* Soil profile.

⇒ Soil profile is the "sequence and nature of the horizons (layers) superimposed one above the other of variable depth". Each horizon differs in morphology, physical structure and chemical and biological characteristics. These horizons are evident when a vertical cut is made through the soil, revealing the soil profile.

The widely accepted structure of the soil profile is as follows —

1) The 'O' horizons:
These are the organic horizons of loose leaves and debris forming above the surface of the mineral matrix.

2) The 'A' horizons:
These are the mineral horizons formed either at or adjacent to the surface.

i) A_1 region: Rich in humus and dark in colour.

ii) A_2 region: Zone of maximum leaching of minerals. Readily available minerals to plant roots are present in this layer.

3) The 'B' horizons:

These are the mineral horizons forming below the surface; also referred to as the "zone of accumulation" since minerals from above and below tend to concentrate here.

4) The 'C' horizons:

It consists of weakly weathered, large masses of rocks.

5) The 'R' horizons:

This is the parent, unweathered bedrock.

* Soil composition:

⇒ Soils are composed of the following five components :— Mineral particles, organic matters, air, and water and biological system.

1) **Soil mineral particles:**
It includes sand, silt and clay. The relative proportions of sand, silt and clay in a soil are referred to as soil texture.

2) **Soil organic matter (Humus):**
It is an organic component derived from the addition of material from organisms and also from the decomposition of plant and animal residues.

3) **Soil air:**
It is the mixture of gases that are present in soil pores that are not filled with water. Oxygen and carbon dioxide are important constituents, and their concentration in the soil affects many processes.

4) **Soil water:**
It refers to all water contained in the soil. Soil water can contribute upto 30% of soil volume, and is essential for the activity and physiological functioning of organisms in the soil. According to the

nature of interaction between soil particles and water molecules, soil water may be classified into the following types ——

i) Hygroscopic water: water present as a thin film around soil particles and remains firmly attached is called hygroscopic water. It is not utilized by plants.

ii) Capillary water: It is the water present in thin and narrow capillaries formed by soil particles. It is widely utilized by plants.

iii) Gravitational water: It is the water present deep into the soil due to the gravitational force of the earth. Not available to plants.

iv) Chemically bound water: It is the water present in the form of hydrated oxides of iron, silicon, aluminium etc. Not available to plants.

5) Biological system:

A fifth component i.e., biological system may also be added, as each soil has a distinctive flora and fauna of bacteria, algae, fungi, protozoa, rotifers, nematodes etc.