

AIR POLLUTION

The presence of one (or) more contaminants like dust, smoke, mist, odour in the atmosphere which are injurious to human being, plants and animals.

Composition of atmospheric air

1. N₂ → 78%
2. O₂ → 21%
3. Ar → <1%
4. CO₂ → 0.037%
5. H₂O vapour → remaining
6. O₃, He, NH₃ → Trace amount.

Sources of air pollution

Natural sources

1. Volcanic eruptions
2. Forest fire
3. Biological decay
4. Pollen grains
5. Marsh gases
6. Radio active materials

Man-made activities

1. Thermal power plants
2. Vehicle emissions
3. Fossil fuel burning
4. Agricultural activities.

Common air pollutants – causes – consequence

1. Carbon monoxide (CO)

- a. Colour less, odour less gas
- b. It is poisonous gas to air-breathing animals.
- c. Emitted from incomplete combustion of fossil fuels and wood.
- d. Industries and cigarette smoking also produce CO

e. effects:

It affects the O₂ carrying capacity of blood. So the reduced amount of O₂ is supplied to brain, heart, tissues causes head ache & anemia.

At high level, it causes Coma, braincell damage and death. It increase the global temp.

2. Nitrogen – dioxide (No₂)

- a. It is a reddish brown irritation gas-air pollutant.
- b. It is converted into nitric acid
- c. $\text{No}_2 + \text{moisture} \rightarrow \text{HN0}_3$
- d. Found in the emission of auto mobiles and industry.

e. Effect:

1. Causes respiratory problems Asthma, Bronchitis.
2. Acid deposition of HN0₃ can damage tree, soil, aquatic life in lakes, metal corrosion.

3. Chromium

1. Solid toxic metal, emitted into the atmosphere as particulate matter.
2. Produced from chromium manufacture, chromium plating ,paint, smelters.
3. Affects central nervous system, cancer, gastro intestinal ulcer.

4. Ozone (O₃)

1. O₃ is a gas composed of three oxygen atoms
2. It is formed when oxides of nitrogen react with volatile organic compounds in the presence of sunlight.

3. O₃ is good when it is present in the ozone umbrella above the earth. But bad when it is present at the ground level.

4. effect: Chest pain, Coughing, Throat irritation, Asthma, damage vegetation & ecosystem, Reduced crop production, Climate changes

Causes ,consciquence and control measures of Air pollution

Causes of air pollution

1. Agriculture:

Hydro Carbon released by plants, pollen grains, insecticide cause air pollution.

2. Dust:

Dust in the air is increased by dust storms, wind, valcones, automobiles.

3. Industries:

Combustion of fossil fuels like coal, petroleum in industries

4. Auto mobiles:
The combustion of petrol and diese in auto mobiles releases harmful gases into the air.They also produce dust.Vehicles are the major source of air pollution in India.

5. Ionizing rodiations:

Testing of atomic weapons, atomic explosions release Alpha,Beta,Gama - particles intothe air.

6. Freons:

Use of freons, CFC in refrigerators,coolants,filling agents in aerosol packages causepollution.

7. Aerosol:

Aerosols are small particles of solid (or) liquid substance in the air. They prevent the gaseous exchange in the air. They prevent the gaseous exchange between plants and atmosphere . It also change the climate.

Consciquence of air pollution

1. Death:

When air is polluted with poisonous gases, death comes as a result immediately. (Ex) Bhopal episode – due to the leakage of methyl iso cyanate – toxic gas into the air killthe mass of 3000 human beings.

2. Green house effect

Green house effect is the increased warming of the earth, caused by the rise in Co₂

Content of the air. Due to this effect, the polar ice caps are melted, as a result sea level rises. Coastal regions, and low lying areas all over the world will be go under H₂O.

3. Global warming:

The overheating of the earth by the increased amount of green house is called global warming.

4. Crop losses:

Heavy loss of the crop plants is caused by smog. It damage leafy vegetables, Cereals, textile crops, ornamental plants, fruits & forest trees.

5. Vomiting: SO₂ Causes vomiting.

6. Jaundice: Arsenic induce RBC breakdown & jaundice.

7. Oxygen Carrying Capacity:

CO reduces O₂ carrying capacity of RBC by its permanent combination with hemoglobin.

8. Coughing: Coughing is induced by phosgenes.

9. Headache: It is induced by SO₂

10. Cancer: It is caused by air pollutants like ash smoke, chromium, nickel.

11. Cardiac diseases: Cadmium causes high blood pressure and heart disease.

12. pneumonia:

Pneumonia is caused by breathing into much of manganese particles.

13. Depletion of ozone layer:

It is due to freons & CFC in Ac

14. Acid rains: precipitation of oxides of sulphur and nitrogen with rain is termed as acid rain.

Acid rain affects materials, organisms & aquatic eco system.

Equipments used to control air pollution:

1. The emission of exhaust from automobiles can be reduced by devices such as “ positive crankcase ventilation valve and catalytic converter”.

2. Electrostatic precipitators can reduce smoke and dust from industries.
3. Gaseous pollutants rising from industries can be removed by 'differential solubility' of gases in H₂O
4. A 'fine spray' of water in the device called 'scrubber' can separate many gases like NH₃, SO₂ from the emitted exhaust.
5. Certain gases can be removed by filtration. (or) absorption through activated carbon.
6. At the government level, pollution can be controlled by framing legislations.
7. Euro II standard is introduced to reduce the pollutants in air.

Control of air pollution

1. Use only unleaded petrol.
2. Use petroleum products and other fuels that have low sulphur & ash content.
3. Plant trees along busy streets because they remove particulates and carbon monoxide and absorb noise.
4. Industries and waste disposal sites should be situated outside the city.
5. Ensure that houses, schools, restaurants & places, where children play are not located on busy street.
6. Use catalytic converters to help control the emissions of carbon monoxide & hydrocarbons.
7. The emission rates should be restricted to permissible level by each & every industry.
8. Continuous monitoring of the atmosphere for the pollutants should be carried out to know the emission levels.
9. Incorporation of air pollution control equipments in the design of the plant layout must be made mandatory.

NOISE POLLUTION

Noise pollution is defined as, the unwanted, unpleasant (or) disagreeable sound that causes discomfort for all living beings.

Causes of noise pollution

1. Heavy noise is produced by industries.(Ex) steel industry, rice mill, saw mill etc.
2. In industries noise is produced by,
 - i. Construction
 - ii. Product fabrication
 - iii. Product assembly
 - iv. Power generation
 - v. Processing activities
3. The transport noise mainly comes from road traffic rail traffic & air crafts
4. Train produces more noise than road traffic.
5. Maximum noise is produced by jet air craft (100db)
6. Badly managed roads produce more noise.
7. Domestic noise is produced from human dwelling places. (Ex) loud speakers, playing of children, church bells, temple bells, grinders etc.

Consequence of noise pollution

1. Noise reduces the power of hearing.
2. It gives pain to the ear.
3. It interferes with communication system.
4. It causes stress.
5. Noise increases the secretion of adrenaline hormone into blood stream which is responsible for blood pressure.
6. It increases the rate of heart beats, & blood pressure

7. It causes head ache, constriction of blood vessels, dilation of pupil of the eye.
8. It causes deafness, emotional upsets.
9. Noise causes physical (or) mental fatigue and lack of concentration.
10. Ultrasonic sound can affect the digestive, respiration cardio vascular systems and semicircular canals of the internal ear.

Control measure of noise pollution

1. Legislation should be framed
2. The sources that generate unwanted sound should be reduced.
3. Noisy auto mobiles should be condemned (punished)
4. Auto mobiles wheels should be oiled properly
5. Industrialists must take up necessary steps to control noise.
6. Lubricate the machines properly
7. Noise producing machines should be placed in closed room
8. Loud speakers should be set at low sound.
9. Trees absorb noise and this reduce the noise pollution so, thick vegetation must be growth around industries, cities and on the sides of roads.
10. Residential houses should be constructed for away from industries, factories & airports.