CHE 110: Environmental Studies

Unit - 1

INTRODUCTION TO ENVIRONMENTAL STUDIES

Unit: 1_Lecture: 3_CHE110_VK

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Land resources

‘The solid portion of the earth’s surface’.

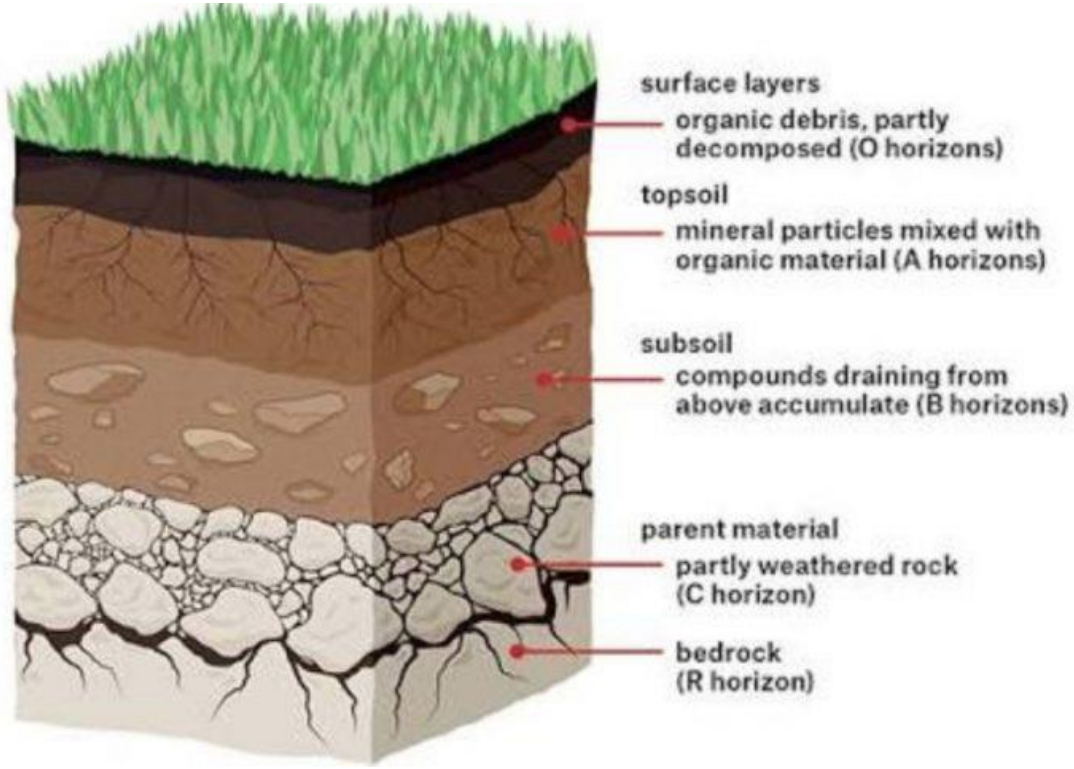
The science dealing with land is known as pedology .

The Importance of Land

- The human civilization has thrived on land.
- Land is used for agriculture.
- Land contains huge amount of mineral deposits.
- It also contains water in the form of underground water.
- Most of the animals find their habitat on land.
- Land directly or indirectly provides all the resources required to fulfill the basic needs of humans: food, cloth, and shelter.

What is a Soil Horizon?

- **Soil horizons** are the layers in a soil profile used to classify soil types.
- Horizons based on **color, texture, roots, structure, rock fragments**, and any unique characteristic worth noting.
- **Master Soil Horizons** are depicted by a capital letter in the order (from top down): **O, A, E, B, C,** and **R**



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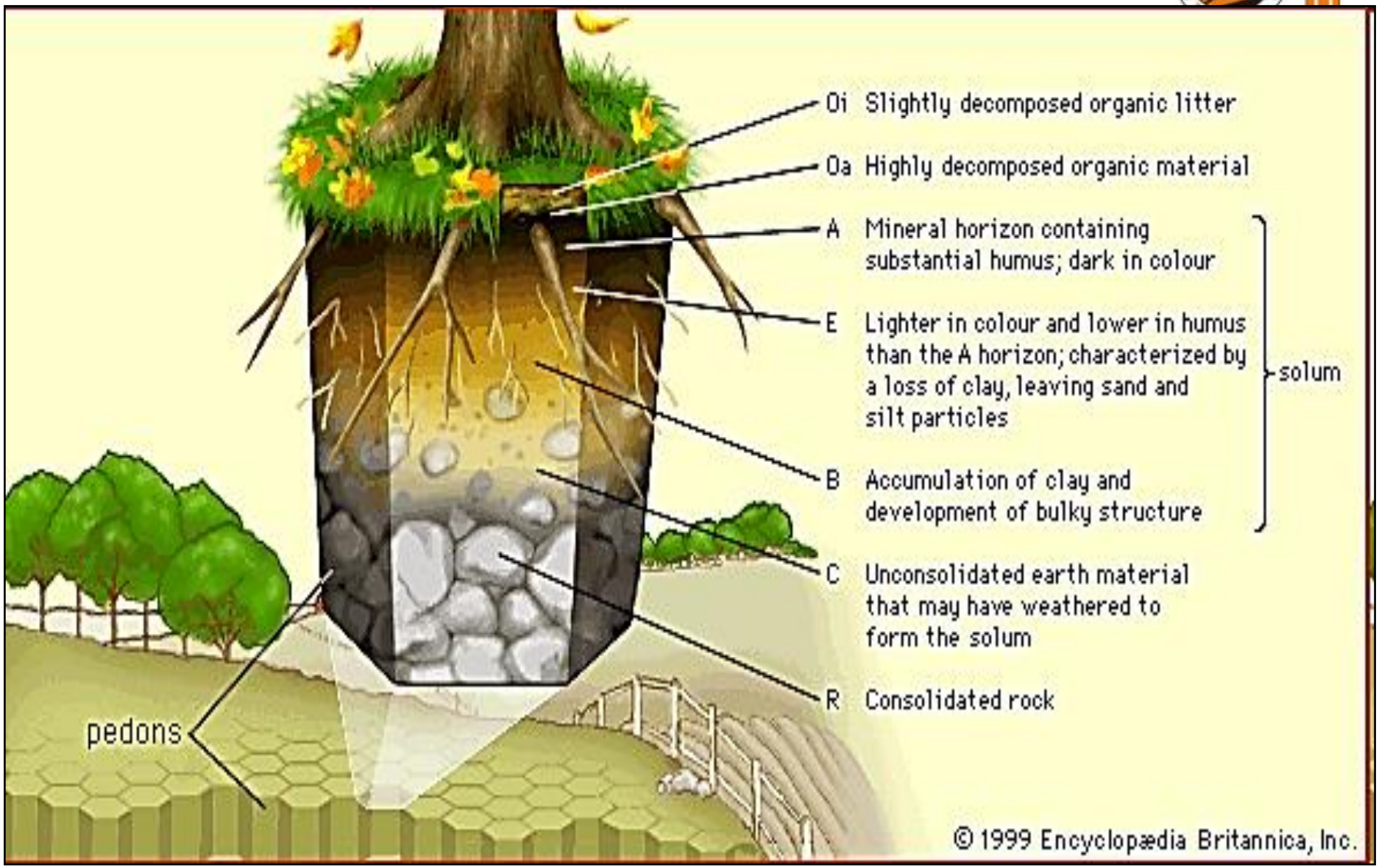
Oi Slightly decomposed organic litter
Oa Highly decomposed organic material
A Mineral horizon containing substantial humus; dark in colour
E Lighter in colour and lower in humus than the A horizon; characterized by a loss of clay, leaving sand and silt particles
B Accumulation of clay and development of bulky structure
C Unconsolidated earth material that may have weathered to form the solum
R Consolidated rock
solum
pedons
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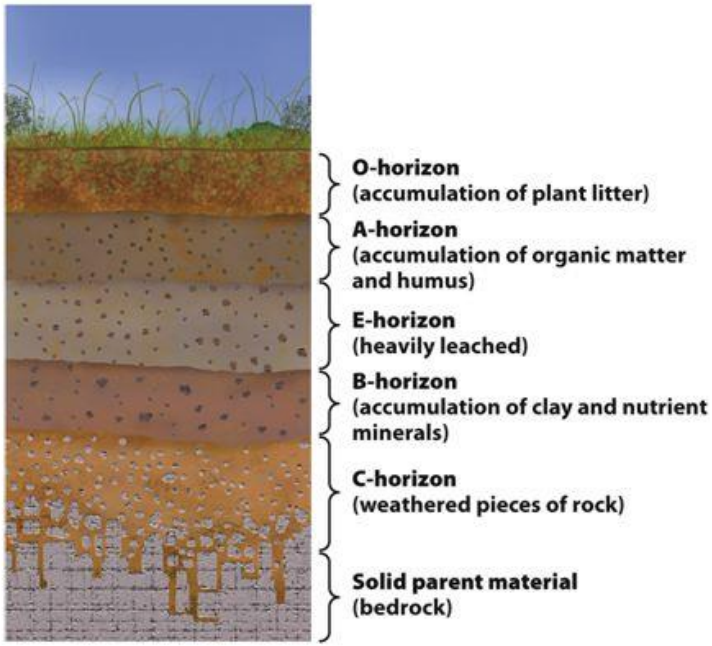
Soil Horizons

- O-horizon
  - Rich in organic material
- A-horizon
  - Topsoil
- B-horizon
  - Lighter colored subsoil
- C-horizon
  - Weathered parent material



O-Horizon

The "Organic Matter" Horizon

- Surface-layer, at depths of 0-2 feet
- Dark in color, soft in texture
- **Humus** - rich organic material of plant and animal origin in a stage of decomposition
- **Leaf litter** – leaves, needles, twigs, moss, lichens that are not decomposing
- Several O-layers can occur in some soils, consisting only of O-horizons

A-Horizon

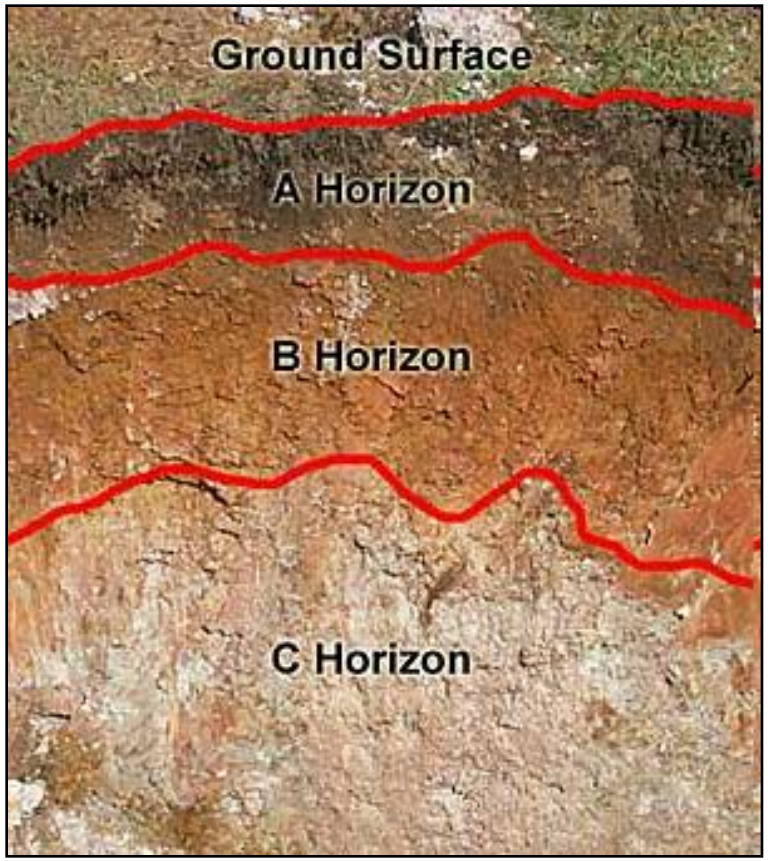
“Topsoil” or “Biomantle” Horizon

- Topmost layer of **mineral soil**, at depths of **2-10 feet**
- Some humus present, darker in color than layers below
- **Biomantle** - most biological productive layer; **earthworms, fungi, and bacteria** live this layer
- Smallest and finest soil particles

E-Horizon

The "Leaching Layer" Horizon

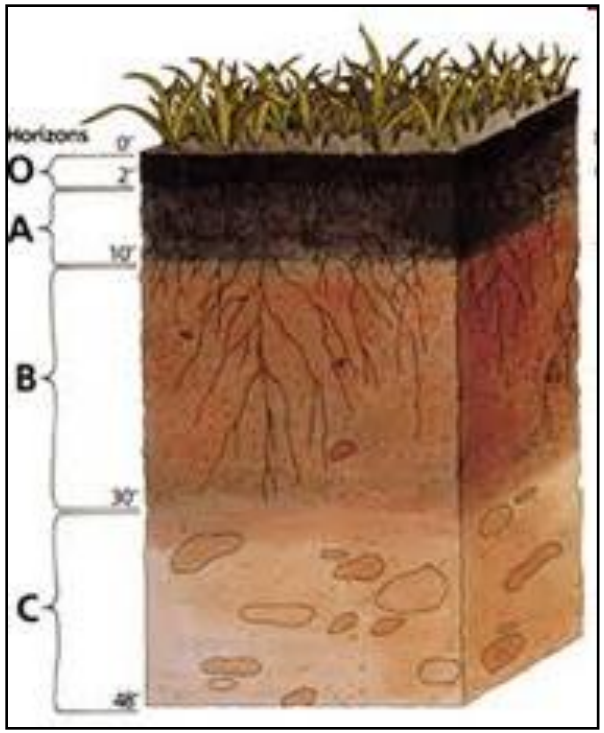
- Small layer between A & B horizons
- At depths of **10-15 feet**
- Light in color, mainly content due to **leak sand & silt**
- **Poor mineral and claying** – the loss of water-retaining plant nutrients to the water table
- Soil particles larger than in A horizon but smaller than in B horizon



B-Horizon

The “Subsoil” Horizon

- At depths of **15-30 feet**
- Rich in **clay and minerals like Fe & Al**
- Some organic material may reach here through leaching
- **Plant roots** can extend into this layer
- Red/brown in color due to oxides of Fe & clay



C-Horizon

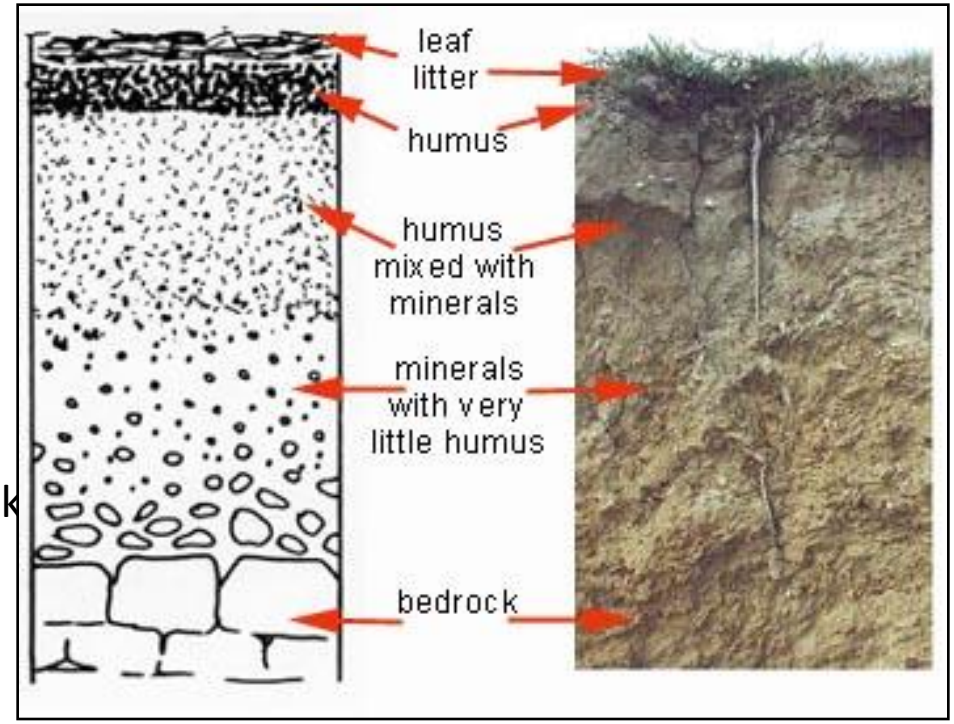
The “Regolith” Horizon

- At depths of **30-48 feet**
- Made up of **large rocks** or lumps of partially broken bedrock
- Least affected by weathering and have changed the least since their origin
- Devoid of organic matter due to it being so far down in the soil profile

R-Horizon

The “Bedrock” Horizon

- At depths of **48+ feet**
- Deepest soil horizon in the soil profile
- No rocks or boulders, only a **continuous mass of bedrock**
- Colors are those of the original rock of the area



- Functions of soil
  - Role in nutrient cycles
  - Regulate the water
  - Regulate the emissions of gases
  - Degrade pollutants and filter ground water
  - Producing clay
  - Provide the structural material as brick, cement etc…
- Land Degradation
  - A number of natural and man-made factors lower the quality of land due to over exploitation.
  - This is commonly referred to as land degradation.
  - The fertility of land supports the growth and productivity of natural vegetation and agricultural crops.
  - Dry land covers 40 % of the earth's surface.

Causes of land degradation

Any change in the condition of natural fertility of the land which reduces its productive potential. In other word

❑ Natural factors

- Heavy rains
- High speed wind and storms
- Natural disasters like earthquakes ,floods, prolonged drought, etc.

❑ Anthropogenic factors:

Biophysical environment is affected by a combination of human-induced processes

- Mining.
- Urbanization
- The indiscriminate and uncontrolled removal of trees
- Excess use of fertilizers
- industrial discharges
- Overgrazing, soil erosion ,etc..

Soil Horizone:
https://www.youtube.com/watch?v=nEShY_S_KGc
https://www.youtube.com/watch?v=BArbrfmsxeQ