UNIT 2:- Environmental Pollution

Definition: Environmental pollution refers to the contamination of the natural environment by substances that cause harm to living organisms and damage ecosystems. It occurs when pollutants exceed the environment's capacity to absorb and neutralize them.

a. Air Pollution

Definition: The presence of harmful or excessive quantities of substances in the atmosphere.

Causes:

1 Burning of fossil fuels (coal, oil, petrol, diesel).

2 Industrial emissions from factories.

3 Vehicle exhaust gases.

4 Deforestation and agricultural burning.

5 Use of aerosols and refrigerants.

Effects:

1 Respiratory problems and diseases such as asthma and bronchitis.

2 Smog formation reducing visibility.

3 Acid rain formation.

4 Global warming due to greenhouse gases (CO_2,

CH_4)

5 Damage to plants and animals.

Control Measures:

1 Use of clean and renewable energy sources.

2 Planting trees and afforestation.

3 Using catalytic converters in vehicles.

4 Reducing industrial emissions through filters.

5 Promoting public transportation and electric vehicles.

b. Water Pollution (Thermal and Marine Pollution)

Definition: Contamination of water bodies (lakes, rivers, oceans, groundwater) by harmful substances.

Causes:

1 Industrial effluents and sewage discharge.

2 Agricultural runoff containing pesticides and fertilizers.

3 Oil spills in oceans (marine pollution).

4 Thermal pollution from power plants releasing hot water.

5 Plastic waste dumped in water bodies.

Effects:

1 Depletion of dissolved oxygen affecting aquatic life.

2 Eutrophication (excessive growth of algae).

3 Waterborne diseases like cholera and typhoid.

4 Destruction of marine ecosystems and coral reefs.

5 Thermal pollution reduces oxygen and affects fish breeding.

Control Measures:

1 Proper sewage and waste treatment before discharge.

2 Ban on plastic dumping into water bodies.

3 Strict laws for industries to treat effluents.

4 Recycling and reuse of wastewater.

5 Oil spill management and clean-up technologies.

c. Land Pollution

Definition: Degradation of land due to the disposal of solid and liquid waste, chemical contamination, and deforestation.

Causes:

1 Improper disposal of solid waste and plastics.

2 Use of chemical fertilizers and pesticides.

3 Mining and deforestation.

4 Industrial and household waste dumping.

Effects:

1 Loss of soil fertility and agricultural productivity.

2 Groundwater contamination.

3 Loss of biodiversity and wildlife habitat.

4 Health hazards due to toxic waste exposure.

Control Measures:

1. Proper waste segregation and recycling.
2. Organic farming and minimal use of chemicals.
3. Reforestation and soil conservation.
4. Implementation of land-use policies.

d. Radiation Pollution and Nuclear Hazard

Definition: The release of radioactive substances into the environment causing harmful effects on humans and nature.

Causes:

1. Nuclear power plant accidents (e.g., Chernobyl, Fukushima).
2. Improper disposal of radioactive waste.
3. Use of nuclear weapons and testing.
4. Medical and industrial radiation sources.

Effects:

1. Cancer, genetic mutations, and birth defects.
2. Destruction of plant and animal life.
3. Long-term soil and water contamination.

Control Measures:

1. Proper handling and disposal of radioactive waste.
2. Safety protocols in nuclear plants.
3. Use of radiation shields and protective gear.
4. Monitoring and early warning systems.

e. Noise Pollution

Definition: Unwanted or harmful sound that disturbs human and animal life.

Causes:

1. Traffic, loudspeakers, and construction work.
2. Industrial machinery.
3. Aircraft and trains.
4. Household appliances and urban crowding.

Effects:

1. Hearing loss and stress.
2. Sleep disturbance and reduced concentration.
3. Wildlife disturbance and migration changes.

Control Measures:

1. Use of sound barriers and green belts.
2. Ban on loud horns and regulated industrial noise.
3. Use of silencers and noise-control devices.
4. Public awareness programs.

Solid Waste Management

Causes: Rapid urbanization, industrialization, and increasing consumerism.

Effects: Land degradation, water pollution, foul odour, and disease spread.

Control Measures:

1. Segregation of waste at source.
2. Recycling and composting.
3. Adoption of 3Rs – Reduce, Reuse, Recycle.
4. Proper landfill management and waste-to-energy conversion.

Global Warming and Climate Change

Global warming refers to the increase in Earth's average surface temperature due to greenhouse gases (CO_2, CH_4 , N_2O).- Carbon dioxide, Methane, Nitrous Oxide.
Climate change refers to long-term changes in temperature, rainfall, and weather patterns as a result.

Effects:

1. Melting of polar ice caps and rising sea levels.
2. Frequent floods, droughts, and cyclones.
3. Loss of biodiversity and agricultural productivity.
4. Health problems due to heat waves and diseases.

Ozone Depletion

Ozone layer depletion is caused by chlorofluorocarbons (CFCs) and halons that destroy ozone molecules, leading to increased UV radiation reaching the Earth.

Effects: Skin cancer, cataracts, and ecosystem imbalance.

Control Measures: Banning CFCs, promoting eco-friendly refrigerants, and international agreements like the Montreal Protocol.

Acid Rain

Causes: Emission of sulfur dioxide (SO_2) and nitrogen oxides (NOx) from vehicles and industries that react with water vapour to form acids.

Effects: Damage to crops, soil, aquatic life, buildings, and monuments.

Control Measures: Use of low-sulfur fuels, pollution control equipment, and afforestation.