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Chapter-17

Waste Generation and Management

Notes

Waste: A waste is any substance which is discarded after its primary use or it is worthless or defective and of no use.

Types of Wastes are:

- Municipal wastes (household waste and ~~commer~~ commercial waste).
- Hazardous wastes (industrial waste).
- Biomedical wastes (clinical waste).
- Special hazardous wastes (radioactive waste).
- Electronic waste (E-waste) etc.

- Domestic Waste: Waste that is generated from domestic activities such as washing, bathing, cooking, etc. is called domestic waste.
  Domestic waste includes fruit and vegetable peels, left over food, waste paper, plastic, glass, rubber, metals etc.
  Sources are: Kitchen waste, plastic glass, rags, paper.

- Industrial Waste: Waste which is generated by industries is called industrial waste.
  Chemical, paint residues, oil, ash, sludge and heavy metals etc. are some types of wastes that are generated by industries.
  The type of industrial waste depends on the raw material and the type of products manufactured.
  Sources are: Mining operations, cement industries, oil refineries and construction units.

- ~~Industrial Waste: Waste which is generated by~~ Agricultural Waste: Waste such as animal manure, plant leaves, bark, flowers etc. which is generated from plants and animals is called agricultural waste, farm waste or garden waste.
  Farm waste includes animal wastes as well as residues of fertilizers, pesticides, insecticides and other chemicals which are used in agriculture to increase crop production.
  Sources are: Agricultural residue, bagasse, pesticides, fertilizers, animal waste.

- Municipal Waste: Waste generated from domestic, industrial and commercial activities is called municipal solid waste or urban waste.
  Wastes such as garbage and plastic bags, glasses, metals, fibres, paper, rubber, discharge from hospitals, hotels etc. are all included under municipal wastes.

E-waste: E-waste is mostly generated in large cities. However, due to fast-improving lifestyles and standard of living, even smaller towns and cities are flooded with electronic devices, resulting in an increase in e-waste. The harmful substances found in e-waste include cadmium, mercury, lead etc. which are toxic in nature and hence harmful to human health. Copper, silver, gold etc. are some of the valuable materials found in e-wastes.
The rag pickers and waste dealers collect discarded electronic gadgets. They remove the usable components and extract secondary raw materials.
Electronic goods contain a variety of materials and metals, which can be recycled for future use.

The wastes are of many types. So, their disposal requires different suitable methods:-

Methods of safe disposal of wastes are:
(i) Segregation:
- One should separate the degradable waste from the non-degradable waste.
- Proper segregation helps the municipal authorities to decompose and dispose of the organic part of the wastes easily.
- Segregation involves separating the refuse into three main categories: reusable, degradable, and non-degradable wastes.

(a) Reusable waste: Wastes such as paper, old books, discarded books, and used envelopes can be recycled. In the case of used metallic cans, the metallic components can be separated from the non-metallic components and reused.

(b) Degradable waste: Organic wastes such as vegetable peels, leaves, leftover food etc. can be decomposed into useful manure with the help of microorganisms. Such decomposition is called (biodegradation) and the substances are called (biodegradation substances).

(c) Non-degradable waste: Wastes such as plastic, pesticides etc. can be dumped or buried at far off places.

(ii) Dumping: Non-degradable wastes such as plastic, pesticides, fibres etc. can be dumped or buried in specially dug up pits at far off places away from human habitation.

(iii) Composting: The rotting and conversion of organic waste into manure is known as composting. The product formed after composting is called compost.
- Household garbage as well as farmland wastes can all be converted into useful compost.

(iv) Drainage: A drainage system is a channel of pipelines that carries sewage from houses, offices, hospitals etc. through drainage

pipes from where it flows to the sewer mains of the city.
- A manhole is a hole with a cover in a road or pavement. Through a manhole, a person can enter a drain or a sewer to fix a faulty pipe if there is leakage or blockage in any of the pipes.
- Sewer mains flow into progressively larger pipes until they finally reach the wastewater treatement plant.
- Storm drains are drains through which rainwater flows before it reaches a water body. They are most often separate from the sewerage system of the cities.

(v) Incineration:- Incineration is a method in which waste is burnt at very high temperatures.
- Hazardous bio-medical wastes, such as discarded medicines, toxic drugs, human anatomical wastes, blood, pus, microbiological and biotechnological wastes etc. are usually disposed of by incineration.

(vi) Effluent Treatment Plants:- Municipal and industrial wastewater are in wastewater treatement plants or effluent treatement plants before they are released into the water bodies.
- Treatment of wastewater involves various physical, chemical, and biological processes.
- In primary treatment, the wastewater is

first passed through bar screens where large objects such as sticks, plastic packets, cans etc. are removed.
- The secondary treatment is a biological process used to remove dissolved and suspended organic matter.
- The tertiary treatment is a chemical process in which the dissolved chemicals, metals and even pathogens are removed from the wastewater.

(vii) Scrubbers:- Scrubbers are devices used to remove both gaseous and particular matter.
- Air is passed through either dry or wet packing material. Gaseous pollution get dissolved in wet packing.
- Air passing out a scrubber is dust-free, clean, and free of gaseous pollutants.

(viii) Electrostatic precipitator:
- In an electrostatic precipitator, gas or an air stream containing dust, smoke, soot, and other particular matter is passed through a chamber containing electrically charged plates.
- The particles may get charged naturally when they pass through the charged plates.
- The electrically charged particles stick to the charged metal plates inside the precipitator.
- Knocking on the plates drops the particles into a hopper tray for disposal. Clean gas

or air passes out of the precipitator.

- Effective steps in the waste management.

1. REDUCE: Minimise the amount of waste produced.
2. REUSE: Use on material more than once.
3. RECYCLE: Use material to make a new product.
4. DISPOSAL: To landfill.