

# Study the Practices of Informal Sector's Processing of E-waste Management and Environmental Damage

Rajan Kumar

Department of Health Safety and Environment,  
Student of Shri Rawatpura Sarkar University Raipur, India

Raj Kumar Bharti

Department of Mechanical Engineering,  
faculty of Shri Rawatpura Sarkar University Raipur, India

Ajay Kumar Gupta

HOD Department of Mechanical Engineering,  
faculty of HSE, Shri Rawatpura Sarkar University Raipur, India

**Abstract:-** Electronic industries in today's era increases exponentially with the increase in the population. People's dependency on gadgets increases rapidly worldwide. Electronic equipment makes the life tasks easier but also pollutes the environment. The older electronic equipment replaced with newer versions termed as electronic waste. E-waste is unintended & unthinkable, makes prejudicial effects that is harmful for humans, animal and environment when contamination of soil, air and water resources by them. Worldwide, approximately 53.6 million tons of electronic waste was produced in 2019, from which only 13% was recycled and remaining are dumped in land-fills and incinerators cause health and surrounding problems due to the existence of perilous materials and chemicals in them. Found in several studies on e-waste so far, many developed and developing countries do not properly manage their waste generation, according to a study by the United Nations Global Waste Report 2019., Needs immediate action for smarter and more sustainable waste management.

This paper outlines India's e-waste statistics and focuses primarily on informal sector e-waste management and environmental damage. Throughout this paper, we will regularly discuss legal measures and awareness programs. Paper provides the information to the readers regarding increment of electronic waste and how to control them by different methods. At the last, it increases the knowledge and focussing on the informal sector how to handle the e-waste pollution and health problems occurs due to this. It will also helpful for framing future policy related to e-waste in India to policy makers. The instant installed E-waste carrying capacity of it is  $11 \times 10^5$  tons per year of electronic waste in the country. It is acutely deficient and necessitates improving as minimal requirement is approximately to be  $22 \times 10^5$  tons per year of waste products.

## I. INTRODUCTION

Rapidly expansion of E-waste products in India is around 70% of the total e-waste processed. In India, this waste comes from foreign countries like China, Japan and Indonesia and many other countries. Imports stopped by Basel convention but rules are violated which causes import happens easily. E-waste exported generally from advanced Nation namely USA & Germany to evolving Nations such as India, Pakistan, China, Ghana, Philippines, Nigeria & Vietnam around 80% of the whole electronic waste produced worldwide found in latest reports is illegally transported or exported to recovering countries. Manipulation of electronic waste in developing countries is completed by the unofficial sectors and adoption of unfastened in cremation and acid leaching to retrieve various metals like Gold, Copper and other useful metals. They dispose the remaining waste with Municipal solid waste in open areas & water, which increases pollution of water, air and soil.

There are seven governmental electronic waste operated plants which are in Delhi, Karnataka, West Bengal & Maharashtra and mostly involved in destroy work only. Approximately 5% of electronic waste in India manipulated through the authorized sector but 95% handling done by the informal sector. (CPCB) Central pollution Control Board handle e-waste recycling in formal sector by employs skilled and trained people. The unauthorized sector is not controlled by any organisation or government or not having any licence. The unauthorized sectors which creates profit by selling the metals which comes out from recycling process. Poor people and unskilled men, women and children's who live in slum areas are also working in this hazardous environment. They cannot use any techniques and proper procedure to take out the metals from electronic waste.

Electronic waste could be obtained from computer and phone pcb's, batteries and other tiny combined electronic devices which was utilized in transportation, health-care machinery and surveillance systems. Electronic gadgets essential to the people of present day society for making their task done comfortably and efficiently. The various factors which is mainly responsible for e-waste are shown in the figure 1. These factors play a huge role for rapidly increasing of electronic waste.

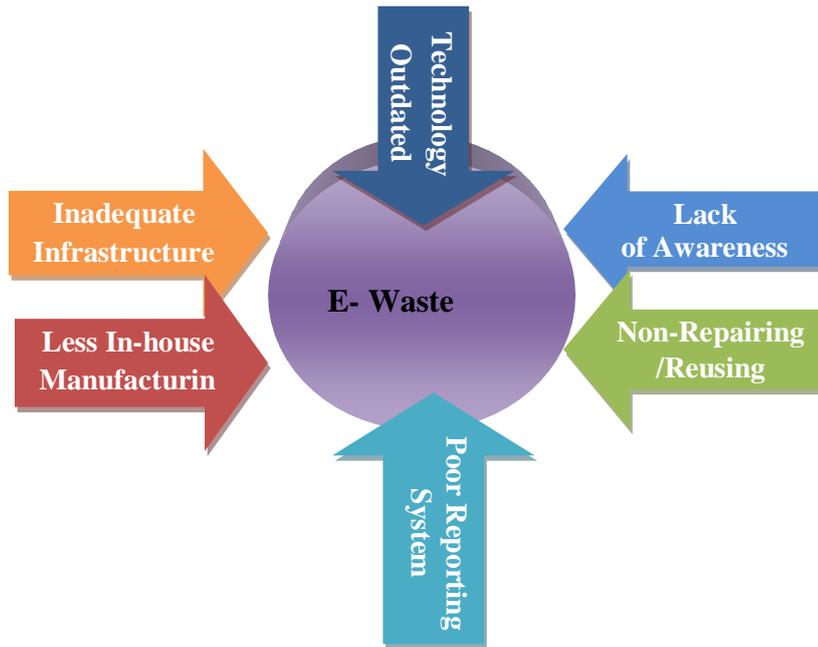


Fig.1: Sources of e-waste

On the report of Global Electronic waste survey 2021, the increasing of electronic waste in year 2019 is approximately near to 53.6million metric per tons in which 17.4% were well stored, reprocess and left 82.6% was not counted. The forecasting upon Global E-Waste is predicted to be 74.7million metric per tons through the year 2030. The plotted data shown in fig 2.

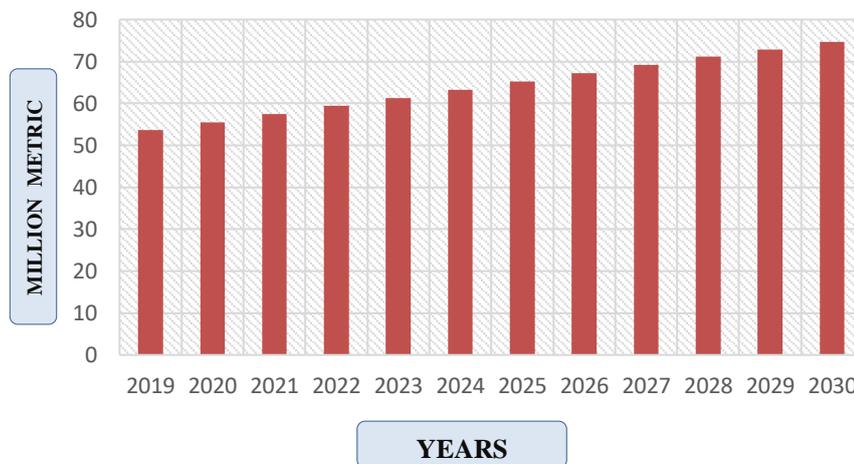


Fig. 2: Forecasting of Global Electronic Waste

According to the Indian Ministry of Commerce and industrial yearly statistics, import of e-waste for the annual accounting period 2018-19 was about 55474.52million USD in India. Associated Chambers of Commerce and Industry of India reports in 2018, finds that around 12.5million metric tons of electronic waste increases yearly in 2018, and risen from 2million tons/year in 2014still 4,38,086 tons of waste is collected & sends to reprocess/year. India’s state

ranking in electronic-waste contribution shows in the manner of Maharashtra, Tamil Nadu, Uttar Pradesh, West Bengal, Delhi NCR, Karnataka, Gujarat and Madhya Pradesh. The data obtained from ASSOCHAM 2018 shows in fig 3 that maximum e-waste generated by Maharashtra state compared to other states of India. Recycling of electronic-waste material in India is not at very good pace, only 47,810t per year e-waste is recycled.

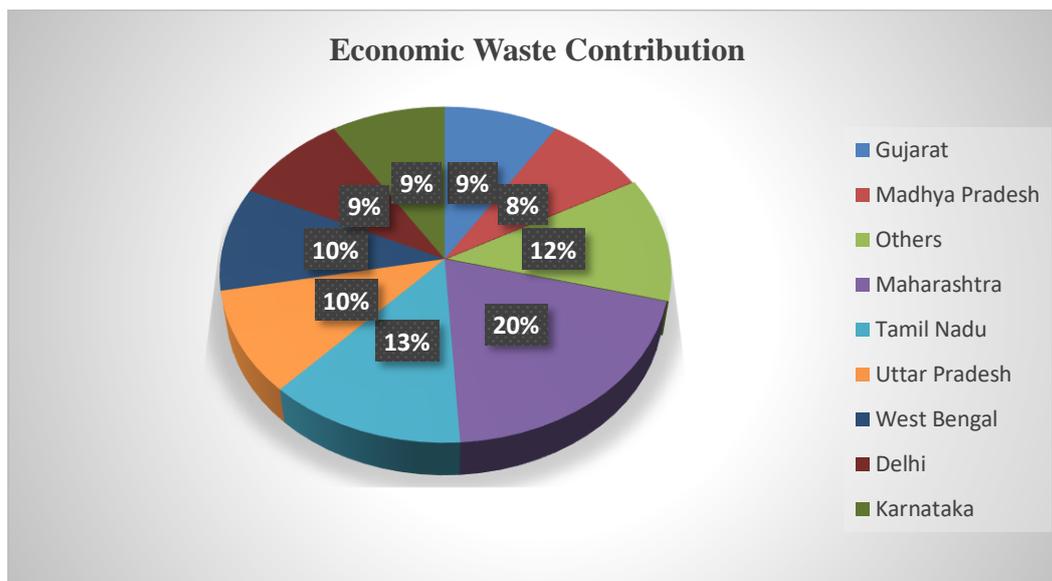


Fig. 3: Graphical representation of Electronic waste contribution of different states of India

In India there are only 5% of total electronic waste are efficiently recovered & reprocessed in which the 95% have been completed through unauthorized sectors. Around 4.5 lakhs child labour and adult labour working in this unauthorized sector where they involved in recovering and processing of e-waste. Disposing and recycling without proper training and knowledge of e-waste and without safety measures may lead to several diseases like nerve structure damage, derma diseases, lung infection, heart disease, liver

infection, respiration problems etc. In India, E-waste production percentage is 4.56 times more from the annually electronic waste processing competency provided in 2019 by the government. E-waste increment products in India are smart phones, desktops, laptops and television. The various kinds of materials present in electronic waste and some are very precious which shown in fig 4 with quantity and their estimated value in euro.

Material	Quantity	Rate(euro)
Iron and steel	16,500	9000
Copper	1900	10,650
Aluminium	220	3204
Gold	0.34	10,450
Silver	1.2	590
Palladium	0.3	1890

Table 1

## II. ENVIRONMENTAL CONCERN AND HEALTH HAZARD

In India, Approx. 6 lakhs employees have been working in organised and unorganised sectors for recovering Electronic Waste and reprocessing which was done in Delhi. Environment badly damaged by the mishandling of e-waste and cause several health problems. Various substances emitted out from e-waste which has all hazardous and non hazardous categories waste. Basically, Electronic waste comprises from wood, glass, PCB, lithium-ion battery, ferrous metals like iron, steel, non ferrous metals like AL, CU and PB, limited earth metals and another costly metals like gold, silver. The chemical substances also present in the e-waste which causes several health diseases. E-waste pollutes the air, water and soil which are harmful to the environment. EIA stands for Environmental Impact Assessment and Life Cycle Assessment have been used as the criterion to evaluate the environmental causes of Electronic Waste. For example, Recovery of copper in Informal sector, copper from cables by burning PVC in open atmosphere caused air pollution similarly pollution caused

by water and soil through electronic-waste and destroy the environment.

## III. E-WASTE DISPOSAL METHODOLOGY

Developed countries export the Electronic Waste to growing nations such as India, Pakistan, China, & Malaysia and most of e-waste disposed-off in landfills, incinerators. In few years, the exports have been banned and it passes through isolated Act for properly destroying Electronic Waste. The electronic-waste removing process have been followed extensively which involves dumping in land-fills, acid-bath dispose, incineration, leaching, reprocess and used again & again.

Handling of e-wastes in informal sectors operates by the poor illiterate people including child, women's in large cities at multiple locations. Such states of the country have to collected Electronic Waste and demolish them and move them forwards to large unauthorised sector's locations after destroying.



Fig. 4

**IV. INDIA’S E-WASTE MANAGEMENT**

Enormous assortment of mixtures has been utilized for making the electrical and hardware gear. For example, the amount of individual weighty metals, synthesis of metals and metalloids have not been determined as expected although creation of the electrical and hardware gear in electronic industry. The arrangements are made by the public authority every once in a while which is displayed in fig 5. State wise

limit increments for obliterate or reusing e-waste. Various awareness programs conducted for the people by the authority in chaotic areas. According to government rules, the reusing office ought to introduce wastewater treatment plant yet the casual units don't have these types of treatment plants that's why all destructive polluted water was empty out in the grounds.

YEAR	ACT
1986	Environmental Protection Act
1989	Hazardous Wastes Management & Handling Rules
2000	Municipal Solid Waste Management & Handling Rules
2008	Hazardous Wastes Management, Handling and Transboundary Movement Rules
2011	E-Waste Management and Handling Rules
2016	E-waste Management Rules
2018	E-Waste Management Amendment Rules
2019-2020	E-Waste Awareness Programs

Fig. 5: Evolution of E-Waste Laws in India

**V. RESULTS**

Assortment focuses increment to gather e-waste. Appropriate preparation and mindfulness program directed at extremely immense scope. Various principles and regulations are there however stringently not follow. Different medical conditions emerge when labourers are working without information on treatment of e-waste and without playing it safe. Different valuable metals are emerging from e-waste material and furthermore synthetics present in them which causes air, water and soil contamination by which climate dirtied. Casual area collects a large portion of the Electronic waste, demolish them and reuse. Directing mindfulness programs and to prepared casual area labourers and giving office to annihilate or reusing of e-waste tackles the issue of unsafe climate. Metropolitan urban communities have numerous focuses at various places where destitute individuals work. A huge piece of Electronic Waste in India is dealt with by the unorganised area where metals are recuperated and helps in lessening the mining in the country. Dealing with limits of formal area will be extended and appropriate direction or information will give to casual areas and severe execution of e-waste the board rules.

**VI. CONCLUSION**

Electronic Waste is the quickest developing strong waste flow around the world. The survey paper has talked about the wellspring of E-Waste, their significance and valuable metal present in them. The conversation on the effects of e-waste on wellbeing, casual e-garbage removal. The Philosophy of casual areas knows and studies various states about age pace of Electronic Waste. The pace of metals in euro and their sum was known by the review. Maharashtra State have higher pace of creation of e-waste contrasted with different provinces of India. Normal observing of e-waste has not been done by the states. Appropriate foundation for e-waste assortment, reusing, treatment and removal is not really ailing in limit and can't stay up with how much e-waste created. The regulation connected with the assortment of civil strong waste has been shaped in year 2000. Mindfulness programs directed and assortment focuses ought to be expanded. Nearby e-waste assortment ought to be expanded and open all time so purchasers can handover their e-waste without any problem.

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