

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

Topic:

## Suborders

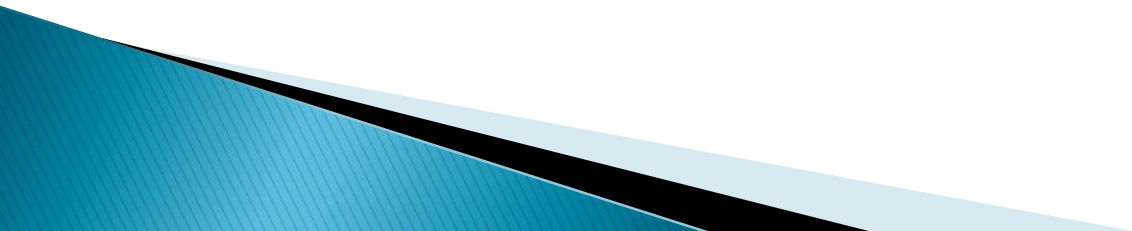


# Aridisols

Aridisol derives from a Latin word “Aridus” Aridus mean dry or arid. These soils are developed in very dry environment. Aridisol have no available water during most of the time. Aridisol tends to be light in color because of limited humus addition from vegetations.



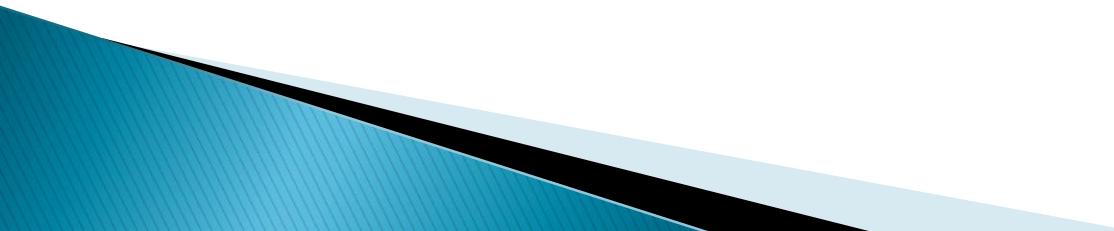
# Aridisols

- ▶ Aridisols are divided into 07 suborders.
  - i. Argids
  - ▶ ii. Calcids
  - ▶ iii. Cambids
  - ▶ iv. Cryids
  - ▶ v. Druids
  - ▶ vi. Gypsids
  - ▶ vii. Salid
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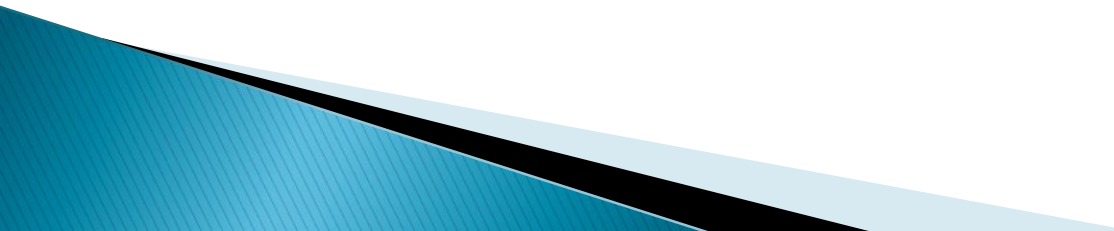
## i. Argids

- ▶ These are Aridisols that have an argilic or natric horizon.
- ▶ The low water flux or availability and high accumulation of salts in many Aridisols usually hinder the crop productivity.

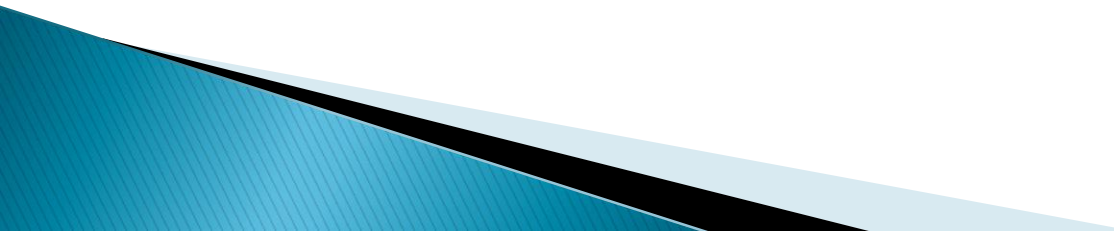
## ii. Calcids

- ▶ Calcids are the Aridisols with high concentration of calcium carbonates that was either in parent material or added externally as dust.
  - ▶ Precipitation is insufficient to leach or even move carbonates to greater depth.
  - ▶ The upper boundary of calcic or petrocalcic horizon is normally within 50cm of soil surface.
  - ▶ If soils are not irrigated or cultivated, micronutrients deficiencies are common.
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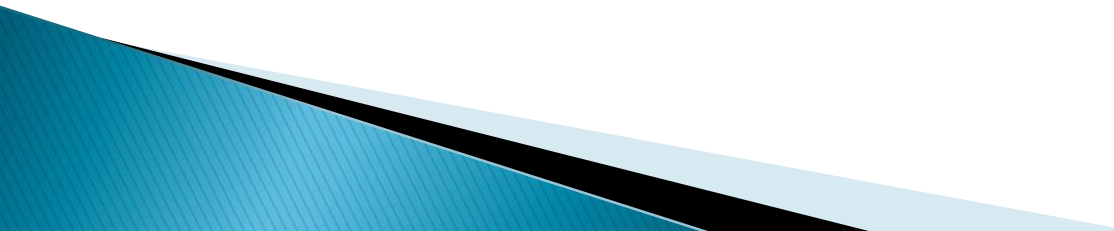
### iii. Cambids

- ▶ These are the Aridisols with least soil development.
  - ▶ These soils have cambic horizon within 100cm of soil surface.
  - ▶ These may have other diagnostic horizons such as petrocalcic, gypsic or calcic horizon but the upper boundary of these horizons must be below 100cm of depth.
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## v. Cryids

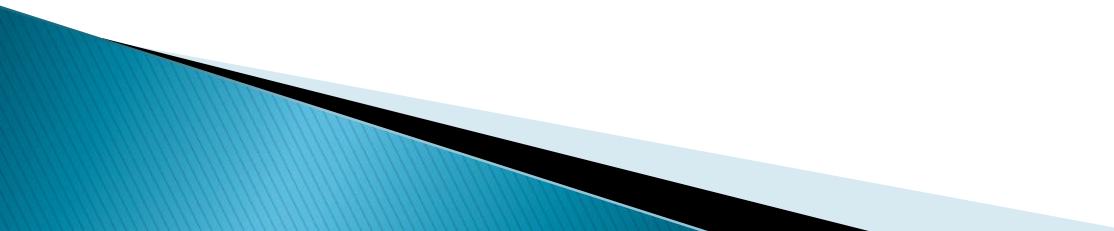
- ▶ Cryids are the Aridisols of cold deserts, short growing season combined with arid conditions limit the use of these soils, and Cryids sub order may have a duripan, Argillic, calcic, gypsic, Natric, petrocalcic, petrogypsic or salic horizon.
  - ▶ These horizons are the basis for great groups.
  - ▶ Some cryids may have ustic or xeric soil moisture regime which is also used as criteria for placing soils in different great groups.
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## v. Druids

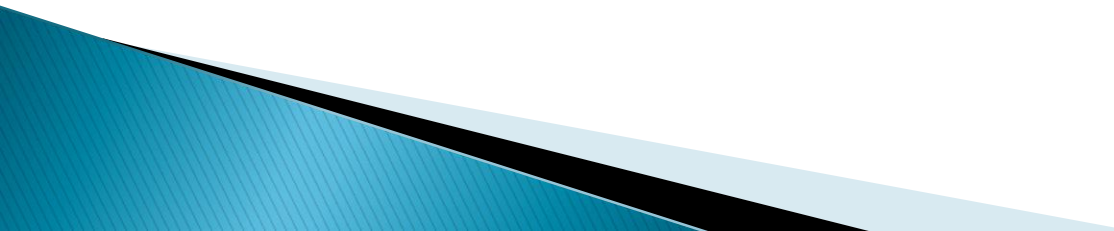
- Druids are the Aridisols that have duripan in many areas.
  - The duripan is within 50cm of soil surface.
  - These soils occur dominantly on gentle slopes.
  - The soils commonly have  $\text{CaCO}_3$ .
  - The duripan is barrier to both water infiltration and root penetration.
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## vi. Gypsid

- ▶ Gypsid are the Aridisols that have a gypsic or petrogypsic horizon within 100cm of soil surface.
  - ▶ Accumulation of gypsum takes place initially as crystal aggregates in the voids of soil but then deposits in the form of layer.
  - ▶ When gypsic horizon occurs as cemented impermeable layer, it is referred as petrogypsic horizon that may restrict the movement of water and plant roots.
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## vii. Salids

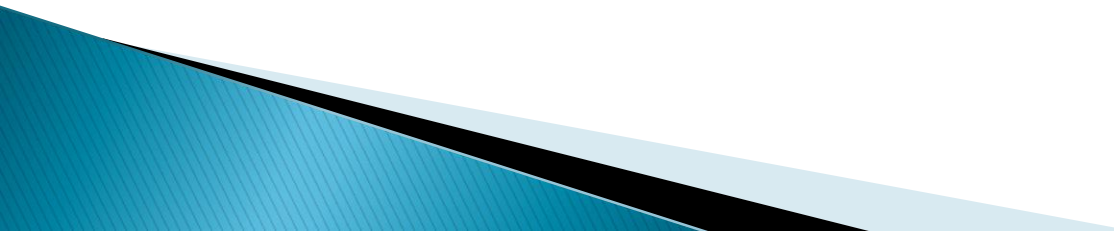
- ▶ The concept of salids represents the accumulation of excessive amount of salts that are more soluble than gypsum.
  - ▶ Salids must have EC 30dsm- in 1:1 soil extract and the product of EC and thickness should be at least 900.
  - ▶ Under arid environment and hot temperature, accumulation of salts commonly occur when there is a supply of salts and net upward movement of salts.
  - ▶ In some areas salic horizon formation may be due to salty parent material.
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# Alfisol

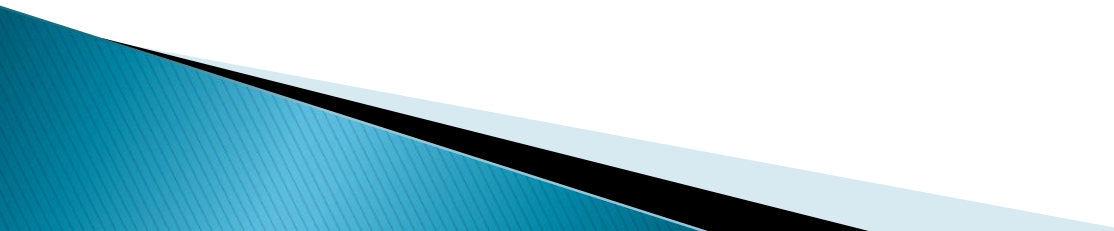
The word alfisols derives from pedalfer , ped mean soil, al mean aluminum, fer mean ferric. The unique character of alfisols is the translocation of clay, aluminum and iron and their subsequent accumulation into the B horizon. Alfisols are developed under forest vegetation, where parent material has gone under significant weathering.



# Alfisols

- ▶ Alfisols are divided into 05 suborders.
  - ▶ i. Aqualf
  - ▶ ii. Cryalf
  - ▶ iii. Udalf
  - ▶ iv. Ustalf
  - ▶ v. Xeralf
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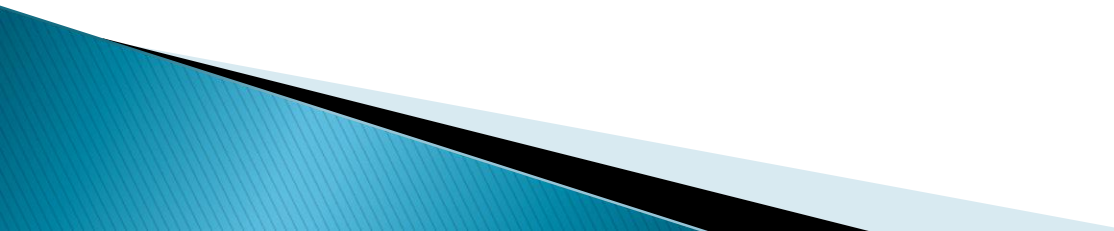
## i. Aqualf

- ▶ Aqualf are the alfisols that have aquic soil moisture regime during some part of the year.
  - ▶ The wetness of aqualf may be due to shallow water table, poor hydraulic conductivity, seepage from any water source or heavy rainfall.
  - ▶ These soils required artificial drainage for cultivation of crops.
  - ▶ Rice is the most important crop of these soils.
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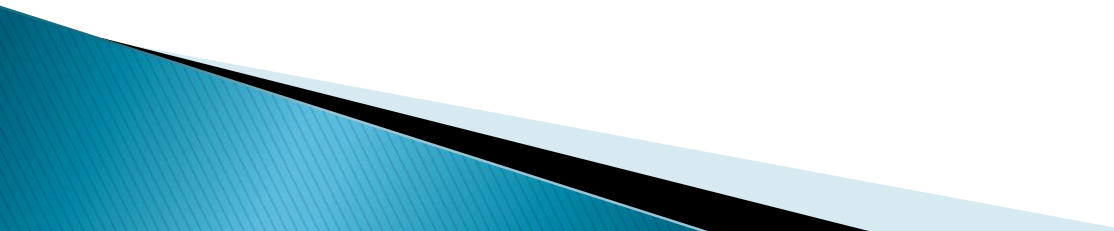
## li. Cryalf

- ▶ Cryalf are more or less freely drained alfisols of cold region.
- ▶ These soils have cryic temperature regime and mostly udic moisture regime.
- ▶ These soils are generally used for coniferous forests.

### iii. Udalf

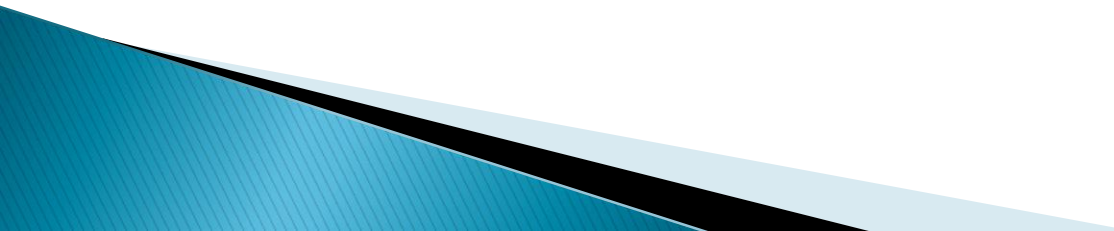
- ▶ These soils have udic soil moisture regime and frigid or warm temperature regime.
  - ▶ These soils mostly support forest vegetation.
  - ▶ Normally the undisturbed soil has a thin A horizon which is darkened by the accumulation of humus.
  - ▶ These soils may have Natric horizon.
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## iv. Ustalf

- ▶ Ustalf are the alfisols of sub humid to semiarid region.
  - ▶ These soils have ustic moisture regime.
  - ▶ Moisture moves through most of these soils to deeper layer only in occasional years.
  - ▶ If carbonates are present in parent material or added to soil surface as dust.
  - ▶ These soils have Bk horizons.
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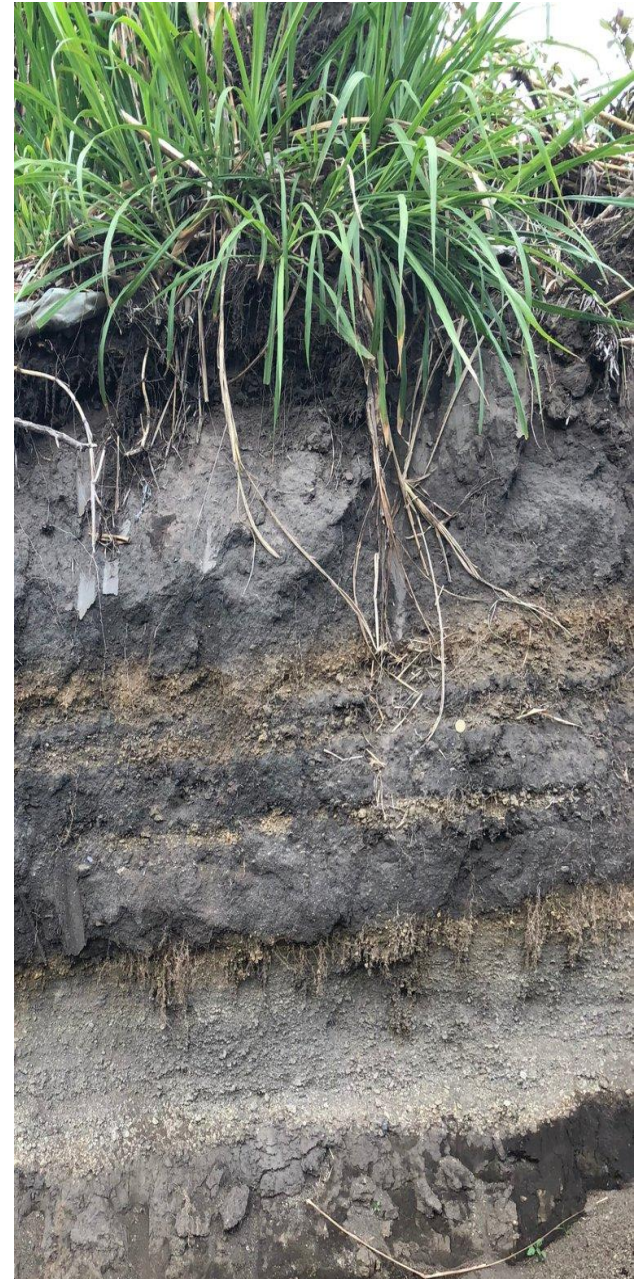


## v. Xeralf

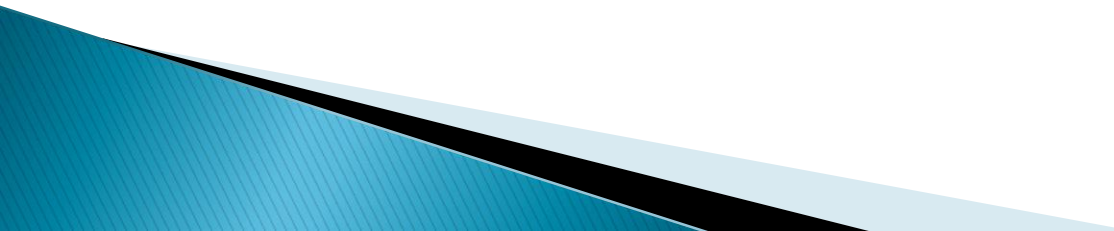
- ▶ Xeralf have xeric moisture regime.
  - ▶ These are dry for extended period in summer but in winter sufficient moisture is available for leaching in occasional years.
  - ▶ If irrigation water is available these soils are suitable for variety of crops.
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# Andisols

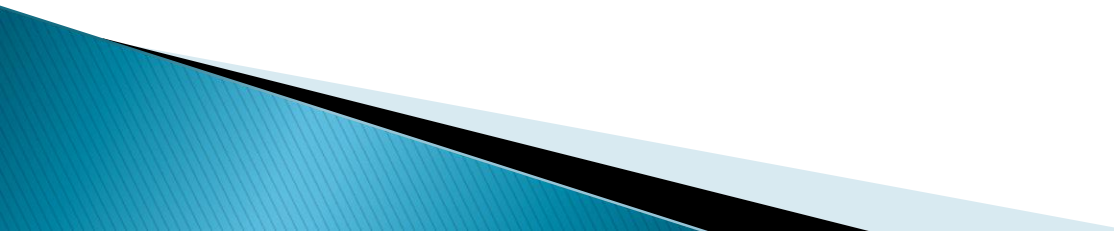
Modified from a Japanese word “Ando” ando mean dark volcanic ash, the unique property of Andisols is the dominance of aluminium and humus complexes that results from weathering and mineral transformation with minimum translocation. These soils have high phosphorus retention available water capacity and cation exchange capacity.



# Andisol

- ▶ Andisol are divided into 07 suborders.
  - ▶ i. Aquand
  - ▶ ii. Cryand
  - ▶ iii. Torrاند
  - ▶ iv. Udand
  - ▶ v. Ustand
  - ▶ vi. Xerand
  - ▶ vii. Vitrand
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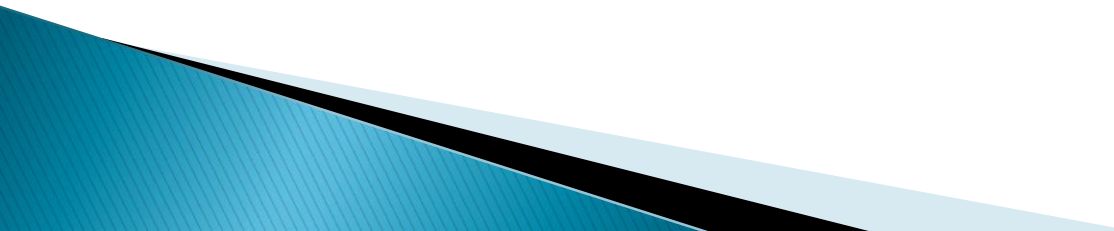
## i. Aquand

- ▶ Aquand are the Andisols with aquic soil moisture regime.
  - ▶ These soils have dark colored surface horizons that meet the requirement of histic or mollic epipedon.
  - ▶ These soils normally occur in lower land scape and generally support forest vegetation.
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## ii. Cryand

- ▶ Cryand are the Andisols that have cryic temperature regime.
- ▶ These soils generally support coniferous forest.

### iii. Torrard

- ▶ These soils have Torric (aridic) moisture regime.
  - ▶ These soils mostly develop under grass or shrub and have ochric or mollic epipedon.
  - ▶ Some of these soils may have duripan or petrocalcic horizons.
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## iv. Udand

- ▶ Udand are the Andisols that have udic soil moisture regime.
- ▶ These soils generally developed under forest vegetation and have umbric epipedon.

## **v. Ustand**

- ▶ These soils have ustic soil moisture regime and frigid or warmer soil temperature regime.
- ▶ These soils have an ochric or mollic epipedon.



## vi. Xerand

- ▶ Andisol that have xeric moisture regime is called Xerand.
- ▶ Most Xerand have a frigid or mesic temperature regime and develop under coniferous vegetation.

## **vii. Vitrand**

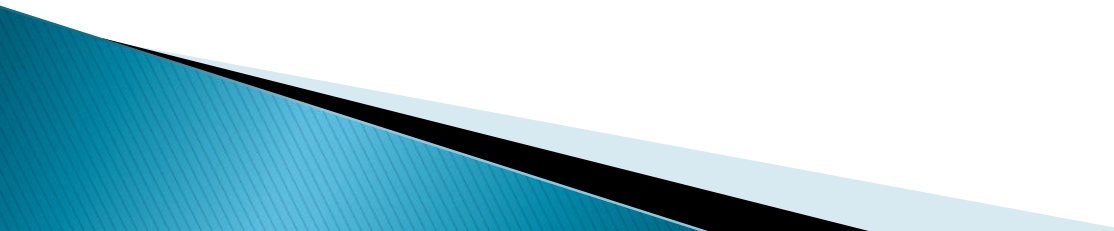
- ▶ These are relatively young soils that occur near volcanoes.
- ▶ These are normally well drained soils having coarse texture.

# Gelisols

Gelisols derived from a Latin word “Gelare” gelare means to freeze, unique property of gelisols is the presence of permafrost (where temperature is always below freezing point) and soil features that are associated with freezing and thawing.



# Gelisols

- ▶ Gelisols are divided into 03 suborders.
  - ▶ i. Histell
  - ▶ ii. Orthell
  - ▶ iii. Turbel
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## i. Histell

- ▶ These are the gelisols with large amount of carbon that commonly accumulate under anaerobic condition.
- ▶ Cold temperature contributes to the accumulation of organic matter.

## ii. Orthell

- ▶ Orthells are the gelisols that show the evidence of cryoturbation (profile development through wetting and drying, freezing and thawing).
- ▶ These soils occur primarily within the zone of permafrost where parent material is mostly coarse textured.

### iii. Turbel

- ▶ These are the gelisols having a layer of organic matter accumulation on the top of permafrost layer.
- ▶ These soils have also the evidence of cryoturbation.

