



JECRC Foundation



**JAIPUR ENGINEERING COLLEGE
AND RESEARCH CENTRE**

**JAIPUR ENGINEERING COLLEGE AND RESEARCH
CENTRE
DEPARTMENT OF CIVIL ENGINEERING**

Class – VI Semester /III Year

Subject –S&HWM

Chapter – 5

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UNIT-5

- What is E-Waste ?
- Sources of E-Waste.
- Types of E-Wastes.
- Effects of E-Waste on environment.
- Effect of E-Waste on human body.
- Methods of disposal of E-Waste.
- Why E-Waste Management?

1. Introduction:

Electronic waste or e-waste describes discarded electrical or electronic devices. Used electronics which are destined for reuse, resale, salvage, recycling, or disposal are also considered e-waste. Informal processing of e-waste in developing countries can lead to adverse human health effects and environmental pollution.

[Electronic waste](#) is emerging as a serious public health and environmental issue in India.^[1] India is the "fifth largest electronic waste producer in the world"; approximately 2 million tons of e-waste are generated annually and an undisclosed amount of e-waste is imported from other countries around the world.

Discarded electronic waste.

Annually, computer devices account for nearly 70% of e-waste, 12% comes from the telecom sector, 8% from medical equipment and 7% from electric equipment. The government, public sector companies, and private sector companies generate nearly 75% of electronic waste, with the contribution of individual household being only 16%.

India had 1.012 billion active mobile connections in January 2018. Every year the number is growing exponentially.

The number of **smartphone users in India** was estimated to reach over 760 million in **2021**,

There were 624.0 million **internet users in India** in January **2021**. The number of **internet users in India** increased by 47 million (+8.2%) between 2020 and **2021**

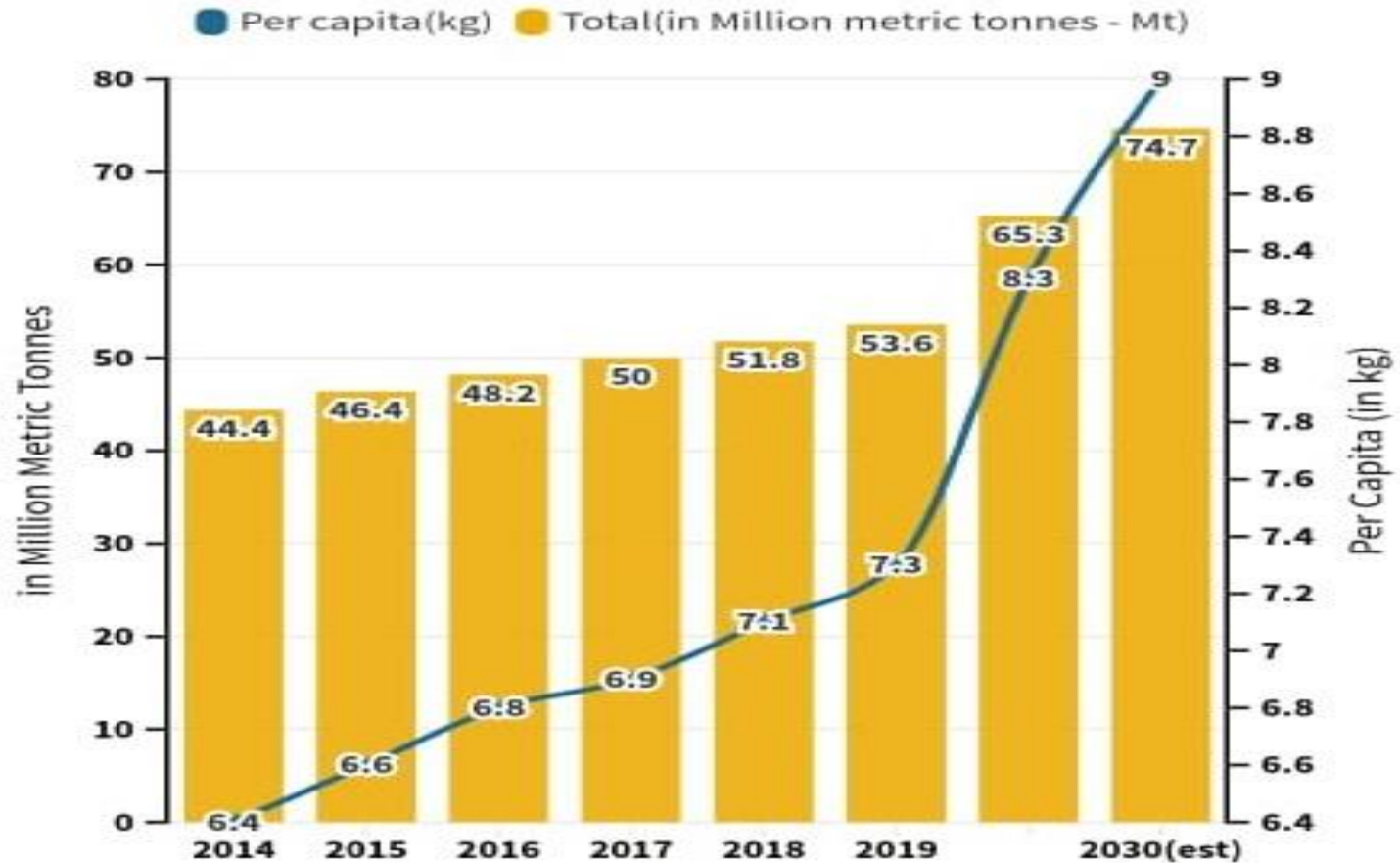
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India collected just 10 per cent of the electronic waste (e-waste) estimated to have been generated in the country 2018-19 and 3.5 per cent of that in the generated in 2017-18, said a recent [report by the Central Pollution Control Board](#).

The figures have taken into account the 21 types of electrical and electronic equipments listed in the E-Waste Management Rules, 2016. These include discarded computer monitors, mobile phones, chargers, motherboards, headphones, television sets, among other appliances.

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Global E-waste Volume



Source: Global E-waste Monitor 2020

FACTLY

NEW DELHI: India is the third largest electronic waste generator in the world after China and the USA and these three countries together contributed 38% of total 53.6 million [tonnes](#) (Mt) of e-waste, generated worldwide in 2019.

Sources of E-Waste:

1. Waste generated from the products used for data processing such as computers, computer devices like monitor, speakers, keyboards, printers etc.
2. Electronic devices used for entertainment like TV, DVDs, and CD players.
3. Equipment or devices used for communication like phones, landline phones, fax etc.
4. Household equipment's like vacuum cleaner, microwave ovens, washing machines, air conditioners etc.
5. Audio, visual components such as VCRs, Stereo equipment etc.

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Characteristics of E-Waste

E-waste contains both hazardous and non-hazardous substances in their components. These hazardous substances like plastic, lead, mercury, cadmium, etc. pose health hazards on the human being to the most when treated in uncontrolled condition via air, water and soil.

#3. TYPES OF E-WASTE



EFFECTS OF E-WASTE ON THE ENVIRONMENT.

- Emissions from E-Waste create environmental damage.
- Toxic chemicals from e-waste enter the "soil-crop-food pathway,"
- These are non-biodegradable and cause soil pollution.
- E-Waste dumping yards and nearby places are polluted and cause health hazards.

EFFECTS OF E-WASTE ON HUMAN BODY

- Element Effect on human body. Lead Damage to central and peripheral nervous systems , blood systems and kidney damage. Affects brain development of children.
- Chromium Asthmatic Bronchitis . DNA damage.
- Cadmium Toxic irreversible effects on human health. Accumulates in kidney and liver. Causes neural damage .
- Mercury Chronic damage to brain and respiratory system.
- Plastics including PVC Burning produces dioxin. It causes reproductive and developmental problems ; Immune system damage ; Interfere with regulatory hormones. And many more....

HOW THESE BECOME E-WASTE?

- Reasons:
- Advancement in technology
- Changes in style fashion and status
- Nearing the end of their useful life
- Not taking precautions while handling them

Composition of E-Waste

The various parts / materials / composition of e-waste may be divided broadly into six categories such as

- Iron and steel, used for casings and frames
 - Non-ferrous metals, especially copper used in cables, and aluminium
- Glass used for screens, windows
- Plastic used as casing, in cables and for circuit boards
- Electronic components
- Others (rubber, wood, ceramic etc.).

Components of E-Waste

Components / Parts of Computer:

The various components / parts of computers are as follows. Mother Board, SMPS (Switch Mode Power Supply), RAM (Random Access Memory), Hard Disk, Processors, Capacitors, IC's (Integrated Circuits), Main Board, Magnetic Touching Sheet, CD Drive, Floppy Drive and Diodes etc..

Components / Parts of Television: The various components / parts of televisions are as follows. Capacitors, Resistors, Transformers, STR (Supply Transformer Regulator), Integrated Circuits (ICs), LOT (Line output Transformer), Tuners, Condensers, CPT Socket (Colour Picture Tube), Zenor Diode and Normal Diode etc.

Components / Parts of Mobile Phone: The various components / parts of mobile phones are as follows. Lens, internal antenna, aerial, speakers, earpiece, microphone, microphone connectors, loud speakers, buzzers, ringers, charging blocks, system connectors, chassis, slide mechanism, ribbon cables, sim slot covers, readers, backup, battery, battery clip, covers, battery contacts, connectors and kea pad membrane etc.

METHODS OF DISPOSAL OF E-WASTE

1. Land fill disposal allows heavy metals to leach into ground water.
2. Incineration makes hazardous material airborne.
3. Acid baths are dangerous and cause water and soil contamination.
4. Recycling of e-waste
5. Reuse of e-waste

Landfilling

This is the most common methodology of e-waste disposal. Soil is excavated and trenches are made for burying the e-waste in it. An impervious liner is made of clay or plastic with a leachate basin for collection and transferring the e-waste to the treatment plant. However, landfill is not an environmentally sound process for disposing off the e-waste as toxic substances like cadmium, lead and mercury are released inside the soil and ground water. .

Incineration

This is a controlled way of disposing off the e-waste and it involves combustion of electronic waste at high temperature in specially designed incinerators. This e-waste disposal method is quite advantageous as the waste volume is reduced extremely much and the energy obtained is also utilized separately. However, it is also not free from disadvantages with the emission of the harmful gases mercury and cadmium in the environment

Acid Bath

Acid bath involves soaking of the electronic circuits in the powerful sulphuric, hydrochloric or nitric acid solutions that free the metals from the electronic pathways. The recovered metal is used in the manufacturing of other products while the hazardous acid waste finds its ways in the local water sources.

Recycling of e-waste

Recycling of e-waste Mobile phones, monitors, CPUs, floppy drives, laptops, keyboards, cables and connecting wires can be re-utilized with the help of the recycling process. It involves dismantling of the electronic device, separation of the parts having hazardous substances like CRT, printed circuit boards etc. and then recovery of the precious metals like copper, gold or lead can be done with the help of the efficient a powerful e-waste recycler. The most crucial thing here is choosing the right kind of recycler that does not break laws and handle the e-waste in the eco- friendly manner.

Reuse

Reuse of electronic devices This is the most desirable e-waste recycling process where with slight modifications the mobile phones, computers, laptops, printers can be reused or given as second hand product to the other person. The old electronic equipment can also be donated in the various charity programs and thus helping the persons in need. Moreover, there is a better way also by selling the old mobile phones or laptops to the some recycling and refurbishing companies. Several websites are acting as the middleman between recyclers and electronic users. It is a win situation for the users as they not only get rid off the old mobile phones but also get paid after reselling it.

ADVANTAGES OF RECYCLING E-WASTE.

- ASSET RECOVERY
- REDUCTION OF NEED FOR LANDFILLS
- REDUCTION OF JUNK AND CLUTTERS
- RESALE AND REUSE
- CREATION OF JOBS

WHY E-WASTE MANAGEMENT

- Pollution of ground water.
- Acidification of soil.
- Emission of toxic fumes and gases.
- It is the fastest growing portion of municipal waste.
- Releases harmful gases into the air.

Need of E-Waste Management

E-waste is much more hazardous than many other municipal wastes because electronic gadgets contain thousands of components made of deadly chemicals and metals like lead, cadmium, chromium, mercury, Long-term exposure to these substances damages the nervous systems, kidney, bones, reproductive and endocrine systems.