

Management and Soil Properties

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SOIL PROPERTIES

—Physical—

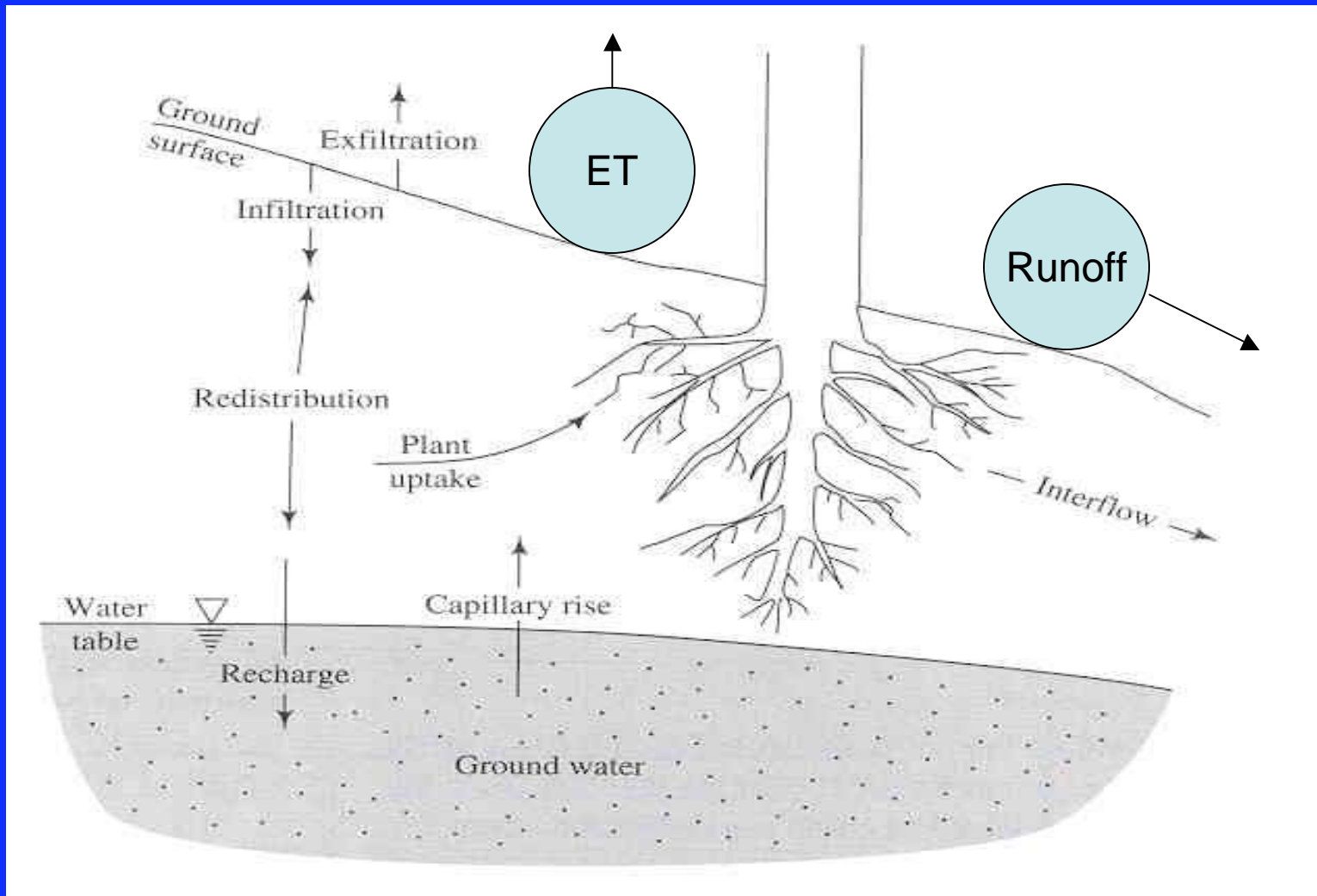
Structure – Erosion – Infiltration

MANAGEMENT

—Systems—

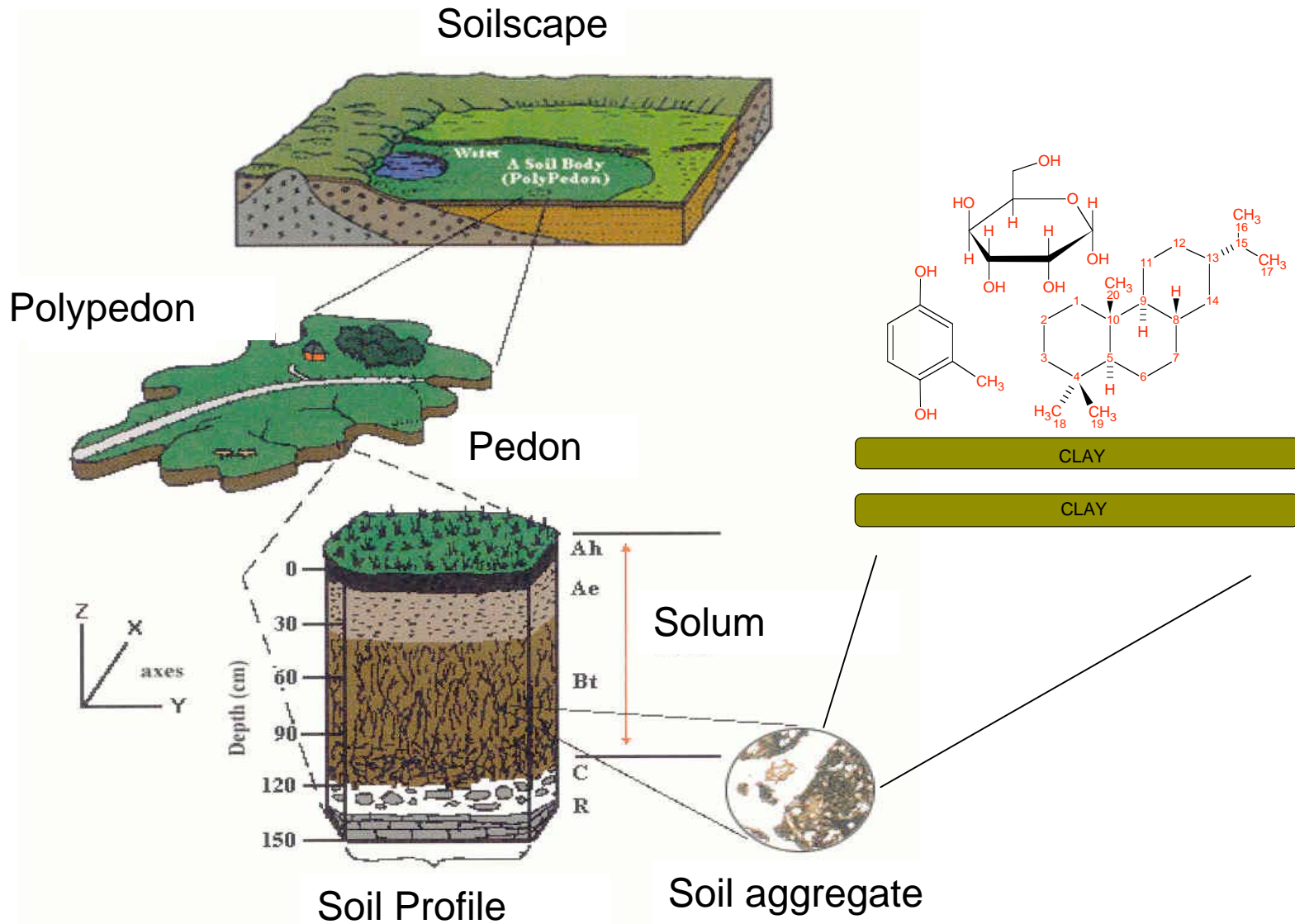
Erosion Control – Water Use Efficiency – Yield

FIELD WATER REGIME



SOIL STRUCTURE

The different "scales" of soil organization



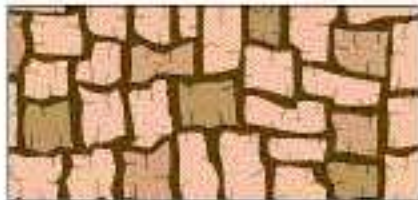
Characterization of Soil Structure



Crumb or granular



Platy



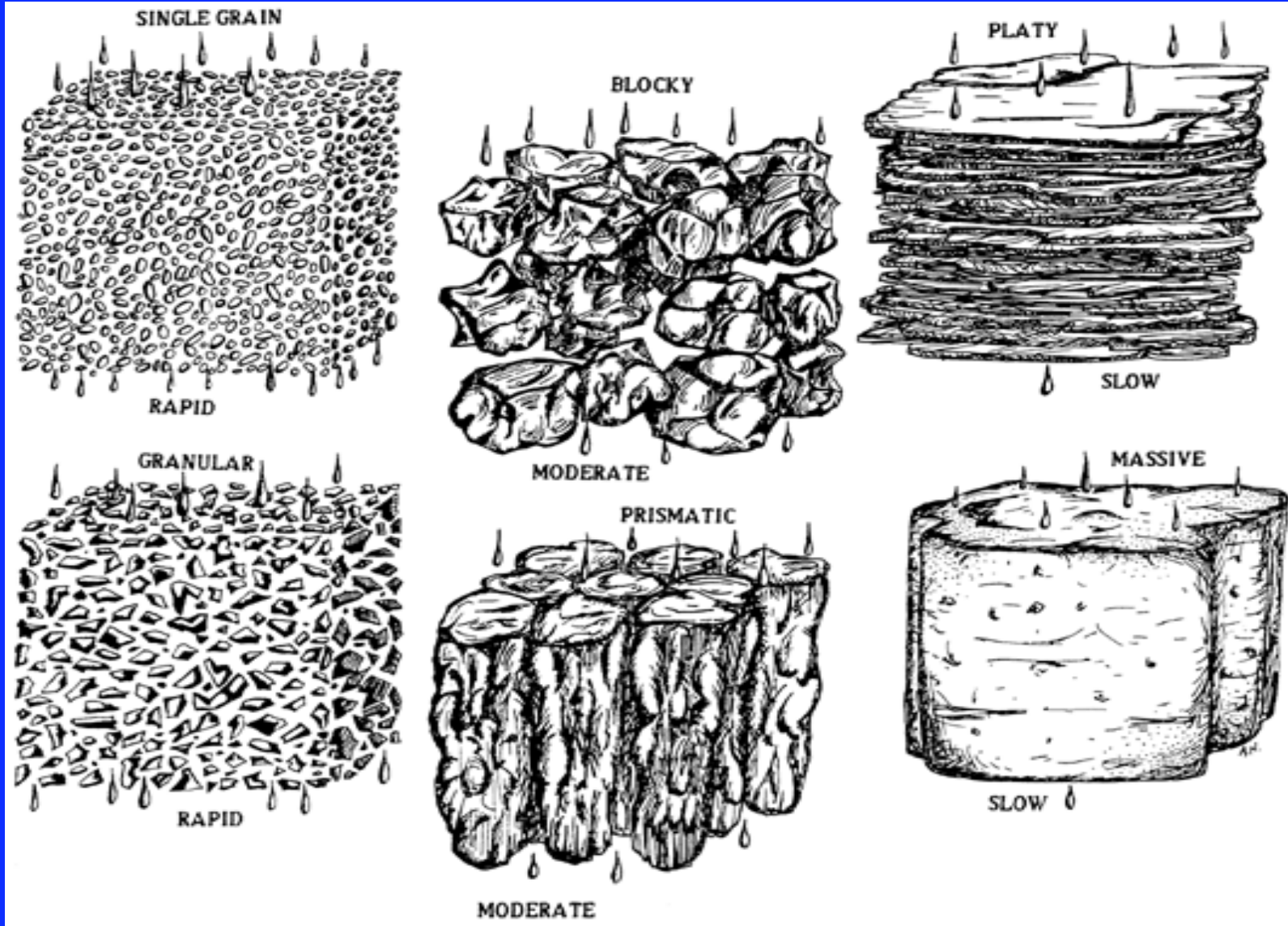
Blocky



Prismatic or columnar

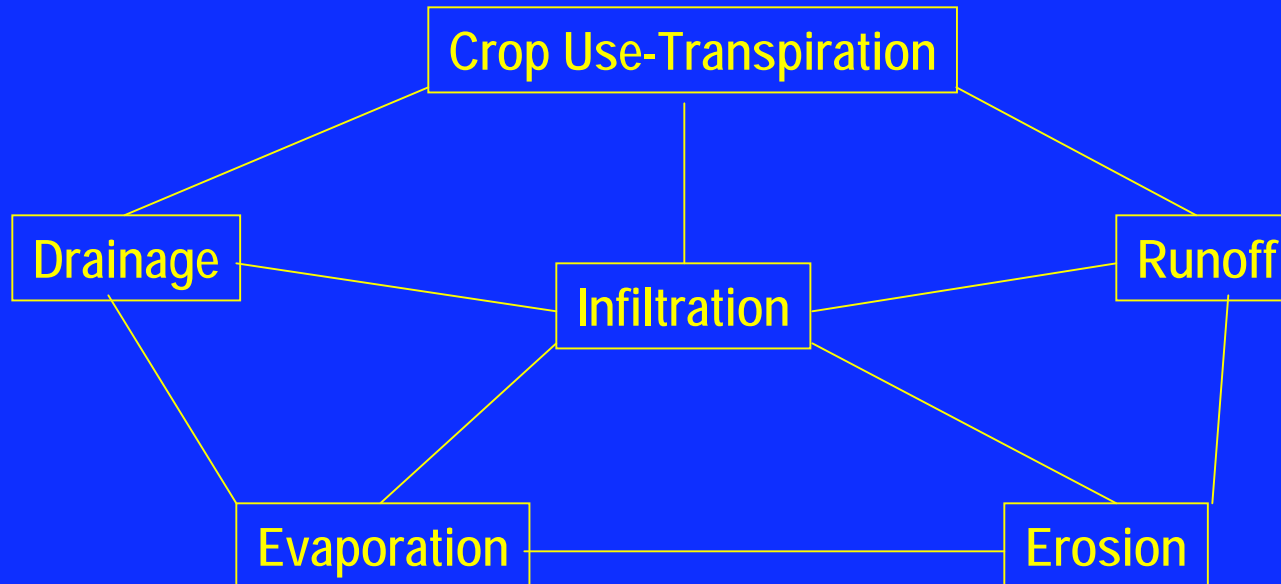


SOIL STRUCTURE AND WATER



Soil Structure and Hydrologic Processes

Structure



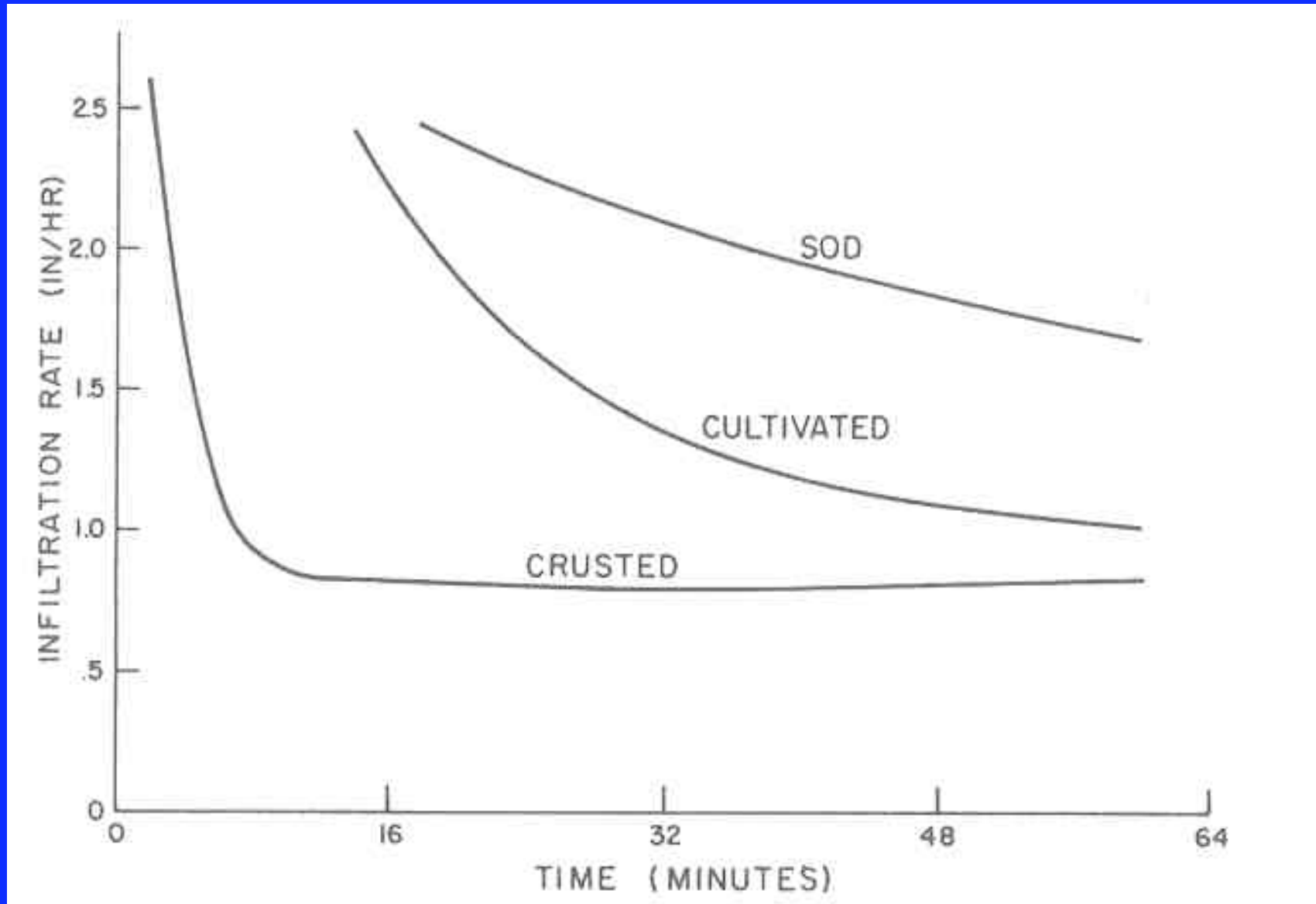
Soil Crust



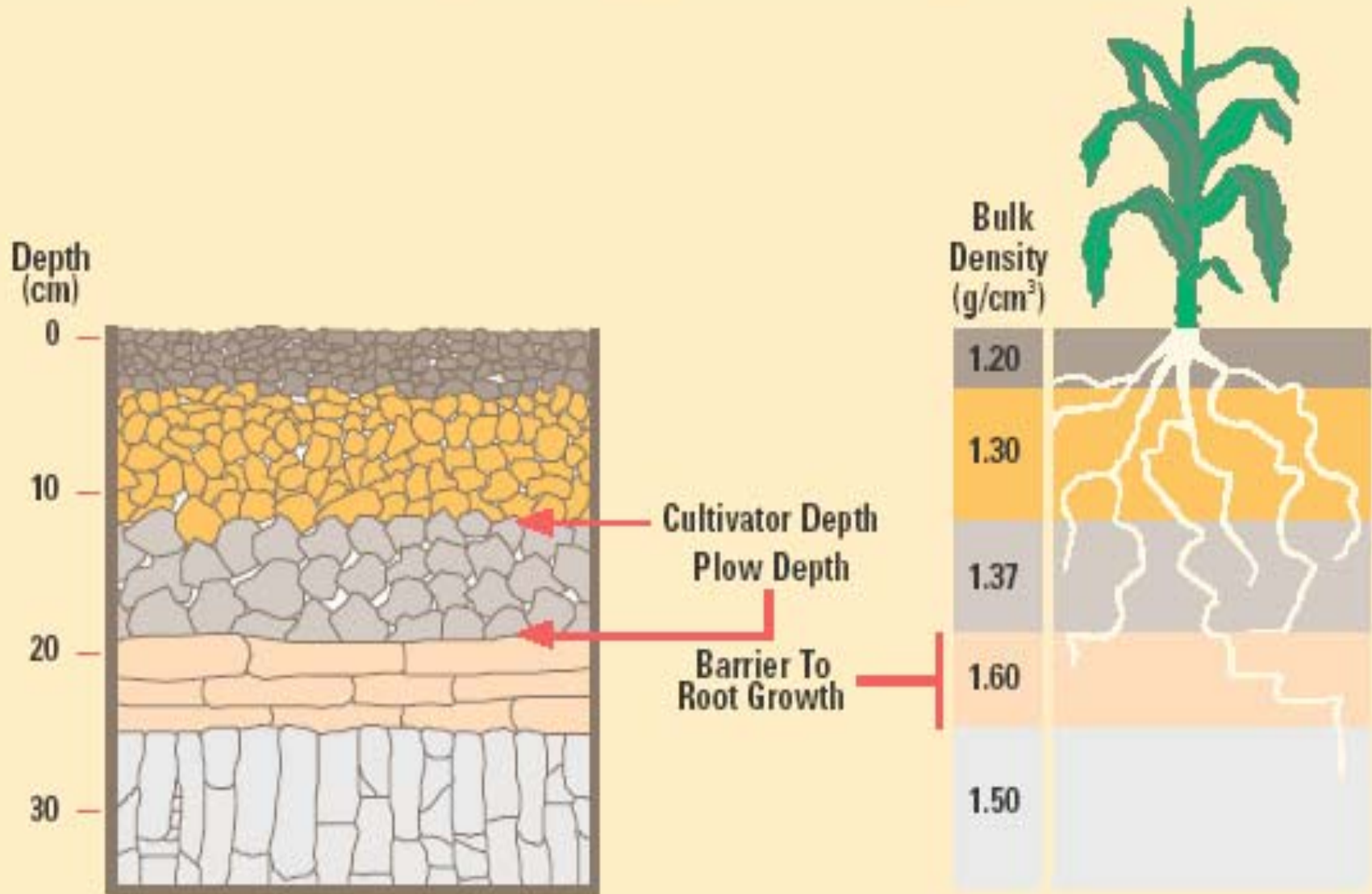
Crust Formation



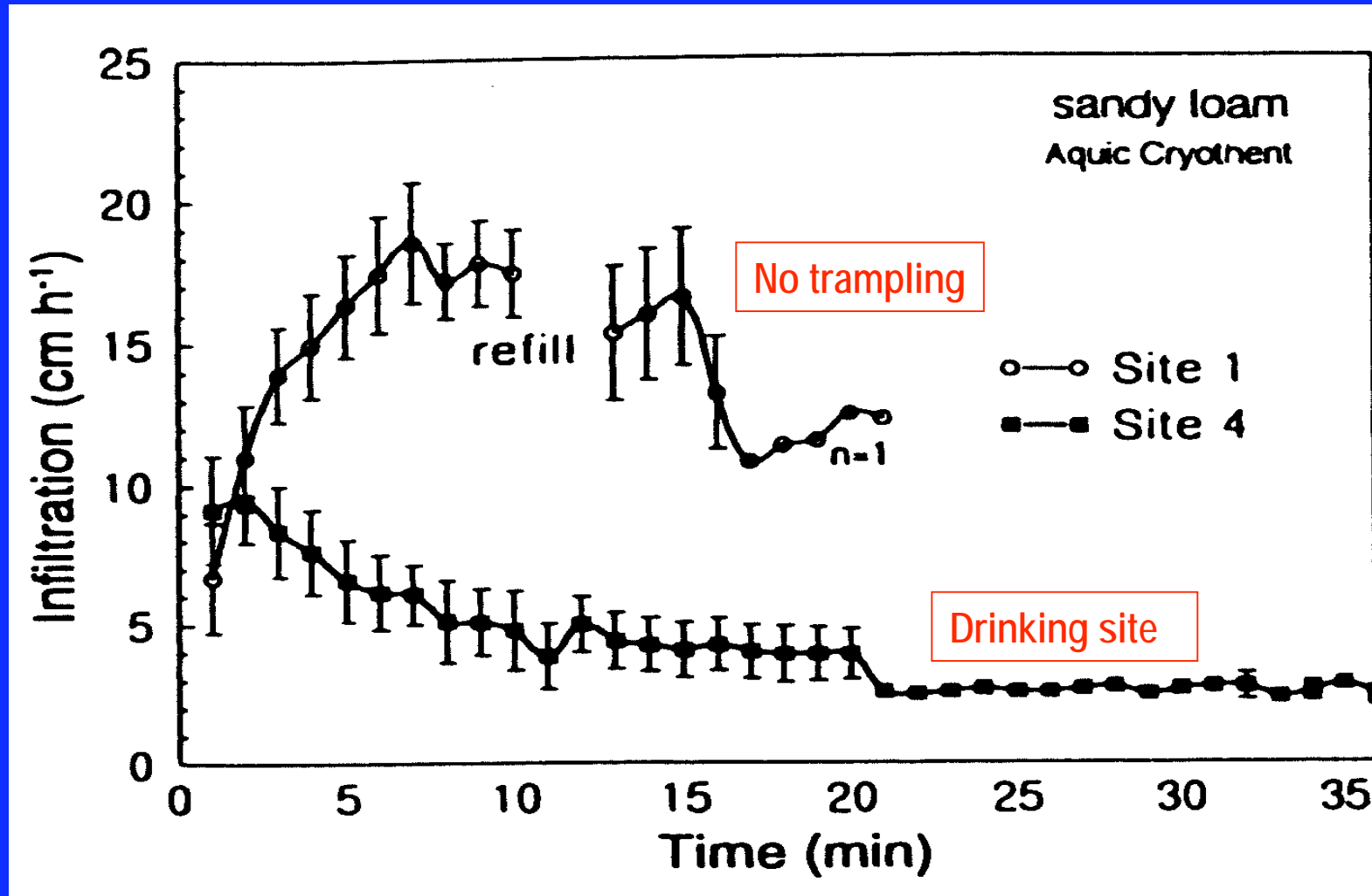
Surface Conditions and Infiltration



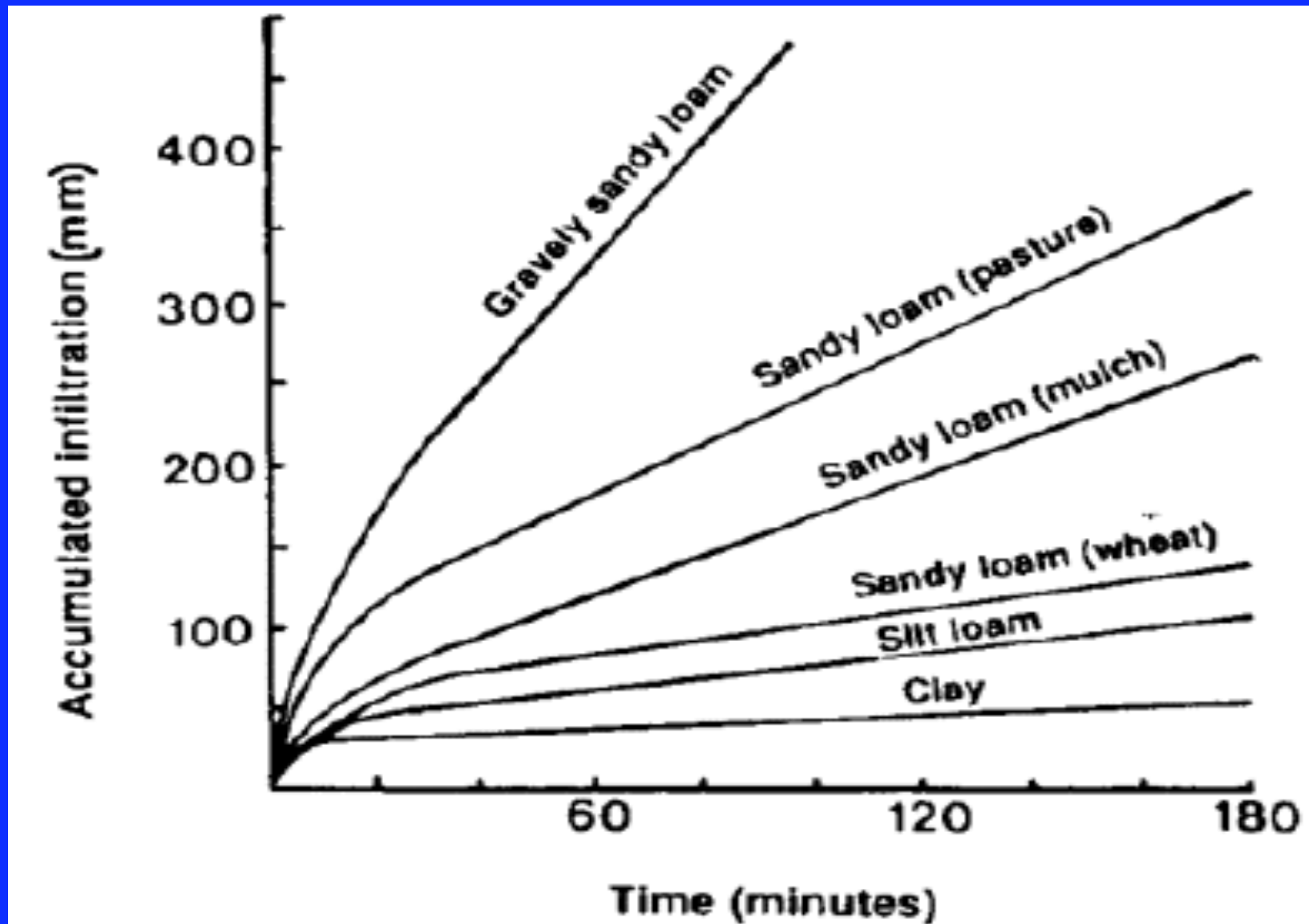
COMMON FARM SOIL STRUCTURE



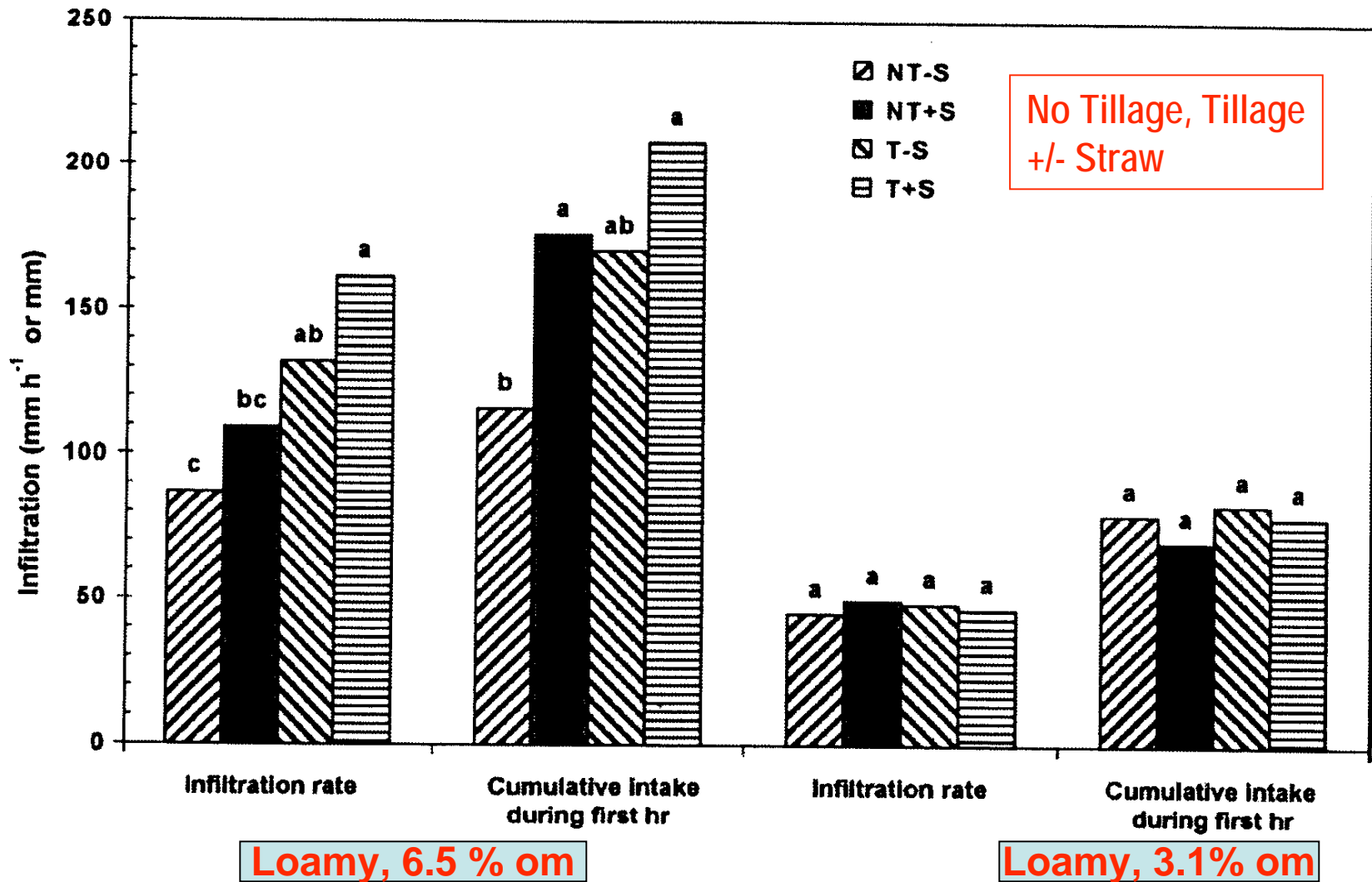
Effects of Trampling by Cattle



INFILTRATION AND TEXTURE



Tillage and Mulch Effects on Infiltration



Crop Water Use Efficiency

$$WUE = \text{Yield} / ET$$

Yield is directly related to crop water use efficiency.

Surface Modification for Greater WUE

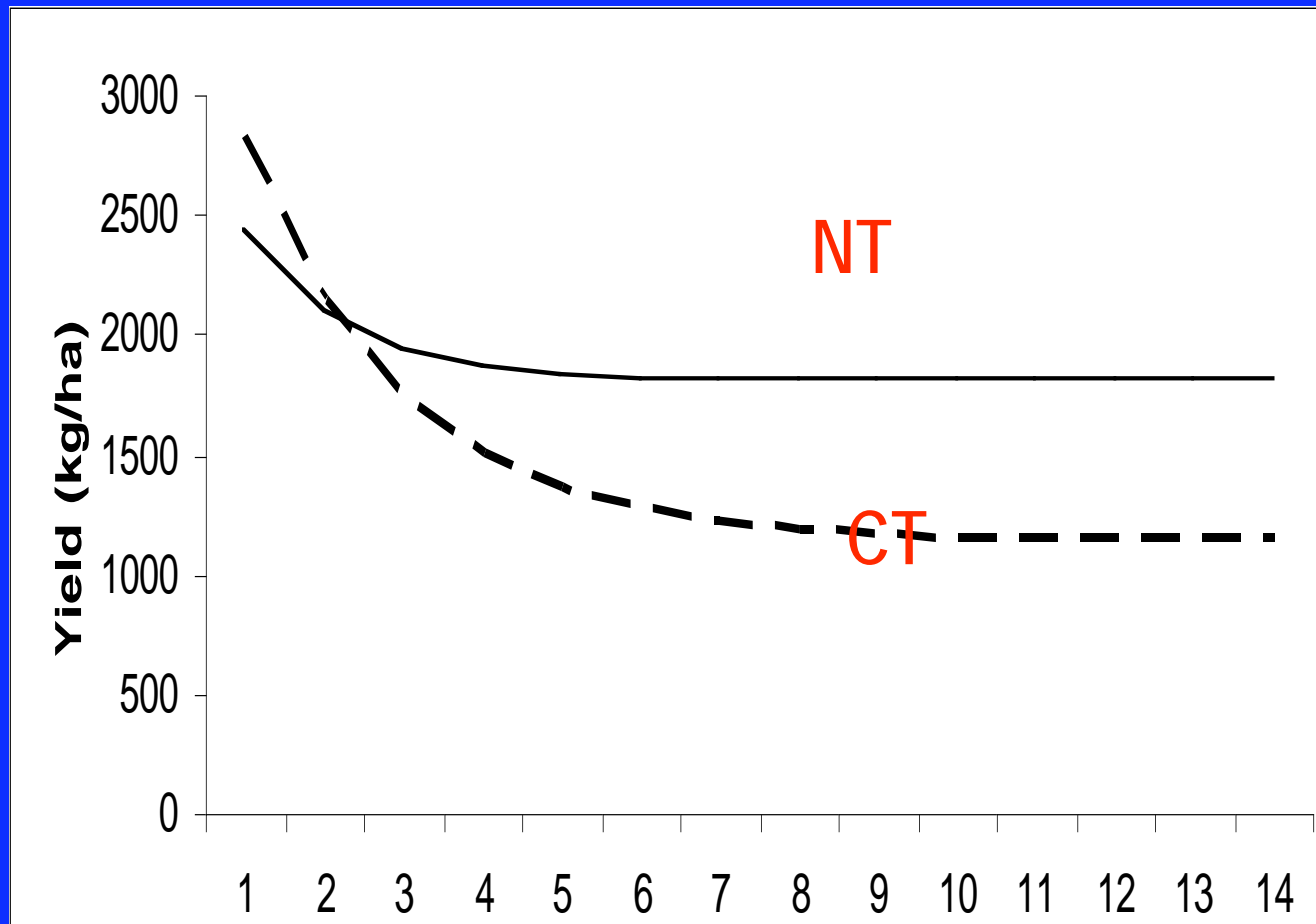
Tillage-Residue Management-Cropping

Increase soil profile

Increase water holding capacity

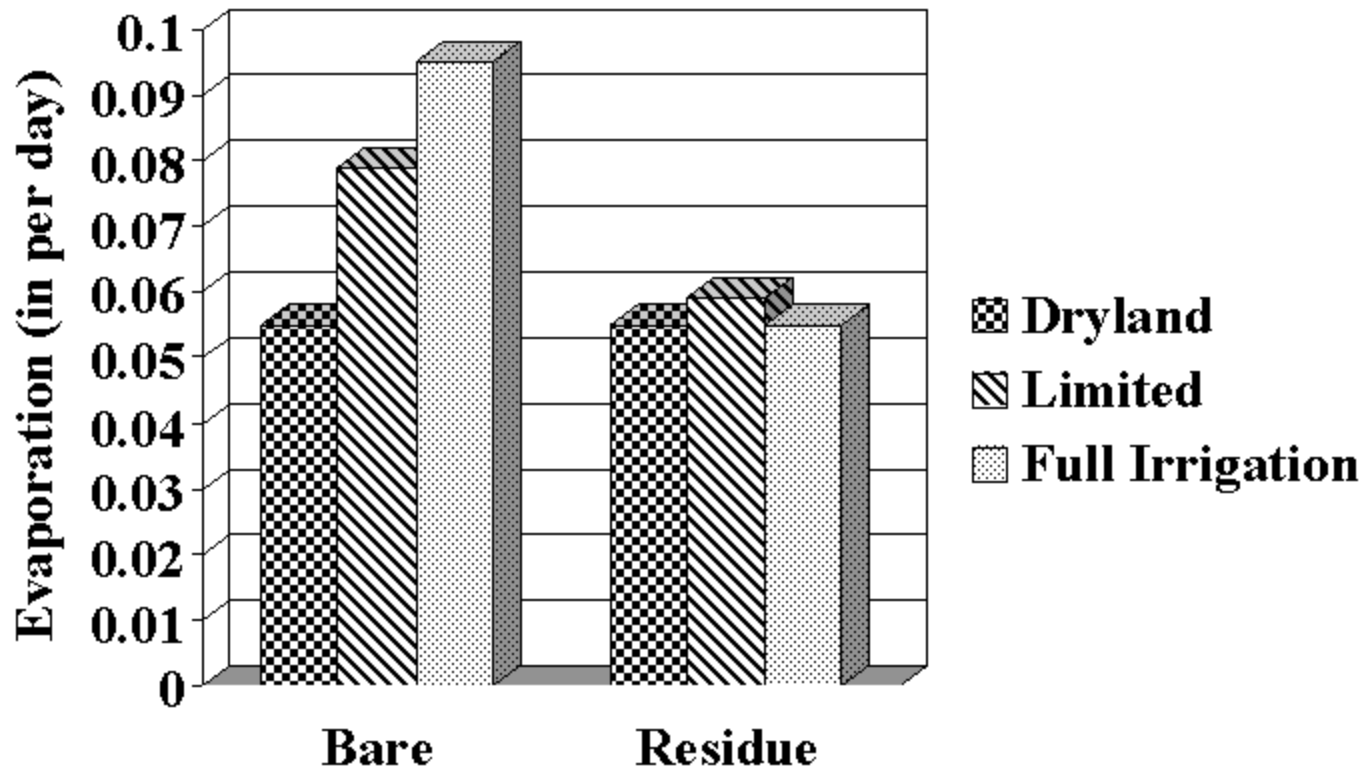
Reduce evaporation losses

Effect of Fragipan Depth on Soybean Yield



NT resulted in 4 to 6 cm more depth to fragipan than CT.

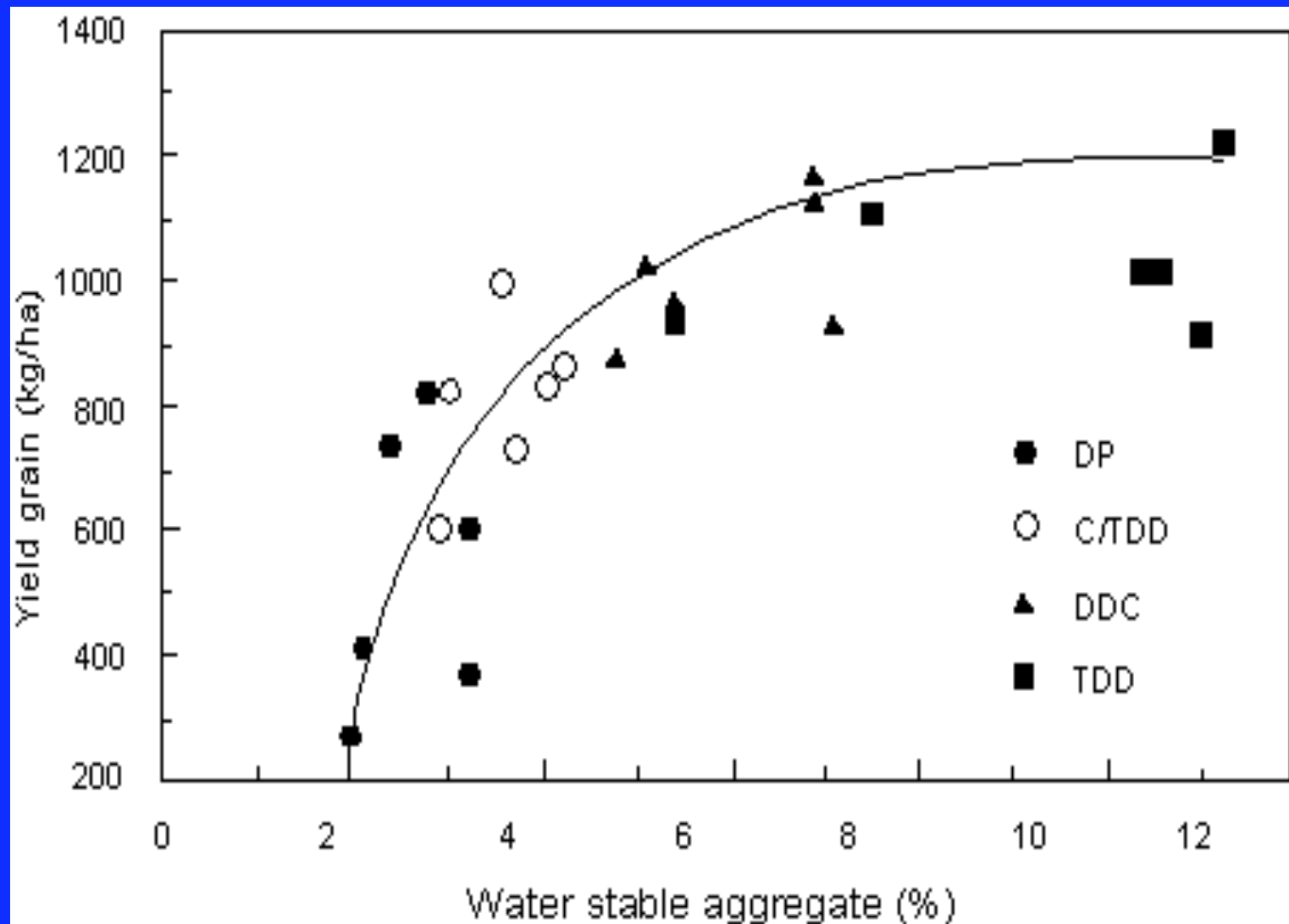
Residue Effect on Evaporation



Crop Species Influence Structure



Soil Structure and Yield



Features to Look for in Soil Profiles

Surface Soil — Crust (extent/thickness/hardness)

Cultivated Layer — Large clods or porous crumbs
Wet or anaerobic zones
Colors and mottles
Earthworms

Subsoil — Presence of compacted layer
Drainage status

Examine: Structure form; root pattern; soil density

Surprise, Surprise!
It's still all about the water.

Proper soil management allows the
soil to provide the crop with water.