

SOIL RESOURCE

Soil is a biologically active porous medium that is present on the uppermost layer of earth's crust it acts as a substratum for life on Earth that serves as a reservoir of water and nutrients, a medium for the breakdown of organic materials, and as a participant of various biogeochemical cycles.

The soil in any particular area evolves through a series of weathering processes that are influenced by biological, topographical, climatic, and geological factors.

*As studies on agriculture and geology have increased, the soil is now considered a complex, dynamic, biogeochemical system that is vital to the life cycles of various land vegetation and soil-inhabiting organisms. Soil is one of the most important elements of an ecosystem as it contains both **biotic and abiotic** components.*

The coverage of Earth's surface with soil varies from place to place. Tropical forests have thin soils that are poor in nutrients, while grasslands in temperate regions have soils that are rich and well able to support crops. There are several different classes of soil depending on how the soil is formed and where it is located. An understanding of which class of soil is found in a particular location is an important foundation to obtaining successful crop yields.

*According to **Wilcox** :- "The history of human civilization is the history of soil and the education of individuals begins from the soil".*

Elements responsible for the formation of soil:-

Parent Material

The mineral from which the soil is formed is termed as the parent material. Rocks are the source of all soil minerals. The parent material is chemically or physically weathered and transported which then deposits to form layers of soils. Usually, the bedrock is the parent

material but there have been cases wherein soil gets transported due to factors like the wind and water.



Image of a Parent Rock

Now the actual process of formation of soil is a cumulative combination of a number of processes. Soil formation also known as Pedogenesis is first kicked off by weathering and variations come according to the weather conditions.

Carriers or Weathering Agents

Glacier:

As glaciers move from one part to another, they push the soil further with them. The drifted material gets deposited miles away from the place of its formation. When the glaciers melt, huge mounds of soil are left behind, a part of which is carried by the stream.

Water:

As rivers flow, the soil particles are transported along with the water. The smallest particles travel the farthest. Heavier particles, such as sand and rock get settled earlier. Soils deposited along the river banks are termed as alluvial soil, which is very rich in mineral content. Rainfall also plays an important role. Rainfall washes off the soils in exposed lands.

Wind:

Air plays the most important role as it transports a huge amount of soil from one place to another. Loose soils are carried away by the wind from one place to another.

Weathering Processes

Freezing and Melting:

Repeated freezing and melting results in the formation of cracks and crevices in rocks. In the presence of the sun, the surface of rock expands. Upon coming in contact with a water body, these pores get filled with water. As we know, water expands when frozen, which pushes the particles further apart, breaking it down. When ice melts again, the rock breaks into loose soil particles

Heating and Cooling:

In places with extreme climatic conditions, such as the arctic circle or the arid region, the rocks are subjected to sudden expansion and contraction, which results in the loosening of their particles and increase in the air content. Over time, the effect significantly reduces a rock to loose soil.

Wetting and Drying:

The rocks swell when they are wet and shrink back when dry. Regular wetting and drying of rocks result in the loosening of its grains.

Grinding or Rubbing:

As the sea waves pound to the rocks along the seashore, abrasion of the uppermost layer occurs along with its fragmentation into smaller rocks and further into smaller particles.

Organisms:

The organisms such as earthworm live in the soil. They churn their way through it by eating it. This results in the production of nutrient-rich manure in the form of their excreta. Their movement in the soil helps in its mixing and aeration.