# 7.3.4 Waste Trade and Circular Econ

# Objectives

- Discuss waste trading
- Discuss the use of circular economy in solid waste management

# International Trade in Waste

- Large volumes of waste—including plastics, recyclables, e-waste, and hazardous waste—are traded across borders.
- EU recyclable waste shipments have risen by more than 70% since 2000.
- Plastic waste exports contribute to unsustainable plastic production and consumption.
- Most waste is exported from high-income countries (HICs) to low-income countries (LICs) due to lower costs and fewer regulatory barriers.
- Waste movement is poorly monitored, increasing the likelihood of illegal dumping and open burning.

# International Trade in Waste

# E-waste

- E-waste consists of discarded electronic devices with batteries or electrical components.
- Major items include phones, microwaves, vacuum cleaners, and kettles.
- Approximately 50 million metric tonnes are produced annually (≈7 kg per person).
- Most e-waste is processed and recycled in LICs in Asia and Africa.

# Hazardous was

- HICs often export hazardous waste to LICs for treatment, disposal, or recycling.
- This practice poses significant environmental and health risks in recipient countries.
- The EU exported about 8.2 million tonnes of hazardous waste in 2020.
- Communities in LICs are disproportionately affected, while populations in exporting countries often remain unaware of the harm.

# Impacts of Waste Trading

## General Impacts

- Affects environmental quality, public health, social welfare, and economic development.
- Greatest impacts occur in receiving countries.
- Illegal dump sites contribute significantly to environmental degradation.

# Impacts of Waste Trading

## Effects on Human Health

- Exposure to toxic materials due to inadequate safety equipment.
- Potential consequences include:
  - Skin burns
  - Absorption, inhalation, or ingestion of toxins
  - Increased incidence of cancer, diabetes, hormonal disorders, skin lesions, emphysema, and reproductive damage
  - Premature mortality from long-term exposure

# Impacts of Waste Trading

## Effects on the Environment

- Water and soil contamination from heavy metals, toxic chemicals, and pollutants.
- Harm to wildlife through poisoning and ecosystem disruption.
- Accumulation of persistent organic pollutants (POPs), which bioaccumulate and biomagnify within food chains.

# Biodegradability and Half-life

- **Half-life**
  - Time required for a non-biodegradable substance to reduce to half of its original quantity; many pollutants persist for long periods.
- **Biodegradable materials:** Degraded by microorganisms into water, carbon dioxide, and methane; do not accumulate in the environment.
- **Non-biodegradable materials:** Cannot be decomposed biologically; accumulate and pose long-term environmental hazards.

# The Sustainable Circular Economy

# Problems with the Linear Economy

- Current global systems follow a “take, make, dump” model.
- Extraction and use of finite resources is unsustainable.
- Waste disposal creates long-term environmental burdens.

# Goals of the Circular Economy

- Restore and regenerate natural systems.
- Promote the use of renewable energy.
- Eliminate or minimise toxic waste.
- Design products to prevent waste generation.

# How the Circular Economy Works

- Producers retain ownership of products throughout their life-cycle.
- Companies act as service providers, leasing products rather than selling them.
- Items are returned after use for repair, refurbishment, remanufacturing, or recycling.
- Reduces demand for raw materials and minimises waste.

# Requirements for Implementation

- Taxation policies favouring renewable energy use.
- Incentives for consumers to return end-of-life products.
- Social policies normalising product return schemes.
- Legislation restricting landfill disposal.
- Education campaigns promoting sustainability.
- Improved access to waste collection and recycling facilities.

# Requirements for Implementation

**Example: Plastic Products**

- Taxes on manufacturers using fossil-fuel-based energy.
- Financial rewards (e.g., deposit-return schemes) for returning plastic bottles.
- Social policies encouraging returns to manufacturers.
- Strong restrictions on landfilling plastic.
- Public education on waste reduction and recycling.
- Accessible recycling points to ensure proper recovery of plastic materials.