Chapter 18: Wastewater Story

- Making use of water for day-to-day chores make water unclean or dirty.
- Wastewater: the water which is contaminated by its use in bathing, cleaning or used in other industrial processes like mixing it with oil. This contaminated black or brown water runs down drains, sinks, showers etc.
- This waste water can be reused by treating it and removing all the pollutants.

- **WATER: A NECESSITY**

1.) One of the basic needs of humans is clean water. Due to its immense use by humans, there is scarcity of clean water.
2.) Due to this large number of water-borne diseases are caused.
3.) To get clean water many people have to walk a large number of kilometers.
4.) There is a constant need of clean water due to population growth, pollution, industrial development, mismanagement and other factors.
5.) World Water Day, is celebrated on 22 March from 2005.
6.) A number of efforts have been made to conserve safe drinking water so, a large number people who do not have access to safe drinking water get clean water.
7.) Cleaning or treating of water is a process of removal of pollutants, as it can be reused. It is known as "Sewage Treatment".

- **SEWAGE:**

1.) Sewage is a complex liquid mixture released from houses, hospitals, industries etc.
2.) Sewage has a number of dissolved and suspended impurities in it.
3.) Other than this water also contains run-off water from street during a storm or heavy rain
4.) To sum up sewage has suspended solids, organic and inorganic impurities, nutrients, saprophytes and disease-causing bacteria and other microbes.
5.) Content of sewage are listed in the table below:

SR. No	Contaminant	Example
1.	Organic impurities	Human faeces, animal waste oil, urea (urine), pesticides, herbicides, fruit and vegetable waste, etc.
2.	Inorganic impurities	Nitrates, Phosphates, metals.
3.	Nutrients	Phosphorus and Nitrogen.
4.	Bacteria	*Vibrio cholera, Salmonella paratyphi, protozoans*

- Clean potable water is supplied to home or public building by one set of pipes.
- Whereas another plumbing line carries away the waste water.
- A complex network of all the pipes (sewers), forming the sewerage.
- The sewerage system is a transport system which carries wastewater from the point of generation to the point of disposal.
- After 50 m to 60 m in the sewerage there is a manhole.

- **TREATMENT OF POLLUTED WATER:**

- Waste water is treated in wastewater treatment plant (WWTP)
- There are a number of processes involved such as physical, chemical, and biological processes.
- Removal of physical, chemical and biological matter contaminating the wastewater is carried out at such treatment plants.
- In the first step insoluble impurities like rags, sticks, cans, plastic packets, napkins are removed by passing the water through large bar screens.
- Dirt or dust particles like grit, pebbles and sand particles are removed in settling tanks. This increases the speed of waste water.
- After this water is made to settle in a large tank which has a slopping end towards the middle.
- Solids material like faeces etc. called as sludge settle down at the bottom of the tank and are removed by scrapers.
- Clarified water is obtained by the skimmers which removes any insoluble, floating solids like oil and grease.
- Anaerobic bacteria then treat the sludge in separate tank where the decomposition reaction takes place. biogas is produced as a side product.
- Biogas can be used as fuels or produce electricity.
- After this process the clarified water is subjected to air which then supports the growth of aerobic bacteria.
- Activated sludge is formed by action of bacteria when these bacteria get settled at the bottom of the tank water decomposition reaction.
- The water is collected from the top.
- The sludge is dried by water removal by machines. This dried sludge is used as manure, organic matter and nutrients to the soil.
- The treated water from organic material and suspended matter.
- This water can then be discharged in sea, river where nature can now clean it up further.
- Chlorine and ozone can be used for disinfecting water before releasing it into the water distribution channel.

➢ BECOMING A RESPONSIBLE CITIZEN:

- Due to human activities large amount of waste water is generated continuously.
- One should use water responsibly so that less waste water is generated.
- In the rainy season, fowl smelling water, open drainage systems, over flowing sewers, all contribute to generating large amounts of waste water.
- All this ultimately leads to unhygienic and unsanitary living conditions where Flies, mosquitoes breed.
- On an individual level as a responsible citizen one can contact the municipal cooperation's or gram panchayat of that area and ask them to take necessary action.
- Make sure that your neighboring sewers are well maintained.

➢ BETTER HOUSEKEEPING PRACTICES:

- Individuals should keep a watch on what is being added to the drainage system.

- Cooking oils and fats directly affect the pipeline by making it hard or clogging it. So, oils should be disposed in dustbins instead of the drainage system.
- Paints, solvents, insecticides, motor oil, medicines are all chemical in nature which are known to inhibit the growth of aerobic bacteria which help in clearing water. So, care must be taken not to dump such chemicals in the drain.
- When remnants of foo d products, used tea leaves, Sanitary napkins should be disposed in bins. If disposed in water tanks, it causes blockage, as well as drainage problems and delays the process of degradation.
- People should actively participate in cleanliness drives initiated by government of India like the "Swachh Bharat" program in 2016.
- A new strategi has been adapted in which the toilets are designed in such a way that human fecal matter is treated by earthworms and is converted into vermi cakes – which can be used as compost

➢ **SANITATION AND DISEASE:**

1.) A large number of diseases are caused by contaminated drinking water, where the sanitation practices are not up to mark.
2.) In a vast country like India, a large number of people excrete in the open which comes in contact with water directly.
3.) Fically contaminated water can be a human hazard responsible for soil and ground and surface water pollution
4.) Groundwater can be obtained from wells, tube wells, springs and many rivers and is easily contaminated by bacteria responsible for water born infections

➢ **ALTERNATIVE ARRANGEMENT FOR SEWAGE DISPOSAL:**

1.) Sanitation practices can be improved in a community by constructing low-cost onsite sewage disposal systems like septic tanks, composting pits etc.
2.) Usually in isolated buildings, hospitals, where well maintained sewerage system is not available septic tanks are used.
3.) In some areas on-site human waste disposal technology are used. In this human scavenging is not required. The human excreta are transported from the toilet through drains into biogas units.

➢ **SANITATION AT PUBLIC PLACES:**

1.) Sanitation fairs to make people aware is a very common practice.
2.) Waste generated in railway stations, bus depots, airports,hospitals should be disposed off properly so that contagious disease do not break out in these areas.
3.) The standards laid down by the government should be strictly followed.
4.) On an individual level, a person should not throw litter in public places and make use of dustbins.

➢ **<u>CONCLUSION:</u>**

- Keeping the environment clean is the responsibility of all the individuals in a society.
- One should maintain clean drinking water and not pollute the water.
- Practicing good sanitation practices is a good habit.