

An underwater scene with sunlight rays filtering through the water. The background is a deep blue, and the foreground shows silhouettes of coral and seaweed. The text "WATER POLLUTION" is overlaid in the center in a bold, white, sans-serif font.

WATER POLLUTION



Contents

- Introduction
- Water pollution
- Types of water pollution
- Classification of pollution
- Sources of Water Pollution
- Causes of water pollution
- Impacts of water pollution
- Problems of using polluted water
- Preventive measures

INTRODUCTION

- Water is a precious source and without life is not possible on earth
- Water is a good solvent and many different chemical substances are found dissolved in water. Gases in the atmosphere will dissolve in rainwater as it passes through the air.
- By the time water reaches a stream or river, it will contain a variety of chemical compounds dissolved within it from the air and from the rocks and soil through which it has percolated. These compounds may be completely harmless, naturally occurring substances, but they may also include pollutants.

Pollution

- Pollution can be defined as the introduction into the natural environment (air, water or land) of substances (pollutants) that are liable to cause harm to human health or to animals, plants and the wider environment.

Water Pollution

- **Water pollution can be defined as presence of solid, liquid or gaseous contaminants in such concentration that may alter the quality of water.**
- **Water pollution is defined as the addition to water of an excess material or heat that is harmful to the living organism or which impairs the beneficial use of water.**

Types of water pollution

- **There are two types of water pollution:**
 1. Organic pollution due to microorganisms - bacteria and viruses - present in the water, generated by excrement, animal and vegetable waste
 2. Chemical pollution generated by the nitrates and phosphates of pesticides, human and animal drugs, household products, heavy metals, acids and hydrocarbons used in industries

Classification of pollutants

- Sediments and suspended solids
- Nutrients
- Biological pollutants
 - i-Bacteria
 - ii-Viruses
 - iii-Protozoa
- Chemical pollutants
 - i-Heavy metals
 - ii-Pesticides(insecticides, herbicides and fungicides)
- Types of pollutant defined by their source

Sources of water Pollution

➤ Point Sources

➤ Non-Point Source

Water pollutants come from either point sources or dispersed sources

- point source is a pipe or channel, such as those used for discharge from an industrial facility or a city sewerage system
- A dispersed (or nonpoint) source is a very broad, unconfined area from which a variety of pollutants enter the water body, such as the runoff from an agricultural area
- Point sources of water pollution are easier to control than dispersed sources

➤ Most types of pollution affect the immediate area surrounding the source

➤ Transboundary pollution

It goes without saying that water pollution can't be contained by a line on a map.

Sometimes the pollution may affect the environment hundreds of miles away from the source, such as nuclear waste, this is called transboundary pollution.

❖ Transboundary pollution is the result of contaminated water from one country spilling into the waters of another. Contamination can result from a disaster—like an oil spill—or the slow, downriver creep of industrial, agricultural, or municipal discharge.

Causes of Water Pollution

The principal sources of water pollution resulting from exploring and production operations are:

- Domestic, Sewage and Solid wastes
- Marine Dumping
- Radioactive waste
- Industries
- Aquatic plants
- Acid Rain
- Oil Industry
- Urbanization and deforestation.....etc.

Causes of water pollution

1. Domestic waste

Dumping of household waste into water.



Causes of water pollution

2. Sewage waste



Causes of water pollution

3. Solid waste



- Solid waste causes blockage in flow of water.
- It causes water as well as air pollution.
- Polythene is the main solid waste.

Causes of water pollution

5. Aquatic Plants

- Water hyacinth, an aquatic plant causes pollution in water.
- It is long leaved plant which grows faster in water bodies and absorbs all essential nutrients from water which is fatal for marine organisms.
- It is also known as 'Terror of Bengal' due to its abundance.



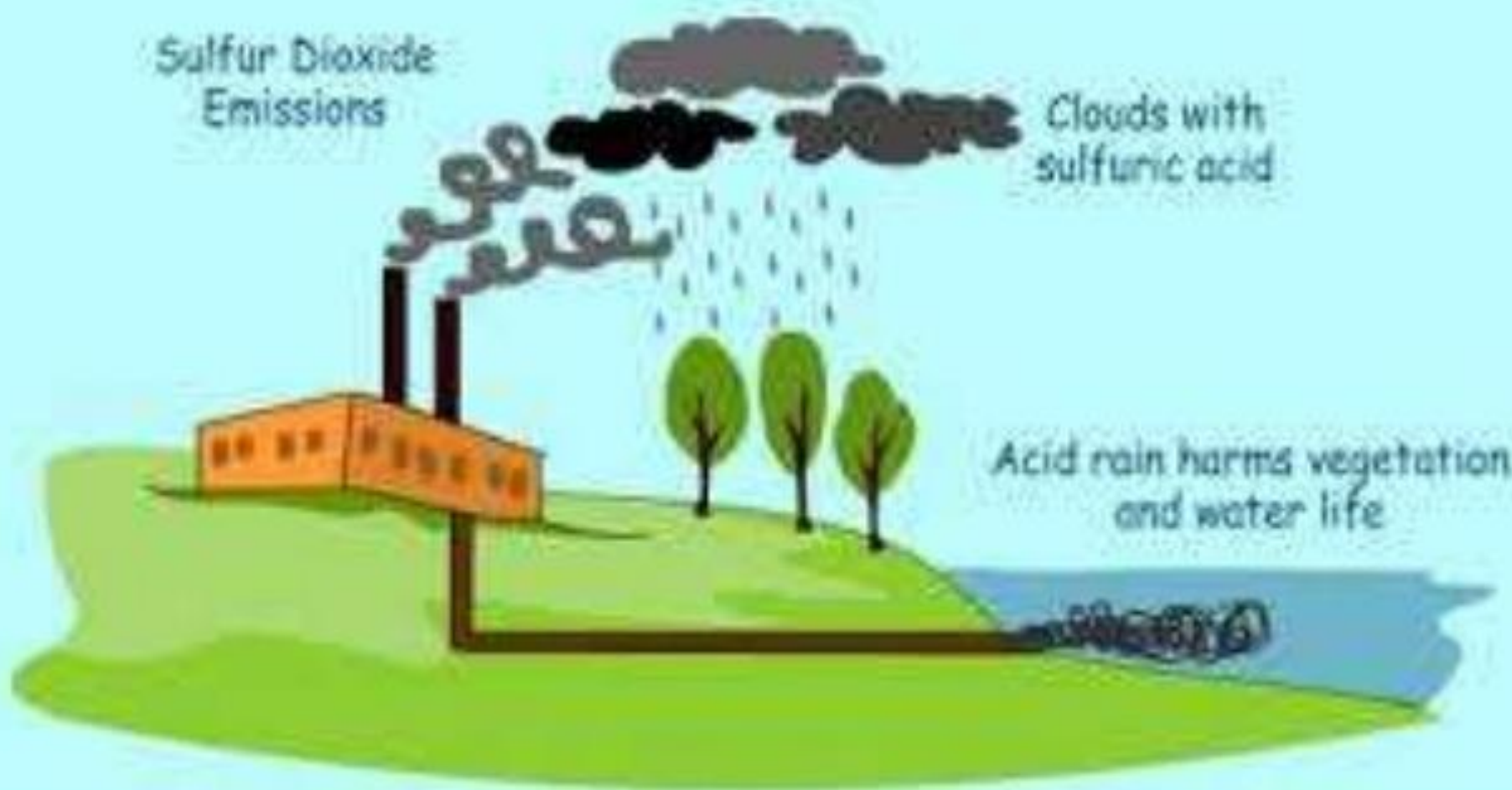
Causes of water pollution

5. ACID RAIN

Sulfur Dioxide
Emissions

Clouds with
sulfuric acid

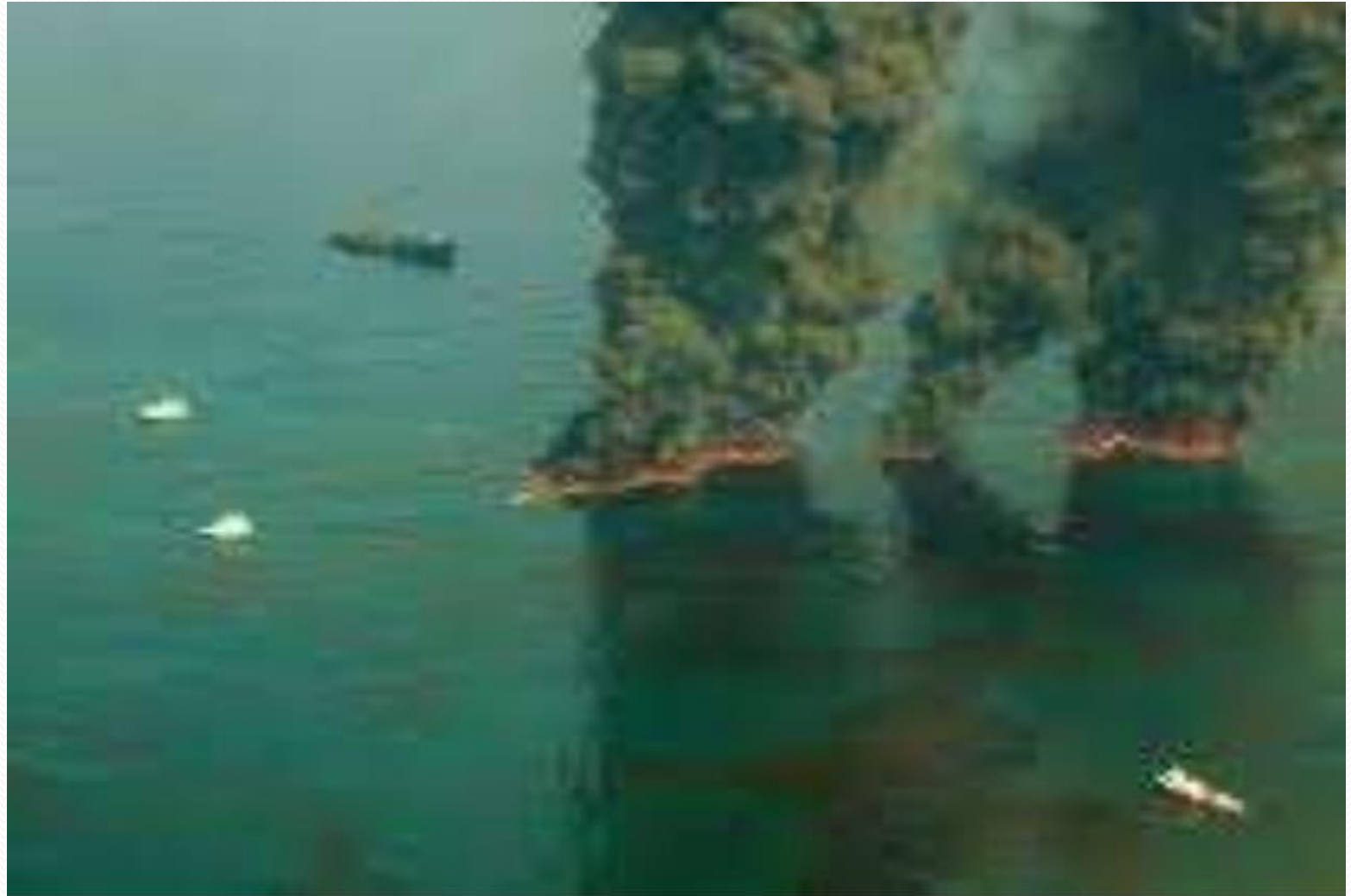
Acid rain harms vegetation
and water life



Causes of water pollution

6. Oil Industry





7.URBANIZATION AND DEFORESTATION

- It does not have a direct impact on water quality, urbanization and deforestation have a lot of indirect effects.
- For instance, cutting down trees and concreting over large areas generates an acceleration of flows which does not give enough time for water to infiltrate and be purified by the ground.



8. AGRICULTURE

- An impact on water pollution due to the use of chemicals such as fertilizers, pesticides, fungicides, herbicides or insecticides running off in the water
- As well as livestock excrement, manure and methane (greenhouse effect).
- Regarding aquaculture, pollution is directly in the water, as excess food and fertilizers are causing desertification



9. RADIOACTIVE WASTES

- Generated - among others - by power plants and uranium mining, radioactive waste can linger in the environment for thousands of years.
- Substances are released accidentally or disposed improperly, they threaten groundwater, surface water, as well as marine resources.



10.INDUSTRIES

- Produce a lot of waste containing toxic chemicals and pollutants.
- A huge amount of the industrial waste is drained in the fresh water which then flows into canals, rivers and eventually in the sea.
- Source of water pollution is the burning of fossil fuels, causing air pollution like acid rain which then flows to streams, lakes, and other stretches of water.



11.MARINE DUMPING

- Everyday, garbage such as plastic, paper, aluminum, food, glass, or rubber are deposited into the sea.
- Items like these take weeks to hundreds of years to decompose
- Major cause for water pollution.





Effects of Water Pollution

WHAT ARE THE EFFECTS

A photograph of a dead fish lying on a sandy beach. To the right of the fish, a yellow and white plastic bottle lies on its side. The background shows the ocean waves crashing onto the shore. The image is used to illustrate the effects of water pollution.

- There are many effects of water pollution as it is not only harmful to animals and water life but humans too. Some effects of water pollution include: death of water animals, breakdown of food chains and diseases in humans as people (eg cholera) can eat seafood that has been polluted or poisoned.

Effects of Water Pollution

1. Death of aquatic organisms



Effects of Water Pollution

2. Rivers are changed into dustbin



Effects of Water Pollution

3. Shortage of drinking water



Effects of Water Pollution

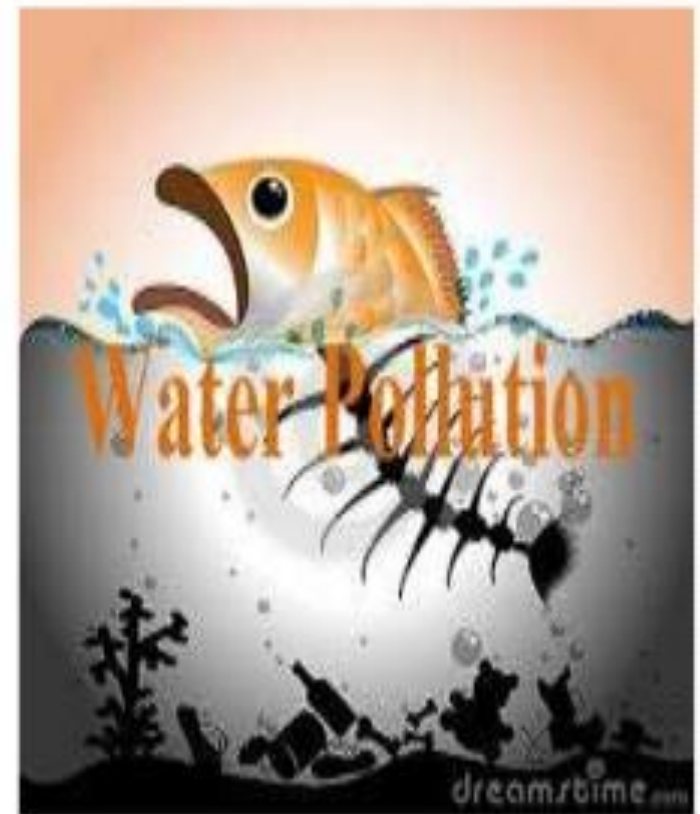
4. Increase in BOD

BOD



The biochemical oxygen demand is defined as the 'measure of dissolve oxygen require to decompose the organic matter in water biologically.

Pure water has < 1ppm
Polluted water >5ppm



5.ON THE ENVIRONMENT

- Water pollution truly harms biodiversity and aquatic ecosystems.
- The toxic chemicals can change the color of water and increase the amount of minerals - also known as **eutrophication** - which has a bad impact on life in water.
- Thermal pollution, defined by a rise in the temperature of water bodies, contributes to **global warming** and causes serious hazard to water organisms.



6.ON HUMAN HEALTH

- Water pollution has very negative effects on public health
- Waterborne pathogens, in the form of disease-causing bacteria and viruses from human and animal waste, are a major cause of illness from contaminated drinking water
- A lot of diseases result from drinking or being in contact with contaminated water, such as diarrhea, cholera, typhoid, dysentery or skin infections
- In zones where there is no available drinking water, the main risk is dehydration obviously

Cont.....

- Even in wealthy nations, accidental or illegal releases from sewage treatment facilities, as well as runoff from farms and urban areas, contribute harmful pathogens to waterways
- Thousands of people across the United States are sickened every year by Legionnaires' disease (a severe form of pneumonia contracted from water sources like cooling towers and piped water), with cases cropping up from California's Disneyland to Manhattan's Upper East Side

Problems of using polluted water

- Impacts of using contaminated water for drinking have been discussed in previous study sessions. However, we use water for other purposes that can also be affected by water pollution such as irrigation, for livestock and for recreation
- Contaminants in irrigation water, may accumulate in the soil and, after a period of years, render the soil unfit for agriculture
- Even when the presence of pesticides or pathogenic organisms in irrigation water does not directly affect plant growth, it may potentially affect the acceptability of the agricultural product for sale or consumption

- Poor quality water can affect livestock by causing death, sickness or impaired growth. Some substances, or their degradation products, present in water used for livestock may occasionally be transmitted to humans
- Purpose of good quality water used for livestock watering is, therefore, to help protect both the livestock and the consumer
- Contaminated water also has health problems for those who swim in it
- They may become ill if the water is contaminated with faecal material or with microorganisms that could cause gastrointestinal illness or ear, eye or skin infections.

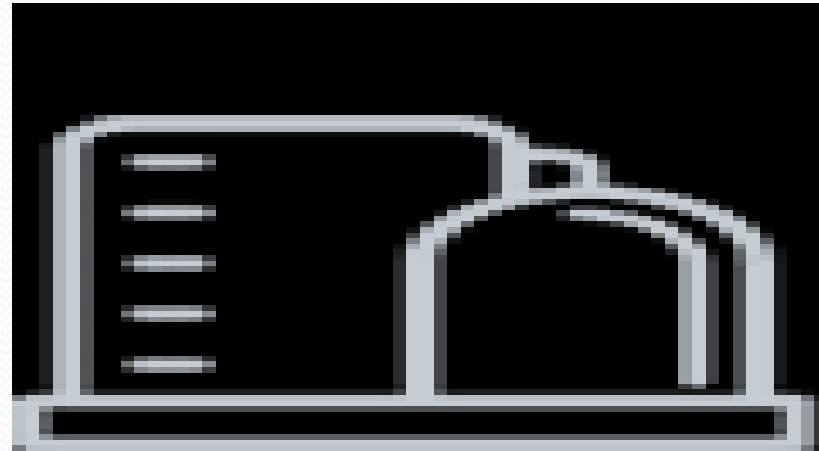


Water pollution prevention

- Here's a list of water pollution solutions:

1. Wastewater treatment

Wastewater treatment consists of removing pollutants from wastewater through a physical, chemical or biological process. The more efficient these processes are, the cleaner the water becomes.



2. Sewage Treatment Plant

Pipes take water to treatment center

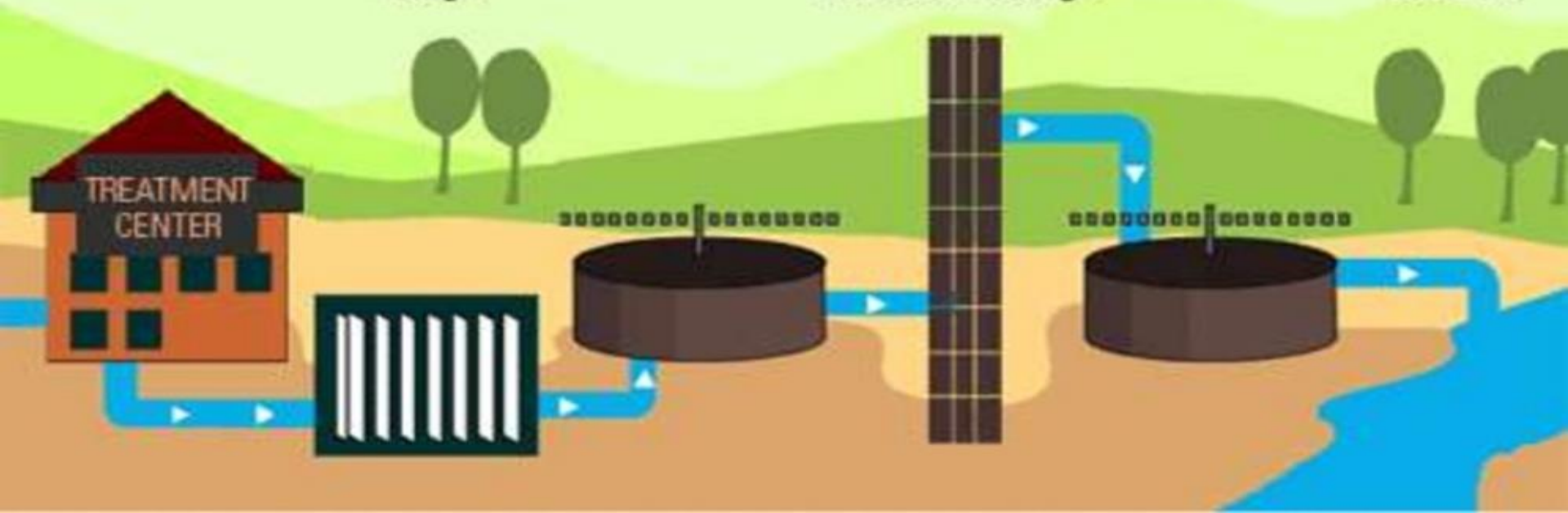
Screening stage

Primary treatment stage

Secondary treatment stage

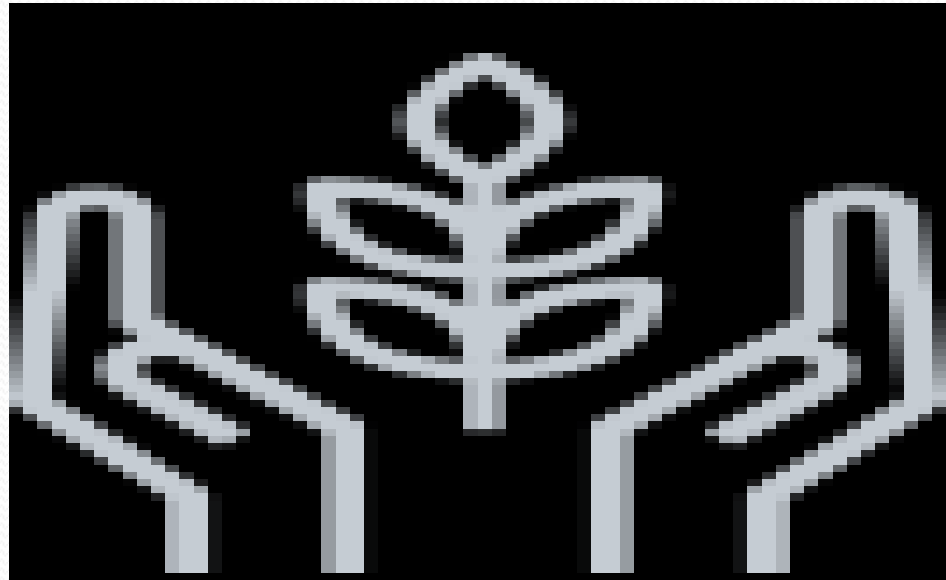
Final treatment stage

Filtered into river



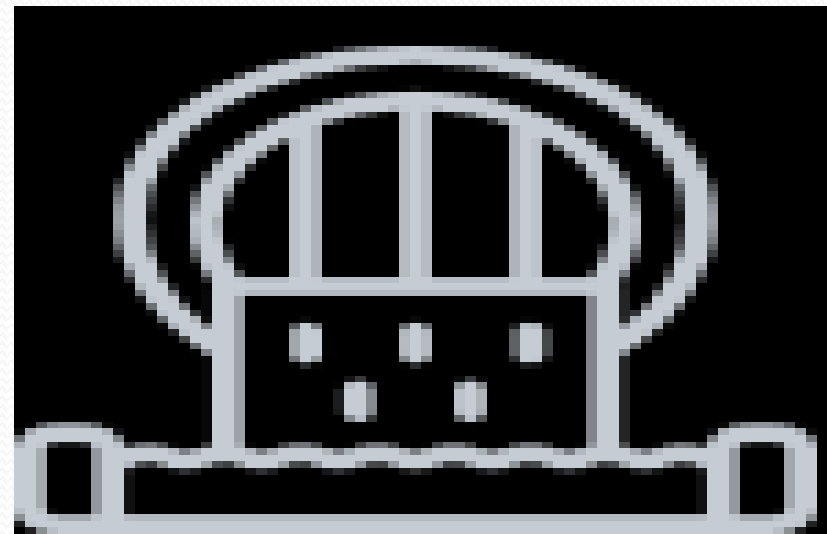
2. Green agriculture

- Globally, agriculture accounts for 70% of water resources, so it is essential to have climate-friendly crops, efficient irrigation that reduces the need for water and energy-efficient food production.
- Green agriculture is also crucial to limit the chemicals that enter the water.



3. Stormwater management

- Stormwater management is the effort to reduce runoff of rainwater or melted snow into streets, lawns and other sites and the improvement of water quality” according to the **US Environmental Protection Agency (EPA)**.
- It is important to avoid pollutants from contaminating the water and helps to use water more efficiently.



4. Air pollution prevention

- Air pollution has an indirect impact on water contamination as 25% of human induced CO₂ emissions are absorbed by oceans.
- This pollution causes a rapid acidification of our oceans, and threatens marine life and corals. Preventing air pollution is the best way to prevent this from happening.



5. Plastic waste reduction

- 80% of plastic in our oceans is from land sources.
- In order to reduce the amount of plastic entering our ocean, we need to both reduce our use of plastic globally
- and to improve plastic waste management.



6. Water conservation

- Without water conservation, we won't go very far.
- It is central in making sure the world has better access to clean water.
- It means being aware that water is a scarce resource, taking care of it accordingly, and managing it responsibly.

