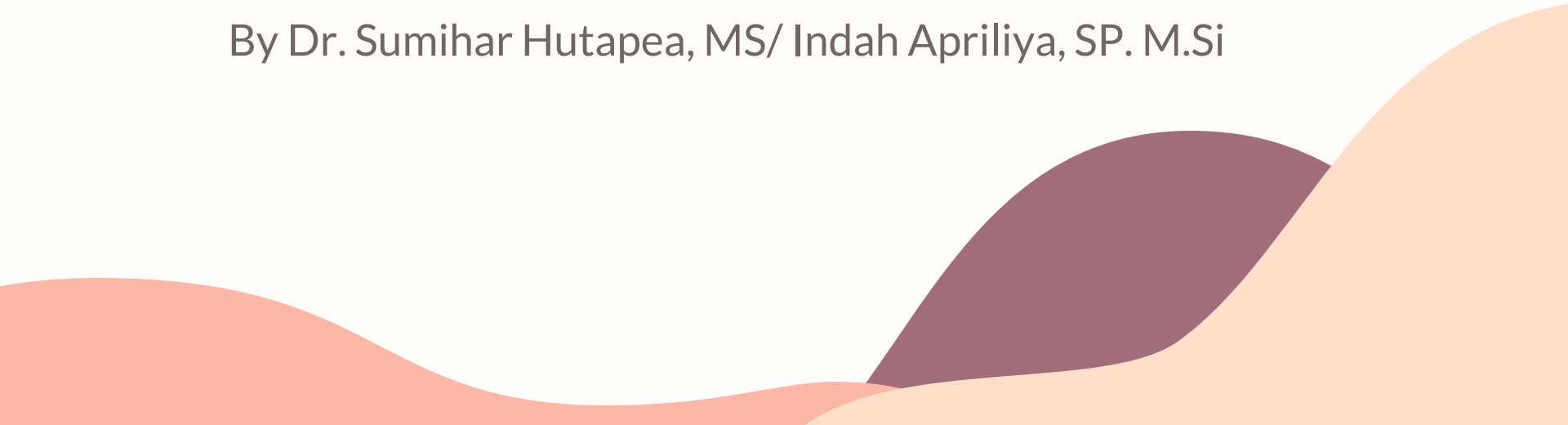


12th Meeting

SOIL AND LAND CLASSIFICATION

By Dr. Sumihar Hutapea, MS/ Indah Apriliya, SP. M.Si



Soil Classification

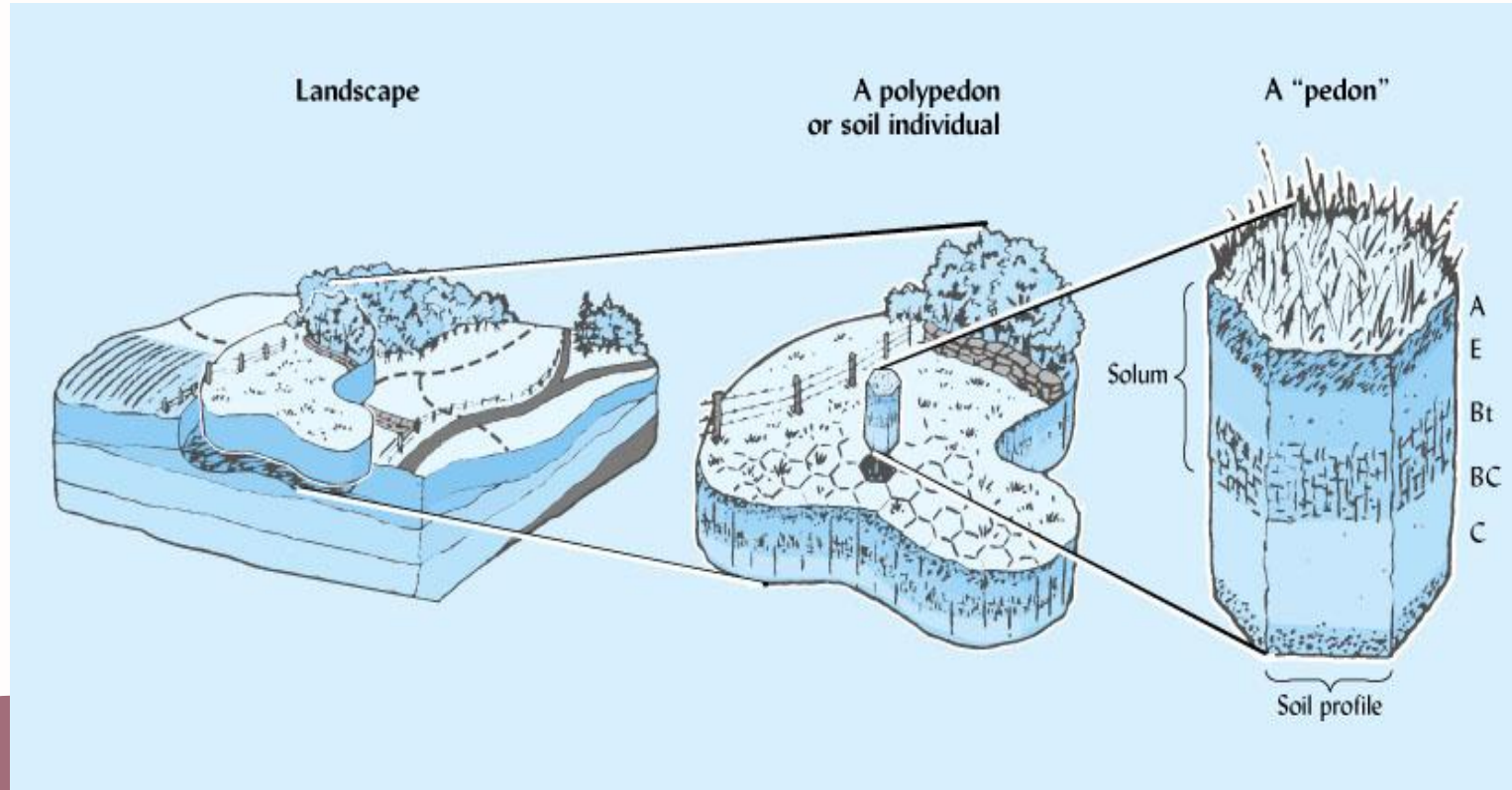
- Like the classification systems for plants and animals, the soil classification system contains several levels of details, from the most general to the most specific types (a system to **describe and classify soil**)
- The most general level of classification system is the soil order, of which there are 12 major types
- To identify, understand, and manage soils, soil scientist have developed a set of soil classification or **taxonomy systems**
- The primary objective of soil taxonomy is to establish hierarchies of classes that permit us to **understand, as fully as possible, the relationship** among soils and between soils and the factors responsible for their character.
- A second objective is to provide a means of **communication** for the discipline of soil science.

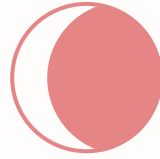
Soil Classification

- Pedon : the smallest volume of soil that displays the full range of characteristic soil properties (or lateral dimensions large enough to permit the study of horizons)
- Area ranges from 1 to 10 m²
- A group of similar pedons is known as a polypedon
- Several pedons or polypedons having similar soil profile properties and horizons are classified as a soil series



Soil Classification



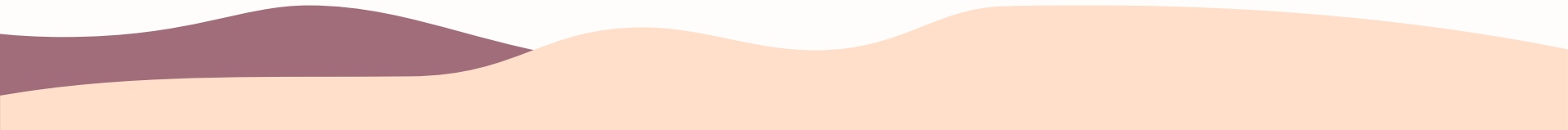


HORIZONS AND CHARACTERISTICS DIAGNOSTIC

This chapter defines the horizons and characteristics of
both mineral and organic soils

HORIZONS AND CHARACTERISTICS DIAGNOSTIC

- It is divided into three parts—horizons and characteristics diagnostic for mineral soils, characteristics diagnostic for organic soils, and horizons and characteristics diagnostic for both mineral and organic soils.
- A soil horizon commonly is differentiated from the horizons adjacent to it partly by characteristics that can be seen or measured in the field, such as color, structure, texture, rupture-resistance class, and the presence or absence of carbonates.
- Diagnostic Horizons:
 1. Diagnostic Surface Horizon : The Epipedon
 2. Diagnostic Subsurface Horizon : The Endopedon



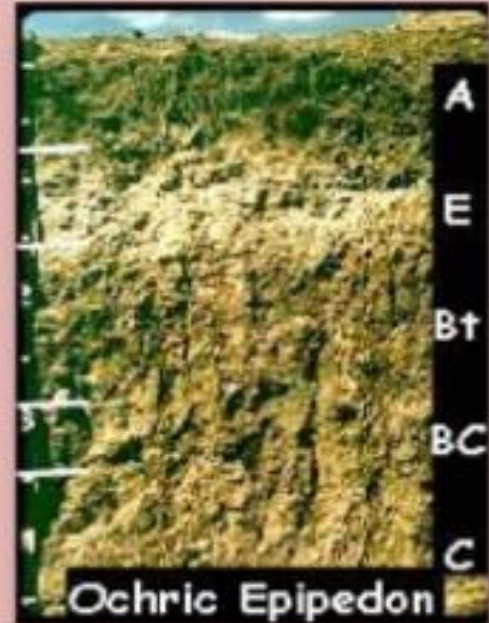
Diagnostic Horizons for Classification

- **Epipedons**

- Albic
- Anthropic
- Histic
- Mollic
- Ochric
- Plaggen
- Umbric
- Arenic
- Grossarenic

- **Endopedons**

- Agric
- Albic
- Argillic
- Calcic
- Cambic
- Kandic
- Gypsic
- Natric
- Oxic
- Petrocalcic
- Petrogypsic
- Placic
- Salic
- Sombric
- Spodic
- Sulfuric



Epipedon (A):

- **Albic:** strongly leached E horizon
- **Anthropic:** people-made mollic horizon
- **Histic:** Organic soil surface underlain by mineral soils
- **Melanic:** Thick, black, friable, formed in volcanic material
- **Mollic:** dark, friable, not strongly acidic
- **Ochric:** thin or light colored surface
- **Plaggen:** people-caused, high humus .
- **Umbric:** Acidic, dark

Endopedon (B)

- **Agric:** tillage-caused, clay and humus accumulation
- **Argillic:** clay accumulation
- **Cambic:** "color" or weakly developed
- **Kandic:** argillic with kaolinite-like clay
- **Natric:** argillic, high ESP
- **Oxic:** highly weathered
- **Sombric:** acidic, humus accumulation, tropical
- **Spodic:** acidic, cool area, humus-sesquioxides accumulation
- **Calcic:** high CaCO_3
- **Gypsic:** high CaSO_4
- **Salic:** high salt
- **Sulfuric:** high sulfides

SOIL TEMPERATURE REGIME & SOIL MOISTURE REGIME

- **Soil Moisture Regimes (SMR)**
 - SMR refers to the presence or absence of either water-saturated conditions (usually groundwater) or plant-available soil water during specified periods in the year.

COMPREHENSIVE CLASSIFICATION SYSTEM: SOIL TAXONOMY

- Several moisture regime classes are used to characterize soils and are helpful not only in classifying soils but in suggesting the most sustainable long-term use of soils:
 - **Aquic**
 - **Udic**
 - **Ustic**
 - **Aridic**
 - **Xeric**

Classes of the Soil Moisture Regimes

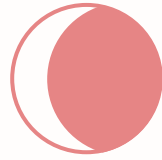
Terms	Meaning
Aquic	Water saturated for at least enough time (several days) so that reducing condition exist
Aridic or Torric	Dry more than half the time when not frozen and never moist more than 90 consecutive days when soil temperatures are above 8° C at 50 cm depth
Perudic	In most years precipitation exceeds evapotranspiration every month of the year
Udic	In most years, these soils are not dry as long as 90 cumulative days
Ustic	In most years, these soils are dry for more than 90 cumulative days but less than 180 days
Xeric	Only in the non-iso temperature areas with dry summers and moist winters

- **Soil Temperature Regimes (STR)**

- STR is based on mean annual soil temperature, mean summer temperatures and the difference between rainy season and dry season temperatures, all at a depth of 50 cm from soil surface.
- Soil temperature regimes, such as frigid, mesic, and thermic, are used to classify soils at some of the lower levels in *Soil Taxonomy*.
- The cryic (Greek *kryos*, “very cold”) temperature regime distinguishes some higher-level groups.

Classes of the Soil Temperature Regimes

Terms	Meaning
Pergelic	Mean annual soil temperature $< 0^{\circ}\text{C}$
Cryic	Mean annual soil temperature $0 - 8^{\circ}\text{C}$ with summer temperatures less than 15°C
Iso	When used as a prefix on the temperature regimes below, iso refers to soils with the average temperature for the 3 warmest months differs by less than 5°C
Frigid and Isofrigid	0°C to $< 8^{\circ}\text{C}$
Mesic and Isomesic	8°C to $< 15^{\circ}\text{C}$
Thermic and Isothermic	15°C to $< 22^{\circ}\text{C}$
Hyperthermic and Isohyperthermic	$> 22^{\circ}\text{C}$



SOIL TAXONOMY

Soil Taxonomy

- Soil taxonomy is a basic system of soil classification for making and interpreting soil surveys.
- Comprehensive soil classification system
- This formal terms refers to the system of classification developed by the USDA of Soil Survey
- The principle of taxonomy are :
 1. Classify soils on basis of properties
 2. Soil properties should be readily observable and/ or measurable
 3. Soil properties should either affect soil genesis or result from soil genesis



Soil Taxonomy

Soil taxonomy has six categories :

01

ORDER

02

SUB-ORDER

03

GREAT GROUP

04

SUBGROUP

05

FAMILY

06

SERIES

ORDER

- There are 12 orders
- They differentiated by the presence or absence of diagnostic horizon or features that reflect soil forming factors
- Soil Order : Alfisols, Andisols, Aridisols, Entisols, Gelisols, Histosols, Inceptisols, Mollisols, Oxisols, Spodosols, Ultisols, Vertisols.

SUB-ORDER

- Sixty-four suborders currently recognized
- Soil sub-orders are differentiated based on soil genetic differences, for example the presence or absence of soil characteristics related to the influence of (1) water, (2) moisture regime, (3) main parent material, and (4) vegetation.
- Meanwhile, the sub-order differentiator for histosol (organic soil) order is the level of weathering of the organic matter that forms it: fibric, hemic, and sapric.

GREAT GROUP

- There are more than 300 great groups
- Great soil groups are differentiated based on differences: (1) type, (2) level of development, (3) horizon arrangement, (4) base saturation, (5) temperature energy, and (6) humidity, and (7) presence or absence of layers- other characteristic layers, such as: plinthite, fragipan, and duripan.
- Example : Fragiudult.

SUBGROUP

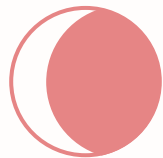
- There are more than 2.400 subgroups
- Soil sub-groups are differentiated based on: (1) the core characteristics of the great group and are given the name Typic, (2) transitional soil properties to: (a) other great groups, (b) other sub-orders, and (c) other orders, and (d) to non-land
- Example : Aquic Fragiudult.

FAMILY

- Soil families are distinguished based on soil properties that are important for agriculture and / or engineering, including soil properties: (1) grain size distribution, (2) clay mineral composition, (3) temperature regime at a depth of 50 cm.
 - Example : Aquic Fragiudult, berliat halus, kaolinitik, isohipertermik.
- 

SERIES

- Soil series are differentiated based on: (1) type and arrangement of the horizon, (2) color, (3) texture, (4) structure, (5) consistency, (6) soil reaction from each horizon, (7) properties other soil chemistry, and (8) mineral properties of each horizon.
- Example : Aquic Fragiudult, berliat halus, kaolinitik, isohipertermik, Sitiung



SOIL SURVEY

Soil Survey

- Land survey is a method or means collect data by going down directly to the field. The data obtained are in the form of physical, chemical, biological, environmental and climatic data.
- Survey activities consist of field activities, laboratory analysis, classifying soil into a taxonomic system or soil classification system, conducting soil mapping or interpretation or interpretation of soil surveys and agricultural technology experts.



TASK...!!

- Make groups of **3 people**
 - Make a power point presentation (Min. 4 pages) consisting of :
 1. Choose one topic discussion from the list (each group cannot be the same)
 2. Fully describe all matters relating to the topic (support with images or video from Youtube conditionally)
 3. Assignments are submitted no later than Des 20, 2020 at 5 pm to email **Indahapriliya93@gmail.com** with the subject **DDIT_Name of Team Leader**
 4. The selected group will present to the class next week
- 

DISCUSSION TOPIC LIST..!!

Topic 1	Alfisols,
Topic 2	Andisols,
Topic 3	Aridisols,
Topic 4	Entisols
Topic 5	Gelisols,
Topic 6	Histosols,
Topic 7	Inceptisols,
Topic 8	Mollisols

DISCUSSION TOPIC LIST..!!

Topic 9	Oxisols.
Topic 10	Spodosols
Topic 11	Ultisols
Topic 12	Vertisols
Topic 13	Epipedon
Topic 14	Soil Survey
Topic 15	Endopedon





THANK YOU