

## **E-Waste Management with Special Reference to India**

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### **Abstract**

Today, the generation of e-waste particularly in developed and developing countries has become a cause of concern due to its hazardous effects on human health and living organisms. India is not an exception to this. However, the management and treatment of e-waste in India have certain limitations. Thus the issue of E-waste has to be studied systematically. With this view, the present paper attempts to understand the present scenario of e-waste management in India. The paper is based on secondary data, which reveals that the e-waste generation in India varies from state to state and city to city. There are certain challenges to e-waste management in the country like lack of reliable data on e-waste generation and its management. The paper gives some suggestions for effective e-waste management and concludes that there is an urgent need for an in-depth investigation and assessment of present and future scenarios of e-waste management in India.

**Key Words:** Management, E-waste, Disposal, Recycling, India

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### **Introduction**

Today, the advancement in science and technology has brought spectacular developments in modern times that have enhanced the quality of our lives. At the same time, these have led to diverse problems of hazardous waste and other wastes generated from electric and electronic products. These harmful and other wastes pose a great threat to human well-being and the environment. The issue of proper management of wastes, therefore, is critical to the protection of livelihood, health and the environment (GoI, 2011). Electronic waste (e-waste), that is, waste arising from end-of-life electronic products such as computers, mobile phones, LED bulbs, televisions, VCRs, stereos, copiers, and fax machines etc is one of the fastest growing waste streams in the world today (Rama, M. et. Al., 2019). The annual global production of e-waste is estimated to surpass 50 million tons in 2020 (Baldé, C. P. et.al. 2017). E-waste in India is not only increasing in amount but also in its toxicity, the reason being the rapid growth in productivity and consumption in the electronics sector (Dwivedy and Mittal, 2010). About 50,000 tons of e-waste are imported to India each year (Manomaivibool, 2009). The electronic and electrical components manufacturing industries are the largest growing

sectors in India (Sepúlveda et al., 2010) producing 40,000 tons of e-waste itself every year (Sthiannopkao and Wong, 2013). Thus, the present research paper highlights the related issues and strategies to mitigate this emerging problem in India.

### **Objectives**

1. To know about the current scenario of e-waste management in India
2. To provide suggestions on challenges in e-waste management

### **Materials and Methods**

The present study is theoretical and is based on secondary sources of data viz. the government and private publications, research articles and reports.

### **E-waste and India**

Today, e-waste has emerged as one of the serious environmental issues, which is related to public health matters. India is one of the major e-waste-producing countries in the world. It produces approximately 2 million tonnes of e-waste annually. In addition, it imports e-waste from developed countries around the world. Electronic gadgets, Computer and telecom devices, medical equipment's and electric equipment are the major sources of e-waste generation in India.

**Table 1: Year-wise e-waste generation in India**

Sr. No.	Year	E-waste generation (Million Metric Tonnes)
1	2015	1.97
2	2016	2.22
3	2017	2.53
4	2018	2.86
5	2019	3.23
<b>Total</b>		<b>12.81</b>

Source: CSE, 2020 compiled from The Global E-waste Statistics Partnership Table 1 reveals that, in the year 2015, India's e-waste production was 1.97 Million Metric Tonnes (MMT). It increased to 2.22 MMTs in 2016 and 2.53 MMT in 2017. This rising trend of e-waste generation continued in 218 and 2019 also. E-waste generation in these years was 2.86 MMT and 3.23 MMT and E-waste formally collected 30 kt , appx 1% collection rate. The yearly growth in e-waste generation was approximately 13 percent.

**Table 2: Percentage contribution by states to annual e-waste generation**

Sr. No.	State	% Contribution
1	Maharashtra	13.9
2	Tamil Nadu	9.1
3	Andhra Pradesh	8.7
4	Uttar Pradesh	7.1
5	Waste Bengal	6.9
6	Delhi	6.7
7	Karnataka	6.2
8	Gujarat	6.1
9	Madhya Pradesh	5.3
10	All other states	30.0
<b>Total</b>		<b>100.00</b>

Source: Electrical and Electronics manufacturing in India, ASSOCHAM & NEC Technologies, 2018  
E-waste generation in India shows a state-wise variation (Table 2). In 2018, Maharashtra was the most industrialized state which generated 13.9% e-waste followed by the states of Tamil Nadu and

Andhra Pradesh (9.1% and 8.7% respectively). Uttar Pradesh generated 7.1% e-waste of the total e-waste generated in the country, while each of the states viz. West Bengal, Delhi, Karnataka, Gujarat and Madhya Pradesh generated more than 5% e-waste in 2018.

**Table 3: Major e-waste generating cities in India**

Sr. No.	City	e-waste generation in Metric Tonnes (MT)
1	Mumbai	96000
2	Delhi and NCR	85000
3	Bengaluru	57000
4	Chennai	47000
5	Pune	19000

Source: Vrushali P., Citizen Matters, Indian Cities Stare at a mountain of e-waste, with little Idea how to manage It, June 11, 2018

In 2018, Mumbai, Delhi and NCR, Bengaluru, Chennai and Pune were the top five e-waste-generating cities in the country (Table 3). Mumbai with its highest e-waste production in the country (96000 MT) ranked first followed by Delhi and NCR with its 85000 MT e-waste production. The city of Bengaluru generated around half (57000) of

the e-waste produced by Mumbai. Chennai generated 47000 MT of e-waste and Pune generated 19000 MT of e-waste.

#### **Challenges before e-waste management in India**

The major challenges of e-waste management found are as below

1. Unscientific handling of e-waste
2. More than 30% of the population resides in urban areas which substantially contributes to e-waste generation.

3. Scattered sources of e-waste generation make e-waste management problematic.
4. Lack of skilled and unskilled workforce needed for e-waste collection, handling and disposal.
5. Adoption of improper methods of e-waste disposal by industries.
6. Financial constraints in the field of e-waste management.
7. Weaknesses of e-waste producing industries,
8. Negligence of e-waste handling and managing institutions.
9. Implementation of unsuitable and improper technology for e-waste generation
10. Vague implementation of e-waste generation and prohibition laws.
11. Paucity and improper installation of e-waste collection bins
12. Unfocused mechanism of e-waste collection

#### **Challenges to policymakers**

1. Lack of e-waste generation, prohibition and management laws in the recent scenario.
2. Dearth of advanced methods of e-waste management
3. Absence of separate e-waste management and disposal department in local government bodies.
4. Inefficiency of the waste segregation system
5. Lack of positive attitude towards cleanliness among the citizens.
6. The unavailability of dependable data on e-waste generation is a major obstacle for policymakers ready to design an e-waste management strategy and to an industry wishing to take rational investment decisions.
7. Only a small amount of the e-waste finds its way to recyclers due to the absence of a well-organized take-back scheme for consumers.
8. It is because of the lack of harmless e-waste recycling mechanisms available in the informal sector, that there is a reliance on formal sectors, which poses risks to human health.
9. lack of infrastructures facilities, financial and policy supports also present challenges in e-waste management.

#### **Suggestions**

1. There should be a separate e-waste management department in urban local government bodies.
2. Local government bodies should collaborate with industries for collecting, transporting and processing e-waste material.
3. E-waste management targets should be achieved phase-wise and systematically.

4. Standard and proven methods for e-waste management should be adopted.
5. There should be a strict vigilance on unorganized sectors.
6. Privatization of the Recycling and reuse industry should be made. Jobs in this industry involve collection, processing, reuse, remanufacturing and more.
7. Awareness campaigning has to be created through formal and informal education systems. Mass media and social media can be used effectively.
8. Privatization and commercialization of e-waste recycling should be made.
9. Workshops on e-waste handling and management should be conducted.
10. Government should provide financial assistance in the form of incentives and subsidies to the e-waste recycling plants.

#### **Conclusion:**

The generation of a large amount of e-waste in various states and cities in India has made the problem of solid waste disposal and management more complex. Lack of reliable data, unavailability of proper disposal methods and shortage of knowledge about e-waste disposal are some of the obstacles in e-waste management. Thus, there is an urgent need for a thorough investigation and assessment of present and future scenarios of e-waste management. Quantification, characterization, qualitative analysis, evaluation of disposal practices and assessment of environmental impacts of e-waste management has become the need of the hour today. Use of suitable and standard methods of e-waste collection, transportation, treatment, storage, recovery and disposal need to be recognized and adopted considering the amount and quantity of e-waste. Public Private Partnership in recycling and disposal of e-waste is essential. Production of low waste-generating electronic gadgets, equipment's and instruments should be encouraged. Minimal use of toxic material should be used in electronic devices. Thus, a collective approach from national and international bodies, including public awareness, is crucial to managing e-waste,

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