

## Soil

- The uppermost layer of the earth crust where plants grow is called soil.
- Soil is a very important natural resource.

## Importance of soil

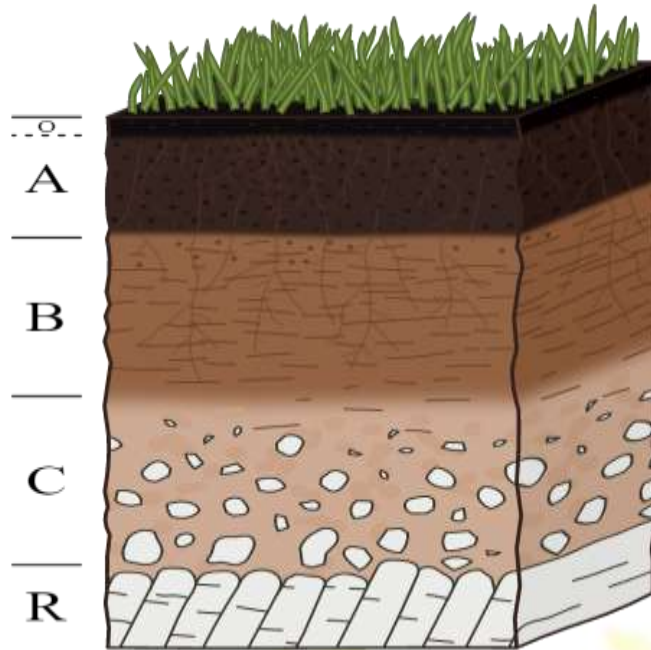
- Soil gives anchorage to plants and provides water and nutrients.
- It is essential for agriculture and is home for many organisms.
- Agriculture is the source of food, clothing and shelter.

## Formation of soil

- Soil is formed by the weathering of rocks. In weathering, rocks are broken down by the action of wind, water and climate. The particles of rock then get mixed with the humus to form fertile soil.
- The organic matter produced by the decomposition of dead plants and animals by some bacteria and fungi is called Humus.
- Humus contains the nutrients and the minerals required for plant growth.

## Soil Profile

- A vertical section of the soil showing different layers of the soil is called the soil profile.
- Each layer has different texture, colour, depth and chemical composition. These layers are called **Horizons**.
- The three layers of soil are:
  - A - Horizon or Top Soil**- The uppermost layer which is dark in colour and rich in humus and minerals. This layer is soft, porous and can retain more water. Humus makes soil fertile and provides nutrients to growing plants. This layer also gives shelter to many living organisms such as worms, rodents etc.
  - B – Horizon or Middle layer** – the second layer contains less amount of humus but more minerals. This layer is harder and more compact than the top layer.
  - C- Horizon or Sub- Stratum** – The third layer is made of small rocks with cracks and crevices. Below this is **bedrock** which is very hard and difficult to dig.



## Types of Soil

- There are three main types of soil:
  1. **Sandy Soil:**
    - the soil that contains greater portion of big particles is called sandy soil. The size of the particles in a soil affects its properties to a great extent.
    - More amount of large particle more is the space between them which is filled with air.
    - Such soil is a well-drained soil. It is well aerated, light and rather dry.
  2. **Clayey Soil:**
    - The soil that contains relatively higher proportion of fine particles is called Clayey Soil.
    - Clayey soil has very high water holding capacity because the fine particles are tightly packed.
    - It is less airy and heavy because of more water.
    - Clayey soil is rich in minerals which is good for the growth of plants.
    - It drains out very slowly which can cause water logging of soil and damage the crop plants.
  3. **Loamy Soil:**
    - The soil that contains a good blend of sand, clay, silt and humus is called Loamy Soil.
    - It has the right water holding capacity for the growth of plants.
    - It has proper air spaces and can be ploughed easily.

## Properties of Soil

1. **Percolation rate of water in soil:** if we pour some water on the soil, some of it gets absorbed and rest will pass through the soil. The process in which water passes down through the soil is called percolation of water. The rate of percolation depends on the type of the soil.

**Rate of percolation in a soil sample:** the rate of percolation is defined as the volume of water in millilitres that passes down the soil in one minute. Rate of percolation can be measured as:

- Take a 20 cm long plastic pipe around 5 cm in diameter.
- Place the pipe about 20 cm deep in the soil where percolation rate is to be measured.
- Hold the pipe vertically. Pour 200 ml water in the pipe.
- Note the time when you start pouring the water and after the water has percolated through the pipe leaving it empty.
- Calculate the rate of percolation by using the given formula:

$$\text{Percolation rate (ml/min)} = \frac{\text{amount of water (ml)}}{\text{Percolation time (min)}}$$

2. **Moisture content of soil:** It is the amount of water present in the soil. During summer, the moisture in the soil evaporates and comes up which reflects sunlight. Thus, the air above looks shimmery.

**Absorption of water by the soil:**

Different soil samples have different water absorbing capacity.

The water absorbing capacity by different soil can be found out by taking 50g of different soil samples.

Take the soil in different funnels placed in different beakers and pour water in the soil with the help of a measuring cylinder.

Continue pouring until it starts dripping.

Now, subtract the amount of water left from the initial amount which was taken.

The resultant amount of water is retained by the soil.

Formula to calculate percentage of water absorbed is

$$\text{Percentage of water absorbed} = \left\{ \frac{U-V}{50} \right\} \times 100,$$

50 gm is the amount of water absorbed.

U is the initial volume of

V is the final volume of water (ml)

## Soils and Crops

- Different types of soil is found in different parts of India.
- The important climatic factors that effect the soil profile and changes the soil structure are wind, rainfall, humidity, light and temperature.
- Clayey and loamy soil are good for growing cereals like wheat and gram.
- Paddy requires clayey soil.
- For lentils and other pulses, loamy soil is required.
- Cotton requires soil that drains out easily but holds plenty of air.

## Soil Erosion

- The removal of top layer of soil by water, ice or wind is known as erosion.
- In the absence of plants, the top layer becomes loose and is removed by wind or air.
- Soil erosion is severe in the areas of little or no vegetation such as deserts.
- Therefore, deforestation should be controlled.

