PART II GEOGRAPHY HONS.
(1+1+1 SYSTEM)

Module :6 ; UNIT : 1 ; TOPIC : 1.3

Prepared By

Dr. Rajashree Dasgupta
Asst. Professor,
Dept. of Geography
Government Girls' General Degree College, Kolkata -23

LATERITE SOIL

INTRODUCTION :

Laterite is a porous, indurated concretionary material which is usually red to reddish brown in colour. The name 'Laterite' was derived from Latin word 'Later' which means 'brick earth'. The term was used by I.V. Dokuchaev in his first classification of soils in 1883. But now the term laterite has become so unclear that it has lost practically all significance in science. Now the concept 'laterite' has been used to apply it not only to soils but to neoformations of iron and soil stratum. These neo-formations may be composed of quartz ferruginous concretions, laterite pans, blocks or crevasses. Formations of this kind can be both ancient and recent.

TYPES OF LATERITES :

There are three types of laterite:

i) Wormhole Laterite.
ii) Pellet Laterite
iii) Soft Doughly Laterite

Wormhole Laterite is concretionary formation with an iron-rich matrix and worm-hole like appearance.

Pellet Laterite is pellet shaped particles cemented by iron-oxide.

Soft doughly Laterite is formed by alternate melting & drying.

Laterite is often confused with Lateritic soil. Lateritic soils are fine-grained materials than laterite. An important physical difference between laterite and lateritic soil is that Laterite has a gravel component but a Lateritic soil does not.

ENVIRONMENTAL CHARACTERISTICS :

i)Climate : A prerequisite for the formation of a laterite or a latertic soil is a climate which is both annual and monsoonal. The characteristics of climate are –long alternating wet and dry season with short temperature between 20^0 to 28^0c, a rainfall about 200-900 cms. or more.

ii.) Hydrology: The fluctutation of ground water table in laterization process.

iii.)Landforms : Laterite soil is found only in matured terrain which is characterized by moderate to heavy dissection. Breaks in slope, scarps, interfluves and flat hill tops are favourable for laterite formation.

iv)Geology: The type of laterite form depends upon the type of rock bedding weathered and amount of iron available. Laterite is formed from the iron-rich basic rocks and as basalt, granite & gneiss.

v)Soil – The surface soil above a laterite form usually hard uneven, highly leached, red to red brown and has black glossy iron pillets scattered. The soil is well to moderately well-drained.

FORMATION OF LATERITE SOIL

The process of soil form take place in alkaline medium. The mineral silicates of the parent materials are completely broken up and very little of clay is formed. If any clay mineral is formed, it is further decomposed into silica and sesquioxides. The alkaline soil dissolves the silica and leaches out, leaving the sesquioxides behind. As the ……. …….. alkaline earth bases are removed from the seat form , the residual soil is acid in reaction. Vegetation is very profuse yet organic matter does not accumulate. The decomposition of organic matter is rapid due to microbial activity brought about by high precipitation and temperature. The organic matter content of this soil is rich. This process of soil formation is known as laterization. The composition of the mineral part of the soil depends on the drainage of the particular rock. Well drained rocks yield Gibbsite and in case of iron deposition, Goethite. Weakly drained rocks yield Kaolinite as well as montmorillonite& mixed layered minerals. In the upper stratum upto 1-4m, , the content of these minerals decreases and that of Kaolinite and Goethite increases,, there is no gibbsite. All these testifies to the impot5ant role played by drainage under tropical conditions of soil form, providing for soils with clay minerals of different composition.

LATERITE SOIL PROFILE

Crusts may usually form from zonal ferrolitic and ferritic soils which show distinct laterite horizons. Aubert provides a profile of a deep Lateraite Soil in which five divisions are there with reference to their variations with climate, parent material and site.

Layer (i)- Organic layers are usually thin and usually thicker on fine textured soils (<0.4 cms.) than on sands (0.1m). Fallen branches and trunks quickly decompose and litter at rate of 1.3% per day. This layer also have low humus content (1- 1.5%). Humus is moderately rich N, with C/N ratio of 10-16 decreasing to C_3 in the mineral soil. Soluble colourless humus is formed by termites, aiding aggregation, micro-organisms produce darker, less soluble inert humus.

Layer (ii)- The upper mineral horizons are greatly leached and greyish, erected and have some Fe concretions. Under equatorial conditions or all illdrained plateau and peneplaimns on acid rocks the upper layers are very light forming palled zones or grey latsoils. The red colour of Tropical Soils need not indicate a high Iron content nor grey the lack of it . For Fe in hydrated form in yellow or wet grey soils may the iron content of red soils. The degree of hydration is the cause of the colour change.

Layer (iii)-It attains 10m. thickness. The BL1-2 horizons are most compact and rich in resistant hydroxides. Usually red, they be yellow or achrons. The lower part Bl_3 is most Kaolin rich, with traces of clay sized quartz. Large quartz crystals collapse to fine powder on pressure. The Bl_3 has stable nutty structure with some Fe concretions.

Layer (iv)-It is moist, mottled (speckled) clay. If it is ever caused to dry out cellular laterite forms. It is best developed in moist coastal low land on acid rocks and the mottled clay absent on drier & poorly developed basic rocks.

Layer (v)-CR is the thickest acid rocks (<5m) It is the true parent material and has large pockets and is porous. The original regolith stratum is visible, with concentric iron skins and pH is higher than in other layers.

DISTRIBUTION OF LATERITE SOILS

Laterite soil occupy considerable tropical areas of Asia, Africa and South America.

True laterite soils cover on 5000 sq. miles in Sn. India. They elsewhere range from heavy loams to clay. In Burma, laterite soils are also rare. Confined to intratropical to South Arakan 7 Tennaserium & laterite soil profile is rare above 150m latitude. Other (width 50m clay) countries of Asia having laterite soil are Malayasia and Indonesia.

In the Congo, recent tropical soils are related to active slopes around eroding in selber and sugar loaf features. A classification in Ghana has gleys and peat as hydromorphic,

mangalitic and podzolized soils as intra-zonal soils. In the Ivory coast , latitudinal sequence of laterite is developed in Sudan and Senegal. In Angola, laterite soils are rich in Kaolin and micaceous clays.

Laterite soils also occur in North Borneo and in Amazon lowlands of South Amewrica. Dartk latsols occur in humid areas or on base rich rocks, red latsols in arid minerals and brown latsols in ash basaltic terrain. Yellow forms are common in ill-drained areas, while dark clayey talpatele are mangalitic.