

A Study on Electronic Waste Management across the state of Assam, India

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ABSTRACT

Electronic waste, also known as e-waste, has become a major environmental concern due to its increasing volume and hazardous nature. This paper provides a comprehensive review of electronic waste management, including the present scenarios and challenges in the field. The paper examines the sources of e-waste, as well as the environmental and health impacts of improper disposal. Furthermore, a survey has been conducted across the state, Assam, which conveys lack of knowledge of the people on the impact of e-waste. This paper highlights some management strategies for the same.

Keywords: *electronic waste, e-waste management, environmental and health impacts, recycling.*

1. INTRODUCTION

The proliferation of electronic devices and rapid technological advancements has led to the generation of a substantial amount of electronic waste worldwide. E-waste, or electronic waste, refers to discarded electronic devices and appliances that are no longer wanted or needed. This includes items like computers, cell phones, televisions, and appliances such as refrigerators and washing machines. E-waste is a growing problem because it contains a variety of materials that can be hazardous to human health and the environment if not disposed of properly [1]. E-waste contains a variety of hazardous materials, including lead, mercury, and cadmium, which can leach into the soil and water if not properly managed. These materials can have a range of negative impacts on human health, including damage to the nervous system and increased risk of cancer. In addition to these health risks, e-waste can also contribute to environmental pollution, as the materials in e-waste can release harmful chemicals into the air when burned or when they break down over time [2]. This review aims to provide a comprehensive overview of e-waste management, including the sources, its environmental and health impacts, and the policies and strategies implemented to manage it.

2. E-WASTE GENERATION SCENARIO IN INDIA

India discarded approximately 1.85 million tons of e-waste in 2016 which is about 12 percent to the global e-waste production. India has emerged as fifth largest. Electronic waste producer in world. Computer devices account for nearly 70% of e-waste, with the contribution of telecom sector being 12%, medical equipment being 8%, and electric equipment's 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%. City-wise, Mumbai tops the list in producing electronic waste, followed by New Delhi, Bangalore and Chennai.[3]

3. COMPONENTS OF E-WASTE AND THEIR IMPACTS ON ENVIRONMENT

Electronic waste, also known as e-waste, is a growing environmental problem caused by the disposal of electronic devices such as computers, cell phones, televisions, and other electronic equipment. E-waste contains a variety of components that can have negative impacts on the environment if not disposed of properly. In this paper, we will discuss the main components of e-waste and their impacts on the environment.

3.1 Printed Circuit Boards (PCBs)

PCBs contain hazardous substances such as lead, mercury, cadmium, and brominated flame retardants. Improper handling and disposal of PCBs can lead to soil and water contamination, posing risks to both the environment and human health. The toxins can leach into water sources and bioaccumulate in the food chain, causing severe health issues, including organ damage and developmental disorders.[4]

3.2 Batteries

E-waste includes various types of batteries, such as lead-acid batteries from vehicles and lithium-ion batteries from laptops and smartphones. Lead-acid batteries contain lead, which can contaminate soil and water, while lithium-ion batteries contain heavy metals like lithium, cobalt, and nickel. Inappropriate disposal and inadequate recycling of batteries can result in the release of hazardous materials, polluting the environment and posing risks to human health.[6]

3.4 Cathode Ray Tubes (CRTs)

CRTs, commonly found in older televisions and computer monitors, contain significant amounts of lead and phosphor compounds. When improperly disposed of or incinerated, these components release toxic substances into the air, soil, and water. Lead exposure from CRTs can lead to neurological disorders, while phosphor compounds may contain persistent organic pollutants (POPs) that can harm human health and ecosystems.[5]

3.5 Plastics

E-waste often contains plastic casings and components, which are derived from non-renewable fossil fuels and can take hundreds of years to decompose. When plastics are burned or buried in landfills, they release toxic gases and pollutants into the air and leach harmful chemicals into the soil and groundwater, contributing to pollution and environmental degradation.[7]

3.6 Metals

E-waste contains a variety of metals such as copper, gold, and silver. These metals can be reused in new electronic devices, but if not recycled properly, they can cause soil and water pollution and damage to human health.

The impacts of e-waste on the environment are significant and include pollution of air, water, and soil, which can have severe health impacts on humans and wildlife. Improper disposal of e-waste can also lead to the release of toxic gases into the atmosphere, contributing to climate change. Therefore, it is essential to recycle and dispose of e-waste properly to minimize its impact on the environment.

4. SURVEY ON E-WASTE:

In an outlook to assess the status of waste management practices across the state, an online survey has been carried out by us. It was conducted on people belonging to different professional background or age. The main objectives of conducting this survey are-

- If they have ever heard about solid waste management.
- Types of waste coming out from their household.
- Their knowledge on e-waste handling.
- Best way to decompose e-waste.
- Their suggestion for minimizing e-waste.

The responses that we have received from the survey are shown below:

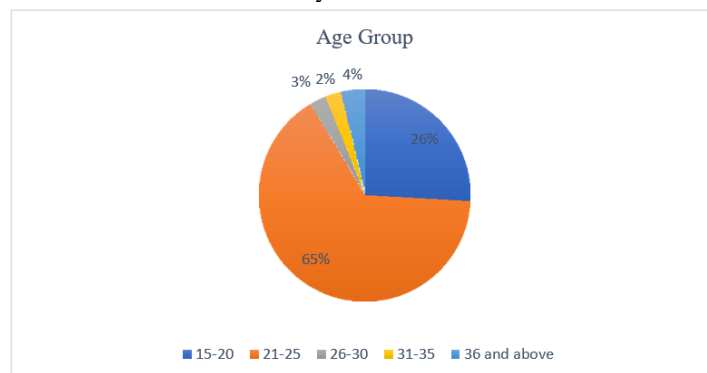


Fig-1: Age group of people

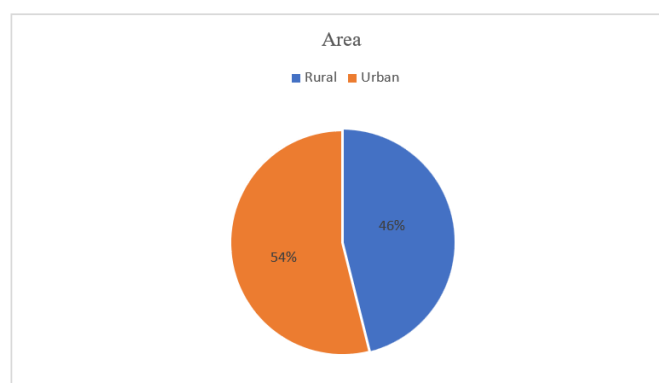


Fig-2: Area from where they belong

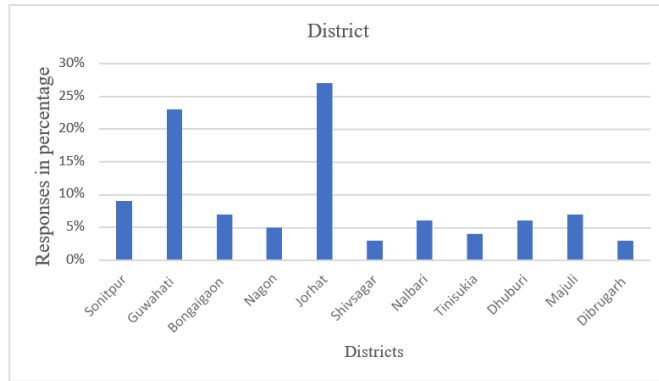


Fig-3: Districts of people

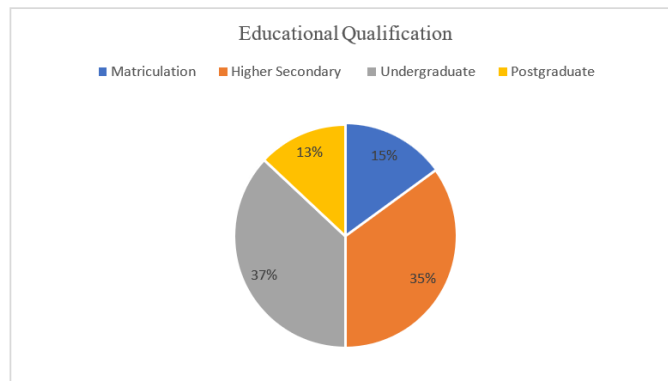


Fig-4: Educational Qualifications

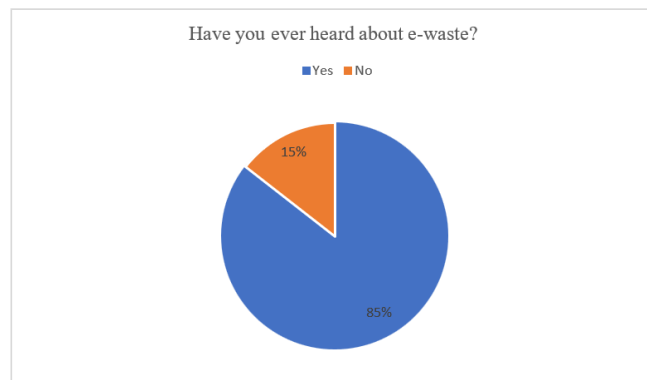


Fig-5: People knowing about E-Waste

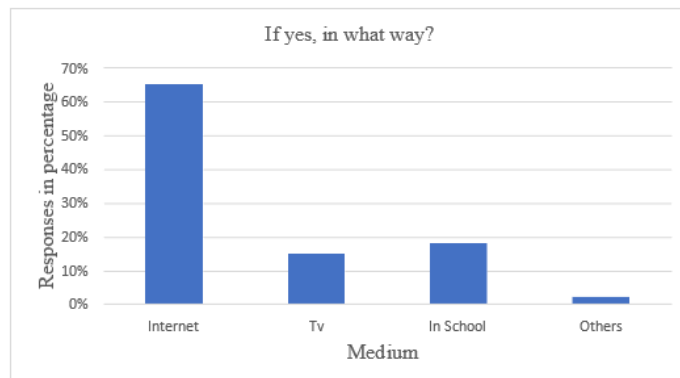


Fig-6: Way of knowing about E-Waste

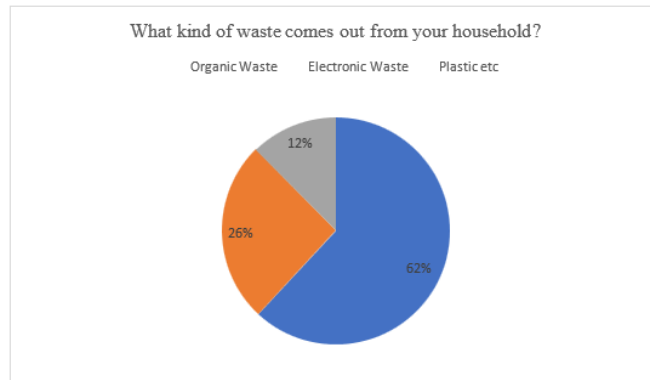


Fig-7: Waste coming out from households

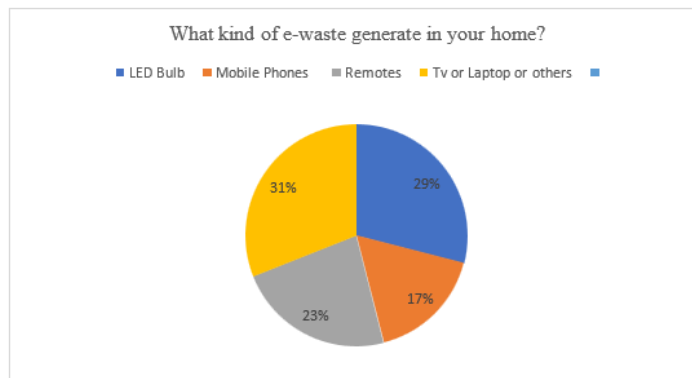


Fig-8: E-Waste generate in households

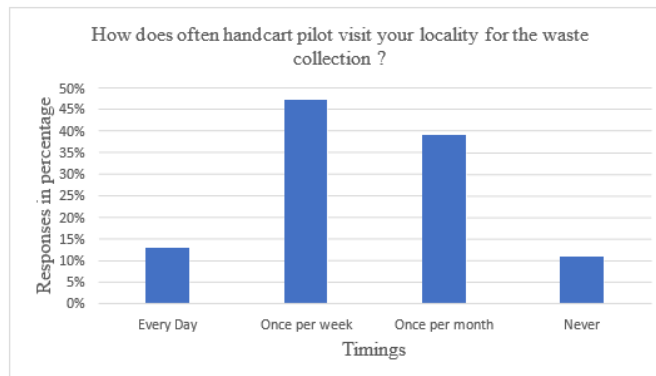


Fig-9: Timing of visiting handcart pilot

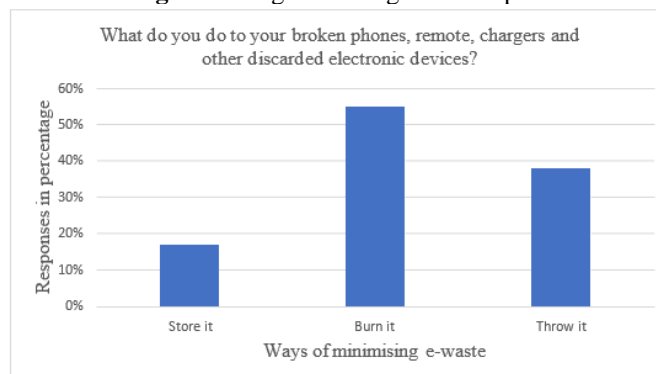


Fig-10: Ways of minimizing E-Waste

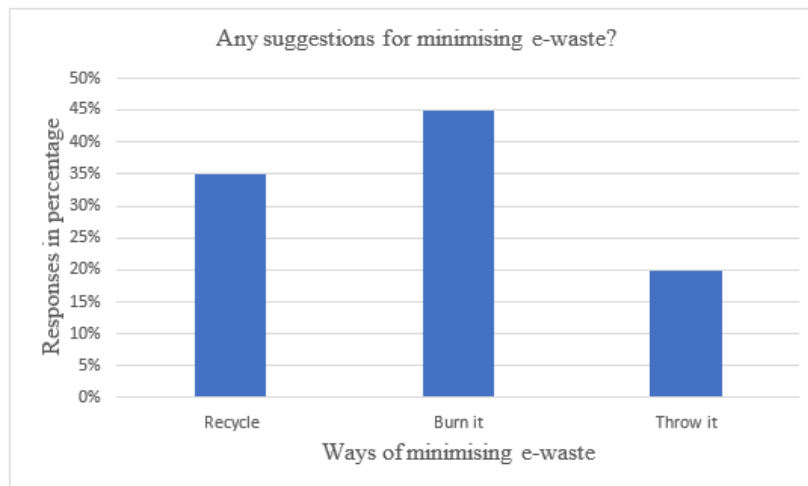


Fig-11: Public suggestions

5. CHALLENGES FACED IN E-WASTE MANAGEMENT

From above survey we can conclude that e-waste management is a complex issue that involves multiple challenges. The first challenge is the lack of proper e-waste collection and recycling. In Assam, there is a lack of efficient e-waste collection points, which makes it difficult for proper disposal of e-waste. Furthermore, no such e-waste recycling facilities are available here. The second challenge faced by the state is that there is no proper implementation of e-waste management policies which allows traders to import e-waste from developed countries in an illegal way. The third and most crucial challenge is the lack of public awareness and education regarding the impact of e-waste on the environment and human health. Many people are not aware of the hazards associated with improper disposal of e-waste, and as a result, do not take proper measures to dispose of their e-waste safely.

6. MANAGEMENT STRATEGIES

Effective e-waste management requires a comprehensive and integrated approach that involves the entire lifecycle of electronic devices, from design to disposal. There are several strategies that can be employed to manage e-waste effectively:

6.1 Design for Disassembly

We need to design the electronic devices keeping in mind to recover their valuable components reducing the amount of e-waste generated.

6.2 Recycling

Another process which can be employed for e-waste management is recycling. We need to ensure proper recycling for recovering valuable materials and components from electronic devices and reduce the amount of e-waste generated.

6.3 Raising public awareness

The Government need to increase public awareness and education regarding the impact of e-waste on the environment and human health through public awareness campaigns, educational programs in schools, and outreach activities.

7. CONCLUSION

In the present scenario, electronic waste management is a critical issue that requires urgent attention. This paper highlights the significant environmental and health hazards associated with improper disposal of electronic wastes. From the survey which we have conducted online, we got to know that not many people are aware of the consequences of e-waste, their proper utilisation and disposal. So, we can conclude that effective management strategies, such as proper collection, recycling, public awareness and disposal are essential for minimizing the negative impacts of e-waste.

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9. REFERENCES

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