

**WASTE MANAGEMENT**-Solid waste management: A systematic administration of activities that provide for the collection, source separation, storage, transportation, transfer, processing, treatment and disposal of waste. Waste are classified in two parts

A. Solid waste

B. Liquid waste

**A. Solid waste**- Higher standard of living of ever increasing population has resulted is an increase in the quality and variety of waste generations Solid waste means wastes other than liquid or gaseous and accumulate on earth surface causes pollution. These wastes can be classified in following manner. The solid waste may be of two categories.

(1) **Biodegradable**- Degraded by microorganism like bacteria and fungi eg. all the biotic components and products.

(2) **Non-biodegradable**- It can not degraded by bacteria and fungi f or eg. polyethene and its products, glasses, and metal.

**(A) Sources of solid waste :-**

(i) **Domestic wastes** – Useless bottles, cane, packing paper, disposal glass, plastic sheet, paper, medical waste, broken glass etc.

(ii) **Biomedical waste** – anatomical wastes, pathological wastes infectious wastes.

(iii) **Construction waste** – Sand, debris, wood, concrete, broken bricks etc.

(iv) **Horticulture waste** – Vegetable part, residue, leafs and discarded fruits.

(v) **Slaughter house waste** – Clotted blood, waste mater, intestinal or undigested food etc.

(vi) **Industrial waste** – It included large no of material including factor rubbish, packing raw materials, organic waste, metals, alkali and acidic, ash from thermal power plants, radioactive waste from Nuclear power plant scrub leather etc.

**(B) Effects of solid waste :-** People clean their houses and commercial area and dump the waste material on soil it causes several problems.

a. **Foul smell** – Decomposition of biotic waste release harmful gases release foul or anoxious smell in environment which can be harmful for the localities.

b. **Good Platform for the vector of diseases**- Mosquitoes, flies, insects and rats grow rapidly on dumping area and causes harmful effects on human health.

c. **Spreads of diseases**- Harmful bacteria, viruses and fungi grows on dumping area and causes harmful diseases.

d. **Toxicity**- Toxic metals, inorganic wastes, insecticides, cleaning agents etc accumulates on environment and makes polluted. These toxicants goes in to the ground water by rain water and make polluted.

e. **Global warning**- Organic waste like animal dung, human excreta and agriculture waste release  $\text{CH}_4$ ,  $\text{NH}_3$  and  $\text{CO}_2$  are causes green hours effects on environment.

**(3) Managements of solid waste** for the best management of solid waste works on 3R pattern for safe life and environment.

**(a) Reduction in use of raw material-** reduce the use of raw material will decrease the production of waste'

**(b) Reuse of solid waste-** Used material like paper, glass, polythene, metals and rubbers products reuse it will also decrease the demand of new material.

**(c) Recycling of solid waste-** Recycling of wastes products like metals, glass, paper can be recycling by several processes and can make new products.

Matter which can not be use in 3R patterns and are known as discarded solid waste and these can be dump on earth surface by following methods.

**(1) Sanitary Landfill-** It is modern technique to fill the non- fertile land, usually the dumping area is covered with plastic sheet which protect the contamination of ground water.

**(2) Biogas Plants-** Animal wastes, plant wastes dead leaf, and cell debris produce the methane gas during anaerobic decomposition and decomposition of biotic wastes in the tank, we can trap the gas by biogas plants and use as a source of energy.

**(C) Biofertilizers-** After decomposition in biogas plants the waste material we can use as a source of energy.

**(D) Composting-** Animal wastes, plant wastes dead leaf, and cell debris etc can be decomposed by the using of earthworms.

**(E) Incineration-** Burning of solid waste at high temperature more than 900<sup>0</sup>C but this process release harmful gases in the environment but it is a big tool to for solid waste managements.

**(F) Pyrolysis-** Solid waste is kept in the closed chamber at high temperature in the absence of O<sub>2</sub>, it reduce the size of waste we can dump that waste in a small place.

**B. Liquid Waste-** A systematic administration of activities that provide for the proper handling, treatment and disposal of liquid waste/wastewater or sewage.

**Classifications of liquid waste/sewage** -Waste water or sewage that are generated from a home or community including toilet, bath, laundry, lavatory, and kitchen- sink wastes, and surface run off may be classified into four. These are

**1) Inorganic pollutants:-** The category of water pollutants consists of acids, alkalis salts, metallic complexes, trace element organometallic compound, detergents from chemical industries, coal mines etc cause pollution when reaches in axes amount in water.

**2) Toxic metals:-** Toxic metals are added in water from industrial activities, domestic sewage, fossil fuel burning, traces of heavy metals etc. Such as Pb, Hg, Cd, Co, Mn, Ag & Cr have been identified deleterious to aquatic ecosystem for human health. These metals reach into water bodies & shows toxic effect there.

**3) Disease causing agents creating pollution in water:** - Pathogenic microbes like bacteria, viruses & parasites which can endanger to health. The potable water contaminated with municipal sewage is the root cause of dangerous diseases in living organisms.

**4) Radioactive pollutants in water:** - Radium is the most significant waste product & is considered to be a hazard in drinking water. Radioactive pollutant goes in water bodies by nuclear reactors, radioactive fallout, mining & ores & research operations etc.

**5) Plant nutrients as pollutants:-** plant nutrients constituent an important factor for plant growth. Nitrogenous & phosphorous goes in aquatic systems & causes ***eutrophication***. The se nutrients are releases from fertilizers, domestic & industrial waste, urban drainage, detergents, animals wastes etc.

**6) Thermal pollutants in water:** - It increases the temperature of water bodies, temperature of water is also show the concentration of dissolved oxygen in water. Chemical industries, electric power-plant, atomic power-plants, sugar mills etc discharge their wastes in heating forms. *A coal power plant releases 16.7 joules of heat water for every 1441.8 joules of just burnt. The heated water have reduced amount of oxygen content which results into killing pf aquatic life.*

**7) Pesticides pollutants in water:** - Pesticides like insecticides, fungicides, herbicides enter in water bodies through rain water, run off agricultural field, domestic sewage, & industrial effluents. Pesticides reach in the aquatic ecosystem & terrestrial organism ranging from acute toxicity to invisible chronic effects in man, animals & plants ***[Bioaccumulation & Biomagnification]***.

**8) Organic pollutants:-** Organic pollutants enter into water bodies through domestic sewage, industrial wastes, wastes from slaughter house, meat packing plants, plants nutrients, detergents & domestic compound goes in water bodies & makes polluted.

**9) Sewage & domestic wastes:-** About 75% of water pollution caused by sewage. Sewage contains decomposition of organic matter & exert oxygen demand on the receiving waters.

**11) Farm wastes in water:-** Cattle, pigs, poultry farm wastes causes considerable water pollution. These wastes contain several pathogens which are transmitted to man through water.

### **Effects of liquid waste;**

**1) Oxygen demanding wastes:-** Organic matter which reaches to water bodies are decomposed by microorganism. Decomposers absorb the DO of water & decreases

aeration photosynthesis activity in water, respiration of animals & plants. DO 8-15 mg/l for active aquatic life less than 5 mg/l O<sub>2</sub> is not desirable for aquatic life including fish.

**2) Nitrogen & phosphorus compounds:-**Eutrophication creates lack of O<sub>2</sub> & release foul smelling gases. Excess growth of decomposition of plant material will change the concentration of CO<sub>2</sub> & pH of water, changing pH, O<sub>2</sub> & temperature will change many physico-chemical characteristics of water.

**3) Pathogens:** - Especially sewage contain many pathogenic & non-pathogenic micro-organisms & many viruses. Water born diseases like cholera, dysentery, typhoid, jaundice etc are spread by water contaminated with sewage.

**4) Toxic compounds:-** Pollutants such as heavy metals, pesticides, cyanides & many other organic & inorganic compounds are harmful to aquatic organisms. The non-biodegradable toxic compound biomagnified in food chain & causes toxic effects at various levels of food chain substances like DDT not soluble in water. Their substances tend to accumulate in the organisms body called **bioaccumulation**. This concentration of their toxic substances build up at successive levels of food chain this process is called "**biomagnification**".

### **Liquid waste management;**

**1) Reduce the uses of pesticides & insecticides from agriculture.**

**2) Avoid the uses of sloped land uses.**

**3) Separate drainage of sewage & rainwater.**

**4) Stop deforestation & reduces the used forest resources.**

**5) Reforestation.**

**6) Treatment of waste water from should be proper by following manner.**

**A) Thermal pollution :-** By using cooling methods

(a) Dry pond.

(b) Sprinkling.

(c) Cooling towers.

**B) Using solar power plant:** - Titanium dioxide works as a catalyst in the presence of sunlight breaks toxicants.

**C) By using water plant:-** Aquatic weeds in water bodies can 1000 times purifying capacity

of water.

D) **By using chemical treatment:** - Generally, chemicals precipitation, solvent extraction & absorption system are applied to remove heavy metals.

E) **Removals of salt by R.O method:** - It is a good tool which can protect & secure the salinity of pond water, sand & other settle down. After the water goes in sedimentation tank where most suspended particles are suspended. About 35% BOD & 60% suspended solids are removed by primary treatment.

E) **Biological method:** - It is biological process which involves microorganism. It removes up 90% of BOD & 90% of suspended solids. BOD wastes are stabilized. Treatment methods are grouped into three general categories:

1. **Primary treatment:** Screening, grit removal, and sedimentation (settling)
2. **Secondary or biological treatment:** biological processes and additional settling.
3. **Tertiary or advanced treatment:** not all sewage treatment plant requires tertiary (advanced) treatment.



