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ASAC 1101 : FUNDAMENTALS OF SOIL SCIENCE (2+1)

Level : B.Sc (Ag), I semester

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Topic

**Basic overview and approaches of soil-
Spheres of earth**



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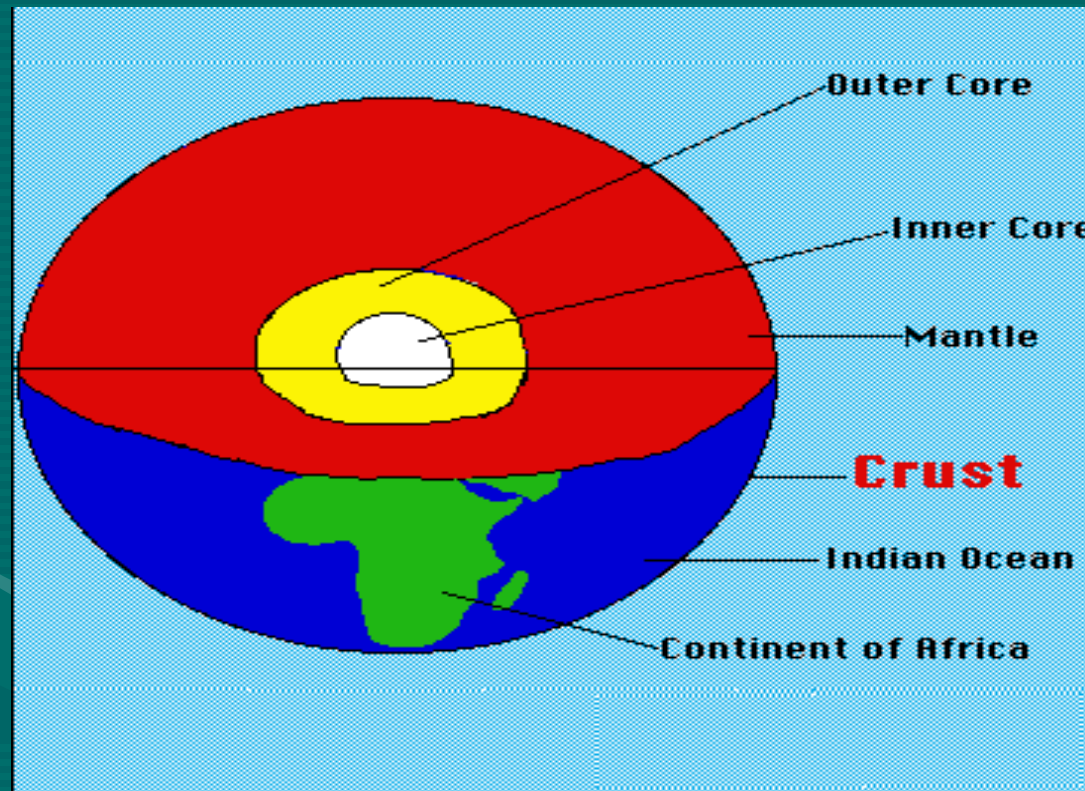
SOIL SCIENCE

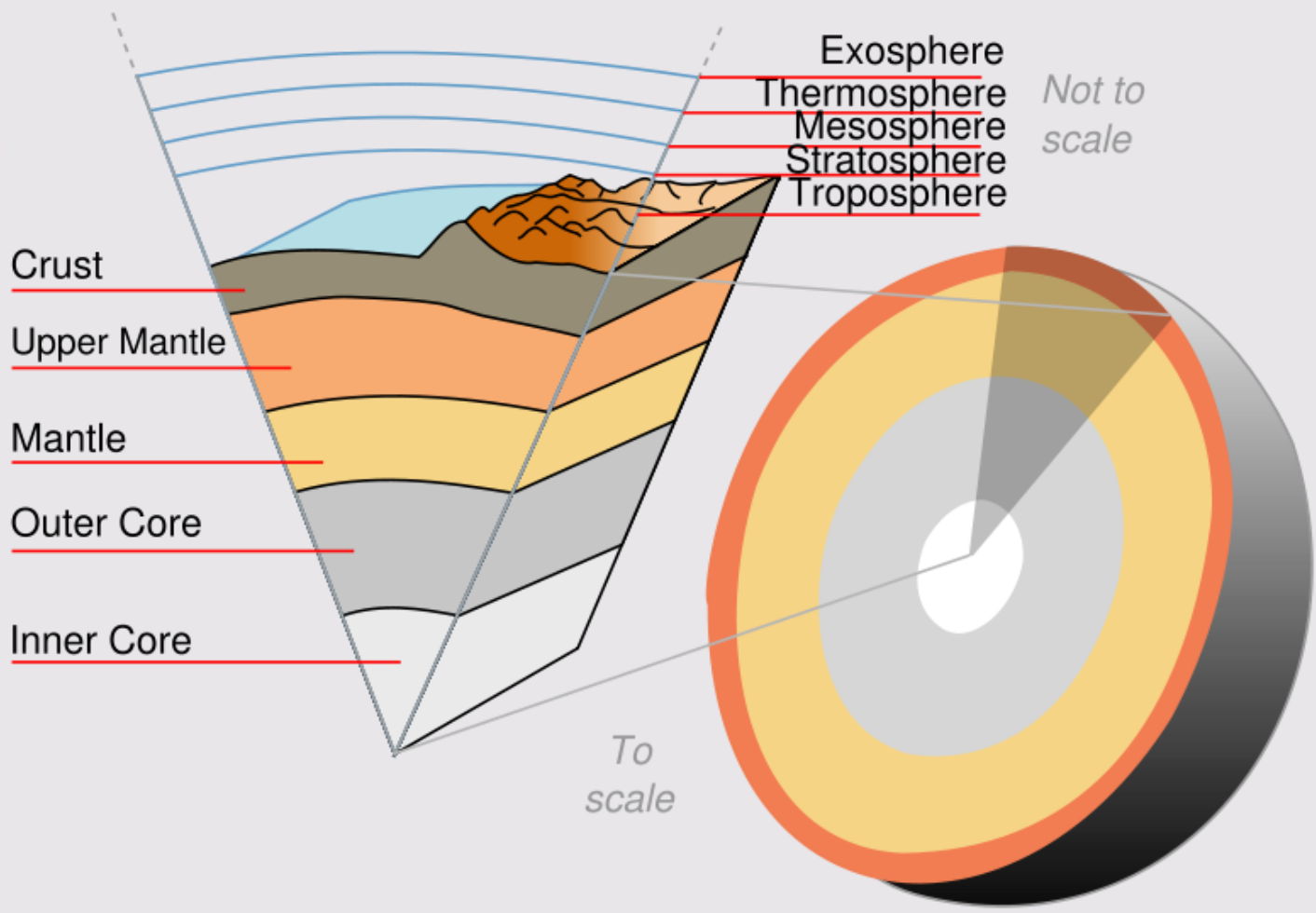
- **Soil science** deals with soil as a natural resource on the surface of the earth.
- It includes soil formation, classification and mapping; physical, chemical, biological, and fertility properties of soils
- and deals with these properties in relation to the use and management of soils.



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Interior of Earth







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Crust

- **Crust is the outer thin layer with a total thickness of around 100 km.**
- **It forms 0.5% of the earth's volume.**
- **The outer covering of the crust is of sedimentary material and below that lies crystalline, igneous and metamorphic rocks are acidic in nature.**



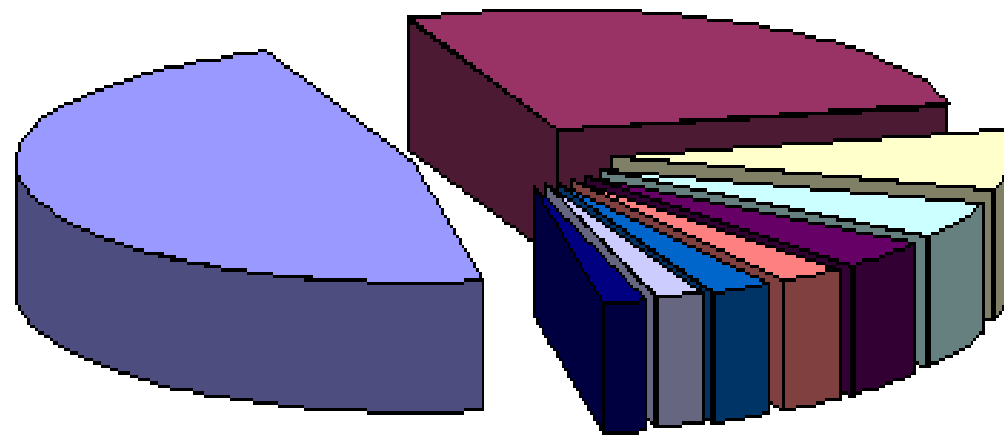
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Composition of earth crust

- **The earth's crust is principally composed of mineral matter.**
- **The mineral matter is made up of various elements combined together to form compounds.**
- **Some elements exist as such without forming compounds.**
- **Out of 106 elements known, 8 are sufficiently abundant as to constitute about 99 percent by weight of the earth's crust (up to 16 km).**

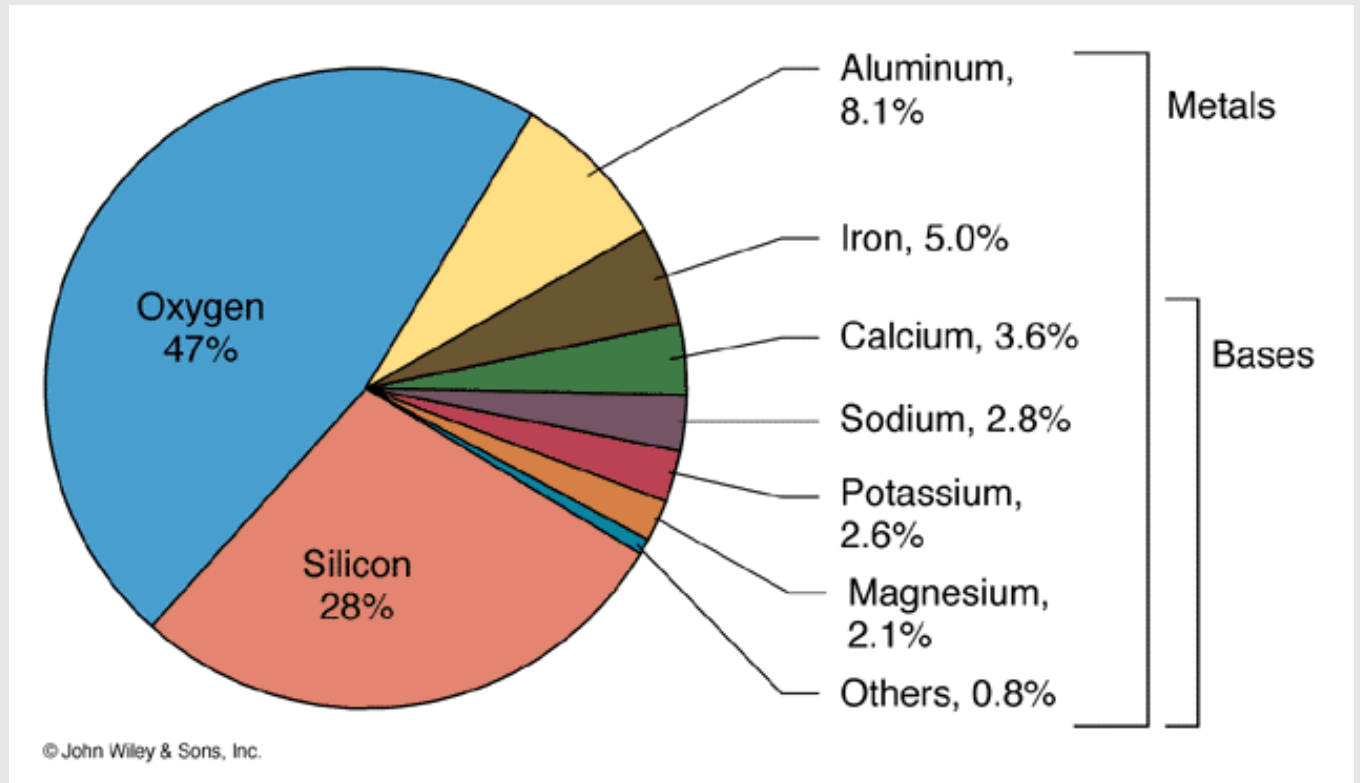


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Oxygen	Silicon	Aluminum
Iron	Calcium	Sodium
Potassium	Magnesium	others

Elements present in the Earth's crust





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More than 90% of all of the minerals in the Earth's Crust, however, are made up of compounds containing Silicon and Oxygen, the two most abundant elements on Earth



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SOIL –INTRODUCTION

- Soil definition
- Soil as a three dimensional body
- Pedological and edaphological concepts



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- **The term SOIL was derived from the Latin Word “SOLUM” Means FLOOR**
- **For a Layman soil is dirt or debris**
- **For an Agriculturist soil is a medium for plant growth**
- **For a Mining Engineer soil is a debris covering the Rocks**
- **For a Civil Engineer soil is a material on which road bed or house bed is formed**
- **For a Home Owner soil is a mellow or loamy or hard material**

A close-up photograph showing a pair of hands holding a clump of dark, rich soil. The soil is crumbly and appears to have some organic matter. The background shows a soil profile with various layers and textures, suggesting a field or garden setting. The lighting is warm, highlighting the texture of the soil and the skin of the hands.

HELPING
PEOPLE
UNDERSTAND
SOILS



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Dokuchaiev (1900):

- **Russian scientist - Father of soil science**
- **Soil is a natural body composed of mineral and organic constituents, having a definite genesis and a distinct nature of its own.**



Old weathered soil in Hawaii



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Joffe (1936)

- “Soil is a natural body of mineral and organic constituents differentiated into horizons
- - usually unconsolidated - of variable depth which differs among themselves as well as from the underlying parent material
- in morphology, physical makeup, chemical properties and composition and biological characteristics”.



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● **As soil provides nutrients, water, air and anchorage and supports life on Earth, it can be called as SoUL Of Infinite Life (SOIL)**

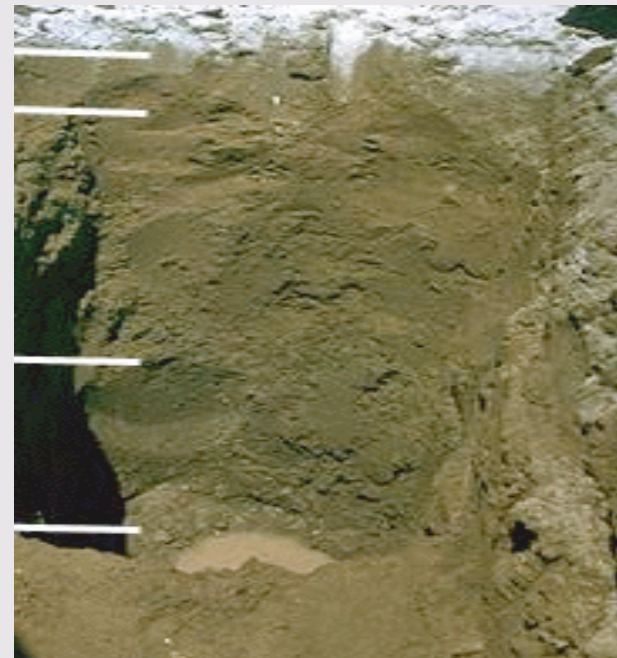
- J.S. Kanwar



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Soil as a three dimensional body

- Soil is a three dimensional body having length, breadth and depth.
- They form a continuation over the land surface and differ in properties from place to place.
- Its upper boundary is air or water and lower boundary is the rock lithosphere.





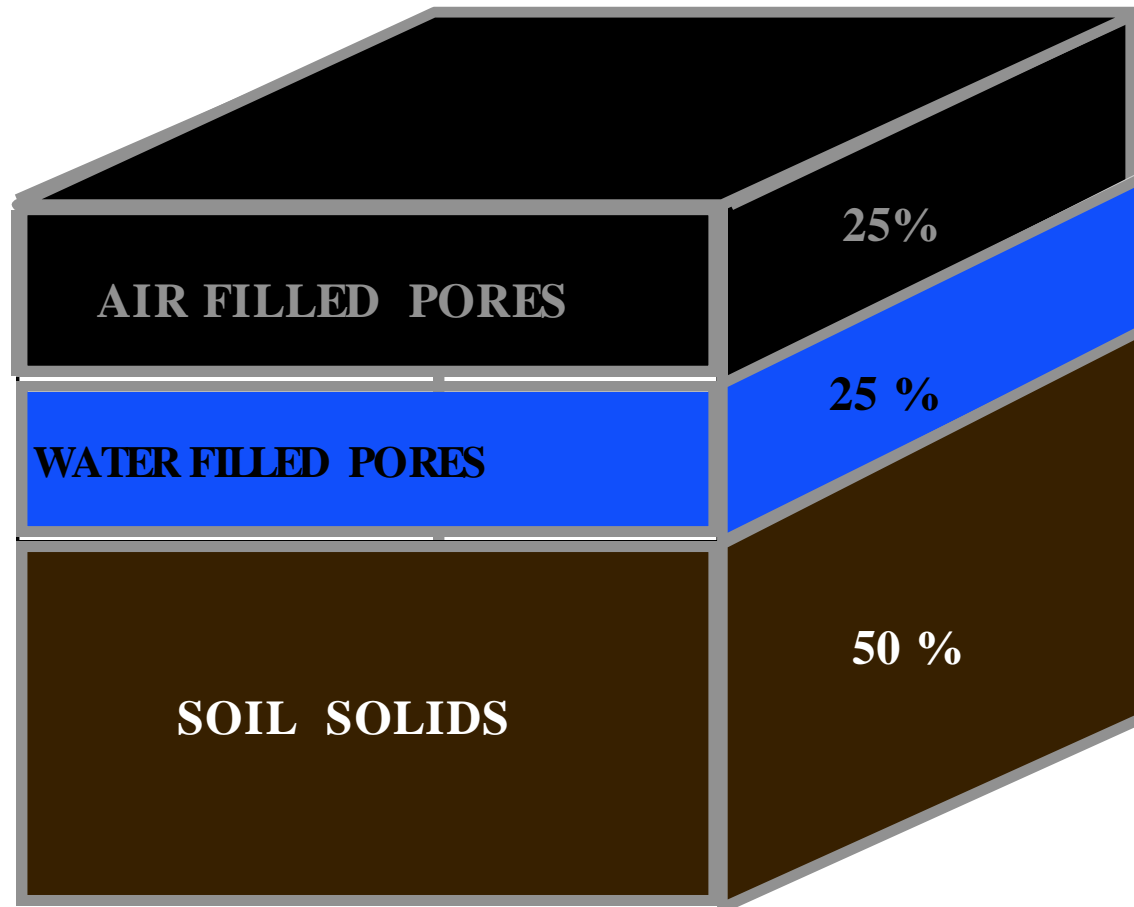
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Composition of soil on volume basis

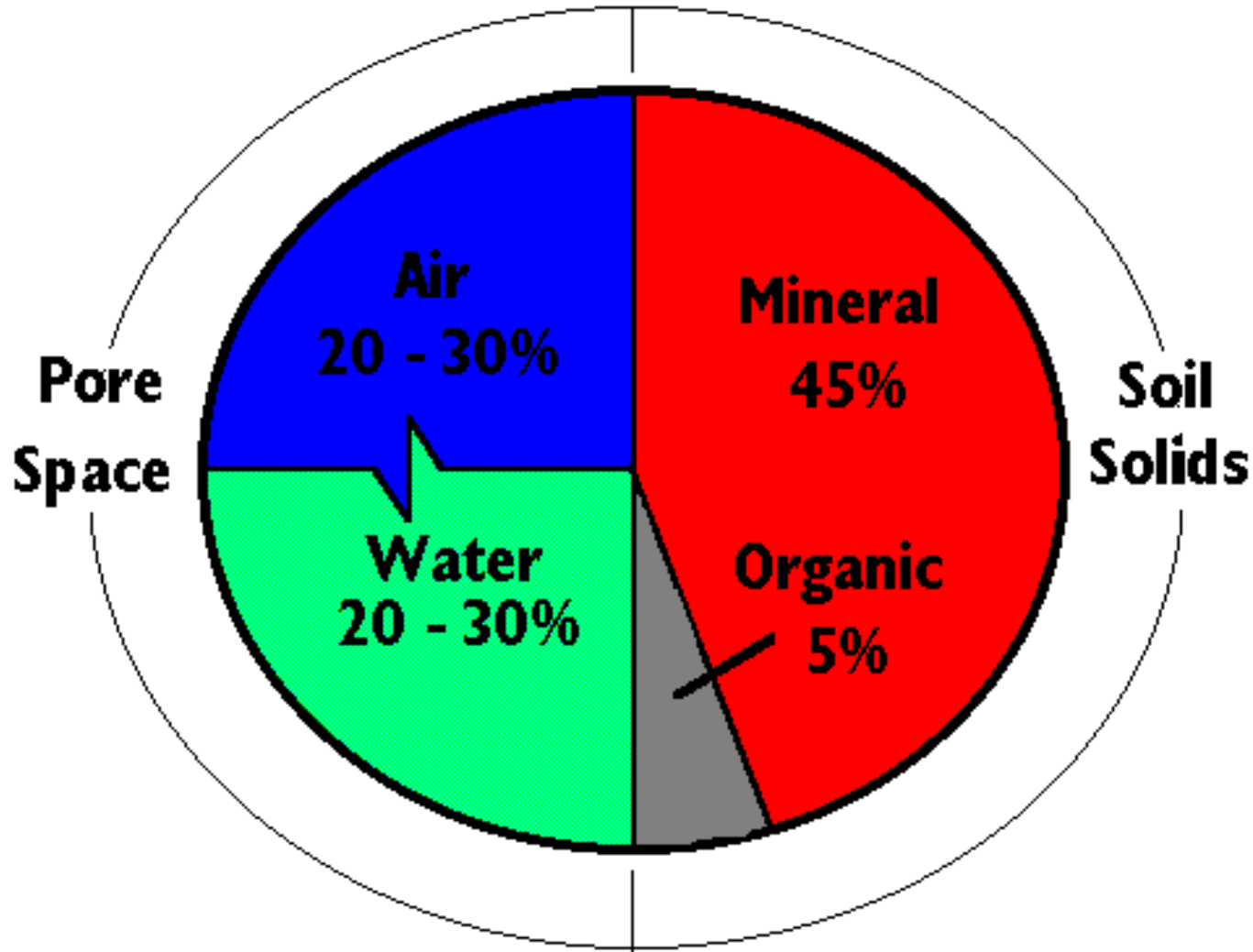
- **Mineral matter : 45%**
- **Organic matter : 5%**
- **Soil water : 25%**
- **Soil air : 25%**

SOIL COMPONENTS

idealized soil



Soil Components (volume basis)





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Approaches of Soil Study

- **Two Concepts:** One treats soil as a natural body, weathered and synthesized product in nature (Pedology)
- while other treats soil as a medium for plant growth (Edaphology)



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Pedological Approach

- **Study of the origin of the soil, its classification and its description is known as Pedology (from Greek word *pedon*, means soil or earth).**
- **Pedology is the study of soil as a natural body and does not focus on the soil's immediate practical use.**
- **A pedologist studies, examines and classifies soil as they occur in their natural environment.**



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Edaphological Approach

- Edaphology (from Greek word *edaphos*, means soil or ground) is the study of soil from the stand point of higher plants.
- Edaphologists consider the various properties of soil in relation to plant production.
- They are practical and have the production of food and fibre as their ultimate goal.
- They must determine the reasons for variation in the productivity of soils and find means for improvement.