Chapter 9

Soil

Weathering of Soil

• The formation of soil is a long process. It begins with the breakdown of huge rocks into smaller pieces by the action of wind, rain, flowing river water, etc. This process is called weathering.

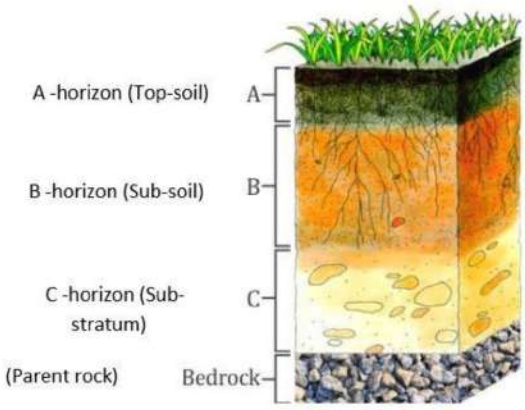
• These small rocks particles then mix up with humus to form fertile soil.

• It takes hundreds of years to break down rocks into fine particles that make the soil.

• The nature of soil depends on the rocks from which it has been formed and the type of vegetation that grows in it.

Soil Profile

• The vertical section of soil showing the different layers is called a soil profile. Soil profile consists of three different layers of soil. Each layer of soil is called a horizon.



Soil Profile

• The three layers of soil in the soil profile are:

(a) A-horizon (Top-soil):

The top layer of soil is called A-horizon or top-soil. This layer is dark in color because it is rich in minerals and humus. Humus makes this layer fertile. The plant roots grow in this layer.

(b) B-horizon (Sub-soil):

The layer of soil which is just below the top-soil is called B-horizon or sub-soil. This layer is made up of slightly bigger rock particles than topsoil. This layer is rich in minerals but has very little humus. Due to this, sub-soil is less fertile as compared to the top-soil.

(c) C-horizon (Sub-stratum):

The layer of soil just below the sub-soil is called C-horizon or sub-stratum. This layer is made up of small lumps of broken rocks with cracks and crevices.

* Tip: Farmland shimmers on a hot summer day because the water of soil evaporates to form water vapor. The water vapors coming out from the soil reflects the sunlight and the air above the soil seems to shimmer.

Types of Soil

There are mainly three types of soil on the basis of the proportion of particles of various sizes:

(a) Sandy soil:

Sandy soil contains a greater proportion of large particles with large spaces. Sandy soil contains very little humus and they are less fertile.

(b) Clayey soil:

Clayey soil contains very small particles with very little space. Clayey soil also contains very little humus and they are more fertile than sandy soil.

(c) Loamy soil:

The amount of large and small particles is about the same in a loamy soil. Loamy soil is a mixture of sand and clay. It contains a sufficient amount of humus and is the most fertile soil.

*Note: Clayey soil contains very small particles with very little space. Clayey soil is tightly packed and there is no space for air. They have more water holding capacity. Clayey soil is very sticky. Due to this, clayey soil is used for making pots, bricks, toys, surahis, etc.

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Properties of Soil

Following are some properties of soil:

(a) Soil contains air:

Air is present in the spaces between the soil particles. This air provides the oxygen required for respiration by the roots of plants and others. Sandy soil provides more air to the plants.

(b) Soil contains water (moisture):

Soil contains water which is called moisture of the soil. This water is used to absorb the roots of the plants for their growth.

(c) Soil can absorb water:

Soil contains some water but it can still absorb a lot of water.

(d) Soil allows water to percolate (pass down through it):

The process in which water passes down slowly through the soil is called the percolation of water. Water can percolate through all types of soils but the rate of percolations of water through different types of soils is different. The percolation rate of water is highest in sandy soil and lowest in clayey soil.

$$\text{Percolation Rate} = \frac{\text{Volume of water percolated(ml)}}{\text{Percolation time(min)}}$$

Moisture in Soil

- Moisture in soil is the total amount of water that is present in the soil.

- Moisture is removed from soil by heating the soil in a boiling tube. On heating, water in the soil evaporates, moves up, and condenses on the cooler inner walls of the upper part of the boiling tube.

• On a hot summer day, the soil shines because the water vapour comes out from the soil and reflect the sunlight.

Absorption of Water by Soil

• When the water is poured into the soil, it absorbs some water. The amount of water absorbed by soil is called the absorption capacity of the soil.

• Percentage of water absorbed by soil:

$$\textbf{Percentage of water absorbed by soil} = \frac{\text{Initial weight of water} - \text{Final weight of water}}{\text{weight of soil}} \times 100$$

Soil and Crops

Paddy - For paddy (rice crop), soil rich in clay and organic matter with a good water holding capacity is ideal. So, clayey soil is ideal for paddy.

Pulses and lentil (masoor dal) - Loamy soil is required, which drains water easily.

Cotton Crop - Sandy-loam soil is suitable for cotton crops which drains water easily and can hold plenty of air in it.

Wheat, Gram - Clayey, and loamy soil both are suitable for growing cereals like wheat and gram. Such soils are good in the water holding capacity.

Soil Erosion

The removal of fertile top layer of soil by wind or water is called soil erosion. Soil erosion occurs easily in those areas which are not covered by vegetation (trees and plants). In absence of trees and plants, soil becomes loose and it can be easily blown away by the wind or washed away by the flowing rain water.

Soil erosion can be prevented by the flowing ways:

1. By preventing deforestation- Cutting down forests tress on large scale is called deforestation. Deforestation causes soil erosion. So, soil erosion can be prevented by preventing deforestation.
2. Soil erosion can be prevented by afforestation. Afforestation is process of growing forest tress on large scale.
3. Soil erosion can be prevented by increasing the plantation (growing plants and trees) around us.