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# ENVIRONMENTAL STUDIES & LIFE SCIENCES

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# ENVIRONMENTAL STUDIES & LIFE SCIENCES

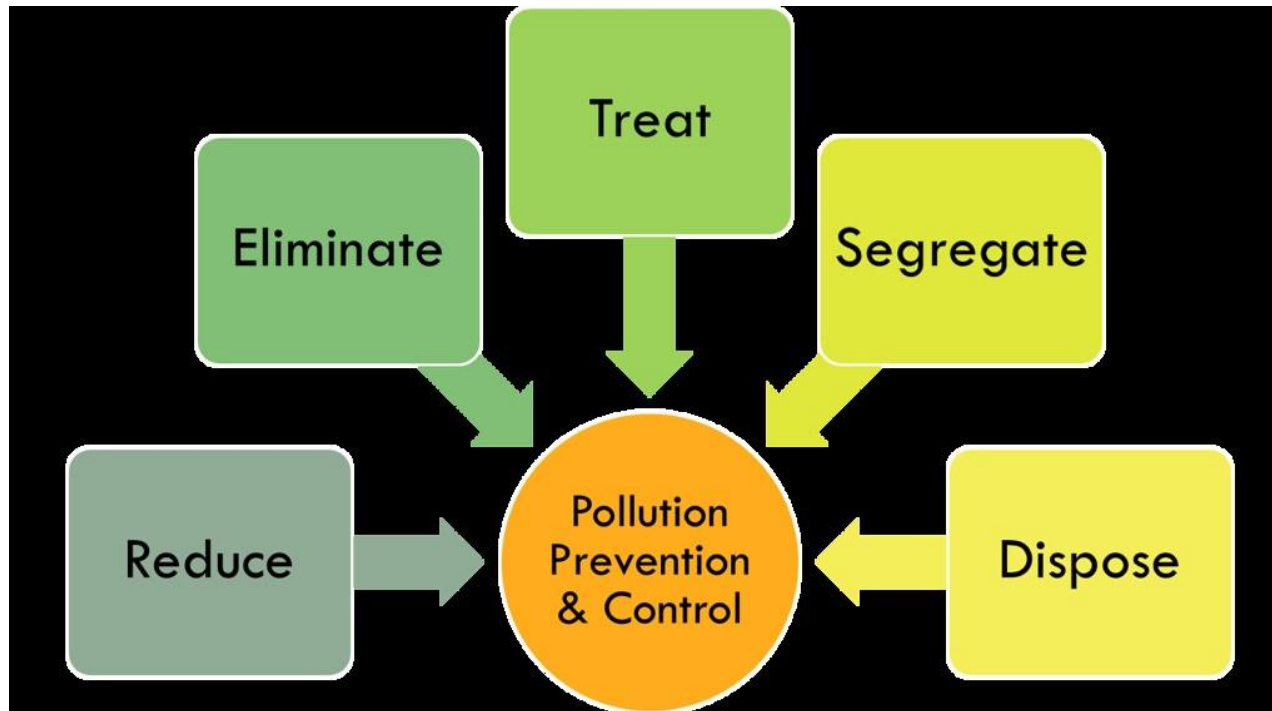
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## Environmental pollution management

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- Around the world, people and governments are making efforts to combat pollution.
- Pollution control is the process of reducing or eliminating the release of pollutants into the environment .
- It is regulated by various environmental agencies which establish pollutant discharge limits for air, water, and land.
- Recycling, for instance, is becoming more common. Glass, paper, aluminum cans, and many types of plastic can be melted/broken down and reused.



- Global organizations
- United Nations Environment Programme (UNEP)
- International Union for Conservation of Nature (IUCN)
- Intergovernmental Panel on Climate Change (IPCC)
- Global Alliance on Health and Pollution (GAHP)
- The Global Environmental Monitoring System GEMS/Air (WHO/ UNEP 1993) is organized and sponsored by WHO and UNEP.

- Governmental agencies
  - Environmental Protection Agency (USA)
  - Fish and Wildlife Service (USA)
  - Federal Office for the Environment (USA)
  - Ministry of Climate Policy and Green Growth (Netherlands)
  - CapeNature (South Africa)

- The Ministry of Environment and Forests (MoEF) is the highest authority in India for protection for the environment. It is the nodal agency for which the Central Government of India has authorized in the planning, promotion, coordination and execution of India's environmental policies and program.
- Wildlife Trust of India, Central Pollution Control Board, Indian Board for Wildlife etc.

- **Air pollution management**
- A government institution typically establishes goals related to air quality. An example is an acceptable level of a pollutant in the air that will protect public health, including people who are more vulnerable to the effects of air pollution.
- Air quality managers need to determine how much emissions reductions are needed to achieve the goal.



- Air quality managers use emissions inventories, air monitoring, air quality modeling and other assessment tools to understand the air quality problem fully.
- The process involves all levels of government – elected officials, national agencies like EPA, tribal, state and local governments.
- Regulated industry groups, scientists, environmental groups, and the general public all play important roles too.

- Actions to reduce air pollution
- Conserve energy - at home, at work, everywhere.
- Carpool, use public transportation, bike, or walk whenever possible.
- Use environmentally safe paints and cleaning products whenever possible.
- Avoid excessive idling of your automobile.
- Avoid burning leaves, trash, and other materials.
- Use Energy-Efficient Devices- Look for the ENERGY STAR label when buying home or office equipment.

- **Water pollution management**

- Surface Water Pollution Control & Groundwater Pollution Control
- Water supplies include:
  1. Public water supply: waters which with conventional treatment will be suitable for human consumption
  2. Agricultural supply: waters suitable for irrigation and livestock watering without treatment
  3. Industrial/commercial supply: waters suitable for industrial and commercial uses with or without treatment.

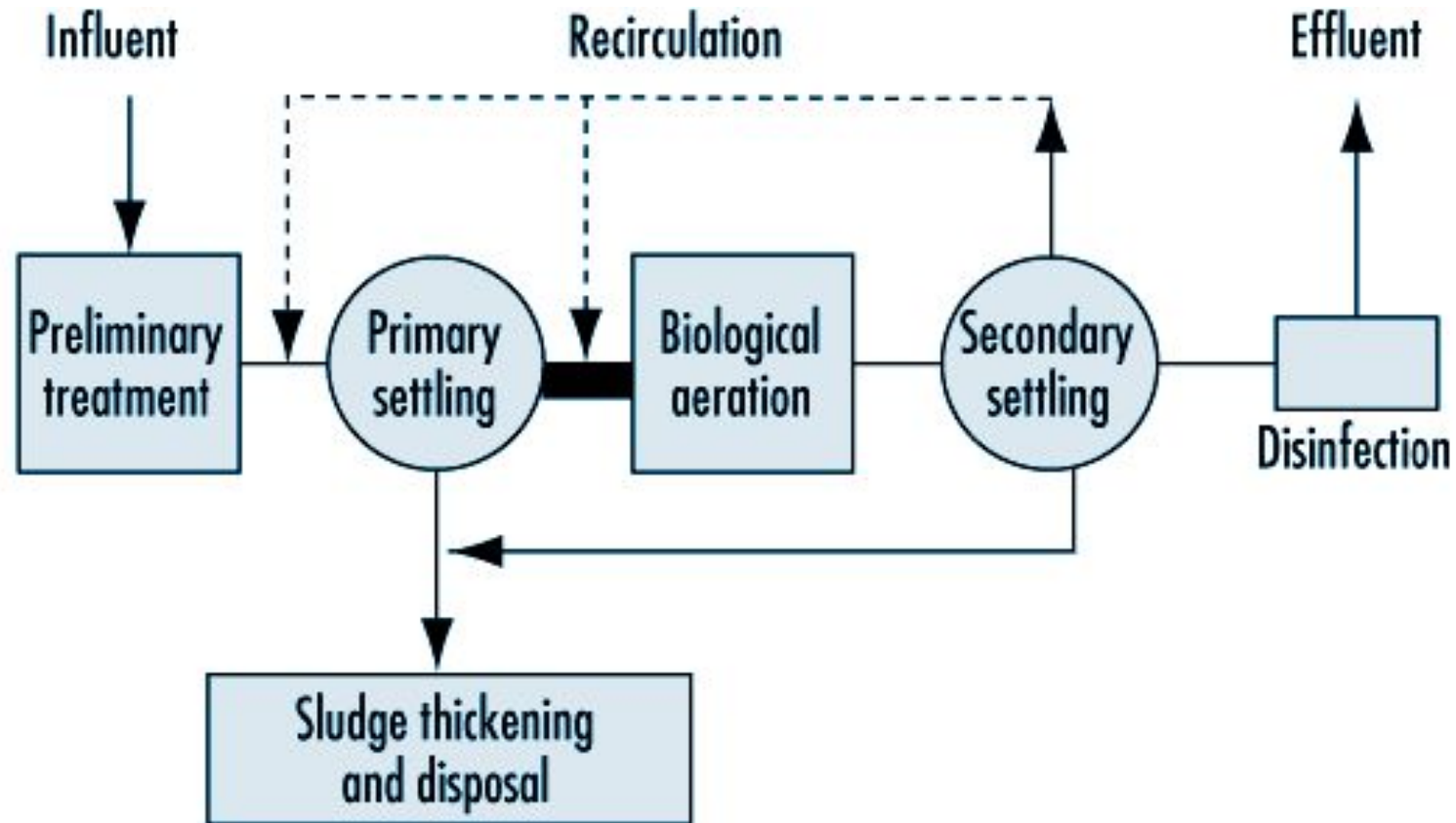
- The Bureau of Indian Standards (BIS) has specified drinking water quality standards in India to provide safe drinking water to the people.
- It is pertinent that drinking water sources be tested at regular intervals and ensure that water is meeting the prescribed standards or not, if not, then, the extent of contamination/unacceptability and follows up required.

### Standard values for drinking water

S.No	Characteristics	Desirable limit
<b>I</b>	<b>Physico-chemical Characteristics</b>	
i)	pH	6.5 to 8.5
ii)	Total Dissolved Solids (TDS)	500 ppm
iii)	Total Hardness (as $\text{CaCO}_3$ )	300 ppm
iv)	Nitrate	45 ppm
v)	Chloride	250 ppm
vi)	Sulphate	200 ppm
vii)	Fluoride	1 ppm
<b>II</b>	<b>Biological Characteristics</b>	
i)	Escherichia Coli (E.Coli)	Not at all
ii)	Coliforms	Not to exceed 10 (In 100 ml water sample)

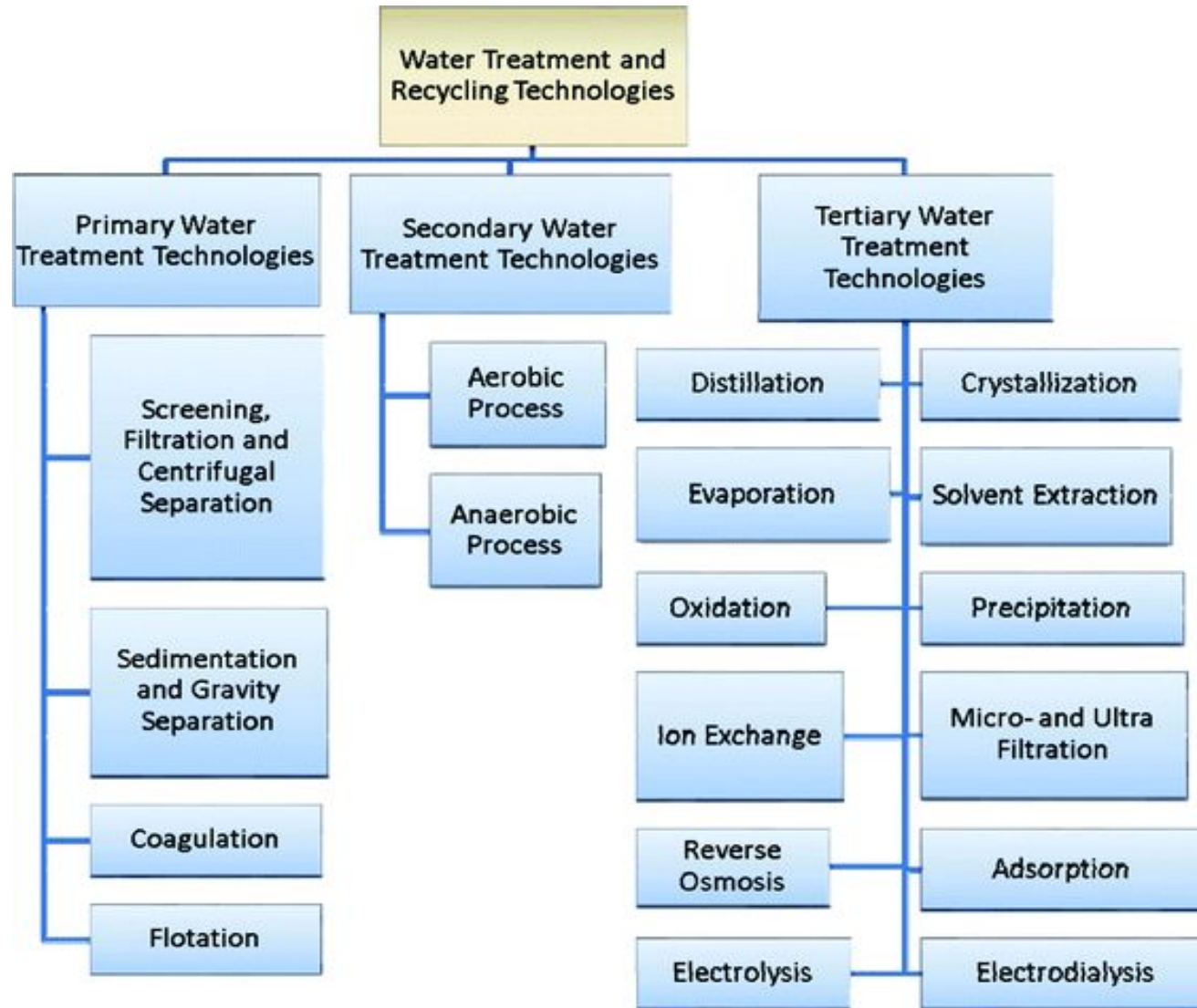
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- **Soil pollution control**
- To reduce land emissions, reduce, reuse, and recycle. It is essential to practice reforestation and afforestation. Organic fertilizers, an integrated pest control method, and crop rotation can all be used by farmers.
- One of the most important ways to help minimize landfill waste, protect natural resources, preserve wildlife, reduce noise, reduce energy use, and slow global warming is to incorporate recycling habits.



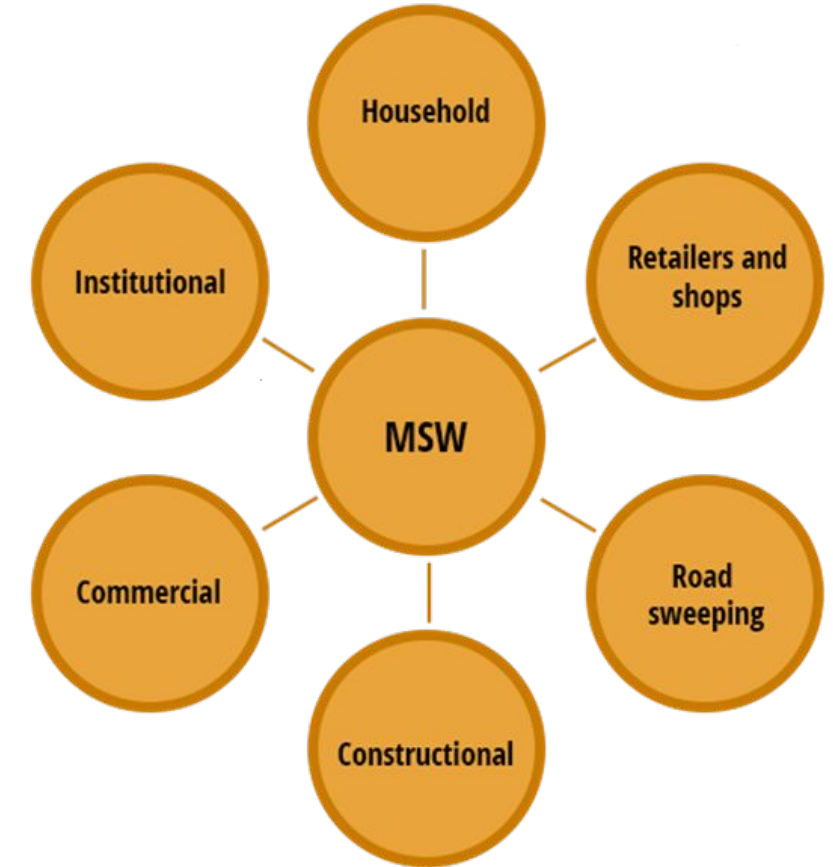
- Improper disposal of municipal solid waste can create unsanitary conditions, and these conditions in turn can lead to pollution of the environment and to outbreaks of vector-borne disease—that is, diseases spread by rodents and insects.
- The sources of solid waste include residential, commercial, institutional, and industrial activities.

- Waste may be grouped into three major categories, depending on its production:
  1. from the primary sector of production (mining, forestry, agriculture, animal breeding, fishery)
  2. from the production and transformation industry (foods, equipment, products of all types)
  3. from the consumption sector (households, enterprises, transportation, trade, construction, services, etc.).

- Management of municipal and ordinary commercial waste:
- Collected by trucks, these wastes can be transported (directly or by road-to-road, road-to-rail or road-to-waterway transfer stations and long-distance transportation means) to a landfill, or to a treatment plant for material recovery (mechanical sorting, composting, biomethanization), or for energy recovery (grid or kiln incinerator, pyrolysis).

- Solid waste management
- Solid wastes are described as residual products, which represent a cost when one has to resort to disposal.
- Management of waste encompasses a complex set of potential impacts on human health and safety, and the environment.
- Bengaluru generates about 3000 - 3500 tons of Solid Waste daily. (<https://site.bbmp.gov.in/documents/Overview.pdf>)

- The BBMP is carries out collection, street sweeping, transportation, processing and disposal of Municipal Solid Waste (MSW) from generators.
- BBMP has a system of door to door collection for collecting the MSW. The MSW collected has to be processed before land filling. BBMP has taken several steps to streamline the MSW management in the city.



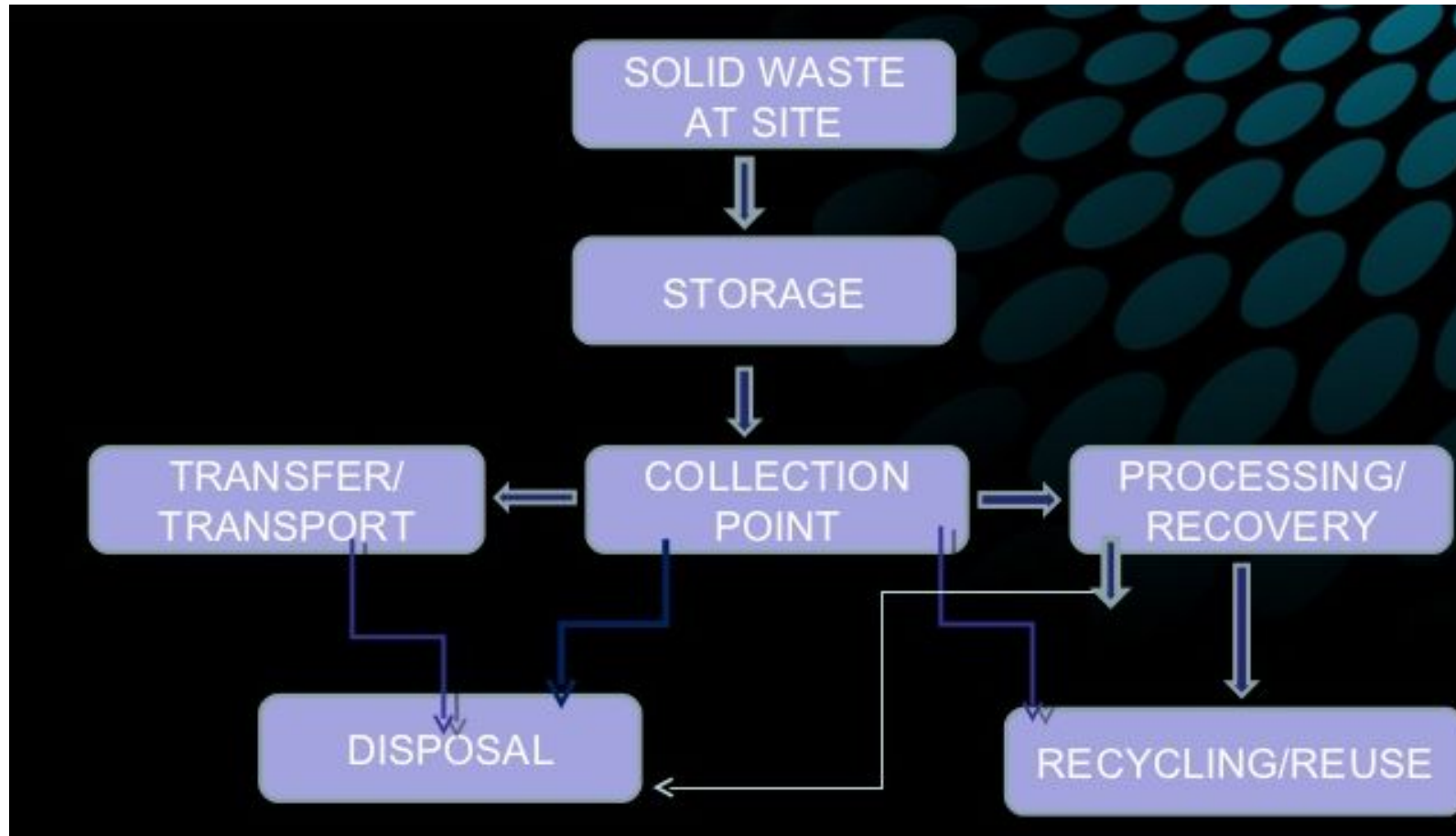
- Segregation at source has been emphasized.
- The households are required to segregate their wastes into two categories namely wet and dry waste. At the later stage, household hazardous waste like discarded medicine, sanitary napkins, diapers, batteries paints etc. is proposed to be collected separately.
- Presently about 30% of waste is segregated at source.



- Recycling
- Recycling or salvaging is the word covering both reuse (use for the same purpose) and reclamation/recovery of materials or energy.
- The reasons for implementing recycling may change depending on national and local conditions, and the key ideas in the arguments for recycling may be:
- detoxification of hazardous waste when high environmental standards are set by the authorities



- resource recovery in low income areas
- reduction of volume in areas where landfilling is predominant
- energy recovery in areas where conversion of waste to energy can replace fossil fuel (coal, natural gas, crude oil and so on) for energy production.



- The 'Swachh Bharat Abhiyan' was created to tackle these issues related to waste management, and it created awareness among the people about the proper treatment of solid waste. Also called Clean India Mission, it is a country-wide campaign initiated by the Government of India on 2 October 2014 to eliminate open defecation and to create Open Defecation Free villages.
- Since the launch of this campaign, the waste management concept has started to gain momentum.

- **Noise pollution management**
- **Noise level tolerance:** (Unit is decibels)
- Silence zone- 40-50 dB
- Residential zone-45-50 dB
- Commercial Zone-55-65 dB
- Industrial Zone-70-75 dB
- As well as damaging our hearing by causing — tinnitus or deafness — constant loud noise can damage human health in many ways, particularly in the very young and the very old.

- How to reduce noise pollution?
- Turn off Appliances at Home and offices when not in use
- Shut the Door when using noisy Machines
- Use of earplugs or earmuffs can bring down loud noises to a manageable level.
- Community law should check the use of loudspeakers, outdoor parties as well as political public announcements.
- There should be control on noise level (Silent zones) near schools, hospitals.

- Better maintenance of machines to reduce noise pollution and improve efficiency.
- Implement sound insulation. Design buildings with soundproofing materials and techniques.
- Educate and raise awareness.- Control traffic noise.
- Create more green spaces to act as natural sound buffers.
- Limit noisy activities.

- **Thermal pollution management**
- Presence of waste heat in water which can cause undesirable changes in the natural environment.
- **Effects:** decreases oxygen level in the atmosphere, leading to health effects of human beings.
- **Control:** cooling ponds, spray ponds, cooling towers-dry/wet.
- Heated water from the industries can be treated before discharging directly to the water bodies.

- Heated water from the industries can be treated by the installation of cooling ponds and cooling towers.
- Industrial treated water can be recycled for domestic use or industrial heating.



Cooling towers



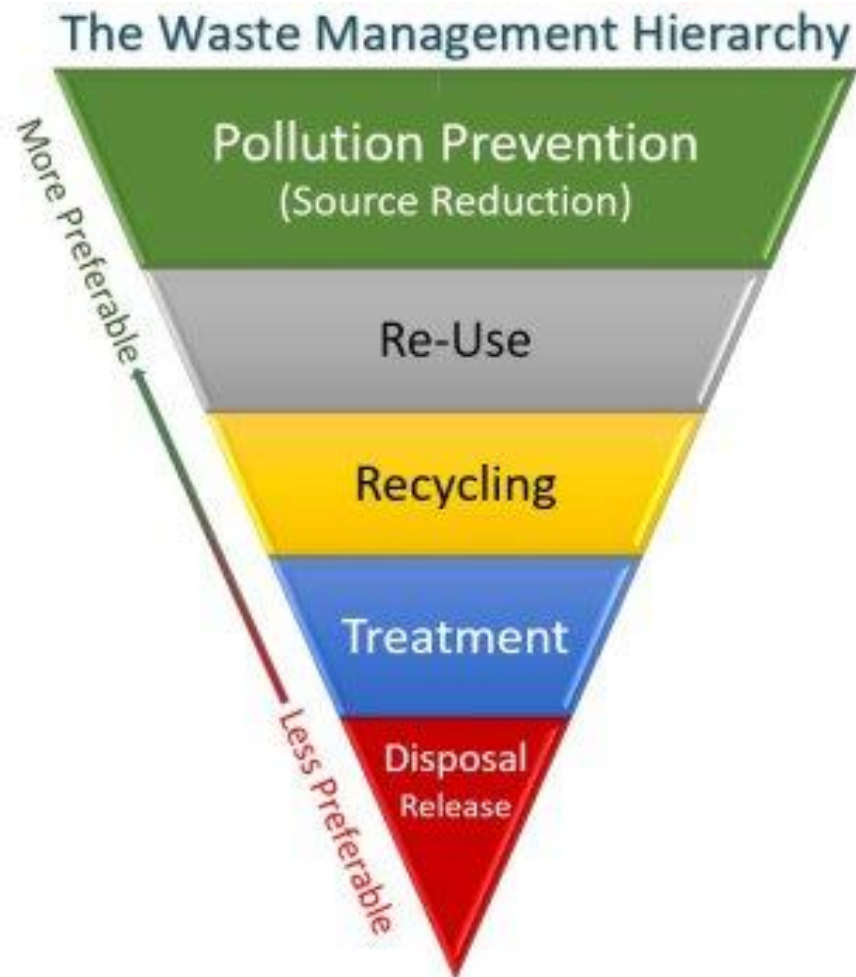
- **Radioactive waste management**
- Like all industries, the generation of electricity produces waste. Whatever fuel is used, the waste produced in generating electricity must be managed in ways that safeguard human health and minimize the impact on the environment.
- For radioactive waste, this means isolating or diluting it such that the rate or concentration of any radionuclides returned to the biosphere is harmless.

- To achieve this, practically all radioactive waste is contained and managed, with some clearly needing deep and permanent burial. From nuclear power generation, unlike all other forms of thermal electricity generation, all waste is regulated – none is allowed to cause pollution.
- Much of the waste produced is radioactive and therefore must be carefully managed as hazardous material. However, not all nuclear wastes are particularly hazardous or difficult to manage as compared to other toxic industrial wastes.

- In accordance with international guidelines, a comprehensive and consistent set of standards are being practiced all over the world for waste management system.
- Radioactive waste would be managed in a manner so as not to cause any undue radiation risk to the workers, the public (present as well as future generation) and the environment.
- Management of these wastes covers the entire range of activities right from handling, treatment, conditioning, transport, storage and disposal.

- Prevention
- Select reagents and procedures that minimize the volume and toxicity of all wastes.
- Avoid ordering excess radioactive materials than requirement.
- Non radioactive wastes must never be mixed with radioactive wastes.
- Promotion of non-radioactive tracers and methods for many common assays, and procedures used in biomedical assays.

- Substitute with short-lived radionuclides where feasible.
- Reduce the activity and volumes of materials used in the experiment to achieve minimal waste generation.
- Replace hazardous chemical solvents with formulations not regulated as hazardous or mixed wastes.
- Limit the number of users of radioactive materials.
- Limit the number of areas where radioactive materials are used.



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# THANK YOU

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