

SOIL POLLUTION & IT'S REMEDIES

Environmental Science

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What is Soil..??

- Soil is the thin layer of organic and inorganic materials that covers the Earth's rocky surface.
- Soil is composed of particles of broken rock that have been altered by chemical and mechanical processes that include weathering and erosion.

SOIL POLLUTION

- It is defined as the build-up in soils of persistent toxic compounds, chemicals, salts, radioactive materials, or disease causing agents, which have adverse effects on plant growth and animal health.
- Soil pollution is also caused by means other than the direct addition of xenobiotic (man-made) chemicals such as agricultural runoff waters, industrial waste materials, acidic precipitates, and radioactive fallout

Causes of Soil Pollution

- Seepage from a landfill
- Discharge of industrial waste into the soil
- Percolation of contaminated water into the soil
- Rupture of underground storage tanks
- Excess application of pesticides, herbicides or fertilizer
- Solid waste seepage
- Deforestation and Soil erosion



- Excess application of pesticides etc.



Excess use & disposal of Plastics and polyethene wastes



➤ Industrial seepage



➤ Solid waste seepage



The most common chemicals involved in causing soil pollution are:

- Petroleum hydrocarbons
- Heavy metals
- Pesticides
- Solvents

Types of Soil Pollution

- Agricultural Soil Pollution
 - i) pollution of surface soil
 - ii) pollution of underground soil
- Soil pollution by industrial effluents and solid wastes
 - i) pollution of surface soil
 - ii) disturbances in soil profile
- Pollution due to urban activities
 - i) pollution of surface soil
 - ii) pollution of underground soil

Agricultural Soil Pollution

- Plants on which we depend for food are under attack from insects, fungi, bacteria, viruses, rodents and other animals, and must compete with weeds for nutrients.
- To kill unwanted populations living in or on their crops, farmers use pesticides.
- The remnants of such pesticides used on pests may get adsorbed by the soil particles and contaminate root crops grown in that soil.
- The consumption of such crops causes the pesticides remnants to enter human biological systems, affecting them adversely.

Agricultural effects:

- Reduced soil fertility
- Reduced nitrogen fixation
- Increased erodibility
- Larger loss of soil and nutrients
- Deposition of silt in tanks and reservoirs
- Reduced crop yield
- Imbalance in soil fauna and flora

Agricultural effects:



Industrial Soil Pollution

- Large quantity of solid wastes like unused and rejected chemicals (like sludge, press mud, saw dust, bottles, plastic materials etc.), unwanted industrial wastes generated during manufacturing processes are dumped over on the surface of soil by almost all industries with difference in the degree.
- Larger the production base, larger is the generation of wastes.
- Traditionally, these materials have been dumped around the factory site or around the entire city. Rarely, they are

Industrial Soil Pollution



Industrial effects:

- Dangerous chemicals entering underground water.
- Ecological imbalance.
- Release of pollutant gases.
- Increased salinity.
- Reduced vegetation.

Industrial Effects:



Polluted land with dangerous chemicals



Soil pollution due to industrial waste

Soil Pollution due to Urbanization

- Urban activities generate large quantities of city wastes including several Biodegradable materials (like vegetables, animal wastes, papers, wooden pieces, carcasses, plant twigs, leaves, cloth wastes as well as sweepings) and many non-biodegradable materials (such as plastic bags, plastic bottles, plastic wastes, glass bottles, glass pieces, stone / cement pieces).
- On a rough estimate Indian cities are producing solid city wastes to the tune of 50,000 - 80,000 metric tons every day.
- If left uncollected and decomposed, they are a cause of several problems.

Urbanization effects:

- Clogging of drains
- Inundation of areas
- Public health problems
- Pollution of drinking water sources
- Foul smell and release of gases
- Waste management problems

Urbanization effects:



Some more effects of soil pollution:

- Pollution runs off into rivers and kills the fish, plants and other aquatic life.
- Crops and fodder grown on polluted soil may pass the pollutants on to the consumers.
- Polluted soil may no longer grow crops and fodder
- Soil structure is damaged (clay ionic structure impaired.)
- Corrosion of foundations and pipelines
- May release vapours and hydrocarbon into buildings and cellars
- May create toxic dusts
- May poison children playing in the area

Some more effects of soil pollution:



Methods to control Soil Pollution

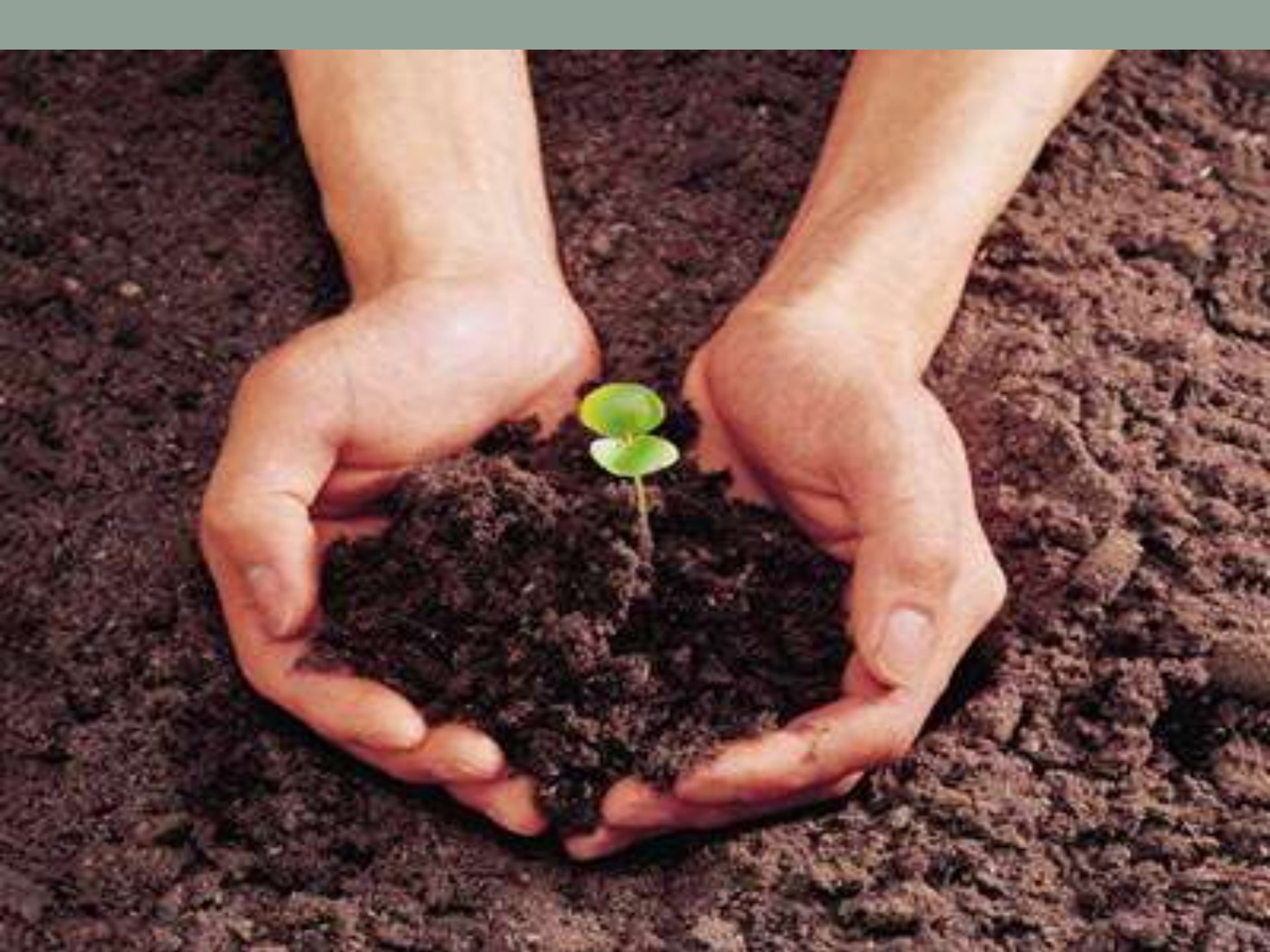
- **Reducing** chemical fertilizer and pesticide use.
- **Recycling** is another way to reduce and control soil pollution. Recycling paper, plastics and other materials reduces the volume of refuse in landfills, another common cause of soil pollution.
- **Reusing** of materials
- **De-forestation**, the cutting down of trees, causes erosion, pollution and the loss of fertility in the topsoil. Planting trees--or re-forestation--helps prevent soil erosion and pollution.

Methods to control Soil Pollution

- Weeds soak up minerals in the soil. Reducing weed growth helps reduce soil pollution. One of the more common methods of reducing weed growth is covering the soil with numerous layers of wet newspapers or a plastic sheet for several weeks before cultivation. This prevents light from reaching the weeds, which kills them.
- Designated pits should be used for the dumping of soil wastes. These wastes should be treated chemically and biologically to make them less toxic and hazardous.

Methods to control Soil Pollution





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THANK YOU