

Soil classification:

"Soil classification is the systematic grouping of soils into categories based on soils morphological and chemical characteristics."

Morphological properties such as colour, texture, structure, nature of horizons and other related properties change gradually. To study the morphology of a soil and its variation, some minimum volume or area is needed and such a minimum area is called a pedon.

Pedon:- It is defined as a three dimensional body of soil with lateral dimensions large enough to permit the study of its morphology. Area of a pedon ranges from $1-10m^2$ depending on soil variability and generally is as deep as roots of normal crops grow.

Polypedon:- It may be defined as two or more contiguous pedons all of which are within the defined limits of a single soil series commonly referred to as a soil individual. It is the basic unit of soil classification.

Soil Taxonomy

It is the basic system of classification of soils making and interpreting soil surveys. It is an arrangement or grouping of soils based on individual soil morphology as described in the field in genetic terms and evaluated in terms of diagnostic horizons & features. Soil moisture & temperature regimes data are also needed for taxonomic soil classification.

Categories & bases of classification

Soil taxonomy is based on the properties of soils as they are found today. Since soil properties often are related to soil genesis, so special importance should be given to soil genesis as well. All chemical, physical & biological properties are used as criteria for soil taxonomy. e.g., moisture, temperature, colour, texture, structure, contents of c-m, clay, iron & aluminum, pH and % age base saturation are important properties for soil classification. Presence or absence of certain diagnostic soil horizons also determines the place of a soil in the classification system.

There are six categories of classification in the soil taxonomy. They are as under:-

- | | | | |
|---|-------------|---|--------|
| 1 | order | F | Family |
| 2 | Sub order | b | Series |
| 3 | Great group | | |
| 4 | Sub group | | |

There is an increasing degree of specificity in soil characteristics from higher to lower categories. This system of classification is based on the properties of soils as they are found today in the field. One of the objectives of the system is to group together soils that have resulted through similar genetic processes, thus placement of soils in these categories is based on soil properties.

Soil orders:- This is the most generalized category, with a grouping of soils on the basis of presence or absence of diagnostic horizons. These horizons reflect the kind and intensity of major soil forming processes. These processes are ^{also} affected by various climatic factors. There are 12 soil orders in the world. Out of these 12 orders, seven have been differentiated on the basis of diagnostic horizons. These seven orders are as under:-

- ① Inceptisols include weakly developed soils.
- ② Aridisols " arid region soils
- ③ Mollisols " naturally productive and fertile soils.

- ④ Alfisols include well developed soils.
- ⑤ Ultisols " soils of warm humid region.
- ⑥ Oxisols " highly weathered tropical soils.
- ⑦ Spodosols " sandy acidic soils formed in cool & humid climate.

Other 5 soil orders are as under:-

- ⑧ Andisols include soils formed from volcanic material.
- ⑨ Gelisols " " with permanent frost.
- ⑩ Histosols include soils having $> 20\%$ O.M.
- ⑪ Entisols " " with no diagnostic horizon distinctive.
- ⑫ Vertisols include soils having high quantity of swelling clays.

Soils orders Found in Pakistan:-

out of 12 total soils orders, six are found in Pakistan. These are

- | | |
|---------------|-------------|
| 1 Aridisols | 4 Alfisols |
| 2 Entisols | 5 Mollisols |
| 3 Inceptisols | 6 Vertisols |

sub-orders :-

3

within each sail order, sails are grouped into sub orders on the basis of sail properties that reflect major environmental controls on sail forming processes. Many sub orders are differentiated on the basis of moisture or temper. regimes. There are 63 sub orders identified for 12 sail orders. out of these 63 sub orders, 14 are found in Pakistan.

Oxthids, ~~Ag~~ Aegids, Aquents, Fluvents, orthents, Psammets, ustalps, udalps, ochsepts, ustests, Torsests, Udolls, ustalls and Berolls.

Great group :-

Great groups are subdivision of sub orders. ~~More~~ ~~than~~ 300 great groups are recognized mainly on the presence or absence of diagnostic holozens. In Pakistan, 21 great groups have been identified.

Sub Group :-

Sub groups are subdivision of great groups. More than 2000 sub groups are identified. The central concept of a great group makes up one sub group.

Exact sub groups = 2484

Family :-

Families are subdivision of sub groups which are differentiated on the basis of those soil properties which are important for plant growth. Soils belonging to a family are similar in their management requirements. Important properties used to classify soils into families are as under: particle size, mineral composition, calcareousness, pH, soil temperature, soil depth & consistency etc.

Total families ~ 8000

Series :-

Soil series is the most specific ~~category~~ unit of classification system. It is the subdivision of family. Soil series are differentiated on the basis of morphological soil characteristics primarily kind, thickness and arrangement of horizons. Total soil series ~ 19000 in the world.

Diagnostic Horizon

Horizons having specific soil characteristics that are indicative of certain classes of soils are called diagnostic horizons. Diagnostic horizons that occur at the soil surface are called epipedons.

There are 7 epipedons. (Only 2 in Pakistan)

1 Mollic epipedon → Mollic Pakistan

2 Umblic "

3 Ochric " → Pakistan

4 Melanic "

5 Histic "

6 Anthropic "

7 Plaggen " *

Sub Diagnostic subsurface Horizons:-

These are formed below the horizon surface and may be exposed to the surface if surface horizon has been eroded. These horizons reflect changes resulting from genesis and weathering of parent material. Commonly these are designated as B horizons in genetic terms and list is as under.

1 Argillic horizon

2 Argic "

3 Cambic "

4 Kandic "

5 Natric "

6 Oxidic "

7 Sombic "

8 Spodic "

9 Albic "

10 Calcic "

11 Salic "

12 Gypsic "