

e-WASTE MANAGEMENT IN SOUTH ASIA - *Scoping Exercise*



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Organised by

New Delhi, India
21st September, 2007



EXECUTIVE SUMMARY

Development Alternatives and South Asia Cooperative environment Program on 22 September 2007 jointly organised the *Scoping Exercise on e-Waste Management in South Asia* in New Delhi, India. The workshop was attended by representatives from all sectors, government, industry, non-governmental organisations and reach institutions, from across South Asia.

The scoping exercise was conducted to review the situation, as it existed in all the countries of the region, identify priority concerns and agree on suitable action points. The workshop not only enabled sharing of experiences and country information, but also pondered on some specific action points at the country and regional levels.

As part of the scoping exercise the following themes were discussed in details:

Based on the country presentations and panel discussion, the following themes were identified for further discussions:

- Inventorisation
- Industry practices - cleaner design, better products
- Policy and regulatory framework
- Collection systems and recycling
- Imports and transboundary movement
- Awareness creation

Constitution of a Regional Task Force on e-waste management in South Asia was discussed as part of the scoping exercise. The main objective of the Task Force would be to look at various recommendations, made in this workshop and later, assess how these could be brought into action in different countries as well as at the regional level, and coordinate action at the regional level.

It was agreed that a coherent approach for e-waste management need to be adopted, taking the South Asian perspectives as a whole.



1.0 Background

Development Alternatives (DA), India, is a non-profit research, development and consultancy organisation that fosters the new relationship in the people, technology and environment interactions needed to attain the goal of sustainable development.

South Asia Co-operative Environment Programme (SACEP) is the intergovernmental environmental organization for the South Asia region. SACEP, as in the programme objectives, focuses to achieve a regional strategy to assist, enable and facilitate the South Asian countries to address the waste management related issues.

DA recognizes the need for regional cooperation and multi-stakeholder participation in South Asia and is hence facilitating adoption of environmentally sound management for e-waste. SACEP seeks to work in areas where regional cooperation and collective action can add value to member countries and produce better outcomes. With its objective to establish a network of institutes, stakeholders and identify centres of excellence in the region for waste management, SACEP lays high priority to e-Waste management.

DA and SACEP propose working together to reduce environmental and health impacts through scientific e-waste management while demonstrating benefits and ensuring multistakeholder participation in the South Asia region by focusing on the following:

- Document current status of e-waste management in the computer and mobile phone industry, concentrating on countries in South Asia.
- Help understand issues, articulate concerns and develop a plan of action including some proposals for seeking funding to engage in demonstration of feasibility of management options, identified above.

Some of the activities identified in this context include

- establishment of contacts with stakeholders, including governments and private sector
- one workshop for stakeholder consultations
- development of one background paper with references to on-going practices and status on the initiatives at various levels (regional / national / local) undertaken by different agencies.

2.0 Inaugural Session

3.1 Opening Remarks

Dr. Ashok Khosla, Chairman, Development Alternatives

Dr. Ashok Khosla, Chairman, Development Alternatives welcomed the participants. Dr Khosla highlighted the importance of the workshop as it focussed on critical issues in the present pattern of consumption in the world, which would not only lead to depletion of resources, but would fundamentally affect the process of development itself. In the past thirty years the world has seen a remarkable growth in the

Information Technology (IT) and the mobile phone sectors, and there has been a consequent growth in all forms of electrical and electronic components and products. While both these technologies could liberate people, create jobs and help promote business, they use materials that are scarce and often toxic. This has created a challenge in disposal of the products at the end of their life cycle, especially in South Asia. Though some efforts are being made at the manufacturing level to reduce pollution, the whole life cycle cost, along with costs of offsetting environmental change, had not been taken into account fully. At the same time, it was also important to see if the disposal process could generate economic value as well, in terms of better recovery, thus reducing wastage of scarce materials, instead of looking at a blanket ban on usage of such scarce materials as a knee jerk reaction to the question of environmental damage. Dr. Khosla concluded by stating that, in order to manage the process of safe disposal as well as recovery, it was important to develop good policies as well as constant involvement of civil society, to provide deeper and wider insights, keeping a watch on the actual process of disposal/ recovery.



Dr. Arvind Boaz, Director General, South Asian Co-operative Environment Programme



Dr. Arvind Boaz stressed on the fact that e-waste was one of the biggest concerns of the countries in the South Asian region. The rapidly growing economies of the region, coupled with the large population, meant that electronic goods manufacturers all over the world saw this region as their prime target, in turn leading to high sales (both new and replacement) of various electronic goods, especially computers and mobile phones. This had led to generation of large quantities of e-

waste, with new models replacing old ones. In addition, because of increasing restrictions elsewhere, South Asia had witnessed the phenomenon of dumping of e-waste into the region, with e-waste exported to South Asia rapidly increasing in the last few years.

Dr. Boaz pointed out that market forces, if left unregulated, dictated that toxic waste would always run “downhill” on an economic path of least resistance, flooding towards the poorest countries, where labour was cheap and occupational and environment protections inadequate. However, he said, that though free trade in hazardous substances was not desirable, there was still an opportunity in proper handling, recovery and disposal of e-waste. The Industry had a major role to play in this issue, requiring greater interaction between industries and the other stakeholders. As countries in the region had similar problems, the aim of this workshop was to discover the extent of the problem in all the countries and develop a

common action agenda. This meeting provided an opportunity to share the different approaches and findings on better e-waste management, for the South Asian region. Such information sharing was vital to accelerate policy, technology and investment progress in the region.

Dr. Boaz added that while some good practices were developed throughout Asia, most decision makers did not have access to such information, and that this was a key reason for stronger regional cooperation in this area. The South Asia Co-operative Environment Program, being an inter-government body established in 1982 by the Governments of South Asia, to promote and support protection, management and enhancement of the environment in the region, had identified waste management as one of the top priority thematic areas. As such, SACEP was very pleased to facilitate this valuable event. It was hoped that the dialogue would help gain insights on a range of issues related to e-waste management. SACEP had also initiated action to set up the regional centre for the Basel Convention at SACEP.

Dr. Lakshmi Raghupati, Ministry of Environment & Forests, Government of India

Dr. Lakshmi Raghupati, explained the action proposed by MoEF with regard to e-waste. Though globally no definition as such existed for e-waste, even in the Basel Convention, the MoEF tried to put together a suitable definition for environmental purposes, and India was among the first to include such a definition as a part of Hazardous Waste Rules. It was said that the danger of becoming a dumping ground existed for all the countries in the South Asian region, it was also a fact that the usage of electronic gadgets was growing in a very fast manner compared to the western countries. As these products have a high rate of obsolescence, considerable production of waste would be from inside the country as well. Though imports of e-waste were not allowed, it did enter in the region as second hand goods through charity, and that these could soon be dumped.

The production of e-goods is mostly in the form of assembly rather than manufacturing in India, legally these also were deemed as processes where hazardous constituents were present. Import and export of such goods was also regulated by law, ensuring that environmental concerns were considered and appropriate responsibility taken by the importers. To help implement the law, the Central Pollution Control Board (CPCB) of India had recently prepared a set of guidelines for recycling of e-waste. The MoEF had also set up a Task Force under its Additional Secretary, in which representatives from various ministries were represented, along with research organisations. This Task Force was entrusted with the responsibility of reshaping the guidelines developed by CPCB, in consultation with all stakeholders. The Hazardous Waste Rules had been recently amended, encouraging recycling, in order to reduce the toxic material going into the environment.



Dr. Raghupati said the major thing lacking in e-waste management was having a proper inventory, and that this was India's weakest point. An exercise on

inventorising was taken up for Delhi and a few metros, but this was limited and there is a need for a national inventory, which would help in better decision-making on the disposal processes. It was hoped that this workshop would provide suitable inputs and recommendations, which could be taken up for further action.

Dr. U. P. Phadke, Ministry of Information and Technology, Government of India.



Dr. U.P. Phadke, Scientist, R&D, Electronics wing of IT, GoI, explained that from the IT Ministry viewpoint, while the software sector was growing rapidly, the hardware (manufacturing) had not grown as fast, and to this, the Ministry was developing a Hardware Policy. He emphasized the fact that as a part of this policy, environmental issues were also considered, and one of the concerns was e-waste. He pointed out that it is also

important to look at designing the products to get cleaner products in the first place, i.e. have less polluting index. The Department of IT had taken some initiatives in this regard, starting a pilot project with UNDP assistance, in modifying not just product design but also the process design, so that other chemicals used in production would also be less polluting. The Department had also very recently initiated a project at the National Metallurgical Laboratory (NML), to look at a similar effort in the recycling process as well.

One difficulty faced by such authorised recyclers was the lack of sufficient raw material, and lack of material reaching these recyclers, though according to the IT industry there is sufficient e-waste in the country. Hence a system for satisfactory collection was required, and if costs for such collection and transport were high, the Ministry was also looking at whether these industries deserved a kind of incentive, in the form of subsidy for effective management of waste.

He concluded by pointing out that producer responsibility, in not only making the product cleaner, but also in managing safe disposal / recovery, in terms of Extended Producer Responsibility (EPR) is the key concern. He wished the workshop all success and hoped that the workshop would look into EPR issues as well, keeping in mind the point that the manufacturing industries in the developed world was on a different footing as compared to India, and looked forward to suggestions and inputs from the workshop.

Dr. K Vijaya Lakshmi, Assistant Vice President (Environment), Development Alternatives

Dr. Vijaya Lakshmi, Assistant Vice President (Environment) DA, highlighted DA's work in e-waste management, with support of the Secretariat of Basel Convention. She mentioned that DA had been associated with the issues concerning environmental, social and occupational health related to manufacturing as well as at the end of life



products, the organisation began working on e-waste about one and half years earlier, mainly in Delhi, involving the Delhi Government. She pointed out that unlike other South Asian countries, in India, industry partners, NGOs and the government had come together and started formulating guidelines on e-waste, over the last 2 to 3 years, and reached a stage where some models had been developed. She said that the aim of the workshop is to conduct a scoping exercise – to review the situation, as it existed in all the countries of the region, identify priority concerns and agree on suitable action points. The workshop would not just be limited to sharing of experiences and country information, but definitely decide on some specific action points, which SACEP could then follow through, both at the country level and the regional level. The agenda for the day was briefly stated and that after an initial overview of the present situation, each country would make a presentation on specific conditions in that country, and that this would be followed by group work on identifying requisite priorities and suggested action ideas.

3.2 Overview of e-waste management in South Asia

3.2.1 Lead Presentation by Development Alternatives

Mr. Arupendra Nath Mullick, Environment Scientist of DA made a presentation on the present situation of e-waste in the region, to provide a backdrop for the discussions. In the presentation, Mr Mullick explained the main challenges of e-waste management in South Asia. He emphasized the fact the growth of the South Asian economy, one of the fastest in the world, have stimulated production and consumption of electronic and electrical appliances, particularly the IT and the telecommunication sectors; hence necessitating a system to be in place for management of the waste generated for these sectors. He highlighted the need for environmentally sound management of e-waste in South Asia and bottlenecks for implementing the same.



Referring to necessary future actions, he pointed out that need for establishment of a Regional Task Force on e-Waste Management to study existing mechanisms, and to help promote co-operation, consensus and coordinated actions at the regional level.



At the national level, he pointed out that there was a need to develop (a) guidelines on inventorisation of e-waste; (b) models for stakeholder engagement; (c) technologies for environmentally sound recycling; (d) systems for controlled movement of used electronic goods; (e) appropriate country level policies and regulations; (f) methods for integration of the 5Rs into e-waste management, not limiting to Reduce, Re-use and Recycle, but also

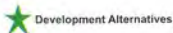
Refurbish and Repair; and (f) awareness among all stakeholders. Mr Mullick mentioned that the proposed future course of actions is suggestions rather than final recommendations, and would be pointers for the subsequent discussions planned for the later sessions.

The presentation is as follows.

e-Waste Management in South Asia

Scoping Workshop

21 September 2007
India International Centre, New Delhi



What is e-waste

Electronic waste or e-waste, for short, is a generic term embracing various forms of electric and electronic equipment that have ceased to be of any value to their owners.

Electrical or electronic equipment which is waste. . . including all components, sub-assemblies and consumables, which are part of the product at the time of discarding. Directive 75/442/EEC, Article 1(a) defines waste as any substance or object which the holder disposes of or is required to dispose of pursuant to the provisions of national law in force.

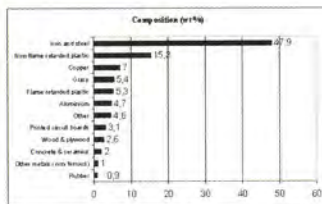
EU WEEE Directive (EU, 2002a)

e-waste encompasses a broad and growing range of electronic devices ranging from large household devices such as refrigerators, air conditioners, cell phones, personal stereos, and consumer electronics to computers which have been discarded by their users.



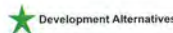
Composition of e-waste

- Contains highly toxic substances such as cadmium, mercury and lead
- Also contains valuable substances such as gold, silver and copper

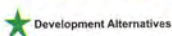


Challenges of e-waste management

- Accelerating trade in goods and materials across borders and across continents.
- Recovering precious metals from e-waste, a profitable business, resulting in global, transboundary trade in e-waste
- The globalized phenomenon of consumerism
- Difference between waste or second-hand products?



The Result



The South Asia Context



The South Asia Context

- South Asian economy growing at avg. 5.3% (1990-2000)
- Creation of SAPTA (SAARC Preferential Trade Arrangement) in 1993 will lead to higher levels of trade & economic cooperation in the region
- Stimulated production & consumption of electronic & electrical appliances
- Systems for managing the e-waste generated from the growing sectors of IT & Telecommunications (mobile telephones)

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Concerns of e-Waste Management in South-Asia

Uncontrolled movement of e-waste

- transportation of the e-waste from the developed nations to the developing countries in Asia
- despite all South Asian countries being signatories to the Basel Convention trade and dumping of e-waste occurs

Increased consumption in developing countries

- South Asian countries emerging as generators of e-waste in their own right.

Lack of regulatory mechanisms

- The lack of national regulation and or lax enforcement of existing laws, promoting the growth of an informal economy in the developing countries (trading, repairing and recovering materials)..

Methods of recycling & recovery

- Recovery of valuable materials from electronic scrap involves hazardous methods, without protection to the environment or health.

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The need...ESM of e-waste

- Under the Basel Convention **environmentally sound management (ESM)** means taking all practicable steps to ensure that hazardous wastes or other wastes are managed in a manner, which will protect human health and the environment against the adverse effects, which may result from such wastes

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Pre-requisites for sound management of e-waste

- An appropriate **legislative framework**□
- Sustainable development policies, including policies on the collection, recycling and recovery of electronic and electrical wastes and ones that address the transboundary movements of such wastes□
- **Economic incentives** for environmentally sound practices and technologies□
- **Green design** aimed at reducing the use of hazardous materials in electrical and electronic products and enhancing their recyclability□
- Closing the loop for recyclables□
- Extending the life of products through **reuse, refurbishment or repair**□
- Elimination of hazardous constituents in products□
- Worldwide environmentally sound management standards or criteria for recycling and final disposal of electronic wastes□
- Action to prevent **illegal traffic**□
- Broad public **awareness**□
- **Public-private partnerships** to engage all stakeholders□
- Regional level playing field on how to deal with **export and import of electronic and electrical wastes**□

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Efforts By South Asian Countries

- South Asian countries viz. India, Pakistan, Bangladesh, Nepal, Bhutan, Sri Lanka and Maldives are all signatories to the Basel Convention prohibiting transboundary movement of hazardous waste.
- The Asia-Pacific Regional Scoping Workshop on the Environmentally Sound Management of Electronic Wastes in November 2002 was the first intergovernmental meeting to be held on the "e-waste" problem in Asia.
- The three day SAARC workshop organized by the Ministry of Environment and Forest, Government of Bangladesh in 2004
- The 3R workshop in Katmandu, Nepal in 2006
- Project on Environmentally Sound Management of e-waste for Asia Pacific by the Secretariat of Basel Convention

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Bottlenecks in implementing ESM

- **Lack of easily accessible information** on flows, quantities, available technology and legislative/trade requirements of countries importing new products that will require increasingly strict standards for minimization, re-use, recycling and recovery.
- **Lack of trained personnel** both in the public and private sectors leading to weak or insufficient enforcement and unsound management of e-waste. Overall there is a lack of awareness and technical capacity for environmentally sound management of e-waste.
- **Lack of legislation including** lack of clarity regarding export/import rules for e-wastes and of regional level-playing field.
- **Inadequate infrastructure** for collection, recycling and recovery and lack of sound handling and processing during sorting, repair, and refurbishment, recycling for material recovery operations to prevent risks to workers, general public and the environment.
- **Lack of awareness** in all sectors of society on the potential harmful effects of substances in these equipment and unsound management of e-wastes leading to unsustainable patterns of consumption and production. There is also a lack of economic alternatives to activities carried out by the informal sector and small repair shops.

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Way Forward

- A. Promotion of collaborative actions at the sub-regional level**
- Establishing a Task Force for South Asia which would report and analyze on the status of existing approaches and particular policies for electronic products and based on this explore recommendations for future developments to solve the e-waste problem.
- B. Improvement of management systems at the country level**
- Development of guidelines for inventorisation of e-waste
 - Models for stakeholder engagement
 - Technology for recycling
 - Controlled movement of used electronic goods
 - Policy and regulation
 - Integration of 5Rs into e-waste management system
 - Awareness for all stakeholders

Thank you

3.2.2 Discussions

In the **immediate discussions** that followed, the participants clarified that the Basel Convention was not for complete prohibition of transboundary movement, but for its regulation and control. It was also felt that policies and regulatory framework need to be first at the national level, and once these are in place, a working mechanism at the regional level could be developed. Laws in some of the smaller countries, in South Asian region, were inadequate, and India has been requested to help them frame appropriate laws and regulatory framework. In this regard it was also worthwhile to explore the need for modifying some existing laws, for even a small transboundary movement within the region, so that centralised facilities, with advantages of scale could work satisfactorily. Thus smaller players could handle just dismantling, and then the components could be transported to the larger central facility for further recovery. At the regional level, the focus could be on coordinating such policy changes, possible technology choices and transfer, and other common action.

The discussions brought forth the fact that the UNEP-IETC (International Environmental Technology Centre) has been already developing manuals on inventorisation of e-waste, as well as on technology for recycling. The house agreed to the fact that in South Asia, India has taken the lead in developing the assessment methodology for inventorisation, and suggested that the two case studies on this aspect be published, which would in turn help avoid duplication or repetition.

The house also emphasised that the EPR concept should be applied for collection and transportation of e-waste and approaches to implement EPR in the South Asian context should be determined, instead of adopting western models.

It was also pointed out that while the focus should not only be on sound recycling of e-waste, but also on cleaner products, so that the burden on recycling is reduced.

Regarding the proposed Task Force it was clarified that the Task Force would not impinge on any country's autonomy, but will focus on collaboration and co-operation. As an example it was mentioned that the Task Force would help other South Asian countries learn from the work already done in India and would also facilitate the process of developing appropriate policy framework in all South Asian countries to enable environmentally sound management of e-waste.

3.0 Technical Sessions

4.1 Country Presentations

After a round of introduction of the participants, country representatives presented the current scenario in Sri Lanka and Nepal, followed by a report on the situation in Bhutan and India, by DA.

Sri Lanka

Mrs. Sarojini Jayasekara, Assistant Director, Hazardous Waste Management Unit, Central Environment Authority, Sri Lanka, presented the status of e-waste management in Sri Lanka. She explained that development of e-literacy, and initiatives by the Sri Lankan Government for economic development in the country had resulted in a large number of computers and printers coming into the country

which became obsolete in 4-5 years due to rapid advancement of e-technology and consumption. The increased consumption also saw considerable quantity of outdated equipment coming into the country at low cost in the guise of used computers and electronic items, especially reconditioned mobile phones, refrigerators etc. Ms. Jayasekara pointed out that in Sri Lanka, only a few companies were involved in e-waste management, primarily dismantling and repairing. There are no formal recyclers in Sri Lanka. As such, finally the majority of e-waste needed to be disposed in some other form. The situation at present is that all the outdated equipment is piled up in different places, often haphazardly.

With regard to the existing regulatory framework, Ms. Jayasekara mentioned that Sri Lanka had ratified the Basel Convention on Transboundary Movement of Hazardous Waste in 1992, and since then, the Central Environmental Authority was designated as the competent authority for the Basel Convention. The national coordinating committee for the implementation of Basel Convention, functioning under the Ministry of Environment, had appointed a technical expert committee to deal with the technical matters with regard to the List B in the Basel Convention and internal Management of Hazardous Waste.

Regulations for the control and management were formulated in consultation with all relevant stakeholders and finalised in 2005, but had not yet been formally gazetted under the Import and Export Control Act, though this was expected soon. Meanwhile, a cabinet decision was taken in 2000 to ban the waste specified in the List A of the Basel Convention, and to control waste listed under List B. The Central Environmental Authority (CEA) had developed a mechanism for granting approval to import waste listed in the Basel Convention List B only, through a technical expert committee, initially seeking approval through administrative proceedings, until such time as the regulations were gazetted.

Ms. Jayasekara added that initially there was no clear definition of electronic waste. Hence the Ministry of Environment developed relevant categories, with the help of Sri Lankan Customs Authority and the University of Moratuwa, using the following steps:

- a) Identifying the items that could come under e-items.
- b) Prioritising of most vulnerable items.
- c) Assigning Harmonised System (HS) codes, in collaboration with customs.
- d) Creating national sub headings and banning all electrical and electronic items which could be specified under the Basel List A.

The national sub-headings developed are:

- a) PCs,
- b) Printers
- c) Televisions
- d) Mobile phones
- e) Air conditions
- f) Photocopy machines
- g) Washing machines and
- h) Used batteries

As this did not directly address e-waste, the provisions of the Basel Convention were used to develop prescribed list of e-waste, under Codes S27 and N022.

With regard to movement of e-waste, Ms. Jayasekara said that as there were manufacturers of electronic items in Sri Lanka, the main entry points were by sea or air, i.e. ports and airports respectively. The material flow then led to marketing and sales, then to the consumer, next to repair and maintenance, and finally piled everywhere.

She added that the major areas of concern in managing e-waste in Sri Lanka are to:

- Develop criteria and guidelines on importation of used computers then for the other prioritized items – often electronic waste came into the country under the heading used/second-hand items.
- Gazette the drafted regulations as soon as possible.
- Develop mechanism to formalize the informal sector related to the e-Waste Management – a lot of people were engaged with dismantling etc.

Further, there are plans to set up a central repair and maintenance and recycling centre in Sri Lanka, for which the Ministry of Environment has submitted a proposal to Basel Convention, and received an acceptance for funding. As an initial step the CEA had completed an inventory on electronic items, which was under evaluation and to be finalised. Once finalised, the inventory would be published.



The presentation is as follows.

PRESENTATION BY SRI LANKA

Country presentation on E- Waste Management SRI LANKA

By Sarojinie Jayasekara
Asst. Director
CENTRAL ENVIRONMENTAL
AUTHORITY



Current Situation of E-Waste in Sri Lanka

- Development of E - Literacy and new E - Sri Lanka initiatives bring a large number of Computers and Printers
 - E.g. After 4 -5 years they become obsolete
- Rapid advances of E & E Technology and consumption led to rapid pace of equipment becoming obsolete
 - E.g. Out-dated equipment come into the Country at low cost
- A limited number of companies involved in recycling these equipment.
- Majority needs to be disposed

Existing regulatory frame work

Sri Lanka has ratified the Basel Convention (BC) on Transboundary movement of Hazardous Waste on 28.08.1992 and since the Central Environmental Authority was designated as the Competent Authority for the BC.

The National Coordinating Committee for the implementation of BC functioning under the MENR has appointed a Technical Expert Committee (TEC) with the leadership of CEA in order to deal with the technical matters with regard to the Basel list B and internal Management of Hazardous Waste

Regulations were formulated in consultation with all relevant institutions and finalized regulations are forwarded to the Department of Imports & Exports for publishing it under the Import & Export control Act in 2005.

CONTD....

A cabinet decision was taken on 2000.01.13 to Ban the waste specify in the List A of the Basel Convention and to control Waste in the Basel List B.

In this situation, CEA has a mechanism for granting approval to import waste listed in the Basel List B through TEC for projects seeking approval in the initial stage as an administrative procedure until such time the regulations are gazetted.

Definition of the E waste in Sri Lankan Context

The following steps were followed in order to get a comprehensive practical definition for E Waste.

Identification of all items that could come under the E items

Prioritization of the most vulnerable items

Assigned the HS codes

Created national sub-headings Ban the all E & E items which could be classified under the BC List A.

This has been done under the leadership of MoE and in collaboration with SL Customs and University of Moratuwa.

List of Selected 09 E-Waste Items

- ✓ Personal Computers
- ✓ Printers
- ✓ Televisions
- ✓ Mobile Phones
- ✓ Refrigerators
- ✓ Air Conditioners
- ✓ Photocopying Machines
- ✓ Washing Machines
- ✓ Used Batteries



Issues identified

- The prevailing regulation does not address E Waste directly: However there are provisions to address it indirectly.
- Steps were already taken to amend the regulation in the form of a prescribed lists (**NON-SPECIFIC SOURCES & SPECIFIC SOURCES**) of waste to facilitate the easy identification of Waste.
- WEEE were identified under following codes;
- S 27 Discarded or off specification batteries containing lead, mercury, nickel, cadmium, lithium and Electrolyte from batteries and accumulators.
- N 022 Electrical equipment or parts containing or contaminated with PCBs and/or PCTs

Possible Entry / Exit points

- Sea /Air ports
- Ports to Go- downs
- Go downs to marketing
- Marketing to sales
- Sales to consumer
- Consumer/ Repairs & maintenance to Collector

Major areas of concern

- Develop criteria and guidelines on importation of used computers then for the other prioritized items.
- Gazette the drafted regulations as soon as possible.
- Develop mechanism to formalize the informal sector related to the E- Waste Management.

Thank You

Nepal

Mrs. Roshni Shrestha, Under-Secretary, Ministry of Environment, Science and Technology, Government of Nepal, elaborated the situation of e-waste management in Nepal. Giving an overview about the geographical location and statistics of Nepal, she stated that the Ministry of Environment, Science and Technology has the objective of (a) promoting environmentally sustainable economic development in the country – which involved protecting the natural resource system (water and soil), (b) promoting research activities for technology promotion and development, for poverty alleviation.

Beside the formulation of Policy, Acts, and Regulations on Environment, Science and Technology and Information Technology, the Ministry was responsible for giving permission for the import of used equipments including electrical and electronic products. Under this category, the Ministry has given permits to import used computers, monitors, air conditioners, medical equipments, survey equipments, refrigerators, laboratory equipment, photocopy machines and parts.

With regard to management of e-waste, Ms. Shrestha stated that steps were taken to explore the source of e-waste in the country (through visits to various repair shops in the country). It was seen that almost all repair shops were storing abandoned electronic equipment, mainly as a source of components for repair of similar items. In some cases, the equipment was disassembled and components stored for use in repair. Often the disassembly was done with just a soldering iron, and the copper and metal wire was also sold to the waste dealers.

Plastic parts were sold to “Kabadis” (petty traders in waste, often rag pickers) who in turn sold them to larger waste dealers. In the case of monitors, these were dumped in municipal waste sites if broken. Unbroken monitors were bought at low prices by the kabadies, and possibly sent to a neighbouring country for recycling – the route taken is not clear. There was no recycling facility in Nepal, and as such it was assumed that all e-waste was ultimately moved elsewhere.

Mr. Ram Charitra Sah, Environmental Scientist, Centre for Public Health and Environment, a non-profit organisation, added that Nepal as yet did not have a proper inventory system, nor had there been any formal studies on electronic waste. However, e-waste had started to enter the waste stream. Therefore, he emphasised, that it was high time for Nepal to take up this issue, and hoped that this forum would throw some light on what could be done. As Nepal was located between India and China, with porous borders on both sides, a lot of electronic goods were coming in from both directions both legally and illegally. There was a high degree of flooding of electronic devices from China all over Nepal, with most of them having very short life span. As such, e-waste had already started its movement into the solid waste stream.

Nepal had many citizens working abroad, and most of them tended to bring in at least one to five electronic devices with them. Similarly people who went abroad on business tours etc., and stayed there for more than a week, tended to bring in electronic items like laptops etc., as they were exempted from customs duties. Because of such unrestricted entry, there were no proper records of how many electronic items were coming in every day.

Mr. Sah said that these were some of the drawbacks faced in developing an accurate inventory of e-equipment and e-waste. Mr. Sah also highlighted the problems faced

by Nepal on all aspects of solid waste, apart from e-waste in particular. Given the difficulties in managing general solid waste, the issue of managing e-waste became even more difficult. He added that till date Nepal had not established specific laws to deal with e-waste, especially with regard to transboundary movement, given the porous borders he had mentioned earlier. He added that NGOs in Nepal were interested in waste management; already carrying out awareness campaigns studies and litigation, and that NGOs would volunteer to take the initiative in data collection, capacity building and awareness building. He hoped that Nepal would soon have relevant laws on e-waste, and bring in the concept of EPR to the extent possible.

PRESENTATION OF NEPAL

A country Report on Scoping Exercise on e-Waste Management in South Asia

21 August 2007
Presented by
Roshani Shrestha
Under Secretary(Senior Divisional Chemist)



Nepal in the World



Ministry of Environment, Science and Technology.

This ministry has the objective of promoting of environmentally sustainable economic development; preserving natural and cultural Environment; protecting life support system i.e. air, water and soil; and promote research activities for technology promotion and development for poverty alleviation. Beside the formulation of policy, Act and regulations on Environment, Science and technology and information technology, this Ministry is responsible for giving permission for the import of used equipments including electrical and electronic products. Under this category, the Ministry has given permit to import used computers, monitors, air conditioners, medical equipments, survey equipments refrigerators, laboratory equipments, photocopy machines and parts.

Country Report

- Nepal lies in South Asia between India and China.
- Population - 25 million
- The country has a length of 885 Km from East to West and an average width of 193 ka from North to South
- The Nearest point from the sea is about 960 km.
- Nepal is among the 27 least developed and 15 land-locked countries.
- The altitude varies from 60m in the south to 8848m high Mt. Everest in the North.
- Nepal has flat land in the south, hills in the middle and Himalayas in the North.
- The southern part (low land) occupies about 17% of the total land area.
- It is fertile with alluvial soil and produces about 60% of the total grain production of the country.
- The central part of the country has moderate size mountains ranging from 1000 to 3000m having warm to cold temperature climate.
- The hill slopes are terraced cultivation and forests cover the remaining land. Most of the rivers are locked in this zone. About 52% of the total population of the country lives in this zone.
- There are 58 municipalities in Nepal.
- Kathmandu is the capital of the country with an average altitude of 1330m with a flat bottomed valley and covers an area of about 351 sq. km.
- The northern part of the country has high mountains. About 4% of the country is covered with snow. Most of the land is not suitable for Agriculture and vegetation is confined up to an altitude of 5500m.
- The variation of topography is responsible for a wide range of climatic condition of Nepal.
- The average annual rainfall in Nepal is about 1600mm but the actual amount differs in different climatic zones. The country records a range of 44.1 0 c. to 17.9 0 c. temperature.

Where do the e-wastes go in Nepal.

A number of TV and computer repair shops have been visited to explore the course of e-waste in the country. Almost all of these repair shops have been found to store the electronic equipments after the useful life and abandoned by the owner for a few years. The purpose of such storage is not reuse .some of the parts from such equipments to repair similar electronic items with defects in other parts.

The plastic parts are sold to Kabadies, who collect or purchase waste items to be sold to waste dealers. Electronic sub assemblies are stored for long time so that some of the components can be taken out and used for repairing other electronic equipment. Some units disassemble all the components from the sub-assemblies and keep them in store to keep used again for the repair similar or other electronic products. The soldering iron is used to extract the components from the sub-assemblies.

In case of the monitors, if they are broken, they find their course together with the Municipal waste to the dumping site. The copper wire and metal is first removed and sold to kabadis. The kabadies come and purchase the unbroken but faulty monitors at a very small amount. A few years back, the faulty electronic components used to be collected free of charge by the kabadis. But now they pay some nominal amount on weight basis. The kabadis pay Rs. 100 to Rs. 200 per defective monitor.

It is said that all the items so collected go ultimately to the neighboring country for further recycling. There is no recycling unit for e-waste in the formal sector in Nepal. Only the repair shops reuse some of the components as described above and rest is sold to kabadis.

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Thank You

Bhutan

While there was no representative from Bhutan, data from the country had been communicated to DA, and a representative from DA provided a brief overview of the situation in that country. It was said that at the Sub-Regional Environmental Policy dialogue meeting, organised in 2005, Bhutan had identified electronic waste as a problem area. Environment had always been a priority area for Bhutan, and the Deputy Minister of Environment of Bhutan pointed out that the e-waste was a problem, and that the country had to be prepared to deal with the e-waste issue. Otherwise, he had noted, the pristine environment of Bhutan would be at marred. Under the 10th Five Year Plan, the Bhutan Government had proposed to conduct an e-waste impact study, as one of the priority programme areas, to be conducted by the Ministry of Information and Communication. A strategy to develop a national e-waste management plan for sustainable environment had been incorporated under the Bhutan ICTE policy and strategy update.

India

The presentation on the situation in India was presented by Mr. Mullick of DA, who mentioned that e-waste issues in India were addressed under the Hazardous Waste Rules. There had been several studies by research Institutes and NGOs to understand the extent and dynamics of the problem of e-waste in India, the main one being a national level study carried out in 2004 with Mr. Amit Jain, of IRG. The inventorisation study, conducted by IRG with support from CPCB and GTZ, estimated that for 2004-05 India generated 14.6 million tonnes of e-waste.

Further to assess the quantum of e-waste, and develop guidelines for e-waste disposal, recycling and recovery, the Central Pollution Control Board (CPCB) constituted a national level task force, which had recently developed guidelines for environmentally sound management of e-waste.

With regard to recycling facilities it was said that formal facilities were being set up only recently, with 6 centres already set up and 3 more in the pipeline. However, the informal sector continue to deal with majority of the e-waste for recycling, and given the fact that a large number of people were dependent on this trade, a project was being implemented for capacity building of informal sector involved in e-waste recycling, with assistance from GTZ and EMPA.

The presentation for Bhutan and India is as follows.

As there were no representatives from Bangladesh, Maldives and Pakistan, the respective country situations could not be presented.

PRESENTATION OF INDIA & BHUTAN COUNTRY PRESENTATION

Country Presentations

 Development Alternatives


India

- The waste electrical and electronic assemblies are covered under category B-1110 of Schedule 3 of the Hazardous Waste (Management & Handling) Rules 2003 of India.
- Several studies by research institutes and NGOs have been done to understand the extent and dynamics of the e-waste problem in India.
- A national-level desk study was carried out in 2004-2005 under the guidance of CPCB/ASEM programme of GTZ, to assess the quantum of e-waste being generated at the national level and to identify states and cities requiring rapid assessment.
- The MoEF/CPCB established a national-level task force to steer the e-waste initiatives in the country. e-Waste manuals describing approach and methodology for inventorization of e-waste and its updating have been prepared. Guidelines for environmentally sound management of e-waste in India prepared by CPCB.
- The Indian government has authorized 6 e-waste recycling units viz. 4 located in the state of Tamil Nadu and 2 in Karnataka, operated by private entrepreneurs.
- Capacity Building for the informal sector is initiated with GTZ & EMPA. – association building and formalisation process initiated.

 Development Alternatives

Bhutan

- The Sub-regional Environmental Policy Dialogue (SEPD) meeting for South-Pacific region in Thimphu, 2005 highlights that disposal of unwanted electronic products, or e-waste, is becoming a problem in this region.
- The Deputy Minister of Environment of Bhutan had pointed out that e-waste could become an unmanageable problem in the future, though it is not of much consequence at the moment.
- The country has to be prepared to deal with this before it becomes an issue. This is especially important considering that Bhutan has always prided itself for its pristine environment.
- The government has reflected e-waste impact study as one priority program in the 10th FYP (2008-2013), under the Ministry of Information & Communications (MoIC)
- A strategy to “develop a national e-waste management system for sustainable environment” has been incorporated under Bhutan ICT Policy & Strategy Update 1 (BIPS-1).

 Development Alternatives

Thank You

 Development Alternatives

4.2 Panel Discussion

Following the brief presentations on each country, a panel discussion was held. The panel constituted of Dr. Arvind Boaz (inter-governmental organisation, SACEP), Mr. Vinnie Mehta (industry association, MAIT), Dr. T.K. Joshi (NIOSH), Mr. P Parthasarathi (Formal e-waste recycler e-Parisara, India), Mrs. Roshni Shrestha (Ministry of Environment Science and Technology, Nepal), Mrs. Sarojini Jayasekara (Central Environment Authority, Sri Lanka), Dr. Lakshmi Raghupati (Ministry of Environment & Forests, India) and Mr Satish Sinha (NGO – Toxics Link India).

The Panel members were requested to take up issues which they felt were important, to be followed by brief question and answer sessions. Based on the points raised, key themes would be identified and be used for subsequent group discussions.

Dr. Boaz Chair-person of the session initiated discussions and putforth the major issues of concern of e-waste management in South Asia, as reflected in earlier PPTs viz.

- Developing Criteria and Guidelines for the import of used electronic items
- Introduce concepts of public health, cleaner environment and sustainability in policies and strategies for e-waste management.
- Coordination of amongst Governments and Ministries of South Asian countries.

Dr. Boaz urged that the concerns of e-waste management have gained importance since a lot of the second hand goods were being sent into the region that had a very short life, in certain cases only a year and most of these end-of-life equipments end up in the hands of the informal sector (where recovery of valuables are undertaken) under poor and unsafe conditions. The hazardous content of e-waste and its potential ill impact on human health further aggravates the problem. It is thus important that a change be brought about in the manufacturing process which focussed on cleaner production and strict regulatory measures be introduced for recycling taking into consideration the health issues and the environment .Dr. Boaz emphasised the need for strict policies and guidelines for manufacturing which could control the manufacturers, especially MNCs, trying to bring in South Asia equipment without the same level of consumer responsibility that they follow in countries with strict regulation . With regard to the 3R policy it needs to be followed if we want to reduce the quantities of hazardous wastes and an (additional R (refurbishment) can be added to the policy). Dr. Boaz suggested that in South Asia, not only to reduce the quantity of hazardous waste and that an additional R-Refurbishment could be included keeping the South Asian context in mind. The 3R strategy could definitely be used as one of the means of management of e-waste.

Dr. Boaz pointed out another very important issue that of coordination among the various ministries in the various Governments concerned with e-waste management. With regard to e-waste, management Dr. Boaz explained the need to deal with the Ministry of External Affairs, the Ministries of IT, Ministries of Environment and Shipping and Ports Authority; coordination among these Ministries is key element, as the electronic sector was growing at a rapid pace. While



such coordination was important at the

country level itself, the challenge was to extend it further to the regional level, to develop coordination among South Asian countries themselves, for management of e-waste. This was all the more important, as there is a transboundary movement issue involved.

Dr Lakshmi Raghupathi emphasized on the importance of a criteria for collection system, many institutions are involved in the process of developing appropriate



guidelines like –the Basel Convention, UNDP, UNEP. In specific context to India, Dr. Lakshmi Raghupathi mentioned that the Central Pollution Control Board have published these guidelines on their website for consultation and comments. These efforts needed to be used effectively, and there is no need to duplicate many of the steps since they have been covered. The Basel guidelines focused on the 3R strategy, primarily, but not solely, on the mobile phone

sector, as this was one of the fastest growing sectors. The focus there was on refurbishment, as a part of the process involved in Re-use, it was felt that this has to be expanded beyond the mobile phones where the 3R strategy has being addressed to some extent.

Reduction of hazardous material would be a key factor under the ROHS notification in force from March 2007 in the European Union, which stated that any material produced and exported to EU needed to meet the EU ROHS norms. In India, the Ministry of IT was handling it. Once a better picture emerged on what could be improved in the manufacturing processes, appropriate design changes would come in. At present most of the countries in the South Asia region are only assembling electronic equipment and not manufacturing. In India, Dr. Raghupathi speculated that manufacturing would start in a big way in the coming years, and with higher production, manufacturers would also export, which meant that they would need to incorporate design changes to suit the ROHS norms. These changes could then be taken up at a regional level, she urged that support from SACEP support would be valuable.

Dr. Raghupathi explained that India was looking for a way forward with regard to legislation and policies. The Hazardous Waste Rules have been amended to bring in focus of recycling. Unlike countries like China, Singapore & Malaysia India has not developed separate legislation for e-waste, as provision for recycling of hazardous waste and minimising environmental damage, already existed and strengthening the existing legislation was easier. Based on the experience of management of waste from the lead acid industries it was felt that one of the most important aspect was the development of an effective collection system that required coordinated effort, on a common platform The system could be different for different countries, but it would be useful to develop a common general approach, and then fine tune it for each country. This would be necessary because recycling facilities needed to be of certain size to be economical, which meant that some material flow across countries would be needed, and hence a collection system at the regional level was needed to address such issues, and decisions of all stakeholders to be involved in the collection system was important. In India only 2 recycling facilities have been authorized by the MOEF to recycle e-waste. Some State Government have been authorised or given consent to operate for some units regionally – Maharashtra, Gujarat and Tamil Nadu. These units were authorised only to dismantle end-of-life equipments and send the

parts elsewhere. Full-scale recyclers were yet to be established – two in Maharashtra and two in TN were proposed, once these facilities are set up they would gradually scale up and would soon run short of raw material. Hence this was the right time to establish systems for collection – channelising the waste to one centre from where it can reach the facility for recycling. Dr. Raghupathi emphasised that if systems were not developed, the recyclers would request for permission to import e-waste. The Indian Government wished to block the avenue of import of e-waste for the sake of operating the recycling facilities economically sustainable. To ensure that adequate flow of material was available, the first exercise was inventorisation of e-waste, and setting up an effective system to channelize the waste to the facility. Coordination among various Ministries is difficult and MOEF did try to rope in ministries concerned but it is a tedious task to interact and it was hoped that SACEP could work out a system at the regional level. Dr. Raghupathi suggested that each country may have a central body to deal with e-waste and this body could manage the coordination within the respective country and as a first step look at inventorisation of the entire region.

Dr. Raghupathi revealed that one of the major bottlenecks was the import of second hand good. Though the Directorate General of Foreign Trade (DGFT) in India does not allow import of second hand goods not in working condition, some of the so-called usable goods were in reality potential scrap in a very short time. Dr. Raghupathi suggested that it would be worthwhile to specify a cut-off date, in terms of number of years of useful life so that the second hand goods that come in do not land up as scrap within a year or two of the import.

Mr. Vinnie Mehta of MAIT, explained said that the electronics manufacturing industry in India has come a very long way as it was mostly an assembly oriented industry, certified by the pollution control board as a non polluting industry. Mr. Mehta acknowledged the numerous efforts by NGOs, involved in inventorisation of e-waste for Delhi, Chennai, Mumbai and Bangalore that have led to the acceptance of e-waste being a problem by these industries. Mr. Mehta pointed out that India's consumption of electronic goods is 2% in the global market and a little more in the case of mobile phones. As such, India was not in a position to significantly influence design changes, though such changes were desirable, and a few steps were being seen in that direction. Possibly, in due course, as India graduated to larger consumption, there might be a chance to influence the design patterns. Mr. Mehta added that, according to MAIT's sister organisation ELCINA, 50% of the manufacturers in India were already ROHS compliant. He pointed out and added that excess that many of the industries support Extended Producer Responsibility. MAIT recommended that EPR be introduced in a *phased* manner – so that there was willingness in the industry to adopt it. However, Mr. Mehta pointed out there were various logistical issues that needed to be addressed even with the establishment of e-waste recyclers; viz. India did not have the entire value chain of recycling in the country today. Further, the recycling today was concentrated in the South of India, and for a country of India's size, transportation cost could be so huge that the entire industry did not know how to handle it. Mr. Mehta suggested that the Government encourage recyclers to come to North of India as well, especially Delhi as it was the hub of the entire processing today. Mumbai had huge quantities of waste that could eventually be transported to Delhi. Mr. Mehta concluded by stating that MAIT along with GTZ, under a EU project, had launched the exercise of inventorising, typically the first step of sizing the mass of the problem, and that hopefully by October the statistics would be available.

Mr. P Parthasarthy of e-Parisara an authorized e-waste recycling firm in Bangalore, was of opinion that the SACEP platform could also be used for capacity building or

capacity utilisation of the existing or the forthcoming recyclers, because it would be difficult to set up such facilities in other South Asian countries like Nepal or Bhutan, and suggested that the e-waste from these countries could be moved to existing formal recyclers in India. Mr. Parthasarathy stated that E-Parisara was planning to set up a facility in North India as a joint venture, and was hoping that the Government would provide some incentive. The proposed facility, Mr. Parthasarathy mentioned, would work mainly on collection initially, and would scale up to dismantling and further levels over time, based on the market response. Mr. Parthasarathy expressed the concern that for the Bangalore facility, though tie-ups had been arranged with IT majors like HP, IBM and Infosys and other MNC's, the required quantities were not yet available, and even in the third year of operation E-Parisara was operating at one ton per day. The model followed by E-Parisara was basically B2B (Business to Business) and there was no system yet for C2B (consumer to business [recycling]). Hence Mr. Parthasarathy suggested that the collection model has to be either a PRO model or a take back model. Despite the absence of effective collection mechanism, Mr. Parthasarathy mentioned that with the efforts of Saahas an NGO a small beginning had been made in Bangalore, especially from schools, colleges and some small organisations. For collection, comprising floppies, CDs and fluorescent tubes and even some computers, Mr. Parthasarathy suggested that an exemption be given from the manifest system, for a certain quantity base, say 100 Kgs per month. Mr. Parthasarathi, who have been has also been involved in the drafting of the e-waste management guidelines for MoEF, India, with the support of a German CIM expert, and academicians from the University of Kuvempu, Department of Applied Geology and Resource Management, is also doing a study with the University on the physico-chemical characterisation of e-waste, the hazard content, its recyclability, etc. Mr. Parthasarathy believed that such characterisation would help in assessing the recycling and economic efficiency in the recovery process. Mr. Parthasarathy concluded by pointing out that the main issue was to solve the consumer to business aspects, i.e., how e-waste could be channelised from the consumer to the recycler.

Ms. Sarojini Jayasekara of Central Environment Authority (CEA), Sri Lanka clarified that as the implementing body, the CEA is required to finalise an appropriate implementing mechanism for satisfactory management of e-waste. There were no authorised recyclers in Sri Lanka, and the informal sector was not abiding any safety measures, the whole question of tracking the flow of used items, and determining how it was recycled, still needed to be addressed fully. The Government of Sri Lanka, Ms. Jayasekara mentioned, was working on developing proper criteria and guidelines in order to manage used electronic items. As a first step, she revealed that significant the Government had completed the inventory to assess the total quantity of e-waste generated annually, which would be useful in developing some central facility to manage e-waste, and if necessary, to scale up the facility.

Dr. T. K. Joshi of NIOSH focussed on the issues related to health impact from e-waste handling, which was not touched is under the purview of the Ministry of Labour and not Ministry of Environment and Forest. Dr. Joshi revealed that significant hazards and risks are associated with handling and managing e-waste, the degree depending on the nature of operation, and the kind of materials being handled. It was very difficult to identify and quantify this risk, in terms of being able to quantify and attribute the risk to the material or process since establishing linkage to the substance was difficult, there are very few organizations, which conduct such assessment and NIOSH is one of them. Moreover there is no database on occupational disease as a whole let alone the specific sectors. The Ministry of Environment & Forests could take up this issue with the Ministry of Labour and there

is no need for new laws or guidelines as the existing ones were adequate and these need to be enforced. The various aspects to be considered for health and safety at the workplace should include assessment of the work area. Adequate personal protection equipments must be provided to the workers, the design of the workplace is important to ensure that the workers are least exposed to hazardous substance which includes adequate ventilation, installation of pollution control systems and also promotion of good health in general which includes essential points such as access to safe water, sanitation, and good nutrition. The other most important factor that needs to be looked at included rehabilitation and compensation in case of injury or death. Dr. Joshi emphasised that most occupational illnesses and diseases could not be treated, excepting a few. It was therefore important to ensure each element of the process, to reduce the risk of illness.

Ms. Roshni Shrestha felt that spreading awareness to a larger audience was very important, and that coordination between the Ministries, NGOs in the country would facilitate the process. Ms. Shrestha suggested that a strong legislation along with the infrastructure for collection of e-waste, safety measures, appropriate storage etc. could ensure effective management. While Ms. Shrestha acknowledged the fact that e-Waste was becoming a critical issue that needs to be taken up seriously. She pointed out that adequate financial assistance to the Government of Nepal would be required to pursue the issue.

Mr. Satish Sinha of Toxics Links said that issue of e-waste was in the minds of people from 2003. Following the formation of a National Committee, a National Working Group was formed, with one of their mandates being to conduct of an inventorisation of waste. A quick survey of the e-waste problem was done at that time, and the report published. Toxic Links was associated, along with IRG, in the study and preparation of the report. Subsequent local studies – city wise, state wise, indicated that the 2003 assessment was broadly accurate. Mr. Sinha suggested that the focus of e-waste studies should not focus only on the IT sector but also look at the other sectors as defined in WEEE. Other electrical wastes like tube lights and CFLs Mr. Sinha urged need to be looked at, since their usage is increasing at a high rate. The discussion needs to look at a broader aspect and not be limited to issues of recycling and take into account the entire process as a whole. With regard to policy and regulation, Mr. Sinha agreed that though India has sufficient regulations framed, the implementation is weak. Framing further guidelines or regulatory process would not be worthwhile unless an appropriate system for managing it was looked into. He pointed out that often, the mechanism for implementation was held up because of lack of clarity on the process. For instance, import of e-waste was banned as per the regulation, but there are no stringent procedures on inspection and declaration hence it is necessary to go beyond the act and clarify the process and responsibilities at every stage to ensure that the process was operative. Electronic or Electrical goods are manufactured in India by a large number of industries – in fact, till recently most of the PCB work was done at the cottage industry levels; It is only recently that the industries entered the formal sector, because market forces had influenced the process and hence it is important to look at the entire sector as a whole with regard to WEEE regulation and implementation of cleaner technologies. Producer responsibilities, being a new concept in India, the sectoral regulations or norms do not permit it in India and this is inaccurate because most of the manufacturers are MNC's and follow the principle of producer responsibility in other countries hence it has to be made mandatory for India and this can work successfully only if there is an integration between product distributorship, product safety, product management and product responsibility at the end of life of a product.

Discussions

In the discussions that followed, Dr. Lakshmi Raghupati provided details about the recycling facilities to be set up in the North of India and mentioned that a parallel committee on mercury has already been constituted which is looking at the management of CFLs and tube lights, since many people are using CFLs for energy conservation which meant increased amount of mercury in the resultant waste. The focus of the discussion was mainly on the electronic equipment due to the enormous growth and increased amount of waste from the sector, the guidelines for management of e-waste was already posted on the website for comments and suggestions that could be finally incorporated while finalizing the rules. Dr Raghupathi pointed that in the view of MoEF, the issue of technology should not be part of regulation, but only part of guidelines since it was essentially policy oriented, giving broad directions. This thinking was also the result of the experiences with the Battery Handling and Management Rules (BHMR), which focused on lead acid batteries. Since then many other types of batteries had been developed and introduced which are not covered in the rules. Hence, a degree of flexibility in specifying the type of materials, and the specific process in recovery or disposal, had been adopted. It was pointed out that classification of any material as hazardous could be done under the provisions of the Factories Act, which can also function as Occupational Health and Safety Act and the Government had the power to classify any process or activity as hazardous. Hence where necessary, any aspect of electronic waste assembly and recycling could be covered under that provision, and all the occupational health and safety measures would then be applicable to the workers concerned. It was also said that e-Parisara has a health and safety policy in place but did not have the facility for training on safety and health issues. It was suggested that the concerned Ministry holding the responsibility should ensure that such training were organized in conjunction to developing stringent rules and regulations.



It was said that though many companies might be following the regulation the focus has to be on the overall system where collection is crucial the present collection system primarily implied waste handlers, who were in such large numbers and had their own systems, that they could be termed an institution themselves. The work environment for the waste handlers is difficult, and they handle all kinds of waste, there is no satisfactory method for sorting the waste and treating each category differently for example CD and VCDs are being thrown away in large quantity – these are polycarbonate with a chemical layer where data was stored, and when burnt, gave out emissions that are hazardous. In the informal sector where recycling takes place there are no safety norms employed and usually children are employed in large numbers who work in this hazardous environment and large quantities are stored in the open which may pose a threat to the environment. The Government of India was successful in implementing the Montreal Protocol, under which the old CFC based

equipments were not allowed in. It was important to learn how the Government developed the relevant systems with DGFT, train the custom officials to identify older equipment –a licensing system needs to be set up to prevent these old equipments from coming in, setting up a cut off date is good, but this will address only imports, while production within the country also needed to be controlled, in ensuring that older equipment was not sold, to dispose of old stock.

The issue of environmental health and safety has not been taken up as the responsibility of the Ministries whether – the Ministry of Environment, the Ministry of Health, and the Ministry of Labour, all have addressed only part of the issue. It was suggested that the toxic footprint of e-waste be identified, similar to a carbon footprint or a climate foot print be taken up since the meaning of terms of hazard needed to be clear to policy makers. This could also be assessed along with the inventorisation, with regard to reprocessing of electronic waste in a safe manner it was important to scale up the operations with the installation of pollution control equipments and safety measures. Hence if the facility was restricted to a small region or in a state, the unit might not be viable. A study has been planned on occupational health and safety effects, and impacts of e-waste recycling with NIOSH, TERI and GTZ, The resulting paper would possibly be the first of its kind in India, and would hopefully serve as a basis for better decision making. Similarly, a study is being conducted for rapid assessment of e-waste for Delhi, and a desk study on national e-waste movement. Thus some of the points highlighted are already under attention. It was also said that regarding toxic footprints, all areas had been geographically mapped, and the informal sector recycling was shown on a GIS. The need at this time was to assess the level of toxics in these areas. A lot of work had been done in China regarding assessment of health impact due to e-waste in the informal recycling sector. A fair amount of literature is available, and this could help develop the assessment methodology in South Asian context as far as recycling sites were concerned. Green Peace has also done a study in India and China, to show the impact of heavy metal on soil and water.

4.0 Group discussions

Based on the ideas that emerged from the presentations and the panel discussion, the following themes were identified for further discussions:

- Inventorisation
- Industry practices – cleaner design, better products
- Policy and regulatory framework
- Collection systems and recycling
- Imports and transboundary movement
- Awareness creation

Two groups were constituted with representatives of all the countries. **Group 1** discussed **Industry practices, Recycling and awareness** while Group 2 would look at **Inventorisation, Policy and Regulatory framework, and Imports**. The groups were given approximately an hour for discussions and come up with a presentation, to be made in the plenary.

PRESENTATION ON DISCUSSIONS

Group 1

The group focused on industry practices, recycling and awareness. It was stated that though, the consumption in India was low, design changes were being introduced to reduce use of hazardous materials in manufacturing, both in the product and the manufacturing process, and also reduce any harmful effects in the usage life cycle. With the advancement in technology most equipment are sophisticated and hence, the total quantum of substances consumed was decreasing, thus reducing the burden. Again, with the introduction of LCD monitors, use of CRT monitors have reduced, whether it was computers, TVs, other display screens etc. This reduction was not just the materials used in CRT, but also reduction in the negative effects of prolonged exposure to radiation. The group recommended that in future all components should be designed to be environmentally safe. Further, refurbishment of older equipment should also be encouraged strongly, to reduce the quantum of e-waste being generated. One worrying trend that was observed was that the metros and urban areas were going in for newer models, with the older products being passed off to rural areas, reflecting an approach of “dumping” such products, as they were cheaper. It was also seen that older equipment was being donated to charitable organisations, and to economically backward people. Coupled with lower awareness, this meant that the likelihood of generating waste tended to be greater in these areas. It was important to control this trend, where the focus should be on their responsibility for recycling and safe disposal to the less fortunate ones. The main responsibility of ensuring safe disposal needed to remain with those who had donated such equipment in the first place, i.e., those higher up in the waste flow chain.

With regard to **collection systems**, the group felt there were different models:

- Producer takes the responsibility
- Formal recyclers take responsibility
- Collection points by small entrepreneurs, with profit incentive for collection
- Some specified agency for collection

It was felt that any single approach might not work, and a combination of these systems might be a better approach. Different companies, like HCL, Nokia and Maruti were following variations of these models. It was felt that instead of focusing on why a given system did not work, it would be better to understand the systems that are working well and these elements could then be replicated or adapted in other countries. It was also strongly suggested that both formal and informal sectors needs to work together, where part of the work could be done by the informal, and the rest of the recycling in the formal sector. While this was evidently the only solution, in reality the informal waste dealers felt threatened by many forces, and tended to stay out of sight. It was important that the informal sector were encouraged to partner with the formal sector.

The systems and mechanisms for **awareness generation** needed to be quite different for the consumer (C2B) and business to business (B2B) streams. In this regard it was suggested that the public sector could take the lead in creating awareness among their staff, on safe usage and disposal, and develop different

methods, which were workable. A concern was expressed with regard to BPO sector that they tended not to disclose the quantum of e-waste generated, nor did they give information on how they disposed the e-waste, though considerable quantity of e-waste could arise in the sector. Given their business needs, a separate model could be developed by the BPOs themselves, if an association or other collective group could be induced to work on this issue.

In discussions, it was said that the number of computers available with any BPO could be assessed, either from the number of seats, floor space, or from the import records – BPOs imported computers under bond. Once the installed base was known, and the obsolescence rate was known, the quantum of e-waste that was generated could be extrapolated. These might not be very accurate figures, but would give broad figures to work on, to develop a system for recycling and disposal. It was felt that just getting to know the rough quantity was not sufficient – there was a need to bring them into the main channel of e-waste, of collection, transportation and disposal. Given the number of units, and the number of computers used, was a big challenge.

All the points mentioned above were based on experiences in India. However, the situation was fairly similar in the other countries in the region, where some differences existed, the suggestions made here could be modified appropriately.

With regard to **imports** of equipment, new or second hand, it was stated that regulatory framework to regulate entry of goods was already available; the issue was to develop an effective mechanism for implementation. With regard to **transboundary movement**, it was felt that a blanket ban was not possible. There was a need to develop appropriate information base in each country, on the e-waste generation as well as the recycling facilities, and share this information among the member countries, so that there was an understanding on how much needed to be recycled, where it could be recycled etc. Based on this, limited transboundary movement within the South Asian region was desirable. This would entail a lot of harmonisation of the existing regulations, and possibly developing new regulations in countries, which might not have such regulations. At present each country had its own set of regulations, and if some policy level work on harmonising was not done, safe disposal would become very complex in some countries, and recycling units might become less viable in others.

In the discussions that followed, it was emphasised that e-waste included both electrical and electronic waste, and systems for recycling of both categories needed to be developed. At present, formal recyclers were mainly concentrating only on computer and electronic waste, and it was vital to include recycling of electrical waste, as the quantum of electrical waste generated was even higher than that of electronic waste.

The need for informal and formal sectors to work together was further discussed with regard to distribution of work between the two sectors and how it could be done satisfactorily it was suggested that the different unit operations in the process could be listed, and the degree of hazard at each step assessed. Based on such assessment, there could be an understanding that certain steps could be taken by the informal waste dealers, such as



dismantling etc. Further, waste dealers could be trained to carry out the identified steps in an environmentally sound manner. A major advantage of waste dealers carrying out the preliminary steps was the significant reduction in the volume to be transported to the formal recycler. Ensuring proper record keeping and following the manifest system were challenges to be faced, and this could be addressed by appropriate legal framework as well as additional training.

On **collection systems**, it was felt that there was a need to give priority to specific sectors, in this case the waste generated from the households, and the municipal limits. Unlike waste from businesses or from the industry, this category of waste needed to be collected from various points in small quantities, and the process of handling such waste was also hazardous. So a dialogue with the municipal authorities, residential welfare associations, to set local collection systems need to be looked at, so that the waste did not go into general municipal waste, but are collected, sorted and sent to appropriate streams. The approach here could not be different for different groups, but a common methodology needed to be developed. In this situation, there was also a need to integrate or work with other municipal efforts that were going on, on other kinds of e-waste, say batteries, mercury, CFL bulbs, etc.

There is no system at present for segregation at source and separate collection points or bins, so it is the waste handlers or rag pickers who managed such sorting. While hazardous methods needed to be stopped, unless an alternative income stream was provided for the waste handlers, the system would continue as at present. Thus increasing their revenue streams needed to be incorporated in any suggested collection system.

It was felt that while **refurbishing was a noble thought**, industry viewed efforts at refurbishment as cannibalisation of fresh sales, and did not support this. Second, in the IT sector, with new generation equipment coming in, the demand for refurbished products tended to reduce considerably, as many of the newer software would not work on the older equipment. Also, in many cases new components for the older equipment were no longer available. There was also the challenge of providing after-sales service for refurbished equipment – which is difficult. At the same time, refurbishment could be promoted wherever feasible, possibly in other sectors as well. Participants also commented that examples of refurbishment already existed, may be in smaller scale, and this needed to be explored further.

PRESENTATION OF GROUP 1

Industry practices

Design:

1. Industry is taking care of replacing the hazardous material in design
2. Miniaturisation is going on
3. CRT is getting replaced

- Future components should be environmentally safe
- Refurbishing is to be encouraged to reduce the quantum of E waste
- Big cities and institutions in metro cities are dumping obsolete equipment into less fortunate organization
- It is going from Bharat to India

Collection system

1. Producer takes the responsibility
2. Formal recyclers take responsibility
3. Collection points(monetary benefit)
4. Some agency to collect

- Different models followed by companies like HCL, NOKIA and Maruthi can be explored and working models suitable for India can be suggested
- Formal Recyclers can integrate with informal sector and kabadiwallahs

- Awareness
- B to C and B to B should have different mechanism
- It is suggested to work with public sector and develop better methods to create awareness
- Task Force working on e-waste management in the armed forces and efforts can be made to replicate this process

- BPO s have a different policy to dispose E waste and so the quantum of that is not disclosed
- An working model is to be initiated for them

- Informal recyclers and kabadi wallahs can be trained to dismantle the E waste then the transport to formal recyclers would be much easy
- They can be certified by a suitable agency

- Role of industries in setting up facilitating dismantling, and processing E waste
- Diploma or an ITI holder can be trained to take dismantling job

- Safety precautions
- Suitable technology to be developed to identify the components that can be handled by human beings
- And the components to be handled by machines only

Thank You

Group 2

Group 2 concentrated on the issues of definition, inventorisation and on policy.

From a policy perspective, the group felt, a very critical element was the need for a very comprehensive definition of electronic waste, taking care of the entire range, and not be selective in defining. Only then the inventorisation can also be equally comprehensive. At the same time, in inventorisation, it was important to have segmentation, and not club all e-waste together in one lump. Within the segmentation, there was a need to carry out prioritisation, and this was a learning from the Sri Lankan experience – where they had prioritised different categories, not only based on the hazardous content but also probably the quantum of that particular waste, either as consumption or generation. Another very good learning from Sri Lanka was that they had been working in association with the customs and used the harmonised system (HS) of nomenclature. Having an international HS code would make it easier to identify each consignment and decide if it contained second hand goods or e-waste. Thus there was a two level definition – defining the range or scope of e-waste at the upper level, and pin-pointing specific products at the ground level. Such specific definitions could also in future be linked to the life of the product, the actual life of course being different for different categories.

It was also important, from a policy perspective, to look at an entire value chain based approach, right from the point of generation to disposal, which would include the entire collection, transportation and dismantling mechanism, so that the guidelines or policy would be comprehensive and would take the entire value chain into consideration. In this, it was equally important to define clearly the roles and responsibilities of all stakeholders.

Many countries have developed **an institutional approach**, involving consultations, use of a multistakeholder approach by the regulators or the Ministries. Such a mechanism would look at the complete management of the e-waste process, from generation to final disposal.

Given this approach, there was a strong need to look at **cross incentivisation**. In South Asian societies, getting monetary benefit would be an added advantage for efficient waste disposal, as was the case when any waste product was sold to the Kabadiwala. As such, the overall process would be sustainable if all elements were economically feasible. The group emphasised that all recycling was not a profitable business, though in popular perception all waste recovery was highly profitable. For instance, a major part of waste from air conditioners was simple metal – iron and aluminium, which did not provide any return, even to cover the cost of separation at times. Another example was the situation in the EU, where recycling facilities needed to be subsidised to the extent of 90% at times. Thus elements of the recycling process, especially collection and transportation, were high expenditure components, and would need some form of support.

From an Indian perspective, it was suggested that the policies and guidelines should take into account the broad National Environmental Policy of the country, especially in the case of involvement of the informal sector. It was important to avoid creating separate compartments for the two (formal and informal sectors).

In the discussions it was mentioned that while specific suggestions on how to harmonise coding was not possible in this forum, a general recommendation could be made to all countries in the region that they should put in place some form of regulation for harmonisation and easy identification.

With regard to **inventorisation**, it was mentioned that different agencies were working in the region on this issue – an example was STEP in Bangladesh. It was felt that there should not be an overlap of efforts at different levels, and a system for information exchange needed to be in place. In response it was mentioned that some degree of interaction was already taking place, with the help of GTZ and other international agencies. It was felt that in essence, there needed to be a platform for regular exchange of information – the platform could have multiple levels and multiple processes, but the platform needed to exist.

Task Force and Action

In the regional context, for any action to be taken forward, it was necessary to have a small group, to co-ordinate and make sure that appropriate actions were finalised and implementation coordinated. Accordingly, a Regional Task Force needed to be formed. The main objective of the Task Force would be to look at various recommendations, made in this workshop and later, assess how these could be brought into action in different countries as well as at the regional level, and coordinate action at the regional level. This was open to the respective Governments to nominate the Task Force member concerned, with the key principles being decided earlier. It was suggested that there be one representative from each member country, and one representative from the other sectors – may be NGOs or the industry. It was decided that the Task Force be limited to 15 members with



seven from the Governments, seven from the other sectors and one member secretary, who would be from SACEP, to coordinate the whole issue. Additionally, observer's status could be provided to some people who could act as advisers they could be from the core sectors, so that the Task Force would be balanced. Each country could nominate a member for any one sector it was preferable if the membership was rotational, with a fixed time span of two years, so that members from other sectors also could change with time. At the end of the two-year period, the representative for that sector could be chosen from another country it is important to get experts working in the field involved in the Task Force, as technical knowledge was a key need in deciding many of the actions. Hence a provision needed to be made to include technical experts on the Task Force, as at times having too many NGO members could lead to biased discussions. It was decided that Task Force should have two experts (one from educational/research background), two from manufacturing industry (one IT and one non-IT), one from the recycling industry, and two from NGOs (of which one could be a consumer association). This was agreed to

in principle. Mr. Bakshi from Kodak Corporation volunteered, as Kodak had operations across South Asia. It was also suggested that a representative of MAIT could be a member – the specific name would be finalised by MAIT later. A representative of Waste Concern in Bangladesh could be chosen, this would also give representation to another country and Dr. Lakshmi Raghupati and Dr. Joshi could be chosen individually as experts, as they had done considerable work in their respective areas. With regard to the core committee, it could be within SACEP itself for ease of operation but it was felt that it needed to have a little broader base rather than only SACEP. SACEP could host the Task Force, but to take decisions, it would be more appropriate to have a broader committee, as otherwise there might be some allegation of bias. As SACEP was located in Colombo, one representative from the Central Environment Authority in Sri Lanka would be appropriate. As SACEP was working closely with DA, it would be appropriate to have someone from DA as well in the core committee. Thus a three or four member committee, with one representative from SACEP, one from Ministry / CEA (which will be the focal point) and one from DA. It was also felt that that other suggestions for Task Force membership would be asked for by the proposed core committee.

5.0 Concluding Session

Various issues were discussed like the need for inventory to assess the quantities of e-waste in the countries, the importance of good practices with regard to health, environment and sustainability which would be possible only if strict policies are strategies were put in place which required the coordination among various ministries within the country as well as at a regional level for better management of e-waste. It was important to develop Criteria and Guidelines for the import of used items and this could be strengthened in the Ministry of imports were trained and better guidelines be provided so that a decision can be taken and The establishment of this task force would definitely provide benefit at the regional level, especially for the least developed countries since these countries lacked the competence, in large part, to address the issue of e-waste. In many countries, development was influenced by what happened in the other countries around, and incurred all the ills of development, without the higher technologies in place to offset these ills. Also, obsolete technologies that were dated in other countries were now being transferred to these small countries, and there was a need to protect the countries' interest, especially environmental interest, against the dumping that was happening the region had a very important country – India, where the IT boom was taking place, and the positive and negative effects of this boom also needed to be kept in mind, as lessons for others as well. A coherent approach needed to be made, taking the South Asian perspectives as a whole. It was also necessary to establish collection systems so that the e-waste management becomes easier and be followed in a more systematic way. The Position Paper will be circulated to the countries in the regions to give in their comments and suggestions as to the steps that need to be taken for e-waste management in India.

Dr. Boaz concluded the workshop by thanking all participants who attended and provided valuable inputs.



ANNEXES



AGENDA

SCOPING WORKSHOP FOR e-WASTE MANAGEMENT IN SOUTH ASIA

Venue – Annex – Room III, India International Centre, New Delhi, India

Date – 21 September 2007

- 0930-1000 **Tea & Registration**
- 1000-1040 **Opening Remarks by**
- ❖ Ministry of IT, Government of India
 - ❖ Ministry of Environment & Forests, Government of India
 - ❖ Dr Ashok Khosla, Development Alternatives
 - ❖ Representative from SACEP
- 1040-1055 *Presentation – Overview of e-waste management in South Asia & Issues of Concern – Draft Position Paper, DA-SACEP*
- 1055-1100 **Introduction of participants & Photo Session**
- 1100-1115 **Tea Break**
- 1115-1300 **Session I: Priorities for South Asia**
- 1115-1145 *Presentation – Country Presentations from South Asia – (Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, Sri Lanka) – Current practices, legislative frameworks & issues of concern*
- 1145-1230 *Panel Discussion – Aspects of e-waste management*
- Dr A Boaz, SACEP
 - Mr Vinnie Mehta, MAIT
 - Representative, Waste Concern, Bangladesh
 - Representative of formal recycler, Trishi Raya / E-Parisara
 - Representative, e-Waste Agency, India
 - Dr TK Joshi, NIOSH
 - Mr Satish Sinha, Toxics Link, India
- 1230-1300 *Facilitated Discussions – Determining the priorities (regional and national)*
- 1300-1305 *Break-up into Working Groups on identified priorities (3-4 groups)*
- 1305-1345 **Lunch**
- 1345-1515 **Session II: Parallel Group Work** – Action Agenda for the identified priorities (regional and national) (3-4 groups)
- 1515-1530 **Tea Break**
- 1530-1615 **Session III: Presentation by each Group**
- 1615-1645 *Facilitated Discussions – Peer review of each group's presentation*
- 1645-1700 **Concluding Session:**
- ❖ Closing Remarks – Mr George C Varughese, DA
 - ❖ Vote of Thanks – Dr A Boaz, SACEP

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