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?

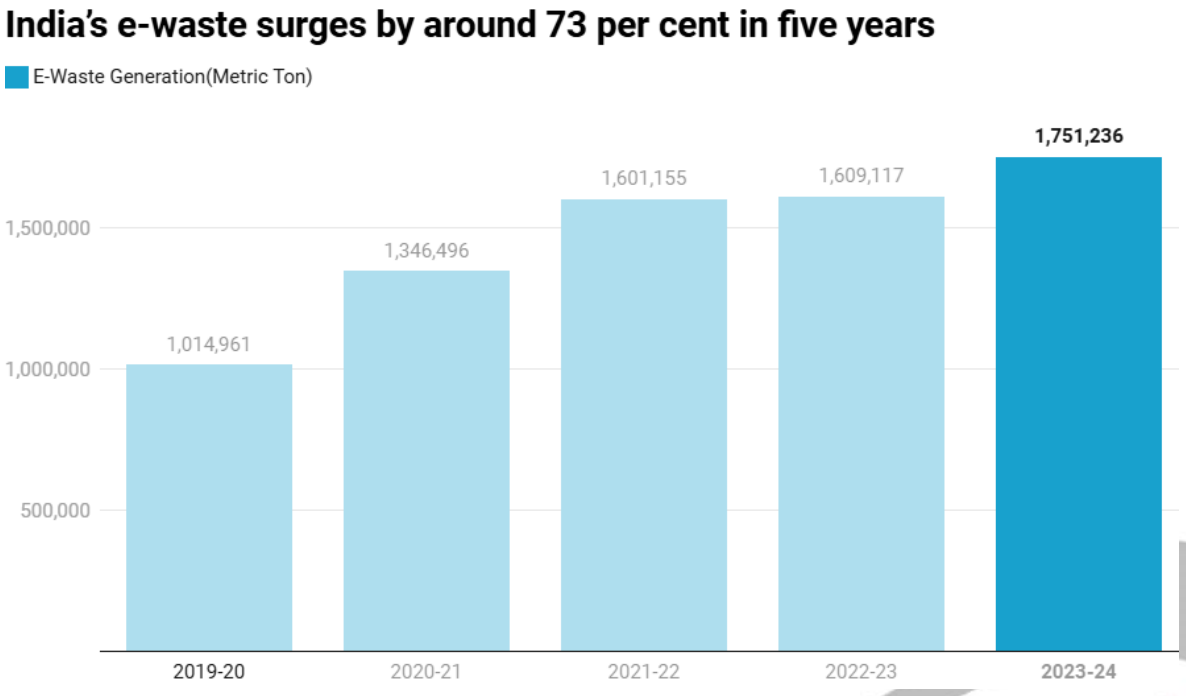
- Recently, the **Minister of State for the Union Ministry of Housing and Urban Affairs** provided data that reflects growing use of electronic and electrical devices across the country.

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.



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) Second Amendment Rules, 2023:** Under **Rule 5 of 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)**