



Toxics Link
for a toxics-free world

'Better safe than sorry': The Heavy Metals and E-Waste Debris

Report on

The International Conference on Heavy Metals and E-waste

Organized by

Toxics Link

26th and 27th October 2009

Introduction

As India embarks on a route to fast economic growth and unprecedented industrial development, environmental concerns increase. In the last decade, heavy metals and e-waste have emerged as serious environmental concerns both in and outside the country. The wide spread use of mercury and lead in products and improper recycling practices related to toxic e-waste cause irreversible harm to human health and environment.

The two day international conference on heavy metals and e-waste, dated October 26th –27th, 2009, organized at the India Habitat Center was a breakthrough in determining heavy metals like **lead and mercury and e-waste** as a pertinent impediment to health and environment.

With an emphasis on world leadership, which will enroute through sustainable development, the two-day conference was an attempt to bring together important international and national expertise and stakeholders and collaborate on development of research, policies and management strategies to direct the future. Increase awareness on heavy metals toxicology and e-waste usage, facilitate discussion, promote exchange of information and experience, its process substitution and best management practices, address the gaps, and analyze policy and strategic issues on heavy metals reduction and e-waste management nationally as well as internationally, were the key reasons behind organizing the conference.

The first day laid emphasis on heavy metals, particularly lead and mercury, while the second day's stimulus was the pertinent to e-waste issue. The representatives attended the two-day conference from government, industries, healthcare institutes, scientific professionals, academicians and NGOs.

26th October 2009: THE HEAVY METALS HOLOCAUST

Over the past years much work has been carried out in the sphere of heavy metals, impacts of these and its possible solutions, which have been largely shared with all the stakeholders. The scattered source combined with a lack of awareness on heavy metals is a grave concern in the South Asian Region. Viable alternate technologies are readily available and are increasingly being used around the world as well as in India. Currently, there is involvement from all stakeholders: government, industry, health, environment and civil Society, and possible solutions are emerging. Alongside, some of these issues like lead in paints and use of mercury products in health care have also become part of international initiatives and India is already in a position to showcase solutions.

This awakening in the present era of chemical surrounding, compelled the stakeholders to raise issues like manifold increase in usage, mechanisms, policy level significance, level of contamination, alternatives and their application, extended producer responsibility and sustainable development with respect to lead and mercury on the first day of the conference.

Ravi Agarwal, Director, Toxics Link, in his welcome address emphasized on the adverse impact of heavy metal on the human health and the environment. And also urged for the immediate action and the need of substituting these heavy metals. He welcomed all the participants and hoped that the two day deliberation will help in taking these issues further.



Rob Donkers, Minister Counselor Environment, European Union (EU), with his opening remarks, drew attention towards the need for a policy on heavy metals and suggested for adopting a 'better safe than sorry' philosophy driven policy in India like EU. The need for evidence from producers and users for safe use of chemicals along with the much-needed collective responsibility were also emphasized.

In his address **Satish Sinha**, Associate Director, Toxics Link mentioned that Extended producer responsibility on products is an important issue, which has been effectively implemented in EU and need to be looked at in India also. He also pointed out that availability of the environment friendly alternatives and more awareness among the general public might lead to the shifting away from toxic materials like mercury and lead. He emphasized the need for a multi-stakeholder participation in finding a sustainable solution to the critical issues of Heavy Metals and E-waste.

Mercury: The truth that lies beneath

Mercury has been widely used in occupational/local/religious/cultural, and medical (dental amalgam, vaccines, skin lightening cream etc) spheres. The sources of mercury have been identified as coal combustion, chlor alkali facilities and incineration of waste, mining, product discards and mercury waste piles. Restriction of mercury in products is largely taking place in other countries around the world and its time now for India to act on the same.

Chaired by **A.K Sengupta**, National Professional Officer, Sustainable Development and Healthy Environment, WHO India gathered a group of panelists to discuss global achievements and challenges of mercury.

Elena Lymberidi, Project Coordinator 'Zero Mercury Campaign' European Environmental Bureau, substantiated global restrictions on mercury use with UNEP's agreement to the global mercury policy framework, which identifies basic elements necessary for comprehensive action on mercury. The advantages of such a policy would be in terms of controlled supply and elimination of global mercury trade, substantial global coordination, prohibition of new undesired activities and implementation of relevant national legislation in developing countries. But at the same time, the challenge would lie in meeting the demand of emissions in a timely manner, technical and financial assistance, and mechanisms addressing compliance with a successful treaty to ensure participation of developing countries and countries with economies in transition.

Dr. Kathleen Mckeehan, Nursing Supervisor from Himalayan Institute Hospital Trust (HIHT), Dehradun, put forth the example of reduction in mercury usage by stating the application of the programme in HIHT. The programme aimed to bring a substantial reduction in mercury products and measures were taken to make blood pressure instruments, thermometers and dental amalgams as mercury free as possible. This was done through research, market assessment, validation process, cost determination and proposal. An implementation team gave in-service education to all faculty, staff and students. Finally grants verification process and a plan in place for storage facility were looked into. At present the programme seeks government relaxation of duty taxes on all non-mercury blood pressure and temperature instruments approved by at least one of the three international approving agencies, a heavy tax be placed on all mercury and non-approved, non-mercury instruments (made inside or outside India) and work more closely with WHO, UNEP, Toxics Link and Health Care Without Harm to assist in formalizing a working committee on hypertension in India.

Shantanu Chacraverti from Disha, an NGO based in West Bengal, through his study, entitled 'Fishing Toxics' tried to quantify and assess the level of mercury in fish and crustaceans collected from water bodies and five prominent markets in Kolkata. The study also aimed at to study the nature and extent of mercury contamination in fish. The laboratory tests were done on 264 samples of fishes. It was found that large number of people, particularly women and children might be at the danger



of being exposed to unhealthy doses of methylmercury. The government therefore needs to launch full-scale investigation and formulate fish advisories, highlighting the most contaminated species and advise the permissible intake, particularly for the most susceptible population like pregnant women and children.

Mercury is released from power plants into the air and settles into water, where microorganisms convert it into methyl mercury, a toxin that accumulates in fish, shellfish, and animals that eat fish. **Dr. Ragini Kumari**, Toxics Link, informed that in 2004 total mercury emission was as high as 254 Mg, while coal fire remained at 121 Mg. These greater emissions from power plants and other industries increase the amount of environmental mercury, since mercury does not break down easily into less harmful substances, and remains hazardous indefinitely.

Membrane technology is an easy substitute and an environment friendly option than mercury in chlor-alkali process. Reasoning the replacement, **Dr. Y.R Singh**, Executive Director, AMAI (Alkali Manufactures Association of India) confirmed the global industry for chlor-Alkali to be 48 billion dollar, while the Indian market for chlor alkali is 1.8 billion

dollar. Of this, only 7 percent of the Indian capacity is based on mercury cell, which is expected to be phased out by 2012, as per Corporate Responsibility for Environmental Protection (CREP). Dr Singh further mentioned that total 347 MT of mercury has been recovered from Chlor-Alkali units in India since March 2003 till date and this is further utilized in the existing plants in order to reduce its purchase and imports.

Lead: Leading to disaster

World-wide, six sources appear to account mainly for lead exposure: gasoline additives; food can soldering; lead-based paints; ceramic glazes; drinking water systems; and cosmetic and folk remedies. Other significant exposures result from inadequately controlled industrial emissions from such operations as lead smelters and battery recycling plants. Lead poisoning is a completely preventable disease, which can be eliminated through exposure, education, treating nutritional deficiencies, and by Chelating therapy.

After raising some poignant issues about the harmful effects of mercury, the focus of the conference shifted to lead, which is a major pollutant crippling human lives. Chaired by **Dr Arvind Taneja**, Director of pediatric services, Max Healthcare the session highlighted serious implications of lead on human health.

Dr. Anupam Sachdev from the Indian Academy of Pediatrics, presented the contradiction between health and lead. The WHO estimates 15-18 million children in developing countries suffer from permanent brain damage due to lead poisoning. Lead is not biodegradable and persists everywhere. Lead poisoning causes coma, convulsions and death. At low levels - levels far below the present obvious symptoms - lead poisoning in childhood causes reductions in IQ and attention span, reading and learning disabilities, hyperactivity, impaired growth, behavioral problems, and hearing loss. These effects are long-term and may be irreversible.



Rajiv Ranjan Sharma, Lal Path Laboratory, informed about lead poisoning in young children which is a matter of grave concern. Exposure to lead can be from lead-painted houses, house dust, lead pipes containing drinking water, hand to mouth activities of children, toys, glazed ceramics contaminated food and drinks, jewelry, ayurvedic remedies, holi colors, auto batteries, ceramics, stained glass, fishing weights, paints, bullets, and fire crackers.

He also highlighted the cases of lead poisoning (blood lead level tests conducted in different states of India)

The global study on lead in paints, jointly undertaken by IPEN and Toxics Link in ten developing countries, confirms the use of lead in paints to make them more durable and corrosion resistant. **Prashant Rajankar**, Toxics Link, presented the study and enumerated the dangerous effects of lead on human health and the enactment of laws by several countries to regulate lead concentrations in paints. Overall 317 paint samples, from ten developing countries were analyzed to find out total lead concentrations. It was observed that 53 percent samples were found to have lead concentrations more than 90 ppm but less than 600 ppm, while 50 percent samples had lead concentrations even more than 600 ppm. It was therefore strictly recommended to determine the source of lead contamination in household dust, set guidelines to reduce exposure to lead, remove old paints or recoat them with new ones, launch a mass campaign, and set guidelines for use for home, decorative, industrial and commercial purposes.

Alternatives to mercury and lead

There had been a plethora of information on the rampant use of lead and mercury products. It was time to discuss the alternatives that can be resorted to these deadly chemicals. Chaired by **Ruma Tavaroth**, environmental specialist (World Bank), and K.C. Gupta, Director (ITRC), the 'next' to mercury and lead were debated and discussed.

Prof. Sangeeta Talwar and Dr Mahesh Verma, Director Principal, Maulana Azad Institute Of Dental Science analyzed the alternatives to dental amalgams. Past 25 years have witnessed advances in alternate filling a material to dental amalgam, but it is still very difficult to state which is the best restorative material. Though alternate materials have been in use since, amalgam appears to be the most cost effective and long lasting restorative material for posterior teeth. Hazards from non- mercury containing alternatives also need to be looked into. The duo reiterated that dental amalgam is safe and indispensable in certain clinical situations; however it is imperative that adequate precautions are taken.

D. Satpute, General Manager-Technical from Nerolac spoke about the Indian paint industry's various initiatives such as increased media coverage, awareness campaign, and regulations on lead usage, use of safe and viable alternatives to lead, involving government and health authorities. Washing children's hands and the things they touch, regularly cleaning floors, window sills, and other surfaces, wiping soil off shoes before entering house, taking precautions to avoid exposure to lead dust when remodeling or renovating, and avoiding the use of a dry scraper or sandpaper on painted surfaces that may contain lead can also prevent lead poisoning. Mr. Satpute also discussed the technology shift from leaded paints to lead free paints that Nerolac has adopted.

Recommendations:

Mercury:

To come to an agreement to the goal that lies ahead for the civil society and government bodes of removing mercury and lead contamination at source and incorporating the alternatives to mercury and lead A number of recommendations were made as follows:

- There is a need of creating awareness amongst the stakeholders highlighting the advisories on mercury products and also the non-mercury equipments.
- There should be a stern proposition that the government should, immediately ban or restrict the usage of elemental mercury as well as mercury compounds through the certain fiscal disincentives, and encourage for using the mercury alternatives.
- In cases of uncontrolled disposal of mercury-containing products or wastes, possible reductions must be achieved by making these practices illegal and restraining access to hazardous waste disposal facilities.
- The example can be emulated from other countries that have made it binding on manufacturers to collect discarded gadgets containing hazardous material.
- Healthcare outlets should be sensitized about the need for segregating hazardous chemical waste from biomedical and other litter that will lead to the safe disposal the wastes.
- Alternatives like the use of membrane technology in the chlor-alkali industry, which though has high investment cost involved but is more eco-friendly should be considered
- In case of pressure measuring and control equipments, pressure gauges, switches and transmitters, mercury can be substituted using flexible membrane, piezoelectric crystals and fiber-optic pressure sensor
- In instruments like barometers and manometers, mercury can be replaced with other liquids or gases at a price that should also be dealt with effectively.
- Global pollutants require global action. No one country can solve it. Developing countries need assistance in reducing chemical use and emissions and a comprehensive and effective treaty needs to be worked out at home

Lead

- The increase in cost for substitution is small and cannot be compared with the harm caused to human beings due to continued exposure to lead. Hence, health over higher costs should be given more weightage.
- Laws should be imposed on companies to restrain use of higher concentration of lead in paints
- The government has to step in and set regulations for lead in products and then ensure that these are enforced

27th October 2009: THE E-WASTE CONCOCTION

Waste emerging out of technology has large hazardous effect. The solution can't just lie on the recovery side: i.e. collection and recycling, but it has to be a composite package - from the beginning of the life cycle of a product. The second day of the conference was dedicated to the dire need of environment friendly e-waste disposal in the present day of unprecedented growth of IT industry and early product obsolescence due to continuous innovation.

Ravi Agarwal, Director Toxics Link, welcomed the participants and highlighted issues around fresh technology specially those concerning new emerging waste streams globally,

which relate to new lifestyles and technological advancement. He pointed out that a pure market mechanism would not be enough to handle the problem but what is required is a regulatory framework involving all stakeholders, industries, civil society organizations, consumers and government.

Dr Bischoff, Director GTZ ASEM, in his opening address spoke about how India has been very progressive in dealing with the issue of E-waste. As per GTZ-MAIT sponsored study, conducted by IMRB, it was observed that 95 percent of e-waste is segregated, dismantled and recycled in the informal sector based in urban slums. He laid stress on the need to integrate them in a new emerging system and also the need for a separate regulation.



B.P Shukla, Senior Environmental Engineer and Incharge, Central Pollution Control Board (CPCB), in his opening address informed the gathering that the organization is in the process of forming legislative framework for management of e-waste, in association with Ministry of Environment and Forests (MOEF). He mentioned about the authorizations issued to 6 E-waste recyclers in the country.

Addressing the audience, **Dr Saroj**, Director MoEF, laid stress on cooperation from all environmental NGOs to get a concrete figure on e-waste generation and the kinds and volume available for recycling. Emphasizing collection centers, the heart of e-waste management, a public-private partnership model was suggested by her. According to her, other grave concerns like recycling regulations at par with international standards, integration of informal sector, import-export restrictions also needed to be addressed. She informed the audience that a task force has been formed to look at the draft e-waste rule proposed by MAIT, GTZ, Greenpeace and Toxics Link. She promised, among applause, that the ministry would come out with a Draft Rule in couple of months and will be happy to receive opinions from different stakeholders to make it an effective framework. Dr Saroj also told the audience that the ministry was open to imports and sees that as a mean to develop and sustain recycling infrastructure in the country.

Satish Sinha, Associate Director, Toxics Link reiterated the pertinent question that faces our country: what mechanisms can be identified for e-waste management, and how can they be implemented. He urged the electronics' industry to take responsibility and adopt a life cycle approach. He also stressed on the need to have a regulation to deal with upstream issues and called for more involvement of Ministry of IT. He urged MoEF to look at the issue of imports more stringently.. He further invited speakers to come forth to discuss the issue of a spiral rise in e-waste and the problems emerging from that. He also thanked all the panelists, the speakers and the participants for attending this important conference.

The incoherent e-waste, health and environment:

Chaired by **Rajoo Goel**, Secretary General, Elcina, the first session drew attention towards the impact of e-waste on health and environment and finding sustainable solutions.

Priti Mahesh, Toxics Link, in her presentation, pointed out that 50 million tones of e-waste is generated globally, of which more than 4 lakh tones of e-waste is generated in India- the concern much greater in the country as it is growing at a faster rate of 10-15 percent annually. Highlighting the problems to human health and environment due to improper recycling practices in the country, she stressed on the need to have a legal framework and better monitoring system. She also raised the issue of major computerization drive in the country and waste management component not being included in these initiatives. She pointed out that E-waste problem could be converted into an opportunity with the help of better management system.

Nitish Dogra, public health physician, International Institute of Health Management and Research (IIHMR), presented a case study on the health of recyclers handling e-waste in National Capital Region done by TERI. He summarized the environmental monitoring study, which makes e-waste standardization and careful correlation with bio-makers like copper necessary. He highlighted the high lead and mercury levels found among workers during the study and also stressed on the need for doing further detailed study.

Anand Kumar, environmental engineer, CPCB, stipulated the proposed road map for better e-waste management which includes: legislative measures such as strengthening of legislative framework, developing mechanism to check illegal import of e-waste, re-visiting import provisions in SEZ regulation, regulating charity goods, banning import of CRT, regulating import based on longer usable life time, assigning responsibilities to various stake holders, formation of core group at national and state level, surveillance of goods at high sea, enforcement of RoHS compliance, and preventing dumping of used/old equipments.

Wilma Rodrigues, founder member of the NGO SAAHAS Bangalore, which works very closely with informal sector working on e-waste recycling, gave an overview of the hazardous yet indomitable informal sector's prominence in e-waste recycling. She highlighted the work being done to upgrade and integrate the unorganized sector in E-waste management and pointed out that E-waste collection from households, smaller institutions and individuals can be targeted effectively since the informal sector extends to these areas.



Global perspectives on e-waste management:

Chaired by **L. Ramakrishnan**, distinguished professor and head Indsearch, Pune, this session was completely dedicated to look beyond India at the global perspectives on e-waste management.

Ted Smith, Founder Silicon Valley Toxics Coalition/ International Campaign for Responsible Technology (ICRT), an international solidarity network that promotes corporate and government accountability in the global electronics industry, emphasized on e-waste and environmental justice in the global electronics industry. Enumerating the experience of TakeBack Coalition in USA, he said that Coalition works on the principle of 'Take it back; Make it clean and Recycle Responsibly' and India should also emulate it. He emphasized the importance of awareness and activism among the consumers i.e. to simply have "The right to know". In response to protests against use of prison labor for recycling and recycling of e-waste in safe conditions, many corporations like HP, DELL, APPLE and SONY have positively responded and introduced the take-back programs-the idea being, "When consumers talk, electronics companies listen".



Wilka Ranasinghe, Divisional Environmental Officer, Central Environmental Authority, Sri Lanka, pointed out Sri Lanka's efforts to formulate new legislations, and develop enforcement capacity and infrastructure to handle e-waste in an environmentally sound manner. The policy objectives being: prevent/ minimize negative impacts to the environment and health; promote integrated e-waste management and sustainable production and consumption. The

speaker also furthered the concept of introduction of a market base instrument to manage e-waste such as Environment Conservation Levy bill on mobile phones introduced in Sri Lanka since 2008, which is a source of funds for e-waste management.

Siddika Sultan from NGO ESDO, Bangladesh made a presentation highlighting how electronic discards are one of the fastest growing segments of Bangladesh's nation waste stream. Analyzing the primary data and information, she pointed out that each year more than 5 million tones of electronic waste (it includes e-waste from 'ship breaking' yard) is generated in Bangladesh. Within this amount of waste, only 20 to 35 percent is recycled and rest is laid into landfills, rivers, ponds, drains, lakes, cannels and open spaces. The process of recycling in Bangladesh is very injurious and hazardous, and there is no proper waste management and recycling guideline, regulation, law or ordinance.

Cleaning the act:

The possibilities of a working model for reduction and management of WEEE were overviewed in the last session chaired by **Satish Sinha**, Toxics Link.

L. Ramakrishnan, Indsearch, made a presentation on Eco Design, which is a concept of product design that takes into consideration the total environmental impact of the product through its life cycle from raw materials, manufacturing, marketing, use and disposal, enabling the design of products with lower environmental impacts. He highlighted the six focal areas of Eco-Design: reduction in mass of the product through less use of natural resources, restriction on hazardous substances, design for recycling by using mono materials, neat plastics / thermoplastics, and physical bonding / press fitting, extended use of resources and lesser EOL waste per unit time, sustainable use of energy resources, and reduction in packaging mass. He pointed out that this could be a very effective tools for E-waste management.

Anne Cheong from APJ Takeback Compliance Lead, Dell, elucidated on DELL's policy and approach. As part of its environmental responsibility, DELL believes in green industry leadership and aims at sustainability throughout the product lifecycle. DELL has banned the export of non-working electronics to developing countries as part of its global electronics disposition policy and expands ban to include all non-working parts or devices to help prevent the unauthorized dumping in developing countries. The policy also reinforces proper recycling by disposing Dell's chain of waste that is tracked and documented throughout the entire until final disposal.

Pranshu Singhal, Head, Environmental Affairs, Nokia in his presentation illustrated some of the sustainable solutions to the problem of WEEE as adopted by Nokia. He highlighted some of the upstream mechanism adopted by Nokia like reduced power consumption by display save mode, optimized brightness and energy efficient chargers. Ecological footprint is being also reduced through smaller and fewer guidebooks, choice of no chargers and more recyclable materials in the packaging. Nokia conducted awareness campaigns and arranged collection points in India which lead to collection of over 3 tones of e-waste from four cities in 45 days, 68000 pieces of old devices and accessories. He said that Nokia was looking at expanding this programme and was committed to E-waste management.



Recommendations

Many important points were raised during the discussions and question answer, which ensued after each session. Issue of clear government policy, transparent mechanisms and greater responsibility from companies were debated extensively. The manufacturing associations also pointed out the need for level playing field. The civil societies, across countries, pointed out the need for banning imports to developing countries.

There were some of the propositions summarized in the conference:

- There is a need for 'inventorization' of e-waste in the country. The assessment should focus on waste generated from all Electronic and Electrical Equipments (EEE)
- There is a need for a separate legislation on e-waste in the country. The focus should be on framing a framework, which is better considered for implementation and does not promote Inspector 'Raj'
- E-waste regulation should be based on EPR and Polluter Pays Principal
- There should be more transparency in the legislation framing procedure
- Collection system is key to e-waste management and should be mandated through a legal framework
- The manufacturers or brand companies need to establish more collection points and create more public awareness
- A legislative framework needs to be developed for phasing out hazardous materials from EEE. Ministry of IT should be pro active in this.
- Eco-design should be promoted. Life cycle thinking needs to be incorporated
- Mechanisms like Eco-labeling can help in promoting greener products. Refurbishment and reuse of EEE should be promoted
- A comprehensive health and environmental study is required to assess the damage caused by improper recycling in the informal sector
- Informal recyclers need to be upgraded in skill and integrated in the new framework
- Proper guidelines should be established for regulating and monitoring the formal e-waste recyclers
- A Nationwide Awareness Campaign should be done by Government and industry to create awareness on E-waste
- Import of E-waste should be strictly regulated. Import of components like CRT should be banned. The need to import second hand EEE for reuse and donation needs to be evaluated
- Strong surveillance of goods at high sea is required to monitor and control Illegal imports
- Import provisions in SEZ Regulation need to be revisited

Conclusion

Issues ranging from guidelines and legislation frameworks, advancement of science and technology, impact of human lifestyles, life cycle of products, and sustainable solutions for e-waste and heavy metals globally and nationally were intrinsically gauged at the conference. Compelling for a collective action, the conference bolstered that the world today faces stiff competition from a different kind of technology such as the likes of 'chip technology', especially in storage devices. Hence, we as a society need to remain prepared for many unknown challenges in the future. With such a well designed and thought provoking debate and discussion, the conference opened the doors to sustainable solution in heavy metals and e-waste management, which were and still are welcomed from all spheres.