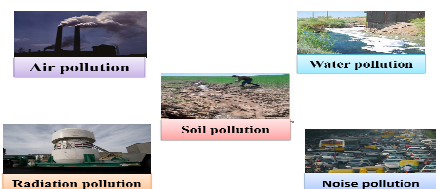


## 10. ENVIRONMENTAL POLLUTION

- Human activity directly or indirectly affect the environment adversely in various manner as SPM, noise, toxic gases, black soot etc to pollute atmosphere and sewerage, unused chemicals, pesticides to pollute water.
- Two terms are widely used:
  - Pollution**(addition of undesirable material into the environment as a result of human activities and
  - Pollute** (agents which cause environmental pollution.

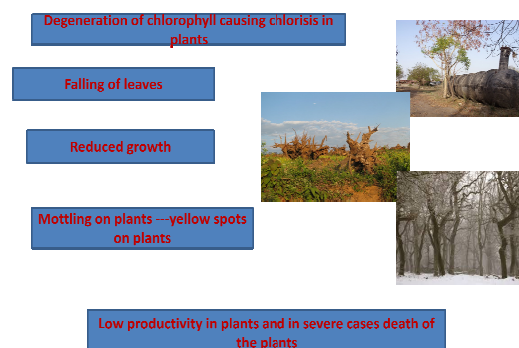
### TYPES OF POLLUTION



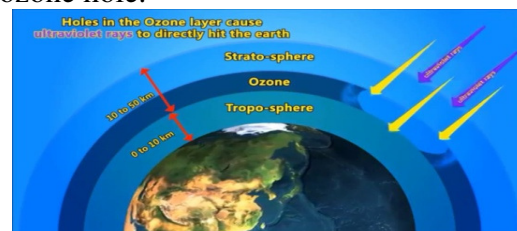
- It may be physical, chemical or biological substances released into environment which directly or indirectly harmful to living beings including humans.
- Presence of any solid, liquid or gaseous form of substances, noise and radioactive radiation in the atmosphere in such concentration
- They may be directly or indirectly injurious to humans or other living organisms, plants, property or interferes with the normal environmental process.
- Air pollutants are two types:
  - Suspended Particulate Matters** (smoke, vehicular soot, fly ash, lead and other metal particles).
  - Gaseous pollutants** (CO<sub>2</sub>oxides of nitrogen and sulphur, hydrocarbons, fibres, etc).
- Poor ventilation in buildings, paint, carpet, furniture, use of disinfectants, fumigants, pathogens in hospital wastes, burning of firewood and biomass are the main sources of indoor pollution.

- Use of cleaner fuels, smokeless chulhas, well ventilated kitchen, use of bio gas and PNG, segregation of wastes are some measure for indoor pollution.
- Use of cleaner fuel, LNG, employ environmental friendly industrial process, use of filters, electrostatic precipitators, inertial collectors, scrubbers and dry scrubbers are some preventive measures for industrial pollution.
- Increasing height of chimneys, shifting of polluting industry away from cities, development and maintenance of green belt are other control measures.
- Follow emission standards norms, PUC (pollution under control) certificate, use of clean fuel can reduce vehicular pollution.

### EFFECT OF AIR POLLUTION ON PLANTS



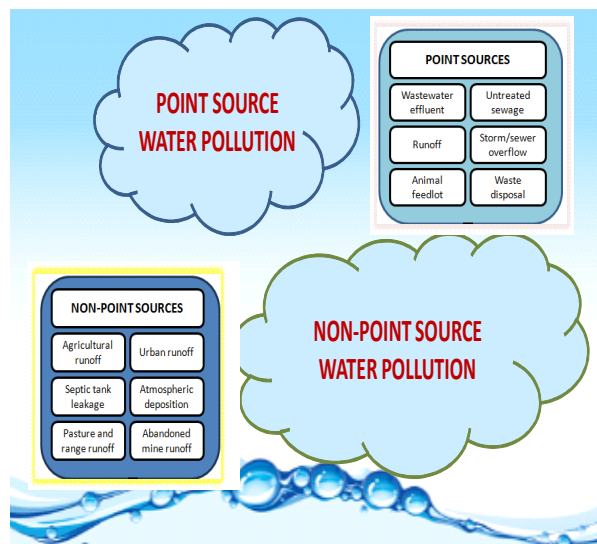
- The stratosphere has an ozone layer which protects the earth's surface from ultra violet radiation from the sun. use of CFCs (Chlorofluorocarbons) can causes damage of ozone layer which has resulted in its thinning over the Artic ad Antarctic regions, is known as ozone hole.



- Increase in earth's temperature or heating effect by Green house gases(CO<sub>2</sub>, CH<sub>4</sub>, CFCs, nitrous oxide etc.)is known as **green house effect**
- Sound without value or any noise that is unwanted by the recipient is defined as noise,
- Noise is a by product of industrialization, urbanization and modern civilization.
- Sources of Noise Pollution

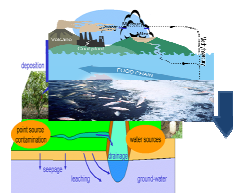
Indoor sources	Outdoor sources
Radio, TVs, generator, electric fans, air coolers, ACs, , different home appliance and family conflict	Indiscriminate use of loudspeakers, industrial activities, automobile, rail and air planes etc.

- Noise disturb sleep, emotional problems and hypertension etc,
- Noise abatement measures, proper maintenance of vehicle, use of sound proof equipments can control noise pollution.
- Addition or presence of undesirable substances in water is called **water pollution**.
- Water pollution is caused by a variety of human activities viz industrial, agricultural and domestic.
- Natural sources of water pollution are soil erosion, leaching of minerals from rocks and decaying of organic matter.
- Rivers, lakes, oceans, estuaries and ground water sources may be polluted by point or non-points sources of pollution.
- When pollutants discharged directly into water body i.e. point source pollution while discharge of pollutants from diffused sources or from a larger area such as run off agricultural fields, grazing lands, construction sites , roads and streets etc. is non-point source pollution.



- Pesticides, inorganic chemicals, metals like Zn, Ar, Cu, Hg, Cd, leakage of oil from tankers, pipelines, discharge of hot water from thermal, nuclear, chemical industries are main causes of water pollution.
- Improper sewage disposal, dumping of farm yard manures, agricultural chemical, industrial effluents are main causes of ground water pollution.

### Pollution due to pesticides and inorganic chemicals

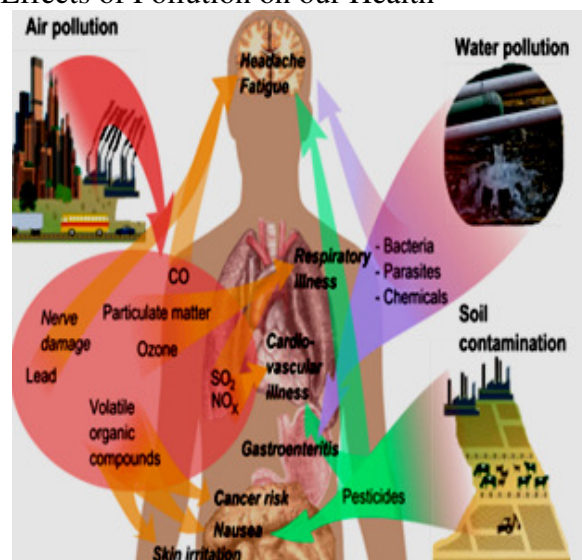


- Discharge of domestic waste, agricultural runoff, land drainage and industrial effluents in a water body leads to rapid nutrient enrichment in a water body.
- The excessive nutrient enrichment in a water body encourages the growth of algae duckweed, water hyacinth, phytoplankton and other aquatic plants.
- The biological demand for oxygen (BOD) increases with the increase in aquatic

organisms' nutrient enrichment of a water body is called **eutrophication**.

- Waste water from domestic or industrial sources or from garbage dumps is generally known as **sewage**.
- The sewage water can be treated to make it safe for disposal into water bodies like rivers, lakes through three stages of treatment i.e. primary, secondary and tertiary. Process includes steps-
  1. Sedimentation
  2. Coagulation/flocculation,
  3. Filtration,
  4. Disinfection,
  5. Softening and
  6. Aeration
- Recycling refers to the use of waste-water by the original user prior to the discharge either to a treatment system or to a receiving water body
- Judicious use of water, reused water with or without treatment, recycling of water, minimized waste water discharge in water bodies can be some effective process to control water pollution.
- Addition of substances which adversely affect the quality of soil or its fertility is known as **soil pollution**
- Solid waste is a mixture of plastics, cloth, glass, metal and organic matter, sewage, sewage sludge, building debris, generated from households, plastic bags, commercial and industries establishments add to soil pollution.
- Fly ash, iron and steel slag, medical and industrial wastes disposed on land are other important sources of soil pollution.
- Indiscriminate disposal of solid waste should be avoided.
- Radiation is a form of energy traveling through space. Radiation can be grouped into non-ionizing radiation and the ionizing radiations
- Non-ionizing radiations are constituted by the electromagnetic waves at the longer wavelength of the spectrum ranging from near infra-red rays to radio waves.

- Ionizing radiations cause ionization of atoms and molecules of the medium through which they pass
- The biological damage resulting from ionizing radiations is generally termed as radiation damage
- Somatic damage refers to damage to cells that are not associated with reproduction.
- Genetic damage refers to damage to cells associated with reproduction
- A traditional unit of human-equivalent dose is the rem, which stands for radiation equivalent in man.
- Effects of Pollution on our Health



## HOW TO CONTROL POLLUTION

MAKING SUSTAINABLE  
FOOD CHOICES

KEEP CHEMICALS AWAY  
FROM WATER BODIES

RECYCLING, REUSING  
AND REDUCING WASTE

MAKING SUSTAINABLE  
TRANSPORTATION CHOICES

MAKING SUSTAINABLE  
ENERGY CHOICES

EDUCATING OTHERS



### Check Yourself

1. Which one is not correct solution for industrial pollution ?
  - a. Use of filters
  - b. Use of electrostatic precipitator
  - c. PUC certificate
  - d. Use of ecofriendly processes
2. Thermal pollution results:
  - a. Depletion of hydrogen
  - b. Death of aquatic animals
  - c. Depletion of oxygen
  - d. Increase in temperature of any water body
3. Which one is the main pollutant to deplete ozone layer?
  - a. Methane
  - b. Ethane
  - c. Carbon dioxide
  - d. Chlorofluorocarbons
4. Nutrient enrichment of a water body is called:
  - a. Eutrophication
  - b. Algal bloom
  - c. BOD
  - d. Sedimentation
5. Reduction of ozone umbrella over the Arctic and Antarctic region is known as:
  - a. Black hole
  - b. Ozone A hole
  - c. Blind hole
  - d. Deep hole

Ans: 1.c 2.d 3.d 4. a 5.b



### Stretch Yourself

1. Define the terms pollution, pollutant, point sources, non-point sources
2. Differentiate between somatic damage and genetic damage.
3. Expand the term TEL, SPM, LDPE and rem.
4. Define Sewage.
5. What are the main sources of noise pollution?



### Test Yourself

1. How can water recycling help in controlling water pollution?
2. Mention the effects of noise pollution on human health
3. Describe the ways for preventing industrial pollution.
4. Why do you think that plastic bags create great havoc in soil pollution?
5. What is soil pollution? How can we control soil pollution?