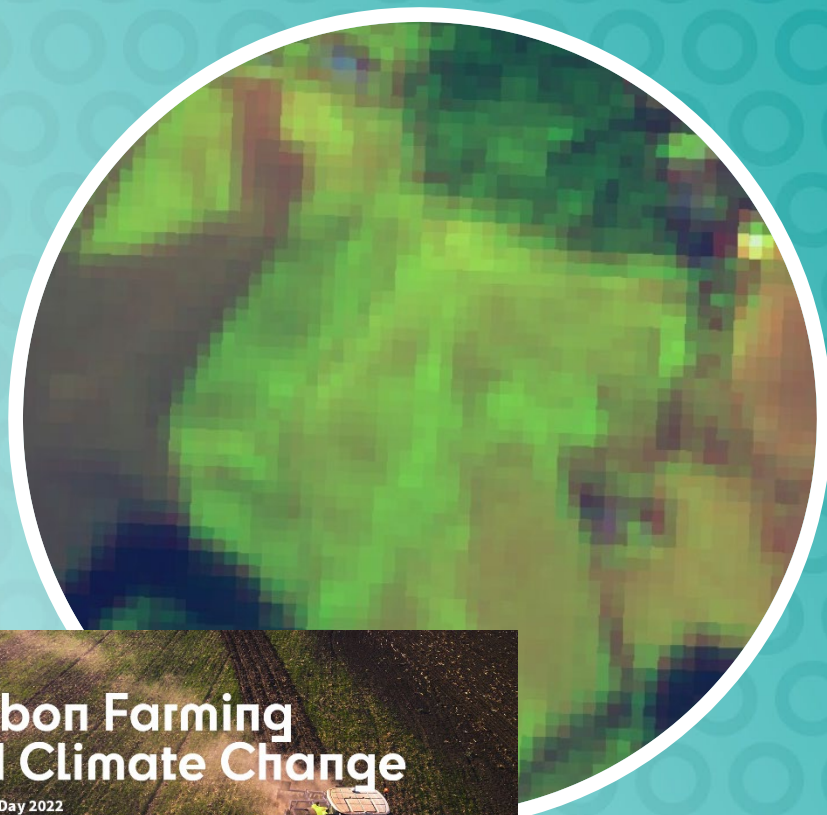


# Agricultural and environmental benefits of carbon farming

Tuomas Mattila

Finnish Environment Institute SYKE

Kilpiä farm



Open event  
**Carbon Farming  
and Climate Change**  
Geoscience Day 2022  
Tuesday 29.11.2022 9.00-13.30  
Helsinki Central Library Oodi

A photograph of a green tractor with a tillage implement working in a field, kicking up dust. The image is part of a promotional poster for an event.

A logo for Carbon Action featuring a stylized white crescent moon and various small icons representing nature and science.

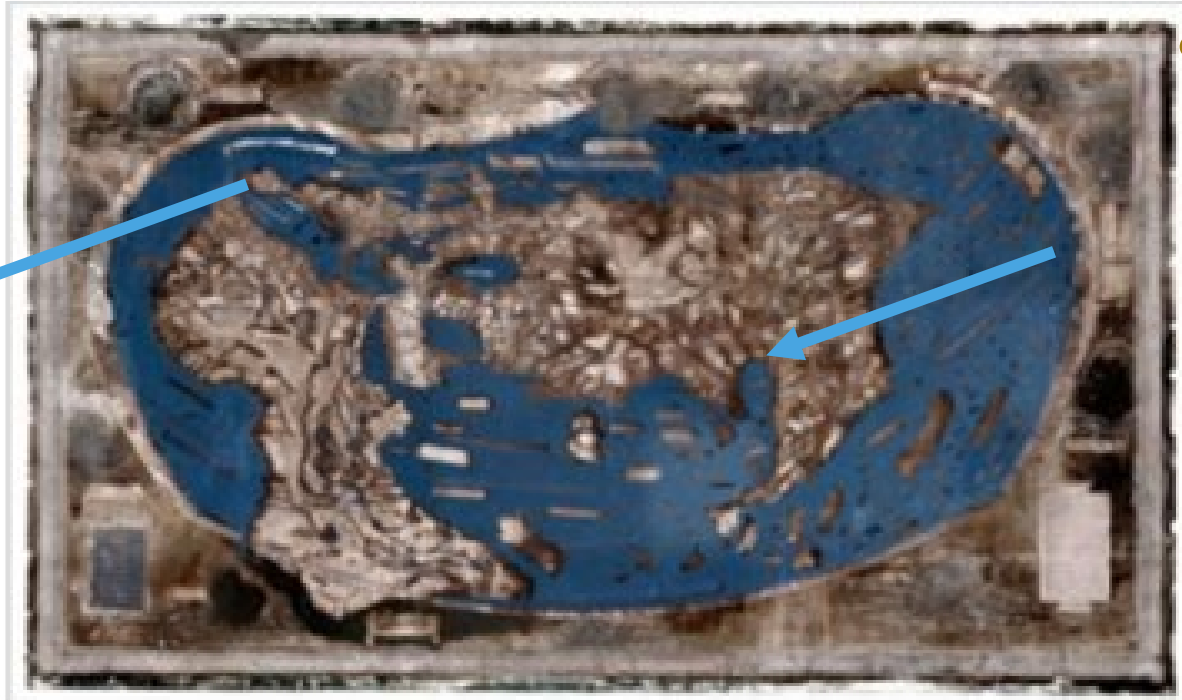
**CARBON  
ACTION**  
STN MULTA

# Two kinds of systems in the world...

- Footballs: "What happens if I kick that ball?" (Relatively easy to predict using basic natural laws.)
- Rhinos: "What happens if I try to steal that rhino's food?"



# Farming systems are "rhinos", better prepare for surprises.



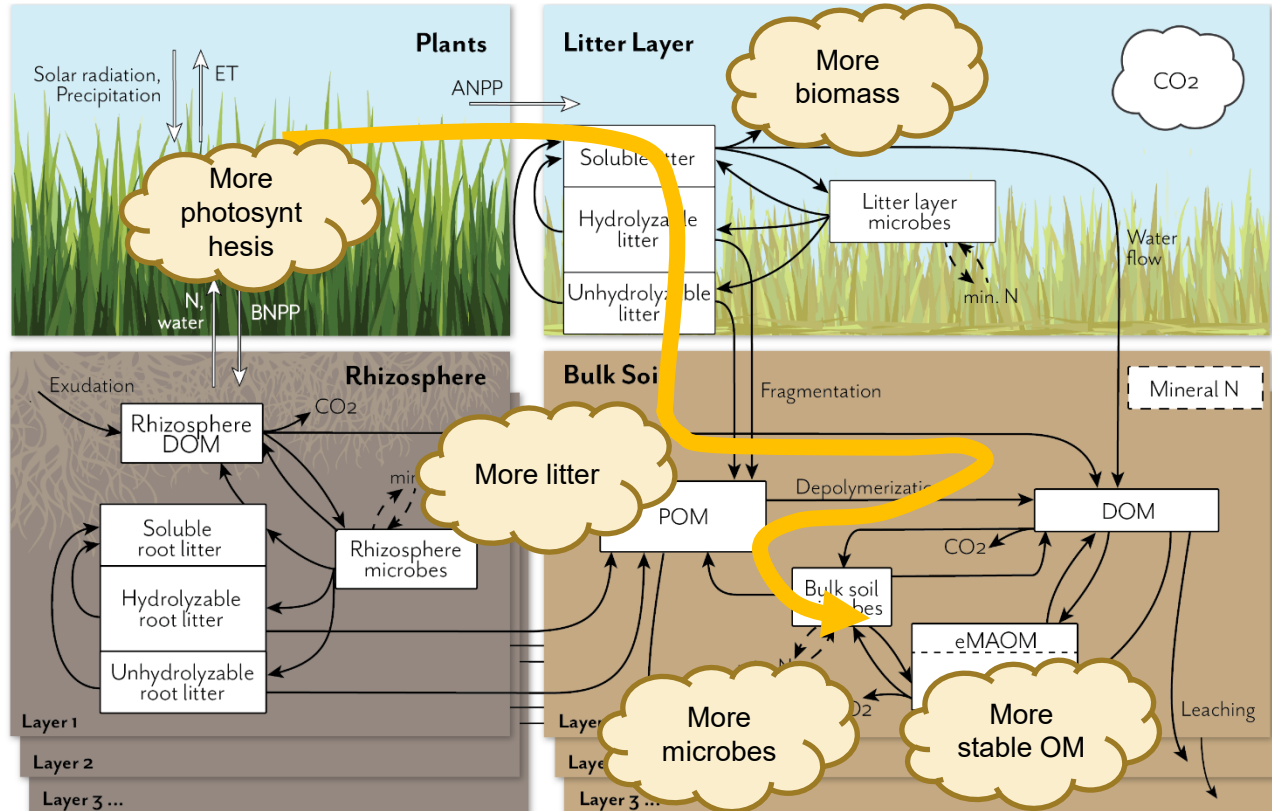
- World map of Columbus, c.a. 1491



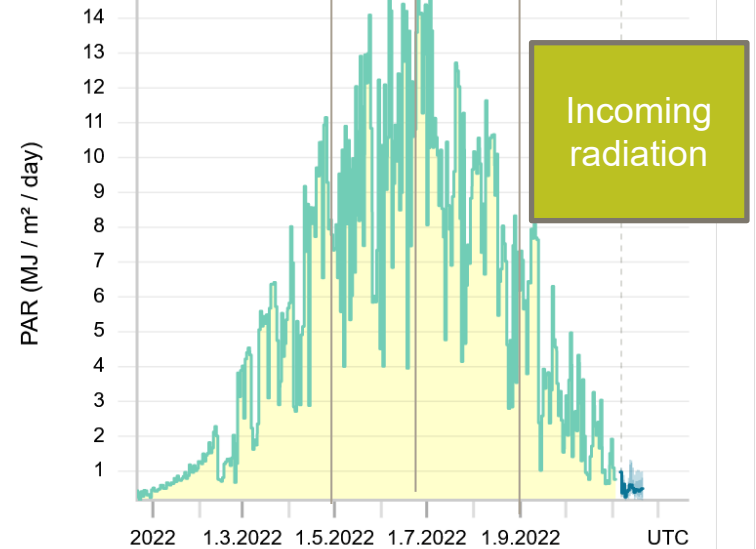
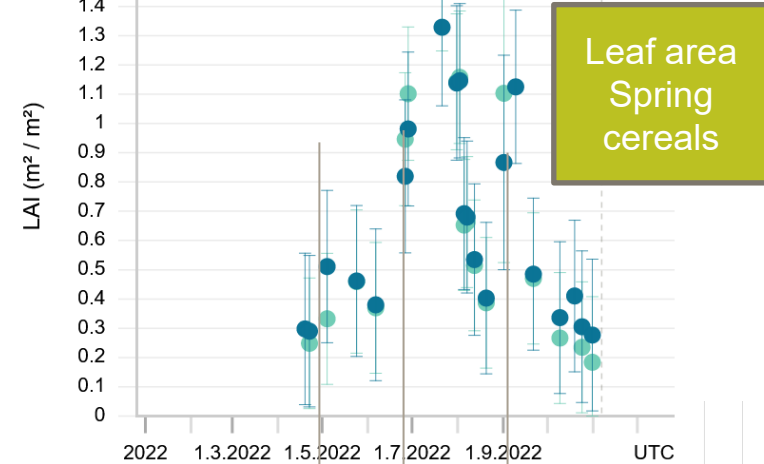
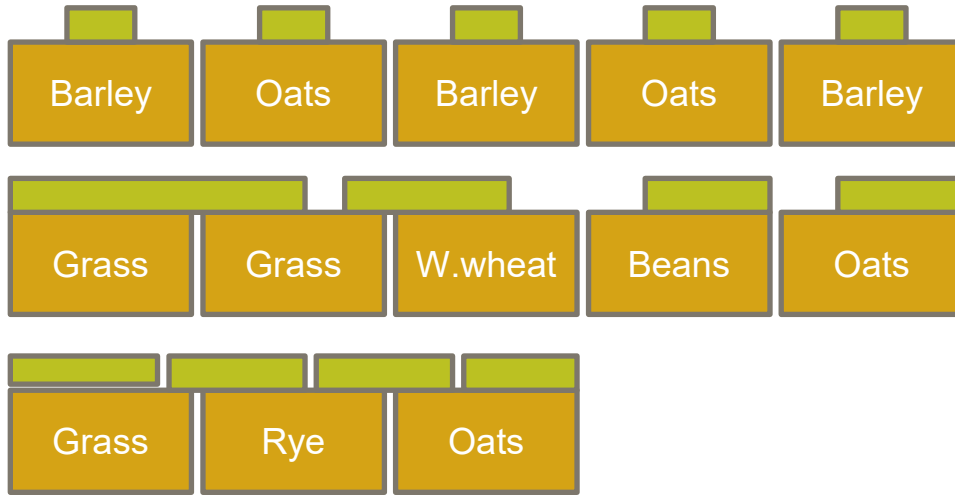
SYKE

Image by Lazarus Project / MegaVision / RIT / EMEL, courtesy of the Beinecke Rare Book and Manuscript Library,  
Developed by Ben Albritton & Jack Reed

# What kind of a rhino do we have? How do we get to India?



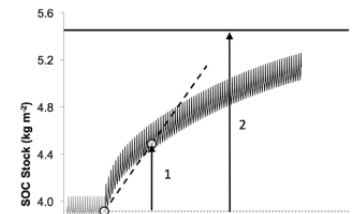
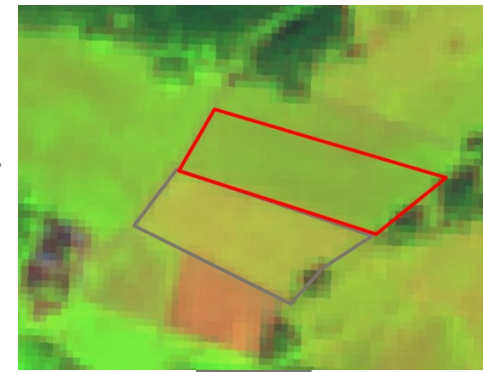
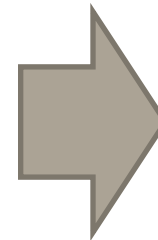
# More green cover



# Carbon action -platform

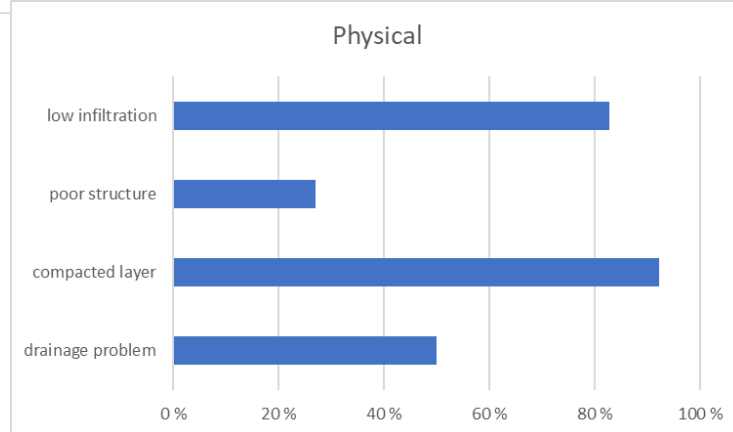
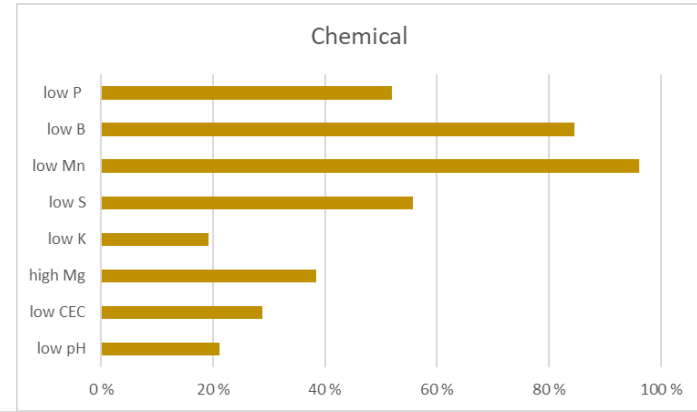
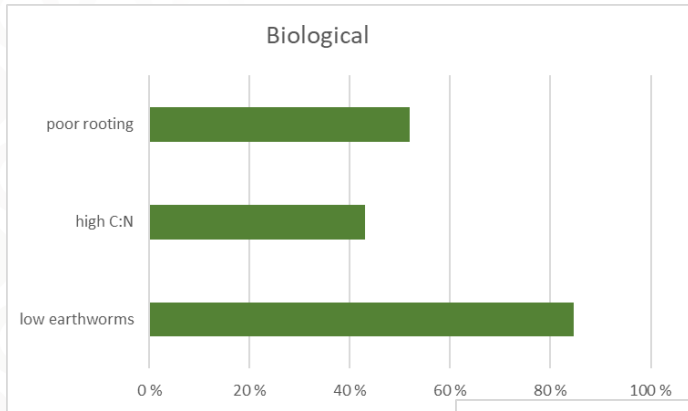
- Cover crops
- Diverse grass leys
- Subsoiling
- Soil amendments
- Adaptive planned grazing
- "All-in"
- (Agroforestry)

210 plots  
= each has a management plan



20 intensive sites  
3-4 flux meas. sites

# Surprise nr 1: Soils are not in a good shape



Fraction of fields with observed problems:  
Nutrient deficiencies, drainage, loss of earthworms

# Structural problems influence plants

Multi-species grass  
dominated by 2  
species



Low % of soil profile  
utilized by roots



Strong growth only  
on drainage lines

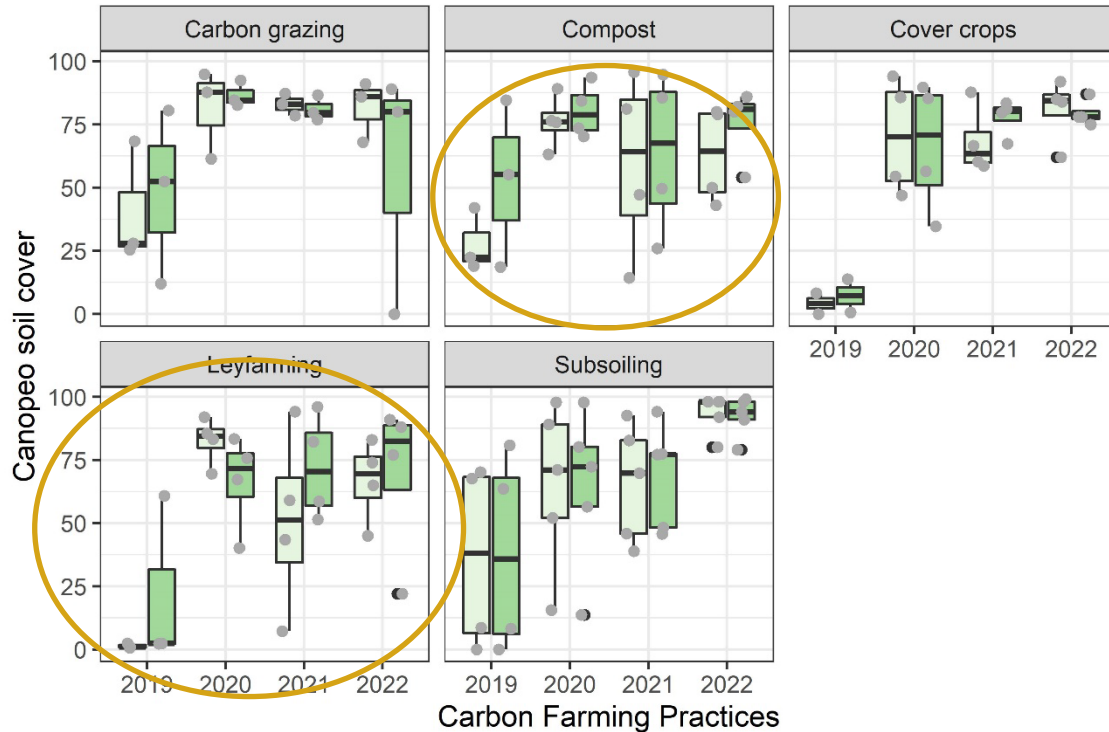
Tillage pan at 6 cm  
depth.





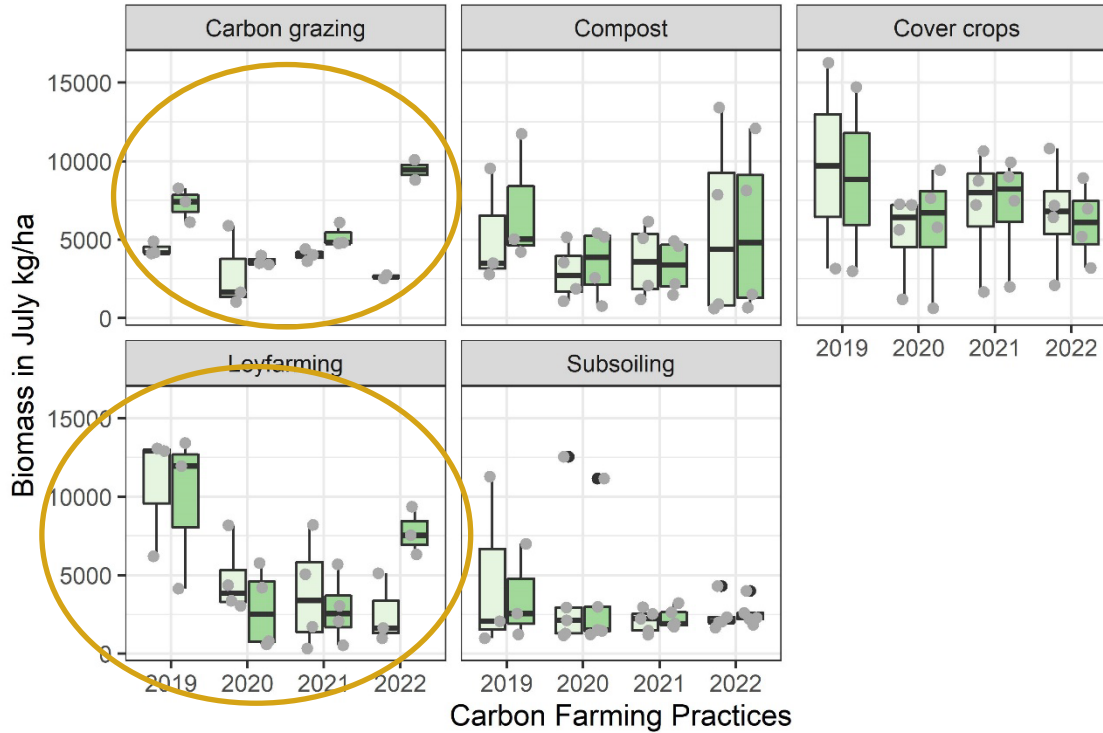
# What carbon farming influences? 20 farms, 4 years.

More photosynthesis



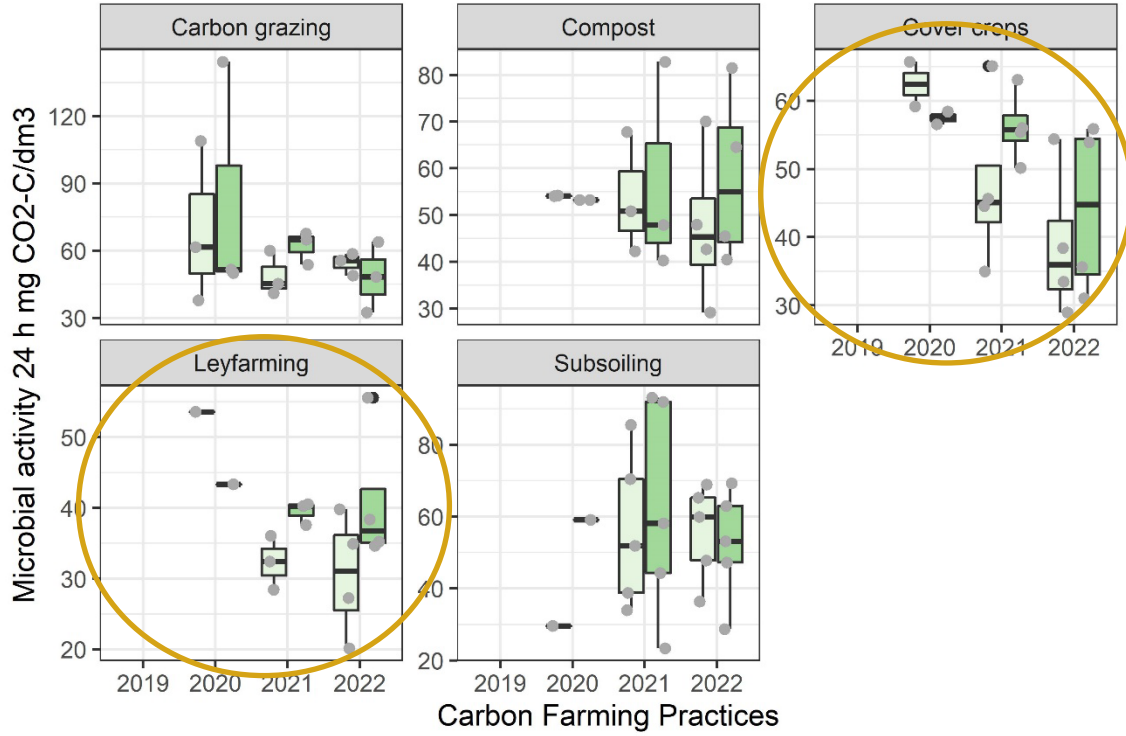
# More biomass: "Soil armor"

More biomass



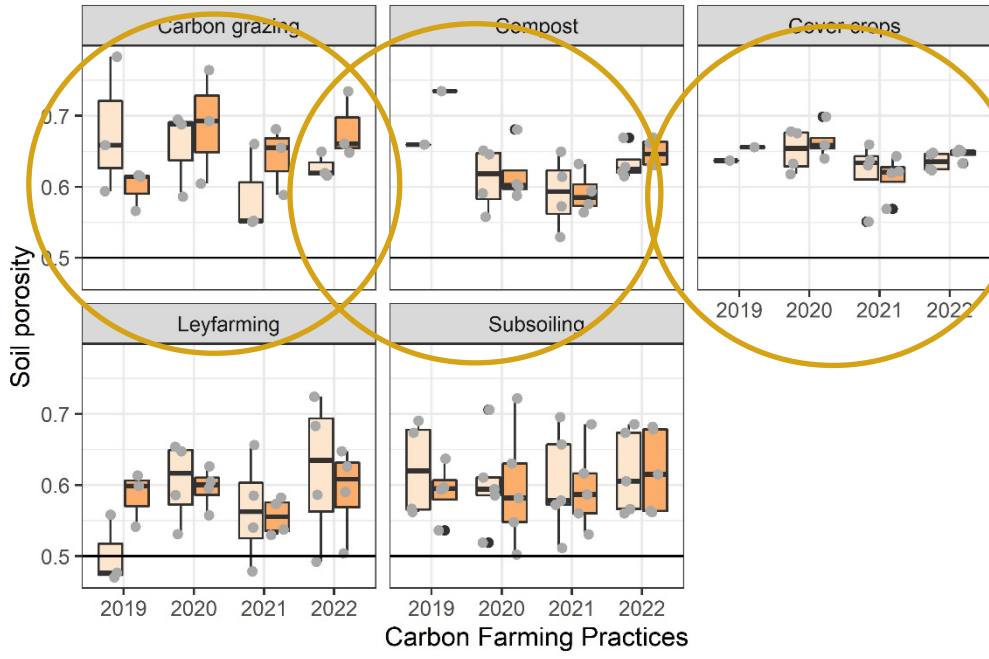
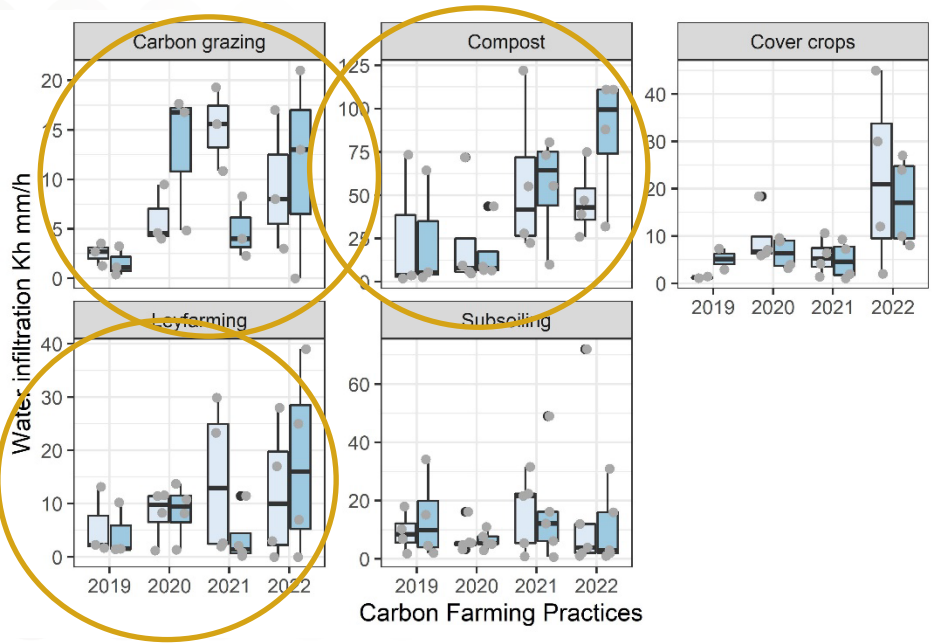
# Higher microbial activity, more N for plants?

More microbes



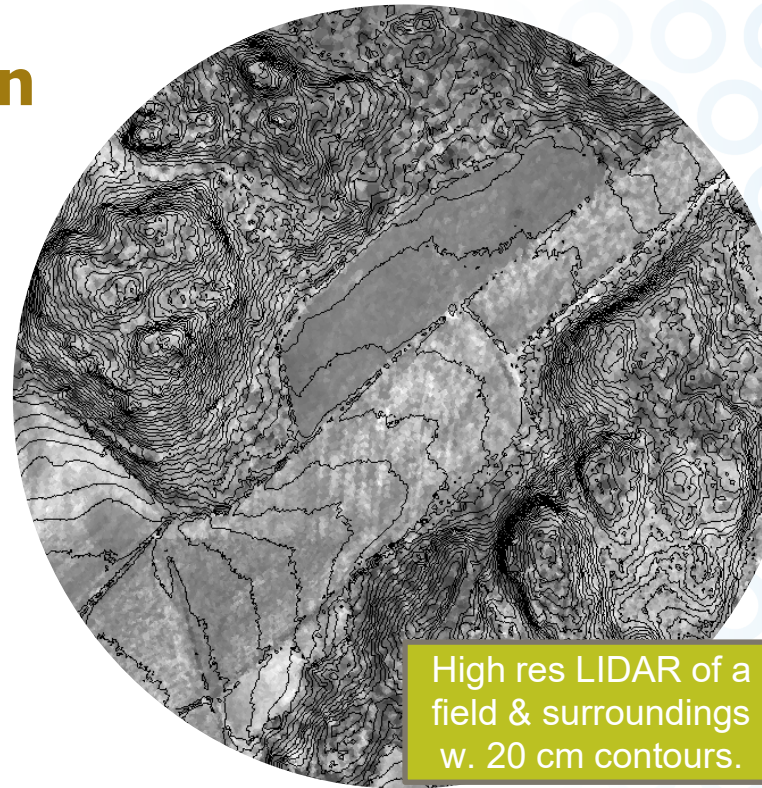
# Higher water holding capacity & infiltration

Better soil structure



# Overall: the map is not the terrain

- Carbon farming can:
  - Help store more water
  - Increase N supply from soil
  - Reduce erosion
- ... but it also limited by
  - Structural problems
  - Nutrient limitations
  - Farming practices & farm system level
- Working around these is why it is called carbon FARMING



**More info... to come over  
winter 2022-2023.**

<http://www.fieldobservatory.org>

