ES 200-S2

Module B : Solid Waste Management and Other Aspects of Environmental Management

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Major Objectives of the Environmental Policies

- Afforestation and regeneration of degraded land
- Control of pollution
- Conservation of existing forests, wildlife and water resources and survey of various areas for identification of new species

Ministry of Environment, Forest and Climate Change (MoEFCC): Nodal Government Agency

- **MoEFCC implements policies and programmes relating to conservation of the country's natural resources.**
- **The major functions include:**

✓ **Formulation of national policies, standards and regulations**

✓ **Implementation of provisions on related legislation on forests, environment and wildlife and control of pollution etc.**

✓ **Survey and exploration of natural resources**

✓ **Bio-diversity conservation**

✓ **Conservation, development, management and abatement of river pollution**

✓ **Environmental research and development, education, training, information and awareness**

✓ **Regulation of diversion of forest land for non-forestry purposes**

✓ **Environmental impact assessment**

✓ **Wildlife conservation, preservation, protection planning, research, education, training and awareness**

✓ **Afforestation and eco-development**

✓ **Administration and management of subordinate and autonomous institutions of the Ministry**

Other Key Institutions Responsible for Formulating and Enforcing The Environmental Acts and Rules

CPCB

Responsibilities

- Advise to central government on any water and air related matters
- Plan nationwide programs for the prevention, control and abatement of pollution
- Coordinate the activities of SPCBs and provide technical assistance
- Carry out/ or sponsor research
- Take legal action against polluters
- Publish technical data on air and water
- Codes and guidelines relating to industrial emissions and effluents
- Organize training of staff
- Programs on environmental protection

SPCB

Responsibilities

- Advise the state governments
- Plan a full state-level pollution control program
- Implement and enforce national standards

Judiciary also helps in enforcing the acts through the PILs

Major Acts

- **Water (Prevention and Control of Pollution) Act of 1974, amended in 1988**
- **Water (Prevention and Control of Pollution) Cess Act of 1977, amended in 1991**
- **Air (Prevention and Control of Pollution) Act of 1981, amended in 1987**

Major Acts…..

- **Environment (Protection) Act of 1986 (EPA)**
  - **Hazardous Wastes (Management and Handling) Rules (1989) amended in 2003**
  - **Hazardous Wastes (Management, Handling and Transboundary Movement) Rules, 2008 amended as Hazardous and Other Wastes (Management &Transboundary Movement) Rules, 2016**
  - **Municipal Solid Waste Management and Handling Rules (2000) amended as Solid Waste Management Rules (2016)**
  - **Bio-Medical Waste (Management and Handling) Rules (2000) amended as Bio-Medical Waste Management Rules (2016)**
  - **E-Wastes (Management and Handling) Rules (2011) amended as E-Wastes Management Rules (2016)**
  - **Construction & Demolition Waste Management Rules, 2016**
  - **Plastic Manufacture and Usage Rules in 1999**
  - **Plastic Waste (Management and Handling) Rules, 2011 amended as Plastic Waste Management Rules, 2016**

Few Examples of NGO Movements and PIL For Environmental Protection in India

- Silent valley struggle
- Chipco Movement
- PIL for the protection of Taj Mahal

Electronic Waste – A Global Environmental Problem

Electronic Waste – An Introduction

- Electronic waste (e-waste) comprises of waste electronic goods which are not fit for their originally intended use.
- Examples of end of life electronic appliances are cellular phone, TV, computers, refrigerators and freezers etc.
- In 2006, Global production of E-waste was estimated at 20 – 50 million tonnes per year (~ 1-3% of MSW annual production)
- E-waste has become a global concern because many valuable as well as hazardous materials need proper handling and recycling methods to conserve the environment and human health.

Classification of E-waste

- **White goods**

✓ **Household appliances**

- **Brown goods**

✓ **TVs, camcorders, cameras**

- **Grey goods**

✓ **Computers, printers, fax machines, scanners**

- **Normally wastes from white and brown goods are less toxic compared to grey goods**

Quantity of WEEE Generated in Indian Cities

(Wath et al., 2010)

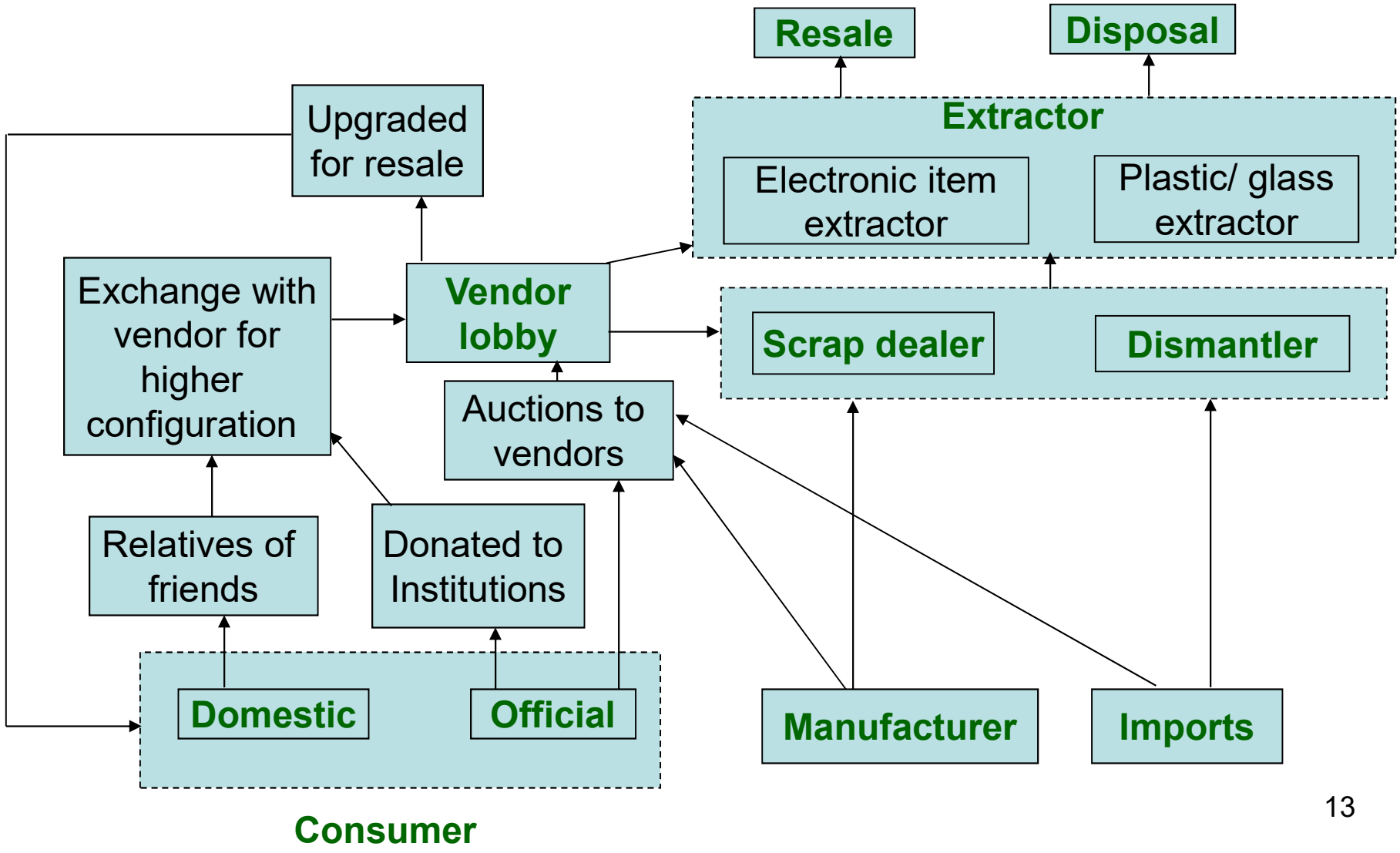
SN	States	WEEE (Tones)	SN	States	WEEE (Tonnes)
1	Andaman and Nicobar Islands	92.2	19	Lakshadweep	7.4
2	Andra Pradesh	12,780.3	20	Madhya Pradesh	7,800.6
3	Arunachal Pradesh	131.7	21	Maharashtra	20,270.6
4	Assam	2,176.7	22	Manipur	231.7
5	Bihar	3,055.6	23	Meghalaya	211.6
6	Chandigarh	359.7	24	Mizoram	79.6
7	Chhattisgarh	2,149.9	25	Nagaland	145.1
8	Dadra and Nagar Haveli	29.4	26	Orissa	2,937.8
9	Daman and Diu	40.8	27	Puducherry	284.2
10	Delhi	9,729.2	28	Punjab	6,958.5
11	Goa	427.4	29	Rajasthan	6,326.9
12	Gujarat	8,994.3	30	Sikkim	78.1
13	Haryana	4,506.9	31	Tamil Nadu	13,486.2
14	Himachal Pradesh	1,595.1	32	Tripura	378.3
15	Jammu and Kashmir	1,521.5	33	Uttar Pradesh	10,381.1
16	Jharkhand	2,021.6	34	Uttarakhand	1,641.1
17	Karnataka	9,118.7	35	West Bengal	10,059.4
18	Kerala	6,171.8		Total	146,180.7

India's E-waste generation in 2010 = 0.4 million tons and estimated quantities in 2013-14 = 0.5 – 0.6 million tonnes (Needhdasan et al., 2014)

Present E-waste Management System in India

- Most of the activities are performed manually by unauthorized sectors
- Improper recycling and disposal operations in different cities may also involve open burning of plastic waste and open dumping.
- In majority of cases, the dismantling and recycling operations are carried out without proper safety instruments in areas without proper lighting and ventilation.
- It can be said that at present, no organized or formal E-waste management system in India exists.

Flow Chart of E-waste Trade Cycle in India



The Characteristics of E-waste System in India and its Implications (Wath et al., 2010)

Activities/ drivers	Facilitators	Constraints
Sale of WEEE by consumer against value	Incentive/motivating factor for consumer for disposing of the WEEE.	Un-valuable EEE is dumped along with municipal solid waste
Second sale of EEE.	Increase in the working lives of the EEE.	May lead to overuse of EEE up to the level of accidents
Reuse/recycling of scrap e.g. plastic, wires, glasses, etc.	Increase in the lifetime of the EEE/components. Increases resource utilization efficiency.	Poor quality/impure material may be reuse/recycled. Will necessarily become waste sooner or later.
Labour intensive system	Employment of local people/Local economic Growth.	Health hazard, time consuming

The Characteristics of E-waste System in India…

Activities/ drivers	Facilitators	Constraints
Involvement of non-technical/unskilled peoples	Cost saving/profitable businesses may be generated	Health hazard, lack of process efficiency/affectivity
Manual operations/dismantling/recycling/non-scientific treatment process, outdated technologies.	Cost saving/profitable businesses may be generated.	Health hazard, environmental pollution, time consuming
Totally market-driven, unorganised and informal sector.	Low initial investment, entry and exit in the WEEE business are easy.	Very less or no control of regulatory bodies, unfair trading practices, quantification of WEEE is very difficult

Various EPR Approaches (Wath et al., 2010)

Type of EPR approach	Types of tools	Examples of EPR applied
Product take back programs	Mandatory take back Voluntary or negotiated take back programs	Packaging (Germany) Packaging (Netherlands, Norway)
Regulatory approaches	Minimum product standards Prohibitions of certain hazardous materials or products. Disposal bans Mandated recycling	EEE, batteries Cadmium in batteries (Sweden) EEE in landfills (Switzerland) Packaging (Germany, Sweden, Austria)
Voluntary industry practices	Voluntary codes of practice Public/private servicing partnerships Leasing, “servicing,” labelling	Transport packaging (Denmark) Photocopiers, vehicles
Economic instruments	Deposit-refund schemes Advance recycling fees Fees on disposal, material taxes/subsidies	Beverage packaging (Korea, Canada) EEE (Switzerland, Sweden) EEE (Japan)
Some other approaches	Tax credits, advance recovery fee	

EMS Standard: ISO 14000 Series

- International Organization for Standardization (ISO) was formed in 1947 and has become the premier International Standards Organization.

- ISO considers the following three key principles:

✓ Consensus

✓ Industry-wide applicability

✓ Voluntary nature

- The aim of ISO 14000 series of standards is to help organizations implement and improve their EMS.

Reading Material

- **Wath et al. (2010). A roadmap for development of sustainable E-waste management system in India. Science of the Environment, 409, 19-32.**