



Soils

Characteristics

Texture

Soil Profile

Soil Types

Threats to Soil



Soil Characteristics

3 characteristics of soil that affect its value for farming and growing vegetation are:

1. Organic Content
2. Mineral Content
3. Soil Texture

Soil Characteristics

1. Organic Content

- A soil's fertility is determined as a ratio of the organic content to the content of ground bed rock. Amount of dead and decomposing material.

Soil Characteristics

2. Mineral Content

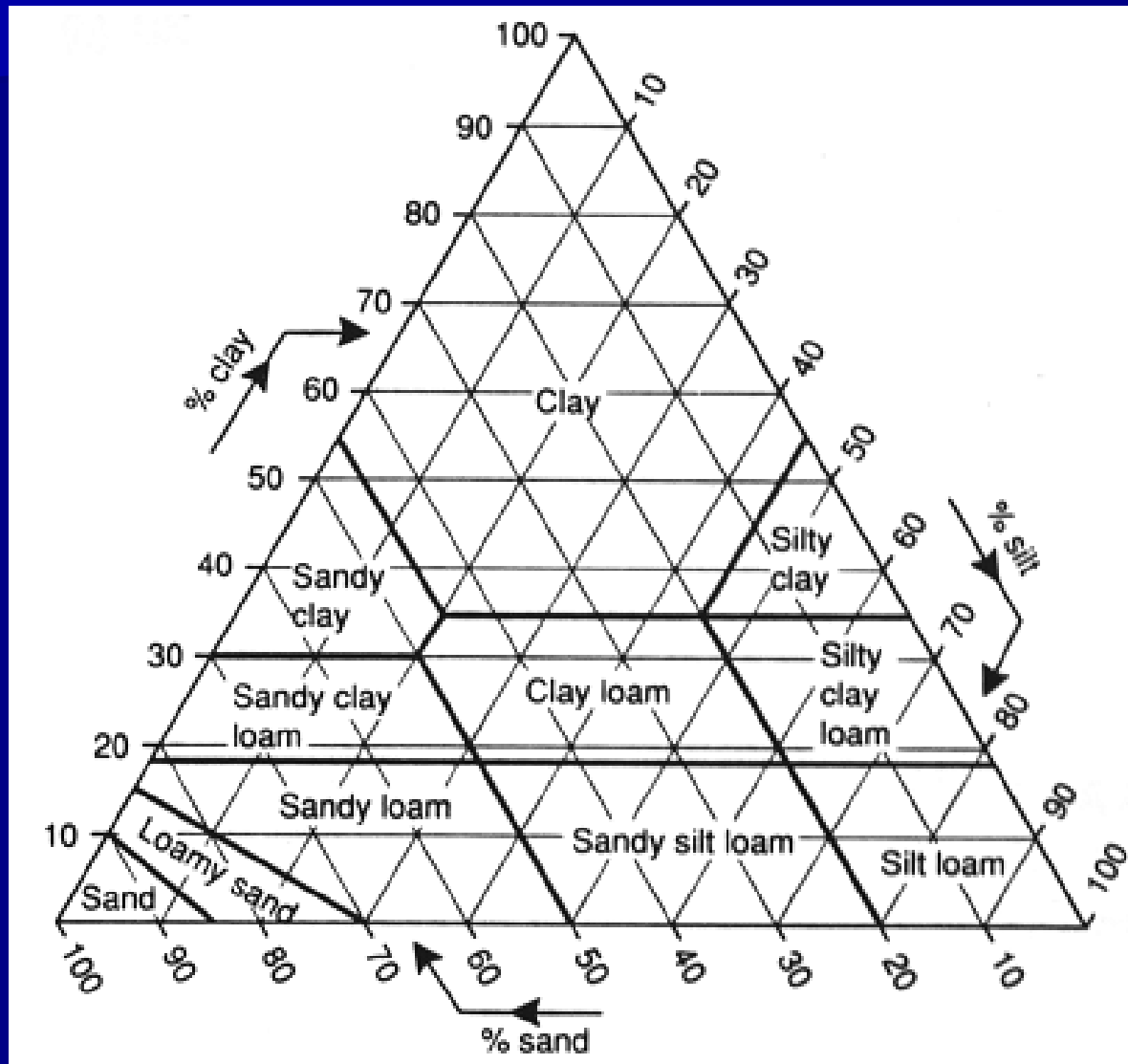
- Varies with precipitation because heavy rains tend to leech soils removing minerals from the root region of soil.

Soil Characteristics

3. Soil Texture (pg. 138)

- refers to the mixture of fine particles (**sand**), very fine particles (**silt**) and extra fine particles (**clay**). The best texture for agriculture is an even mixture of each (**loam**).

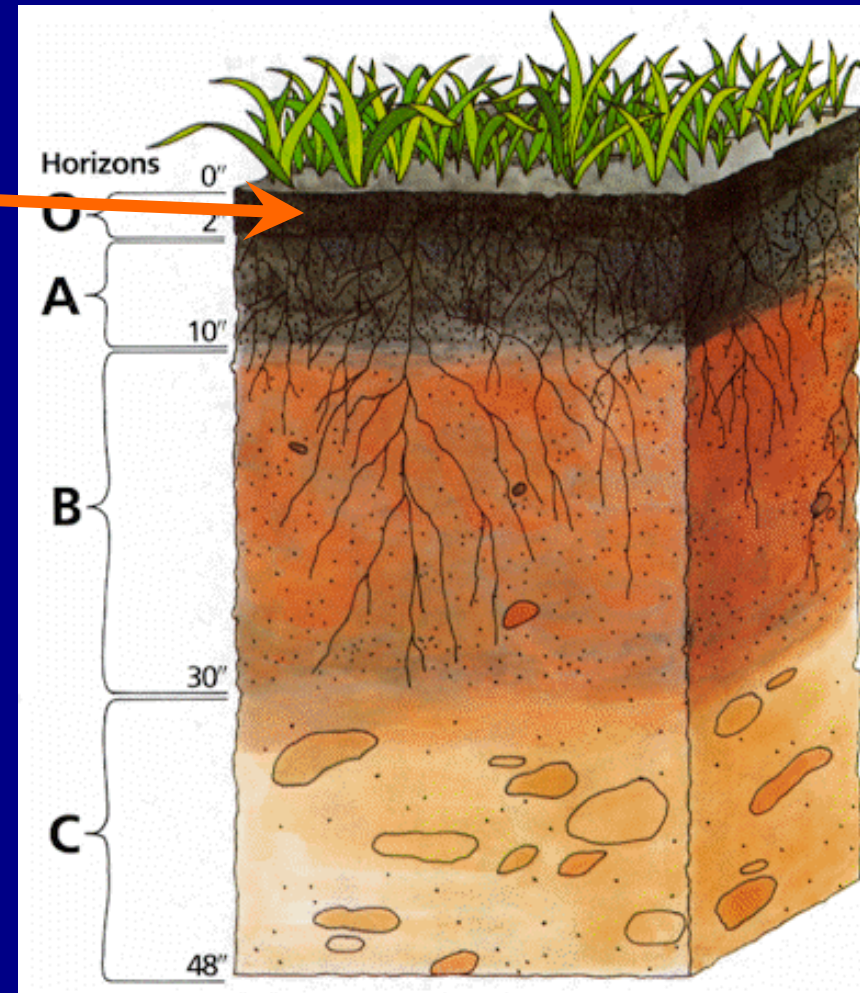
Triangular graph of Soil Texture



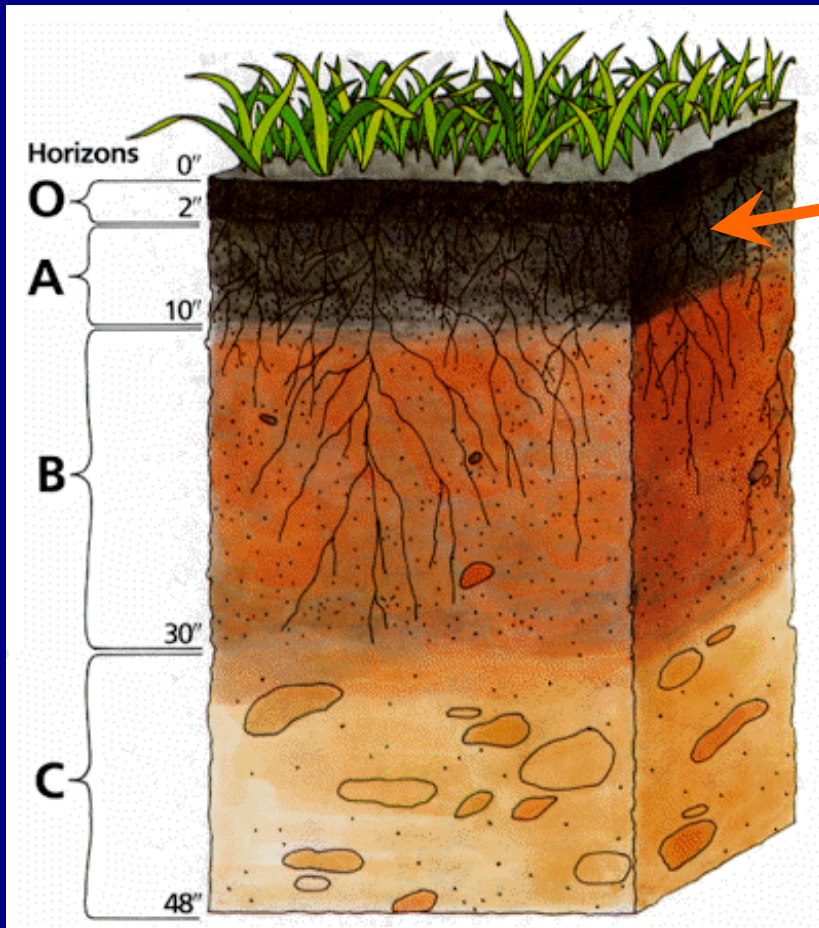
Soil Profile

(pg. 135-136)

- **O Horizon – “Organic”**
- **HUMUS:** dead or decaying plant matter, leaf litter and other organic material **lying on the surface.**
- **dark** because of the **decomposition.**
- decompose into **nutrients** that enrich the soils.



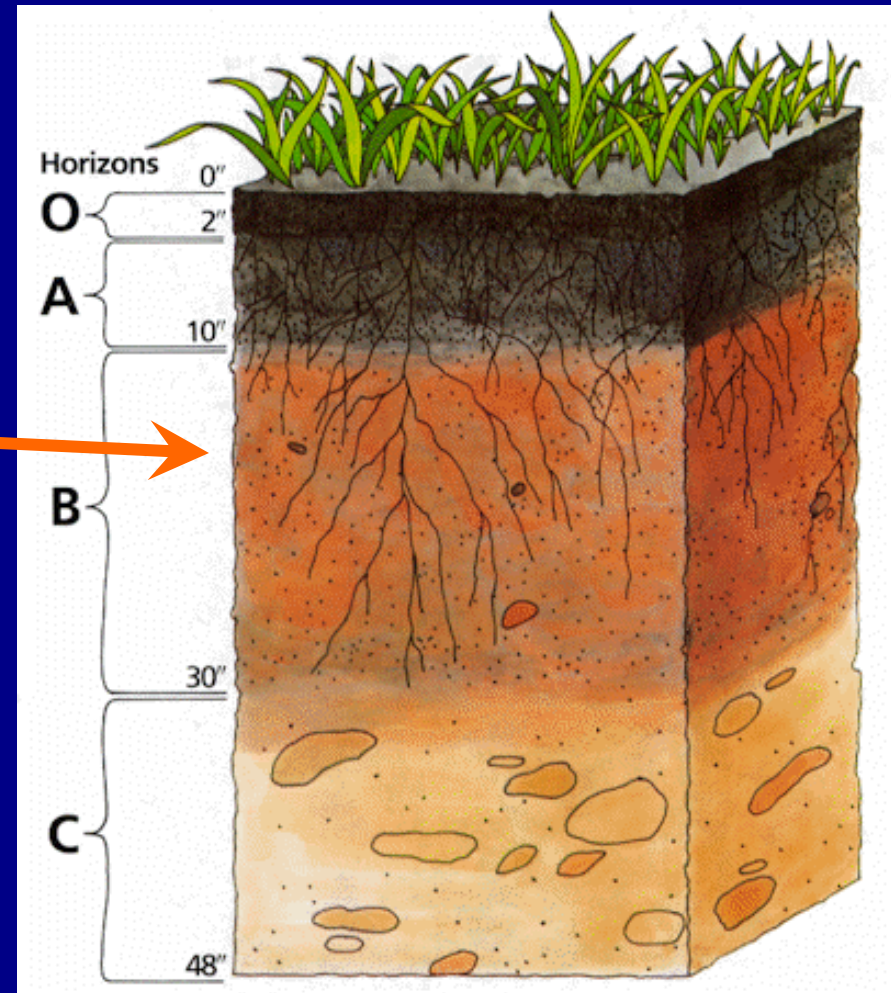
Soil Profile



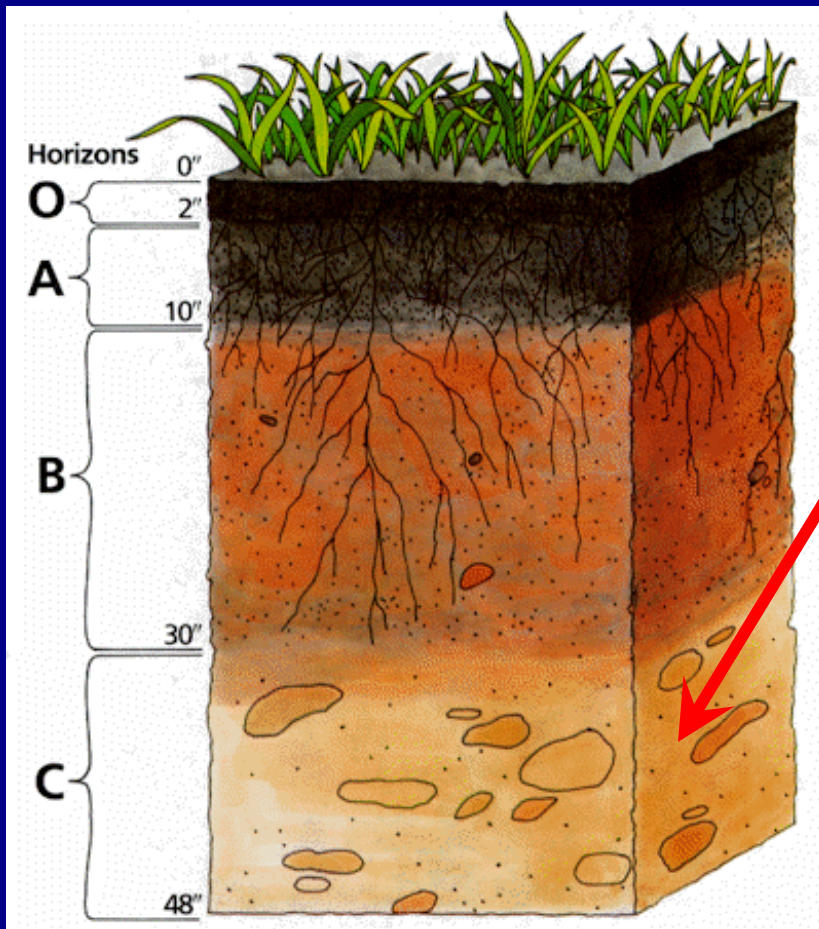
- **A Horizon – “Topsoil”**
- darker than the lower layers.
- loose and crumbly with varying amounts of organic matter.
- most productive layer of soil.

Soil Profile

- **B Horizon – “Subsoil”**
- Light colored, dense, and low in organic matter.
- materials leached from the topsoil accumulate here.



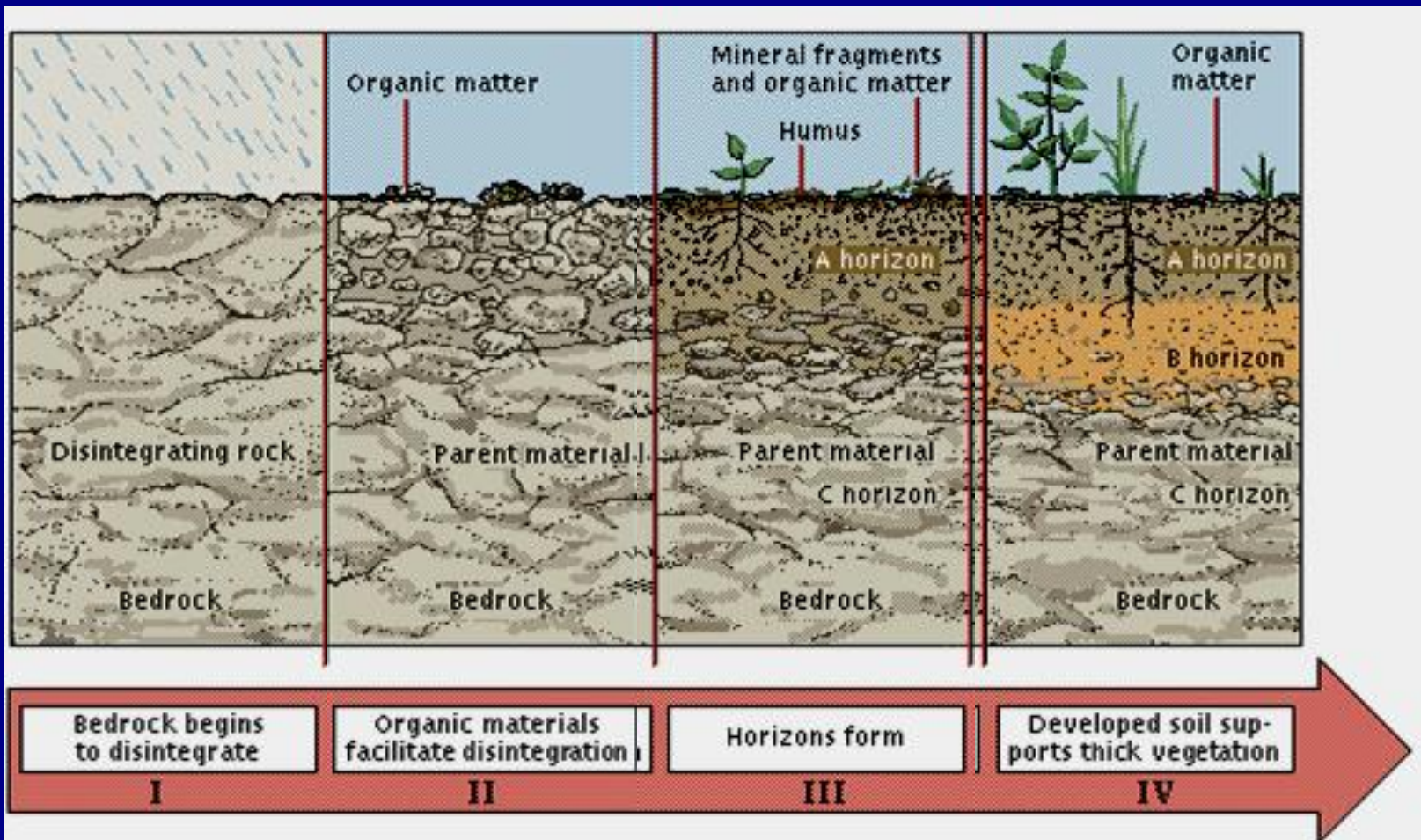
Soil Profile



- **C Horizon – “Weathered Parent Material”**
- transition area between soil and parent material.
- Partially disintegrated parent material.
- mineral particles.
- less organic/living matter.

Soil Formation/Advancement

: the process by which rocks are gradually broken down into smaller particles and mixed with decaying organic material.



Differentiate among the terms humus, leaching, eluviation and capillary action.



- **Humus** is the accumulation of dead and decayed plant and animal matter that makes up the **organic nature of soil**. Occurs where there is substantial **plant and animal** growth.



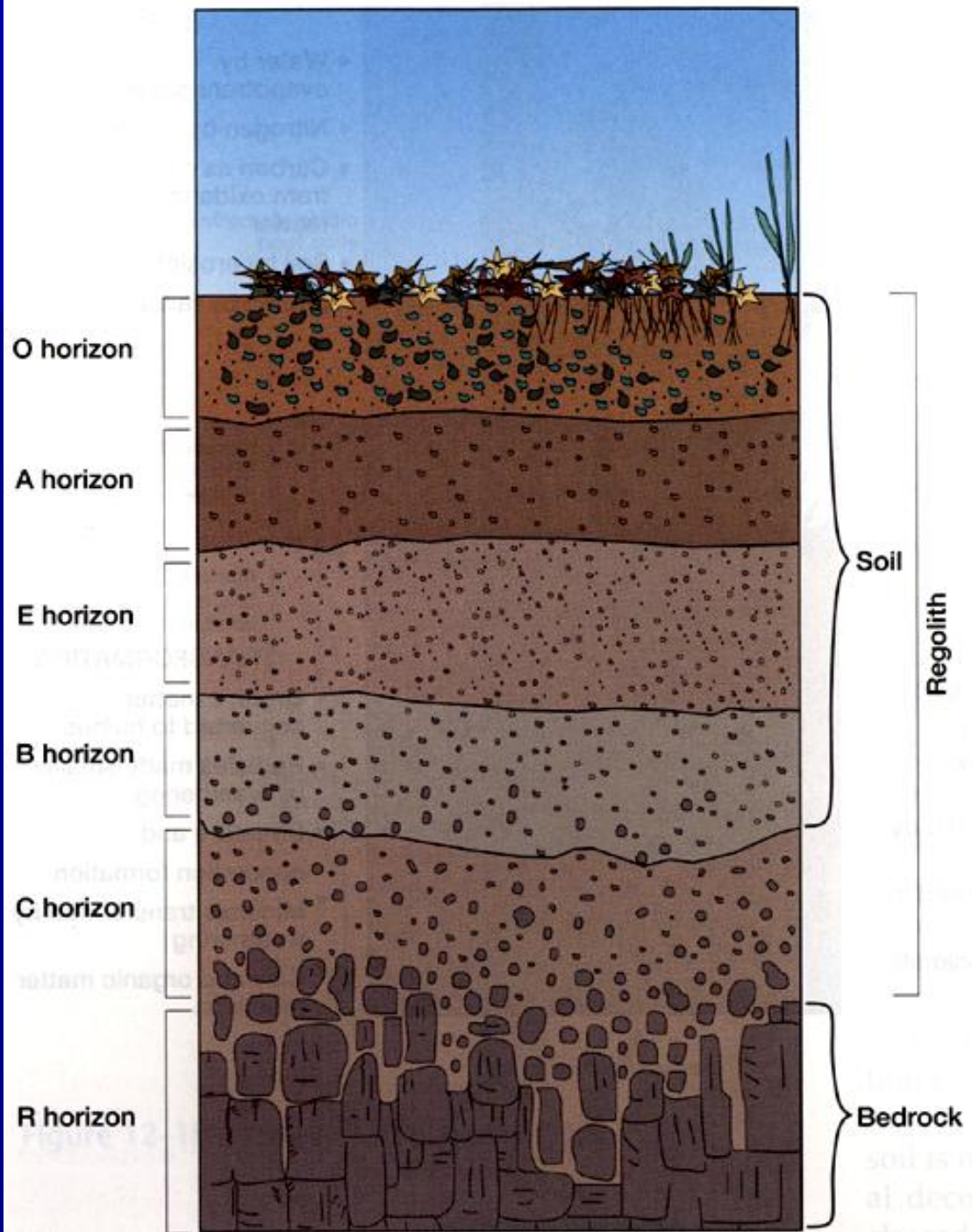
- **Leaching** is the process where nutrients are washed down through the soil with the **movement of water down** the soil profile. Occurs where there is substantial rainfall.



- **Eluviation** is the lateral or **downward movement of clay and other fine materials** in suspension. Occurs where there is **substantial rainfall**.



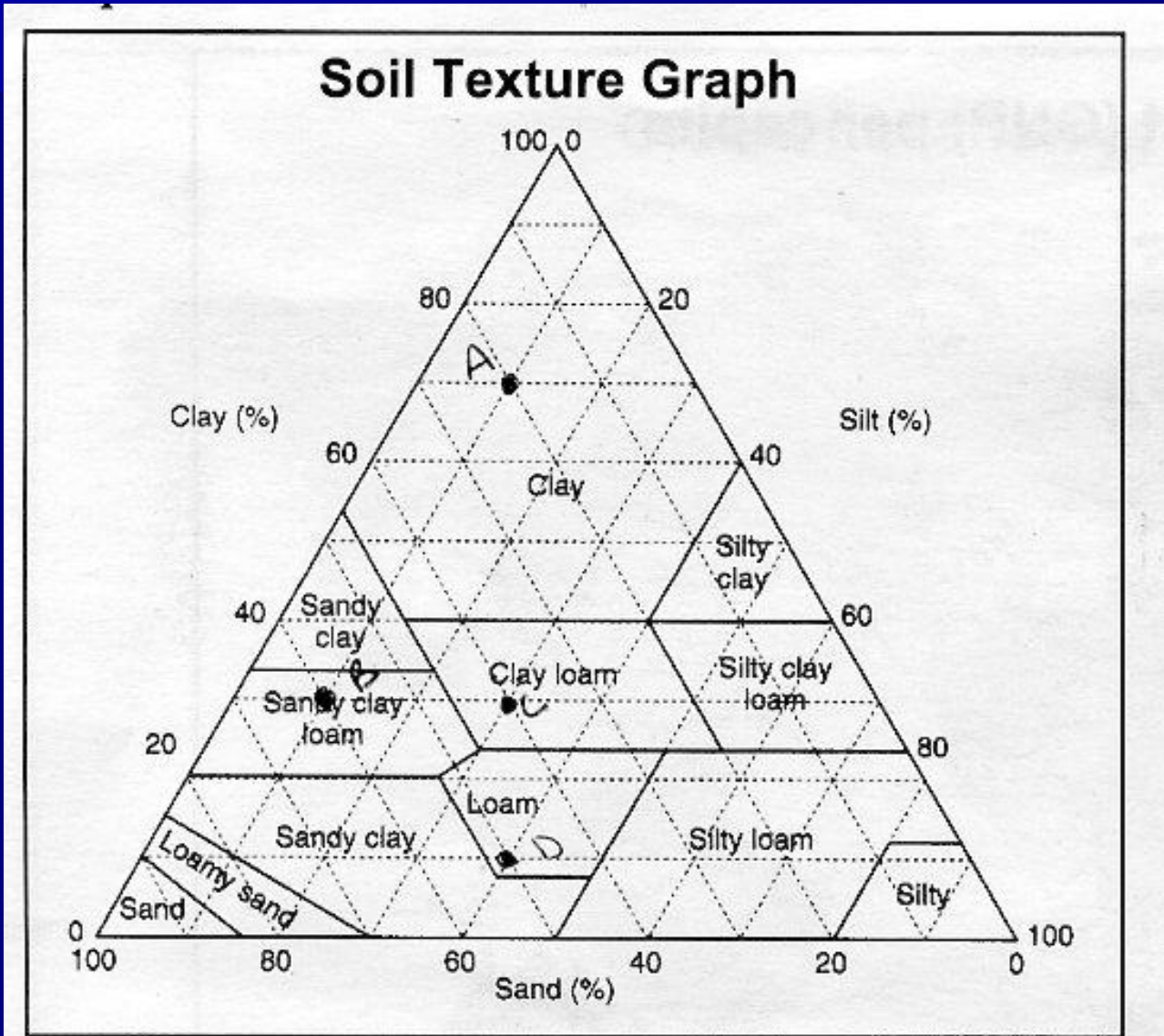
- **Capillary action** results when water molecules are attracted to clay particles and **drawn upward** through the soil profile. Occurs where it is **substantially dry**.



Using the triangular graph of soil texture, which combination would make the poorest soil?

- A) 20% sand, 70% clay, 10% silt *
- C) 40% sand, 30% clay, 30% silt

- B) 60% sand, 30% clay, 10% silt
- D) 50% sand, 10% clay, 40% silt



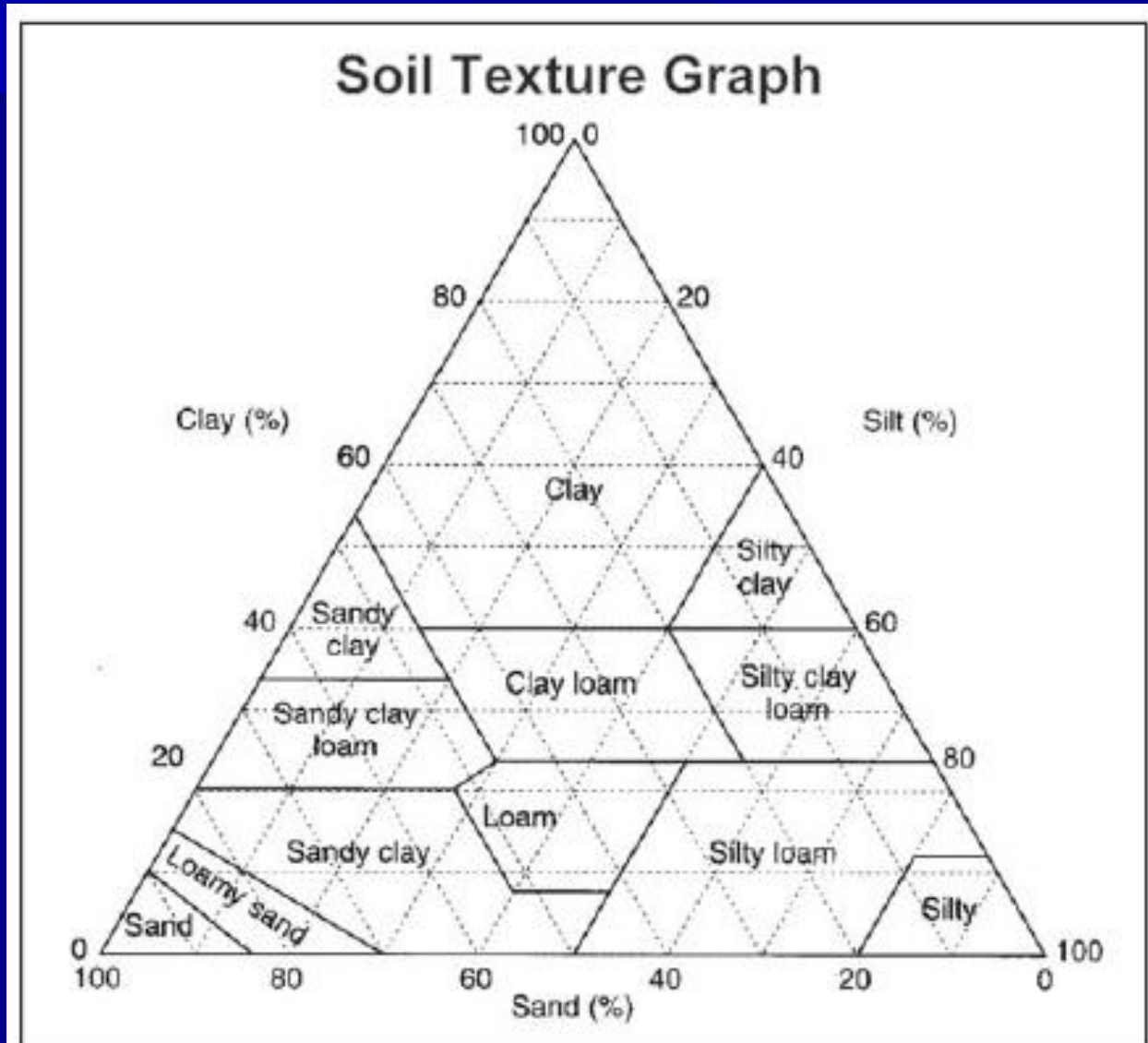
Using the triangular graph of soil texture, which condition would make the least favourable soil for farming?

(A) 40% sand, 20% clay, 40% silt

(B) 30% sand, 10% clay, 60% silt

(C) 25% sand, 60% clay, 15% silt *

(D) 50% sand, 10% clay, 40% silt



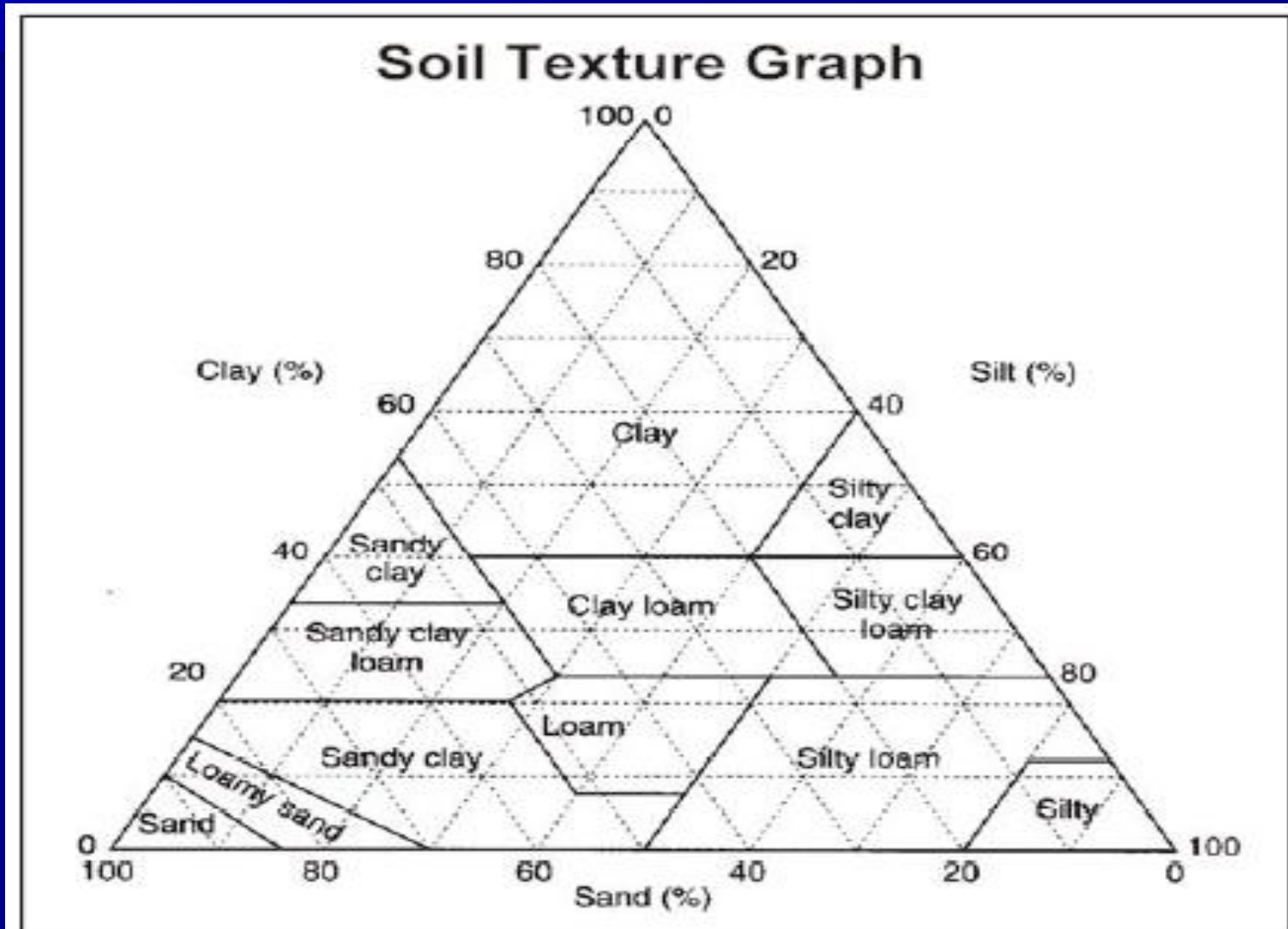
Using the triangular graph of soil texture, a soil texture combination of 20% sand, 10% clay and 70% silt would constitute which soil type?

(A) sandy clay

(B) sandy loam

(C) silty clay

(D) silty loam *



Using the triangular graph of soil texture below, which combination would make the most favourable soil for farming?

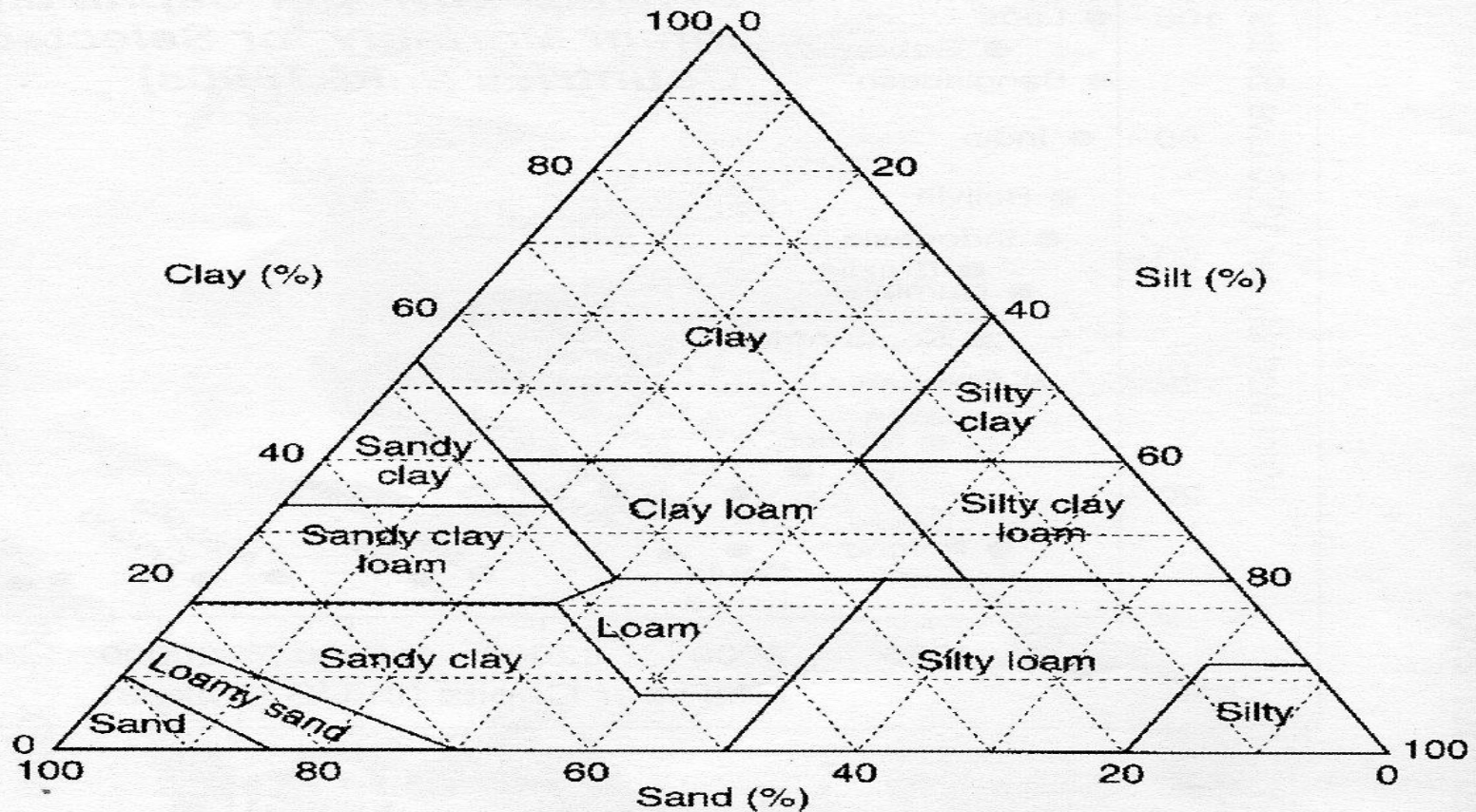
(A) 10% sand, 15% clay, 75% silt

(B) 15% sand, 55% clay, 30% silt

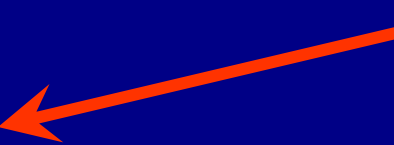
(C) 20% sand, 70% clay, 10% silt

(D) 50% sand, 20% clay, 30% silt *

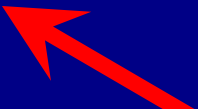
Soil Texture Graph




Which process transports insoluble inorganic matter downward through the soil?

- A) accumulation of humus
 - B) capillary action
 - C) eluviation
 - D) leaching
- 


Which term refers to the process by which particles of insoluble inorganic matter are transported downward through the soil?

- (A) accumulation of humus
 - (B) capillary action
 - (C) eluviation
 - (D) leaching
- 

Which refers to the upward movement of soluble material through the soil by water?

- (A) capillary action 
- (B) eluviation
- (C) erosion
- (D) leaching

Which term refers to the process by which minerals and dissolved salts are transported upward through the soil?

- (A) accumulation of humus
- (B) capillary action 
- (C) eluviation
- (D) leaching

3 types of Soil

pg. 136-137

- 1. Latosol**
- 2. Podzol**
- 3. Chernozem**

Latosol

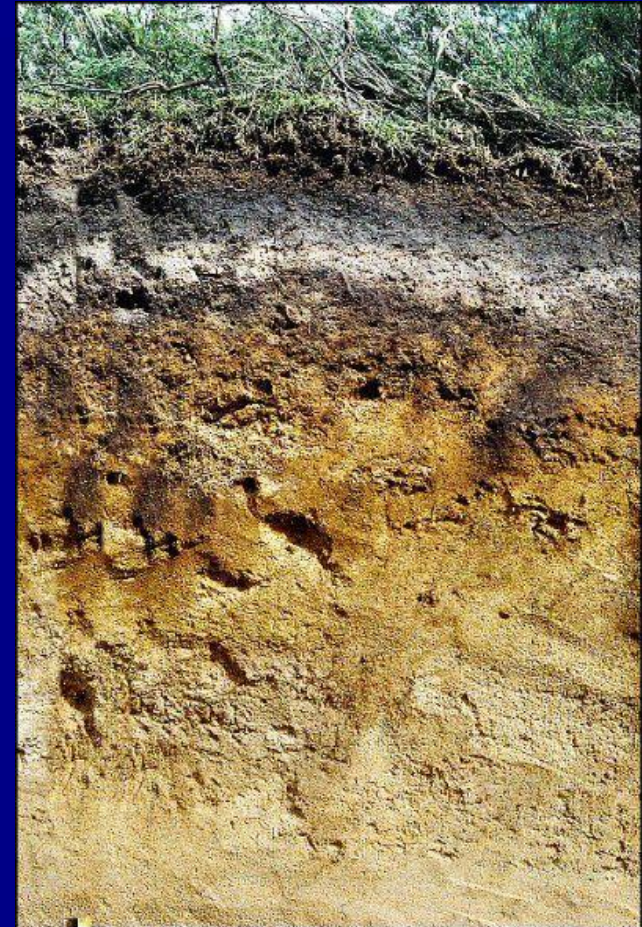


A94F00 Alamy Images

- Typically in **tropical rainforest**.
- Very deep, very well drained, homogeneous.
- **Infertile** due to....
 - Highly **weathered** and **leached** soils because of high amounts of **rainfall**.
- They tend to have medium to very high **clay** contents.

Podzol

- Typically found in the **Boreal forest**.
- Extends immediately **south of the tundra** regions of the Northern Hemisphere.
- Gray in color, ashy appearance.
- Often **severely leached** and **highly acidic**.
- They are **low in agricultural value, forests** being their most common and practical coverage.



Chernozem



- Rich in organic matter in the form of **humus**.
- True chernozem is **black in color**.
- They are found in **grasslands** which are **semi-arid...**
- Resulting in **less leaching** and a **mineral rich soil**.
- It is **very suitable for agriculture**.

Threats to Soil

Environmental Factors:

1. Temperature

- affects **humus** (low temps. slow the decay of organic matter).

2. Precipitation

- affects **mineral content** (rain causes minerals to be eluviated).

Threats to Soil

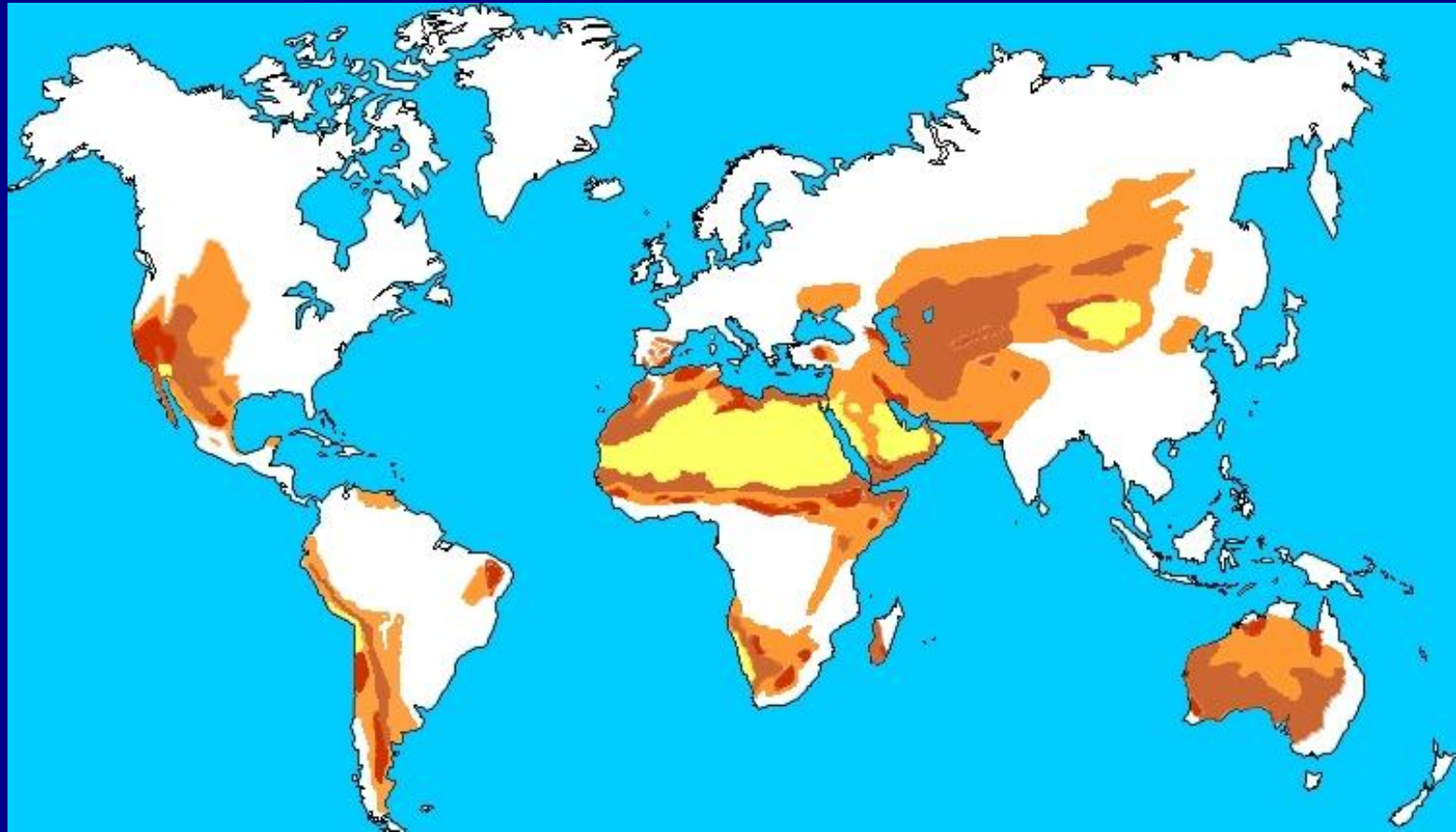
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- Poor soil management
 - agricultural areas and grasslands.
- Urban Expansion
 - settling in rich farmland



Threats to Soil

- Desertification – the spread of desert-like conditions in semi-arid environments



Threats to Soil

- Erosion



- Flooding
- Overgrazing
- Deforestation

Reducing Soil Erosion

Pg. 142

Soil Erosion can be reduced by:

1. Strip cropping

- Alternating strips of open-growing crops and close-growing crops.
- If the open-growing crops are eroded by wind or water, the close-growing crops will not be affected.



Reducing Soil Erosion

2. Cover cropping

- Planting close-growing crop in soil while it rebuilds its nutrients.



- When soil is ready to use, this crop gets ploughed back into the soil, increasing the humus content.

Reducing Soil Erosion

3. Contour ploughing

- Respects the natural shape of the land and forms mini-terraces which discourages water run-off.



Reducing Soil Erosion

4. Terracing



- Constructing steps or shelves in the sides of hills or sloping land to reduce water run-off and retain moisture.