

Pollution of Air and Water

- **Global warming** - The rise in overall temperature of the earth because of the green house effect is referred as global warming.
- **Air pollution**
 - The layer of air present around the earth is called atmosphere.
 - Atmosphere is composed of 78% of nitrogen, 21% of oxygen, and 1% percent other gases such as carbon dioxide, ozone, water vapour, methane, etc.
 - The phenomenon of contamination of air with unwanted substances so that it becomes harmful for living organisms and non-living substances is known as **air pollution**.
 - The substances, which cause air pollution, are called **air pollutants**.
 - Sources of air pollution are
 - Power plants
 - Factories
 - Automobiles
 - Burning of firewood
- **Types of air pollutants**
- **Carbon monoxide**
 - It is a colourless poisonous gas.
 - It is produced from incomplete burning of fossil fuels.
- **Smog**
 - It is made up of smoke and fog.
- **Sulphur dioxide**
 - It is produced from combustion of fuels.
- **Nitrogen dioxide**
 - It is produced from incomplete burning of fuels.

- **Chlorofluorocarbons (CFCs)**

- They are released from refrigerators, air conditioners, and aerosol sprays.
- They cause damage to the ozone layer resulting in the formation of ozone hole.

- **Suspended particulate matter**

- It comprises of tiny particles, which remain suspended in air for a long time.
- They are produced during burning of fossil fuels in power plants, mining, steel making, and other industrial processes.

- **Types of air pollutants**

- **Carbon monoxide**

- It is a colourless poisonous gas.
- It is produced from incomplete burning of fossil fuels.
- It reduces oxygen carrying capacity of the blood.

- **Smog**

- Smog is made up of smoke and fog.

- **Sulphur dioxide**

- It is produced from combustion of fuels.
- It causes respiratory problems including permanent lungs damage.
- It causes formation of acid rain.

- **Nitrogen dioxide**

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- It causes respiratory problems.
- It causes formation of acid rain.

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- **Suspended particulate matter**

- It comprises of tiny particles, which remain suspended in air for a long time.
- They are produced during burning of fossil fuels in the power plants, mining, steel making, and other industrial processes.
- They reduce visibility and cause haze.
- They cause respiratory diseases on inhalation.

- Soot released from Mathura refinery has caused yellowing of the marble of Taj Mahal.

- **Acid rain**

- It is formed when sulphur dioxide and nitrogen dioxide present in air react with water droplets to form nitric and sulphuric acid.
- When it rains, it brings these acids along with it, which causes damage to plants, animals, and monuments.
- Acid rain has caused corrosion of the marble of Taj Mahal.

- **Greenhouse effect**

- Trapping of heat by gases (CO_2) in the atmosphere.
- Gases that cause the greenhouse effect are responsible for increasing the temperature of the Earth and thus contributing to the phenomenon called **global warming**.

- **Causes of Green house effect**

- A part of solar radiations cause warming of the earth's surface.
- A part of solar radiation is reflected back, which is trapped by the earth's atmosphere. This phenomenon is called green house effect.

- **Green house gases**

- These are the gases, which trap the solar radiations, and in this way, are responsible for the increase in the temperature of Earth.
- The examples include carbon dioxide, methane, nitrous oxide, and water vapours.

- **Global warming**

- The CO_2 level in atmosphere is increasing due to various human activities such as deforestation and burning of fossil fuels.
- Build up of CO_2 in the atmosphere will result in a rise in the average temperature of earth's atmosphere, leading to global warming.
- Global warming will lead to melting of glaciers and increase in the sea level.

- **Prevention of air pollution**

- Use of clear fuels such as CNG, LPG, and unleaded petrol in public and private transport.
- Use of renewable sources of energy such as solar, wind, and hydel energy.
- Planting more and more trees to prevent pollution.

- Prevent burning of dry leaves and use them in composting.
- Kyoto protocol is an agreement between various countries for reducing green house emission.
- The addition of harmful substances to water, as a result of which its physical, chemical, and biological properties get altered, is called **water pollution**.
- **Types of water pollutants**
- **Domestic sewage**
 - It is composed of food wastes, detergents, and disease-causing pathogens.
 - The bacteria present in faecal matter of mammals indicate the pollution levels in a river and if such water is consumed, it may cause various diseases.
- **Industrial waste**
 - It is rich in toxic chemicals such as arsenic, fluorides, and lead.
 - It causes toxicity in plants and animals.
 - It affects the soil by causing changes in its acidity and growth of worms.
- **Agricultural waste**
 - It is rich in agricultural pesticides and weedicides.
 - It causes ground water pollution.
 - It causes an increase in the population of algae in water.
 - When these algae die, they are acted upon by decomposers, which use lots of oxygen dissolved in water leading to depletion of dissolved oxygen.
 - This results in the death of fish and other aquatic organisms.
- **Release of Superheated Water**
 - The release of superheated water from some industries and nuclear power plants causes thermal pollution of the water bodies.
 - The abrupt change in the temperature of water body can kill the fish and other organisms adapted to particular temperature range.

Methods of preventing water pollution

- Industrial waste must be chemically treated to remove harmful substances before dumping into the water bodies.
- Disposal of human and animal excreta into water should be avoided.
- Sewage water must be treated before releasing into the rivers.
- **Water pollution**
 - It is the mixing of harmful substances in water such as sewage and toxic chemicals so that its physical and chemical properties get altered and it becomes toxic for living organisms.
 - Substances that pollute water are called water pollutants.
- **Sources of water pollution in Ganga river**
 - Untreated discharges from textile, paper and sugar mills, and oil refineries.
 - Disposal of agricultural discharge from near-by fields, which are rich in pesticides and weedicides, into the river.
 - Flow of untreated domestic sewage into the river.
 - Cremation of dead bodies into the river.
 - Immersion of idols of gods and goddesses, flowers, garbage, and polythene bags into the river.
- **Ganga Action Plan** aimed to reduce the pollution levels in the river.
- **Conservation of water**
 - Reusing the waste water from the kitchen (water that has been used to wash vegetables, etc.) to water the plants in the garden
 - Turning the tap off while brushing or shaving
 - Checking for leaky taps and fixing them up
 - Rainwater harvesting
 - Using improved farming and irrigation techniques
 - Preventing pollution of water
 - Conserving and replenishing ground water

- Proper removal of silt from water bodies
- Preventing cutting of trees
- **Prevention of water pollution**
 - Proper treatment of industrial waste and domestic waste before their disposal into rivers.
 - Strict implementation of environmental laws in industrial units.
 - Reusing water used in kitchens (such as to wash vegetables) for watering plants.
 - Getting the leaky taps checked and preventing wastage of water.
- **Potable water**
 - Water that is fit for drinking is called potable water.
 - Methods of obtaining potable water.
- **Physical methods**
 - Sedimentation and filtration
 - Boiling of water
 - Use of domestic filters such as candle type filter
- **Chemical method**
 - Use of chlorine tablets
 - Infusion of ozone gas