

INTERMEDIATE

Soil can be defined as a thin layer of the earth's crust which serves as a natural medium for the growth of plants. Soil, though considered as a non-living thing, acts as a for various living organisms from small worms and insects, to reptiles, etc. Thus, the soil is an environment of its own. For a healthy ecosystem, healthy soil is important.

The physical properties of any kind of soil largely determines the manner in which it can be used. Properties like water holding capacity, permeability to water, aeration, plasticity and nutrient supply ability, are influenced by the size, proportion, arrangement and mineral composition of the soil particles. The major soil groups are as follows:

Black soil

These soils vary in depth from shallow to deep. They are highly argillaceous, very fine grained and dark, containing a high proportion of calcium and magnesium carbonates. But they are poor in phosphorus, nitrogen and organic matter.

Alluvial soil

This type of soil differs in constituency from drifting sand to loam and from fine silt to stiff clay. This is also the most important soil group contributing, in a major extent, to agricultural wealth.

Red soil

This is the most predominant type of soil found in Tamilnadu. These soils are rather shallow, very open in texture, having a pH ranging from 6.6 to 8.0 and are generally poor in nitrogen, phosphorus and humus.

Laterite

These soils are specially well developed on the summits. Though poor in lime, magnesium and nitrogen they are rich in plant nutrients.

Clay

Since the soil particles are very fine grained and fine textured, the quality of retaining water is more and hence the water infiltration capacity is low.

Sand

This is found in coastal and river bed areas. These soils are very permeable and drain well, but are less water retentive.

PROBLEMS ARISING DUE TO SOIL LOSS

- Deforestation
- Leaching
- Erosion

Deforestation leads to loss of top soil, soil erosion, nutrient leaching. It takes 2,000 years for the top soil to develop. Due to deforestation, on open, bare land, soil gets dissipated or carried away by monsoon rains and deposited in rivers, tanks and ponds, thus leading to silt formation, thereby reducing their water holding capacity. The exposed poor soil in agricultural lands makes it unfit for cultivation.

Soil erosion occurs due to wind and rain. Prolonged soil erosion may lead to formation of gullies and may lead to land slides.

SOIL POLLUTION

Land is a very valuable but limited resource, as the population increases rapidly. Many highly urbanised cities are faced with acute space problems, as in Calcutta or Bombay. Besides the limited availability of land, 175 million hectares of land are becoming less productive every year. India loses 20 tons of topsoil per hectare in a year due to floods, rainfall and deforestation. 20 % to 50 % of lands under irrigation can go out of cultivation at this rate because of water logging and salinity.

The scenario of desertification is compounded by pollution which includes

- Indiscriminate discharge of industrial effluents on land and into water bodies
- An increase in the use of fertilisers for agriculture
- Open defecation by animals and human beings
- Accumulation of solid waste; this is a major problem in developing countries like India where the garbage and refuse are not degraded
- Radioactive substances from nuclear plants which are released into the soil

MAJOR SOIL POLLUTANTS AND THEIR EFFECT ON HUMAN HEALTH

METAL	SOURCE	EFFECTS
Arsenic	Occurs naturally	chronic poisoning leads to loss of appetite and weight, diarrhoea, alternating with constipation, gastro intestinal disturbances, peripheral neuritis, conjunctivitis and sometimes skin cancer.
Cadmium	mining, metallurgy chemical industry and electroplating	lead to chronic poisoning and affects the proximal tubules of the kidney, causing formation of kidney stones.
Lead	lead smelters storage battery	lead poisoning can lead to severe mental retardation or death.
Mercury	industrial wastes	methylmercury compounds are much more toxic than other forms of mercury, causes neurological problems and damages renal glomeruli and tubules.
Cyanides	waste from heat treatment of metals, dismantling of electroplating shops, etc.	rapid death may follow due to exposure to cyanide as a result of inhibition of cellular respiration.