

SOILS IN EAST AFRICA:

Soil is a thin layer of very tiny weathered particles covering the earth's surface. Soil is a mixture of solid, liquid and gaseous materials.

Components of Soil:

Soil air. Soil air is an important component because plant roots and other micro-organisms like bacteria make use of it.

Living organisms. These include very tiny plants and animals which live together in the soil e.g. bacteria.

Humus/organic matter. This is the dark brown/black top layer of the soil and makes 50% of the soil matter.

Inorganic matter. It is made up of minerals from the parent rock. It makes up 45% of the soil matter.

Soil water.

Types of soils:

- ✓ Loam soil. This is one of the most fertile soils. It is rich in humus and other soil nutrients.
- ✓ Clay soil. These are fine grained soils with less humus. It retains a lot of water and is acidic. It lacks oxygen which accelerates decomposition of organic matter. It discourages crop growing.
- ✓ Lateritic soil. It is formed through leaching. It is formed when top soil loses its mineral nutrients to the deeper soil. It is good for road construction and brick making. However it discourages crop growing. It is common in Buganda due to heavy rainfall which encourage leaching.
- ✓ Alluvial soils/alluvium. These soils that were deposited by rivers or running water. They contain a lot of nutrients and so area fertile. It found along valleys, river banks and the East African coast.
- ✓ Loess soils. These are soils carried and deposited by wind. They are mostly found in dry areas like Kotido, Moroto, kabong and Nakapiripiriti and northern Kenya.
- ✓ Moraine soils. These are soils deposited by glacier or ice.

Factors for Soil Formation.

Climate. This probably the most important factor influencing soil formation. Heavy rainfall and hot temperatures promote chemical weathering leading to the formation of deep soils. However little rainfall and hot temperatures lead the on formation of thin sandy soils.

Relief. Affects drainage and rate of soil erosion. Hill tops tend to have well drained but heavily leached soils. This is why Buganda hills and Kenyan highlands have reddish brown soils indicating a high degree of leaching.

On steep slopes, the soils tend to be thin and skeletal due to high level of erosion while the valley areas tend to have deep soils due to increased deposition.

Vegetation. Rotting vegetation provides humus thus changing the soil profile.

Plant roots sometimes penetrate the parent rock through cracks or joints causing the breakdown of the rock into soil particles. Therefore areas with dense vegetation cover like forests are associated with deep fertile soils while areas with scanty vegetation have shallow and infertile soils.

Parent rock. The parent rock determines the rate of breakdown, color and texture of the soil e.g. areas with volcanic rocks which have low content of quartz and loose texture tend to break down rapidly and give rise to fertile volcanic soils.

Time. Time is required for all other factors to play their part in soil formation. In most areas, the more the time the deeper the rate of weathering and the more developed the soil will be.

Influence of human activities. In some areas man is directly involved in the actual break down of rocks through activities such as mining, road construction and digging while in other areas he influences weathering and soil formation through his influence on the vegetation type and climate.

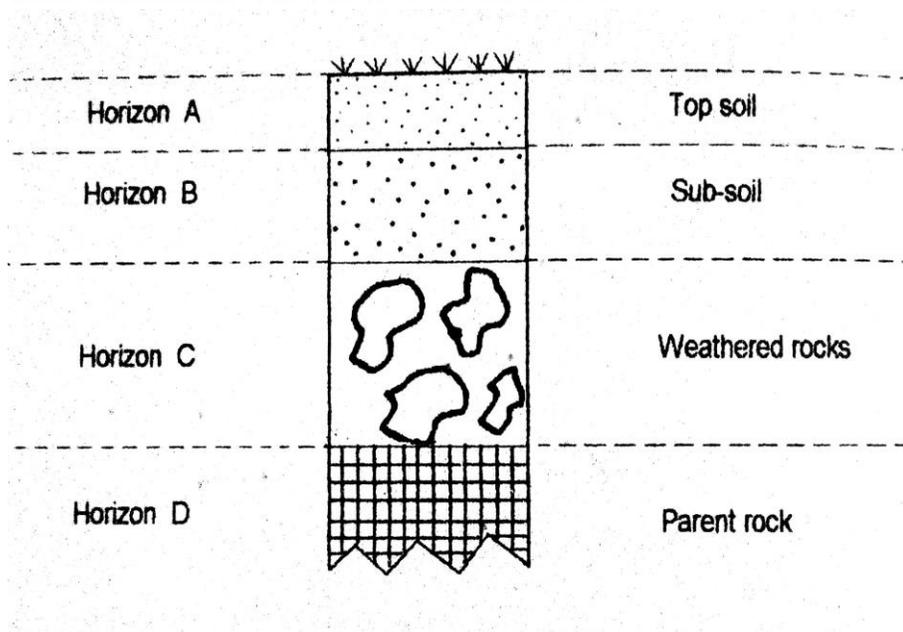
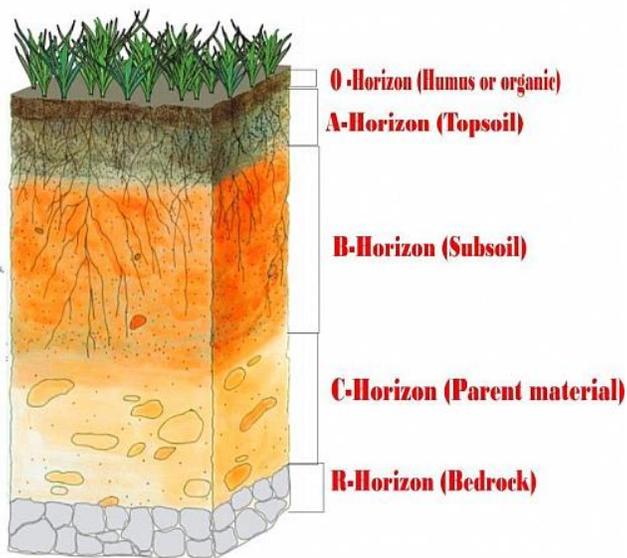
Major Terms Associated with the Study of Soil:

Soil Profile: It refers to the vertical arrangement of the soil layers from the surface to the bottom (underlying rocks). A well developed soil profile has three layers called horizons i.e. horizon A, B and C.

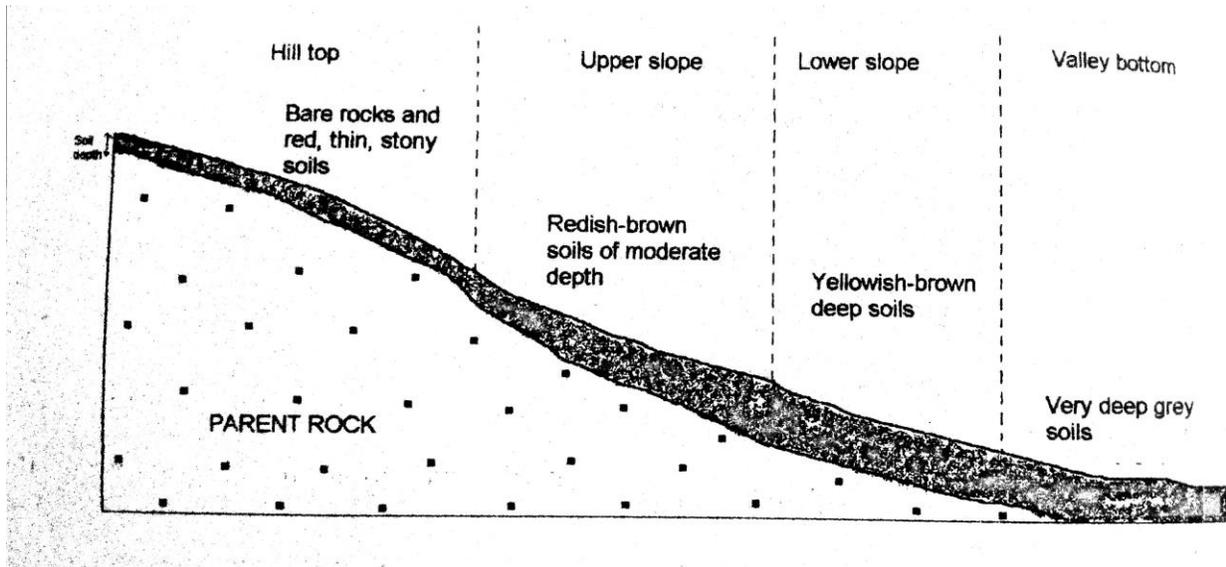
- ✓ Horizon A is rich in humus compared to other horizons. This is because it is more exposed to biological activities such as decomposition of plant and animal remains. It is also the horizon most affected by leaching.

NB. Leaching is the vertical movement of soluble soil nutrients from horizon A to B. Leaching results into the formation of lateritic soils.

- ✓ Horizon B is a zone of accumulation/deposition of materials removed from horizon A. The process of deposition of material is called Illuviation.
- ✓ Horizon C is the zone of recently weathered materials lying on the bed rock.



Soil Catena: This refers to the sequence of soils down the slope. In some parts of East Africa, soils change down a given slope. Steep slope often have thin soils and so are of limited use for crop cultivation. The lower slopes have deeper soils and are more suitable for crop cultivation. Valleys have deep soils due to deposition but they often become water logged.



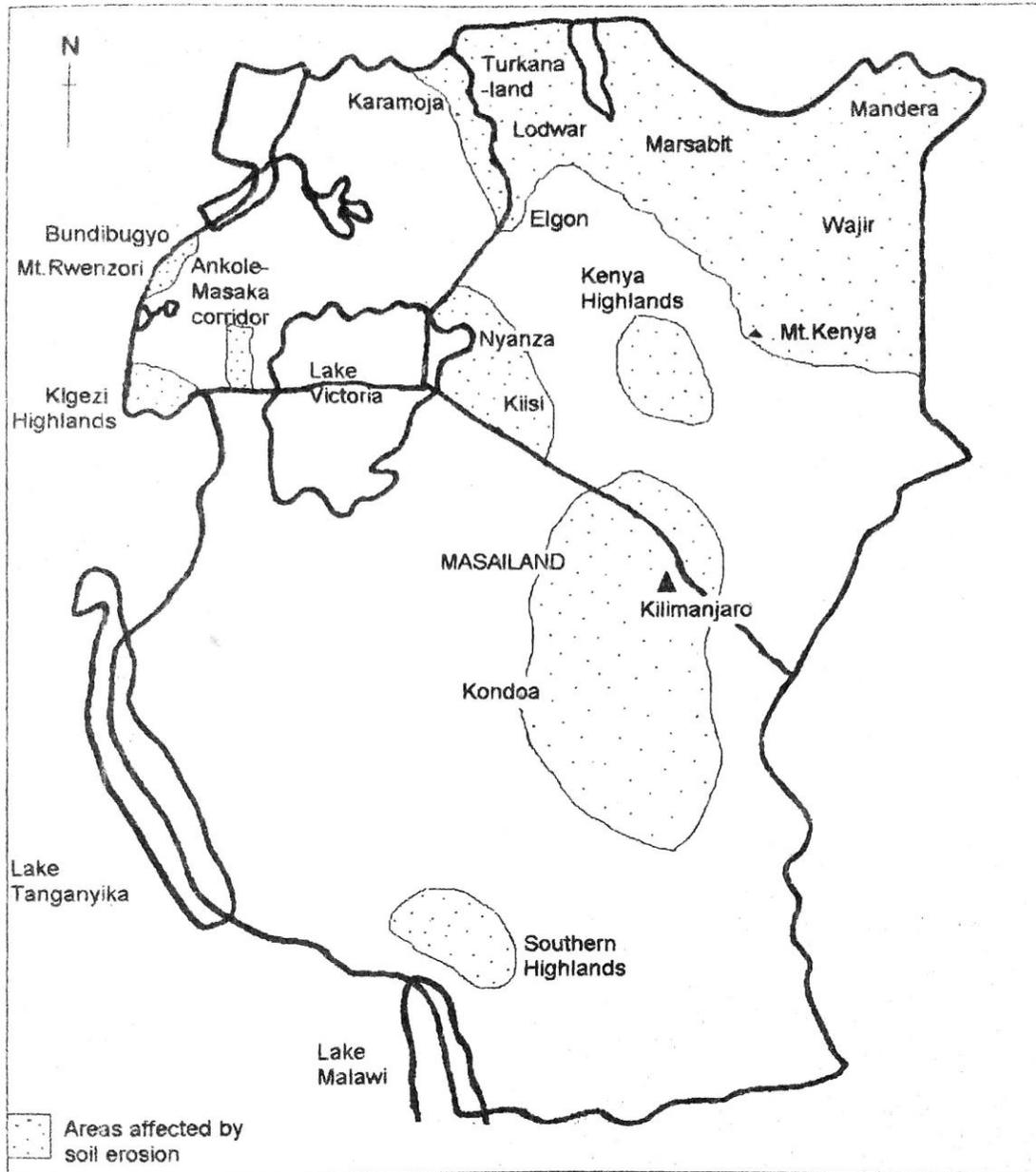
Soil Texture. This refers to the degree of coarseness or fineness of the individual particles which make up the soil. These particles include, sand, silt, clay and gravel.

Dominant texture	Diameter in mm
Very course sand	Above 2.0
Coarse sand	2.0 - 0.2
Fine sand	0.2 - 0.02
Silt	0.02 – 0.002
clay	Below 0.002

Soil Erosion:

This is the washing away of the top layer of soil.

MAJOR AREAS AFFECTED BY SOIL EROSION IN EAST AFRICA



Types of Soil Erosion:

- ✓ Sheet Erosion. This is when a thin layer of the soil is removed over a large ground surface.
- ✓ Rill erosion. This when top soil is removed along small channels and sometimes it leads to exposure of shallow plant roots.
- ✓ Gully erosion. This the type of erosion caused when heavy rainfall rushes down the slope cutting deep grooves which later widen to form gullies into the land.
- ✓ Rain drop/splash erosion. This caused when rain drops fall with sufficient force onto the ground loosening and displacing the soil facilities.
- ✓ Stream bank erosion. This caused when soil particles at the banks of streams and rivers are carried away by the running water or the streams and rivers.

Causes of Soil Erosion:

- ✓ Deforestation. It is the cutting down of many trees without replacement. It leaves the soil bare exposing it to agents of soil erosion.
- ✓ Over cultivation. Is the growing of crops on the same piece of land without letting it to rest. This consumes all the humus in the soil reducing their crumbing and making erosion easier.
- ✓ Over grazing of animals on the same piece of land leaves it bare exposing it to soil erosion agents in the rainy season.
- ✓ Low rainfall received or definite dry season. The heating of the exposed soil turns it into dust thus making it easy for soil erosion agents to erode the soil.
- ✓ Ploughing up and down the slope loosens soil particles and also creates water routes which increase surface runoffs.
- ✓ Bush burning to prepare the land for cultivation and hunting makes the soil bare and dry because the sun heats the soil direct.
- ✓ Excessive use of artificial fertilizers which destroys soil structure ie reduce the crumbing ability of the soil.

Effects of Soil Erosion:

Positive Effects of Soil Erosion.

- ✓ Soil erosion leads to soil formation in the lower areas. Soil is removed and deposited along gentle slopes leading to creation of deep soil profiles for example in Buganda region or foot hills of Mt. Elgon in Mbale.
- ✓ Soil erosion exposes minerals. For example limestone at Tororo is exposed by erosion. Granites in Buganda are also exposed by erosion.
- ✓ Erosion has exposed several volcanic features which act as tourist attractions such as inselbergs at Mubende, Mwana and Kakamenga hence a source of foreign exchange used to provide social services.
- ✓ Soil erosion exposes hard rocks that are used to install communication gadgets such as T.V, Telephone and Radio Transmitters.

Negative Effects of Soil Erosion.

- ✓ The removal of top soil exposes the fresh parent rock to agents of weathering. This leads to the formation of fresh new soils.
- ✓ Removes top fertile soils which results into reduction in crop production.
- ✓ It results into flooding of rivers like River manafa due to continuous deposition of silt into the river.
- ✓ Soil erosion along roads creates pot-holes and gullies that hinder transport and communication.
- ✓ It is one of the major causes of drought and desertification in northern Kenya and north eastern Uganda.

Measures to Control Soil Erosion/Soil Conservation:

- ✓ Afforestation. This is the planting of trees to provide vegetation cover so as to reduce the speed of running water and wind.
- ✓ Re-afforestation. This is the planting of trees where they have ever existed. Is widely done in kigezi, Bundibujo and Mbale.
- ✓ Mulching. This is where grass and other plant remains are covered on the soil to reduce the force of rain droplets.
- ✓ Contour ploughing. This practiced in hilly areas. It is where the farmer ploughs across the slope rather than up and down the slope.

- ✓ Strip cropping. This is where alternate strips of crops and plants are planted alternatively.
- ✓ Intercropping. This where different crops are grown together.
- ✓ Terracing. This is practiced in hilly areas. Steps/platforms are cut along the slopes and then crops planted on the steps. It also reduces the speed of flowing water down the slope.
- ✓ Educating the masses on the dangers of soil erosion and the possible soil conservation measures.
- ✓ Construction of gabions. These are structures constructed with wires and then filled with stones. They are constructed in areas experiencing rapid soil erosion.
- ✓ Rotational grazing using the paddock system especially in pastoral areas.