


MSc S3: 16P3EVST09 :  
Environmental Pollution and Technology  
Dr Anju. S. G, Asst. Professor,  
Environmental Science Department,  
Sacred Heart College, Thevara


TOPIC – SOIL POLLUTION

# SOIL



- ▶ Soil is the natural body made of mineral and organic constituents.
- ▶ It is produced by solid material recycling and complex processes of solid crust modifications.
- ▶ Soil offers shelter, habitat for numerous organisms and is the living medium for plants.
- ▶ Soil is the basis for agriculture. All vegetation for human food and animal feed depend upon soil.

- 
- ▶ Soil is a vital part of the natural environment.
  - ▶ It controls the flow of water and chemical substances between the atmosphere and the earth, and acts as both a source and store for gases (like oxygen and carbon dioxide) in the atmosphere.




World Soil Day was established in 2002 by the International Union of Soil Sciences (IUSS) to celebrate the importance of soil and its vital contributions to human health and safety.


On December 20, 2013, the 68<sup>th</sup> UN General Assembly recognized December 5<sup>th</sup>, 2014 as World Soil Day and 2015 as the International Year of Soils.

# SOIL POLLUTION



- ▶ Soil pollution is the reduction in the productivity of soil due to the presence of soil pollutants. Soil pollutants have an adverse effect on the physical chemical and biological properties of the soil and reduce its productivity.

- 
- ▶ Pesticides, fertilizers, organic manure, chemicals, radioactive wastes, discarded food, clothes, leather goods, plastics, paper, bottles, tins-cans and carcasses- all contribute towards causing soil pollution.
  - ▶ Chemicals like iron lead mercury, copper, zinc, cadmium, aluminium, cyanides, acids and alkalis etc. are present in industrial wastes and reach the soil either directly with water or indirectly through air. (e.g. through acid rain).

- 
- ▶ The improper and continuous use of herbicides, pesticides and fungicides to protect the crops from pests, fungi etc. alter the basic composition of the soils and make the soil toxic for plant growth. Organic insecticides like DDT, aldrin, benzene hex chloride etc. are used against soil borne pests.



▶ **Types of Soil Pollution**

▶ **Agriculture soil pollution** is caused due to the excessive use of pesticides and insecticides

▶ **Soil Pollution by industrial discharges** such as chemicals from mining and manufacturing of goods


▶ **Solid waste soil pollution**


▶ **Soil Pollution due to urban activities** such as urine, faeces, domestic garbage etc



# Effects of soil pollution

- ▶ Soil contamination leads to health risks due to direct and indirect contact with contaminated soil. Soil pollution causes huge disturbances in the ecological balance and the health of the organisms is under risk. The effects of pollution on soil are quite disturbing and can result in huge disturbances in the ecological balance and health of living beings on earth. Normally crops cannot grow and flourish in a polluted soil. However if some crops manage to grow, then these crops might have absorbed the toxic chemicals in the soil and might cause serious health problems in people consuming them.


- 
- ▶ In such a case, the soil becomes unhealthy for vegetation, and often becomes useless and barren. When soil pollution modifies the soil structure, deaths of many beneficial soil organisms (e.g. earthworms) in the soil could take place. Other than further reducing the ability of the soil to support life, this occurrence could also have an effect on the larger predators (e.g. birds)

- 
- ▶ and force them to move to other places, in the search of food. People living near polluted land tend to have higher incidences of migraines, nausea, fatigue, skin disorders and even miscarriages. Depending on the pollutants present in the soil, some of the longer-term effects of soil pollution include cancer, leukemia, reproductive disorders, kidney and liver damage, and central nervous system failure. These health problems could be a result of direct poisoning by the polluted land (e.g. children playing on land filled with toxic waste) or indirect poisoning (e.g. eating crops grown on polluted land, drinking water polluted by the leaching of chemicals from the polluted land to the water supply, etc).



▶ **(iv) Deforestation:**

- ▶ Soil erosion occurs when the weathered soil particles are dislodged and carried away by wind or water. Deforestation, agricultural development, temperature extremes, precipitation including acid rain, and human activities contribute to this erosion. Humans speed up this process by construction, mining, cutting of timber, over cropping and overgrazing. It results in floods and cause soil erosion.
- ▶ Forests and grasslands are an excellent binding material that keeps the soil intact and healthy. They support many habitats and ecosystems, which provide innumerable feeding pathways or food chains to all species. Their loss would threaten food chains and the survival of many species.

- 
- ▶ During the past few years quite a lot of vast green land has been converted into deserts. The precious rain forest habitats of South America, tropical Asia and Africa are coming under pressure of population growth and development.
  - ▶ Soil erosion occurs when the worn out particles are dislodged and passed away by wind or water. Deforestation, agricultural development, and human actions add to this erosion.
  - ▶ Forests hold up many habitats and ecosystems, which make available immeasurable feeding pathways or food chains to all species. During the past few years quite a lot of vast green land has been converted into deserts. Deforestation is slowly destroying the most dynamic flora and fauna areas.

# Decontamination method for polluted soils

- ▶ landfills
- ▶ incinerate

# Solution:

- ▶ Use of correct farming techniques
- ▶ Recycling of Waste before disposal
- ▶ Proper disposal method of household and industrial waste
- ▶ Use of organic fertilizers instead of chemical fertilizers and pesticides
- ▶ Community education and awareness
- ▶ Proper maintenance of sewage system
- ▶