

CO1: ENVIRONMENTAL POLLUTION

ENVIRONMENTAL POLLUTION

Solid Waste: Generation and management
Bio-medical Waste: Generation and management
E-waste: Generation and management

Story of Alang

- **Alang, Gujarat: The World's Biggest Ship Breaking Yard & A Dangerous Environmental Time Bomb**

<https://www.marineinsight.com/environment/alang-gujarat-the-world%E2%80%99s-biggest-ship-breaking-yard-a-dangerous-environmental-time-bomb/>





- Largest in word
- 184 ship breaking plots
- 300 ships every year
- Turnover of 6000 crores (2011)
- Employs 40000 people directly and 100000 more indirectly. (migrants from Orissa, UP, Bihar)

What is wrong???

- Most of ships come with what????

What is waste?

- Waste is any material that is not needed by the owner, producer, or processor.
- Humans, animals, other organisms and all processes of production and consumption produce waste.
- Even nature is also involved, but apparently it's not a waste as far as nature is involved. It will be used in any cycle and ultimately it will be consumed.
- The composition, quality and disposal of waste determine the environment problem it creates.
- To minimize its effect we need to manage our waste::::

Solid Waste Management - How to bring best out of waste?

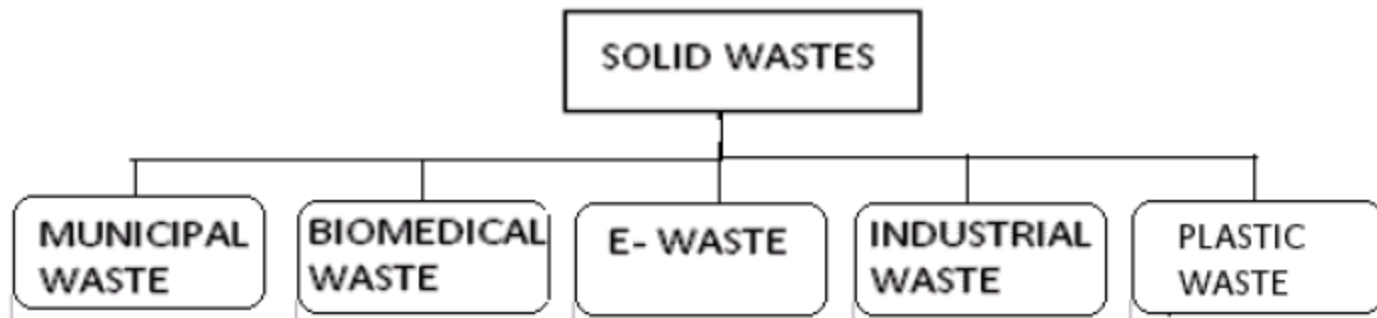
- All solid and semi-solid wastes arising from human and animal activities, are discarded as useless or unwanted are included in the term 'Solid-Wastes'.
- It includes garbage, rubbish, ashes and residues, demolition and construction wastes, dead animals, radioactive wastes, etc.
- The quantity of solid-wastes produced depends upon the living standards of the population.
- It will be more for an industrialized modern society. It also depends on seasons.

Solid Waste Management

Solid Waste Management (SWM) is the efficient disposal of unwanted substances which we can characterize as waste.

In our country, practices and methodologies used for SWM are still following the unscientific and inefficient methods and are mainly dependent on the informal sector. Besides, owing to the population explosion, enormous amount of waste is generated leading to the overflowing landfills.

These overburdened landfills pose serious implications including environmental, health, air, water and soil pollution and even global warming.



Municipal wastes

Municipal wastes are those wastes which arise from household activities, restaurants, public places, institutions, markets, street-sweepings, etc. and typically include garbage, rubbish, ashes (due to burning of coal, wood etc.), demolition and construction wastes, street-sweepings, dead animals, etc. and also treatment plant waste.

The general sources of municipal solid-waste are residential, commercial (markets, hotels, garages, institutions, etc.) and open areas (streets, parks, beaches, highways, play grounds), etc.

Industrial wastes

Industrial wastes are those wastes which arise from industrial activities, and typically include rubbish, ashes, construction and demolition wastes, special wastes and toxic wastes.

Hazardous Wastes

Are those wastes that pose a substantial danger immediately or over a period of time to human, plant or animal life.

A waste is said to be hazardous if it exhibits any of the following characteristics, viz., ignitability, corrosivity, reactivity or toxicity.

Typical hazardous wastes are radioactive substances, chemicals, biological wastes, flammable wastes, and explosives.

The sources of hazardous wastes are industries, nuclear plants, hospitals, research institutes, laboratories, etc.

Biomedical Waste

- According to Biomedical Waste (Management and Handling) Rules, 1998 of India “Any waste which is generated during the diagnosis, treatment or immunization of human beings or animals or in research activities or in the production or testing of biological samples are referred to as biomedical waste”.
- Improper disposal increases risk of infection and develops resistant microorganisms. Mixing of hazardous waste with the non-hazardous waste results in contamination and makes the entire waste hazardous.



What is Biomedical Waste (BMW)?



Hospitals and other health facilities



Laboratories and research centres



Nursing homes

Blood banks and collection services



Animal research and testing laboratories



Mortuary and autopsy centres

BMW generated at home



Biomedical Waste

BMW Rule
2016

Yellow Non-chlorinated Bag/Bin



Human Anatomical Waste, Animal Anatomical Waste, Soiled Waste, Expired or Discarded Medicines including antibiotics.

Treatment and Disposal options:

- i. Incineration or Plasma Pyrolysis* or deep burial
- ii. All other discarded medicines shall be either sent back to manufacturer or disposed by incineration.

* **Plasma pyrolysis** : disintegration of organic compounds into gases and non-leachable solid residues in an oxygen-starved environment

(i) Chemical Solid Waste (ii) Discarded Linen, mattresses contaminated with blood/body fluid (iii) Microbiology, Biotechnology and other clinical Lab waste

Biomedical Waste

- Red Bag - Syringes (without needles), soiled gloves, catheters, IV tubes etc should be all disposed of in a red colored bag, which will later be incinerated.



Contaminated Waste (Recyclable) Wastes generated from disposable items.

Treatment and Disposal options:
Autoclaving or micro-waving/ hydroclaving followed by shredding or mutilation or combination of sterilization and shredding.

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Biomedical Waste

BMW Rule
2016

White Category: Sharp Containers



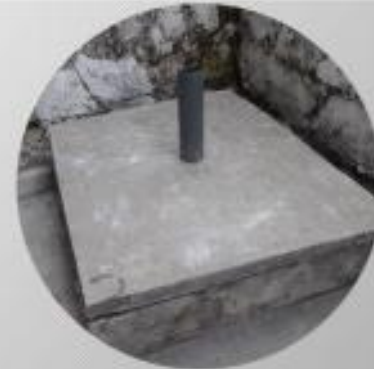
Waste sharps Including
Metals



Sharps must always be kept in puncture-proof containers to avoid injuries and infection to the workers handling them.



Treatment and Disposal options: Autoclaving or Dry Heat Sterilization followed by shredding or mutilation or encapsulation in metal container or cement concrete(Sharp Pit); combination of shredding cum autoclaving.



Biomedical Waste

BMW Rule
2016

Blue Category: Cardboard Box



Glassware & Metallic Body Implants



Treatment and Disposal options: Disinfection (by soaking the washed glass waste after cleaning with detergent and Sodium Hypochlorite treatment) or through autoclaving or microwaving or hydroclaving and then sent for recycling.

Electronic Waste (E-waste)

- The E-Waste constitutes all types of unwanted products obtained from the disposal of electronic gadgets and their manufacturing units.

- According to a [2020 report](#) by the Central Pollution Control Board,
- India generated 1,014,961 tonnes of e-waste in FY 2019-2020 – up 32% from FY 2018-2019. Of this, the report found that only 3.6% and 10% were actually collected in the country in 2018 and 2019, respectively.

Waste Management and Policies

In India as per the CPCB reports 2013, no city can claim 100% segregation of waste.

In the cities, on an average only 70% waste is collected, and **the remaining 30%** is lost in the urban environment. Further out of total waste collected, only 12.45% waste is scientifically processed and **rest is disposed in open dumps.**

The status of Waste Management Practices

Segregation

Collection

Recycle and Reuse

Transportation

Reasons of excess generation of Solid Wastes

The main causes for the rapid growth in the quantity of solid wastes are :

- (1) Over-population***
- (2) Urbanization***
- (3) Industrialization***
- (4) Technology development***
- (5) Modern Life Style***

Methods of Waste Disposal

Garbage accumulation has never been much of a concern in the past, but due to globalization and industrialization, there is a need for a more efficient waste disposal method. Following are some of the methods that are used today.

Open dumping

In India, MSW (Municipal Solid Waste) generated is usually directly Unscientific disposed on low lying area.

Usually every city have dumping sites with the piles of waste

Landfilling

Metropolitan centers like Delhi, Mumbai, Kolkata and Chennai have limited availability of land for waste disposal and designated landfill sites are running beyond their capacity.

Landfill gas-to-energy plants

In India, estimated methane emission is about 16 million metric CO₂ equivalents per annum through landfills (International Energy Agency, 2008)

The energy potential from landfill gas available at selected sites in Delhi (Balswa, Gazipur and Okhla) is 8.4 MW, Mumbai (Deonar and Gorai) 5.6 MW, Ahmadabad (Pirana) 1.3 MW, and Pune (Urli) had 0.7 MW annually

Composting

A MSW composting center installed at Indore City (Madhya Pradesh) is one of the best maintained facilities.

In Bengaluru, Vadodara, Mumbai, Delhi, and Kanpur, mechanical composting units of 150 to 300 tons/day capacities were also installed.

Maharashtra and Gujarat are the top states in the composting of the waste

Benefits of Waste Management

- **Economic**

Creation of new job opportunities and business activities are the direct implication of effective waste management as is evident from their reuse and recycle.

Benefits of Waste Management

- **Social –**
- By reducing adverse impacts on health by proper waste management practices, social benefits can be reaped easily.
- One such example is the prevention of the outbreak of the recent diseases such as dengue and chikungunya.

Benefits of Waste Management

- **Environmental**

Reducing, reusing and recycling reduces or eliminates adverse impact on the environment. It also improves the quality of air and water and help in reduction of greenhouse emissions.