

# Labile Carbon

## What it is

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# Organic Matter

- It is the most important constituent required to rebuild or to maintain soil health.
- Organic matter change in its appearance in the soil as it progresses through the different carbon pools.
- There are large differences in the capacity of organic matter management systems to improve soil health and soil structure.



# Benchmarking management

for maintaining and sustaining soil health

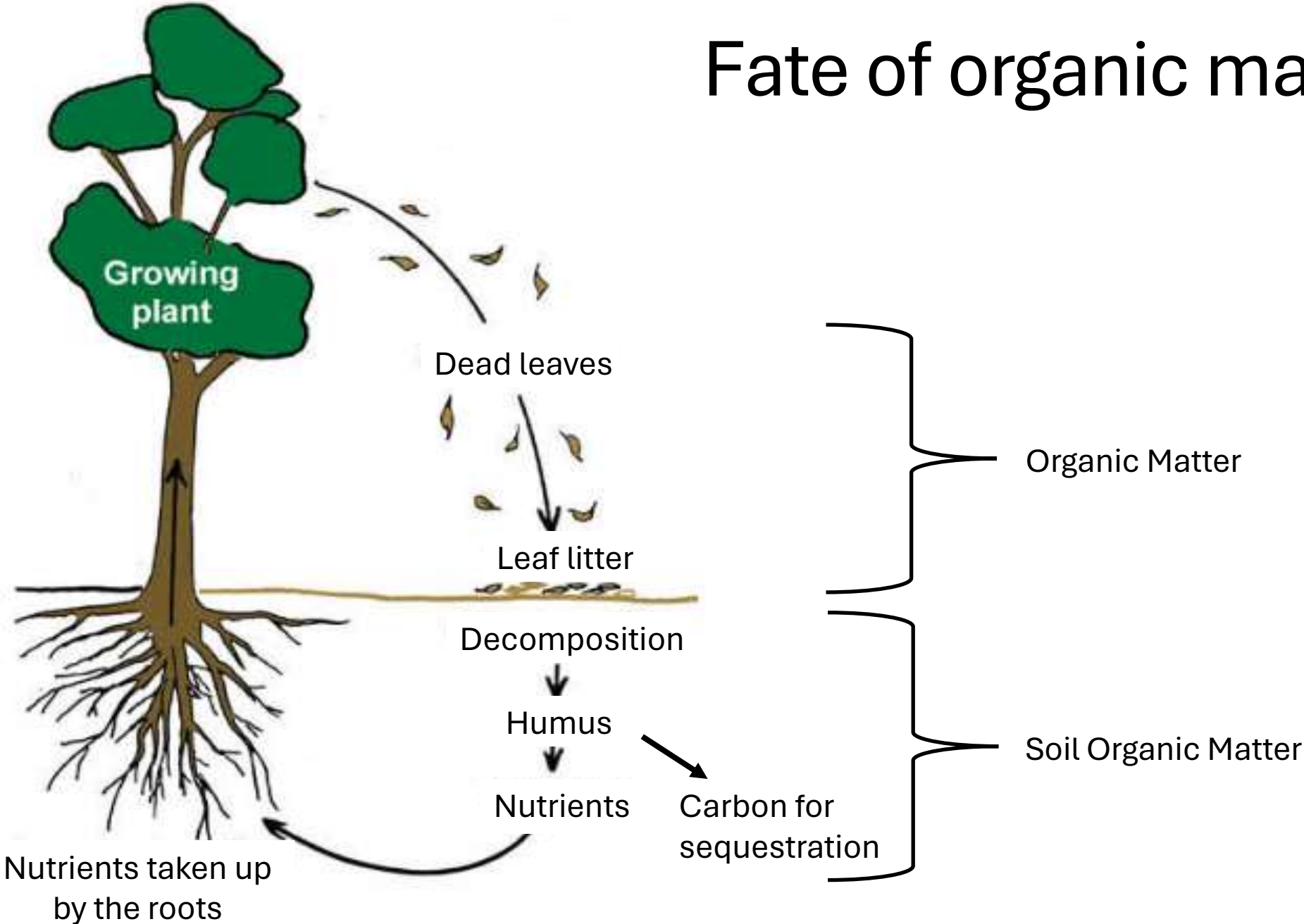
Most  
aggrading

SYSTEM	
1.	Kikuyu pasture; grazed
	Ryegrass/clover pasture; grazed
	Natural grassland or bush
	Permanent grass; hay production (e.g. <i>E. curvula</i> )
	No-till annual row crop, legume rotation, residues remain
6.	Sugarcane, not burned, residues remain, green manure every 10 years
7.	Sugarcane, not burned, residues remain, no green manure
	No-till annual cropping; residues remain
9.	Sugarcane, burned, regular OM additions (e.g. chicken litter)
	No-till annual cropping; grain & residues harvested (e.g. maize silage)
	Annual row cropping, conventional tillage (plough & disc), residues remain
12.	Sugarcane, burned, green manure at plant
13.	Sugarcane, burned, no green manure
	Annual row cropping, conventional tillage; residues removed (e.g. maize silage)
	Regular and intensive tillage; little return of residues (typically vegetables)

Most  
degrading

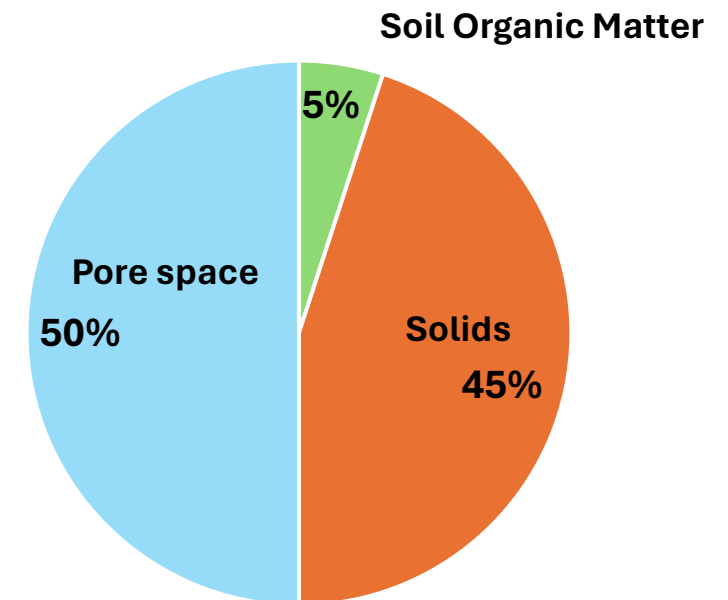


# Fate of organic matter

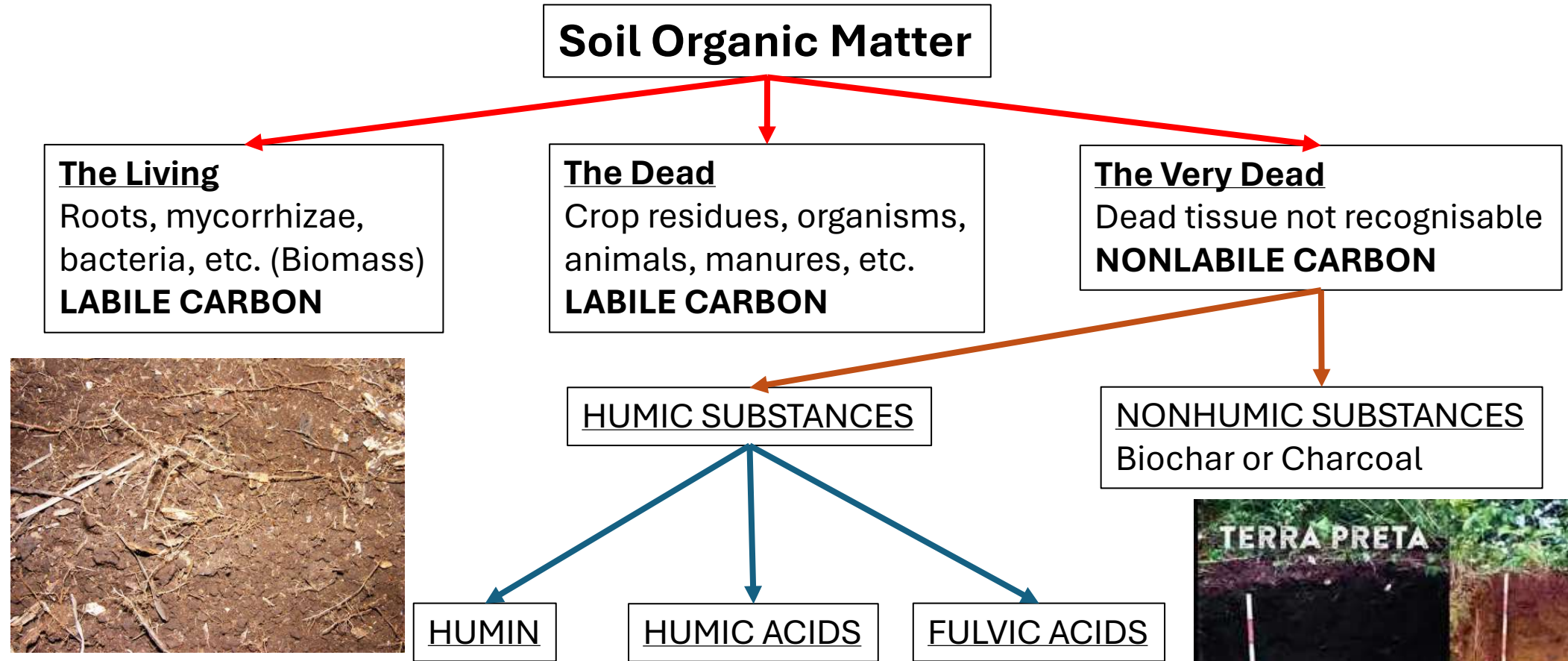


# Soil Organic Matter (SOM)

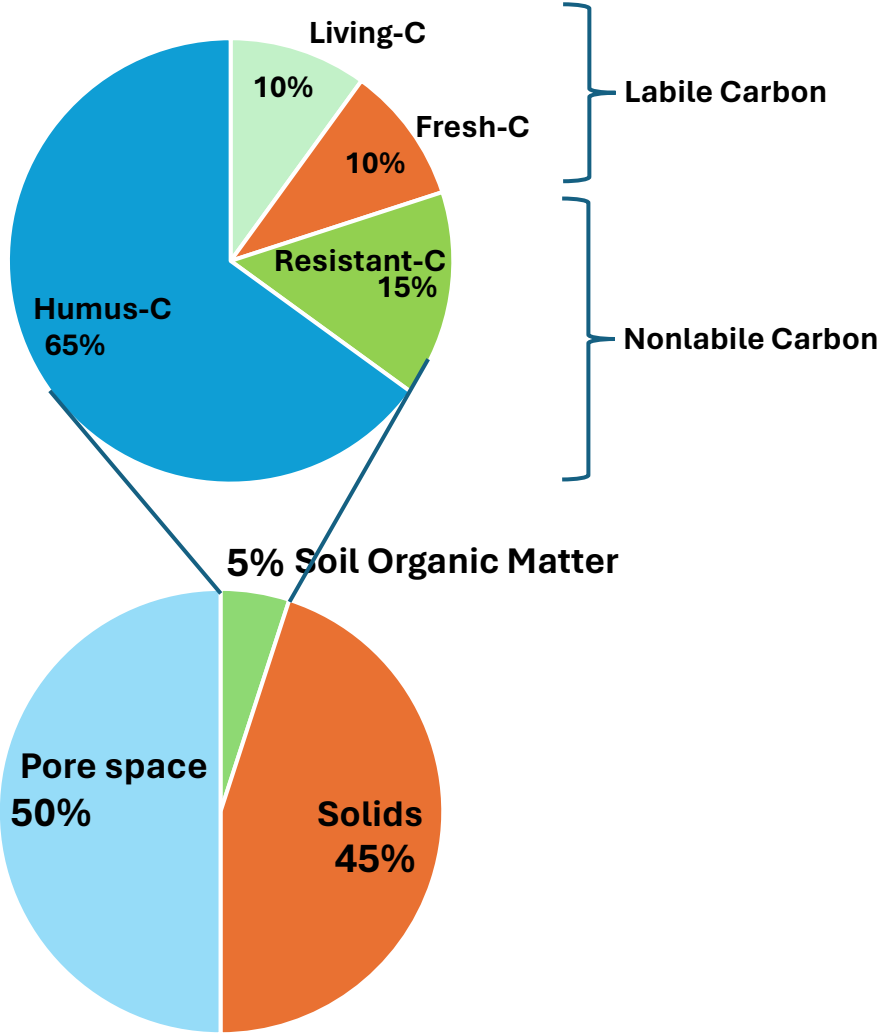
- SOM is only a small fraction of the total soil volume, but it is extremely important to sustain soil life, as a nutrient source and as a building block to create the all-important soil structure.
- SOM is the fraction of the soil that consists of
  - living plant and animal tissue or
  - when dead in various stages of breakdown (decomposition).
- In laboratories SOM is measured as Carbon and this value is then converted into SOM using a constant:  
E.g.  $SOM = Carbon \times 1.72$



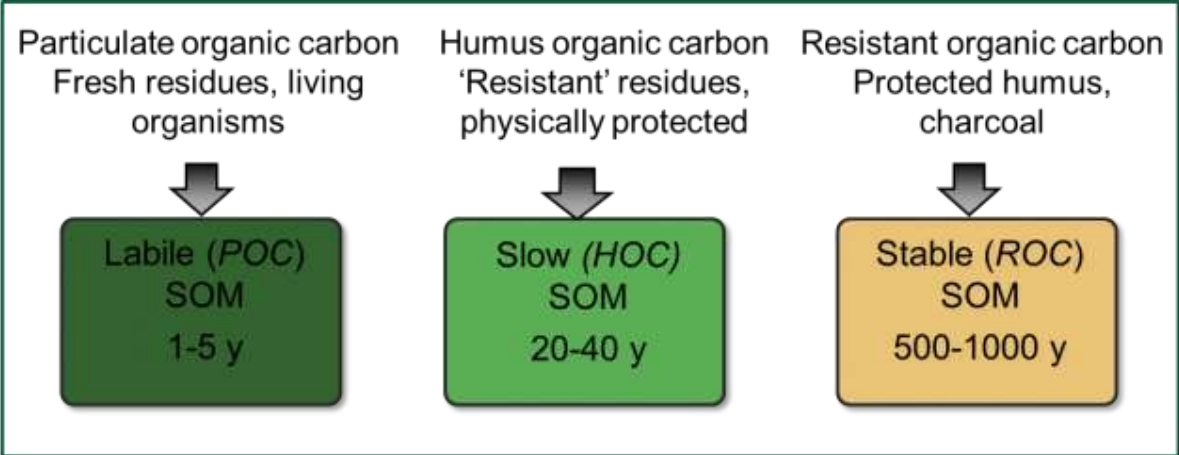
# Classification of Soil Organic Matter



# Carbon fractions in soil



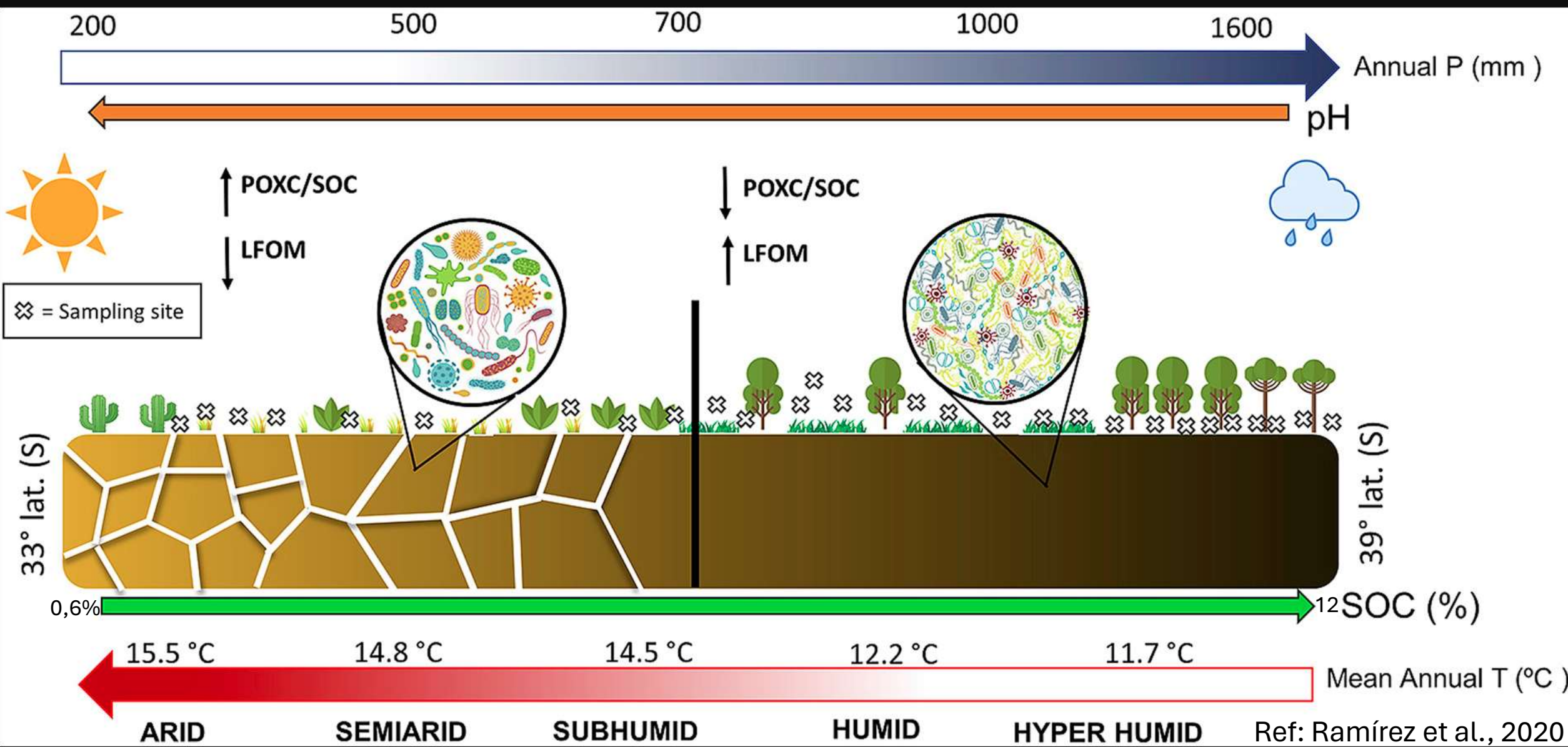
## Sequestration time



# Factors affecting Labile Carbon

- Region / Climate
- Slope
- Sampling depth
- Irrigation
- Sand vs Clay
- Land use
- Land management for production
- Temperature
- Biological activity
- Acidification
- Salinity
- Sodicity
- Parent material
- Soil pH

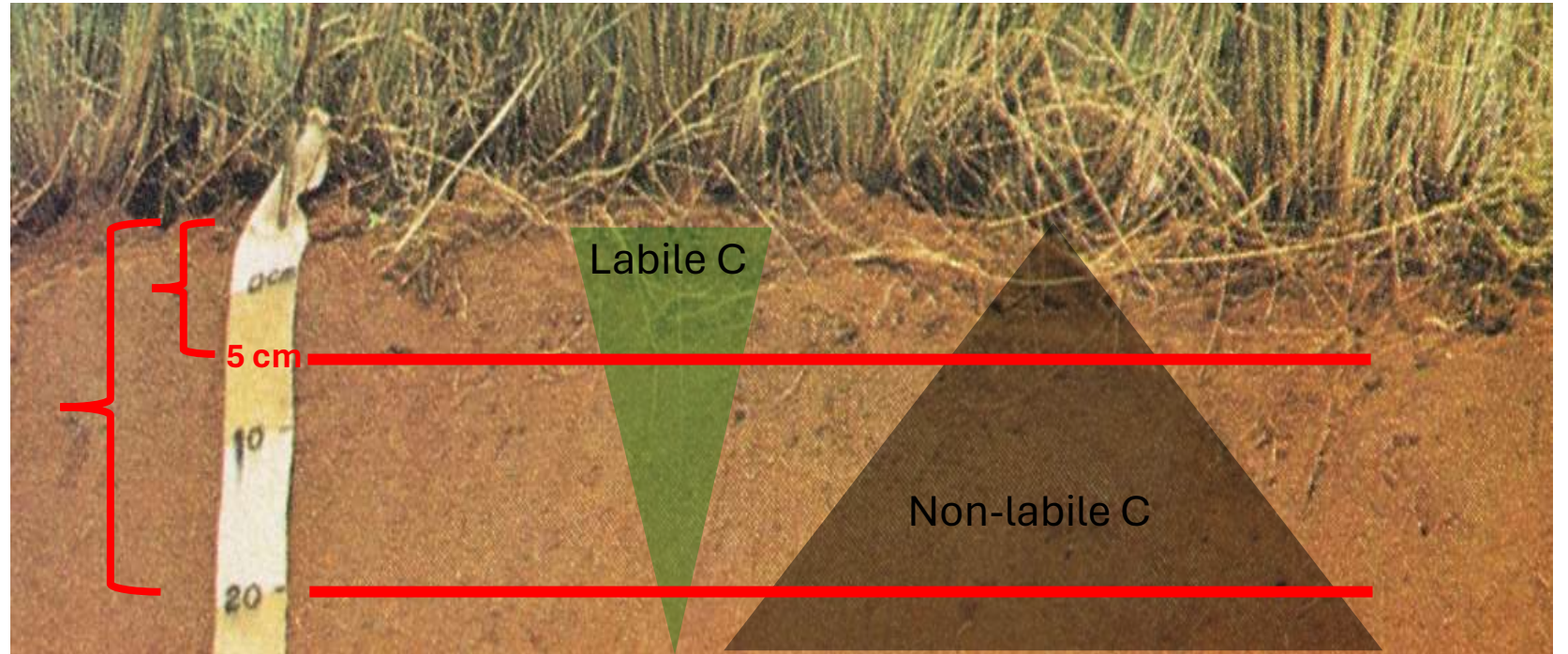




- POXC = Permanganate Oxidizable Carbon
- SOC = Soil Organic Carbon
- LFOM = Light Fraction Organic Matter

# Factors affecting Labile Carbon

- Sampling depth



# Factors affecting Labile Carbon - Summary



## **Labile carbon decrease with an increase in:**

- Temperature
- Sampling depth
- pH
- Alleviation (higher position in the landscape)

## **Labile carbon increase with an increase in:**

- Microbial biomass carbon
- Soil organic carbon
- Rainfall
- Clay content

Land management for production

# Factors affecting Labile Carbon - Summary



Thank you 😊

Land management for production