

B.A Part-II Soil Profile Definition

“Soil profile is defined as the vertical section of the soil from the ground surface downwards to where the soil meets the underlying rock.”

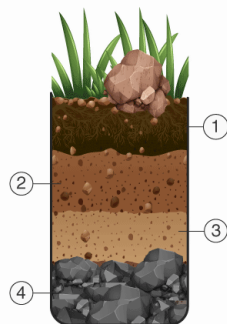
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[What is Soil Profile?](#)

The soil is the topmost layer of the earth’s crust mainly composed of organic minerals and rock particles that support life. A soil profile is a vertical cross-section of the soil, made of layers running parallel to the surface. These layers are known as soil horizons.

SOIL PROFILE



- | | |
|----------------------------|----------------------------|
| ① The O-Horizon (Organic) | ② The A-Horizon or Topsoil |
| ③ The B-Horizon or Subsoil | ④ The C-Horizon or Bedrock |

The soil is arranged in layers or horizons during its formation. These layers or horizons are known as the soil profile. It is the vertical section of the soil that is exposed by a soil pit. The layers of soil can easily be

identified by the soil colour and size of soil particles. The different layers of soil are:

- Topsoil
- Subsoil
- Parent rock

Each layer of soil has distinct characteristics.

Soil profile helps in determining the role of the soil as well. It helps one to differentiate the given sample of soil from other soil samples based on factors like its colour, texture, structure, and thickness, as well as its chemical composition.

Read on to explore what is soil profile and the different layers of soil that make up the soil profile.

[Layers of Soil](#)

The soil profile is composed of a series of horizons or layers of soil stacked one on top of the other. These layers or horizons are represented by letters O, A, E, C, B and R.

[The O-Horizon](#)

The O horizon is the upper layer of the topsoil which is mainly composed of organic materials such as dried leaves, grasses, dead leaves, small rocks, twigs, surface organisms, fallen trees, and other decomposed organic matter. It contains about 20 to 30% of organic matter. This horizon of soil is often black brown or dark brown in colour and this is mainly because of the presence of organic content.

The A-Horizon or Topsoil

This layer is rich in organic material and is known as the humus layer. This layer consists of both organic matter and other decomposed materials. The topsoil is soft and porous to hold enough air and water.

In this layer, the **seed germination** takes place and new roots are produced which grows into a new plant. This layer consists of microorganisms such as earthworms, fungi, bacteria, etc.

The E-Horizon

This layer is composed of nutrients leached from the O and A horizons. This layer is more common in forested areas and has lower clay content.

The B-Horizon or Subsoil

It is the subsurface horizon, present just below the topsoil and above the bedrock. It is comparatively harder and compact than topsoil. It contains less humus, soluble minerals, and organic matter. It is a site of deposition of certain minerals and metal salts such as iron oxide.

This layer holds enough water than the topsoil and is lighter brown due to the presence of clay soil. The soil of horizon-A and horizon-B is often mixed while ploughing the fields.

The C-Horizon or Saprolite

This layer is devoid of any organic matter and is made up of broken bedrock. This layer is also known as saprolite. The geological material present in this zone is cemented.

The R-Horizon

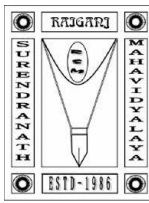
It is a compacted and cemented layer. Different types of rocks such as granite, basalt and limestone are found here.

What Is Soil Moisture?

Water in the soil is referred to as soil moisture. **Water absorption in the soil** is determined by various factors. It plays a major role in soil formation. As a result of precipitation, water arrives at the surface. The particle size distribution of soil determines its porous nature and causes downward movement of water vertically which is known as infiltration. This penetration continues deep in the layers of soil until it reaches saturation.

Water, on reaching this barrier, cannot seep vertically further, hence moves sideways. Formation of puddles as a result of saturation is called surface ponding which can be long-lasting. Water that is available to plants is called Root zone moisture while surface soil moisture is the water available in the immediate upper region of soil.

Moisture content in the soil can be measured using a device known as Tensiometer. They are water-filled tubes which are sealed with a porous ceramic tip towards the bottom and a gauge at the top which is devoid of air molecules. They are penetrated into the soil till the root level. Water passes between the tip of the device and the ambient soil until it reaches an equilibrium and hence tension is recorded on the gauge. Readings thus obtained gives a measure of soil moisture in that region.



Also Refer: [What Is Soil?](#)

[Types of Soil Moisture](#)

The different types of water present in the soil include:

• **Gravitational Water**

The water that reaches the water table of the soil due to the gravitational force is referred to as gravitational water. This is not available to the plants.

• **Hygroscopic Water**

This water is also not available to the plants. It is a thin film of water tightly held by the soil particles.

• **Chemically Combined Water**

The chemical compounds present in the soil particles contain water. This is known as chemically combined water. This is also not available to the plants.

• **Capillary Water**

This water is available to the plants for absorption. This water exists between soil particles in small capillaries.

• **Atmospheric Humidity**

The hanging roots of the epiphytes absorb the moisture in the air due to the presence of hygroscopic hairs and spongy velamen tissues.

[Importance of Soil Moisture Content](#)

- Soil water carries food nutrients for the growth of plants
- Soil moisture content determines the yield of the crop in a region
- Crucial in maintaining soil's temperature

- Soil moisture acts as nutrients
- Important for soil formation
- Moist soil is ideal for the growth of many plants that demand a huge supply of water (Ex: Rice)
- Soil moisture catalyses biological activities of microbes in the soil.
- Water is a primary need for photosynthesis in plants.

[Measuring Soil Moisture](#)

The soil moisture can be measured by various tools mentioned below:

[Tensiometers](#)

These measures the tension of soil moisture. They are water-filled tubes, with a porous ceramic tip at the bottom. These are sealed and have a vacuum gauge at the top. They are inserted in the soil to the depth of the plant root zone. The readings obtained in the tensiometers indicate the availability of water in the soil.

[Electrical Resistance Blocks](#)

These consist of two electrodes connected to lead wires extending to the soil surface. The electrodes are embedded in the blocks of porous material. It is used to measure soil water tension.

[Time Domain Reflectometry \(TDR\)](#)

TDR – Time Domain Reflectometry is used to determine the soil moisture content. Steel rods are placed in the soil and electrical signals are sent through them. The returned signals are

measured to determine soil water content.

Important Questions for Soil Profile

- **What is Soil?**

Soil is one of the most important naturally occurring resources. It is the natural habitat of plants and many microorganisms. It nourishes plants with water and essential nutrients hence enabling their growth. Soil is the most important raw material for agriculture. Agriculture provides food, clothing and shelter to all entities either directly or indirectly. Hence soil is an inseparable part of our living.

- **What is Soil Profile?**

The soil profile is a vertical section of the soil that depicts all of its horizons. The soil profile extends from the soil surface to the rock material.

- **How is Soil Formed?**

Soil is mainly formed by the breakdown of bigger rocks into smaller and fine particles with the continuous action of wind, rain and other agents of natural force. It takes hundreds to thousands of years for the formation of soil.

- **What are the basic components of Soil?**

Air, water, minerals and other organic matter are the basic components of soil.

- **What is the importance of Soil Profile?**

The soil profile plays an important role in maintaining the fertility of the soil and the nutrition content in the soil.

- **What are the horizons of soil?**

The soil profiles are composed of a series of horizons or layers of soil, which are stacked one above the other. The 4 horizons of soil are:

1. The O-Horizon.
2. The A-Horizon.
3. The B-Horizon.
4. The C-Horizon.

- **What is Topsoil?**

The topsoil is the topmost layer of the soil. It is dark brown coloured soil which mainly consists of organic matter, decomposed material and many living organisms including some microbes, earthworms and other worms.

- **List out the different types of Soil Moisture?**

The different types of water present in the soil include:

1. Capillary Water.
2. Hygroscopic Water.
3. Gravitational Water.
4. Atmospheric Humidity.
5. Chemically Combined Water.