysis and Survey Project.

	Industrial sector: 10,000 tons/yr E-waste from households: 90,000 tons/yr (2003)	MoI, 2003 cited in AIT, 2008
RECYCLE		
	22% (actual recycled in 2007) from recovery activities e.g. waste banks, municipal collectors and junk shops	PCD, 2008

The waste trading system is largely influenced by garbage traders (buy-sell) because they can both buy garbage from the poor or garbage collectors and directly contact the industries, which makes the recycled garbage consumption rate reach two to seven percent of overall garbage compounds.

Presently, the solid waste quantification prevention and control regulation has been implemented, emphasising the 3R enforcement regulation with 3R practices, 3R awareness campaigns, and even the promotion of financial support for 3R technology, research and development in cooperation with government sectors, including the Pollution Control Department (PCD), Department of Environmental Quality and Promotion, Ministry of Science and Technology, Ministry of Interior, and Ministry of Public Health. They contribute and cooperate by regulating the policy, with which the local authority can widely implement in their respective localities. Moreover, waste segregation groups, local communities, and NGOs⁵³ now recognise the crisis of waste management and have fully collaborated with the government in 3R activities. These collaborations have initiated many useful 3R practices throughout the country such as waste banks, EM fertiliser, and trash for eggs, etc.

The survey of the Pollution Control Office on successful cooperation found that 22 percent of the overall generated waste is recycled (approximately 3.19 million tons). More than 1,953 (2.99 million tons) of this amount is from local waste trading practices, waste banks, garbage for goods and waste buyers (only recycled wastes in community), while about 0.2 million tons have been treated with EM fertiliser.

Aside from segregation and recovery of solid waste at the local level, there are entrepreneurs who call back their products and packages for reuse such as out of order product exchange, recycle stamp return, deposit for packaging, and rewarding products. The above strategies certainly helped in reducing the amount of overall wastes to 64 percent particularly in 2006.⁵⁴

3.6.2 Existing systems and regulatory framework for waste management and the 3Rs

⁵³ Thai Creative Association, the Foundation of Media Center for Development, the Foundation for Environmental and Energy Development.

⁵⁴ Codify data from glasses and mirrors industry groups, papers and fiber industry groups, Thailand industry assembly, Thailand Metal and Iron Institute, Customs Department, Office of Industry and Economy, SCG Co., Ltd., and SCIG Co., Ltd.

Significant policies and legislations related to waste management and the 3Rs in Thailand are illustrated in table 3.6.2.

Table 3.6.2. Main Policies, Laws and Regulations related to Waste Management and the 3Rs in Thailand

Date	Title
Significant Legislation	
1997	Decentralization Act B.E. 2540 This Act includes management and conservation of natural resources and the environment and for the continuous decentralisation that has been legislated. The decentralisation to localities plan has been formulated including those of waste management.
1992	Enhancement and Conservation of National Environmental Quality Act This Act provides a frame for setting environmental standards, formulating environmental quality management plans, and announcing designated areas for protection and promotion of environmental quality. It establishes the EIA system to be applied to industrial disposal sites.
1992	Hazardous Substances Act B.E. This Act includes a provision on controlling and overseeing production processes, imports and exports, trading, transportation, storing, disposing and elimination of hazardous substances.
1992	Public Health Act This Act contains a provision to minimise risks associated with public health hazards. The Act may also be used to require hospitals to follow the same procedure in the collection and disposal of hospital waste, the operation of treatment and disposal facilities, fees for treatment and disposal of waste and toxic waste, an integrated approach to the management of hazardous waste and procedures for closing down waste disposal facilities.
1979	Factory Act B.E. 2535 The Factory Act controls the use of recycled materials. It contains provisions of the law associated with controlling and monitoring of industrial factories, including that in relation to environment and safety and the overall scope and guidelines for the management of solid waste and discarded substances from industrial operations.
	Public Cleansing Act B.E. 2535 This Act involves public cleansing in general regarding garbage, odour, nuisance and visual pollution.
Act	
1987	Customs Tax Rate Act Incentives such as reduction of rates or exemptions of certain customs duties provided for producers using recycled materials.
1979	Export Import Act This Act authorises the regulation of imports and exports of goods which can be applied to regulate imports of used materials or goods.
1977	Investment Promotion Act: This Act seeks to provide incentives for investors and may be used to promote investment in recycling businesses.
1975	Town Planning Act An added feature of this Act should be the mandatory requirement that, through consultative processes with concerned parties, the layout plan of urban areas should include areas designated for the construction of integrated waste disposal facilities.
1968	Industrial Standards Act This Act helps ensure the production of industrial products and the importation of industrial goods that meet required standards.
1926	Customs Tax Act The Act authorises the Department of Customs to collect taxes, duties, and fees for the import and export of goods. This may be applied to control the import of used goods and prevent the dumping of wastes in

	the country.
Action Plan	
2003	Drafted National Solid Waste Management Master Plan.
2008	Ministry of Natural Resources and Environment (MONRE) was named as the key agency in drafting a National Waste Management Plan. The Department of Pollution Control within MONRE is the agency responsible for drafting the plan which has already been approved by the National Environment Board. The National Waste Management Plan (NWMP) consists of several important measures covering social, economic as well as legal dimensions.
	National Plan on Environmental Quality Management: National Agenda on Waste Management

Source: Chula Unisearch, Chulalongkorn University. Thailand Environment Institute, 2007. PCD, 2008

3.6.3 Current progress of 3R National Strategy Development (as of August 2009)

In May 2006, the Thailand Environment Institute (TEI) requested PCD to host the Expert Meeting on Strategic Framework for 3R Promotion in Thailand. TEI also received financial support from MOEJ⁵⁵ and IGES⁵⁶ through UNEP Regional Resource Centre for Asia and the Pacific (AIT/UNEP RRC.AP) to carry out 3R research in order to promote the efficient use of resources and to generate ideas concerning 3R policy formation as well as development of suitable technology.

A series of four 3R conferences was held back to back with the 3Rs and waste management projects exhibition showcase in Phitsanulok, Khon Kaen, Songkla and Nonthaburi covering all four regions throughout Thailand. About 350 participants, 70 from the north, 90 from the northeast, 120 from the central and east region and 70 from the south, participated in the conference for the development of the 3R National Strategy and Action Plan for Thailand. The participants included local authorities, and representatives of community associations and the private sector.



The Draft of the 3R National Strategy including the waste management policy was presented and discussed during the series of conferences. Inputs, comments and contributions from the stakeholders will be incorporated in the revised draft National 3R Strategy for Thailand.

⁵⁵ Ministry of the Environment, Japan

⁵⁶ Institute for Global Environmental Strategies

Waste problems and waste management gaps in the municipalities in the respective regions of Thailand, waste separation at source and the promotion of 3R practices were discussed in the conferences during the open forum. Each representative from the local authority, academe and private sector, e.g., Wongpanit Separation Recycling Company, contributed to the forum, particularly presenting success stories on recycling activities including the case of Phitsanulok, the model city on waste recycling.

AIT/UNEP RRC.AP contributed through lobbying the promotion of the 3Rs and presenting examples of existing National 3R Strategy and Action Plans from developed and developing countries in the Asian region.

To cite, Wongpanit Separation Recycling Company presented good practices on waste separation recycling activities, training workshop for households and other practical workshops to the public on waste management in one of the 3Rs conferences held in Phitsanulok.

The conferences became the avenue to providing inputs and/or additional elements for the improvement of the draft National 3R Strategy, which were actively elaborated through experiences and success stories on 3R practices and solid waste management in the region.

In terms of market value, the private sector enterprise which plays a leading role in 3R businesses in Thailand is the Wongpanit Separation Recycling Company . Some say it is an icon of 3R business in Thailand. The company began as a small junk shop in 1974 in the province of Phitsanulok in the northern part of Thailand. The business covers purchasing of non-toxic industrial waste from local suppliers, and transforming it into a form of usable raw material for further manufacturing and products. The types of wastes and residues accepted by the business mainly include paper, metals, glass and plastic. It also welcomes other sorts of waste, such as coconut residues, used motor oil, vegetable oil and leftover foodstuff. Today, the Wongpanit Separation Recycling Company has a capacity of 75,000 tons per year, with paper comprising 22,500 tons, metals 15,000 tons, glass bottles 11,550 tons, plastic 16,500 tons, and others 9,500 tons.

3.6.4 Suggested focus of 3R National Strategy

Under PCD, the Waste Minimization Division of the Waste and Hazardous Substance Management Bureau drafted the National 3R Strategy in which waste management is divided into four steps: production, distribution, consumption and recycling, and treatment and disposal. The 3R strategies include promotion of resource efficiency, sustainable consumption, waste reduction and recycling,

as well as technical-based treatment and disposal (refer to figure 3.6.1 for details).

The highest target of this 3R strategic plan is to promote a waste reduction scheme and waste segregation system for maximum reuse and recycling prior to final disposal. The specific targets based on various means to bring waste back into use are explained below.

The 3R strategic plan aims to minimise waste by one percent of the total waste generated in 2011, three percent by 2016 and five percent by 2022.⁵⁷ The plan aims to achieve 30 percent material recovery in every community by 2011, 60 percent by 2016, and 90 percent by 2022, and to make use of each recycling material by reuse and recycling. The plan also aims to achieve at least five percent of energy recovery from used items by 2011, 10 percent by 2016, and 15 percent by 2022.

An important factor for the success of the 3Rs is the integrated management that covers all stages including design, production, distribution, consumption, recycling, and waste management and where participation of all stakeholders is formed. Other factors include adapting suitable technology for recycling, employing waste recovery, promoting 3R implementation in local communities, and exchanging information, technology, and experience on 3Rs implementation in the national and international arena. Therefore, PCD has drafted the National 3R Strategy to correspond to each step that generates waste as shown in figure 3.6.2.

⁵⁷ Draft National 3R Strategy of Thailand, PCD 2008.

Figure 3.6.1. Concluded Linkage of Strategies and Measures under National 3R Strategy, 2009

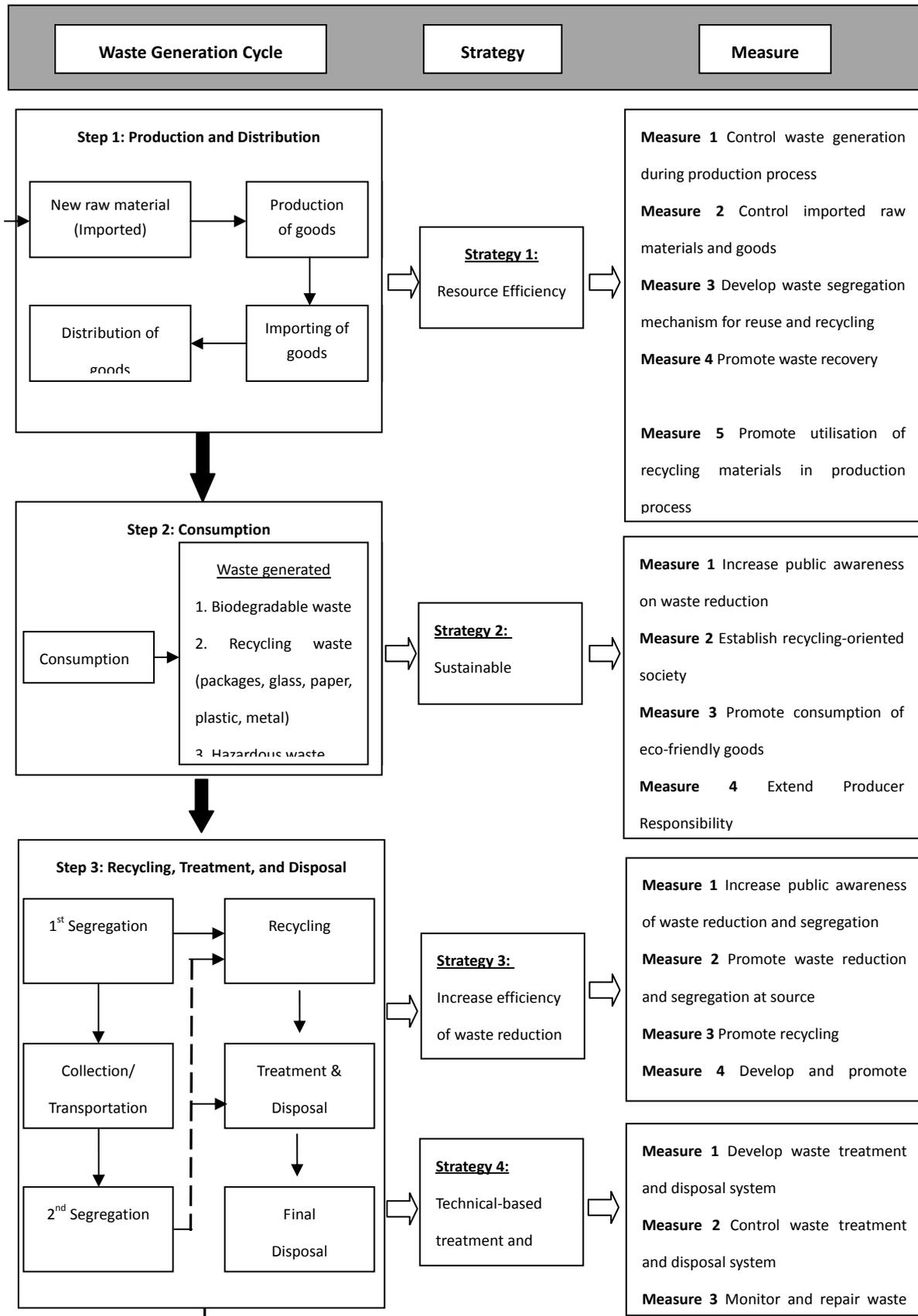
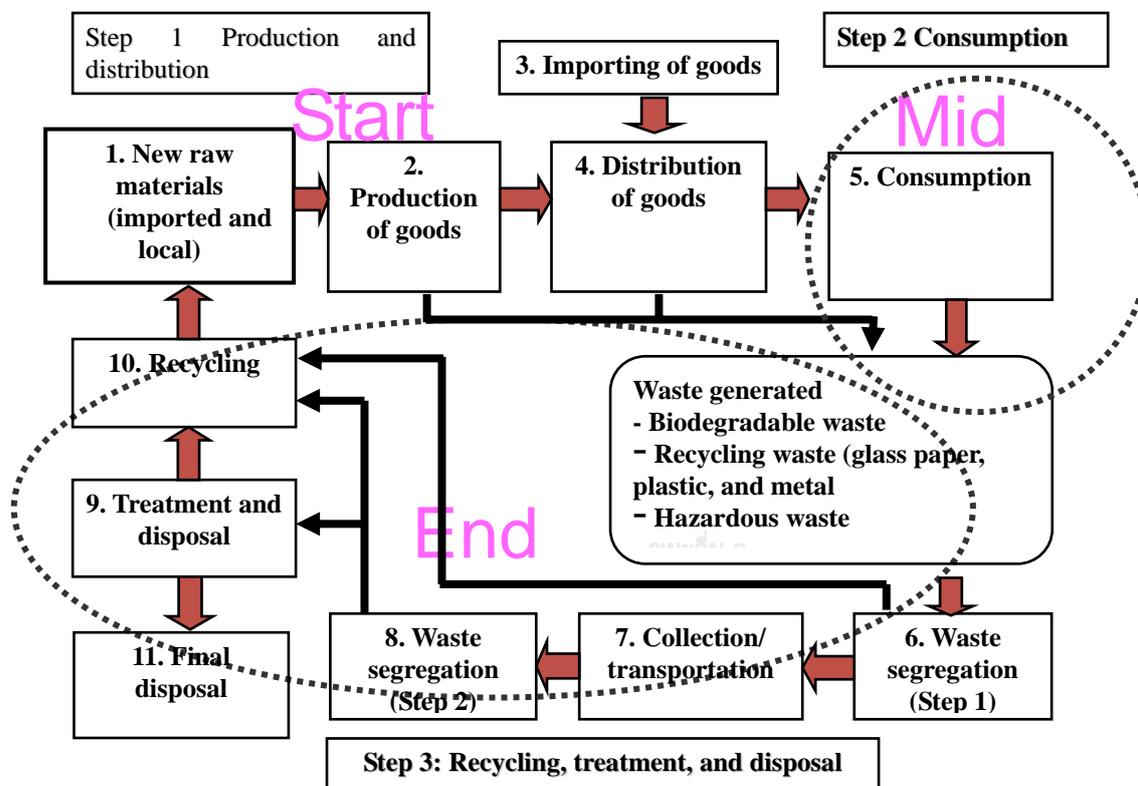


Figure 3.6.2: Cycle of Waste Generation and its Management (Draft Thailand 3R Strategy, 2009)



3.6.5 Future challenges

Thailand has established solid and hazardous waste disposal facilities, improved municipal waste management, and supported environmental friendly programmes. However, it still has issues related to reducing and recycling waste; developing treatment and safe disposal of solid and hazardous waste; enhancing the supporting institutional, regulatory, and financing framework; and broadening public and community participation. Waste recycling and reduction are relevant aspects and have the potential to prompt reductions in the quantity of waste disposed more than the introduction of taxes, fees or other incentives. Examples of waste recycling and reduction are reducing packaging waste, separating waste, and disseminating instructions concerning the proper waste management for household and other categories. In addition, effective training, support and increased staffing at the provincial and municipal level also need to fill the gaps in recycling activities built in many areas of the country.

Even if Thailand has an excellent administrative and management system that foresees issues and formulates plans, management gaps remain among regulatory control, information networks, and

promotion of 3Rs, which lacks a system for quality surveillance, and requires an increase public awareness and participation among the people and local government to implement the 3Rs.

With regard to solid waste facilities, regulatory mechanisms for municipal landfills have not been set, as landfills are not considered a pollution source under the 20-year plan. Open dumping of hazardous waste has been reported. Again, sustainable waste management cannot be accomplished successfully through the efforts of the public sector alone but needs increased public and local government awareness and participation as well.

3.7 Viet Nam⁵⁸

3.7.1 Current situation of waste management and the 3Rs

The Law on Environmental Protection (No. 52/2005/QH11) defines waste as substances in the solid, liquid, or gaseous form discharged from production, business, service, daily life or other activities.⁵⁹ Further, solid waste is described under the Decree on Solid Waste Management (No. 59/2007/ND-CP) as waste in a solid form, discharged from production, business, service, daily life or other activities.⁶⁰

Table 3.7.1. Definitions of Wastes in Viet Nam

Term	Description	Source
Waste	<ul style="list-style-type: none"> Substances in solid, liquid, or gaseous form discharged from production, business, service, daily life or other activities. Ordinary waste is classified into: (a) recyclable or reusable wastes; and (b) wastes to be destroyed or buried. 	(1)
Solid Waste	<ul style="list-style-type: none"> Waste in solid form, discharged from production, business, service, daily life or other activities. Solid waste includes ordinary and hazardous solid waste. Also categorised into daily-life solid waste and industrial solid waste. 	(2)
Hazardous Waste	<ul style="list-style-type: none"> Wastes containing elements that are toxic, radioactive, inflammable, explosive, abrasive, contagious, poisonous, or otherwise harmful. 	(1)
Waste Management	<ul style="list-style-type: none"> Activities of sorting, collecting, transporting, minimizing, reusing, reprocessing, treating, destroying and discarding wastes. 	(1)

Sources: (1) Law on Environmental Protection (No.52/2005/QH11), (2) Decree No. 59/2007/ND-CP.

According to the Viet Nam Environment Monitor 2004: Solid Waste (World Bank, MONRE, and CIDA), over 15 million tons of solid waste is generated per year, most of which come from municipal sources (12.8 million tons per year). The recent surveys and investigations by the Ministry of Natural Resources and Environment (MONRE) estimate that a total of 17 million tons of solid waste were generated in 2007. Due to the strong urbanisation process, the amount of municipal solid wastes is increasing rapidly to an average level of 0.7 - 1.0 kg/capita/day and is inclined to steadily increase by 10 to 16 percent per year (MONRE, 2009⁶¹).

Industries generate over 2.6 million tons of waste each year, including 2.51 million tons of non-hazardous waste and 128,400 tons of hazardous waste. While most of the industrial wastes

⁵⁸ This section is has been prepared based on the information available in the *National Strategy for Waste Reduction, Reuse and Recycling Until 2020 (Draft No. 4 of Feb. 2009)*, prepared by the Institute of Strategy and Policy on Natural Resources and Environment (ISPONRE), Ministry of Natural Resources and Environment (MONRE), Viet Nam.

⁵⁹ <http://faolex.fao.org/docs/pdf/vie64190.pdf>

⁶⁰ <http://faolex.fao.org/docs/pdf/vie72745.pdf>

⁶¹ MONRE, 2009. *National Strategy for Waste Reduction, Reuse and Recycling Until 2020 (Draft No. 4 of Feb.2009)*.

are produced in the industrial centres in the North and South, it is worth noting that about 770,000 tons of solid wastes are generated in craft villages (World Bank, MONRE, and CIDA, 2004).

Studies estimate that by 2010, municipal solid wastes will reach 19.5 to 20 million tons per year.⁶² ⁶³ Industrial wastes are also projected to grow up to 3.2 million tons per year by 2010 (World Bank, MONRE, and CIDA, 2004), and a recent study projects that it will grow even further, to as much as 8.2 million tons per year (CECTTT, VEPA, and MONRE, 2008). The same study estimates that the solid waste from craft villages may grow up to one million tons per year by 2010.

Table 3.7.2. Current Situation of Wastes in Viet Nam - at a Glance

Category	Statistics	Data Source			
TOTAL VOLUME OF WASTES (tons/year)					
Municipal Solid Waste	12,800,000 (50% urban, 50% rural)	World Bank, 2004.			
Industrial Solid Waste	Non hazardous: 2,510,000				
Hazardous Waste	Industrial: 128,400 Healthcare: 21,000 Agriculture: 8,600				
FUTURE WASTE PROJECTIONS					
By 2010 (ton/year)	Municipal solid waste: 20,000,000 (63% urban) Industrial waste: 3,200,000 (15% hazardous) Hazardous health care waste: 25,000 Household waste: 1.2-1.5 kg/pers/day (urban)	World Bank, 2004.			
WASTE PER CAPITA (kg/pers/day)					
	National: 0.4 (Urban: 0.7, Rural: 0.3)	World Bank, 2004.			
SOLID WASTE MANAGEMENT					
Collection of waste (% of waste generated)	71% in urban areas, <20% in rural areas 50-60% nationwide	World Bank, 2004. Draft Nat'l 3R Strategy			
No. of solid waste disposal facilities	Total number of landfills: 82 Sanitary landfills: 8	National Environment Report, 2005.			
CRAFT VILLAGES					
Number of villages	1,450 villages distributed across 56 provinces	World Bank, 2004.			
Non-hazardous Waste	774,000 tons/year (largely produced in the North)				
RECYCLE					
Craft Villages	Materials recycled	Inputs (tons/year)	Products (tons/year)	% recycled	World Bank, 2004.
	Plastics	25,200	22,900	90.9	
	Paper	51,700	45,500	80.0	
	Metals	735,000	700,000	95.2	
	Total	811,900	768,400	94.6	
Industries	At least 80 percent of non-hazardous industrial waste				

⁶² Centre for Environmental Consultancy, Training and Technology Transfer, Viet Nam Environmental Protection Agency, MONRE, 2008 (as cited in *National Strategy for Waste Reduction, Reuse and Recycling Until 2020 Draft No. 4 dated Feb.2009, Annex 3, Table 3-2*).

⁶³ World Bank, MONRE, and CIDA (2004). *Viet Nam Environment Monitor 2004 Solid Waste*.

	from selected industries is recyclable (Potential is high.)	
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Source: Prepared by UNCRD (data sources are indicated in the table)

While waste generation is projected to grow with the combined effect of increasing and changing consumption patterns, population growth and rapid urbanisation, practices of solid waste management still face many areas that need improvement. The National Strategy for Waste Reduction, Reuse and Recycling until 2020 (fourth draft) identifies the challenges to waste reduction, reuse, and recycling in the following areas: (1) increasing quantity, composition and toxicity of waste; (2) low awareness and sense of responsibility of communities on waste reduction, reuse and recycling; (3) poor waste treatment infrastructure and technology and weak 3R practices;⁶⁴ and (4) incomplete and weak legislation on waste management in general and the 3Rs in particular.

In terms of the national efforts on the 3Rs, the country presents a mixed picture of rich traditional practices and limited application of advanced technologies and approaches. On the traditional side, households in Viet Nam have a tradition of separating recyclable wastes with economic value to the buyers, who deliver these materials to recycling facilities and craft villages. According to the statistics from 2003, about 52,000 tons of paper, 25,000 tons of plastic and 735,000 tons of waste metal were recycled by craft villages in the northern region.⁶⁵ These practices are contributing to the reduction of wastes to a certain degree.

However, recycling technologies used by craft villages are not highly sophisticated and is reportedly causing serious environmental and health risks to the people living in the villages and the surrounding areas. Limited application of advanced technology is not an issue just for craft villages, but also for other industrial enterprises. Reportedly only about 200 out of 200,000 enterprises have been applying the cleaner production approach, which is very effective in reducing waste in production activities. While the Viet Nam Environment Monitor 2004 estimates that at least 80 percent of non-hazardous industrial waste from selected industries is recyclable, this high potential of recycling is yet to be fully explored.

3.7.2 Existing systems and regulatory framework for waste management and the 3Rs

In Viet Nam, waste reduction, reuse and recycling have been mentioned as one of the key issues

⁶⁴ According to the National Environment Report 2005, there are 82 landfills in the country out of which only eight meet hygienic and technical standards.

⁶⁵ World Bank, MONRE, and CIDA, 2004. *Viet Nam Environment Monitor 2004 Solid Waste*.

on environmental protection, among the directions and policies of the Party and the State. Overall direction has been provided in two major policy documents. One is the Strategic Orientation for Sustainable Development in Viet Nam (Viet Nam Agenda 21) of 2004, in which people are encouraged to save natural resources and energy; use environment-friendly products and packaging materials; minimise toxic and persistent wastes; recycle and use recycled products.⁶⁶ The other is the National Strategy for Environmental Protection Until 2010 and Vision Toward 2020 prepared in 2003, in which waste reduction, reuse and recycling (the 3Rs) is stated as one of the solutions for pollution control.

In terms of laws, the Law on Environmental Protection 2005 has allocated one specific chapter on waste management, and promotes the 3Rs as one of the key policies for environmental protection. The law highlights important key concepts such as individuals' responsibility for the 3Rs to minimise waste, Extended Producers' Responsibility, and at-source waste separation.

Under the overall direction provided by the umbrella policies as well as the Law on Environmental Protection 2005, a number of Decrees and Decisions have been issued. As one notable recent development, efforts have been made by the Government of Viet Nam to secure financial resources for waste management/the 3Rs. For example, through the Prime Minister's Decision dated 22 February 2005, it has been decided that the state will allocate no less than one percent of the total state budget for environmental protection tasks, and such expenses would include waste management activities, among others. A Decree has also been issued on 29 November 2007 regarding Environment Protection Charges for Solid Wastes, through which the scales of charges and its use have been stated (The charges are to be decided by provincial/municipal Peoples' Committees, and a part of the collected charges are to be retained locally for solid waste related activities.)

Another issue that must be highlighted is the critical need to review and streamline the existing laws in order to promote the 3Rs. For example, as there are efforts being made to promote composting as useful ways of converting waste to resources, the Ministry of Agriculture and Rural Development has recently banned the application of compost materials made from domestic waste for leafy vegetables for safety reasons. While this move may have good reasons behind it, the country must find ways to overcome these kinds of situations, for example by close collaboration among the related ministries to set appropriate technical standards for composting in order to ensure safety for consumers.

⁶⁶ http://www.va21.org/eng/va21/VA21_strategy_content.htm

Table 3.7.3. Main Policies, Laws and Regulations related to Waste Management and the 3Rs in Viet Nam

Viet Nam		
Type	No./Date	Title
Overall		
Decision	153/2004/QD-TTg of 17 Aug. 2004	The strategic orientation for sustainable development in Viet Nam (Viet Nam Agenda 21)
Strategy	May 2003	National Strategy for Environmental Protection Until 2010 and Vision Toward 2020
Law	No.52/2005/QH11 of 12 Dec. 2005	Law on Environmental Protection
Decree	No. 80/2006/ND-CP of 9 Aug. 2006	Guiding the Implementation of the Law on Environmental Protection
Decree	No. 21/2008/ND-CP of 28 Feb. 2008	Amending and supplementing a number of articles of the Government Decree No. 80/2006/ND-CP of 9 August 2006
Decree	No. 81/2006/ND-CP of 9 Aug. 2006	Sanction of administrative violations in the domain of the Law on Environmental Protection
Joint Circular	114/2006/TTLT-BTC-TNMT of 29 Dec. 2006	Guiding the management of environmental non-business funds
Hazardous Wastes		
Decision	No. 155/1999/QD-TTg of 16 July 1999	Regulations on Hazardous Waste Management
Decision	No. 23/2006/QD-BTNMT of 26 Dec. 2006	Issuance of Hazardous Waste List
Circular	No. 12/2006/TT-BTNMT of 26 Dec. 2006	Guidelines on the conditions and procedures for application preparation, registration, license granting to practice and the issuance of the code for hazardous waste management
Decision	No. 60/2002/QD-BKHCNMT of 5 Aug. 2002	Technical guidance on burial of hazardous wastes
Decree	No. 13/2003/ND-CP of 19 Feb. 2003	List of Dangerous Goods and Land-Road Transport of Dangerous Goods
Solid Wastes		
Decree	No. 59/2007/ND-CP of 9 April 2007	Solid Waste Management
Decree	No. 174/2007/ND-CP of 29 Nov. 2007	Environment Protection Charges for Solid Wastes
Directive	No. 23/2005/CT-TTG of 21 June 2005	Enhancing the Management of Solid Wastes in Urban Centers and Industrial Parks
Decision	No. 43/2007/QD-BYT of 30 Nov. 2007	<ul style="list-style-type: none"> • Promulgating the regulation on management of medical wastes • Repeals Decision No. 2575/1999/QD-BYT of the Minister of Health promulgating the regulation on management of medical wastes
Movements of Wastes		
Decision	No. 12/2006/QD-BTNMT	Issuance of the List of Scraps subjected to Automatic Permit for Imports as Secondary Production Materials
Decision of Minister of Trade	No. 2504/2005/QD-BTM	Regulations on Management of Businesses on Temporary Import for Re-export and Transit of Commodities prohibited or suspended from Import
Decision	No. 03/2004/QD-BTNMT of 2 April 2004	Promulgating the Environmental Protection Regulation applicable to discarded materials imported for use as production raw materials
Joint Circular	No. 002/ 2007/ TTLT-BCT-BTNMT of 30 Aug. 2007	Guiding the implementation of Article 43 of the Environmental Protection Law regarding criteria for and conditions on the import of scraps

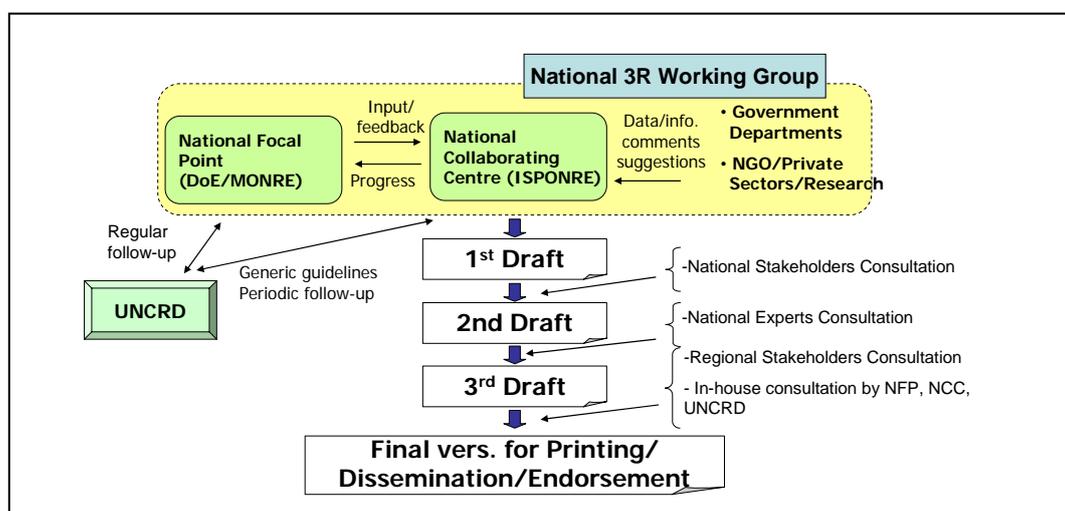
Source: Prepared by UNCRD, based on: (1) Official Gazettes available on Internet; and on (2) IDE/JETRO, 2007.

3.7.3 Current progress of 3R National Strategy Development (as of August 2009)

The National 3R Strategy formulation process originates from the needs assessment mission conducted by UNCRD in 2004 (refer Chapter 2 of this Report). During this mission, UNCRD held consultations with the Ministry of Natural Resources and Environment (MONRE), Ministry of Industries (MOI), and other relevant ministries and departments, through which the following needs/priorities were identified: (1) formulation of a strategy (cum-Action Plan) for waste minimisation through sustainable consumption/the 3Rs and life cycle approach; and (2) organisation of a training programme on the 3Rs/SPC tools. Subsequently, a keen interest to develop policies on the 3Rs was expressed by MONRE, and the Environment Minister requested UNCRD to mobilise the necessary technical and financial resources for formulating national 3R policies in Viet Nam drawing on the experiences of Japan.

In December 2005, a consultation meeting was held in Hanoi, in which representatives from relevant ministries/departments and national experts/researchers experienced in the field participated. As an outcome of the meeting: (1) the overall structure and key elements of the National 3R Strategy were developed and agreed upon; and (2) a consultative process was recommended that involve two national consultations and three regional consultations through which nationwide awareness will be raised and comments from key stakeholders will be received. ISPONRE was named as the National Coordinating Centre (NCC), which takes on the key task of formulating the Strategy in close consultation with the Department of Environment, MONRE, and other members of the National Working Group (Figure 3.7.1).

Figure 3.7.1. National 3R Strategy Formulation Process in Viet Nam



The National 3R Strategy formulation process began keeping the overall structure and following the recommended process as described above. Table 4 summarises the formulation process to date. The Pre-final draft was prepared, and was tabled at the donor consultation meeting on 26 March 2009. It is anticipated that the final draft will be brought to the Prime Minister’s Office in 2009 for official endorsement.

The formulation process of the National 3R Strategy of Viet Nam is unique in the sense that it is not only a process for Viet Nam alone. Rather, it has been viewed as a pilot case for the Greater Mekong Sub-region countries. The Strategy formulation process in Viet Nam is receiving financial support from the Asian Development Bank (ADB) through its project titled “TA-6289 – Greater Mekong Sub-region – Core Environment Program (CEP) and Biodiversity Conservation Corridors Initiatives (BCI) Phase 1 (2006-2009)” in addition to the original assistance from the Ministry of the Environment of Japan, and as such, the experiences in Viet Nam are envisaged to be shared with the GMS countries once the Strategy is endorsed, through means of regional workshops and other mechanisms.

Table 3.7.4. National 3R Strategy Formulation Process up to March 2009

Date	Activity
October 2007	• First Draft National 3R Strategy developed.
November 2007	• First National Stakeholders’ Consultation Meeting was held. • Over 60 participants were invited, including the relevant ministries of the central government, local government, academia, NGOs, and the private sector.
April 2008	• Second Draft National 3R Strategy developed.
May 2008	• Second Consultation Meeting (Experts’ Consultation) was held.
September 2008	• Third Draft National 3R Strategy developed.
September – October 2008	• Regional Consultations were held in Hanoi (Northern Region), Hue (Central Region), and Ho Chi Minh City (Southern Region). • The core participants of the Regional Consultations were local government officers, including the Urban Environment Company (URENCO) and representatives from the provinces.
February 2008	• Fourth Draft National 3R Strategy developed.
March 2009	• Pre-final Draft being prepared by international resource person (fine-tuning/technical editing).

Source: Prepared by UNCRD.

3.7.4 Suggested focus of National 3R Strategy

The objectives of the National 3R Strategy, its focuses, and suggested programmes are summarised below.

Figure 3.7.2. The Objectives, Targets and Major Contents of the Strategy

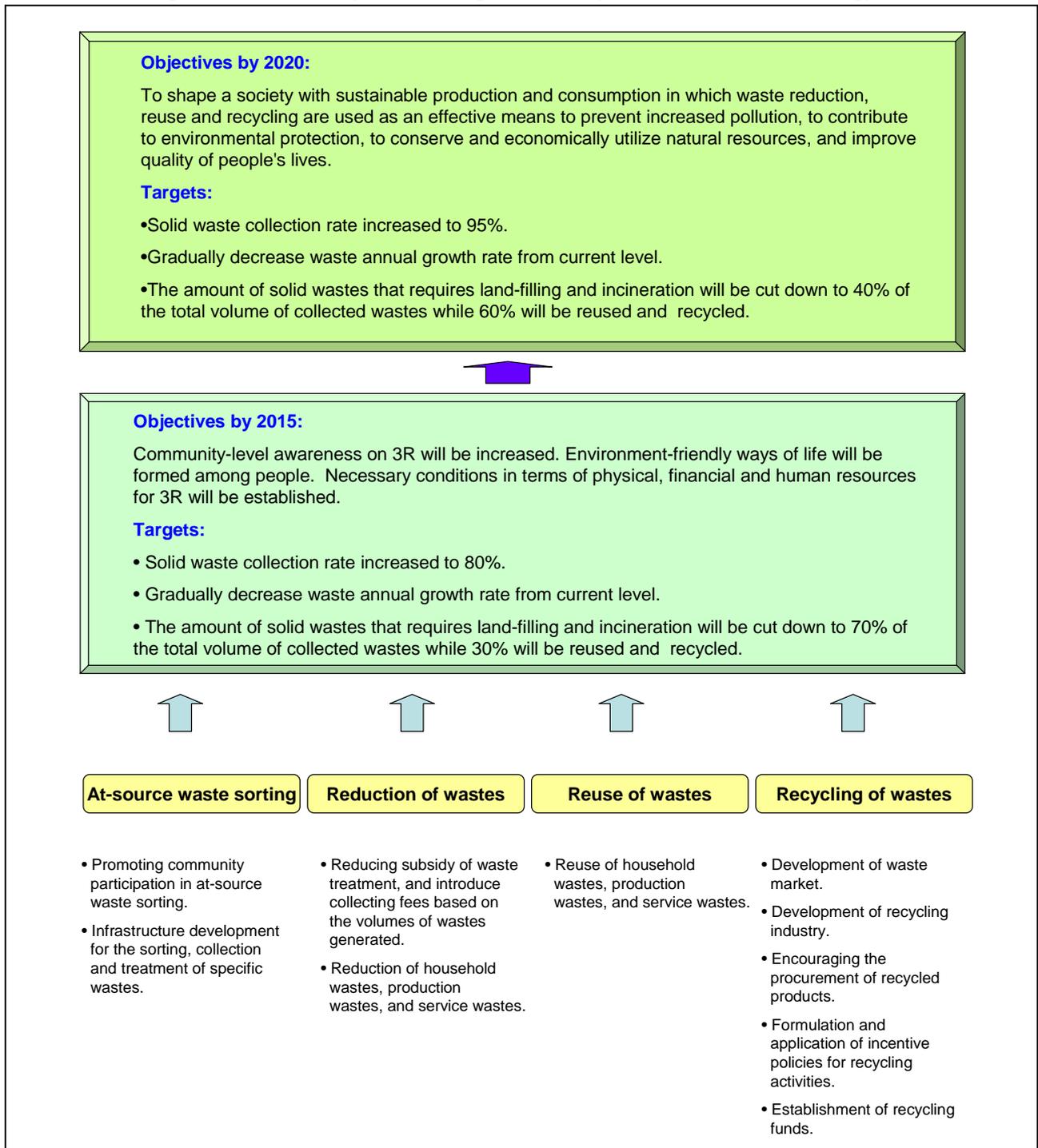


Table 3.7.5. Priority Programmes and Projects to be implemented under the Strategy

#	Programmes	Expected Outputs	Completion Time
Period 2009-2015			
1	Programme on development of policy and legislation system of waste reduction, reuse and recycling	Law on waste reduction, reuse and recycling and guidance decrees are developed, adopted and promulgated.	2012
2	Programme for propaganda, education and awareness raising for communities on waste reduction, reuse and recycling	Awareness of the community on waste reduction, reuse and recycling is raised.	2013
3	Programme on building capacity for waste collection, reuse and recycling in rural areas	Waste collection in rural area is promoted, collection rates improved, and recycling activities encouraged.	2014
4	Programme for development and application of economic instruments in waste management	Development of fees based on generated waste volume, recycling fee, deposit-refund system in collection of some types of wastes and other instruments.	2014
5	Programme to establish a network for solid waste reuse and recycling facilities that produce compost, materials or energy	Network of compost production facilities constructed and operated.	2014
6	Programme on at-source waste separation in 05 national cities and other 1 st grade cities	Municipal waste in 05 big cities and other 1 st grade cities is separated at source.	2015
7	Programme on improvement of quality and enhancing the use of composts in agricultural and forestry practices	Plans for quality improvement and usage promotion of compost are developed and implemented.	2015
8	Programme on research, piloting and replication of waste recycling technology	Research on new waste recycling technologies conducted, new foreign technologies introduced to Viet Nam.	2015
9	Programme on piloting recycling and treatment of construction wastes	Regulation on reduce, reuse and recycling of construction waste developed, approved and implemented.	2015
10	Programme on development of recycling industry	Orientation, guidelines and plan for development of recycling industries developed.	2015
Period 2016-2020			
11	Programme on reduce, reuse and recycling of packaging waste	Regulation on reduce, reuse and recycling of packaging waste developed, approved and implemented.	2016
12	Programme on recycling of electronic waste and home appliances	Regulation on reduce, reuse and recycling of electronic waste and home appliances developed, approved and implemented.	2017
13	Programme on enhancing and promoting green procurement/sustainable consumption	Green procurement plans of sectors, ministries and localities are developed and implemented.	2017
14	Programme on development of markets for waste and recycled products	Information, data base network on recyclable waste and recycled products of business entities is established and disseminated.	2018
15	Programme on recycling of end-of-life vehicles	Regulation on recycling of end-of-life vehicles developed, approved and implemented.	2019
16	Programme on development of legislation on cleaner production	Law on cleaner production and guidance decree developed, adopted and promulgated.	2020

Source: National Strategy for Waste Reduction, Reuse and Recycling Until 2020 (Draft No. 4 of Feb. 2009). The original table includes a column that indicates the focal point and collaborating agencies.

3.7.5 Future challenges

A wide range of comments were received from the stakeholders, Viet Nameese experts, and Japanese experts during the formulation process (table 3.7.6). While many of the comments have been reflected in the latest draft, some have to be kept in mind when implementing the Strategy. Among the key future challenges in implementing the Strategy are: (1) approaches for craft villages; (2) collaboration and coordination between the central and local levels and among line ministries; and (3) mobilising resources.

Table 3.7.6: Comments received from Stakeholders and Experts (not exclusive)

	Comments
Scope/ Programmes	<ul style="list-style-type: none"> • Specific references should be made on different types of wastes, such as hazardous waste, medical waste, construction waste, etc. • There is a need to establish a mechanism that includes at-source waste separation, transfer, and treatment. • Subsidies for collecting waste should be abolished step by step, and economic measures should be introduced to provide incentives for reducing waste. • Differences of localities must be taken into consideration in setting up the programmes. • Programmes may be reorganised by linking actions with national targets. • The Strategy may need to include some priority programmes addressing the industrial sector, as wastes from this sector are likely to increase significantly in the coming years.
Objectives/ Targets	<ul style="list-style-type: none"> • The Strategy needs a specific roadmap that shows what should be achieved by the respective target years (2015 and 2020). • The target year should be much sooner for high priority programmes. • It would be useful to stipulate how these target figures are being set, and what goal is to be achieved by reaching the targets. • Target figures are ambitious and may be difficult to achieve within the given timeframe.
Roles and Responsibilities of Stakeholders	<ul style="list-style-type: none"> • The Strategy must make reference to and clarify the roles/responsibilities of all stakeholders involved, including mass organisations, local governments, environmental police, etc. • Roles of the line ministries must be clearly presented. • There is a need for close/integrated coordination amongst the government, private sector and research institutes in order to scale up pilot activities.
Informal Sector / Craft Villages	<ul style="list-style-type: none"> • The Strategy must clearly state its position regarding the Craft Villages (i.e. they are the “key existing actors” in recycling). Will they be strengthened, or are they expected to become replaced by the formal recycling industry? • People who currently get their incomes from informal reuse and recycling activities need to be offered realistic ways to earn their living if these activities are replaced by more technologically advanced options.
Laws and Regulations	<ul style="list-style-type: none"> • Completion of the legal framework is critical and must be done as highest priority. • Existing laws and regulations must be streamlined and made consistent with each other to promote the 3Rs. For example under the current law/regulations, compost cannot be applied to growing leafy vegetables (It is only allowed for fruit trees.) This means that the market for compost is small.
Financial Issues	<ul style="list-style-type: none"> • The Strategy should propose financial mechanisms (e.g., how fees will be collected for municipal solid wastes and for other specific wastes), and how such fees would be used. • There should be a rough cost estimate for each programme, together with the source of funds (domestic, international, etc.).

Source: Extracted from the comments received from the Regional Consultations (Sept. / Oct.2008) and the Japanese Experts’ Meeting (Sept. 2008).

Firstly, the Viet Nam Government must clarify its position regarding craft villages, who are the main actors in the recycling sector at present. If they are expected to continue playing a significant role in this sector, they need to be empowered in various ways, most importantly in technological aspects, in order to reduce the environmental and health risks posed to the villagers and the surrounding communities. If they are expected to become replaced by a formal and more technologically advanced recycling industry, then they must be offered realistic ways to earn their livelihoods as their source of income would gradually disappear.

Secondly, there is a crucial need for closer coordination and collaboration among stakeholders, especially among the line ministries and also between the central and local authorities. This is particularly important in the implementation phase, as many of the activities would require substantial support/collaboration of a number of ministries. For example, promotion of compost for agriculture production would require collaboration with the Ministry of Agriculture and Rural Development (MARD) and the Ministry of Trade and Industry.

Thirdly, Viet Nam is no exception in that they would face challenges in securing the needed financial resources for implementing the Strategy. As mentioned in section 3.7.2, there have been some efforts recently by the government to secure financial resources for waste management through allocations from the state budget, and also through setting environmental protection charges. The challenges are in the state and local authorities' hands as to how such funds can be planned and used effectively. Meanwhile, MONRE is also keen to get the needed support from the international community, and is planning to have a donor consultation in late March 2009 to brief them about the National 3R Strategy. With the strong commitment of the Viet Nameese Government together with potential support from donors/international organisations in key areas, the 3R Strategy would be able to smoothly shift into the implementation phase.

Annex

From National 3R Strategy Development to Strategic Implementation of the 3Rs

On March 9, 2009, the Asia 3R High-Level Seminar was held in Tokyo to (i) facilitate shared understanding on the progress of 3R promotion especially, those of National 3R Strategy development in Asian countries; (ii) facilitate shared understanding of the needs and priorities with regard to capacity development in the 3Rs areas; (iii) identify incentives and co-benefits to implement the 3Rs; (iv) identify challenges and opportunities in real implementation of the 3Rs at both national and regional levels; and thus (v) foster common understanding among participating countries on the establishment of the Regional 3R Forum in Asia.

The seminar recognised that the development of National 3R Strategies has been a positive step forward from the stage of policy dialogues and dissemination of the 3R concept to the stage of strategic implementation of the 3Rs in cooperation with international organisations and aid agencies. The seminar recognised too the importance of 3R policies and programmes not only limiting the field of down-stream waste management but also linking to the upstream issues such as waste minimisation and resource efficiency through institutional and technical capacity development. The seminar also acknowledged the importance of climate change mitigation through appropriate programmes and activities related to the 3Rs and waste management, including application of relevant environmentally sound technologies and measures.

Towards the strategic implementation of the 3Rs, the seminar recognised the need for a wide range of collaboration among potential stakeholders at local, national and regional levels to support appropriate project development and their implementation, research networking, improved information sharing on best practices, training and capacity development, and also to achieve co-benefits. Participants acknowledged the importance of appropriate awareness raising among civil society through the demonstration of clear social, economic, environmental, and health benefits as a key to effective promotion and implementation of the 3Rs.

Based on the above points, the seminar identified the following as the priority areas and activities for the 3Rs;

1. Mainstreaming the 3Rs in National Environmental and Economic Policies and Programmes through further development of inter-agency and multi-stakeholder collaboration which have been initiated through National 3R Strategy development processes, as well as through the introduction of various policy instruments on waste management by local and central government authorities. Clear demonstration of the

economic benefits can be instrumental in influencing national finance and planning authorities. While linking the 3Rs to the highest possible policy level, mutual consultation and cooperative arrangements with international organisations and aid agencies could be useful. With the support of the international community and aid agencies, the countries are ready to initiate the implementation of priority activities such as those identified in the National 3R Strategy: for example, formulation and/or improvement of laws and regulations and inter-institutional policies to create a supportive and conducive framework for promoting 3R implementation as well as environmentally sound waste management; establishment of an effective recycling system; addressing resource efficiency and application of clean technologies in the industrial sector, with consideration of cost-benefit aspects as well as social/cultural/local conditions.

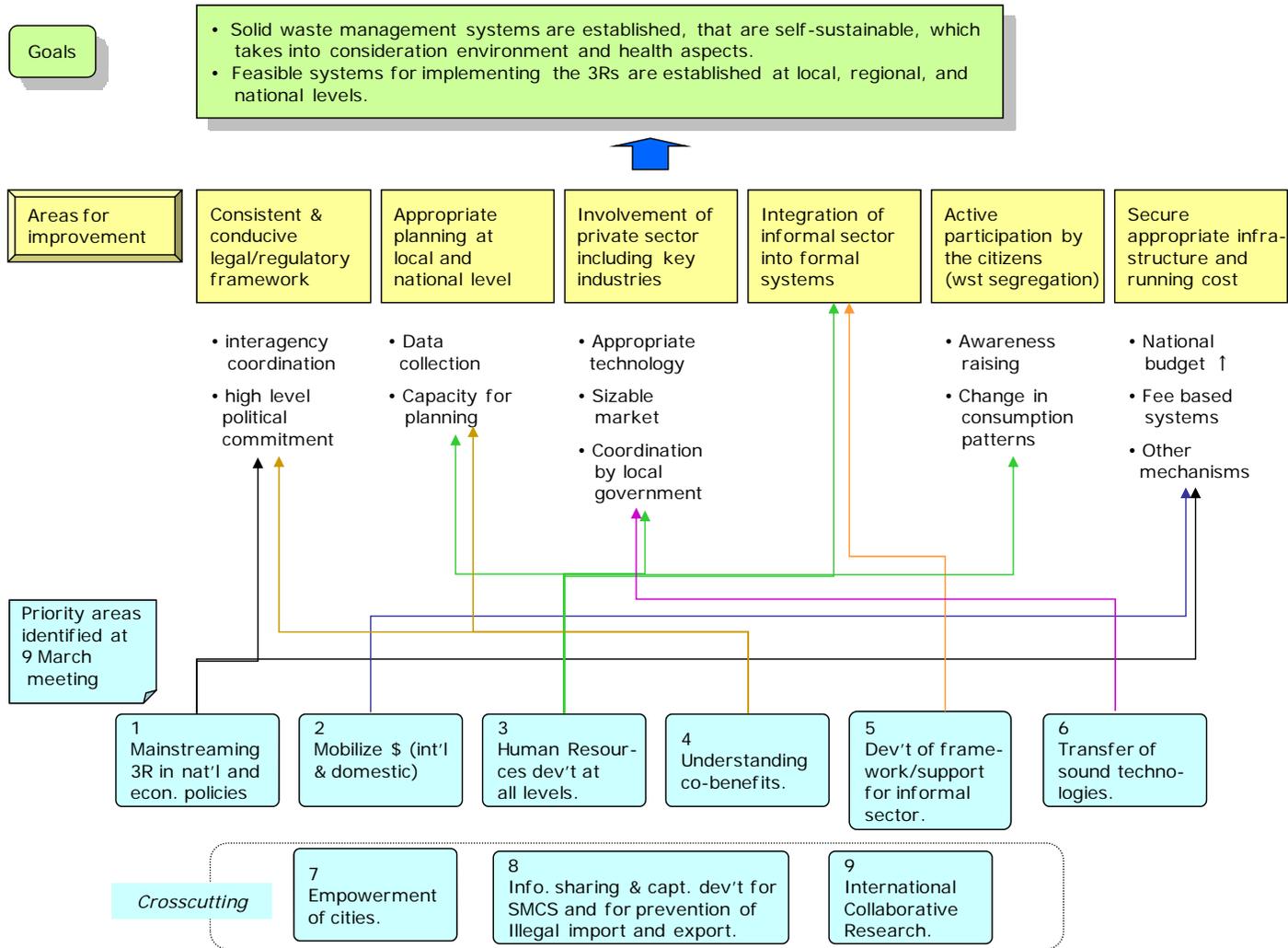
2. Mobilising financial resources in cooperation with bi-lateral and multi-lateral aid agencies for the implementation of 3R promotional activities. These financial mechanisms, which could be materialised through dialogues between high-level governmental officials and donor agencies, along with domestic financial resources available, could be utilised to identify and disseminate various good practices, including the transfer of environmentally sound technologies and practices, in harmony with the local culture and socio-economic conditions. The possibilities to mobilise carbon financing for the implementation of the 3Rs should be explored further.
3. Development of human resources both at local, provincial, and national levels to overcome waste management issues as well as to facilitate efficient diffusion of 3R knowledge and technologies. Importance should be attached to strategic alliance with the private sector through PPP to build 3R infrastructure in line with public health standards and environmental conservation. There is a need to build capacity of regional governments to follow alternative paths of development: waste to energy and resource efficient economies.
4. Understanding of both the main benefits of the 3Rs and the co-benefits in the forms of improvement of environmental management and competitiveness among industrial sectors, achieving resource and energy efficiency, climate change mitigation, and MDGs, by integrating the 3Rs in local/national waste management policies, urban strategies, integrated water resources management, and social welfare strategies. The 3Rs and waste to energy can complement one another based on local conditions.
5. Develop necessary organisational frameworks/support to deal with informal sectors who play an important role in the waste chain, but generally operate without proper health care and labour policies.
6. Development and transfer of environmentally sound technologies for waste management and the 3Rs that are applicable in the context of prevailing socio-economic conditions in each country through collaboration among stakeholders such as national governments, provincial, local governments, the private sectors (including inter-industrial collaboration), and the research and scientific community, which can also contribute to addressing regional disparities. Waste intensive industries may be given special attention in this context. Collaboration with materials industry is a key for technical capacity development for 3R-related technologies and industries. The markets for recycled materials may need to be stimulated through measures such as green procurement.
7. Empowering cities to be core clients for financing and investments towards implementation of 3Rs/materialising Sustainable or Eco Cities.
8. Information sharing and technical capacity development for the establishment of a sound

material cycle society in each country and on the regional level, and for prevention of illegal import and export of wastes in recognition of the obligations under the Basel Convention.

9. International collaborative research on improving the ability to discuss advanced implementation of theory and technology into policy and disseminate policy relevant information in close cooperation with advanced research institutes, centres of excellence and international organisations.

The figure 4.1 shows the relationship between priority areas identified by the Asia 3R High-level Seminar and areas of improvement for the strategic implementation of the 3Rs as further steps for the regional cooperative scheme which is expected to be facilitated by the Regional 3R Forum in Asia.

Figure 4.1 Priorities of Strategic Implementation of the 3Rs



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