

Land

Land is among the most important natural resources. It covers only about thirty per cent of the total area of the earth's surface and all parts of this small percentage are not habitable.

The uneven distribution of population in different parts of the world is mainly due to:

- **Landforms:**

People prefer to settle in areas with fertile plains for farming and economic activities, rather than in mountains, deserts, or rugged terrain.

- **Climate:**

Moderate climates with adequate rainfall are more hospitable and better for agriculture.

- **Water Availability:**

Access to water is crucial for human settlements and agriculture.

- **Soil Fertility:**

Fertile land is essential for farming, making areas like river valleys more attractive for dense populations than areas with rocky or sandy soil.

- **Resource Availability:**

Regions rich in natural resources like minerals and forests attract economic activity and settlements.

Soil

The thin layer of grainy substance covering the surface of the earth, It is closely linked to land.

Landforms determine the type of soil. Soil is made up of organic matter, minerals and weathered rocks found on the earth. This happens through the process of weathering. The right mix of minerals and organic matter make the soil fertile.

Soil horizons

Soil horizons are the layers in the soil as you move down the soil profile. A soil profile may have soil horizons that are easy or difficult to distinguish. Most soils exhibit 3 main horizons:

- **A horizon**

humus-rich topsoil where nutrient, organic matter and biological activity are highest (i.e. most plant roots, earthworms, insects and micro-organisms are active).

- **B horizon**

clay-rich subsoil. This horizon is often less fertile than the topsoil but holds more moisture.

- **C horizon**

underlying weathered rock (from which the A and B horizons form).

Some soils also have an O horizon mainly consisting of plant litter which has a

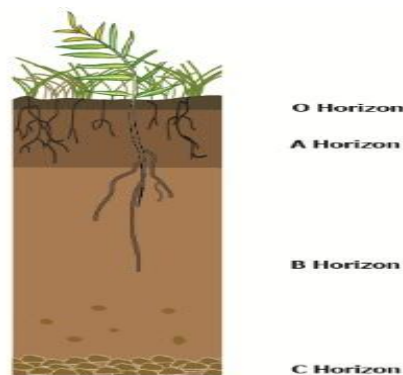


Fig (1) Soil profile showing the different layers or horizons

What is a Soil Profile?

Soil profile definition: A soil profile is a vertical section of soil from the surface down to the unweathered parent rock. It displays all the distinct layers, or horizons, that soil develops over time. Each horizon has unique features, influenced by factors like climate, plant activity, and parent materials. Soil profiles help us understand soil fertility, structure, and suitability for crops and construction.

Factors of Soil Formation

- The nature of the parent rock
- Climatic factors
- Factors are the topography
- Role of organic material
- Time taken for the composition of soil formation

Factors affecting soil formation

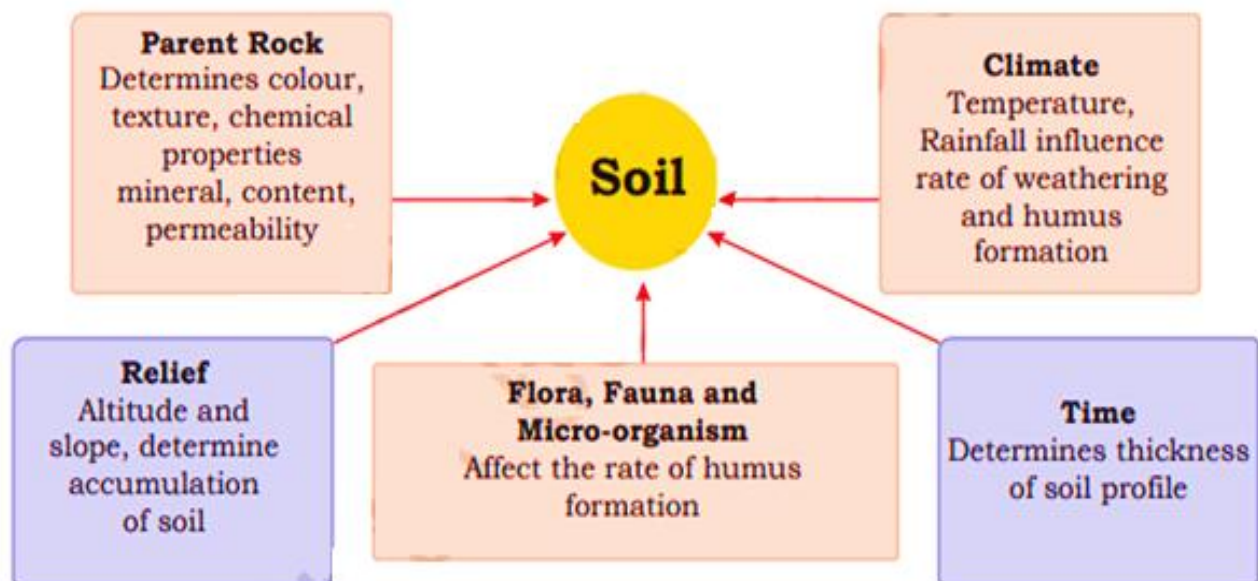


Fig.(2) Factors affecting soil formation

Here are some of the key reasons why soil is important:

Plant growth

Soil provides the necessary nutrients, water, and support for plant growth.



Fig (3) Plant growth, Source Google Image

Biodiversity

Soil is home to an incredible diversity of microorganisms, including bacteria, fungi, and protozoa.

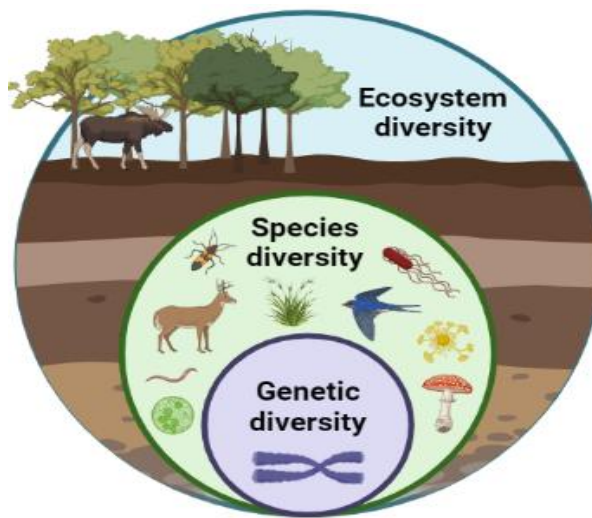


Fig. (4) Biodiversity

Water storage and purification

Soil acts as a sponge, absorbing and holding water after rainfall or irrigation. This helps to prevent flooding and erosion and also allows for the slow release of water into streams and groundwater aquifers.

Carbon storage

Soil is a major reservoir of carbon, holding more carbon than the atmosphere and all living vegetation combined.

Habitat

Soil provides habitat for a wide range of organisms, including insects, worms, rodents, and other animals.

Cultural and historical importance

Soil has played a central role in human history and culture, from providing the foundation for agriculture and civilization to serving as a symbol of land ownership and heritage.

Types of Soil Depletion

There are several types of soil depletion, each with its causes and consequences. Here is a detailed explanation of the different types of soil depletion:

Nutrient depletion:

Nutrient depletion occurs when the soil lacks essential nutrients required for plant growth, such as nitrogen, phosphorus, and potassium.

Soil erosion:

Soil erosion occurs when the top layer of soil is removed by water, wind, or other natural forces.

This can be caused by deforestation, overgrazing, and unsustainable land use practices.



Fig. (5) Soil erosion

Nutrient depletion

Plants require essential nutrients such as nitrogen, phosphorus, and potassium to grow. However, continuous cultivation without proper nutrient management can lead to the depletion of soil nutrients, making it difficult for plants to grow.

Pollution

Soil pollution is caused by the accumulation of harmful chemicals such as pesticides, fertilizers, and heavy metals in the soil.

Overuse

Excessive use of soil without proper rest and soil conservation practices can lead to soil depletion.

Climate change

Climate change can affect soil health by altering precipitation patterns and increasing the frequency of extreme weather events such as floods and droughts.

Some methods of soil conservation are listed below:

- ***Mulching***

The bare ground between plants is covered with a layer of organic matter like straw. It helps to retain soil moisture.

- ***Contour barriers***

Stones, grass, soil are used to build barriers along contours. Trenches are made in front of the barriers to collect water.

- ***Rock dam***

Rocks are piled up to slow down the flow of water. This prevents gullies and further soil loss.

- ***Terrace farming***

Broad flat steps or terraces are made on the steep slopes so that flat surfaces are available to grow crops. They reduce surface runoff and soil erosion (Fig. 2.5).

- ***Intercropping***

Different crops are grown in alternate rows and are sown at different times to protect the soil from rain wash.

- ***Contour ploughing***

Ploughing parallel to the contours of a hill slope to form a natural barrier for water to flow down the slope

- ***Shelter belts***

In the coastal and dry regions, rows of trees are planted to check the wind movement to protect soil cover



Terrace Farming



Contour Ploughing



Shelter Belts

Fig.(6) Some methods of soil conservation

Soil improvement methods Applications

- green manuring
- animal manure
- composting
- chemical fertiliser applications

What is Land Use Planning

Land use planning is the systematic assessment of land, and providing alternatives for land use based on social and economic conditions in order to select and adopt the best land uses options.

When is land-use planning useful?

- The need for changes in land use, or action to prevent some unwanted change, must be accepted by the people involved.
- There must be the political will and ability to put the plan into effect.

Goals of land use plans;

- Efficiency
- Equity and Acceptability
- Sustainability
- Study Interrelationships between People –Activity – Location.