Pollution

Environment: It refers to surroundings including air, water, soil, plants, animals, and human beings.

Pollution: It means any undesirable change in the natural quality of the environment due to physical, chemical, or biological factors.

Pollutant:
A pollutant is any substance present in the environment in excess quantity which causes harm to plants, animals and man.
Environment Pollution: It refers to unfavourable alteration of surroundings mainly due to human activities.

Classification of Pollutants

(i) Based on formation
- Primary pollutants: Pollutants released directly into the environment.
  Examples: Smoke, dust, carbon monoxide.
- Secondary pollutants: Pollutants formed by chemical reactions of primary pollutants.
  Examples: Smog, ozone.

(ii) Based on degradability
- Biodegradable pollutants: Pollutants decomposed by microorganisms.
Example: Sewage, food waste, paper.
- Non-biodegrable pollutants: Pollutants which persist for long periods.
Example: plastic, glass, pesticides, e-waste.

(iii) Based on quantity
- Quantitative pollutants: Naturally present substances harmful in excess quantity.
Examples: Carbon dioxide.
- Qualitative pollutants: Artificial substances not naturally present in nature.
Examples: Detergents, pesticides.

Types of Pollution

(i) Air pollution: It refers to the presence of harmful substances in air beyond safe limits.
Causes: • Vehicle exhaust.
• Industrial smoke.
• Burning of fossil fuels.
• Construction dust.

(ii) Water pollution: It refers to change in physical, chemical, or biological quality of water making it unfit for use.

Freshwater pollution: Pollution of rivers, lakes, and ponds.

Causes: • Untreated sewage.
• Industrial effluents. [effects].
• Agricultural runoff containing fertilizers and pesticides.
• Domestic and religious waste.

Marine water pollution: Pollution of seas and oceans.
Causes: • Sewage and industrial waste carried by rivers.
• Oil spills from ships and tankers.
• Offshore drilling.
• Mining activities.
• Plastic waste.
* About 80% marine pollution originates from land sources.

(iii) Soil pollution: It refers to degradation of soil quality due to waste and chemicals.
Causes: • Open dumping of solid waste
• Excessive use of fertilizers and pesticides.
• Disposal of sewage on land.

(iv) Noise pollution: It refers to unwanted sound causing irritation and health problems.
Causes: • Traffic.
• Loud music.
• Industrial machines.
Effects: • Headache.
• Stress.
• Hearing loss.
• Lack of concentration.

(v) Radioactive pollution: It refers to contamination caused by radioactive substances.
Man-made causes & are -
- Nuclear reactors.
- Nuclear weapon tests.
- Improper disposal of radioactive waste.

Reasons for dangerous:-
- Radiation damages body cells.
- Effects last long.

(vi) Nuclear pollution: It refers to pollution caused by nuclear fuels due to release of heat, radioactive wastes, and contaminated coolants into the environment.

Sources of Pollution

A. Pollution: Previous chapter

Forms of Pollution: a. Noise pollution.
b. Air pollution.
c. Water pollution.
d. Soil pollution.
e. Radioactive pollution.

Types of Sources of Pollution

a. Point sources
- Pollution come from a single, fixed, and identifiable source.
- Such sources are easy to monitor and control.
- Examples: Wastewater released from a factory through a pipe.

b. Non-point sources
- Pollution comes from many scattered sources.
- These sources are difficult to identify and control.
- Example: Fertilisers and pesticides washed into rivers by rain.

B. Sources of Noise Pollution:

a. Traffic
- Increase in number of vehicles increase noise levels.

- Traffic congestion leads to frequent honking.
- Continuous horn use cause stress.
- In cities, flyovers are fitted with fibre glass sheets which absorb sound and reduce noise pollution.

b. Factories
- Heavy machines run for long hours.
- Textile mills, metal works, and printing presses produce loud noise.
- Factories near residential areas disturb people.

c. Construction Sites
- Demolition and repair work produce loud sound.
- Heavy equipment like drills and cranes are noisy.
- Noise from construction sites is often worse than factories.

d. Loudspeakers
- Used during religious and social functions.
- Used during elections and public meetings.
- Excessive volume disturb nearby residents.

e. Airports
- Jet engines produce very loud noise.
- Noise is highest during take-off and landing.
- During landing, aircraft remain close to the ground for a longer time, increasing noise impact.

f. Defence Activities
- Artillery, tanks, and rockets.
- Military aircraft and explosions.

g. Household Sources
- Television and music systems.
- Mixer grinders and vacuum cleaners.
- Washing machines and air conditioners.

h. Agricultural Equipment
- Tractors.
- Harvesters.
- Tube wells.

c. Sources of Air Pollution
- Classification of Air Pollutants

a. According to origin

(i) Primary Pollutants
- Released directly into the atmosphere from sources.
- Cause immediate harm.
- Examples: Smoke, dust, carbon monoxide, sulphur dioxide, nitrogen oxides.

(ii) Secondary Pollutants
- Formed, when primary pollutants react in the atmosphere.
- Often more harmful.
- Examples: Ozone, sulphur trioxide, PAN (Peroxyacetyl Nitrate).

b. According to State of Matter

(i) Gaseous Pollution
- Present in gaseous form.
- Spread easily.
- Examples: Carbon dioxide, sulphur oxides, nitrogen oxides.

(ii) Particulate Pollutants
- Tiny solid or liquid particles suspended in air.
- Enter lungs and cause respiratory diseases.
- Examples: Dust, smoke, soot.

c. According to Sources

(i) Natural Sources
- Volcanic eruptions.
- Dust storms.
- Forest fires.

(ii) Man-made sources
- Industries.
- Vehicles.
- Power plants.
- Agriculture.

- Sources

a. Vehicular pollution
- Major source of air pollution in cities.
- Releases carbon monoxide and nitrogen oxides.
- Causes smog and breathing problems.

b. Industrial Pollution
- Cement, chemical, paper, and petroleum industries.
- Release smoke, dust, and toxic gases.
- Causes ~~acid~~ acid rain and health hazards.

c. Burning of Garbage
- Open burning releases poisonous gases.
- Produces smoke and foul smell.

d. Thermal Power Plants
- Burning of coal releases sulphur dioxide and nitrogen dioxide.
- Contributes to acid rain.

e. Smog
- Smog is a mixture of smoke and fog.
- Causes asthma, bronchitis, eye irritation.
- Reduces visibility and affects traffic.

f. Bursting of Crackers
- Releases smoke and harmful gases.
- Adds particulate matter to air.
- Produces loud noise causing noise pollution.

D. Sources of Water Pollution

a. Domestic Sources
- Sewage from houses enters water bodies.
- Detergents, plastics, and human waste pollute water.

b. Industrial Sources
- Factories discharge chemical waste into rivers.
- Heavy metals like lead and mercury poison aquatic life.

c. Agricultural Sources
- Excess fertilisers and pesticides wash into water bodies.
- Phosphates cause rapid growth of algae, known as eutrophication.

d. Biomedical Waste
- Hospital waste enters water through drains.
- Causes spread of diseases.

E. Sources of Soil Pollution
a. Chemical Fertilisers
- Excessive use reduces soil fertility.
- Changes natural composition of soil.

b. Pesticides
- Toxic residues remain in soil for long periods.
- Enter food chain through crops.

c. Biomedical Waste
- Disease-causing germs contaminate soil.
- Spread infections.

F. Sources of Radioactive Pollution
a. Natural sources
- Cosmic rays from outer space.

b. Man-made sources
[i] X-ray Waste
- Used in medical diagnosis and treatment.
- Damages body cells and genes.

[ii] Nuclear Power Plants
- Leakage from reactors releases radiation.
- Disposal of radioactive waste is dangerous.

[iii] Nuclear Weapons Testing
- Radioactive fallout spreads through air and rain.
- Pollutes soil and water.

[iv] Radioactive Isotopes
- Used in laboratories and research.
- Wastewater contaminates rivers and lakes.