

E-WASTE MANAGEMENT - A PROBLEM OF MUMBAI METRO REGION (A ROOT CAUSE APPROACH)

Amit Naik¹ and Dr. Santosh Dandwate²

¹Assistant Professor / Research Scholar, SRTM University, Nanded, India

Email: amitnaik.a@gmail.com

²Professor / Research Guide, SRTM University, Nanded, India

Email: sdandwate@gmail.com

ABSTRACT

E-waste is 'an electrically powered appliance that no longer satisfies the current owner for its original purpose'. E-waste, e-junk and e-trash are frequently used synonyms. E-waste problem is related to electronic products and its disposal mechanism. The use of electronic goods is growing fast because of innovations, low price and easy to use facilities. Due to higher income, standard of living and professional requirement, people are replacing the electronic goods very fast. Mumbai Municipal Corporation is generating high e-waste in Mumbai Metropolitan Region. In Thane district, Thane Municipal Corporation generates high e-waste but Ulhasnagar Municipal Corporation generates low e-waste. New Mumbai region is also highly contributing to e-waste in region. E-waste generation is depending on population, health and education institutions, shops and malls, industrial units etc. E-waste in Municipal Corporations of Metropolitan Region is positively co-related to population growth. People are using different kinds of electronic products in their routine life. The old electronic products are discarded in bins. The market for replacement of electronic products is not well developed. The recycling facility is not well developed in region.

Problems related to e-waste are many and increasing many folds day by day. Organized and Unorganized sectors are working in this area but due to lack of proper guidelines and control measures, it is been observed that it is a serious threat to sustainable development.

This paper highlights the hazards of e-wastes, problems created, spread across the region due to increase in e waste, impact on environment, major threats to human and animal health and perils to future generations.

Keywords: E-waste Management

INTRODUCTION

Electronic industry is one of the fastest growing manufacturing industries in India. The new electric and electronic equipments have infiltrates all aspects of our daily life providing us with more comfort, health and security. The technological boom has also given different opportunities to human being. Therefore trade, commerce, education, health, welfare

institutions and households are using the electronic goods for different purposes. As the electronic goods have more reasonably priced, the volume of electronics in society has increased exponentially. It is because large section of society is purchasing and using electronic goods. As the affordability has increased, the replacement rate with the speed of technology has also increased. Innovations offer more functionalities, smaller size and newer design in the market. Given the time lag between the purchase of the product and its end of life means that products purchased one to ten years ago are being discarded now. Most of the products are either out of service or new features are added in it. The old products and features are no more useful in surrounding environment. The old products are either discarded or they are replaced. But the replacement system of old electronic products is not well functional in markets and specifically in urban areas.

Maharashtra state is number one in e-waste production in India. Mumbai city is a financial and cultural capital of India. It generates more employment opportunities and attracts skilled labor force across the country.

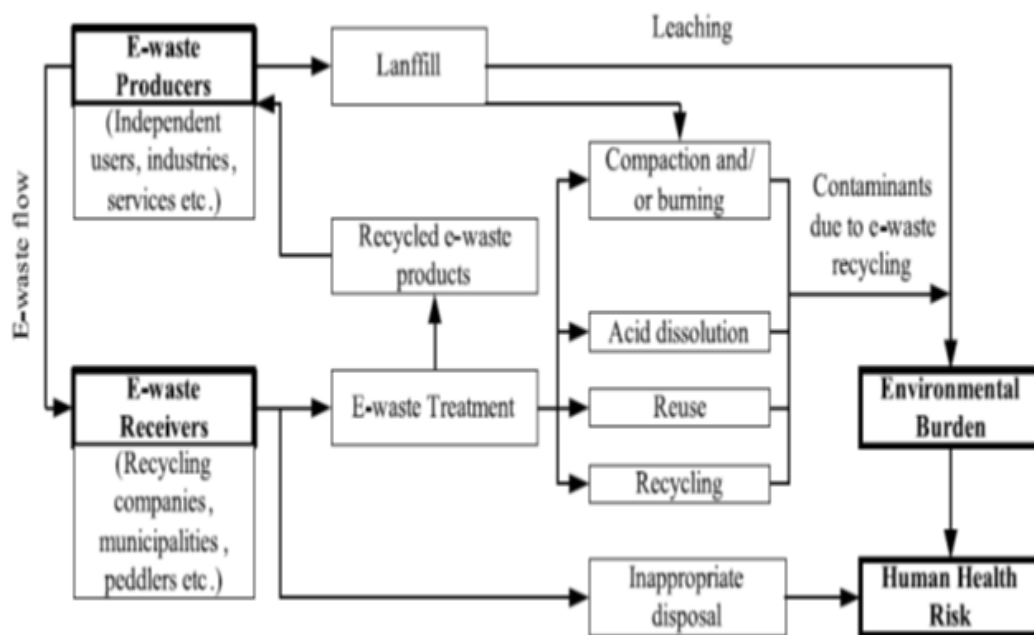


Figure1. E-waste routes

Due to high density of population, skilled labor force and technological innovations, electronic waste is growing fast in city. According to Central pollution control board (CPCB), Mumbai is at top in order to generate e-waste in the country. The Mumbai metropolitan region will generate 2.92 lacs ton e-wastes in 2020. It means e-waste is continuously rising with alarming rate in region. At present, e-waste disposal is mixed with solid waste. It is posing a greater threat for environmental degradation and the effects are much more than they are estimated. E-waste that is land filled pollutes water, soil and air. E-waste contaminates rivers, wells and other water resources in the region. The air gets pollute due to emission of gases and burning of e-waste. The fertility of land declines due to e-waste

landfill. Effects of e-waste on human health are widely observed. E-waste of chemicals such as lead, mercury, copper found in computer screens and televisions are poisonous. It can lead to fatal diseases like cancer, kidney failure, thyroid, hormone disruption and damage.

Most of the informal units are responsible for e-waste collection, segregation and disposal. Nearly 95 percent of the e-waste in region is processed by the informal sector. Women and children are collecting the e-waste in the metropolitan region. Women and children are less educated and they do not have much knowledge of e-waste. They collect e-waste and sell it to the retailer. In replace of that, they get few amount of money which is used for daily livelihood. Waste pickers are from poorer section of society therefore they can afford to work at lower wage. They do not get any medical allowance or compensation for injury. They are also not aware of such rights. They do not prefer to wear masks and hand gloves while handling e-waste. They are at high health risk due to exposure to dangerous and slow poisoning chemicals. But lower labor cost, high unemployment rate, migration and lack of protest are the reasons of the waste pickers working for e-waste collection.

E-waste management depends on the attitude of citizens. But lack of awareness among city residents is the major hurdle to keep e-waste management system in order (Ciocoiu et al, 2011). E-waste is usually regarded as a waste problem which can cause environmental damage if not dealt with in an appropriate way

Table1. E-waste types and their estimated life cycle

Item	Mass of Item (kg)	Estimated life (years)
Personal Computer (PC) ^a	25	3
Fax machine ^b	3	5
High-fidelity system ^c	10	10
Cell phone ^c	0.1	2
Electronic games ^c	3	5
Photocopier ^b	60	8
Radio ^c	2	10
Television (TV) ^d	30	5
Video recorder/DVD Player ^c	5	5
Air-conditioner ^b	55	12
Dish washer ^c	50	10
Electric cooker ^c	60	10
Food mixer ^c	1	5
Freezer ^c	35	10
Hair-dryer ^c	1	10
Iron ^c	1	10
Kettle ^c	1	3
Microwave ^c	15	7
Refrigerator ^c	35	10
Telephone ^c	1	5
Toaster ^c	1	5
Tumble Dryer ^c	35	10
Vacuum cleaner ^c	10	10
Washing machine ^c	65	8

Table2. Sources of E-waste generated

Category	Metals	Quantity
1. Non ferrous metals	Copper, aluminum	13%
2. Precious metals	Gold, silver, platinum, palladium	Very insignificant quantity
3. Toxic metals	Lead, mercury, chromium, cadmium, selenium	
4. Plastic	--	21.0%
5. Iron and steel	--	50.0%
6. Other insignificant materials viz. glass, wood, circuit board, ceramic, cement, rubber, leather, chemicals like polychlorinated biphenyl	--	16%

Source: UNEP report

However the enormous resource impact of electrical and electronic equipment is widely overlooked. The electronic and electrical devices lead not only to significant environmental problems but also to systematic depletion of the resource base in secondary material (Schluep M. et.al 2009).

E-Waste - Impact on All

Many electronic devices include heavy metals such as lead, cadmium, mercury and arsenic. If not handled properly, these can poison our environment and threaten the health of individuals and communities.



There are growing concerns that most of the e-waste generated in developed countries is ending up in developing countries that are economically challenged and lack the infrastructure for environmentally sound management of e-waste. This results in adverse socio-economic, public health and environmental impact of toxins in e-waste. A study conducted in soil, air dust and human hair collected from an e-waste recycling site in

Mumbai, Bangalore and (number 1 and number 2 cities in waste generation in India respectively) , India, clearly found increased concentrations of trace elements such as lead, zinc, silver, cadmium and copper compared to reference sites

E-waste contains a combination of reusable raw materials as well as toxic materials. The raw materials have value and can be reused to manufacture new products. However, it can be extremely labor intensive and very expensive to extract the value of these materials from such devices. Many people presume e-waste to only compilation of thrown electronic and electrical appliance.

E-waste contains toxic materials such as lead, mercury, cadmium and brominated flame retardants.



These materials are considered bio-accumulative, which means they concentrate in fatty tissues where they can have severe, negative impacts on fetal development and on nursing infants. It has been estimated that consumer electronics may be responsible for up to 40% of the lead found in landfills.

Lead

Found as solder on printed circuit boards and in television and computer monitor glass Lead can cause damage to the central and peripheral nervous systems, blood systems, and kidneys in humans. Lead has also been shown to have severely negative effects on fetal development and on nursing infants.

Mercury

Found in all fluorescent lamps, printed circuit boards, laptops and LCD screen backlights Mercury in lakes and rivers converts to methylated mercury in sediments. The toxin can then accumulate in living organisms and travel up the food chain. Mercury can adversely affect a baby's growing brain and nervous system. Adults can suffer organ damage, mental impairment, and a variety of other symptoms.

Cadmium

Found in chip resistors and semiconductor Cadmium and several cadmium-containing compounds are carcinogens that can induce various types of cancer. Cadmium can also accumulate in, and harm, the kidneys.

Brominated Flame Retardants (BFRs)

Found in printed circuit boards and some plastics. Less is known about BFRs than some other contaminants, but research has shown that these toxins may increase the risk of cancer (digestive and lymph systems) or cause endocrine disruption.

Impacts of E-Waste

Electronic wastes can cause widespread land-filling of e wastes can lead to the leaching of lead into the ground water.

Non controlled methods of precious metal extractions lead to intensification of problem, even after extraction of required parts dumping of unwanted material without any proper guidelines or procedure.

In case of area of research i.e. Mumbai Metro Region, under survey many factors contributes to create this problem viz. it is a financial and economical capital of the country, population is very dense, Poor sector undertake any kind of work knowingly or unknowingly in order to fulfill their regular needs, due to being a developing country many developed countries are dumping their E-waste, etc.

CONCLUSION

The relationship between cause and effect is important in all kinds of waste. Here the causes may be characterized as the causes for the generation and rapid obsolescence of electrical and electronic equipment. The reasons for prompt generation and obsolesces of E-waste include rapid economic growth, urbanization, openness of the market, high Research and Development facilities, industrialization, increased consumerism etc. The effects are on the health and environmental risks associated with E-waste. The effects of improper disposal of E-waste are observed relatively after a long period of time, When an electronic gadget is disposed of with all its hazardous elements embedded in it, precarious health and environmental effects are not observed immediately. It takes considerable amount of time to have an outlook of the actual risk from the waste. This intensifies the problem of realization of the hazards from waste. In India, e-waste management assumes greater significance not only due to the generation of its own e-waste but also because of the dumping of e-waste from developed countries. This is coupled with India's lack of appropriate infrastructure and procedures for its disposal and recycling.

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