

**Asia 3R Conference Chair's Summary**  
**October 30<sup>th</sup>-November 1<sup>st</sup>, 2006 Tokyo, Japan**  
**Chair's Summary**

**Introduction**

1. The Asia 3R Conference was held in Tokyo, Japan on October 30th-November 1st, 2006 hosted by the Ministry of the Environment of Japan. The Secretariat of the conference consisted of the Ministry of the Environment of Japan and the Institute of Global Environmental Strategies in Japan. There were nineteen participating countries from Asia (Bangladesh, Bhutan, Brunei Darussalam, Cambodia, China, India, Indonesia, Japan, Lao PDR, Malaysia, Maldives, Nepal, Pakistan, Philippines, Republic of Korea, Singapore, Sri Lanka, Thailand, and Vietnam), five G8 member countries and community (European Commission, France, Germany, United Kingdom, and United States of America) and eight participating international organizations (the Asian Development Bank (ADB), Secretariat of the Basel Convention (SBC), South Asia Cooperative Environment Programme (SACEP), the United Nations Economic Social Commission for Asia and the Pacific (UNESCAP), the United Nations Centre for Regional Development (UNCRD), the United Nations Environment Programme (UNEP), and the World Health Organization (WHO)).

**Opening Session**

2. Mr. Masatoshi Wakabayashi, Minister of Environment, Japan, delivered opening remarks as follows:

Japan has entered a new era this year with the new administration of Mr. Shinzo Abe, newly elected prime minister who advocates "a beautiful country Japan." As the environment minister, Mr. Wakabayashi is responsible for promoting the 3Rs. Japan convened the senior officials meeting early this year, and intends to contribute to the regional and international policy processes on the 3Rs. Japan promotes the 3Rs in Japan's overseas cooperation program to support sustainable development and reduce wastes as it assists in the development taking place in Asia. Japan has revised its Containers and Packaging Recycling Law to promote the 3Rs domestically. Biomass is another topic to be promoted in conjunction with the 3Rs. The Japan Forum for the Promotion of 3R Activities steers the 3Rs in partnership with the government, businesses and academia. Japan will play a leading role in promoting the 3R Initiative towards its G8 presidency in the year 2008.

3. Mr. Kazuyoshi Okazawa, Senior Advisor to the Minister, Ministry of the Environment of Japan, was elected Chair of the conference. The chairs of the Working Groups Sessions were appointed by the Chair as follows: Mr. Adisak Thongkaimook of Thailand for Working Group One on "Partnership and International Cooperation for the Promotion of the 3Rs," Prof. C. Visvanathan of Asian Institute of Technology for Working Group Two on "Medical Waste Management," Mr. Ong Seng Eng of Singapore for Working Group Three on "Municipal Organic Waste Management," and Mr. Michikazu Kojima of the Institute of Developing Economics-JETRO for Working Group Four on "E-waste management."
4. Mr. Hideto Yoshida, Director General, Waste Management and Recycling Department, Ministry of the Environment, Japan spoke about "Background and Objectives of the Conference." His major points were as follows:

The increase in waste has become an important environmental challenge in Japan and Asia. Japan has undertaken a series of policy reforms to promote waste reduction for disposal, and plans to share its experiences with the international community. The final disposal amount has been drastically reduced and the ratio of recycling material has also been increasing at the same time. Dioxin emissions from waste incinerators dropped by 98% from 1997 to 2003. Treatment of polychlorinated biphenyl (PCB) has been promoted under the PCB Disposal Treatment Law. The 3Rs are promoted in the continuum of manufacturing, distribution, consumption and disposal processes. It is proposed that the 3Rs be pursued in East Asia, aiming at establishing a sound

material-cycle society at a regional level. This conference intends to share experiences, discuss 3R strategies and thematic topics, and pursue regional cooperation.

5. Mr. Hiroaki Takiguchi of the Ministry of the Environment, Japan, then presented the agenda for the conference, which was endorsed by the participants.

### **Plenary Session**

6. Two keynote speeches were made; one by Dr. Yuichi Moriguchi, National Institute for Environmental Studies (NIES), Japan on “Establishing a Sound Material Society in Asia” and the other by Prof. C. Visvanathan, Asian Institute of Technology (AIT) on “Environmentally Sound Waste Management in Asia.”

7. The major points of Dr. Moriguchi’s presentation were as follows:

A large quantity of resources has been extracted to produce consumer products and develop infrastructure that result in waste generation. The 3R Initiative contributes to reduce waste and improve the material cycle. International trade expansion also changes the dynamics of material trade across borders. The 3Rs and ESM (environmentally sound management of wastes) mutually support the policy objectives of developing a sound material-cycle society. Prevention of the illegal trade of wastes should be reinforced as a prerequisite for international 3Rs. The partnership remains vital in promoting the 3Rs with multi-stakeholder involvement at the national and international levels. Japanese policy reforms on the 3Rs include reinforcement of extended producer responsibility (EPR). The Fundamental Law for Establishing a Sound Material-Cycle Society prioritized the ways of handling wastes in the following order: reduce, reuse and recycle, energy recovery and proper disposal. In 2003, Japan adopted the “Fundamental Plan for Establishing a Sound Material-Cycle Society” setting a target for 2010 with concrete indicators for material flow accounts (MFA). Dematerialization and detoxification are the basic direction of policies. Japan’s Action Plan on the 3Rs of 2005 intends to promote a global zero waste society, in which Asia should play a key role.

8. The major points of Prof. Visvanathan’s presentation were as follows:

It is important to focus on the positive side of waste management. In the classical approach, the major constraints are inadequate infrastructure, finance, lack of clear roles and responsibilities, and the uncontrolled disposal of solid waste, which leads to significant threats to public health and environmental pollution. It is important to recognize that municipal solid waste is not purely an engineering problem, as half of the problem is related to social, policy and institutional issues. Asian countries are already implementing many measures to enhance the 3Rs, including improvements in collection, transport, and sorting. It is important to note that there is a significant role for waste pickers in the informal sector. Community-based solid waste management is very important, not only in collecting waste but also in creating jobs. Community-based composting in Bangladesh is a good example of this. Many businesses have also begun 3R activities such as green procurement and eco-labelling. Even with respect to landfills, a few simple steps could make a big difference even in cases where it is not possible to employ the most advanced technology. There are some conflicts between regional and national policies.

9. After the keynote speeches, eight international organizations and aid agencies including UNEP/IETC, UNEP/ROAP, UNCRD, UNESCAP, SACEP, ADB, JICA and the Secretariat of the Basel Convention made presentations on their activities being implemented for promotion of the 3Rs in Asia. The summary of each presentation is in Annex 1, attached to this summary.

### **Four Focal Points for Discussion**

10. Presentations and discussions on specific challenges for 3R promotion in Asia were conducted focusing upon four broad topics, notably (i) “Partnership and International Cooperation for the Promotion of the 3Rs,” (ii) “Medical Waste Management,” (iii) “Municipal Organic Waste Management,” and (iv) “E-waste Management.” The first two of these topics were discussed on Day 1 of the Conference and the latter two in Day 2. The chairs of the respective Working Groups

prepared the summary of discussions as follows.

### **Topic 1: Partnership and International Cooperation for the Promotion of the 3Rs**

11. Delegates from Asian countries and experts made presentations on the case studies of 3R implementation aimed at reducing waste generation, enhancing recycling and developing a sound material cycle society. The following points were underlined in the presentations and discussions. The summary of the presentations in Working Group 1 appears in Annex 2.

#### **(1) Stakeholder Collaboration to Promote the 3Rs**

The 3Rs need to be promoted through the involvement of multiple stakeholders, including partnership with central and local governments, business, NGOs, local communities, and academia. Policy dialogues, incentive provisions and other policy measures are needed to facilitate multi-stakeholder involvement and partnership for the 3Rs. In the upstream of the 3R process, the role of business is particularly important. In central governments, cooperation and coordination among related ministries are critical to the success of 3R policies.

Participants took note of the appeal jointly prepared by an international network of NGOs in Japan, Korea, China and the US. The NGO network emphasized the role to be played by civil society such as the use of consumer power to promote environmentally-friendly products, participation in decision-making processes to reflect the views of civil society, and awareness raising.

It is vital to integrate the informal sector, including waste pickers, in the mechanisms for effective 3R implementation in a way that will contribute to business and employment opportunities.

#### **(2) Promotion of the 3Rs at the National Level**

The 3R policies are considered as a strategic avenue to pursue sustainable development while enhancing material efficiency and reducing negative environmental impacts. 3R policies must be further mainstreamed at the national, regional and international levels.

3R policies should be supported by related policy principles and approaches such as EPR. Different socio-cultural and economic conditions, however, need to be fully taken into account when developing EPR in individual countries.

National 3R strategies will provide a basis upon which coordinated measures are taken in a country. In this regard, initiatives taken by the Government of Japan, in collaboration with UNEP, UNCRD, and ADB, to help a few developing countries of Asia prepare national 3R strategies are considered timely and effective.

National capacities need to be enhanced in terms of institutions, financing mechanisms, scientific and technical expertise. While the national governments and stakeholders need to further collaborate in this respect, international collaboration will remain essential in promoting capacity development for 3R implementation.

#### **(3) Promotion of the 3Rs at the Regional Level**

Regional systems to promote the 3Rs through international trade can be implemented with a view towards promoting overall material efficiency, paying full attention to important principles such as those articulated in the Basel Convention. More attention should be paid to the illegal movement of hazardous waste. The need to develop more harmonized approaches (e.g., common definition of wastes and recyclables, and strengthening of export and import inspections) to promote environmentally sound regional 3R systems was raised, and in this respect, the role of international organizations in facilitating such efforts has been emphasized.

The regional recycling system introduced by Fuji-Xerox Co. in East Asia provides a good model in this respect. The company has developed a take back system, drawing upon their lease-based business model, which has proven effective in both developed and developing countries. Two conditions imposed by the

Government of Thailand when the company established its recycling factory in Thailand (i.e., (i) no import of wastes or used products for final disposal in Thailand, and (ii) re-export of hazardous elements to countries with appropriate treatment facilities) turned out to be effective.

## **Topic 2: Medical Waste Management**

12. Delegates from Asian countries and experts made presentations on the case studies of medical waste management (MWM) in Asia. The following points were emphasized in the presentations and discussions. The summary of the presentations in Working Group 2 appears in Annex 3.

### **(1) General Points**

In the area of medical waste, the first R of the 3Rs, “reduce,” is key, as well as sound waste management. Also, substitution of non-toxic or less-toxic options may assist in reducing hazardous waste, and other substitutions, including reductions in the use of disposables and substituting them with reusables, such as using glass for plastics, may also play a role in waste reduction. Segregation at source is also recognized as critical.

In addition to the activities by the participating Asian countries, international organizations such as ADB and WHO have been working for better MWM. The participants warmly welcomed them and further expected their initiatives including development of appropriate medical waste treatment technologies.

### **(2) Institutional Strengthening**

Regulations, strategies, institutions and guidelines for sound MWM should be established at a national level. For the purpose of reduction and sound waste management, each country needs to establish a clear definition of medical waste to distinguish infectious and hazardous waste from other waste. (Without definitions, the true amount of medical waste is unknown, and classification and segregation are difficult.) The guidelines by WHO, the Secretariat of the Basel Convention may be a great help in doing so.

There is a need to identify clearly which agency has responsibility for management/disposal (Ministry of the Environment, Ministry of Health, etc.); collaboration among relevant agencies and among different levels of government is also crucial.

### **(3) Challenges in the Generation Stage**

Hospitals generating medical waste may need to be considered similarly to businesses generating industrial waste. Responsibility for waste treatment should rest primarily with medical institutions. The motivation of workers to adopt good waste management practices must be addressed in order to make waste segregation effective.

Systems to promote segregation of medical waste should be established, from national rule making to practical handling in medical institutions such as development and promotion of appropriate containers. Segregation and management of infectious waste in medical institutions should be carefully conducted under the supervision of doctors and knowledgeable health care workers. Standardization in color-coding of wastes, at least at the regional level, should also be considered to reduce the risks of transboundary movement of wastes for countries that are unable to treat their own wastes.

Creating networks among small clinics can assist in awareness raising and also in identifying waste management service providers known to be legitimate.

### **(4) Appropriate Treatment Technologies**

Medical waste treatment and disposal technologies that are appropriate for developing countries should be developed and promoted. Encapsulation systems, disposal receptacles, etc. do not necessarily require high-tech or fancy equipment; some lower-tech solutions already exist.

Establishment and enforcement of standards and policies are necessary for the operation of appropriate

treatment facilities.

(5) Challenges in the Management Stage

(a) Enforcement and Monitoring

Integrated systems will be critical for proper MWM. Improvements are necessary in not only legislation but also standards for packaging and labelling and technical requirements, such as those governing autoclaves and other equipment. Attention must be given to monitoring and enforcement as well. Monitoring and enforcement are necessary to ensure that segregated medical wastes are not later disposed of along with municipal wastes. New technologies such as Radio Frequency Identification (RFID) can assist with monitoring and avoiding illegal dumping and treatment.

(b) Capacity Building

Capacity building of all stakeholders related to MWM should be strongly promoted for sound MWM.

(c) Awareness Raising

Training and awareness-raising of a broad spectrum of persons involved with medical waste, including lab technicians and sanitation workers, in areas such as waste segregation, while not solving the problem, can bring significant improvement in many countries. Awareness-raising among sanitation workers and the general public (notably the informal sector) regarding medical waste-related risks will reduce potential health and environmental impacts.

(d) Two basic lines of thinking

Two schools of thought exist; i.e. localizing waste treatment and disposal, and centralizing it. When adopting localized treatment systems, one of the major issues is ensuring that proper capacity exists at individual treatment facilities. Some countries have had success in having common facilities at the city or state level. However, when facilities are centralized, proper transportation and enforcement of laws and regulations becomes particularly important.

**Topic 3: Municipal Organic Waste Management**

13. Delegates from governments, private industry, and academia introduced various challenges in organic waste management as well as solutions currently being implemented in Asian countries. The key points of the discussions were as follows. The summary of the presentations in Working Group 3 appears in Annex 4.

(1) Lessons learned from practices already underway

With as much as 79% of municipal waste in some Asian cities being organic waste, organic waste management is an area that deserves priority. Organic waste presents a variety of unique challenges during waste collection, particularly in hot and humid Asian climates, where timely collection and disposal are critical.

Among the points raised about the future of organic waste management in Asia is the tremendous biomass energy potential that exists in the Asia region compared to Europe and North America.

A number of successful practices are already being implemented in countries around the region. The following points were among those shared at this session.

(a) Organic waste has the potential for energy generation through (i) eco-fuels derived from biomass waste, (ii) methane recovery from fermentation, and (iii) thermal recovery from incineration. Recovering organic waste and composting it, thereby preventing organics from generating methane in landfills, is also being utilized in some countries to prevent greenhouse gas emissions.

(b) Creative financing solutions (such as credits under the CDM) are already in use to (i) recover costs and (ii) reduce the burden on public budgets. A representative of the private sector in one developing country which originally relied heavily on public investment for composting start-up

projects mentioned that an expansion of some projects is now under way without reliance on government subsidies, with funding coming from compost sales and CDM credits.

- (c) Composting efforts may be easier to start if organic waste from the food industry is used rather than household organic waste, because the quality of the organic inputs can be more closely controlled. However, proper waste segregation at source or from the household will ensure the safety of organic waste.
- (d) Various practices have been adapted to countries' specific socio-economic and climatic conditions. As one example, organic waste is being composted on a small scale in urban settings. In one country's low-cost barrel-type composting program in slums, training is provided for slum dwellers, resulting in income generation through the sale of compost.
- (e) Simplifying waste segregation was recognized as useful in enhancing comprehensibility and increasing compliance. For example, in some countries color-coded waste segregation bins have enhanced compliance among the less-educated and among children.
- (f) In some countries, the privatization of waste collection has brought both cost savings and greater effectiveness and efficiency. Some countries have been successful in ensuring quality by conducting public tenders for waste collection contracts, with these contracts strictly stipulating the collection services to be provided.
- (g) Korea recovers as much as 94% of organic waste from households, restaurants and agricultural and fishery centers as feedstock, compost, or energy sources (methane gas), with 97% of food waste segregated at source.

## (2) Ongoing Issues

The working group identified a number of issues relevant to implementation of organic waste management, including the following prominent points.

- (a) Solutions must consider the circular loop as a whole. Notably, organic waste will be under-utilized as a resource if sufficient users do not exist farther along in the circular loop. Moreover, while downstream efforts typically comprise the bulk of organic waste-reduction practices, upstream efforts should not be ignored. For example, increasing the percentage of compostable materials in a product will assist in later efforts downstream.
- (b) Economies of scale may not exist in many countries, meaning that (i) subsidies from the government may be necessary, as the private sector lacks incentives to participate; (ii) cross-border efforts may be necessary for economies of scale to succeed.
- (c) Identification and adoption of the most appropriate technologies remain key issues. Support from NGOs and from the private sector will assist greatly in this area. It was also noted that it is not appropriate to rely too heavily on high technology, as individual behaviour and other factors play such a heavy role in effective implementation of the 3Rs.

With regard to individual practices being undertaken, the following points were raised.

- (d) The market for compost may be limited, with compost having a value close to zero or even a negative value. As a result it is critical to (i) develop markets for compost, (ii) develop standards within each country for compost quality, and (iii) reduce costs in producing compost to make composting economically viable even if the potential sale price is low.
- (e) Organic waste presents complex challenges during its reuse, particularly with regard to food safety when used as livestock feed or compost.
- (f) Public awareness must be enhanced to overcome misconceptions about food safety, such as public resistance to purchasing food cooked in biogas-fueled ovens.

#### **Topic 4: E-waste Management**

14. Delegates from Asian countries and experts made presentations on case studies of E-waste management. The following points were underlined in the presentations and discussion. The summary of the presentations in Working Group 4 appears in Annex 5.

(1) Improvement of domestic management schemes for E-waste

(a) Challenges of E-waste management

In Asia, some countries such as Japan and Korea have legally-binding management systems for E-waste. China is introducing comprehensive legal management systems and conducting pilot projects on collecting and recycling E-waste. Thailand has started to introduce a partnership mechanism. Many countries in the region have an informal recycling industry to recover resources from E-waste. Uncontrolled and improper recycling activities in the informal sector often causes serious environmental and health concerns.

Major challenges for constructing proper domestic management schemes are the establishment of appropriate collection mechanisms, proper recycling capacity, and reduction of hazardous substances in products. Due to a lack of separation at source and proper collection mechanisms, recycling industries with environmentally sound technology often face shortage of recyclables. Stakeholders should participate in the establishment of proper collection mechanisms. Economic incentives are necessary to shift flow of recyclables from the small-scale informal sector to more proper recycling facilities. To establish proper recycling capacity, it is necessary to establish a network of recyclers including dismantling facilities, non-ferrous refineries, plastic recyclers, and glass recyclers. To reduce environmental and health impacts, it is recommended that efforts be undertaken to reduce hazardous substances in products.

(b) Need for data and guidelines

To establish a formal and proper recycling mechanism, data such as an inventory of waste materials is necessary. Japan, Korea, China, and India have been developing these inventories. Some Asia and Pacific countries have implemented, or are in the process of implementing, E-waste inventories with the support of the Secretariat of the Basel Convention. Guidelines for conducting inventories and proper management of E-waste are also useful for evaluating recycling facilities and certification of good recyclers, and these guidelines are now being developed by Basel Convention Regional Centre for South-East Asia based in Indonesia (BCRC-SEA).

(c) Options for countries lacking appropriate technology

For those countries lacking appropriate technology, recommended measures include improvement of existing recyclers including informal recyclers, introduction of EPR and other economic incentive policies, technology transfer and foreign direct investment to introduce appropriate technology which is environmentally sound and economically feasible, and export of recyclables which cannot be properly handled in the exporting country to countries with facilities with environmentally sound management capacity.

(2) Promotion of international efforts

(a) Two contradictory observations regarding international efforts to manage E-waste

International management of E-waste poses a contradiction. On one hand, export of E-waste may lead to improper recycling, but on the other hand, state-of-the-art recycling in conjunction with transboundary movement could prevent improper recycling.

To solve transboundary E-waste issues, there are several options: stricter enforcement of regulation of transboundary movement of hazardous wastes to stop illegal trading, introducing standards to distinguish between secondhand electronics and E-waste, and promoting good recyclers with appropriate facilities. For this purpose, ongoing initiatives such as the Asian Network for the Prevention of the Illegal Transboundary Movement of Wastes should be further promoted. In addition, these efforts and experiences should be shared with other countries.

(b) Towards international cooperation for E-waste management

In addition, international organizations can play an important role for promoting international cooperation for E-waste management. International cooperation should focus on policy harmonization, sharing information on experiences, transfer of appropriate technology, and capacity building. The Basel Convention is one of the international mechanisms related to the control of transboundary movement of E-waste. Full implementation of the “Project on the Environmentally Sound Management of E-waste for Asia Pacific Region” under the framework of the Basel Convention is recommended in order to enhance the national capacity of each country. International harmonization of EPR should also be discussed further.

### **Overall Discussion**

15. In promoting the 3Rs in Asia, participants identified a number of important factors to be considered.
  - (a) Full attention needs to be paid to the diversity of the countries in the region. Asian countries are in different stages of development. There are commonalities in their ways of addressing the 3Rs, but there are also differences among the countries in the region. Waste issues are different depending on the socio-economic conditions of each country. In some countries, even traditional systems of waste management are found to be effective.
  - (b) More discussion is considered necessary regarding how to reduce waste generation. In this respect, more attention needs to be placed on cleaner production processes and technologies.
  - (c) Technologies are an important element for promoting the 3Rs. The best available technologies may be very specialized and expensive, and so they may not work well in many places. The technologies that are needed are not necessarily the most advanced ones but those which are environmentally sound, economically viable, and socially acceptable.
  - (d) The problem of how to implement regulations is a concern for most of the countries in the region. In this respect, more cooperation, both technical and financial, is considered necessary.
16. In addition, the view was expressed that Asia has a great need to establish clear protocols for handling wastes in the event of a disaster, both natural and manmade.
17. There are a few important elements, such as traceability, accountability and transparency, that should be incorporated in any future regional cooperation schemes. A few participants pointed out that it may take some time before specific regional agreements can be discussed because of significant national differences.

### **Further Steps for the Promotion of the 3Rs in Asia**

18. Participants shared the importance of promoting the 3Rs in Asia and appreciated the Asia 3R Conference for providing the opportunity for policy makers and experts from Asian countries and international organizations to discuss issues on the 3Rs.
19. Participants recognized the necessity of further regional cooperation to promote the 3Rs in Asia. In this regard, participants welcomed various initiatives taken by international organizations concerned with the promotion of the 3Rs in Asia over the last two years. Such initiatives include, among other things, assistance in developing 3R national strategies and organizing regional/subregional workshops on the 3Rs and related topics. Participants welcomed the great progress that has been made in developing the 3R Knowledge Hub since the 3R Senior Officials Meeting held in Tokyo in March 2006. The 3R Knowledge Hub for Asia and the Pacific, which was initiated by UNEP, AIT, UN-ESCAP, and ADB, will serve as a mechanism to disseminate vital information to facilitate implementation of the 3Rs in the region in close collaboration with other potential partners. It should collect lessons learned not only from successes but also from failures in attempts to promote the 3Rs and other similar initiatives, including the circular economy in China and Green Growth for Asia-Pacific. To implement this objective, the participants agreed to support the activities of the Hub.
20. Participants appreciated Japan’s initiative on the 3Rs in Asia. It is important, as a first step, to work



together to share information and experiences regarding the 3Rs. Most Asian countries have already taken a wide range of steps to promote the 3Rs, and it is expected that more stakeholders will expand, accelerate, or replicate efforts involving a full range of 3R-related activities in the near future. The thematic working group on solid and hazardous waste under the Regional Forum for Environment and Health in the Southeast and East Asian Countries served by WHO and UNEP as the joint secretariat can be one of the mechanisms for a follow-up to this Conference. The delegates encouraged subregional forums such as SACEP, ASEAN, and NEASPEC to further address the 3R agenda in the region.

## **Annex 1: Summary of Presentations by the International Organizations and Aid Agencies in Plenary Session 1**

### **Dr. Per Bakken, UNEP/IETC**

A short overview of UNEP activities was provided. UNEP is now implementing some of their ideas relating to 3R, efficient resource use, and integrated waste management through several pilot projects. Normative functions of UNEP are still continuing, but strengthened through experiences with pilot projects. Ongoing projects were discussed. There are many examples from the Asia Pacific region in which industries have been able to use waste as energy or production material. A waste strategy for the Pacific islands is under development in cooperation with SPREP and ADF. Integrated waste management plans are being developed. IETC has developed a sustainability assessment tool for evaluating relevant technologies, looking at not only environmental components, but also social and economic ones. Waste pickers are an issue for all countries, and they need to be taken into consideration. In addition to many projects, a number of publications covering various aspects of waste management have been published. In the future, a set of training manuals for integrated waste management will be developed, a set of regional training workshops will be conducted, and then work will be done on a sub-regional and regional level. It is hoped to support a number of countries in their actual study of this. An international panel on the sustainable use of natural resources will be established with UNEP Paris as the secretariat. It will provide independent scientific advice to governments and international organizations.

### **Mr. Hiroshi Nishimiya of UNEP Regional Office for Asia & the Pacific**

There needs to be a paradigm shift from a waste management approach to a 3Rs approach. Waste is not waste but should be thought of as renewable resources for sustainable development. Especially, organic waste can be converted into organic fertilizer and biofuel. UNEP/ROAP's main activities are: i) supporting to establish 3R national strategies, ii) promoting regional/sub-regional cooperation, and iii) providing 3R information, good practices through 3R Knowledge Hub. 3R will also help to reduce CO<sub>2</sub> to prevent climate change, improve energy efficiency, and help to shift to the use of biomass energy. The UNEP/ROAP 3R National Strategy Model Project, sponsored by IGES, will develop a model strategy policy for Thailand, Philippines, Malaysia, and Cambodia. The strategy will employ a holistic approach covering both downstream and upstream issues, develop new and improved 3R legislation, clear targets, and a stable and effective enabling policy. It will also feature capacity building, pilot projects, collaboration and linkage with municipalities, environmental education and public awareness, and information dissemination. The partnership to create a 3R knowledge hub will function as a think tank to promote technology, good practices, policy strategies, and management. A key point is that waste, especially organic waste, can be converted to energy. A future idea is the creation of a biomass industrial complex.

### **Mr. Kazunobu Onogawa, UNCRD**

Strategy in 3Rs promotion in the context of sustainable regional development and in supporting the MDGs. How can the gap between the 3Rs and conventional waste management be filled? UNCRD implements projects in line with the 3Rs Initiative, at national, local and city levels, in cooperation with sub-regional initiatives. Due consideration should be given to the issues concerning conventional waste management. Asia faces serious problems in managing its wastes. UNCRD offers practical and useful support to plan and achieve sound regional development through the 3Rs in collaboration with other organizations. UNCRD conducted a Needs Assessment of 10 Asian countries. UNCRD is facilitating national strategies for Vietnam and Indonesia with a bottom-up approach., pilot and demonstration projects (priority to organic waste management and composting), training courses, and raising awareness on the 3Rs. For the development of strategies it follows a highly participatory approach and through intensive inter-agency coordination. UNCRD is also facilitating 3R promotional activities in Bangladesh.

### **Mr. Masakazu Ichimura, UNESCAP**

UNESCAP aims at promoting environmentally sustainable economic growth in the region: green growth. Its study "the State of the Environment in Asia and the Pacific 2005" analysed that, as the region still

needs to pursue economic growth to address persistent poverty, the current pattern of growth cannot be sustained as already exceeding the region's limited environmental capacity; therefore, eco-efficiency must be promoted to achieve decoupling of economic growth and environmental pressures. 3R and GG are intricately interlinked and mutually enforcing since they both address not only improving eco-efficiency of production & consumption of the entire society, but also showcase a political commitment to provoke actions across ministries and agencies, provide policy principle to impact comprehensively the society's development pattern, and promote regulatory, incentive & technical tools providing practical guidance and methodology. UNESCAP is ready to share with broader audience, information and experiences from its programmes in the relevant field, such as green growth and the Kitakyushu Initiative for a Clean Environment, though, in particular, 3R Knowledge Hub. UNESCAP can also contribute to 3R in linking it to the ongoing global dialogue, such as MDG, CSD and, in particular, Marrakech processes, and in promoting the regional and subregional cooperation targeting at international harmonization of 3R related policies and programmes in Asian and Pacific region.

Mr. Takashi Ohmura, ADB

ADB is incorporating 3R principles in its operations for assisting member countries and facilitating the promotion of 3Rs through regional/sub-regional cooperation. ADB is providing financial and technical support for adopting the 3R principles and is further enhancing this direction under ADB's Mid-Term Strategies II. For example, ADB's new Energy Efficiency Initiative plans to enhance energy efficiency. And another example is its Carbon Market Initiative to support CDM projects. Its urban development project is focused on supporting the collection and disposal of municipal and solid wastes, and recently, reduction and recycling are incorporated in many projects that involve communities and the private sector. ADB also supports regional/sub-regional initiatives for promoting the 3Rs by organizing sub-regional workshops, producing a comprehensive guide on 3Rs in Asia for policy-makers, and it is supporting the establishment of the 3Rs Knowledge Hub.

Ms. Kyoko Okubo, JICA

JICA implements Japan's technical cooperation with developing regions of the world. Waste management is one of the key areas in JICA's environmental programmes. It started with hardware inputs in the 1970's, software in 1980's and capacity development in the 1990's. Technical cooperation in solid waste management (SWM) has been undertaken in many developing countries in Asia. In the past 2 years, a SWM study project in Cambodia was completed in March 2005, and it included various components such as the master development plan, master implementation plan, and related activities. These included waste collection demonstration, community/waste picker mobilisation, and infrastructure development. Similar projects were implemented or being implemented in Bangladesh, Malaysia, Viet Nam, Philippines and others. They address policy formulation, demonstration projects, human resource development, and capacity development involving national/local governments, the private sector, academia, local communities, and NGOs.

Ms. Sachiko Kuwabara, Secretariat of the Basel Convention

The Basel Convention addresses the issues of transboundary movement of hazardous and other wastes and capacity building. South-south trade for environmentally sound management of such wastes as well as north-south trade in hazardous waste is becoming important. There is a growing concern among parties over the increasing and rapid growth in the generation of hazardous waste in developing countries which are often mixed with municipal wastes. In connection with the 3Rs, 14 Basel Convention regional centers and innovative public-private partnerships, have been steering their programmes. A project is underway on used lead acid battery collection in the Caribbean and the establishment of regional facilities for recycling in the Caribbean in collaboration with Venezuela and Colombia. There are other thematic projects such as on medical wastes for West Africa, used oil co-processing in cement kilns in cooperation with municipalities and industry in Ecuador and global and regional partnership programmes on e-waste. Concrete guidelines were developed for end of life mobile phones with 12 manufactures, providers recycling and refurbishing industry and NGOs. The 8<sup>th</sup> Conference of the Parties will be held in Nairobi this November under the theme of finding creative solutions for the environmentally sound management of E-waste.

## **Annex 2: Summary of Presentations at Working Group 1, “Partnership and International Cooperation for the Promotion of the 3Rs”**

### **Session 1**

Mr. Mohammad Helmy, Ministry of Environment, Indonesia

3R programmes in Surabaya and Jakarta programme have been increasing rapidly in line with the member of environmental cadres and motivators. Based on the Surabaya and Jakarta models, 3R principles will be applied in Bandung with community participation in municipal solid waste composting programmes that have been supported by GEF and World Bank. It also targets small and medium enterprises (SMEs) which number about 41 million and account for 57 % of GNP. A cartoon is also used to promote cleaner production and the 3Rs, using the example of tofu house industries. Challenges remain in the areas of e-waste, food waste, and medical waste, particularly due to trans-boundary movement and illegal activities. Training, education, and pilot projects involving businesses and international cooperation remain vital for mobilizing support to the 3Rs. Timeline, structure, and conceptual guidelines have been established for the formulation of National 3R Strategy using the technical guidance of UNCRD. There is also a plan to establish a national 3R working group (N3RWG) to substantially support the 3R strategy.

Dr. Lakshmi Raghupathy, Ministry of Environment and Forests, India

India’s policies and strategies provide for the adoption of 3R principles. They underline the need for adoption of clean technology, reuse/recycling, and strengthening small scale enterprises. The scheme for the registration of recyclers/re-processors and actual users of hazardous wastes encourages reuse/recycling in an environmentally sound manner (ESM). The regulatory framework has adequate provisions for environmentally sound waste management such as hazardous, biomedical, recycled plastics, municipal solid wastes and used lead acid batteries. The transboundary movement of hazardous and E-wastes are regulated. Essentially, 3R principles are being adopted for every possible waste stream to facilitate conservation of resources and for substantial reduction in the waste destined for disposal. However, capacity building and inclusion of Best Available Technologies is necessary.

Dr. R.C. Trivedi, Ministry of Environment, India

Fast economic grow entail the increase in waste. Waste collection rate is high in urban areas, but not so much in local areas. Policy and institutional reforms have been promoted, such as initiatives on the use of waste plastic with a mix of polymer for road construction. The introduction of polymer mix in road construction contributed to the durability of roads and improvement of temperature variation.

Dr. A.A. Boaz, South Asia Co-operative Environment Programme (SACEP)

SACEP adopted the work programme for 2006 – 2007 that list waste management as a priority. It advocates an environmental efficiency, minimization of environmental impacts and stakeholder engagement. The South Asian Games in 2006 posed a challenge to the National Olympic Committee for waste management at the 1 sites where the games were held. This gave an opportunity to SACEP to not only manage the waste based on 3R principles, but also engaged the various stakeholders like the National Olympic Committee, the Ministry of Environment, the private company Abans, and the media, to manage and disseminate the message of 3R to the whole of the South Asian region through sportspersons and spectators from 8 (eight) countries. It was the first time that a public, private, and media collaboration was successfully implemented by SACEP with both technical and financial contributions from all stakeholders. In these games, coloured waste bins were introduced for segregated waste collection and subsequent environmentally sound disposal. It also promotes the awareness-raising with the multi-stakeholder involvement, the study of feasibility regarding the regional programme, outreach, and environmental education through distribution of waist/waste pouches carrying the 3R

message and a 7-minute film on waste management that was made and broadcast by the local TV channel ART(TV) during the games in prime time.

Mr. Fumitaka Kato, Waste Reduction Department, City of Nagoya

In Nagoya, the volume of waste was rapidly growing in 1990's and the plan for building a new landfill site in Fujimae tideland was seriously considered. In February 1999, the City of Nagoya announced the Emergency Declaration on Waste Management advocating 20 per cent reduction of waste in 2 years. Enhanced efforts were made to promote the segregated waste collection for recycling. Local volunteers also monitor the level of segregation regarding the household waste placement in the waste collection station. Consumers were also encouraged to carry their own shopping bags to reduce the use of disposable shopping bags with the provisions of coupons for those who use their own shopping bags over a certain number of times. With the increased involvement of citizens, the City of Nagoya succeeded in reducing the waste volume by 30% and increasing recycle ratio by 2.6 times.

Mr. Hirose Toshiya, Asia Waste Watch; Ms. Kim Mihwa, Korea Zero Waste Movement Network; Mr. Lai Yun, Greenpeace China; Ms. Takamiya Yuka, Basel Action Network

A number of NGOs from Japan, South Korea and China met a couple of times to exchange views, to examine the situation of E-waste recycling practices in China, and today to present messages of civil society organizations to contribute to the 3R policy processes. They advocate the EPR system, government investment in recycling systems, proper implementation of regulatory measures such as Basel Ban Amendment, and sound management of E-waste and other hazardous wastes. Recent dumping of hazardous wastes that killed people in Cote d'Ivoire still tells us the deficiency in policies for sound hazardous waste management and important task entrusted to this 3R policy process. At the end, an NGO appeal was submitted to the chair to demonstrate their commitment to play a role in helping to solve global E-waste issues.

## **Session 2**

Mr. Hidetoshi Kimura, Ministry of Environment, Japan

Japan promotes the action plan for developing global zero waste society and intends to advocate the 3Rs for Asia. For this purpose, Japan facilitates legislative and institutional development such as the law for establishing a sound-material cycle society and a strategic scheme for economic growth. A policy package is developed to be promoted a wide range of actors and collaborators. In particular, collaboration among related ministries is a key to success of 3R policies. The international cooperation on the 3Rs has been promoted with the JICA and other cooperation agencies. Policy dialogues remain to be important to facilitate policy processes at the regional, sub-regional and bilateral forums and channels addressing issues of waste management and resource circulation.

Mr. Thevarack Phonekeo, Science Technology and Environment Agency, Lao PDR

Laos has adopted and has been implementing relevant policies, laws and strategies such as the environmental protection law and decree on the implementation of the environment protection law. Laos faces an increasing pressure of waste management particularly in the capital city of Vientiane. A number of intervening activities have been undertaken, for instance, the training of the waste pickers in the market, the devising of waste collection methods and the development of markets for recyclables. A positive sign has been burgeoning on the development of the market for recyclables and the income generating impacts for waste pickers. Data collection and management for waste still need to be developed. Survey on landfills must also be conducted.

Mr. Sarun Sambo, Ministry of Environment, Cambodia

Cambodia promotes waste management under the environmental law, sub-degree, declaration and guidelines. The waste flow, identified through the JICA's studies, has been developed in the practices at the community level. Material wastes have been collected for recycling. Composting of biomass waste has been also promoted. The e-waste volume such as TV sets, computers and telephones have been growing rapidly. As to batteries, the import of lead, acid and batteries remain to be high while the ratio of recycling has been slowly increasing. The constraint in promoting recycling are: information deficiency on solid waste recycling, inadequate policy framework, insufficient infrastructure and financing schemes, limited public awareness and capacity, and under-developed legal instruments.

Prof. Benedict Francis Antony Basnayake, University of Peradeniya, Sri Lanka

In promoting the 3Rs a number of perspectives need to be reinforced. One is life cycle analysis. In the case of recycling the energy required for transporting wastes needs to be taken into account. A market mechanism also plays an important role, and the incentives need to be provided at the waste generating countries for promoting 3Rs. Training and R&D remain to be important for forging information systems including agricultural and hazardous waste. Education and accountability building are important. For these reasons, it is suggested to establish a protocol that defines the uniformity of waste management. Methodological development and capacity development should also be promoted.

Mr. Tomio Watanabe, Fuji Xerox

Fuji Xerox works in partnership with governments, companies and customers toward establishing a sustainable society. Fuji Xerox aims at achieving zero emissions. Unused or abandoned machines/products are now being collected and recycled to fulfil the responsibility of Fuji Xerox to achieve material recycling. In 11 years, Fuji Xerox has achieved a collection rate of 90%. Used parts were also reused in new products amounting to 30,000 units. In August 2002, zero emission systems were developed in the company's Japanese operations. At the regional level in Asia, Fuji Xerox has established an international resource recycling network utilising their existing supply chain. Five to fifty percent of product waste used to be land-filled in Thailand, but this has now been brought into the recycling process. In the company's regional recycling operations in Thailand, 64 parts are separated, and recycled except 4 toxic materials that are re-imported to Japan for final disposal. Fuji Xerox recycles 21,000 units per year, which represents a recycling ration of over 90 percent, and over 1,000 tons of materials have been recycled in the company's operations in Thailand in 2005. Mitsui Corp. has been assisting in the collection of used/abandoned products. To achieve an international recycling system, technical cooperation is vital.

## Annex 3: Summary of Presentations at Working Group 2, “Medical Waste Management”

### Session 1

Prof. C. Visavanthan, AIT

Data on the amount of medical waste generated is not reliable as the definition of what constitutes medical waste is imprecise. Among the 3Rs, the first R, “reduce,” is the key for medical waste management, insofar as recycle and reuse opportunities are limited. As a critical element of reduction efforts, waste segregation is essential because non-risk waste comprises the bulk of medical waste. Medical waste is often treated using on-site incinerators, but they are typically old, poorly managed, fail to reach the necessary temperature, and lack equipment to capture targeted pollutants. Furthermore the resulting ash is often disposed of improperly. Specific legislation does not exist in some countries; in other countries, enforcement and implementation are unsatisfactory. Coordination is necessary among various authorities and stakeholders, yet delineation of which agency holds what specific authorities and responsibilities is typically lacking. Positive changes underway in Asia include greater attention being given by many countries to legislation and guidelines, the vital role being played by NGOs and local communities, and the introduction of better technologies.

Dr. Satoshi Imamura, Japan Medical Association

A key question to be addressed is why doctors should be concerned with something like waste management. The answer is that medical wastes are a cause of disease, and it is doctors’ role and responsibility to act to prevent disease. In fact, threats exist not only for human health but also for the environment. Doctors’ activities should not be limited to ensuring proper waste management inside health facilities, but should instead extend to management activities outside the hospital, such as implementing tracking systems to ensure that waste has been disposed of properly after leaving the hospital and paying visits to waste treatment facilities to confirm that the waste is being disposed of properly. Professional associations also have a role to play in medical waste management, such as promoting proper waste treatment through seminars, assisting with the selection of the most appropriate waste treatment companies, assisting local governments to counter illegal dumping, and promoting the use of new technology, such as using IC chips for tracking wastes.

Dr. Zhou Goumei, State Environmental Protection Administration, China

China has integrated the 3Rs into its development of a sound material cycle economy and solid waste management. The current status of medical waste management is also being addressed including the development of a national master plan, national regulations, technical guidelines, and relevant standards. However, there are some problems and challenges faced by China in terms of weak enforcement and monitoring, insufficient disposal facilities and illegal recycling of hazardous medical wastes, among others. Policy directions have also been proposed, such as encouraging centralized disposal facilities, coordination of different stakeholders, improvement of national legislation as well as awareness raising and education.

Dr. Jawed Ali Khan, Pakistan, Director, Ministry of Environment, Pakistan

Approximately 25% of hospital medical waste in Pakistan can be categorized as biomedical risk waste. The amount of hospital waste, currently generated at the rate of 0.8 tons per day, will increase to alarming rates in the future due to increases in both population and healthcare facilities. The Government of Pakistan launched a Hospital Waste Management Project in 2004, whose project outcomes included the compilation of hospital waste management rules, guidelines on hospital waste management, specifications and guidelines on incinerators, and training manuals for paramedics. Hospital waste management rules delineate responsibility for waste management, with waste management teams of each hospital, clinic, or lab being responsible for the proper management of generated waste. Specific responsibilities include the preparation of and monitoring of a plan; periodic review, revision, and updating; implementation of the plan; and compliance. Prominent waste management options include,

for means of treatment, incineration, chemical disinfection, autoclaving, encapsulation, and microwave irradiation; as well as, for means of disposal, landfilling and burying inside premises, among others. Furthermore, waste minimization, as well as the related issue of what kinds of waste should not be incinerated, are vital. Finally, awareness and advocacy, as well as training components, are important elements of efforts being undertaken. In developing action plans, it is necessary to break down who is undertaking what activities and the timeline involved. In stakeholder analysis, the key issues are not merely who should undertake what actions, but also why and how.

Dr. Mohd Nasir Hassan, WHO

The approach to proper management of health-care wastes in developing countries should start with a clear definition of health-care wastes, medical wastes and general wastes. Health-care wastes are all wastes (unwanted and discarded materials) generated from all health-care establishments and they consist of medical wastes and general wastes. Proper medical waste management in developing countries poses three challenges: failure to understand the risks posed by these wastes, application of inappropriate technology, and a lack of financial resources. It is crucial for all countries to have policy guidelines and appropriate technology in place, and these should also include consideration for small health-care establishments and management of medical wastes during and after disasters. Technologies to manage medical wastes are numerous and each technology has its own advantages and disadvantages. Incineration of medical wastes is a major concern in developing countries for many reasons including poor operation and maintenance, which leads to serious combustion efficiency and emission problems. There should be three levels of intervention for medical waste management in developing countries: basic, intermediate, and advanced. Many developing countries require basic intervention that involves formulation of national policies, strategies and plans, introduction of essential medical waste management systems such as source-segregation, a standard colour-coding system for waste bags and containers, basic and easy to manage treatment systems, capacity-building, and training of relevant health-care personnel. Intermediate intervention is related to improving treatment systems and allocation of financial resources to those countries that already had medical waste management policies in place. Advanced interventions are meant for developed countries to continuously improve their technologies through research and development and to develop long-term strategies to reduce medical waste production.

Dr. Gil Jong Oh, National Research Institute of Environmental Research, Republic of Korea

In the Republic of Korea, medical waste is a subset of hazardous wastes. The generation of medical waste has been increasing continuously. In 2004, 43 thousand tons were discharged. This is about 1 kg per person in a year. 82.0% of wastes are incinerated directly, 17.6% are incinerated as non-hazardous waste after sterilization and pulverization, and the rest are reused. There are two types of designated containers for medical waste. One is a plastic type and the other is a corrugated cardboard box type which is double sealed with a transparent orange plastic bag. Bio-hazard mark collars are designated depending on the type of waste. Decayed medical waste must be stored in a freezer after being put into the container before treatment. Incineration is the main treatment method. The government regulates the storage periods, 10 days for the waste generator and 5 days for the medical waste treatment company. In addition, the government regulates incineration very strictly in order to preventing dioxin emissions and secondary contamination. A Radio Frequency Identification (RFID) System was developed in 2005, and a model project is on-going during 2006. It will be used nationwide in 2007. Expected effects of the introduction of RFID include cost reduction and greater efficiency of medical waste management.



## Annex 4: Summary of Presentations at Working Group 3, “ Municipal Organic Waste Management”

### Session 1

Prof. Masanobu Ishikawa, Kobe University, Japan

Priorities for municipal organic waste with regard to the 3Rs in Japan are (1) feedstock, (2) compost, and (3) energy. Important considerations of 3R-related municipal organic waste in connection with problems to overcome in implementing the 3Rs related to organic waste management are (1) links to food safety, (2) perishability, and (3) renewability and carbon neutrality. Recent numbers are 87% are incinerated, 4.8% dumped, 1.8% feedstock, 2.5% composted, and 3.0% other uses, such as usage in soaps or bio-diesel oil. Problems to be overcome for the municipal organic waste 3Rs are cost reduction, establishment of a credible recycling loop, finding demand, and improvement of total efficiency.

Mr. Ahmed Murthaza, Environmental Research Centre, Maldives

The large quantity of waste generated, coupled with limited land area and technology, makes the disposal of waste a challenge for the Maldives. A major pressure on the environment arises from the wastes and pollutants produced as a by-product of domestic and industrial activities.

In order to adopt effective management of solid waste management in the Maldives, a central landfill site has been constructed. However, the landfill site receives wastes from the capital island, resorts and industrial areas within the catchment. Although the wastes received by the landfill site are sorted, recycling is not being practiced. Solid waste management on the inhabited islands is inadequate. The absence of a policy framework and a proper regulatory mechanism hinders the community from taking ownership of their wastes.

Mr. Nado Rinchen, Deputy Minister of Environment, Environment Commission, Bhutan  
Mr. Hemraj Chhetri, Thimpu Municipal Corporation, Bhutan

Bhutan made a presentation on waste management in the capital city Thimphu. Modern solid waste management in Bhutan started in 1992-1994, when the waste generation in the capital city Thimphu was 8-10 metric tons per day and a small sanitary landfill was built with a design period of 7 years. Over the years, with increasing development activities and rural-urban migration, the population has increased from 15,000 (1992) to 80,000 (2005) and waste generation has increased to 36 metric tons per day. Now, the government has given a high priority to preserving the environment, promote composting, and raise environmental awareness through campaigns in the community. Bhutan also raised the problem of finding appropriate landfill sites because of difficult geographical terrain. In addition, Bhutan appreciates the 3R initiative, looks forward to further assistance in capacity building, and technology and financial assistance for adopting 3R initiative to deal with waste management and to achieve Gross National Happiness with a clean environment for the future generation.

Mr. Ong Seng Eng, National Environment Agency, Singapore

Singapore presented its integrated waste management system for addressing the challenges of solid waste disposal. Its goal, “towards zero landfill”, is to minimize the amount of wastes sent to landfills and work “towards zero waste.” Given the small size of its territory and difficulties in finding suitable sites for disposal facilities, Singapore is pursuing incineration to reduce waste volume and promoting recycling of waste in the domestic, commercial, and industrial sectors. Singapore is also moving upstream to reduce waste at source by promoting green design, reducing packaging, and reusing and recycling packaging materials. Privatization of waste collection has been successful in improving efficiency and reducing costs to the country. The landfill only receives non-incinerable materials and incineration ash. The recycling rate has increased to 49% in 2005. The amount of wastes that need disposal has shown a downward trend since 2001.

Mr. Iftekhar Enayetullah, Waste Concern, Bangladesh

Solid waste management has become a major environmental problem in Bangladesh. Only 50% of the waste is currently collected by municipalities, while the rest constitutes a source of pollution and risks to human health and the environment. Approximately 75% of the waste is organic, which presents not only problems but also opportunities. In order to improve this situation, community-based as well as city-wide composting projects have been initiated in many cities and towns using public-private partnerships. CDM financing is being used to bring investment in solid waste management into the country.

Ms. Ana Cabatbat, Environmental Management Bureau, Philippines

The delegate from the Philippines discussed the implementation of the 3Rs in her country. The basic management processes were described, namely segregation at the source and waste recovery for recycling. The country's Ecological Waste Management Law mandates that local communities (barangays) are responsible for waste collection and recycling of materials. The country's Ecological Solid Waste Management Law mandates that local communities at the barangay level are responsible for managing the compostable/organic and recyclable wastes, and at the municipal level are responsible for waste collection and disposal of non-factory returnable and special wastes (wastes that contain hazardous or toxic elements).

Prof. Sakai Shinichi, Kyoto University, Japan

Bioenergy recovery can play a role in implementing the 3Rs for municipal organic waste and other organic matter. Organic waste is a renewable resource. The recoverable amount can be estimated on the basis of the biodigestion potential of wet biomass and the thermo conversion capability of dry biomass. Technologies such as pyrolytic gasification, gas reforming for fuel cells, and liquefaction/thermo-conversion for ecofuel are being developed. Ecofuel includes bioethanol and biodiesel. It is very important to analyze the total system for biomass utilization considering the energy balance, greenhouse gas emissions, and other environmental impacts. The cascade system can be useful for this purpose.

Mr. H. S. Premachandra, Central Environment Authority, Sri Lanka

The country faces various problems managing its wastes, such as: lack of awareness, difficulty in finding land for MSWM facilities, lack of resources, lack of qualified human resources, lack of commitment by local authorities, and no proper disposal facilities (only 1 sanitary landfill exists in the country, which is financed by JICA). Around 60% of wastes are collected in the western province, which is the most urbanized. A color coding system for separate collection of recyclables was developed using plastic bags of different colors for various materials. Sri Lanka has actively pursued composting, and today more than 70,000 compost bins are in use throughout the country. Some cities also use reactors to process organic wastes. In the 1960s, Sri Lanka introduced 3,000 Chinese-type small-scale biogas plants that processed organic waste.

Mr. Joon Ki Kim, Ministry of Environment, Republic of Korea

Japan and Singapore incinerate most of their organic wastes, while Korea has followed a different path. Since 1996, it implemented its Food Waste Minimization and Recycling (FMR) Initiative. Through various measures, about 94% of food waste is recycled as feed stock, compost, or energy recovery from methane. Active participation of key stakeholders is one of the main reasons behind the success of the program. Most of the waste is segregated at the source. Two of the main benefits of this initiative are: i) it substituted imports of livestock feed and compost resulting in savings of US \$112 million in 2005 and ii) it extended the life of landfills by 11 years.

Dr. Chhewang N. Lama, Ministry of Environment, Science and Technology, Nepal

Waste management initiatives are one of the key priority issues considered by the government of Nepal. The 3R approach and its implementation in cities will significantly reduce the waste generated by households and communities. However, the 3R approach and its implementation will only be successful if the country has adequate financial, technical, and human resource capacity. Countries like Nepal need substantial assistance in order to adopt a 3R approach. Therefore, the 3R Secretariat should extend its cooperation and coordination efforts to create a safe environment for a better future.

Mr. Haji Mohd Noor Haji Salleh, Department of Environment, Parks, and Recreation, Brunei Darussalam

Brunei is a small country which puts strict limits on the availability of land for solid waste management facilities. The government has decided to pursue integrated solid waste management including the 3Rs. A high priority will be given to implementing the 3Rs. A comprehensive solid waste management plan is being prepared, which will include the development of transfer stations and the construction of a new sanitary landfill to improve final disposal. The authority has ongoing public awareness programs with regard to the 3Rs and hopefully will achieve a high-quality standard of solid waste management.

## Annex 5: Summary of Presentations at Working Group 4, “E-waste Management”

### **Session 1**

Dr. Atsushi Terazono, National Institute for Environmental Studies (NIES), Japan

E-waste generation is increasing both in developed and developing countries. Uncontrolled "invisible flows" exists even in the countries with recycling system legislation, and inappropriate handling is likely to occur. Since informal sectors usually benefit economically from collecting E-waste, appropriate management schemes and enforcement are needed. International trade of secondhand products or dismantled parts/materials to Asian developing countries from developed countries is increasing. Illegal trade such as disguised shipments or smuggling occurs, and this leads to inappropriate reuse/recycling. Environmental pollution is caused by uncontrolled recycling activities such as open burning of wires and heating of print circuit boards. Toxic compounds such as PAH, PCB, PBDE, PCDD/DFs and heavy metals are released, while open dumping of residues from uncontrolled recycling can be readily observed. Cooperative understanding and management should be promoted between exporting and importing countries.

Mr. Ibrahim Shafii, Secretariat of the Basel Convention

The background of the Asia Pacific E-waste Project was presented. The conference was informed that the project was launched in November 2005 at the Regional Inception Workshop in Japan. Presently, there are 10 participating countries and 3 regional centres involved. There are ongoing activities in several countries at the regional, sub-regional, and national levels. Four countries will start to implement national inventory of E-waste. In addition, a large Japanese company will begin a project to recover precious metals from end-of-life mobile phones to be implemented in Malaysia, Thailand and Singapore. In view of the global dimension and ensuring ESM, the theme of the COP 8 of the Basel Convention will be “Creating innovative solutions through the Basel Convention for the ESM of electronic wastes.” It is anticipated that there will be a ministerial statement or declaration including steps of future work to be adopted at COP 8.

Mr. Aboejoewono Aboeprajitno, Basel Convention Regional Centre for South-East Asia in Indonesia

The goal of development of regional technical guidelines for E-waste inventory and 5R TG is to promote environmentally sound management of E-waste in Southeast Asia through the development of guidelines, technical assistance, training and coordination, and multi-stakeholder partnership. The responsibility of the BCRC-SEA is to carry out the activities, and SBC is to provide financial support. The first progress report is expected by October 31, 2006, and the final report is expected in December 2006. The E-waste inventory as well as 5R TG uses the TGLD methodology. Generating an inventory for E-waste streams is more difficult than for common industrial hazardous waste streams. E-waste imports may not be properly controlled or noticed by a BC national focal point and not in accordance with BC. Neglect of the electronic hazardous substances aspect of E-waste 5R in developing countries in Southeast Asia is apparently due to lack of awareness, economic reasons, and difficulties with regulatory control and enforcement.

Ms. Lin Ling, China National Standardization Program, China

The program is trying to help China to develop an appropriate recycling system. Ongoing research projects include developing a national technology platform, national recycling standards, policies and regulations, and a labelling feasibility study and implementation plan. The standards and sub-standards frameworks for recycling and recovery of waste products were outlined. There are several ongoing programmes of standards development. The future research plan focuses on development of management strategy for waste products, implementation system for EPR, recovery and recycling labelling systems, green purchasing systems, E-waste statistical information systems, and eco-design methods and models.

Mr. Masayuki Naka, Dowa Eco-System, Japan

The problem with E-waste is that it contains hazardous materials, but these materials are also

economically valuable. Dowaco has 5 companies engaged in environmental business. Dowaco's business model integrates the metals sector and the environmental business sector. Dowaco accepts used automobile catalysts to recover precious metals, and crushed OA, printed circuit boards, and mobile phones to recover silver and other metals. Dowaco is accepting E-waste to recover 17 kinds of metals through a smelter/refinery process. Traditional processes recover mainly precious metals and can cause severe water pollution. Dowaco's processes can recover more metals with fewer negative environmental effects. Dowaco has a pilot project to establish a system for collection and movement of E-waste from Southeast Asia to Japan in collaboration with SBC.

## Session 2

Prof. Eiji Hosoda, Keio University, Japan

Japan's Home Appliance Recycling Law was enacted in 1998 and enforced in 2001. Its objective is to realise sound waste treatment and efficient use of resources through reduction of wastes and full utilisation of recyclable resources. It focuses on four products: air conditioners, televisions (CRT types only), refrigerators and freezers, and washing machines. Some features of the Law include the following: (i) regarding producer responsibility, retailers also have some responsibility, (ii) the Japanese system is different from EPR, since consumers need to pay, (iii) retailers have a responsibility to take materials to a designated collection site, (iv) the definition of the recycling rate is peculiar to the Japanese system: i.e. waste is counted recycling only when it has economic value, and (v) illegal dumping is not conducted on a very large scale. Some materials are being reused, and some are exported. So there are some unseen flows, and this is a problem.

The Japanese government has established a committee to review the Home Appliance Recycling Law. The review will focus on several points, including the percent of appliances which are recycled, prevention of illegal dumping, promotion of Design for Environment (DFE), promotion of reduce and reuse, the recycling fee system, which appliances should be targeted, achievement of recycling standards, establishment of more efficient collection routes, improving public awareness, and consideration of the recycling system from an Asian perspective. Overall, collected home appliances are recycled with high standards, but unseen flows are a serious problem. At what stage the recycling charge is paid is another serious issue.

Dr. Il Ho Park, Ministry of Environment, Republic of Korea

E-waste recycling is a new issue for Korea. Generation of E-waste in Korea has been increasing rapidly. A waste deposit-refund system was introduced in 1992, guidelines for improvement of the material/structure of products were introduced in 1993, and the EPR system started in 2003. Initially the EPR system covered 5 items, and now it includes 10 items. The recycling rate has increased significantly. Each stakeholder has a role to play. There are 5 E-waste recycling centres throughout the country. Korea is now considering a proposed Act for Resource Recycling of Electrical/Electronic products and automobiles. It consists of both precautionary and end-of-pipe regulation, and covers the product life cycle. It is expected that the law will be enforced on January 2008. Open forums and symposia have been held for cooperation among stakeholders (producers, recyclers, NGOs). The concentration and exemptions of the precautionary regulation are the same as the EU RoHS Directive, and it also focuses on designing easy to recycle products. The end-of-pipe regulation will use the current EPR system. The future agenda includes harmonization with international test/analysis methods, enhancement of cooperation among stakeholders, and the development of recycling technology.

Dr. Zhou Guomei, SEPA, China

The current status of E-wastes in China was introduced. The amount of E-waste generated in China is increasing, and the life span of e-products is declining. China has faced significant challenges in dealing with E-waste, such as informal collection system, lack of comprehensive regulation, and weak enforcement. The Chinese government is strengthening E-waste management. A series of policies and technical guidelines have been formulated. New regulations are expected to be approved soon. New policies and regulations will incorporate EPR including national product directories, economic instruments such as funding for E-waste sectors with good environmental performance, technology

research, and national eco-town projects. Given the environmental problems of imported E-wastes, China has been strengthening the management of imported E-waste. China needs to learn good practices from international experience. International cooperation is needed to prevent illegal movement of waste. It is proposed that capacity building in developing countries needs to be strengthened in terms of monitoring, technology, policy-making, and enforcement of regulations regarding E-wastes. China's future policies will focus on improving the product responsibility system including DFE, implementing EPR, and establishing a charge system for E-waste and recycling treatment.

Mr. Charuek Hengrasamee, Electrical and Electronics Institute, Thailand

An overview of Thailand's E&E industry was provided, along with a description of the E-waste management system. EE products compose more than one third of Thailand's total exports. Many stakeholders are involved, and there are many independent players in the informal sector. Recycling centres are clustered around industrial areas, and most use conventional methods. There are many remaining issues, including separation and treatment. Thailand's focus on waste management started from 2000 following EU directives on WEEE and RoHS. In 2003, DIW began to restrict imports of EEE. Thai WEEE strategy focuses on development of appropriate technology and management processes, capacity building of related stakeholders, and development of financial and investment mechanisms to support WEEE management. Thailand is promoting the eco-design pilot projects for capacity-building relating to LCA/eco-design for SMEs in the E&E industry and EEI itself. In the future, Thailand needs to develop a "Thai WEEE" system, appropriate recycling technology, and it also needs to work on capacity building activity to promote a 3R society. There are also needs for greater cooperation between government and the public and private sectors (both domestic and international) to ensure progress towards a 3R society.

Dr. Yasuhiko Hotta, Institute for Global Environmental Strategies (IGES), Japan

This presentation was made jointly by UNESCAP and IGES. The concept of EPR was discussed. EPR takes the life cycle perspective, and it can increase recycling as well as reduce the amount of waste that is finally disposed, including illegal dumping. The problem is that considering international flows, production, recycling, and disposal take place in different places, so it is difficult to implement in one country. EPR has been introduced in some OECD countries, but in Asian countries, only Japan and Korea have EPR systems, and now China is considering adopting it but has not implemented it yet. Even if one country introduces a good domestic recycling system, pollution can still happen through international flows of goods and materials. So in order to prevent this problem, EPR should be introduced throughout the region. It is sometimes difficult to treat or reuse wastes in a particular country, so trade is needed in some cases. To establish an internationally harmonized mechanism for implementing EPR, it is necessary to harmonize the institutional setting and a scheme for information sharing is needed. International cooperation for capacity development is an important starting point for this process.

IGES and UNESCAP would like to suggest starting an examination of the possibilities and issues involved in introducing internationally harmonized EPR system taking into consideration economic integration and increasing trans-boundary movements of materials in the Asian region.

Ms. L. Raghupathy, Ministry of Environment and Forests, India

What concerns India are the toxic constituents in E-waste. India's existing legal provisions are being reviewed to regulate e-wastes and also to provide for recycling in an environmentally-sound manner. A needs assessment study on E-waste has been carried out. Introduction of environmentally sound technology has been found to be a primary requirement. Appropriate policy and technology interventions are needed in several areas. In order to provide criteria for recovery, recycling, and disposal of waste, India has also proposed to develop guidelines for environmentally sound management of E-waste with a view to facilitate handling E-waste in an environmentally-sound manner and encourage 3Rs. Many stakeholders have been involved in this process.