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Electronic Waste Management in North East India

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Abstract: *Electronic Waste or E-waste, resulting from obsolete electrical and electronic devices is posing to be a rapidly expanding issue in today's world. Yet it has limited awareness among the masses. Prevailing to be a consistent problem in the developed countries, the e-waste management scenario in the developing countries is even worse due to improper disposal of e-waste or otherwise unsafe and primitive technologies involved in its recycling. This paper delves into the issue of proliferating e-waste accumulation, with emphasis on the North-Eastern part of India and suggests a few effective ways for abatement of this impending hazard. During the course of our study it has come to the fore, that unless the problem of e-waste management is immediately addressed, it will continue to emanate and prove to be detrimental to human health as well as the environment.*

1. INTRODUCTION

The last two decades have globally witnessed an exponential growth of the market of Electronics and Electrical Equipment (EEE).The digital revolution due to rapid urbanization and industrialisation is not foreign to India, the reason being the accelerating growth of the Indian Information Technology (IT) sector. New electronic gadgets and appliances along with providing easy information acquisition and exchange, have increased our comfort and security levels. This however comes with a disadvantage. The ever shortening lives of Electronic and Electrical Equipment has resulted in bulk generation of E-waste or Waste Electronics and Electrical Equipment (WEEE), whose management is the impending concern of many countries, notwithstanding India. Though there is no standard definition as to what E-waste is, it mainly constitutes items such as computers, mobile phones, digital music recorders/players, refrigerators, washing machines, televisions (TVs) and many other household consumer items.

Compared to conventional municipal wastes, certain components of electronic products contain toxic substances (namely, lead cadmium, mercury etc.), which can pose a great threat to the environment as well as to human health, yet this fact remains unaware to most people. When these products are placed in landfills or incinerated, they pose tremendous health risks. This calls for urgent steps and policies for its addressal. The government of India has regulated „E waste management and handling rules 2011", however even after its implementation it has few takers. The issue of E-waste management is particularly nascent in North East India as a result of minimal awareness among the masses. This paper while discussing E-waste and its management is organized as follows: Section 1 introduces the concept of E-waste; Section 2 discusses the prevailing problems and challenges related to e-waste and its management; Section 3 defines the methods used to restrict this phenomenon and finally Section 4 provides an effective conclusion.

2. PROBLEMS AND IMPACTS OF E-WASTE

E-waste concerns in the North-East India are crucial because of the volumes of obsolete products generated and the toxic materials like Lead, Mercury, Bromine containing Flame Retardants etc. present in them. With the complete lack of awareness and the ever increasing usage of electronics in this part of the region, this toxic waste stream has the potential to damage the fragile environment. Absence of any recycling system adds to the bleak scenario.

Electronic wastes can cause widespread environmental damage due to the use of toxic materials in the manufacture of electronic goods (source: Mehra, 2004). Hazardous materials such as lead, mercury and hexavalent chromium in one form or the other are present in such wastes primarily consist of Cathode ray tubes (CRTs), Printed board assemblies, Capacitors, Mercury switches and relays, Batteries, Liquid crystal displays (LCDs), Cartridges from photocopying machines and Electrolytes. Although it is hardly known, e-waste contains toxic substances such as Lead and Cadmium in circuit boards; lead oxide and Cadmium in monitor Cathode Ray Tubes (CRTs); Mercury in switches and flat screen monitors; Cadmium in computer batteries; polychlorinated biphenyls (PCBs) in older capacitors and transformers; and brominated flame retardants on printed circuit boards, plastic

casings, cables and polyvinylchloride (PVC) cable insulation that releases highly toxic dioxins and furans when burned to retrieve Copper from the wires. All electronic equipments contain printed circuit boards which are hazardous because of their content of lead (in solder),and brominated flame retardants(typically 5-10 % by weight) and antimony oxide, which is also present as a flame retardant (typically 1-2% by weight) (source: Devi et al, 2004). Dumping of e-wastes in landfills can lead to the seeping of lead into the ground water. If the CRT is crushed and burned, it emits toxic fumes into the air (Ramachandra and Saira, 2004). The cadmium from one mobile phone battery is enough to pollute 600 m3 of water (Trick, 2002). The quantity of cadmium in landfill sites is significant, and considerable toxic contamination is caused by the inevitable medium and long-term effects of cadmium leaking into the surrounding soil (Envocare, 2001). Because plastics are highly flammable, the printed wiring board and housings of electronic products contain brominated flame retardants, a number of which are clearly damaging to human health and the environment. (Source: Sardinia 2007)Even in the city, we can witness the gradual darkening of the "Bharalu" river, due to improper dumping of toxic materials, of which e-waste too constitutes a major part. Unless proper awareness is instilled among people, dumping of e-waste will continue, which leads to contamination of the waters, thereby affecting the aquatic life and human life thereafter.

Fig. 1: The darkening of the Bharalu river in Guwahati implies that the "Digital age is the Dark age"

3. METHODOLOGY

The samples of data estimation of the total e-waste generated in the four leading authorised service centres of electronics in Guwahati, were collected and it was found that the e-waste accumulation were sent to the respective head offices for recycling purposes. In addition, to know about the awareness of e-waste management among the citizens of Guwahati, a general survey was conducted among a group of 25 random people.

4. RESULTS AND DATA

The estimated amount of e-waste generated in the companies per month were collected and found to be as under:

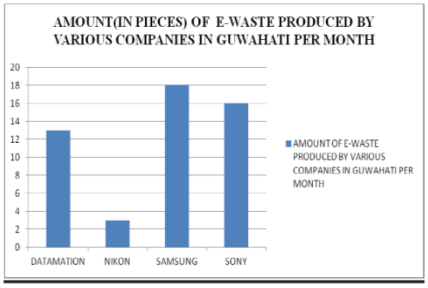

Fig. 2: Generation of e-waste in Guwahati

We conducted a general survey of a group of 25 people regarding their thoughts on e-waste disposal. Out of them, 8 did not even know what the term "e-waste" meant, bringing to light the complete unawareness among the masses. 9 out of 25 said that the dump their used electronic batteries in the dustbin like any other form of waste. While 6 of them said they sold their electronic wastes to neighbourhood scrap dealers. While a mere number of 2 people said they actually sent their e-wastes to authorised service centres and vendors.

5. PRESENT SCENARIO OF E-WASTE MANAGEMENT

In view of the growing hazard of e-waste, the State Government is planning to implement a project for scientific disposal, including recycling, of e-waste materials generated in Assam. A study has started in this regard, and as per a preliminary survey report, a quantum of 50 MTs of e-waste materials were found available in the surveyed areas. Places where the survey was conducted include Petrochemicals Ltd (Namrup), BVFCL (Namrup), Dibrugarh University, ONGC (Jorhat), Jorhat Engineering College (Jorhat), OIL (Duliajan), IOCL (Digboi), ONGC (Sivasagar) IOCL (Bongaigaon), Army Headquarters (Tezpur), Air Force Station (Tezpur), Tezpur Central University, Assam Engineering College (CSE Dept), and some offices of the Deputy Commissioners of the State. The Information Technology Department, Government of Assam, has already released a sum of Rs 20 lakh for survey, awareness meeting, seminars and capacity building for the purpose. The Deputy Commissioners of several districts and leading institutions having e-waste materials have been contacted and requested for giving full data concerning their e-waste generation. The proposed e-waste project will have integrated e-waste recycling and treatment facilities for minimizing the hazards. The facilities are to be developed on a plot 10 bigha land, which will have three blocks. The first block will be the „administrative block", which will deal with the overall administration and liaison-related concerns. The second block will be the „waste management block" and it will have facilities for collecting different e-waste in different places. The third one, the „recycling block", will be used for recycling e-waste in a scientific manner with the help of state-of-the-art machinery

The process for selection of the site for the e-waste plant is on. The e-waste plant is likely to come up somewhere in the Chandrapur revenue circle, which is the proposed site. The process for identification of the required land has started.(Source: The Assam Tribune, Feb 2014).

A report released by Toxic Link associate, Satish Sinha confirms that Assam produces approximately 14,000 tons of e-waste. Meghalaya‟s capital city Shillong generates roughly 446 tons of e-waste annually. He expressed grave concern and added that while these are just approximate figures, they indicate that e-waste is increasing at an alarming rate in the North East.

In a workshop organized by Toxics Link, „E Waste- Creating Changes‟, on 5th-6thSeptember 2013, in Guwahati, the State Pollution Control Boards of Assam, Arunachal Pradesh, Manipur, Mizoram, Meghalaya and Nagaland expressed grave concern on the status of E-waste management in their states and decided to take initiatives to tackle with this problem. According to the officials of State Pollution Control Boards (SPCBs) present in the workshop, the major concern in the North East is that this toxic waste is largely being collected by the scrap dealers, mixed with municipal waste and dumped in the landfills, to be burned openly or leach out and contaminate the soil, water and air. The authorities identified lack of mass awareness as one of the key bottlenecks which needs to be addressed immediately. The civil society organizations present in the meeting also spoke about increasing volumes of this waste and the need to integrate the existing informal sector.

6. RESULT AND DISCUSSION

We can create GREEN spots wherein waste can be deposited. Every GREEN spot location has bins (called gaylords) that are used for the collection of e-waste. When these fill up, we pick up the material and bring it to a certified recycler. We work with multiple recyclers that service particular geographic regions which help us reduce our environmental footprint. Then the following steps are undertaken: **6.1 Sorting** Once the material arrives at the facility, it is sorted by item type. Devices containing cathode ray tubes are processed in one line and most other electronic devices are processed in another. Some recyclers dismantle the electronic devices and further sort into circuit boards, ferrous metals, plastics, etc. CRT devices are dismantled and sent downstream to a facility that specializes in removing lead from the CRT glass panel

6.2 Data Destruction

- Hard drives are always removed and destroyed. While every recycler has a different method of doing this, two of the most common methods are:
- Crushing the hard drives in a ten ton process
- Shredding the hard drives

6.3 Shredding

After sorting and dismantling the electronic waste, the material is usually shredded in to pieces about the size of a quarter. This material is further separated by machine process and if necessary, sent downstream for further processing.

6.4 Reuse

Once the material is processed, it is sent to manufacturers and other buyers for reuse in new products. The exception is CRT glass. Even though the lead is removed from the glass, it will still contain trace amounts of lead and cannot be used in most consumer products. Typically, this material is sold to manufacturers who will reuse the glass when manufacturing new CRT devices.

7. CONCLUSION

- This paper concludes that with the evolving lifestyle on the personal and business landscape being heavily dependent on technology, electronic commodities have become a corollary to the way we live. Therefore, E-waste accumulation will be there; what can be done is effective methods can be nodded upon for its proper disposal.
- We, as informed and concerned citizens of the environment, should spread awareness ensure that our used electronics only end up with authorized recycling vendors and not to the neighbourhood scrap dealer.
- . A proper government-public collaboration can help restricting if not eliminating this E-waste menace.
- If e-waste is handled properly then it would not only help replenish the resources but would also create job opportunities for many.

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