



E-Waste Management in India **Jyotasana**

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Introduction:

The rapid growth of information & communication technology (ICT) & widespread adoption of electronic devices have significantly improved global connectivity & economic development. However, this technological progress comes with a downside -electronic waste, commonly referred to as e-waste includes discarded electronic and electrical equipment (EEE) such as computers ,smartphones ,television ,and household appliances.

The improper handling and disposal of e-waste have led to severe environmental and health challenges , particularly in developing countries where much of the recycling occurs in informal sectors. E-waste contains toxic substances such as lead, mercury , and cadmium, which when mishandled, pose a significant threat to human health and the environment.

In this context, e-waste management is not only an environmental necessity but also a socio - economic opportunity, as it can generate employment, reduce resource depletion , and help achieve global sustainability goals

Literature Review on E-Waste Management:

- Studies by the global e - waste monitor (2020) highlight that approximately 53.6 million metric tons of e-waste were generated

globally in 2019, with only 17.4% being formally recycled.

- India is the third- largest producer of e-waste generating over 3.2 million metric tons annually (CPCB 2020).s (gupta & Singhal,2022)
- Research by pinto (2008) and heacock et al. (2018) highlights that improper e-waste recycling release toxic substances like lead, mercury, and cadmium.
- Several studies (e.g., borhakur & Govind, 2017) emphasize the inadequacy of current regulations in india.enforcement is weak, and compliance with extended producer responsibility (epr) remains low due to a lack of monitoring and accountability.
- According to singh & kumar (2019), low awareness about the environment impact of e- waste and the lack of convenient disposal options hinder effective management.

Statement of problems in E-Waste Management:

The rapid growth of electronic waste (e- waste) in India has become a significant environmental and public health concern. these include inadequate public awareness, poor infrastructure for collection and recycling, and the dominance of informal recycling sectors that employ hazardous methods. Moreover, limited enforcement of regulations high cost of advanced recycling technologies,

and low compliance with extended producer responsibility (epr) further exacerbate the problem. Illegal import of e-waste, coupled with the complex and hazardous nature of its composition, compliances safe disposal and recycling.

Objective of Research on E-Waste Management in India:

1. Analyze the volume and composition of e-waste generated in India across various sectors (households, industrial, and institutional).
2. Study the effects of improper e-waste handling on ecosystem and public health, particularly in areas near informal recycling units.
3. Explore efficient recycling technologies and processes to minimize environmental harm and recover valuable materials.
4. Investigate barriers to formal e-waste recycling and develop strategies to integrate recyclers into the formal sector.
5. Study the economic potential of e-waste recycling, including opportunities for employment and resource conservation.
6. Evaluate the enforcement of regulations and propose strategies to improve compliance among stakeholders.

Methodology:

Primary data:

Survey and questionnaires: conducted with households, industries, and informal recyclers to understand awareness, disposal habits and recycling practices.

Interviews: semi-structured interviews with stakeholders such as policymakers, recycling companies, and environmental experts.

Field observations: on-site visits to formal and informal e-waste recycling facilities to observe processes and conditions.

Secondary data:

Review of government reports, e-waste management policies (e.g., e-waste rules, 2016), academic journals, and case studies from other countries.

Conclusion:

The literature reveals critical gaps in infrastructure, regulatory enforcement, and public participation in e-waste management. There is a pressing need for technological advancements, stronger policies, and the integration of informal recyclers into formal systems to address the challenges effectively. This research will build on these findings to propose sustainable solutions for managing e-waste. Effective e-waste management mitigates environmental hazards, protects public health, conserves resources, and supports economic growth, contributing to a sustainable and balanced ecosystem.

References:

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