

E-Waste Management

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E-Waste Management Towards a Sustainable Digital Future

Introduction

- In **May 2025**, global tech majors **LG and Samsung** filed legal petitions against the Indian government, contesting the new **e-waste recycling regulations** that mandate a **minimum payout to recyclers** under Extended Producer Responsibility (EPR).
 - This has reignited the debate on the **challenges, policy effectiveness**, and the **future of e-waste management** in India.
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What is E-Waste?

- **Electronic waste (e-waste)** refers to discarded **electrical and electronic equipment (EEE)** such as mobile phones, computers, TVs, refrigerators, etc., that are no longer useful or wanted.
 - It contains:
 - **Valuable materials:** gold, silver, copper, palladium.
 - **Toxic substances:** lead, mercury, cadmium, flame retardants.
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Status of E-Waste: Global and India

- **Global:**
 - In **2022**, about **62 million tonnes** of e-waste were generated.

- Only **22.3%** was formally collected and recycled.
 - According to the **UN's Global E-Waste Monitor 2024**, e-waste is growing **5 times faster** than its recycling rate.
- **India:**
 - In **2023-24**, India generated **1.751 million metric tonnes (MT)** of e-waste — a **73% increase in five years**.
 - India is the **third-largest e-waste generator** globally after **China and the USA**.
 - Over **95% of e-waste** in India is handled by the **informal sector**, often using **unsafe methods** like acid baths and open burning.
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Impacts of Improper E-Waste Management

- **Environmental Damage:**
 - **Soil contamination, groundwater pollution, and air degradation** due to toxic leachates and burning.
- **Public Health Crisis:**
 - Causes **neurological disorders, respiratory issues, and cancer** in workers and nearby communities.
- **Climate Change:**
 - Releases **methane and greenhouse gases** from landfills and incineration.
- **Loss of Valuable Resources:**
 - India loses **\$10+ billion annually** due to poor resource recovery and pollution-related impacts.
- **Biodiversity Loss:**

- Ecosystem imbalance due to pollution and improper disposal methods.
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E-Waste Management Rules in India

- Regulated by **E-Waste (Management) Rules, 2022** under the **Environment (Protection) Act, 1986**.

Key Features:

- **Extended Producer Responsibility (EPR):**

- Producers are responsible for **collection, recycling, and eco-friendly disposal** of e-waste.

- **Mandatory Registration:**

- All stakeholders (manufacturers, recyclers, etc.) must register on the **CPCB portal**.

- **Environmental Compensation:**

- Fines levied for non-compliance with recycling targets.

- **Floor Price for EPR Certificates:**

- Protects registered recyclers and deters unsafe informal practices.
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Challenges in E-Waste Management

- **Infrastructure Limitations**
- **High Costs of Advanced Recycling Technology**
- **Rapid Technological Obsolescence**

- **Product Complexity** (multi-materials, miniaturization)
 - **Lack of Public Awareness**
 - **Inefficient Collection Systems**
 - **Dominance of Informal Sector**
 - **Illegal E-Waste Imports**
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Way Forward

- **Expand and Modernize Recycling Facilities**
 - **Develop Accessible Collection Points Nationwide**
 - **Formalize the Informal Sector** through incentives and training
 - **Strengthen Reverse Logistics Infrastructure**
 - **Public Awareness Campaigns** (IEC initiatives)
 - **Government-Private-NGO Partnerships** for innovation
 - **Strict Monitoring and Enforcement** by CPCB/SPCBs
 - **Promote Eco-Design and Circular Economy Principles**
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Conclusion

India's expanding digital economy must be matched by a **robust, sustainable e-waste ecosystem**.

The **E-Waste (Management) Rules, 2022** are a progressive step but require **effective implementation, technological investment, and public cooperation**.

Moving towards a **circular economy** and achieving **Sustainable Development Goals (SDG 12 - Responsible Consumption and Production)** is essential for environmental sustainability and

national well-being.

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