Issues Paper

Asia 3R Conference

30 October to 1 November, 2006

Mita Conference Hall, Tokyo, Japan

19 October, 2006

Ministry of the Environment, Japan
Institute of Global Environmental Strategies, Japan

19 October, 2006

Contents

Abbreviations

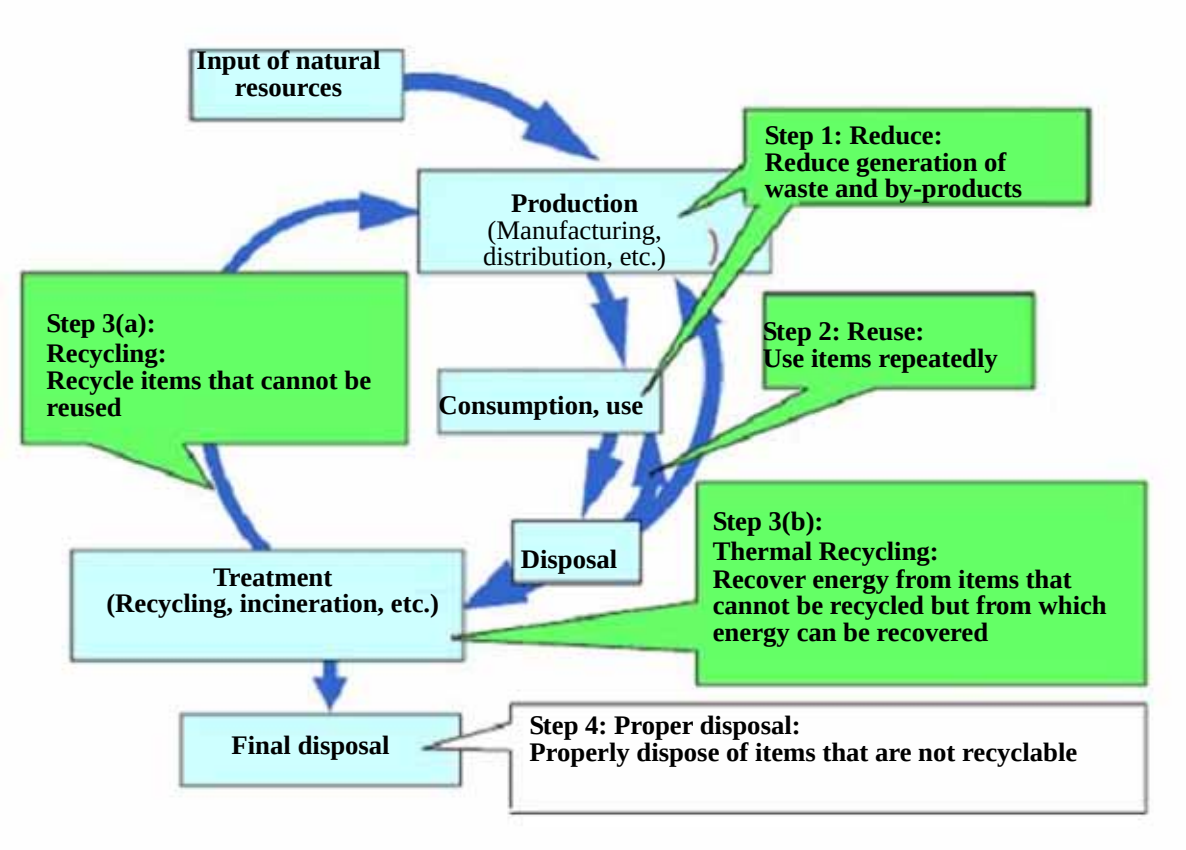
3Rs	**Reduce, Reuse and Recycle**
ADB	**Asian Development Bank**
AIT	**Asian Institute of Technology**
CDM	**Clean Development Mechanism**
EPR	**Extended Producer Responsibility**
EU	**European Union**
IGES	**Institute of Global Environmental Strategies**
JICA	**Japan International Cooperation Agency**
NGOs	**Non-governmental Organizations**
PPP	**Polluter Pays Principle**
UNCRD	**United Nations Centre for Regional Development**
UNEP	**United Nations Environment Programme**
WEEE	**Waste Electrical and Electronic Equipment**
WTO	**World Trade Organization**

1. Progress in the 3R Initiative

The Concept of the 3Rs

In June 1992, the United Nations Conference on Environment and Development (the "Earth Summit") was held in Rio de Janeiro, Brazil. Following the conference, a number of international agreements have been reached in order to progress towards sustainable development.

For the shift to a socio-economic system based on "sustainable consumption and production", the creation of a sound material-cycle society is of particular importance. This would restrain wanton consumption of natural resources, raise resource productivity and lower environmental impact. The keys to building such a society lie in the promotion of the 3Rs (Reduction of solid waste generation, Reuse of resources and products, and Recycling) and the environmentally sound management of waste, which is a prerequisite to the promotion of the 3Rs (see Figure 1-1).



Progress in the 3R Initiative (see Fig.1-2)

At the G8 Summit held in June 2004 at Sea Island, Georgia, in the United States, Mr. Junichiro Koizumi, then Prime Minister of Japan, proposed the launch of the 3R Initiative.

The Summit adopted the “Science and Technology for Sustainable Development: '3R' Action Plan and Progress on Implementation” as a part of the G8 Action Plan.

The 3R Initiative has the objective of promoting 3R activities on a global scale. Following the agreement at the G8 Sea Island Summit, the Ministerial Conference on the 3R Initiative held in Tokyo in April 2005 formally launched the 3R Initiative. The 3Rs Action Plan set forth the following five points to be pursued through the 3R Initiative:

1) To promote the 3Rs through visions and strategies;
2) To reduce barriers to the international flow of goods and materials in relation to recycling and remanufacturing;
3) To encourage cooperation among the various stakeholders;
4) To promote science and technology for the 3Rs; and
5) To promote cooperation between the developed and developing countries in this field.

The outcome of the Ministerial Conference was presented at the G8 Summit held at Gleneagles in the United Kingdom in July 2005. “The Gleneagles Plan of Action for Climate Change, Clean Energy and Sustainable Development” stated that the 3R Initiative is “an important step towards encouraging more efficient use of resources and materials, which increases economic competitiveness whilst decreasing environmental impacts”.

As a follow-up to the Ministerial Conference on the 3R Initiative, a Senior Officials Meeting on the 3R Initiative was held in Tokyo, in March 2006. In the pursuit of international promotion of the 3Rs, delegates from countries and international organizations exchanged experiences and opinions on advanced activities, identified possible directions of their programmes and projects, and discussed issues pertaining to transboundary movements of 3Rs-related goods, materials and products.

In July 2008 at the G8 St. Petersburg Summit, the G8 members agreed to the St. Petersburg Plan of Action which includes “We will set targets as appropriate taking account of resource productivity” to further efforts related to the 3R Initiative.

The 3R Initiative will be further promoted to give impetus to the G8 Summit in Germany in 2007, and in Japan in 2008.

The Asia 3R Conference is held in this context with the objective of promoting concrete 3R-related actions by sharing common understanding on the significance of the 3Rs in Asia.

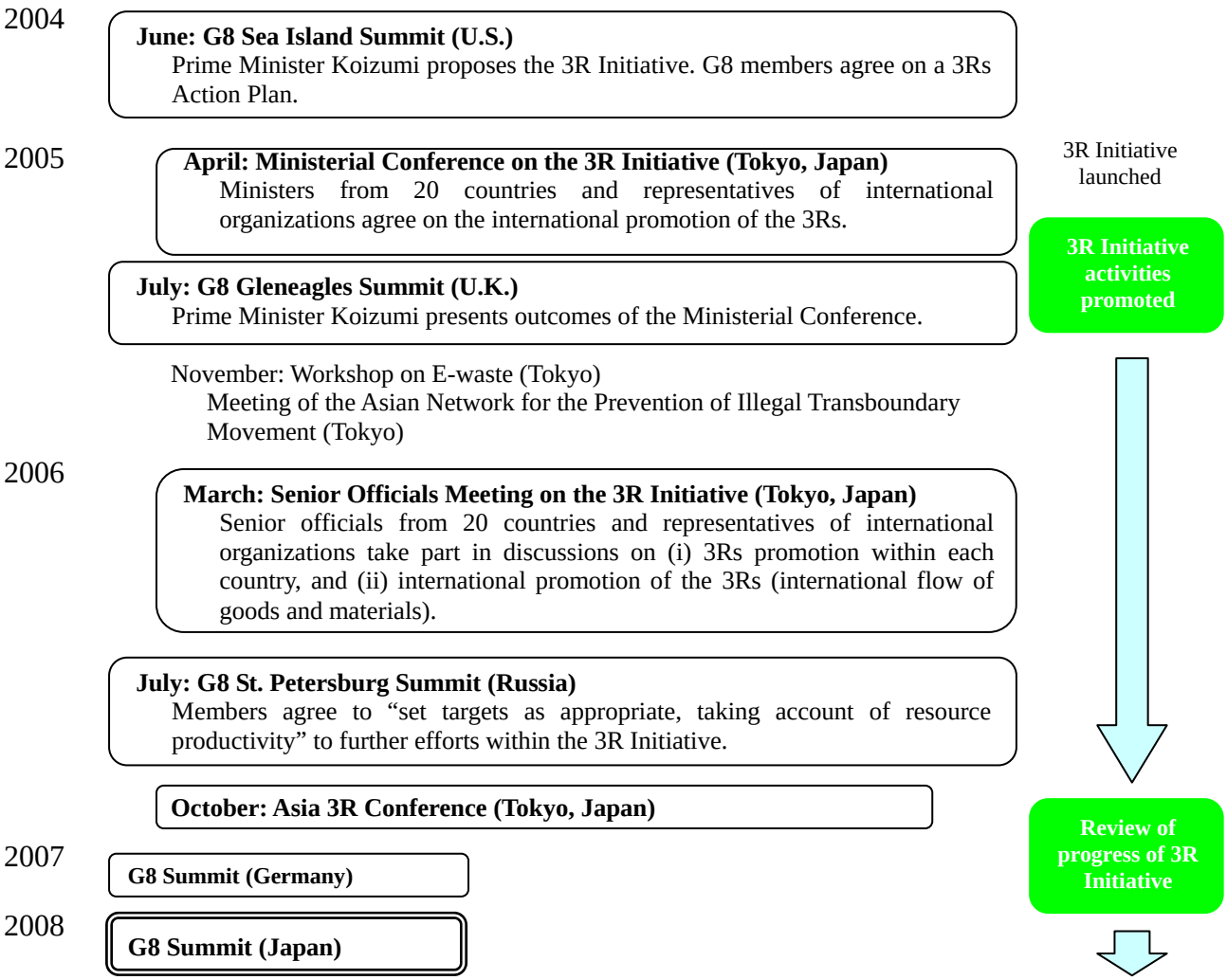


Fig.1-2: Evolution of the 3R Initiative

2. Promotion of the 3Rs in Asia

Importance of the 3Rs in Asia

Asia has some of the highest concentrations of production bases in the entire world and is achieving rapid economic growth. The Asian region accounts for approximately half the world's population and 26% of the world's GDP (UNDP 2005 Human Development Report). In Asia, many signs of modernization are appearing at a rapid rate, including concentration of population 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 this solid waste, transboundary movement of 3Rs-related goods, materials and products, and soaring prices of resources.

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

There is a pressing need for sustainable development in Asia to realize more efficient use of resources and materials and to reduce the environmental impact of consumption and production activities. Promotion of the 3Rs, through the integration of policies on waste management and resource management, is one of the keys to realize sustainable production and consumption in Asia.

The Asia 3R Conference

A series of expert meetings and policy dialogues on the 3Rs identified "municipal organic waste management", "medical waste management" and "E-waste management" as priority issues in Asia. While, in general, the 3Rs inherently promotes sustainable use of resources in the entire product lifecycle from production, distribution and consumption to disposal, in Asia, priorities should focus on the environmentally sound management of these urgent waste-related challenges by utilizing the 3R concept.

Examples of challenges for "municipal organic waste management" include hygienic issues, water contamination by organic pollutants, and air pollution from spontaneous combustion in open dumping site. To cope with these challenges, the 3Rs will provide an economically pragmatic solution.

"Medical waste" is a mixture of several different types of waste including infectious waste,

toxic waste such as waste medicine, hazardous wastes such as infectious items, used medical equipment, radioactive waste, and non-hazardous waste. The medical waste stream often includes high quality metal and plastics. Thus, there is concern that improper management such as reuse activities without appropriate equipment and knowledge can cause direct harm to human health. Therefore, to avoid harm, environmentally sound management of medical waste is an urgent challenge in addition to the 3Rs in the other areas.

Because regional economic development in Asia has stimulated production and consumption of electronic and electrical products and home appliances, quantities of "E-waste"(electronic and electrical waste) are expected to increase rapidly. While E-waste contains recyclable precious metals and high quality plastics, pollution prevention during the recycling process is necessary to deal with hazardous heavy metals (used along with recyclable precious metals), Freon in thermal insulation materials, and brominated flame retardants during the recycling process. Promoting the 3Rs of E-waste carefully considering the above challenges, E-waste management can be a successful example of resource recovery carried out along with along with pollution prevention practices.

Discussions at the Asia 3R Conference will centre on specific actions to address the three concrete challenges mentioned above in the promotion of the 3Rs in Asia. With the expectation of using the results of the conference in other 3R-related challenges, the conference will discuss basic directions of 3R promotion in Asia. Also, the conference is expected to accelerate further international cooperation in this area through the sharing of information and experiences on the progress of 3Rs-related programmes and projects that are being implemented by countries and international organizations in this region. Furthermore, promotion of the 3Rs in Asia is expected to contribute to the global promotion of the 3Rs by providing inputs to international policy making processes such as the G8 Summit and the International Panel on Sustainable Resource Management.

On-going Programmes and Projects related to the 3R Initiative in Asia

In Asia, 3R activities have started to be implemented in each country. Also, as shown below, several programmes and projects embodying the concept of the 3Rs have been launched already by international organizations and others:

Assistance for development of national 3Rs strategies
UNEP(United Nations Environmental Programme), UNCRD(United Nations Centre for Regional Development), Ministry of the Environment of Japan, IGES (Institute for Global Environmental Strategies) and others, have taken the lead in extending assistance to Thailand, Viet Nam, Indonesia and other countries in the development of their respective national strategies for promotion of the 3Rs.

Environmentally sound management of E-waste in the Asia-Pacific region
At the suggestion of the Secretariat of the Basel Convention, activities directed toward environmentally sound management of E-waste in the Asia-Pacific region have been in place since 2005. These include a pilot project, capacity building in countries party to the Basel Convention, and the strengthening of public-private partnerships. Thirteen countries and one economy are taking part: Cambodia, China, Hong Kong (China), India, Indonesia, Malaysia, Papua New Guinea, Philippines, Singapore, Republic of Korea, Sri Lanka, Thailand,

Viet Nam, and Japan.

The Asian Network for Prevention of Illegal Transboundary Movement of Hazardous Wastes
Based on the proposal from Japanese government, officials from Asian countries in charge of the Basel Convention have formed a network to exchange information, hold workshops, operate a website that contains information on pertinent legislation in member countries, and formulate guidelines to help ensure lawful transboundary movement.

3R Knowledge Hub
The Asian Development Bank (ADB), the United Nations Environment Programme / Regional Office for Asia and the Pacific(UNEP/ROAP) and the Asian Institute of Technology (AIT) have agreed to work together to create a reservoir of knowledge and technologies related to the 3Rs and disseminate this information in Asia.

Sub-regional 3R Expert Meetings
ADB, UNEP, and IGES are organizing workshops which bring together international experts on specific challenges in 3Rs promotion in Asia. As an initial step, the South Asia 3Rs Expert Meeting was held in Kathmandu, Nepal, from 30 August to 1 September, 2006. Approximately 40 experts on the 3Rs from research institutes, international organizations, governments and NGOs reviewed the present situations and challenges of South Asian countries in the fields of “municipal waste,” “industrial waste,” “medical waste” and “E-waste,” and discussed issues on the promotion of the 3Rs in South Asia in three working groups;“society,” “finance and economy,” and “technology”.

Asia-Pacific Solid Waste Management Expert Meetings
Solid waste management and 3Rs researchers together with experts from Japan, China, Republic of Korea, Thailand and other Asian and Pacific countries are working together to share basic knowledge in waste management and to promote joint research. Creation of an international network of solid waste management and 3Rs experts is being considered as well. The first such meeting was held in Tokyo in October 2005. The second meeting is scheduled for, 23 - 24 November 2006 in the city of Kitakyushu, Japan.

In addition to these projects and programmes, JICA (Japan International Cooperation Agency) implemented a survey in Malaysia on national strategy for waste minimization by incorporating the 3Rs concept. Also, in Hanoi, Viet Nam, a 3R project on separation and recovery of municipal organic waste has been started by JICA.

3. Partnership and International Cooperation for the 3Rs

The Asia 3R Conference has the aim of stimulating concrete actions by enhancing the common understanding of the significance of promoting the 3Rs in Asia. The conference will first introduce on-going 3R-related programmes and projects in Asia. Then, issues of "partnership and international cooperation for the promotion of the 3Rs" will be discussed as a cross-cutting theme in a working group session.

"Partnership and international cooperation for the promotion of the 3Rs" includes the following two major themes: (i) partnership among stakeholders, and (ii) international cooperation.

Partnership and cooperation among central and local governments, citizens, 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. Cooperation among stakeholders contributes greatly to the improved sustainability of solid waste management systems and recycling systems. For example, in the province of Nonthaburi, Thailand, the municipal government and the local communities cooperate with each other very closely. In Bangladesh an NGO by the name of *Waste Concern* is playing a major role in city waste management, linking the local community, public sector and business. In Surabaya, Indonesia, the local community takes the lead in waste management. Singapore promotes public-private partnerships.

Also, the informal sector plays a major role in recycling in several countries. Therefore, it is a challenge how to evaluate the role of informal recycling and if and how to collaborate with these activities. Also, in some countries policy response is needed to address the activities of waste pickers at interim waste collection points and final disposal sites.

Equally indispensable for the promotion of the 3Rs is an international perspective, because the high degree of economic interdependence in the Asian region is expected to lead to greater imports and exports of materials and products.

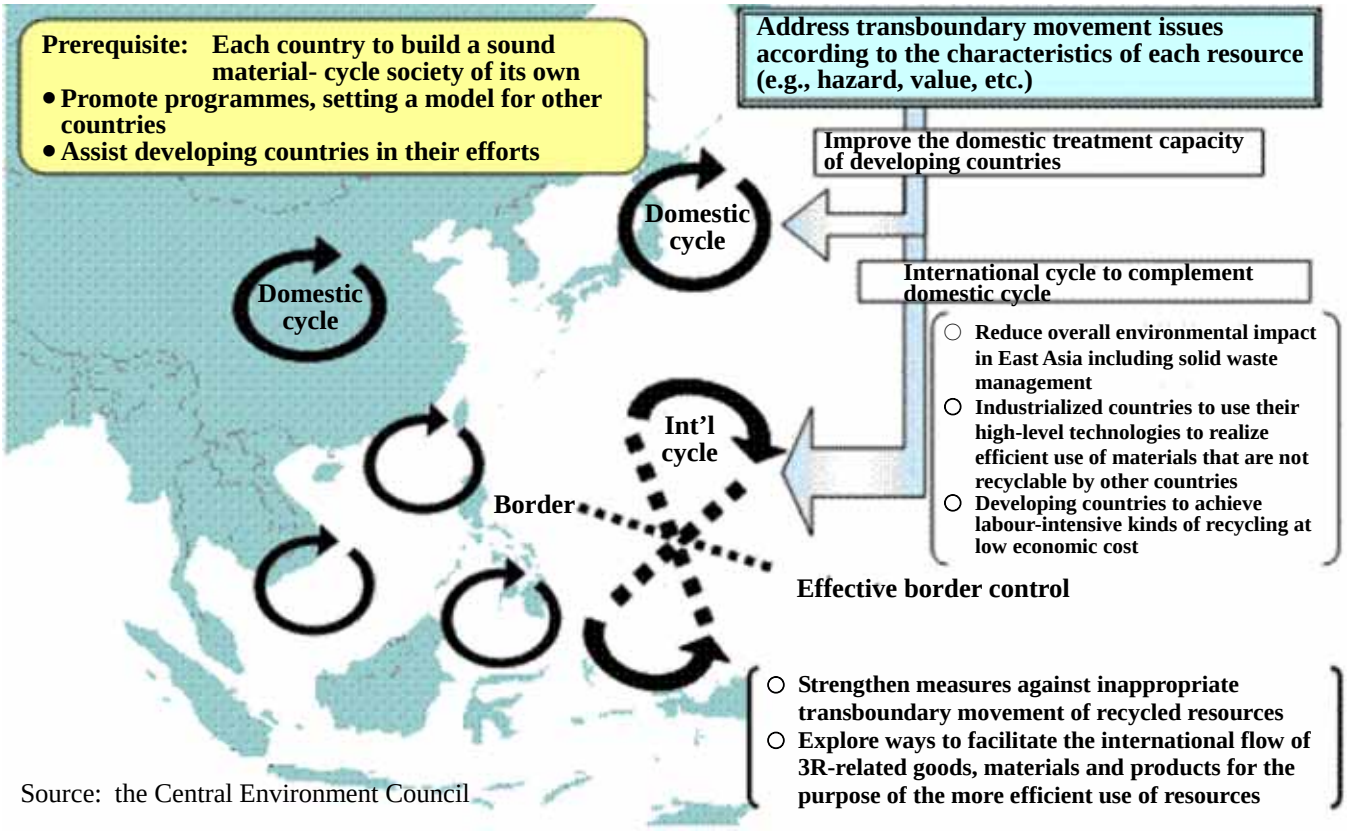
In order to construct an international material-cycle society through the 3Rs, it is considered necessary to (i) build a sound material-cycle society in each country and (ii) establish and reinforce the framework to prevent illegal trade of wastes, and then (iii) facilitate export/import of 3R-related goods, materials and products. (see Fig. 3-1). The discussion on international cooperation should be based on this idea.

To bring about a sound material-cycle society in each country, a series of international cooperation techniques have been already implemented in the form of training of human resources, technical cooperation, and the provision of necessary equipment. For example, providing key equipment to countries in urgent need of environmentally sound waste management can contribute to establishing a system for a sound material-cycle society. Donating secondhand equipment or selling it at low cost, in addition to donating new equipment, can be considered as a transboundary reuse activity. In this case, one should ensure that used equipment is sufficiently durable. Also, cooperation to exchange know-how on providing collection and maintenance systems is desirable.

Private enterprises have started to establish international networks of remanufacturing for

their used, exported products collected from various countries through their international supply chains. Also, in Asia some recycling businesses have state-of-the-art advanced technologies for the recovery and remediation of hard-to-manage materials. Therefore, one of the major issues for the international promotion of the 3Rs must be how to extend the potential contribution of private enterprises.

The development of a list of environmental goods and services under the Doha Mandate of the World Trade Organization (WTO) is in progress. Also, the WTO Non-Tariff Barrier Initiative to Eliminate Barriers to Trade in Remanufactured and Refurbished Products is under discussion. This kind of initiatives contributes to the international promotion of the 3Rs. On the other hand, illegal trade of waste disguised as recyclable materials or remanufactured goods can be a concern. Also, there is the issue that the burden associated with final disposal of goods could increase in importing countries.



Source: the Central Environment Council

Fig.3-1: Vision for an International Sound Material-Cycle Society

4. Specific Challenges for the Promotion of the 3Rs and the Environmentally Sound Management of Waste in Asia

For the 3Rs and environmentally sound management of waste, the Asia 3R Conference deals with three specific issues: "Municipal Organic Waste Management", "Medical Waste Management", and "E-waste Management". These specific issues are common in the Asian region and require urgent responses.

4-1 Municipal Organic Waste Management

Background

About 40 to 70% of solid waste generated in Asian countries currently under management is biodegradable waste and is characterized by high levels of moisture content (see Fig.4-1). Major components of municipal wastes are also biodegradable, as is organic waste from the food industry and agricultural waste.

In major cities in Asia's developing countries, solid waste management costs accounts for 20 to 50% of the city's total expenditures.[1] In Kathmandu, Nepal, the costs of collection and transport of solid wastes[2] amount to 93% of the total.[3]. It is also pointed out that only 50 to 70% of the population is served in cities where a solid waste management service is believed to be provided.[4]

Fig: 4-1 Composition of Solid Waste in Major Cities in Asia

Waste Categories (average percentage of wet weight)							
City/Country	Bio-degradable	Paper	Plastic	Glass	Metal	Textiles & Leather	Inerts (ash, earth) & others
Indonesia[1)]	74	10	8	2	2	2	2
Dhaka[1)]	70	4.3	4.7	0.3	0.1	4.6	16
Kathmandu[1)]	68.1	8.8	11.4	1.6	0.9	3.9	5.3
Bangkok[1)]	53	9	19	3	1	7	8
Hanoi[1)]	50.1	4.2	5.5		2.5		37.7
Manila[1)]	49	19	17		6		9
India[1)]	42	6	4	2	2	4	40
Karachi[1)]	39	10	7	2	1	9	32
Japan[2)]	31.8	33.6	13.9	4.5	3.0	4.2	9.0

Source: 1) Zurbrugg, C. (2002), "Urban Solid Waste Management in Low-Income Countries of Asia How to Cope with the Garbage Crisis" Presented for: Scientific Committee on Problems of the Environment (SCOPE) Urban Solid Waste Management Review Session, Durban, South Africa, November 2002
2) Ministry of the Environment, Japan (2006), "(Heisei 17 nendo Haikibutsu no Kouiki Idou Taisaku Kentou Chosa oyobi Haikibutsu nado Junkan Riyouryou Jittai Chosa Houkokusho (2005 fiscal year report of survey on response for wider-area movement of waste and current situation of quantity in circular use of waste and other materials)"

[1] C. Visvanathan and T. Norbu (2006) "Reduce, Reuse and Recycle: The 3Rs in South Asia" presented at 3R South Asia Expert Workshop, Kathmandu, Nepal, August 30th to September 1st, 2006
[2] Glawe, U., Visvanathan C., Alamgir, M. (2005): Solid Waste Management in Least Developed Asian Countries – A Comparative Analysis", International Conference on Integrated Solid Waste Management in Southeast Asian Cities, 5-7 July, Siem Reap, Cambodia.
[3] Glawe, U., Visvanathan C., Alamgir, M. (2005): Solid Waste Management in Least Developed Asian Countries – A Comparative Analysis", International Conference on Integrated Solid Waste Management in Southeast Asian Cities, 5-7 July, Siem Reap, Cambodia.
[4] C. Visvanathan and T. Norbu (2006)

Therefore, collaboration among the various actors such as central and local governments, enterprises and local communities can enhance the promotion of various 3R activities with regards biodegradable waste and, as a result, can contribute to the saving of resources and governmental expenditure on collection and transportation in most of the countries as well as the protection of the environment.

Key points for the 3Rs in Municipal Organic Waste Management

(1) Reduction of Municipal Organic Waste Generation

For 3Rs promotion, reduction of organic waste generation should be a priority. For example, in response to lifestyle change arising from urbanization, it is necessary to promote the reduction of food waste generation from households, restaurants and food retailers, and foster efforts by the food industry to reconsider the procurement of ingredients, packaging, and production processes to reduce waste.

(2) Segregation

Municipal waste is, by its very nature, a mixture of a large variety of materials. The same applies to household waste. Therefore waste segregation is a prerequisite to recycling. In developing countries, waste is generally segregated at three levels, 1) at a household and community level, 2) in the process of collection and transportation by local governments, and 3) at final disposal sites by waste pickers. However, even in cases where the citizens and the municipal government are environmentally conscious and a high degree of segregation is carried out at source, the absence of recycling industries, among other factors, often precludes effective recycling and the sorted waste ends up being mixed with unsorted waste in open dumping sites.

(3) Composting

The composting of biodegradable waste is a highly effective approach to alleviate the pressure on the waste management budget of the municipal government and also to improve the hygienic conditions and bring about revenue and employment opportunities for the community. In order to achieve these kinds of benefits from composting, it is a prerequisite to implement multitiered segregation and sorting of generated biodegradable waste, taking into account the points mentioned in (2) above.. The key to success lies in the marketing of not only the sorted metals and plastics, but also the compost. However, the replication of local initiatives in other areas and the realization of economies of scale for efficient and economic production are major challenges. Effective economic, and policy schemes are needed to meet these challenges. In addition, it is necessary to create an overall plan incorporating both infrastructure and management aspects. This would include better understanding of the need for product quality driven by the consumer (mainly farmhouses) as well as the achievement of product quality and policies that improve citizen's perception of benefits and address fears relating to agricultural products made through waste composting. This area is eligible for consideration as a CDM project, as promotion of composting yields a substantial reduction in methane emissions..

(4) Energy recovery

Energy recovery can be another effective solution for the implementation of the 3Rs for biodegradable waste. The main route usually considered for energy generation from biodegradable waste is methane fermentation. This technology is eligible for consideration as a CDM project as it contributes to the reduction of fossil fuel consumption.

In addition, concerns on bio-fuel production are rapidly growing along with the steep rise in energy and resource prices. Meanwhile, extensive deforestation of rain forest for the bio-fuel production leads to serious environmental problems. Therefore, it is suggested that biodegradable wastes from household and agricultural activities should be utilized in the bio-fuel production as alternative resources.

Suggested topics for discussion

(1) Challenges for promotion of 3Rs and biodegradable waste segregation

- Characteristics of biodegradable waste in each Asian country. Barriers to reduction and recycling of municipal organic waste; experiences and information useful for overcoming such barriers
- Challenges in segregation, collection, and transportation for mitigating increasing waste management cost
- Challenges on financial and technical solutions
- Challenges and opportunities for stakeholder cooperation in the 3Rs for municipal organic waste and successful case

(2) Challenges related to composting

- Effectiveness for promotion of composting. Economic/policy schemes to promote composting, especially for replication and extension of good practices to other communities

(3) Challenges on energy recovery

- Example cases of bio-energy recovery from municipal organic waste, both successful and otherwise
- Synergy with climate change measures; use of municipal organic waste as a resource
- Cooperation among the related governmental agencies

4-2 Medical Waste Management

Background

Waste generated at medical institutions by medical practices includes infectious waste with microbiological hazard (biohazard) risks. Because medical waste contains, or is feared to contain, infectious pathogens, it must be managed with the utmost caution to protect human health and environment. Of specific concern are items such as blood-stained cotton and gauze, bandages, syringes, scissors, medical knives, ampoules, gloves, and blood sampling devices.

In general, of all waste generated by health care providers, infectious waste consists around 15-20% (WHO 1999). When infectious waste is mixed with others, the mix should be treated as hazardous and it is difficult to achieve the 3Rs due to high processing/management costs. In addition, medical waste disposal mixed with other waste leads to a situation where people such as sanitation workers and waste-pickers can easily come into contact with hazardous and infectious medical waste. As a result, it is feared that these people are exposed to a high risk of being infected with hepatitis or HIV, among others. Moreover, if infectious wastes such as used syringes are reused without disinfection treatment and recycled, it causes additional health risks to those who are treated by these medical gears.
.

Key points for Medical Waste Management

Challenges in the management of medical waste can be summarized in the following two points: (1) how infectious waste and non-infectious waste ought to be appropriately segregated and discharged by health care providers to reduce waste that must be handled carefully as infectious; and (2) how infectious waste ought to be appropriately managed.

(1) Appropriate segregation and discharge

In many Asian countries, infectious waste is not sorted at the stage of generation in medical institutions, and is collected, transported and disposed of with other various waste. On the other hand, some countries and leading medical institutions are making efforts to build systems to enforce appropriate segregation of medical waste thorough control of the waste segregation at the medical institutions.

(2) Appropriate treatment of medical wastes

There are several treatment technologies for medical wastes such as incineration, sterilization and disinfection, particularly important for infectious medical wastes. For the purpose of better management of medical waste as well as protection of sanitary workers, it is important to ensure the separation of these medical waste throughout the process of collection, transport and treatment. The following table shows the advantages and disadvantages of treatment technologies.

Table 4-2 Advantages and disadvantages of treatment technologies

Treatment technologies	Advantages	Disadvantages
Incineration	• Reduction of waste volume and weight • Acceptability for all waste types • Heat recovery potential	• Public opposition, larger space and footprint required • High investment and operation costs • Formation of dioxins and furans linked to serious health problems including cancer • High maintenance, testing and repair costs • Vulnerability to future stringent emissions standards
Autoclave Disinfection	• Encourages reuse and recycling • Commercially available in varying sizes from desktop to industrial size • Low investment and operating costs • Ease of operation • Creation of residue that is less hazardous than incineration	• Inability to change waste volume and waste appearance • Lack of suitability for some waste types *e.g. low level radiation, toxic contaminant* • Production of uncharacterized air emissions and odor problems
Microwave Disinfection	• Significant volume reduction • Absence of liquid discharges	• High investment cost and increased waste weight • Lack of suitability for some waste Types. Potential to expose workers to contaminated shredder • Production of uncharacterized air emissions
Chemical Disinfection	• Significant waste volume reduction • Ability to make waste unrecognizable and easy to use • Waste deodorization • No combustion by-products	• Possible toxic by-products in wastewater • Lack of suitability for some waste types • Production of uncharacterized air emissions • Need for chemical storage and use
Electron Beam Gun Technology	• Waste volume reduction (20%) • No toxic emissions or discharge (except for small amounts of ozone) • A room temperature process and nothing is added *e.g. steam, water, chemicals, etc* • Well-automated technology and requires little operator time	• High investment costs and operation costs • Shields and safety measures are necessary to prevent workers from ionizing radiation
Plasma pyrolysis	• Suitable for all types of waste and results in reductions up to 80-90% in volume and in weight	• Suitable for very large hospitals and regional treatment facilities • Still at the demonstration scale

Source: Visvanathan & Adhikari (2006), Original source: Healthcare without Harm (2001); WHO (1999)

Suggested topics for discussion

(1) Challenges faced in promoting the efforts of medical institutions

- Guidelines for the classification of medical waste into infectious or non-infectious waste
- Dissemination and educational activities for medical institutions
- Clarification of a judgment method of infectiousness / non-infectiousness by a medical institution, and its security method
- Thorough responsibilities for treatment by medical institutions
- Economic incentives to support small- and medium-sized medical institutions

(2) Appropriate treatment technologies

- Treatment technologies of medical waste applicable in developing countries
- Establishment of standards and policies necessary for the operation of appropriate treatment facilities

(3) Challenges for constructing appropriate management systems

- Formulation of strategies, institutions and guidelines at a national level
- Institutional framework for promoting appropriate management (treatment manager, biohazard mark, and traceability, etc.)
- Coordination between the waste management department and the health department
- Awareness raising and educational activities by NGOs and communities
- Avoiding the remix
- Establishment of communal waste management among large hospitals, small clinics and municipalities

4-3 E-waste Management

Background

E-waste is defined as waste from electronic and electric products and goods, typically include TVs, refrigerators, air conditioners, washing machines, PCs, mobile phones. Components such as printed circuit boards inside these home appliances are also included as E-waste.

(1) Increased generation of E-waste

Electric and electronic industries continue to grow in many countries of the world, and a huge quantity of new products is supplied to markets every day. In many cases, this prosperity has led to the discharge of many electric/electronic products before their intrinsic product life is reached. Such products discharged prematurely are reused as second-hand merchandise, recycled metal and plastics for resource recovery, or disposed of as a waste.

It should be noted here that overall economic development is most likely to result in a decrease in the reused quantity, and an increase in E-waste. Societies in an earlier phase of economic development have a large demand for second-hand electric/electronic products, leaving relatively little room for recycling and waste disposal. When an economy grows and people enjoy greater disposable income, however, they demand newer, higher quality and cleaner products, pushing the demand down for second-hand products and sending larger quantities of used products to be recycled or disposed of. This trend is particularly noticeable in Asia, which is achieving remarkably high rates of economic growth. Asia should be making adequate preparations to deal with the large-scale generation of E-waste, which will undoubtedly become a reality in the near future.

(2) Influences of hazardous substances

E-waste mostly contains cadmium, lead and many other heavy metals and chemicals that, if discharged without any treatment, could cause adverse effects on human health and the living environment. Simple recycling or disposal of such E-waste without appropriate additional measures poses threats of adverse impacts on the health of workers and local residents as well as on the environment of the neighborhood.

To address the issue of such hazardous substances, the EU has launched measures at the level of product manufacturing by way of the RoHS Directive. In most Asian countries, however, no special actions have been initiated even though a few countries are spearheading efforts.

(3) Difficulty of appropriate management

Under the present market conditions of high metal prices and low-cost labour, E-waste is recycled by the private-sector through the working of market forces. However, if this situation changes and resources are available at low cost, schemes for sound management of E-waste must be structured. This may cause a serious challenge for

appropriate transportation and treatment of E-waste. Many municipalities lack the appropriate technology and capacity for sound management, because it is quite different in form and nature from conventional household waste (municipal organic waste, waste plastics, etc.).

(4) Transboundary movements

Although this is not only limited to the E-waste category, what could be considered as waste in one country can become a viable second-hand products in another country, then recyclable resources in a third, and again become waste in another country, all depending on the economic, social and technological situations of the country in question. This characteristic is particularly apparent in Asia, which has a very large country-to-country variance in terms of economic development.

In many Asian countries, import and export of E-waste for the purpose of recycling is prohibited or regulated to follow the procedures prescribed in the "Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal". However, in countries prohibiting or restricting import of E-waste, it is reported that sometimes the illegal import and export is done under the disguise of second hand goods and recycled improperly, causing health damages and environmental pollution in the recipient countries.

In addition, despite transboundary movement and its transboundary impact, the lack of an international mechanism to manage E-waste and the substances contained therein makes it difficult to collect the data and statistics that are necessary for the formulation of national policy measures.

Key points for the 3Rs of E-waste

(1) Promotion of international management practices

Since E-waste issues are closely associated with the international flow of materials, international collaboration on the Asian regional level is indispensable for its management. Therefore, at the suggestion of the Secretariat of the Basel Convention, the "Environmentally Sound Management of E-waste in the Asia-Pacific region" project has been in place to promote environmentally sound management of waste electrical and electronic equipment (WEEE) since 2005. The Project will make detailed inventories of E-waste in countries, and implement pilot projects for segregation, collection, repair, and remanufacturing and recycling of E-waste. Through activities that reflect and synthesize outcomes of the project (such as preparing a guideline for national policy making), expected results are improved build capacity and strengthen public-private partnerships to deal with E-waste issues in countries party to the Basel Convention.

However, additional international collaboration in the Asian region is required to address the E-waste problem, including the strengthening of controls on exports and imports, preparation of statistical data for information gathering on the volumes of these exports and imports, and the reduction in and disclosure of information on toxic substances in

the product traded in the region.

Furthermore, it is important to investigate the potential of the utilizing the advanced technologies and systems used by some nations and private firms to realize a transboundary environmentally sound recycling system.

(2) Domestic promotion of the 3Rs of electronic and electric products

Quite often, electronic and electric products are still usable after being disposed of. Therefore, efforts to "Reduce" through longer use as well as promotion of "Reuse" to minimize E-waste generation are needed. Also, a life cycle approach to the environmental impact of products is necessary for policy formation to encourage industry to design and develop recycling-friendly products. Then, reuse of product parts and materials can be improved by establishing and operating E-waste specific treatment facilities. In principle, these activities for E-waste should be first implemented domestically.

(3) Environmentally sound management of residues from the 3R activities

Because E-waste is quite different in form and nature from conventional household waste and it is often difficult to be collected and treated in an environmentally sound manner. Technologies for the treatment of residues from recycling and laws and policies to promote recycling of home appliances and electronic products are valuable tools to establish a system for the environmentally sound management of E-waste. For this purpose it is necessary to make an inventory of E-waste to understand what kind of electronic products are produced, sold, imported, traded and disposed of domestically.

The market mechanism alone is not enough to secure environmentally sound management of E-waste. Therefore, the institutionalization of recycling through collaboration of public and private sectors is necessary. In this case, careful consideration of policy options such as Polluter Pays Principle (PPP), tax mechanisms, deposits, direct charging mechanisms, and EPR is necessary. Also, information sharing should be encouraged to raise awareness among stakeholders of the health and environmental impacts of improper treatment of E-waste.

Suggested topics for discussion

Challenges facing the prevention of environmental human health damage associated with E-waste and securing the environmentally sound flow of materials include the following:

(1) Promotion of international efforts

- Structuring of cooperative schemes among Asian countries
- Establishment and improvement of export/import controls
- Compilation of statistics to keep track of export/import quantities (data processing by HS code, etc.)
- Assistance to promote wider use of technologies for appropriate treatment and

recycling

- Regional-scale efforts aiming to reduce the use of hazardous substances in product manufacture, as well as information disclosure
- Transboundary utilization of private enterprises with advanced recycling technologies

(2) Improvement of domestic management schemes

- Introduction of a legal system for the promotion of recycling and environmentally sound management of E-waste
- Intra-governmental collaboration
- Facilitate the development and diffusion of appropriate treatment, e.g. through development of guidelines
- Consideration of cost sharing mechanism for recycling and environmentally sound management (PPP, tax system, deposit, payments, EPR, etc.)
- Design and development of recycling-friendly products
- Information and knowledge sharing through collaboration with industries and NGOs

Bibliography

Books, Articles and Reports

ADB, IGES and UNEP (2006), *Promoting Reduce, Reuse and Recycle in South Asia; Synthesis Report of 3R South Asia Expert Workshop* Kathmandu, Nepal 30 August – 1 September, 2006

Glawe, U., Visvanathan C., Alamgir, M. (2005): Solid Waste Management in Least Developed Asian Countries – A Comparative Analysis", International Conference on Integrated Solid Waste Management in Southeast Asian Cities, 5-7 July, Siem Reap, Cambodia

Health Care Without Harm (2001):Non-Incineration Medical Waste Treatment Technologies. available online [http://www.noharm.org/library/docs/NonIncineration_Medical_Waste_Treatment_Techn.pdf] as of August 2006

IGES (2005), "Networking International Recycling Zones in Asia – towards improvement of resource efficiency and solutions for environmental problems in developing countries", *IGES Policy Brief* #1, IGES, Hayama

IGES (2006), *3Rs in Asia*, APFED Policy Dialogue Working Paper Series No.2, IGES, Hayama

JICA (2005), *Supporting Capacity Development in Solid Waste Management in Developing Countries -Towards Improving the Solid Waste Management Capacity of an Entire Society-*, JICA, Tokyo

Kojima, M. (2005) (ed.), *International Trade of Recyclable Resources in Asia*, IDE-JETRO, Chiba.

Ministry of Economy, Trade and Industry Japan, Working Group on Enhancing International Recycling, Waste Prevention and Recycling Sub-committee, Industrial Structure Council (2004), "Toward a Sustainable Asia Based on the 3Rs", Ministry of Economy, Trade and Industry Japan, Tokyo.

Ministry of the Environment Japan (2005), *Background paper-Ministerial Conference on the 3R Initiative*, Ministry of the Environment Japan, Tokyo

Ministry of the Environment Japan (2005), *Issues Paper-Ministerial Conference on the 3R Initiative*, Ministry of the Environment Japan, Tokyo

Ministry of the Environment Japan (2006), *Issues Paper-Senior Officials Meeting on the 3R Initiative*, Ministry of the Environment Japan, Tokyo

Ministry of the Environment, Japan (2006), "Heisei 17 Nendo Haikibutsu no Kouiki Idou Taisaku Kentou Chosa oyobi Haikibutsu nado Junkan Riyouryou Jittai Chosa Houkokusho (2005 annual report of survey on response for wider-area movement of waste and current situation of quantity in circular use of waste and other materials)"

UNEP (2001), *State of the environment 2001*, http://www.eapap.unep.org/reports/soe/

UNEP-IETC (2004), "State of Waste Management in South East Asia", UNEP-IETC, Osaka

Visvanathan, C. and T. Norbu (2006) “Reduce, Reuse and Recycle: The 3Rs in South Asia” presented at 3R South Asia Expert Workshop, Kathmandu, Nepal, August 30th to September 1st, 2006

Visvanathan, C. and U. Glawe (2006) “Domestic Solid Waste Management in South Asian Countries – A Comparative Analysis” presented at 3R South Asia Expert Workshop, Kathmandu, Nepal, August 30th to September 1st, 2006

Visvanathan, C. and R. Adhikari (2006) “Healthcare Waste Management in South Asia” presented at 3R South Asia Expert Workshop, Kathmandu, Nepal, August 30th to September 1st, 2006

World Bank (2003), *Thailand Environment Monitor 2003 – Solid and Hazardous Waste*, downloadable from World Bank website at http://www.worldbank.or.th/

World Bank (2004), *Indonesia Environment monitor 2003 - Special focus : reducing pollution, Vol. 1 of 1*, downloadable from World Bank website at http://www-wds.worldbank.org/

World Bank (2004), *Philippine Environment Monitor 2004: Assessing Progress*, downloadable from World Bank website at http://www.worldbank.org.ph

World Bank (2004), *Vietnam Environment Monitor 2004: Solid Waste*, downloadable from World Bank website at http://www-wds.worldbank.org/

World Bank (2005), “Waste Management in China: Issues and Recommendations”, downloadable from World Bank website at http://worldbank.org/

Zurbrugg, C. (2002), “Urban Solid Waste Management in Low-Income Countries of Asia How to Cope with the Garbage Crisis” Presented for: Scientific Committee on Problems of the Environment (SCOPE) Urban Solid Waste Management Review Session, Durban, South Africa, November 2002

Website

Basel Convention Website (Access date, October 2006): http://www.basel.int/

The 3R Initiative Official Website of Ministry of the Environment, Japan (Access date, October 2006)：http://www.env.go.jp/recycle/3r/en/index.html

The 3R Initiative Website at IGES (Access date, October 2006)
http://www.iges.or.jp/en/news/topic/0609_3r.html

The South Asia 3R Expert Workshop Website (Access date, October 2006)
http://www.iges.or.jp/en/ltp/activity08.html

Ministry of Economy, Trade and Industry, 3R Policy Survey Reports Website (Access date, October 2006)(Japanese):
http://www.meti.go.jp/policy/recycle/main/data/research/index.html

UNCRD, SPC/3R Website (Access date, October 2006): http://www.uncrd.or.jp/env/spc/

UNEP-DTIE, Cleaner Production Status Reports, Regional Sustainable Consumption and Production Reports Website (Access date, October 2006):

http://www.uneptie.org/pc/cp/library/catalogue/regional_reports.htm

UNEP-DTIE Recycling website (Access date, October 2006):
http://www.unep.fr/pc/pc/waste/recycling.htm

World Health Organization (WHO, 1999): Wastes from Healthcare Activities. Available online [http://www.who.int/water_sanitation_health/medicalwaste/wastemanag]
as of August 2006.