

## **MODULE –II**

### **Environmental pollution**

#### **2.4 Soil pollution**

- Causes of soil pollution
- Consequences of soil pollution
- Control of soil pollution



## 2.4 Soil pollution

Soil is the thin layer of organic and inorganic material that covers the Earth's rocky surface. The organic portion, which is derived from the decayed remains of plants and animals, is concentrated in the dark uppermost "topsoil." The inorganic portion, which is made up of rock fragments, is formed over thousands of years by physical and chemical weathering of bedrock.

Soil contaminants are spilled onto the surface through many different activities. Most of these are the result of accidents involving the vehicles that are transporting waste material from the site at which it originated to the site at which it is to be disposed. Others involve accidents involving vehicles (automobiles, trucks and airplanes) not transporting wastes, but carrying materials, including fuel, that, when spilled, contaminate the soil.

### Soil pollutants:

- |             |                                 |
|-------------|---------------------------------|
| 1. Plastic, | 5. Broken glasses               |
| 2. Rubber   | 6. Radio active elements        |
| 3. Leather  | 7. Dead animals                 |
| 4. Cloth    | 8. Pesticides, Herbicides, etc. |

### Causes of soil pollution

- **Industrial wastes:** Disposal of industrial wastes is the major problem for soil pollution. Industries like pulp & paper mills, chemical industries, sugar factories, fertilizer, coal & mineral mining industries disposed their wastes into land.
- **Urban wastes:** Urban wastes consist of both commercial & domestic wastes. It is a dried sludge of sewage. Sewage contains glasses, metallic cans, fibers, fuel residue and other discarded products. These waste products are not easily decomposed.
- **Agricultural practices:** Modern agricultural methods pollute the soil to a large extent. Based on agro-technology a large quantity of fertilizers, pesticides, herbicides, weedicides are added to increase crop yield. These inorganic chemicals pollute the soil.

- Radio active pollutants: Radio active pollutants are coming from nuclear dust explosion, nuclear testing labs & industries. These pollutants penetrate into the soil and accumulate there by creating land pollution.
- Biological agents: Soil gets large quantities of human, animal & birds excreta which is the major source of land pollution by biological agents.
- Municipal sewage, waste water and wrong method of agricultural practices also induce the heavy soil pollution.

### **Consequences of soil pollution**

- Bad smell: The waste from hotels, houses, dead animals, garbage , floating materials release unbearable bad smell.
- Dirty surroundings: The dumping of wastes on the streets and road sides spoils the aesthetics of the site.
- Insecticides: It induce gene mutation in human being
- Cancer: Chromium & DDT cause cancer in human tissues
- Sex hormones: DDT in the soil affects sex hormones in mammals & birds
- Decline of reproduction: Due to the accumulation of DDT in soil reduces the reproduction capacity of the mammals & birds.
- Bio magnification: Increasing accumulation of pesticides in higher organisms is called bio magnification.
- Desertification
- Decrease in the extent of agricultural land
- Top soil erosion
- Excess use of irrigation leads to waterlogging and soil salinisation.
- Fertilizer run off leads to the eutrophication of waterways.

### **Control of soil pollution**

- Cleaning up of polluted soil

- Planting trees as a part of afforestation/ shelter belts/wind breakers
- Reduction, Recuse, Re-cycle principles helps to control and prevent the soil pollution.
- Soil erosion: Soil erosion is controlled by planting more trees, strip cropping, contour cultivation, constructing diversion channels.
- Proper dumping of unwanted materials:
- Kitchen wastes are dumped into municipal waste container kept on the sides of streets.
- Solid wastes of kitchen, municipality, hospital, broiler, houses, agriculture are treated by the following methods .
  - Land fill- Burying under ground
  - Composting - making manure
  - Incineration - Burning
- Pesticides are used in the limited amount.
- Biological pesticides& fertilizers are used instead of chemical fertilizers.
- Appropriate water management practices in agriculture
- Land sliding & water logging is prevented.
- Sewage water must be treated by primary,secondary and tertiary treatment steps.
- People should be trained regarding the sanitary habits.
- Proper soil conservation measures to minimize the loss of top soil
- Government should ban some important toxic chemical like DDT, BHC which cause the soil pollution. INM, IPM, using bio pesticides and integrated environment friendly agriculture to reduce pesticides or fertilizers