E-waste: A new challenge for waste management in India

Ishan Laddha, Sankalp Bhagwate, Venkatesh Bhutada, Raj Singh, Monica Seth

Student, Student, Student, Student, Professor
All Authors currently pursuing Bachelors in Engineering in Electronics and Communication, Shri Ramdeobaba College Of Engineering and Management, Nagpur, Maharashtra, India.

ABSTRACT :

Whenever we have our eyes on the topic of waste, we only think in the perspective of garbage or solid, semisolid waste and not anything else .what about E-waste ! from a back decade e-waste has become a global issue. India is too generating a bulky amount of e-waste every year. Every other waste except e-waste is getting wide media coverage due to which awareness regarding e-waste among people in society is very less or negligible.

E-waste recycling (i.e. 3 R's) is a concept hardly in existence in India . As of now most of e-waste generated is getting dumped in rivers or dumping yards either of getting properly recycled or reused after treatment which in result have adverse effects on environment as well as health issues.

So basically paper describes the current situation of e-waste management in India and other parts of globe. It also describes the case study of trend of e-waste in India with other countries . In last ten years , it is observed that e –waste is increasing day by day and the principal generators of these e-waste are computers ,mobile , telephone equipment widely used by the government ,public sector companies and private sectors, generate nearly about 75 % of e-waste and on other hand with the contribution of individual household being only 16%. According to ASSOCHAM compound Annual growth rate of electronic waste is 30%. Computer equipments contribute about 70% of total e-waste generated in India and telecommunication equipments accounts for almost 12%. State wise Maharashtra ranked first followed by Tamil Nadu and UP in e-waste pollution and among all cities Mumbai ranks first in generating e-waste followed by Delhi and Bangalore.

KEY WORDS: e-waste, e- waste management, recycle.

INTRODUCTION :

E-waste is any electrical or electronic equipment that's been discarded. This includes working and broken items that are thrown in the garbage or donated to a charity reseller like Goodwill. Often, if the item goes unsold in the store, it will be thrown away. E-waste is particularly dangerous due to toxic chemicals that naturally leach from the metals inside when buried.

E-waste contains various toxic substances such as mercury, lead or brominated flame-retardants which have the adverse effects on human health.

These toxic substance have adverse effects on the major parts of human body such as nervous systems, blood systems, brain development, skin disorders, lung cancer, heart, liver, and spleen damage. It can also significantly affect the nervous and reproductive systems of the human body, leading to disease and birth defects. Improper disposal of e-waste is unbelievably dangerous to the global environment, which is why it is so important to spread awareness on this growing problem.

The adverse consequences for health and the ecology of exposure to waste products from human consumption have long been recognized. A relatively recently recognized hazardous waste product comes from discarded electrical and electronic equipment (EEE).

EEE includes items that have either a battery or a power cord. E-waste generated from discarded EEE is commonly divided into 3 main categories: large household appliances (refrigerators and washing machines), information technology (IT) and telecom (personal computers, monitors, and laptops), and consumer equipment (TVs, DVD players, mobile phones, mp3 players, and leisure and sporting equipment). Equipment components including batteries, circuit boards, plastic casings, cathode-ray tubes, activated glass,

and lead capacitors also are considered to be e-waste .There are varying estimates as to the amount of domestic, regional, and global e-waste produced. According to STEP (Solving the E-waste Problem Initiative), the 2012 global generation of e-waste totalled 45.6 million metric-tons. The United Nations Environmental Program (UNEP) approximated that the amount of e-waste produced in 2012 is enough to fill 100 Empire State buildings and averages to more than 6.8 kg (15 lb) for every living person. E-waste is a global, interregional, and domestic problem. Of the 20 million to 50 million tons generated yearly, it is estimated that 75% to 80% is shipped to countries in Asia and Africa for "recycling" and disposal.

OBJECTIVES AND METHODOLOGY:

The objectives and the research methodology are as follows:

OBJECTIVES OF STUDY:

The study has been adopted to achieve the following objectives;

1. To examine the tendency of management of electronic waste in India in comparison with some other parts of world
2. Our aim is to study the current status of e-waste management in India.
3. To put up or fabricate some suggestions to deal with the adverse problem of e-waste with the growing era of digital India.

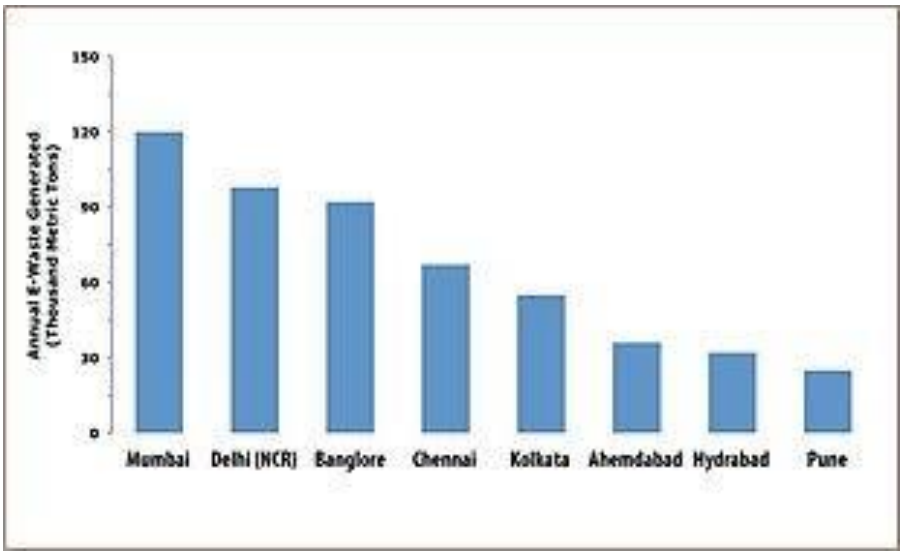
RESEARCH METHODOLOGY:

Type of Research: Quantitative , Analytical Research and data analysis

This paper describes an descriptive methods based on Quantitative and analytical reviews of the environmental and social aspects in the areas of e-waste sector . Data were extracted through various sources such as websites and reports , news letters various news articles , magazines and government NGO's. This paper basically focuses to resolve the issues related to e-waste management in India

E-WASTE IN INDIA

India discarded approximately 3.2 million tonnes of e-waste in 2019 which is about 12 percent to the global e-waste production. India has emerged as 3RD largest Electronic waste producer in world after China (10.1) and United States (6.9). Computer devices account for nearly 70% of e-waste, with the contribution of telecom sector being 12%, medical equipment being 8%, and electric equipments being 7% of the annual e-waste production. The Government, public sector companies, and private sector companies generate nearly 75% of e- waste; with the contribution of individual household being only 16%. The tier-1 cities tops the list in producing e- waste such such as Mumbai on top followed by Delhi , Bangalaore and Chennai.



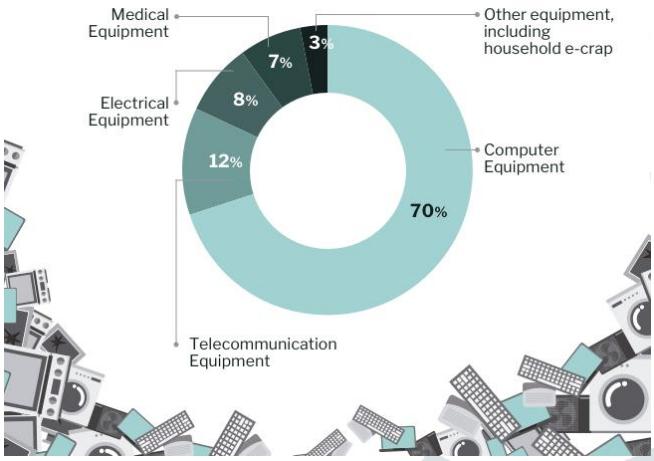
India is among the top three e-waste generating countries in the world besides China, the US, Japan and Germany. Among states, Maharashtra contributes the largest e-waste of 19.8% but recycles only about 47,810 tonnes per annum (TPA). Tamil Nadu with e-waste contribution of 13% recycled about 52,427 TPA; Uttar Pradesh (10.1%) recycles about 86,130 TPA; West Bengal (9.8%), Delhi (9.5%), Karnataka (8.9%), Gujarat (8.8%) and Madhya Pradesh 7.6%, as per the joint report

TOP COUNTRIES IN E-WASTE PRODUCTION IN ASIA CONTINENT:-

The biggest e-waste recycling market in India is in Delhi followed by Bengaluru and Chennai. First recycling unit was opened in Bengaluru .

It estimates 1000 tonnes of plastics which has the same equivalent of Iron, about 300 tonnes of lead and about 43 tonnes of nickel copper is generated about 350 tonnes and 300 tonnes of lead as electronic waste in Bengaluru.

Break-up Of E-Waste In India

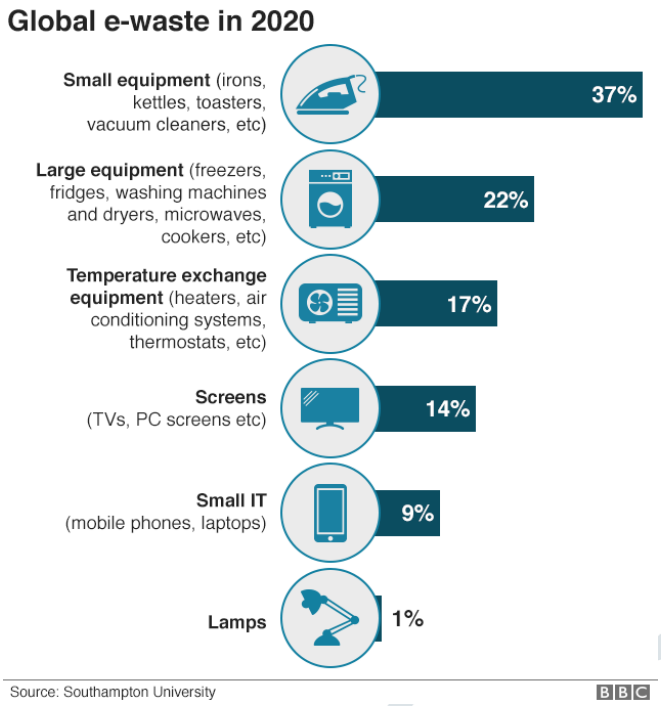


The report published on December 18, 2020 mentioned that the collection targets for 2017-18 and 2018-19 based on the rules were 35,422 tonnes and 1,54,242 tonnes, as per the studies.

The actual collection, however, was less in both the years — 25,325 tonnes in 2017-18 and 78,281 tonnes in 2018-19 as per the reports.

In the guidelines, the environment ministry had made the producers responsible for collection of end-of-life electronic products as part of the Extended Producer Responsibility, in line with the global best practice. The pollution board said 1,630 producers were extended EPR authorisation as on November 26, 2020. Also, 312 dismantlers or recyclers were authorised in the same period with a capacity of processing 782,080.2 tonnes of e-waste every year. These units processed 69,413 tonnes of e-waste in 2017-18 and 164,663 tonnes in 2018-19.

This is also vital because the key elements in most electronics – rare earth metals – aren't exactly rare as their name suggests, but are definitely hard to obtain, at least locally. The latest forecasts show that e-waste's global worth is around $62.5 billion annually, which is more than the GDP of most countries. It's also worth three times the output of all the world's silver mines.



Global e-waste generation by 2020 (in millions MT)

TOP 5 E-WASTE GENERATING COUNTRIES IN THE WORLD:

China	US	INDIA	JAPAN	GERMANY
10.1 Million Tonnes	6.9 Million Tonnes	3.2 Million Tonnes	2.5 Million Tonnes	2 Million Tonnes

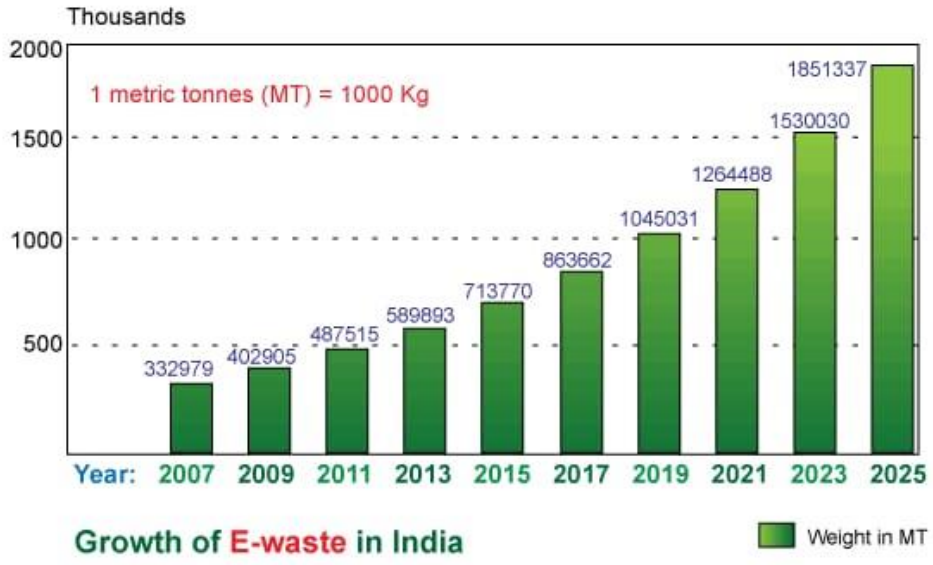
India is the third biggest producer of e-waste in the world

TOP 3 E-WASTE GENERATING CITIES OF INDIA:

The ASSOCHAM-KPMG study, titled "Electronic Waste Management in India'' identified computer equipment & mobile telephones as the principal e-waste generators in India. According to this study, computers contributed about 70 per cent of the total e-waste generated in India, while telecommunication equipment accounted for 12 per cent. Among the India cities, Mumbai topped the list as it generated an estimated 1, 20,000 tonnes of e-waste annually. Delhi and Bengaluru ranked second and third, with 98,000 and 92,000 tonnes of e-waste generation respectively. State-wise list Maharashtra ranks first in generation of electronic waste, followed by Tamil Nadu and Uttar Pradesh.

India is among the top five e-waste generating countries in the world besides China, the US, Japan and Germany. Among the states, Maharashtra contributes the largest e-waste of 19.8% but recycles only about 47,810 tonnes per annum (TPA), the report released by Assocham and NEC on ahead of the Environment Day on 5 June 2019.

Tamil Nadu with e-waste contribution of 13% recycled about 52,427 TPA; Uttar Pradesh (10.1%) recycles about 86,130 TPA; West Bengal (9.8%), Delhi (9.5%), Karnataka (8.9%), Gujarat (8.8%) and Madhya Pradesh 7.6%.



INDIA'S E-WASTE FROM OLD MOBILES WILL JUMP 1800 % IN 2020:

By the year 2020 India's e-waste from old mobiles and computers will rise by about 1800 per cent and 500 per cent respectively as compared to the levels in the year 2007, according to an ASSOCHAM-KPMG joint study.

With more than 1.1 billion mobile phones in circulation, nearly 25 per cent end up in e-waste annually. India, which has emerged as the world's second largest mobile market after China, is also the fifth largest producer of e-waste. Telecom equipment alone accounts for 12 per cent of the e-waste, a study by ASSOCHAM said.

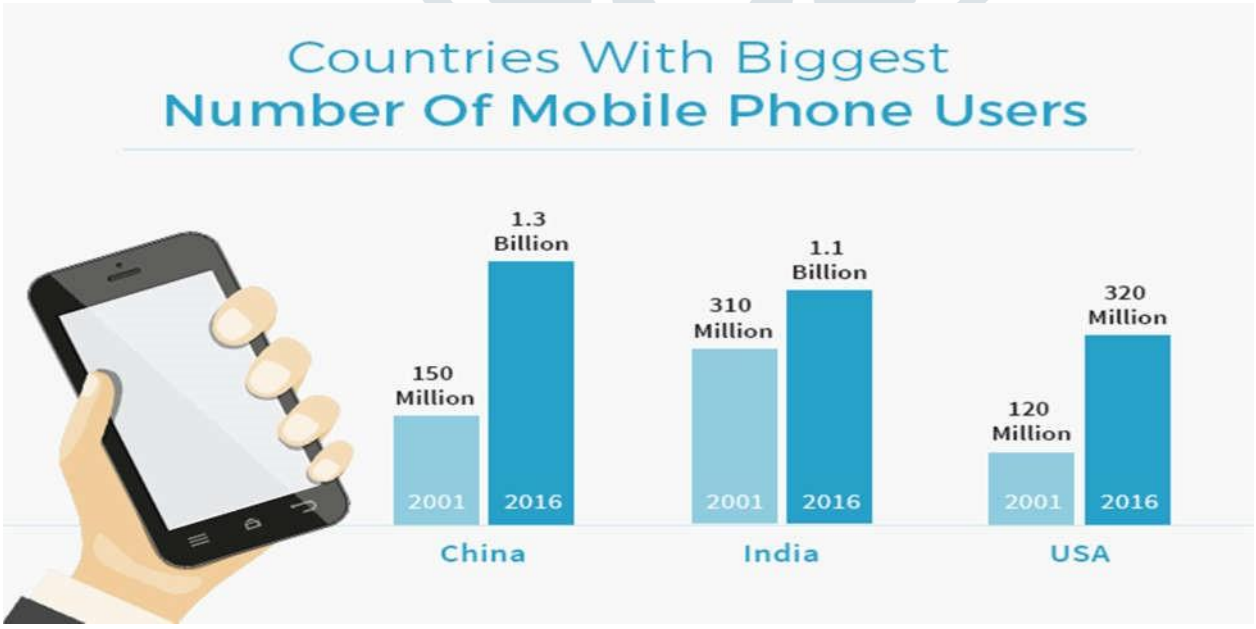


Figure 5: Countries with biggest No. of Mobile Phone Users Source: ASSOCHAM-KPMG Report

Vital Causes of e-waste management in India :

1. The lack of awareness about the e-waste.
2. Out of reach of e-waste recycle units.
3. The cost or high investment required for recycling of e-waste.
4. The labours required for recycling and the hazardous materials contained.
5. lack of workforce needed for waste collection and processing .
6. Industries dump their waste in rivers for petty profits which get back into homes of people via water they use.
7. Corruption leads to improper way of installation of dustbins and other e-waste collection instruments.
8. Improper implementation of the way of Recycling , Reusing and Reducing the use of e-waste (i.e. 3R's).
9. Waste pickers are not properly entertained in the waste management cycle.
10. No proper implementation of punishment for those who are not following proper way to dump e-waste .
11. Urbanization directly contributes to waste generation, and unscientific waste handling causes health hazards and urban environment degradation.
12. It is not easy for government to collect waste from every corner of country ,as waste is widely scattered in parts of the country .
13. Another reason is , improper dumping of waste by industries which further get back into houses of society via water .

Suggestion to improve e-waste management :

1. Awareness campaign should be conducted by government with the help of media coverage .

2. Government should apply incentives schemes for industries and approach them so that industrial e-waste can be properly managed .

3. Organize what u have :

   one should properly organize their gadgets such as wires connectors, DVD's , batteries, etc. so to improve e-waste management at personal level. If this step is taken by every individual in society it will be an great help to government to dispose that e-waste for recycle at its best.

4. 3 R's :

   That are Reduce , Reuse, Recycle should be in acted by each and every individual , housing, industries, public sector companies ,private sector companies so that it may help in the proper disposal of e-waste .
   One should follow all the rules , regulations and acts, initiated by the government .

5. Awareness Campaign :

   There is an urgent need to reach out to the workers of all the informal sector, raise awareness about the consequences of improper e-waste management and include them as part of the solution to e-waste related issues.

6. Government can also refer those methods adopted or in acted by other world wide countries .:

For example, South Korea, one of the largest producers of electronics managed to recycle 21 per cent of the total 0.8 million tonnes of e-waste that it produced in 2015. Korea recycles all the e-waste that it produces. It has set up the Seoul Resource Centre (SRC) which receives 20 per cent of the Seoul's e-waste for extraction of valuable metals such as gold, copper, etc. The remaining 80 per cent of Seoul's e-waste is used entirely for land filling.

7. Give away or donate your e-waste.

if you don't need a thing, donate it so someone else can use it. Donations are great for tax deductions; often the amount will be close to the value of the item if you tried to sell it.

8. Think ahead:

We actually had to pay to toss a bunch of electronics the last time we moved. We didn't have enough time to find people that wanted what we had, which felt terrible.

There's no quick way to get rid of e-waste—we have to dispose of them sooner or later, so why not make money on them now? Don't let them pile up.

Conclusion :

As of now, after research we came to know that there are many hurdle for proper management of Electronic waste in India and other countries too.

There is an urgent need of an effective suggestions as mentioned above to reduce e-waste management and to save our lives and environment .

At last but not the least, inspire your neighbours to join you in proper implementation of e-waste management or disposal . One should always take care that while buying new product last one used should be properly disposed or reused by another means or should be recycled .

Don't be so gluttonous to buy more and more new products ,if you cannot dispose or reused the old one properly. At last be a part of solving the problem of e-waste rather than increasing the problem .

REFRENCES:

https://www.assocham.org/newsdetail.php?id=6677

https://www.downtoearth.org.in/blog/waste/recycling-of-e-waste-in-india-and-its-potential-64034

https://gadgets.ndtv.com/laptops/news/worlds-e-waste-unsustainable-says-un-report-citing-china-india-and-us-2256324#:~:text=the%20report%20said.-,China%2C%20with%2010.1%20million%20tonnes%2C%20was%20the%20biggest%20contributor%20to,world's%20e%2Dwaste%20last%20year.

http://www.msruas.ac.in/pdf_files/Publications/MCJournals/Jan2017/3_Kiran.pdf

https://www.unsustainablemagazine.com/the-effects-of-e-waste-on-the-environment-and-human-health/

https://www.gerecycle.com/3-scary-effects-of-e-waste-on-the-environment-and-human-health/

https://www.ewaste1.com/what-is-e-waste/

https://en.wikipedia.org/wiki/Electronic_waste

http://www.assocham.org/index.php

http://onlinelibrary.wiley.com/doi/10.1111/jiec.12645/full