

General Characteristics of Soil| sample answer

Q: 'Examine the general composition and characteristics of any one soil type that you have studied'

(2007 Q17)

Latosol- A tropical zonal soil.

3 aspects will be discussed.

- 1. Composition:** *Soil is composed of a number of ingredients/components. These components can vary in portion.*

All soils form as result of the action of several factors. These factors combine to influence the many processes at work in soil formation eg. Leaching and weathering. These give soil its own characteristics. Soil is composed of number of ingredients and constituents. The components of soil are mixed in different quantities to create different soil types. They are made up of mineral matter, air, water, humus, living organisms.

However, climate is the single most important factor in determining what a soil will be like as climate influences vegetation, the rate of weathering and soil, forming processing in an area.

The majority of soil is composed of mineral matter. Mineral matter are rock particles from the bedrock and weathered rock. The soil type varies depending on mineral matter.

Unconsolidated material eg boulder clay will help form soil more rapidly than solid bedrock as it is partly weathered.

Soil is also composed of organic matter. Organic matter includes decaying plants and animals which bacteria and fungi breakdown. Humus is a dark brown jelly-like substance formed from organic matter.

Living organisms are also included in 'organic matter', earthworms, beetles, fungi, bacteria; they digest organic matter to humus and also mix and create soil.

Water is another important component of soil. The amount of water is determined by the climate of the area in question. Water affects the rate and type of weathering and rate of decay of organic matter and rate of leeching.

If there is too little water- drought brings evaporation and upward movement of water causing salinisation and calcification.

If there is too much water waterlogging inhibits humification.

Latosol is a tropical zonal soil developed in response to tropical and equatorial climate. These climates have up to 6000 mm of rainfall per annum which causes leaching and rapid humification. Latosols are rich in aluminium and copper and organic matter.

- 2. Characteristics:** *all soils can be described according to their characteristics. Characteristics may vary.*

General Characteristics of Soil| sample answer

Organic content. Organic matter of soil is important due to its ability to support plant growth. Organic matter is very fertile because it is rich in nutrients.

Latosols have a low humus content. This is due to the rapid breakdown of organic matter by the many bacteria which thrive in the hot and wet conditions and rapid uptake of humus by plants.

Water is important for a soil for the following reasons; it enables plants to absorb nutrients dissolved from the mineral grains and it reduces soil erosion by wind because water holds soil particles together.

Latosols are wet due to high rainfall in the tropical region, are very permeable. However should the forest cover be removed soil dries out rapidly and becomes impermeable to water and useless for farming.

Colour. The colour of a soil depends on factors such as the rock it developed upon, parent material and the processes that have occurred such as leaching.

Latosols are red or yellow in colour. Leaching is so intense that only aluminium and iron compounds are left. These compounds give the soil its red or yellow colour.

The pore space between the peds hold air and water and are important for plants to access air and water in the soil. The shape of peds indicated the structure of soil.

Latosol is often poorly developed due to intense chemical weathering of mineral grains which prevents well shaped peds forming.

Texture describes how a soil feels to the touch. The texture of a soil is controlled by the amount of sand, silt and clay particles in it.

3. Factors and influences: *Various factors influence the processes affecting soil and soil characteristics.*

Climate, relief, parent material, living things and time are important controlling the formation of soils. They do this by influencing the processes affecting soil and soil characteristics.

Climate is the most important factor in soil formation. Temperature and precipitation are the biggest effectors. Temperature is important in bacteria activity. For example in hot weather, bacteria thrive and cause rapid decomposition.

Latosols are up to 40m deep in parts of Brazil because the climate has very high temperature. This high temperature and the permeability of the soil causes heat and moisture to reach deep and cause deepest soil.

Relief can influence the depth and drainage of soil. In general sloping land is well drained and soils are quite dry. However mass movement (soil creep) can occur, meaning soil is spread thin.

Flat upland is cold and wet meaning microorganisms are slow to work. An accumulation of dead debris occurs and peat is an example of this. Resulting in upland soils being infertile.

Latosols in Brazil are formed under the rainforest on flat land and on slopes which allows tree growth. They are thicker on flat land and thinner and better drained where land is sloping.

Parent material affects soil characteristics. The type of rock that a soil develops from can influence its pH, colour, water content and texture.

General Characteristics of Soil| sample answer

For example limestone produces calcium rich, dark- coloured soil. In general igneous and metamorphic rock tend to develop acidic soils. The parent material of a soil is not always rock. Soil can develop from sands and gravel too.

A variety of parent materials are found under latosols in Brazil. These different parent materials cause latosols to vary in colour from red to yellow.

Laterisation is the dominant process in forming latosols. Laterisation is a combination of deep leaching and chemical weathering. These combine to dissolve all mineral except iron and aluminium.

If soil erosion removes the loose topsoil, iron and aluminium is exposed. High temperatures soon bake this soil into a hard brick like surface which is impossible to cultivate.