



## India's E-Waste Management

**For Prelims:** [E-Waste \(Management\) Rules, 2022](#), [Groundwater contamination](#), [Air pollution](#), [Soil degradation](#), [Extended Producer Responsibility \(EPR\)](#), [Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal](#), [Stockholm Convention on Persistent Organic Pollutants](#), [Hazardous and Other Wastes \(Management and Transboundary Movement\) Rules, 2016](#), [Landfilling](#).

**For Mains:** Policy Initiatives and Programs related to E-Waste Management, Current Scenario of E-Waste in India, Challenges in E-Waste Management and Socio-Economic Implications.

**Source:** [DTE](#)

### Why in News?

- Recently, the **Minister of State for the Union Ministry of Housing and Urban Affairs** provided data that reflects growing use of electronic and electrical devices across the country.

### E-waste

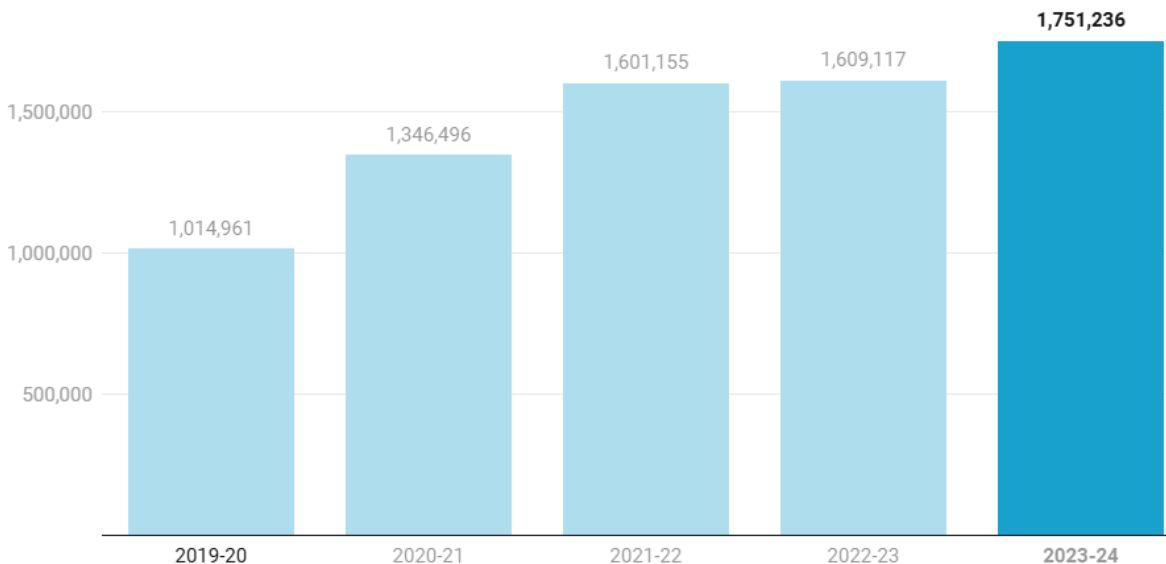
- Electronic waste (e-waste)** refers to discarded electrical and electronic equipment, including household appliances and office devices, that are old or at the end of their life.
- E-waste contains numerous toxic chemicals including metals such as lead, cadmium, mercury, and nickel.

### What is the State of E-Waste in India?

- Volume Growth:** India has witnessed a **72.54% rise in e-waste generation over five years**, increasing from 1.01 million metric tonnes (MT) in 2019-20 to 1.751 million MT in 2023-24.
  - Approximately **57 % of e-waste (equivalent to 990,000 MT)** of e-waste remains untreated annually.
  - The 65 cities in India generate more than 60% of the total generated e-waste, whereas 10 states generate 70% of the total e-waste.
- Recycling Gaps:** Only **43% of e-waste** was recycled in 2023-24, up from **22% in 2019-20**.
  - Informal sectors dominate e-waste handling, lacking environmental safeguards.
- Global Context:** India is the **third-largest e-waste generator** globally, after **China and the US**.
  - Approximately **53.6 MT of e-waste** was generated worldwide in 2019, as per UN estimates.

## India's e-waste surges by around 73 per cent in five years

E-Waste Generation(Metric Ton)



### E-Waste (Management) Rules

- **E-Waste (Management) Rules 2022:**
  - **Extended Producer Responsibility (EPR):** Producers are mandated to achieve annual recycling targets via registered recyclers.
    - **EPR** certificates ensure accountability for recycled products.
  - **Expanded Product Coverage:** Inclusion of 106 **Electrical and Electronic Equipment (EEE)** items from FY 2023-24 (up from 21 items).
  - **Integration of Bulk Consumers:** Public institutions and offices must dispose of e-waste via registered recyclers/refurbishers.
    - Registered recyclers and refurbishers are tasked with managing e-waste collection and processing.
- **E-Waste (Management) Rules, 2022, clause 4** was added to ensure safe, accountable, and sustainable refrigerant management in refrigeration and air-conditioning manufacturing.
- **E-Waste (Management) Amendment Rules, 2024:**
  - The **Central Government** may **establish platforms** for **trading Extended Producer Responsibility** certificates as per guidelines issued by the **Central Pollution Control Board** with its approval.
  - The Central Pollution Control Board will **set the price range for Extended Producer Responsibility** certificates at **100% (maximum)** and **30% (minimum)** of the environmental compensation for non-compliance.

### What are the National and International Conventions Related to E-waste Management?

- **International:**
  - **[Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal \(1989\)](#).**
    - **India** is a party to the Basel Convention
  - **Bamako Convention (1991):** Prohibits the **import of hazardous waste (including e-waste) into Africa** and controls the transboundary movement of such waste within the continent.

- **Minamata Convention on Mercury (2013)**
  - **India** ratified the Minamata Convention in **2018**.
- **Stockholm Convention on Persistent Organic Pollutants (POPs) (2001)**.
  - India ratified the Stockholm Convention and implements its provisions through domestic laws.
- **National:**
  - **E-Waste (Management) Rules, 2022**: Focuses on **EPR** and proper recycling.
  - **Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016**.
  - **National Action Plan for Chemical and Waste Management**: Reflects commitments to the Stockholm and Rotterdam Conventions.

## What are the Common E-Waste Disposal Methods in India?

- **Landfilling**: It involves **burying e-waste in excavated pits**, sealed with layers of earth.
  - A major **concern** is the **risk of hazardous substances leaching into soil** and groundwater, causing environmental harm.
- **Incineration**: Controlled **burning of e-waste at high temperatures (900-10,000°C)**, reduces waste volume and neutralizes some hazardous substances.
- **Recycling**: **Dismantling e-waste** to recover valuable materials (**e.g., metals, plastics**) and safely dispose of toxic components. It reduces hazardous substances like mercury, cadmium, and lead, minimizing environmental and health risks.
  - **Examples**: Recycling printed circuit boards, CRTs, mobile phones, and wires.

## What are the Issues and Challenges in E-Waste Management?

- **Informal E-Waste Recycling**: **Informal e-waste recycling**, using **hazardous methods like burning and acid leaching**, releases **toxic fumes and contaminates soil and water**, posing serious environmental and health risks.
  - Informal recycling markets in **China, India, Pakistan, Vietnam, and Philippines** handle anywhere from 50 % to 80 % of the world's **E-Waste**.
- **Lack of Infrastructure**: The lack of infrastructure for e-waste management, including **insufficient collection points** and **recycling facilities**, leads to improper disposal.
  - This **results in e-waste ending up in landfills**, causing soil and water contamination from harmful chemicals.
- **Lack of Awareness**: Lack of awareness among consumers, businesses, and policymakers about **proper disposal and recycling**.
  - **For instance**, individuals might dispose of their **e-waste in regular trash bins** or **donate it to charities** that lack the proper resources to manage e-waste responsibly.
- **Environmental Effects of E-waste**: E-waste harms the **environment as toxic materials** (like **lead, cadmium, and mercury**) **contaminate water, soil, and air**, affecting wildlife.
  - **Improper disposal exacerbates groundwater contamination, air pollution**, and **soil degradation**.

## What Strategies Can Strengthen E-Waste Management in India?

- **Integration of Informal Sector**: Integrate informal waste handlers into formal systems **to boost collection rates**. Provide training programs for informal recyclers on safe handling techniques.
  - For example, **China** formalizes the informal sector with training and financial support through Regulation on the Management of the Recovery and Disposal of **Waste Electrical and Electronic Products (WEEE)**.
- **Technological Advancements**: Promote research in advanced recycling technologies to enhance efficiency and **develop AI and IoT-based solutions** for improved e-waste tracking and collection systems.
  - EUs **“right to repair”** rules clarify the obligations for manufacturers to repair goods and encourage consumers to extend a product’s lifecycle through repair.
- **Learning from Global Practices**:

- **EU:** Set stringent **recycling targets** and enhance eco-design incentives for producers.
  - For example, **the Waste Electrical and Electronic Equipment (WEEE) Directive** by the European Union (EU).
- **Japan:** Introduce a **nationwide e-waste recycling fee** to **fund and support recycling initiatives** effectively.
  - Japan focuses on **Extended Producer Responsibility (EPR)** through **Home Appliance Recycling Law (HARL)**.
- **Refurbishing and Reuse Programs:** Create **incentives for companies** to refurbish used electronics for resale, extending their lifecycle.
  - **Example:** In **Germany**, consumers can **return old devices for repair** or refurbishment at designated centers.
  - **Strengthen organized second-hand markets** to make affordable electronics accessible while reducing e-waste.
- **Public Awareness and Education:** Campaigns targeting urban and rural populations on e-waste hazards and proper disposal methods.
  - Collaboration with NGOs and think tanks for outreach programs.
- **Collaboration with International Bodies:** Partner with organizations like the **International Telecommunication Union (ITU)** for capacity building in recycling technologies.

### **Drishti Mains Question**

Discuss the challenges related to e-waste management in India and suggest ways for its effective management.

## **UPSC Civil Services Examination, Previous Year Questions**

### **Prelims:**

**Q. Due to improper/indiscriminate disposal of old and used computers or their parts, which of the following are released into the environment as e-waste? (2013)**

1. Beryllium
2. Cadmium
3. Chromium
4. Heptachlor
5. Mercury
6. Lead
7. Plutonium

**Select the correct answer using the codes given below:**

- (a) 1, 3, 4, 6 and 7 only
- (b) 1, 2, 3, 5 and 6 only
- (c) 2, 4, 5 and 7 only
- (d) 1, 2, 3, 4, 5, 6 and 7

**Ans: (b)**

### **Mains:**

**Q. What are the impediments in disposing of the huge quantities of discarded solid waste which are**

continuously being generated? How do we safely remove the toxic wastes that have been accumulating in our habitable environment? **(2018)**

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