

Solid Waste Management

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Definition of Solid Waste (SW)

Any solid or semi solid or slurry with high consistency, that arises from different anthropogenic activities and which are considered to be useless, unwanted or throwable .It is discarded mass of heterogeneous compound from the urban household communities and relatively homogeneous accumulation of commercial, agricultural, industrial activities.

Types of Solid Waste

☐ Municipal Solid Waste (MSW)

- Urban solid waste include predominantly household (domestic) waste. e.g. kitchen waste, food stuffs, veg.waste, broken glasses, discarded bottles, can, etc.

☐ Industrial Solid Waste

- Solid waste arises from industrial activities, factory and plants due to unused raw material, salvaging finished products, discardable byproducts.

e.g. fly ash in coal based thermal power plant, Antibiotic plants-mycellium waste, slags in iron, aluminium smelting operation, Veg and fruit pilling waste- food processing plants, tides, leather, bones- tannery and slaughter house, metallic, non metallic, organic, in some cases hazardous.

☐ Hazardous Solid Waste

-Which are potentially dangerous for explosion, fire hazard, inflammable, toxic and leading to ill effects of human health.

e.g. oily sludge, hospital and health care waste, chrome laden sludge from tannery, TNT, Pesticidal, arsenic sludge, electronic waste.

☐ Agricultural Waste

-Agricultural, garden trimming, Crop residue, animal manures (used as main source of fuel and bio energies).

☐ Commercial Solid Waste

Arises from Commercial and business areas.

-Market area – Mixed organic and Combustible material.

-Shopping malls/Centre- papers, raps, plastics.

-Hotels, restaurants

-Industrial areas

Public Health and Solid Waste

Direct relationship between solid waste and human diseases has no direct evidence except toxic and hazardous waste.

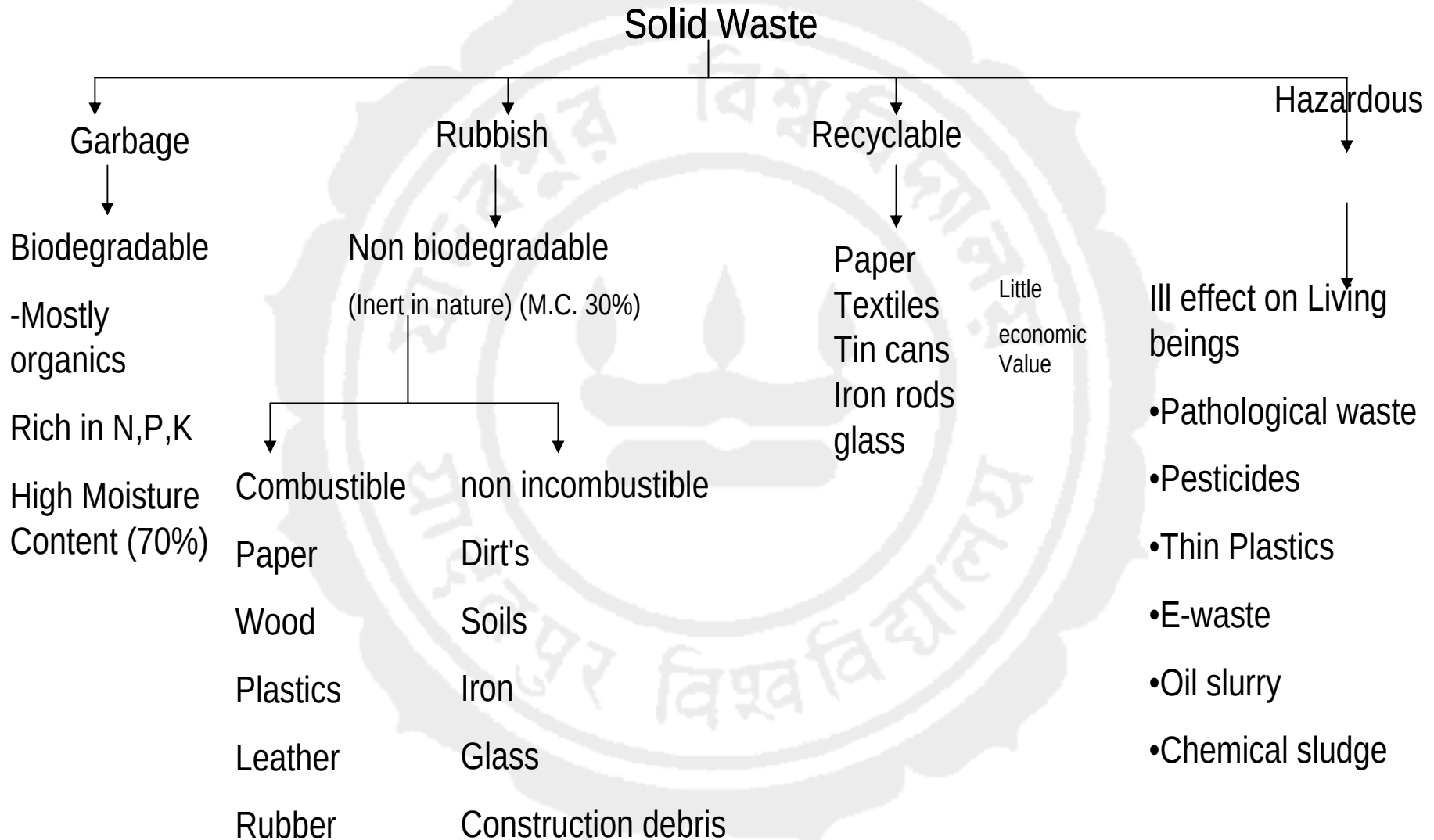
Problems are associated with

- ☐ Negative economy.
- ☐ Huge amount of disposal and land cost.
- ☐ Bad aesthetics / Nuisance.
- ☐ Providing sites of vectors paving for communicable disease (malaria, plague, fever, etc.)
- ☐ Faecal diseases.
- ☐ Contamination of food, water, crops etc.

Solid waste is characterized by

- ☐ Physical Components
- ☐ Density
- ☐ Moisture Content
- ☐ Heating Value
- ☐ Chemical Composition
- ☐ Ash Content

Classification of Solid waste



Solid Waste Management System (SWMS)

Elements of SWMS

- ☐ Waste generation
- ☐ Storage
- ☐ Collection
- ☐ Processing
- ☐ Transfer
- ☐ Disposal

❑ Waste Generation

- In India, solid waste generation rates: 200-500 gm/person/day.
- In U.S.A. and other developed countries: 1000-2000 gm/person/day.
- For metropolitan cities in India: 500-750 gm/person/day.

❑ Waste Storage

House Bins – 10-20 lts capacity.

Storage Community Bins – 100 – 1000 lts.

Normally Community Bins are provided @ 100 m interval for collection of 20 families.

Large bins are capable for storing 500-1000 persons usually made of concrete blocks masonry structures.

❑ Collection and Transport

Primary Collection- House hold to the community bin (Manual Collection, plastic bags, hand carts) [House to house collection]

Secondary Collection- Transportation of SW from community bin to processing/disposal site by container systems, motorised vehicles, trucks.

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❑ Processing

❑ Objective of processing

- Size reduction
- Volume reduction
- Biological processing
- Drying
- Screenings
- Incineration

❑ Devices Used:

- Hammer, Trommal Screen, Shrudder, Ball Mills, Centrifuges, Incineration, Furnace

Composting process

❑ Biological stabilization of organic solid waste into stable dark black/brown mass known as 'humus' by the microbial action of mixed consortia.

❑ The benefits of composting material

- Good N,P,K,(nutrient) content used as fertilizer and soil conditioner
- Reduces the moisture loss
- Organic manure for removing 'soil sickness'.

❑ Vermicomposting

Use of worms to faster degradation of compactable material (garbage) along with conditioning.

❑ Composting practices:

- 1) Pit Composting
- 2) Windrow Composting
- 3) Mechanical Composting
- 4) Vermi Composting

Besides, anaerobic composting (absence of oxygen) can produce methane rich bio gas to be used as fuel.