Geography Foundation

6|April|24

Biogeography & Env. Geography

12:00 - 2:30 | Lec-2

Soil classification

- Organised study
- Appreciate & better insights of soil diversity
- For future planning & utility.

Classification

Marbut scheme
(based on soil genesis or soil forming factors)

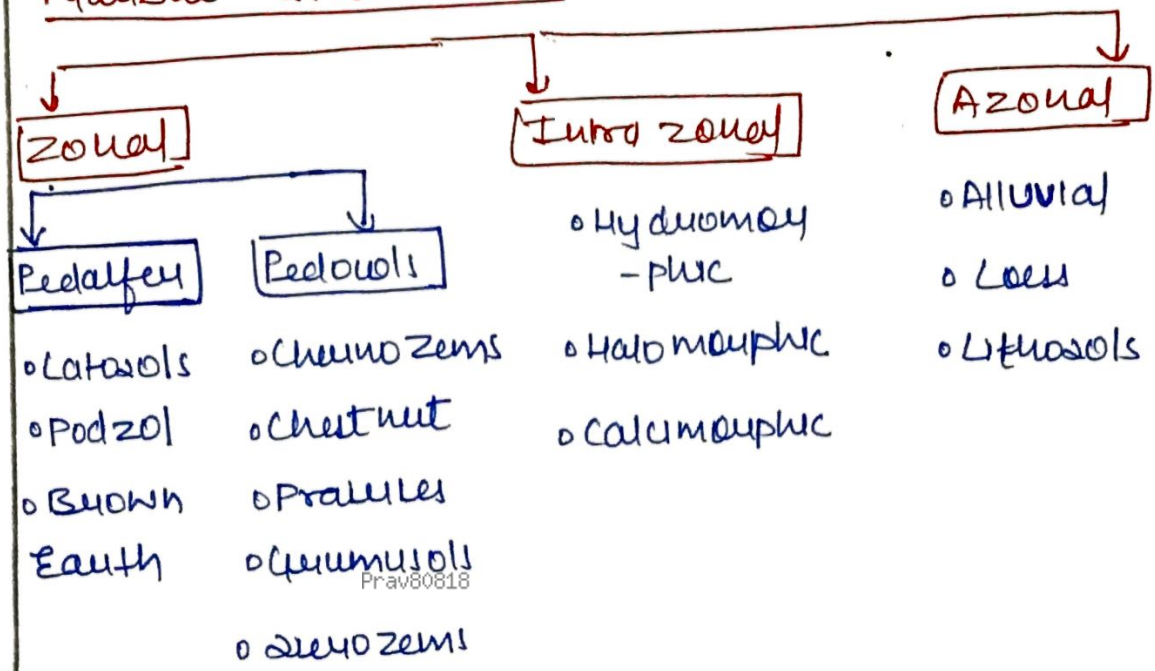
USDA (US Dept of Agri.)
(based on observable properties of soil - texture, colour)

- 7th Approximate scheme

- The aim of soil classification is to have organised study of soils, appreciate diversity of soil, ensure utility of soil for planning purpose

- Initially the works on soil was carried out by Russians followed by Americans

Naubut Classification



a] Zonal soils -

- Zonal soils are linked with climate of particular area. These soils are mature & have well developed horizons
- Zonal soils are further classified into Pedalfer & Pedocals.

- **Pedalfer** → E
- Precipitation > Evaporation
- In Humid areas
- Leaching is dominant
- Subdivided ~~based on Latitudes~~ ÷

a] ~~Chernozems~~

b] ~~Chestnut~~

a] Latosols

b] Podzols

c] Brown Earth

Ped- soil
al- Aluminium
Fe- Iron

Pedocal

- Evaporation > precipitation
- Dry areas
- Capillary action is dominant
- Subdivided based on Latitude ÷

a] Chernozems, Chestnuts, Prairies [Temperate Grasslands]

b] Chernozols [Tropical Grasslands]

c] Xerozems (Desert/ Want/Hot areas]

Ped- soil
cal - Calcium

1] Zonal soils -

1]a] Pedalfers

• **Latosols** - found in hot & humid areas like tropical monsoons. in which silica is leached down & Iron & Aluminium accumulates on top layer. such soil appears to be in red colour due to the process of Laterisation.

such process is seen in mountainous areas of tropical region like W. Ghats, E. Ghats, Amarkantak plateau.

It also forms a hard layer of soil called as Hardpan or Patlands as observed in the areas of Jharkhand & Bihar.

It is also used for brick making. They are not good for cultivation but few plantat" crops like tea, rubber, coffee can be grown here

• **Podzols** - they are found in cool & humid region where Iron & Aluminium are leached & silica get accumulated in top.

soil is acidic in Nature, grey in

colour

It is found along Taiga belt of Coniferous forest

- **Brown Earth** - found in areas that are comparatively cooler areas than the Tropical areas but warmer than the Temperate zone

Leaching takes place but it is ineffective ∴ widespread distribut^{n} of silica, Iron & Aluminium but silica is at top & other two remains at bottom

This soil is used for forestry & is seen in Britain & has brown colour ∴ called as Brown Earth.

1] b] **Pedocals** -

- **Chernozems** - found in Temperate Grassland along Russian steppes.

They are found in cool & humid conditions with adequate amount of organic matter i.e

Humus making soil appears Black in colour

- considered as one of the best soil in the world. Such soils are also found in Temperate grasslands such as Downs (Australia), Pustaz (Hungary), Veldt (S. Africa), Canterbury (NZ), Pampas (Argentina)

- **Chestnut** - are found in drier areas comp-are to Chernozems. They have low organic content compared to Chernozems

They are dark maroon in colour

- **Prairie soil** - found comparitively on the wetter side in comparison to Chernozems

Ex Prairies of USA

- **Grumusols** found in areas of Tropical grasslands like Savannah. Such type of soil witness cracking in the dry season.

Azonal soils / Desert soils - They have high accumulation of salts. The capillary action is dominant in this soil due to which salts accumulate on top layer.

Such soils are found in deserts of Sahara, Atacama, S. Arabia, Mojave deserts etc (Capillary action - Evaporation > ppt)

2] Intrazonal soils - depends on local condition like local drainage, climate & local rocks (Hydromorphic) (Halomorphic) (Calcimorphic)

- **Hydromorphic soil** - This soil is found in areas of bad drainage

Dominent process involve in it is gleification (Glei patches, Blue green patches, anaerobic condition etc)

Such soils are formed in Mangroves, Wetlands & coastal region. In Kerala, this soil is called as **Karri soil**

These soils are also called as **Bog soils**

- **Halomorphic soil** - found in dry areas where there is accumulation of salts

When accumulation of salts is calcium salts such soils are called as **Solonchak soil**

When accumulation of salts is sodium salts such soils are called as **Solonetz soil**

- **Calcimorphic soils** - developed in the areas where parent rock is calcareous. There are 2 types of Calcimorphic soils -

a] Terra Rossa soil

b] Rendzina soil

a] **Terra Rossa soil** - Red in colour & found in the Mediterranean region. The soil is used in Grape Cultivation.

b] **Rendzina soil** - found in Britain, found in areas of Chalk.

3] Azonal soil

- called as Transported soils & formed by the action of denuding agent like rivers, glaciers, winds

Ex • Alluvial soils (formed by Rivers)
- Loessic soils (formed by wind action)
- Lithosols [found in Mountainous region formed by imperfectly weathered material or rock fragments & here rate of erosion is as fast as it is formed]

- Such soils are immature soils as they lack Horizons development however this soil can be fertile as they have been brought by different plans thus enriching its fertility

Shortcomings of Marbut Scheme -

- Marbut classificat^{n} is based on experience of USA & doesnot adequately represent soils of Tropical region.
- Zonal soils found in diff. type of climate Marbut considered that Podzols are soils of Temperate areas but such soils are also found in Tropical areas.

A] Marbut's classification ✓

B] USDA classification of soils -

- Based on observable properties like soil colour, texture, porosity, permeability, clay content etc
- Histosols (Bog soil) - formed in swampy areas, mangroves, wetlands, coastal regions
  - Gleisation (blue patches, anaerobic decomposition) (Use of potassium gluconate)
  - Bog (peaty soil)
  - Hydromorphic soil in Marbut scheme

- **Oxisols** - found in Equatorial area, leaching is dominant. Silica leached down from top
  - Latosols of Manbut

- **Ultisols** - soil of the Tropical region. Leaching is dominant. Acidic in Nature & process of Laterisation operates in this soil
  - Latosols of Manbut Shinny

~~Po~~

- **Spodsols** - found in cooler & humid regions
  - Silica remains at top & Aluminium & Iron are leached
  - Grey in colour
  - Acidic in nature
  - Podsolisation.

- **Vertisols** - such soil become sticky when wet & develops crack when dry
  - such soil is called as self ploughed soil

Ex Black cotton soil of India & soil of

of Snake Columbia Plateau (USA)

- **Entisols** – It is at embryonic stage i.e recently formed and it lacks horizon development
  [E = Embryonic stage]
  – Azonal soil in Marbut scheme

- **Inceptisol** – These soils have weak horizon development & are at inception stage
  – both Entisols & Inceptisols are found from Equator to Polar areas

- **Mollisols** – They are found in areas of grassland/steppes – from sub humid to semi arid areas. Mainly their extension is 60 latitude of N. America, ~~Africa~~ → S. America & equatorial areas of S. America & Africa

- **Aridisols** (Soils of Arid Regions) - Desert soil similar to Prav80818 Kerozem soils
  - Capillary action is dominant
  - Evaporation > Precipitat"
  - forming Alkaline soil
  - Salts accumulated close to the surface

- **Andisols** - These soils are found from volcanic ashes of Andes mountains
  - with extensive water irrigation, this soil can become fertile.

- **Alfisols** - These soils are extremely wide in latitude & spans across enormous types of climate
  - Types -
    a] Boralfs soil - found in boreal forest of N. America & Eurasia
    b] Udalf soil - found in Mid-Latitude zones

c] Ustalf soil - found in warmer zones

d] Xeralfs soil - found in Mediterranean zones

Evaluation of USDA scheme -

- In USDA classification local factors have given more prominence ∴ more easier to understand as it is based on Empirical evidences.
- This scheme is also based on data collection & laboratory analysis which is not easily available in under developed & poor countries.

Soils of India -

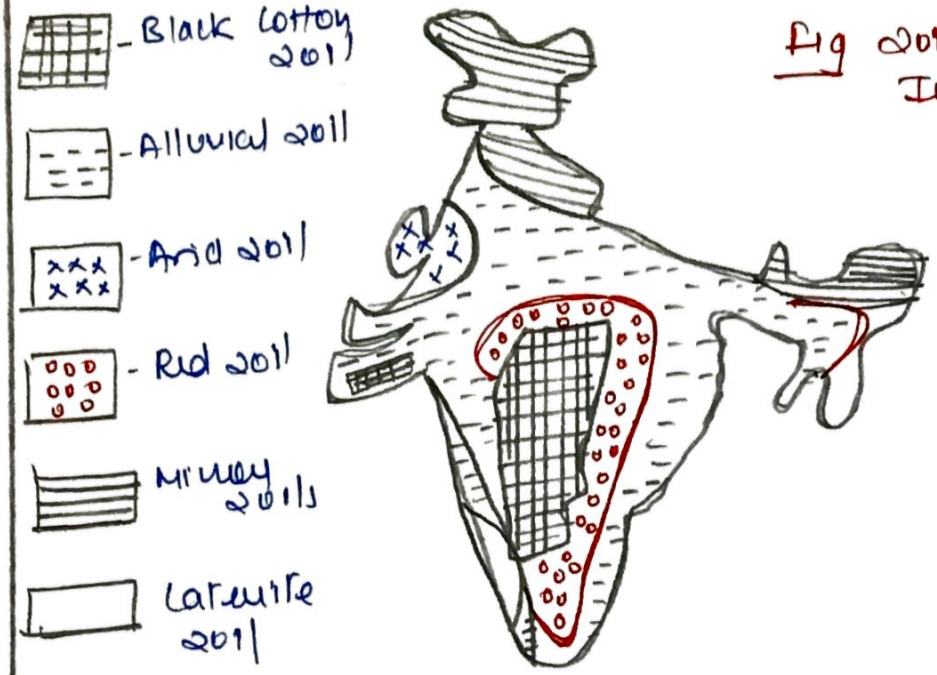


Fig Soils of India

- **Alluvial soil** - It is a transported soil as it is deposited by rivers along valleys, coast & deltas.
- It is rich in potassium & poor in phosphorus
- The soil is suitable for cultivat° of rice, wheat, sugarcane. However soil is suffering from problem of over-cultivat° & sand mining

• Red soil - commonly seen in peninsular region & is formed by the weathering of Granite & Gneiss rocks.

- This soil is poor in Nitrogen, Phosphorus & Humus.

- Such soil is found in dry areas of Bundelkhand, Telangana & suitable for the cultivation of pulses, oil seeds & millets.

- This soil has coarse texture & found in dry areas

• Black soil - Regur soil

- found in areas of Maharashtra, M.P, Karnataka

- found by weathering of basaltic rocks.

- It becomes sticky when wet & develops crack when dry

- also called as self ploughed soil

- Rich in lime, iron, aluminium & magnesium
- Suitable for cultivation of water intensive crop like sugarcane & cotton however soil is suffering from problem of salinization

Laterite soil - found in highland areas of India like N. Ghats, E. Ghats, Amarkantak plateau
- Red in colour & suited for plantation crop for rubber, tea, coffee
- Suitable for brick making & bauxite mining
- Red in colour due to presence of Iron oxide