e-Waste and Its Health Impacts

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Abstract: The e-waste generated locally in the NCR and imported from other places even from overseas, had assumed such an enormous volume that the Delhi Government has plan to dispose off it in Haridwar, Uttar Pradesh. This is the result of realization of health and environmental hazards associated with this waste which has lead to this decision. The e-waste has various toxic and carcinogenic gases, and heavy metals, which have grievous effects on the health of workers involved in the activity of recycling it unsafely and also populace of the locality. Further, unscientific disposal of its junk after recycling may contaminate groundwater.The problem has motivated the researcher to investigate the health impacts of workers and others involved in the recycling process of e-waste in two junkyards in Delhi. The result of the study are very startling as more than 75 per cent persons involved in this activity suffer from one or the other disease which can directly be attributed to the result of unsafe recycling of e-waste.

Keywords: E-waste, health impacts, toxic, carcinogenic, heavy metals, recycling.

I. INTRODUCTION

E-waste is a collective name to all electronic devices which have been expired of their useful life period like discarded computers, computer peripherals, mobile phones, televisions, and others. E-waste has increased the total waste volume and after dismantling, it releases various toxic and carcinogenic gases and metals which are posing a threat to human health and also contaminate the environment. It is not only the locally generated waste but also added by the e-waste coming from other parts of the country and overseas in order to be dumped after recycling. The huge import of e-waste which is coming as charity to the developing countries like India, the question is where to dump this burden and how to manage this waste which has become a serious environmental threat nowadays. It is because recycling a PC in USA costs $20 where as in India it just costs $2.The total e-waste from all electrical and electronic devices is estimated to be 1, 46,180 tones/year of which 66,805 tons per year (45.70 per cent) is certified by electronic waste {Computers, TV's and mobile phones). Mumbai is the leading generator of e-waste and tops with 11,017 tones/year followed by Delhi, Bangalore. Chennai, and Kolkata which produces 9730, 4648, 4132 and 4025 tones/year respectively (Survey: International Resources Group South Asia).The basic problem related to e-waste is that the dismantling and recycling yards {for gaining usable parts and precious metals from the discarded e-items) are very few and most of these activities are carried out by the workers in an unsafe manner. However, such studies are lacking in India. Geography is conspicuous by the absences of such research as adopting its holistic approach, it may contribute significantly for the benefit of the mankind. And the process is very dangerous and insecure as the workers even do not have gloves or masks and are exposed to injuries by metals and glasses, acids and have to inhale poisonous, toxic and carcinogenic gases. In this manner the life and health of these workers is highly endangered. The next problem is related to the disposal of dismantled material which may contain traces of harmful gases and other toxic substances like heavy metals as lead, cadmium., mercury, etc. which are leached into ground water through soil and has thus potential to pollute the air, water, and soil of the area where they are disposed off. The question is how to dispose off this junk in sedimentary strata or upstream areas of Haridwar which may pollute the downstream areas through surface runoff and result in the contamination of ground water of the immediate surrounding areas due to leaching of residual harmful gases and metals present in this junk. If this practice of dumping e-waste on a particular site for long period may pollute ground water to the extent it renders unusable or may jeopardize the health of people drawing water from shallow aquifers trough wells and hand pumps. In this case of upstream disposal as planned in the case of Haridwar, it may contaminate downstream areas.There is no paucity of scientific research on the e-waste management. Researchers are analyzing the impacts of e-waste and are finding the possible solutions to lessen the problem. In India, the biggest source of e-waste is through import. Studies done by Toxic link (NGO working on e-waste in India) suggested that Bangalore city alone generates 30, 000 obsolete PC's every year. Jain (2003) of International Resources Group South Asia, has said that e-waste generation is going to reach 2 million units by 2010 by domestic market supply. United Nations Environmental Programme (UNEP, 2005) noted that 20-50 million tones of electrical and electronic equipments waste is generated worldwide every year and could bring serious risks to human health and the environment. China alone discarded 4 million PC's per year around 20 million PC's became obsolete in 1994 which reach to 100 million units in 2004. The USA alone discards 48.5 million Computers every year.

II. STUDY AREA

The National Capital Region is the second largest metropolis with a population with a population of 2.2 million and spread an area of 33578 sq. km. The total population of NCR is 3, 37, 90, 180 in 2001. The region includes union territory of Delhi (1,483 sq. kms) with a population 1, 37, 82,976, parts of Haryana (13,413 sq.kms.) with population equal to 7801786, Uttar Pradesh (10,853 sq. kms.) with population as 9214466 and Rajasthan (4,493 sq.kms.) with a population of 2990862. In Haryana the District of Gurgaon comprising the Tehsils of Gurgaon, Nuh, Pataudi and Ferozpur-Jhirka. District of Faridabad comprising the Tehsils of Ballabgarh. Palwal and Hathin.

The Rohtak district comprising of Rohtak, Jhajjar, Bahadurgarh, Meham and Kosli. Sonepat district consists Tehsils of Sonepat Ganaur and Gohana. the Panipat tehsil of District of Karnal and Rewari Tehsil of District of Mohindergarh. The state of U.P. Consist of District Bulandshahr (comprising Tehsils of Anupshahr, Bulandshahr, Khurja and Sikanderabad), Meerut (Tehsils of Meerut, Bagpat, Mawana and Sardhana) and District Ghaziabad comprising the Tehsils of Ghaziabad, Hapur, Dadri, and Garmukleshwar.And in Rajasthan state the Tehsils of Atwar district, namely Behroor, Mandawar, Kishangarh, Tijara, Alwar and Ramgarh are included in the NCR.

III.   OBJECTIVES

1) To have a general observation of the recycling yards.
2) To compute the total amount of e-waste annually in the NCR.
3) To examine the techniques of recycling at the recycling yards.
4) To find out the health conditions of workers dealing with this waste.

IV.   METHODOLOGY

For the purpose of investigating the problems associated with this activity a pilot survey of two recycling yards of NCR at Turkemangate and Seelampur has been carried out. Questioners were prepared and filled.after asking the workers about the ways of recycling and dismantling, the kinds of metals derived, their health conditions, and duration of involvement in this activity. On the basis of stratified random sampling of E-devices in use, their age of expiry and disposal mode have been collected in the NCR and thus an estimate has been made about the generation of e-waste in the study area

V.   PRODUCTION OF E-WASTE IN NCR

The problem become seriously increasing in the National Capital Region (NCR). The Information and Technology enabled services (ITES) are expanding their wings at a faster rate in and around the NCR. In 2006 their about 42 lakhs PCs were sold, 2075547 became obsolete and 3596 tones of computer waste was generated in the NCR. There are about 25,000 workers dealing with e-waste which are involved at various levels and process about 10,000- 20,000 tones of e-waste every year. Basu 2006.
However, the greed of junk dealers and need to earn some money by the poor have caused a stream flow e-waste in the NCR which itself produces a large quantity of it. Dismantling and recycling is virtually carried by carried out in an unorganized sector in the region. Traces of harmful gases and toxic substances like heavy metals have been found in ground water and soil samples and have thus contaminated the whole environment in the study area. Further, the hazardous gases emitting during recycling also pollute the air. Informal Recycling in NCR takes place in

Mandoli, Krishna Nagar, Dharmpur, Silampur and Shastri Park. (Toxic Link).On the basis of stratified random survey, data on number of e-devices in use, their expired age and disposal mode have been collected. The strata being economic and socio cultural establishments as industries, business and commercial establishments, schools, colleges, universities, medical institutions, governmental and non-governmental organizations from a few amounting to 0.01 per cent have randomly selected. Similarly,
dealers in electronic goods mentioned earlier have randomly been selected from major commercial areas of the towns and cities in the NCR. Their proportion being almost to 2 per cent of all such dealers in the NCR. The user establishments have been asked about number of these items used therein, the rate of replacement and future expansion. They were also questioned about junk dealers whom they sell or give their defunct e-devices. People dealing with the import of this waste in the NCR have also been interviewed about the volume and places of origin of this waste and also to whom they generally sell this junk for dismantling and recycling. Although the data extracted from these persons may not be very authentic but give a good insight into the magnitude of the problem. The data on number of local production of e-waste taking key elements as T.V. personal computer and mobile phones into consideration in 1991 and 2001 is given in the following table.
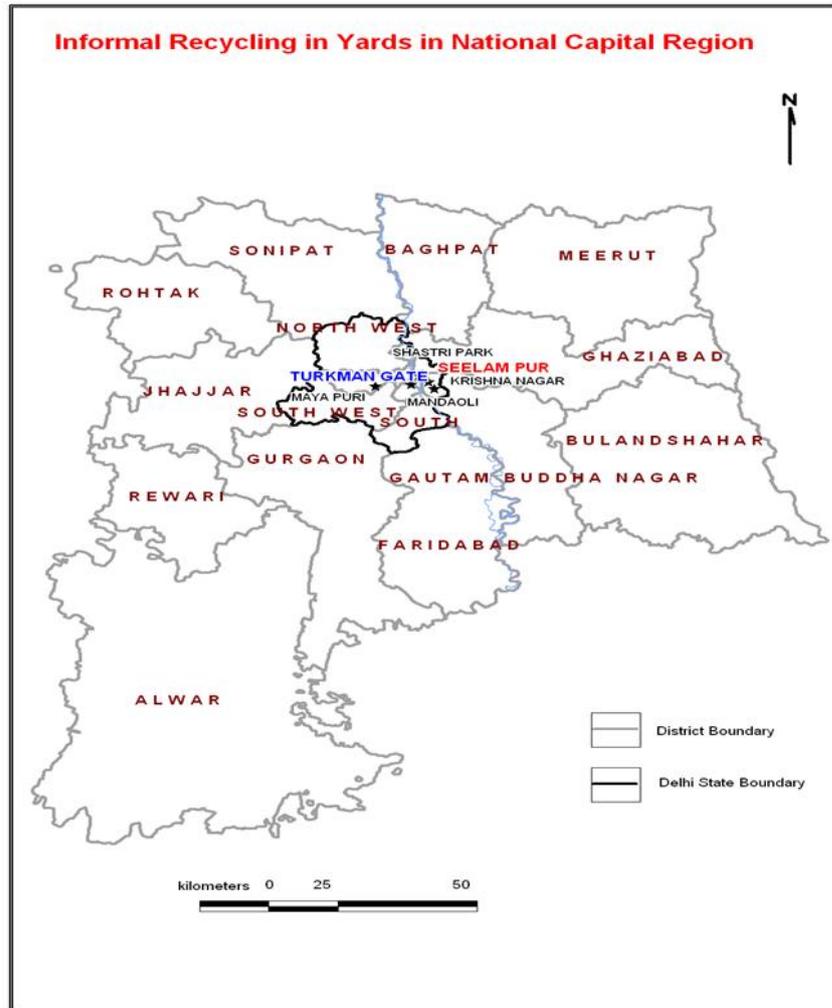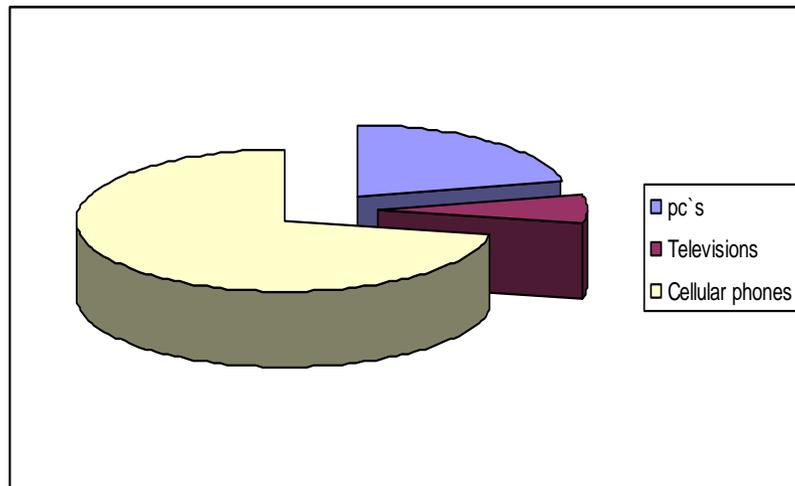
Table 1.1

E-devices	Obsolete rate	Average life time
PC's	5-7 years	10-12 years
TVs	8-10 years	10-15 years
Cell phones	4 years	5-7 years

Table, 1.2

| Key electronic-devices	E-waste generated	
	1991	2001
Personal Computers	30 lakh	54 lakh
Televisions	11 lakh	17 lakh
Cellular phones	75 lakh	180 lakh

KEY ELEMENTS IN 2001 IN THE NCR

VI.   HEALTH CONDITIONS OF WORKERS AT RECYCLING YARDS

For the purpose of investigating the problems associated with this activity a pilot survey of two recycling yards at Turkemangate and Seelampur in Delhi has been carried out. The total number of workers enumerated to be 63 workers including men women and children. All of them found to work without any safety as the techniques of recycling are very undeveloped or pathetic. The owner of the junk yards did not provide even gloves and appropriate tool to carry out the work. In the case of workers working in this industry for last five years, their disease and ill history was recalled. In some cases there may be lapse of recall, but in the case of number of large number of workers, physicians prescriptions and hospital records were cross verified and their present health problems have been diagnosed with the help of a qualified lady physician Dr. Santosh specialized in pollution related diseases These people have been asked about their health problems during last five years.

As whole, of the total surveyed people (63), 57 or 90 per cent have been found with injuries, burns and skin diseases on their hands, face and legs. The results of this pilot survey related to health conditions of workers involved in this activity are presented in the following table.

Diseases and Symptoms	Number of workers affected	Percentage of workers
Respiratory track irritations	19	30.2
Kidney and blood infections	7	11.1
Symptoms of lung cancer (beryllicosis)	4	6.3
Nervous breakdown and brain diseases	2	3.2
Total	32	50.8

Source: Compiled by the author
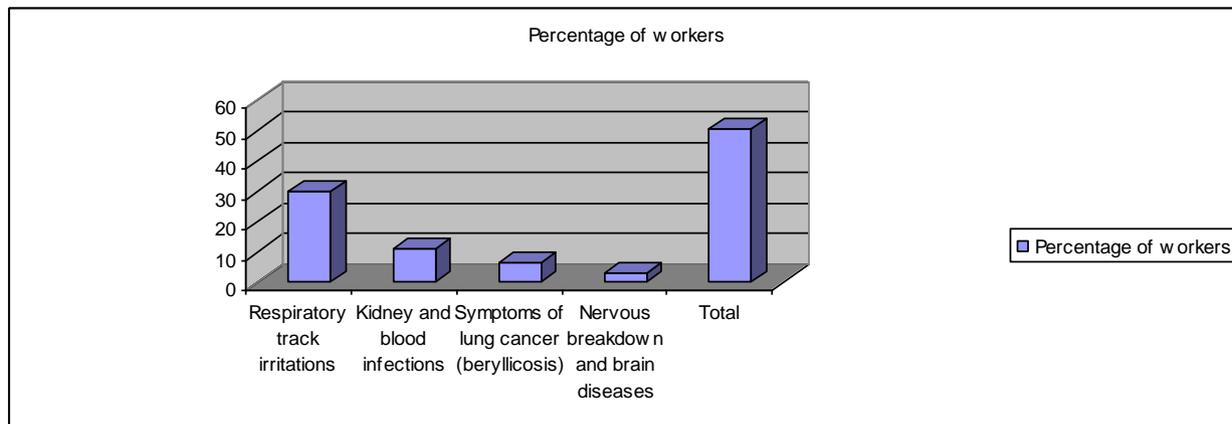
VII.   CONCLUSION

The large quantities have been generated in the National Capital Region has created many problems related to human health and environment. Thus there is urgent need for proper management of this waste and efficient ways to recycle and suitable places of dumping so that it may not contaminate the underground water and soil. Therefore, there is an urgent need to make people aware of the hazards created by it so that toxic effects of e- waste can be avoided

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