VIVEKANANDA COLLEGE

THAKURPUKUR

KOLKATA-700063

NAAC ACCREDITED 'A' GRADE

Topic: Factors Affecting Soil Formation

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Name of the Teacher: Baishali Mukherjee

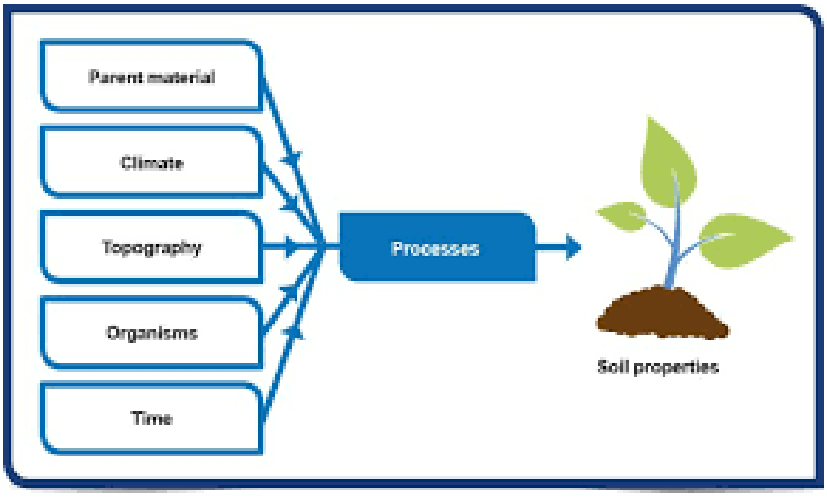
Name of the Department: Geography

Factors Affecting Soil Formation

The National Cooperative Soil Survey identifies and maps over 20,000 different kinds of soil in the United States. Most soils are given a name, which generally comes from the locale where the soil was first mapped. Named soils are referred to as soil series. Soil survey reports include the soil survey maps and the names and descriptions of the soils in a report area. These soil survey reports are published by the National Cooperative Soil Survey and are available to everyone.

Soils are named and classified on the basis of physical and chemical properties in their horizons (layers). “Soil Taxonomy” uses color, texture, structure, and other properties of the top two meters of soil to key the soil into a classification system to help people use soil information. This system also provides a common language for scientists.

Soils and their horizons differ from one another, depending on how and when they formed. Soil scientists use five soil factors to explain how soils form and to help them predict where different soils may occur. The scientists also allow for additions and removal of soil material and for activities and changes within the soil that continue each day.

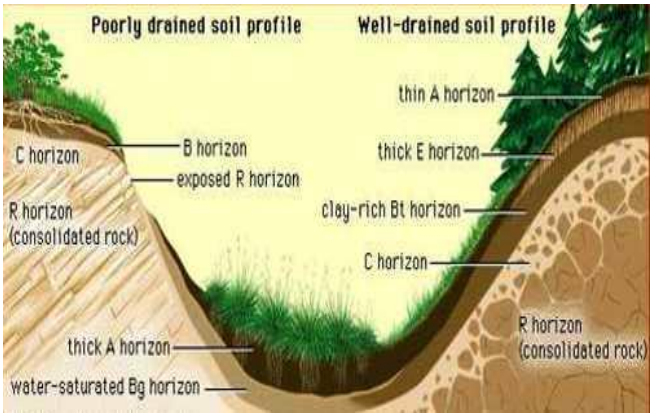


Factors Contributing to Soil Formation

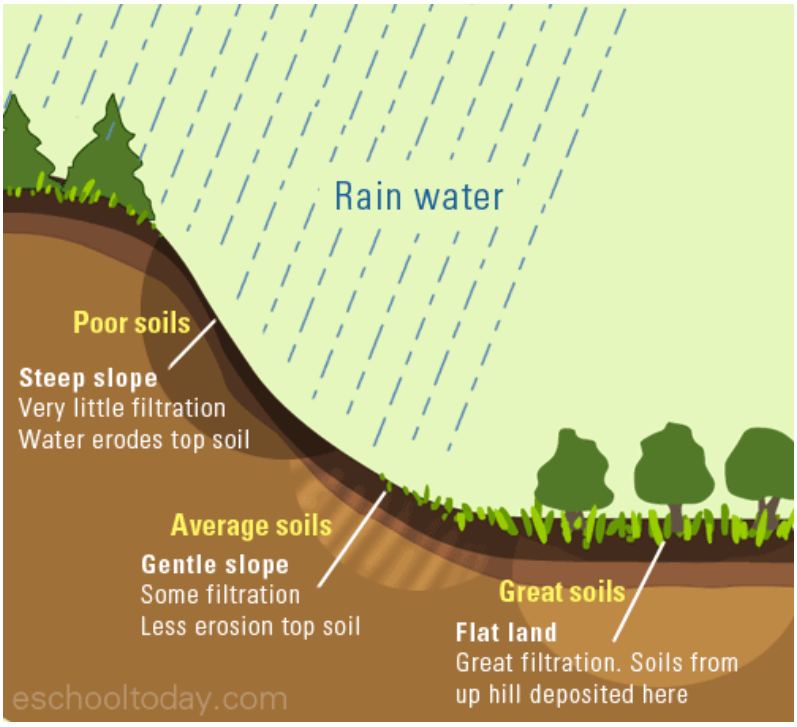
Parent material - Few soils weather directly from the underlying rocks. These residual soils have the same general chemistry as the original rocks. More commonly, soils form in materials that have moved in from elsewhere. Materials may have moved many miles or only a few feet. Windblown loess is common in the Midwest. It buries glacial till in many areas. Glacial till is material ground up and moved by a glacier. The material in which soils form is called “parent material.” In the lower part of the soils, these materials may be relatively unchanged from when they were deposited by moving water, ice, or wind

Sediments along rivers have different textures, depending on whether the stream moves quickly or slowly. Fast-moving water leaves gravel, rocks, and sand. Slow-moving water and lakes leave fine textured material like clay and silt when sediments in the water settle out.

Climate - Soils vary, depending on the climate. Temperature and moisture amounts cause different patterns of weathering and leaching. Wind redistributes sand and other particles, especially in arid regions. The amount, intensity, timing, and kind of precipitation influence soil formation. Seasonal and daily changes in temperature affect moisture effectiveness, biological activity, rates of chemical reactions, and kinds of vegetation.



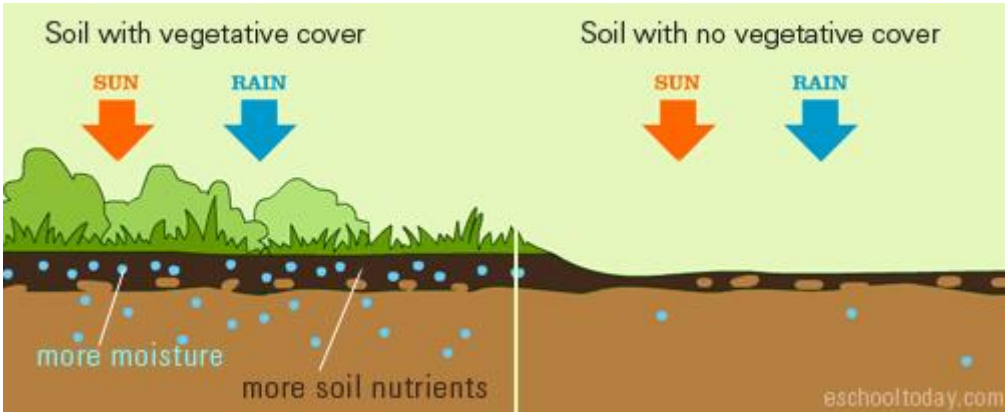
Topography - Slope and aspect affect the moisture and temperature of soil. Steep slopes facing the sun are warmer. Steep soils may be eroded and lose their topsoil as they form. Thus, they may be thinner than the more nearly level soils that receive deposits from areas upslope. Deeper, darker colored soils may be expected on the bottom land.



Biological factors - Plants, animals, microorganisms, and humans affect soil formation. Animals and microorganisms mix soils and form burrows and pores. Plant roots open channels in the soils. Different types of roots have different effects on soils. Grass roots are fibrous near the soil surface and easily decompose, adding organic matter. Taproots open pathways through deeper layers. Microorganisms affect chemical exchanges between roots and soil. Humans can mix the soil so extensively that the soil material is again considered parent material.

The native vegetation depends on climate, topography, and biological factors, plus many soil factors such as soil density, depth, chemistry, temperature, and

moisture. Leaves from plants fall to the surface and decompose on the soil. Organisms decompose these leaves and mix them with the upper part of the soil. Trees and shrubs have large roots that may grow to considerable depths.



Time - Time is also a component for the other factors to interact with the soil. Over time, soils exhibit features that reflect the other forming factors. Soil formation processes are continuous. Recently deposited material, such as the deposition from a flood, exhibits no features from soil development activities. The previous soil surface and underlying horizons become buried. The time clock resets for these soils. Terraces above the active floodplain, while similar to the floodplain, are older land surfaces and exhibit more development features.

These soil-forming factors continue to affect soils even on stable landscapes. Materials are deposited on their surface and blown or washed away from the surface. Additions, removals, and alterations are slow or rapid, depending on climate, landscape position, and biological activity.