

NORSØK

Norwegian Centre for Organic Agriculture

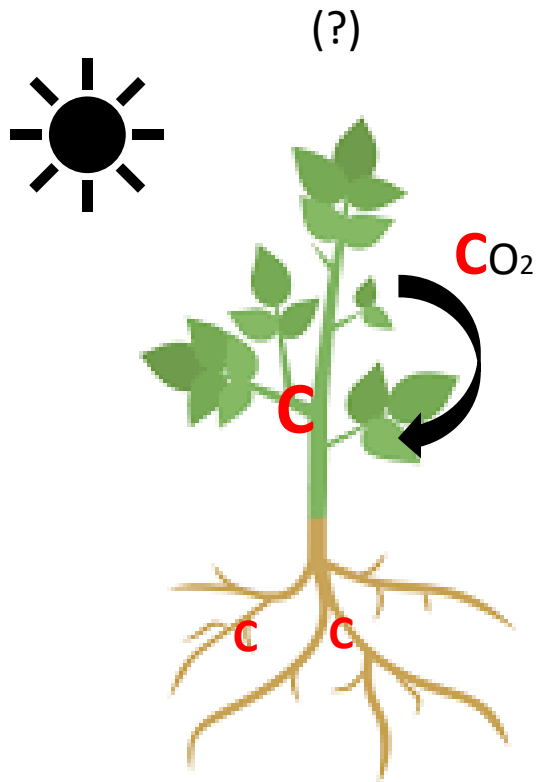


Karbon i jord

Tatiana Rittl, mange mange mange andre

Carbon sequestration, storage and persistence

Soil C sequestration



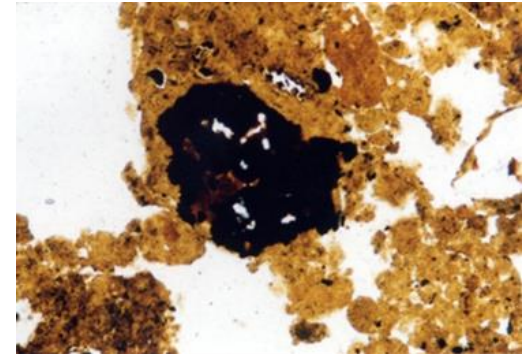
Soil C storage



Soil C persistence

(> 100 years)

(?)



Microaggregate

Hva vi har gjort?

- Mermold
- Capture
- K-BEP
- Soileffects
- CarouND



MerMold



Undersøke hvordan **ulike typer organisk materiale** påvirker jord C lagring



MerMold : Ulike typer organisk materiale

Tilført organisk materiale i 2019

Fast råtnerest



Hestegjødsel



Biokull fuktet med flytende råtnerest

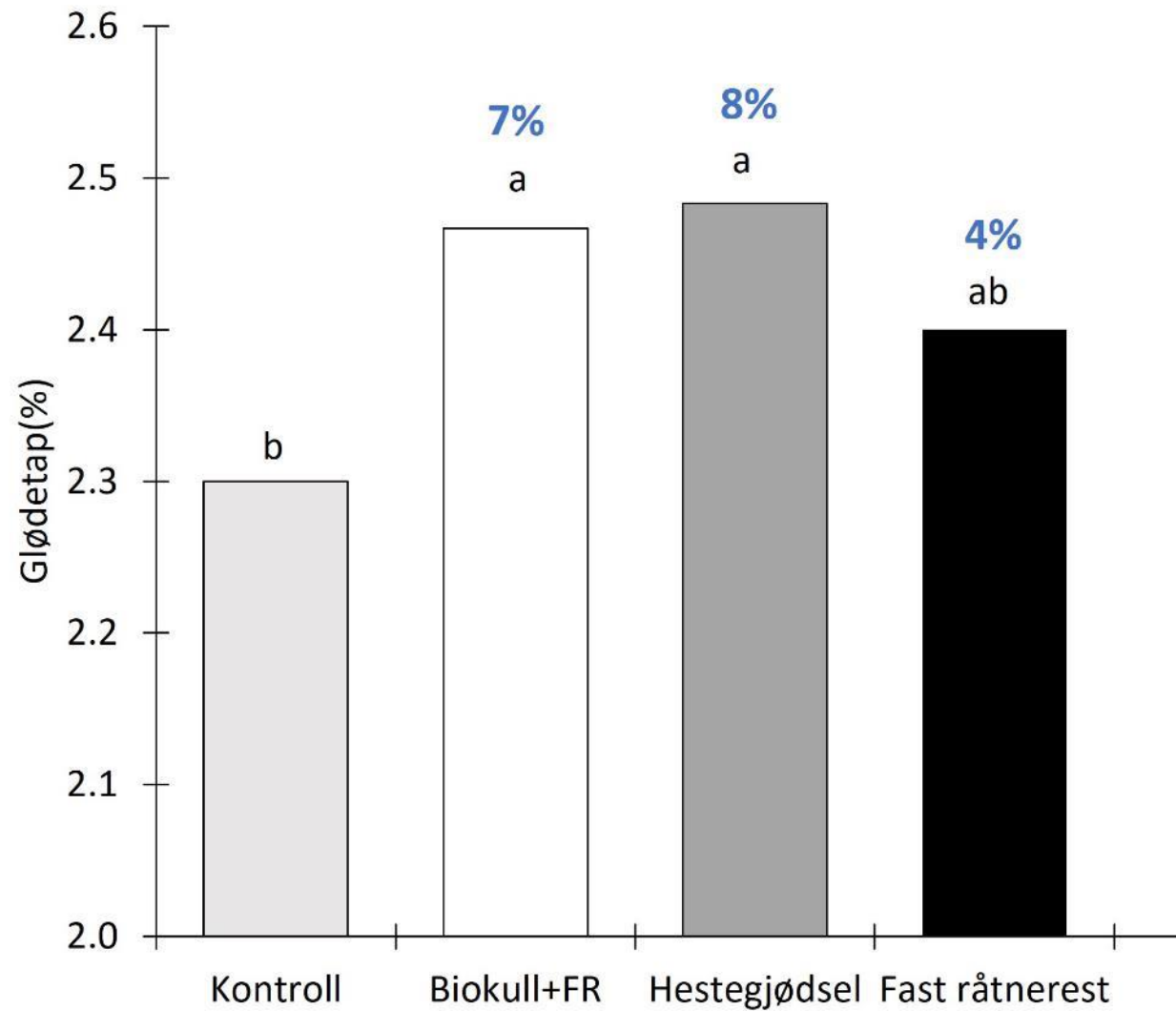


2019



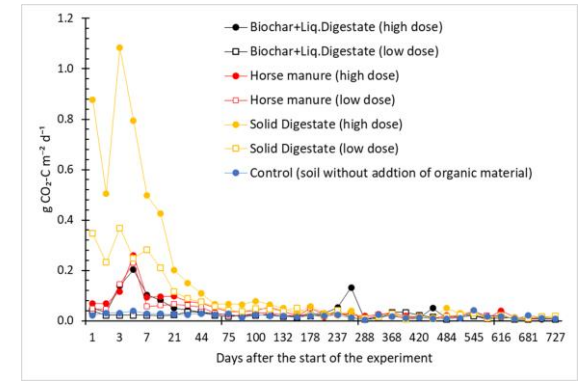
Moldinnhold i 2021

Feltforsøk



Potensialet for karbonlagring

Laboratorieforsøket



| Organisk materiale | Maksimum tid i jord (år) |
|--------------------|--------------------------|
|--------------------|--------------------------|

| | |
|------------|----|
| Biokull+FR | 32 |
|------------|----|

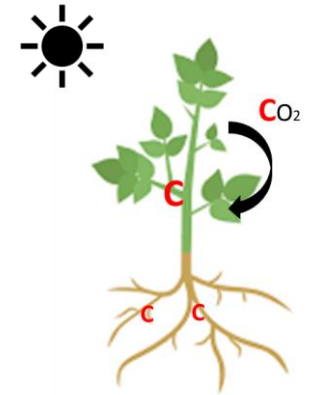
| | |
|--------------|---|
| Hestegjødsel | 8 |
|--------------|---|



| | |
|----------------|---|
| Fast råtnerest | 3 |
|----------------|---|



CAPTURE: fangvekster i korn produksjon



Fangvekster til jordkarbon

Summer vetch



I. Ryegrass



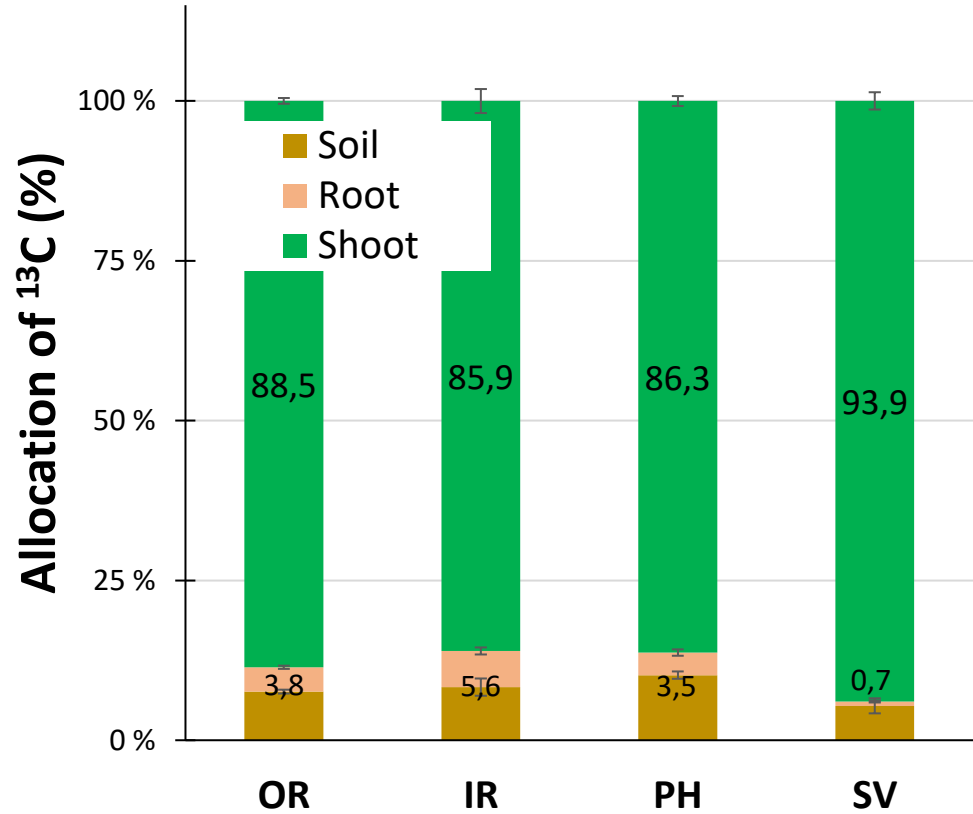
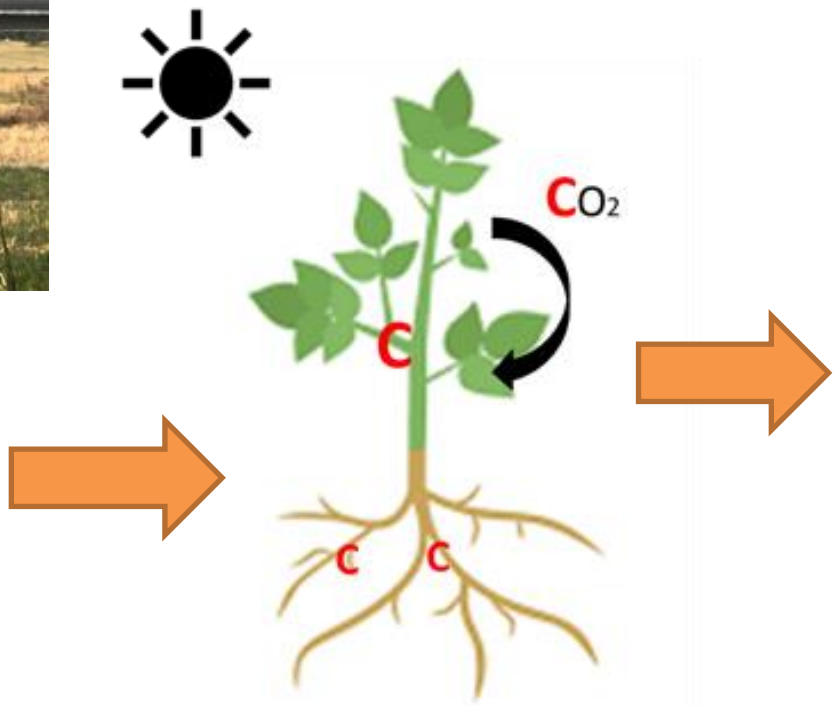
Phaselia



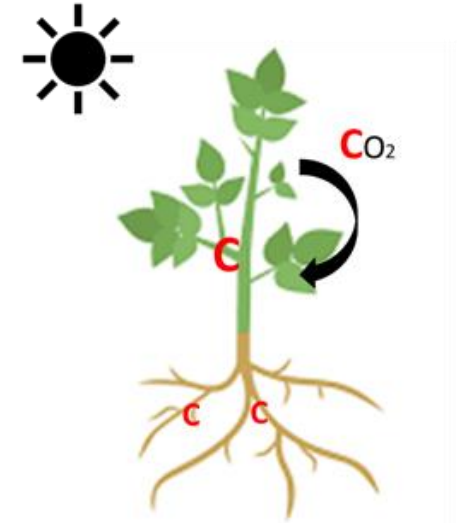
O. radish



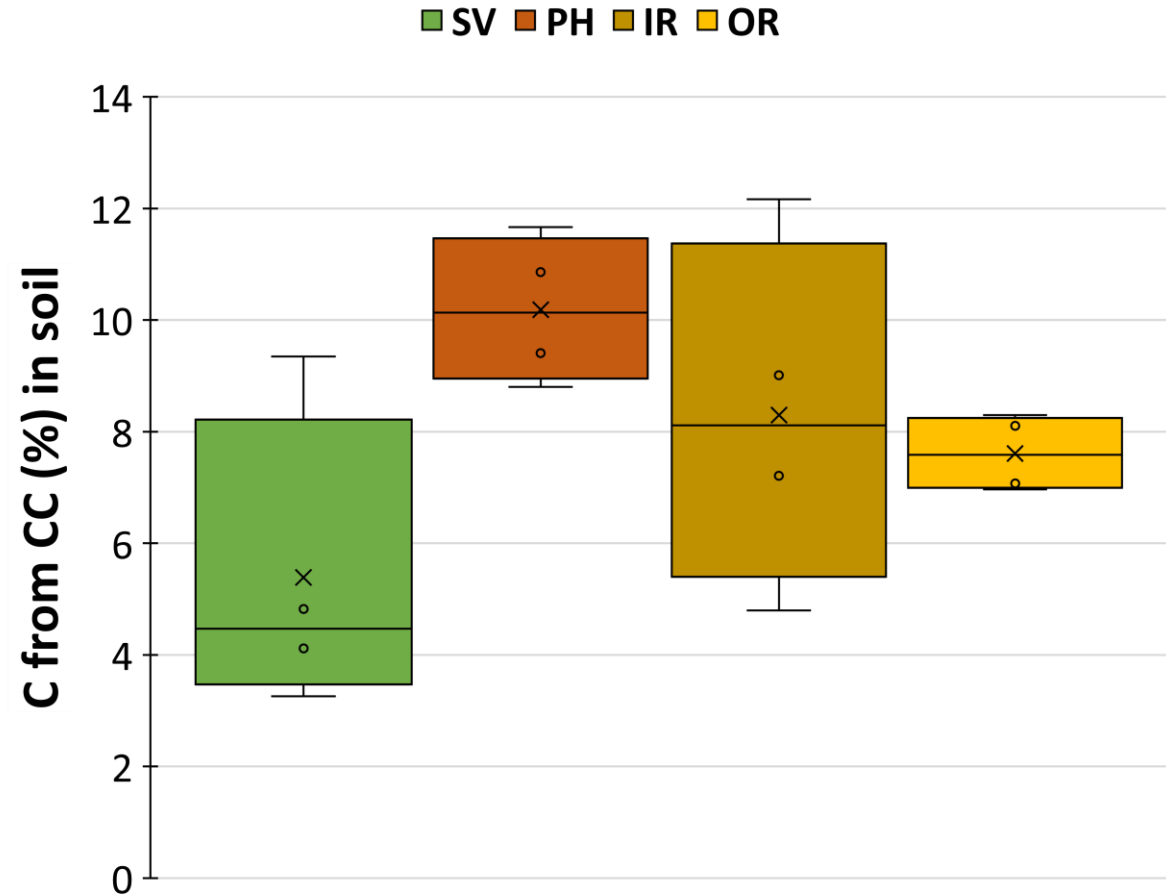
CAPTURE: Fangvekster til jordkarbon



CAPTURE: Fangvekster til jordkarbon



Resultater fra september 2021



CAPTURE: Persistence C in soil (2022, 2023,)

Jordfraksjoner

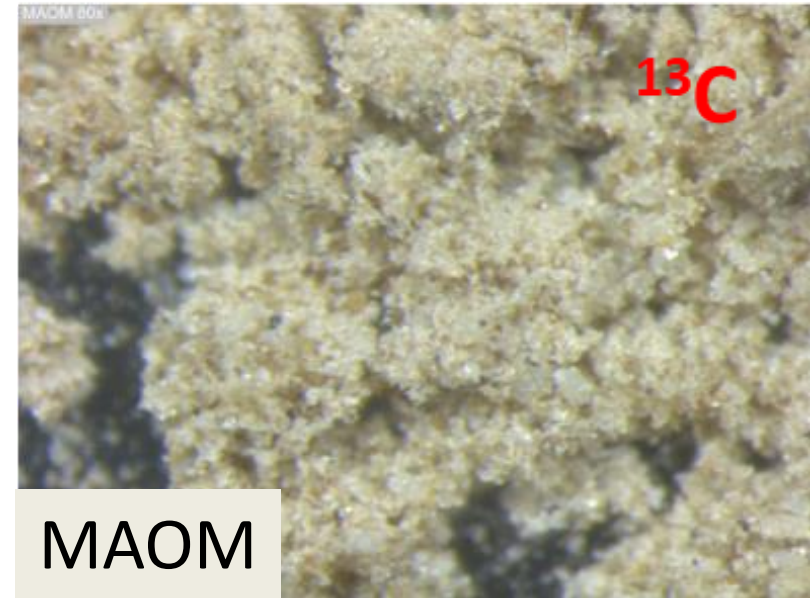
Jordhelse



POM

POM: Particulate Organic Matter

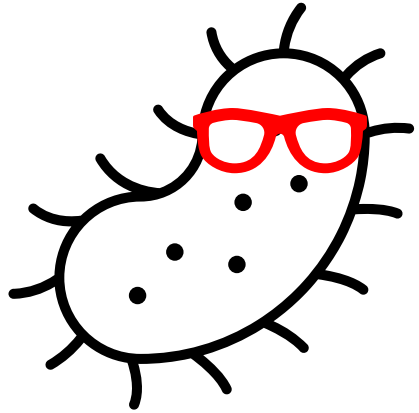
C-lagring



MAOM

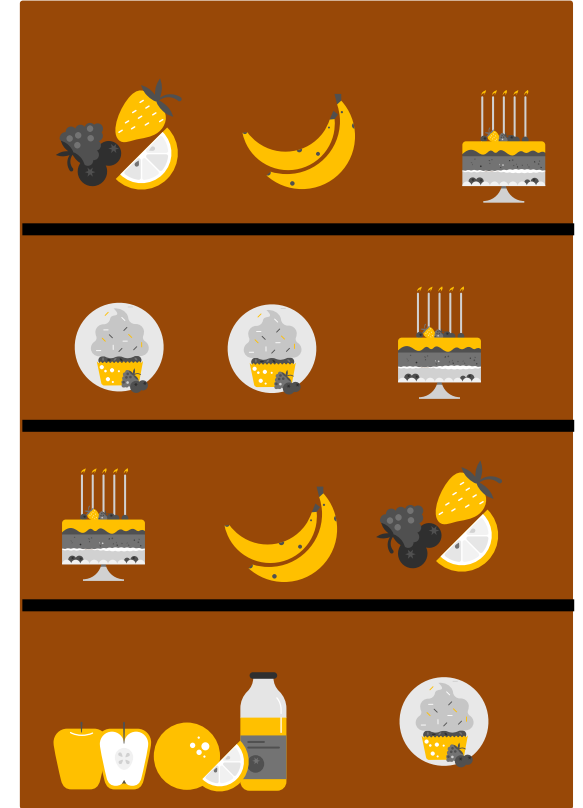
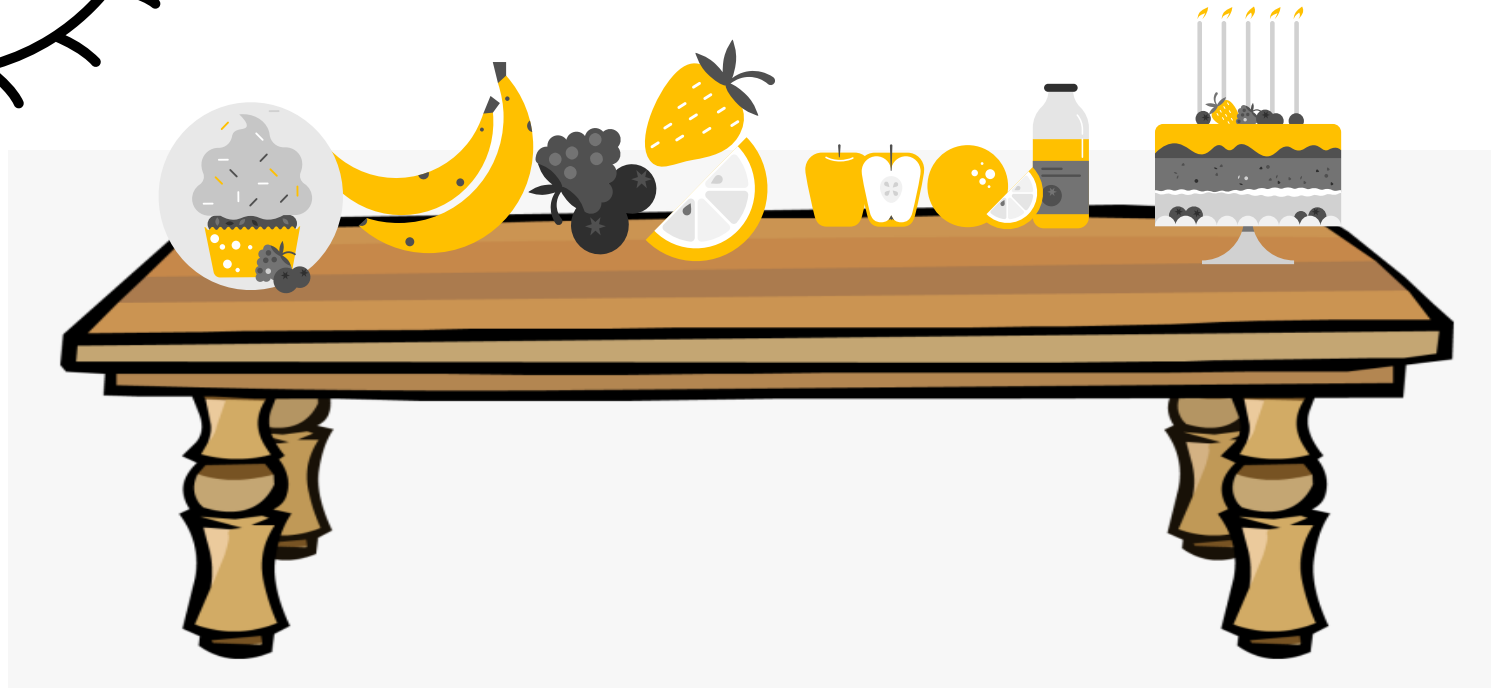
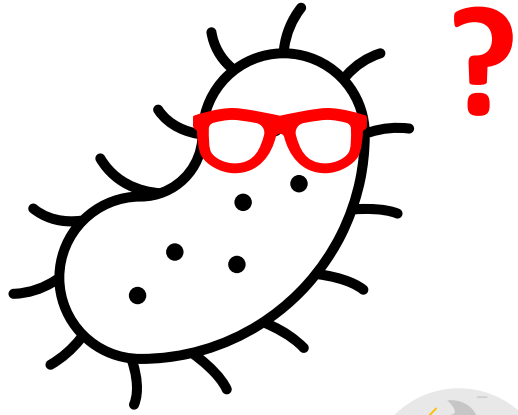
MAOM: Mineral-Associated Organic Matter

Jordfraksjoner

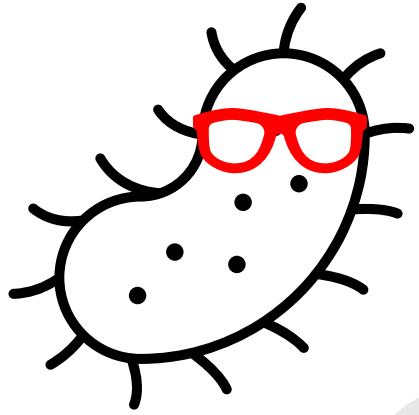


Jord mikrobe

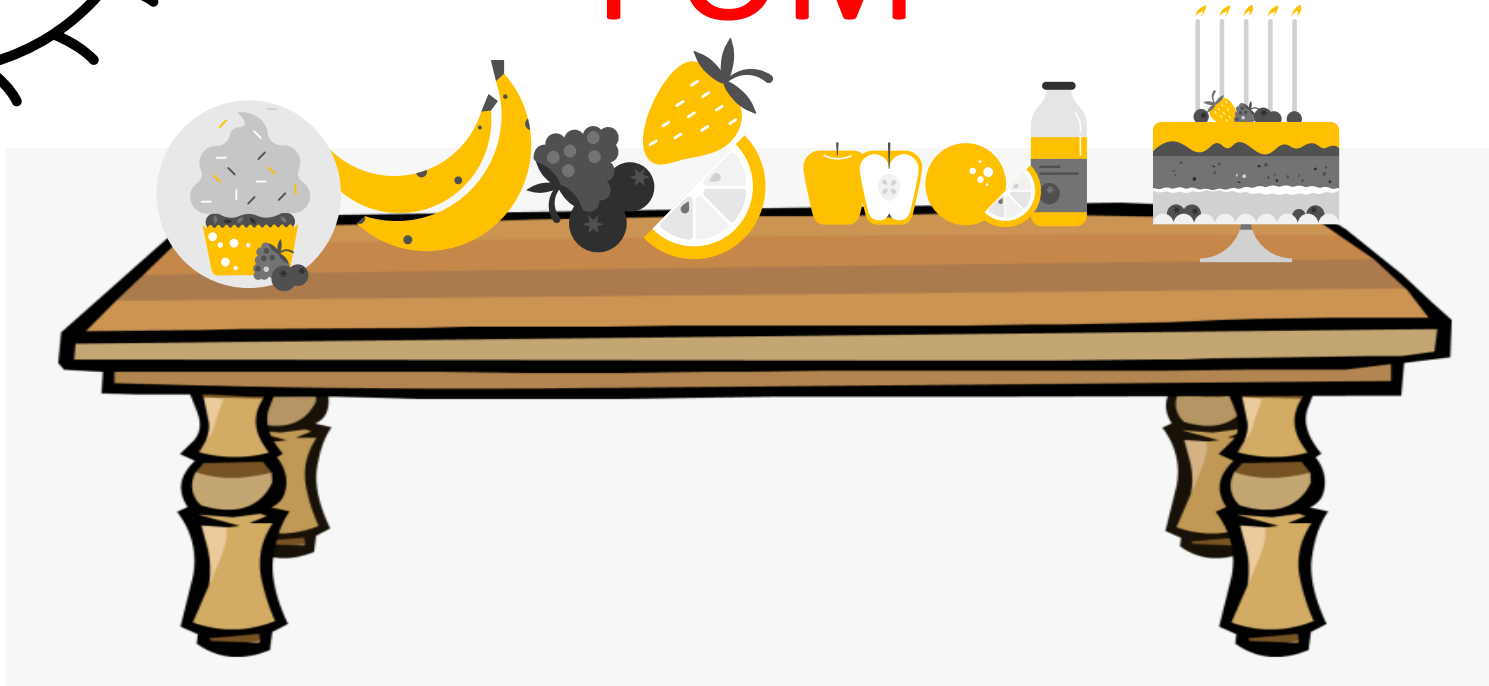
Jordfraksjoner



Jordfraksjoner



POM

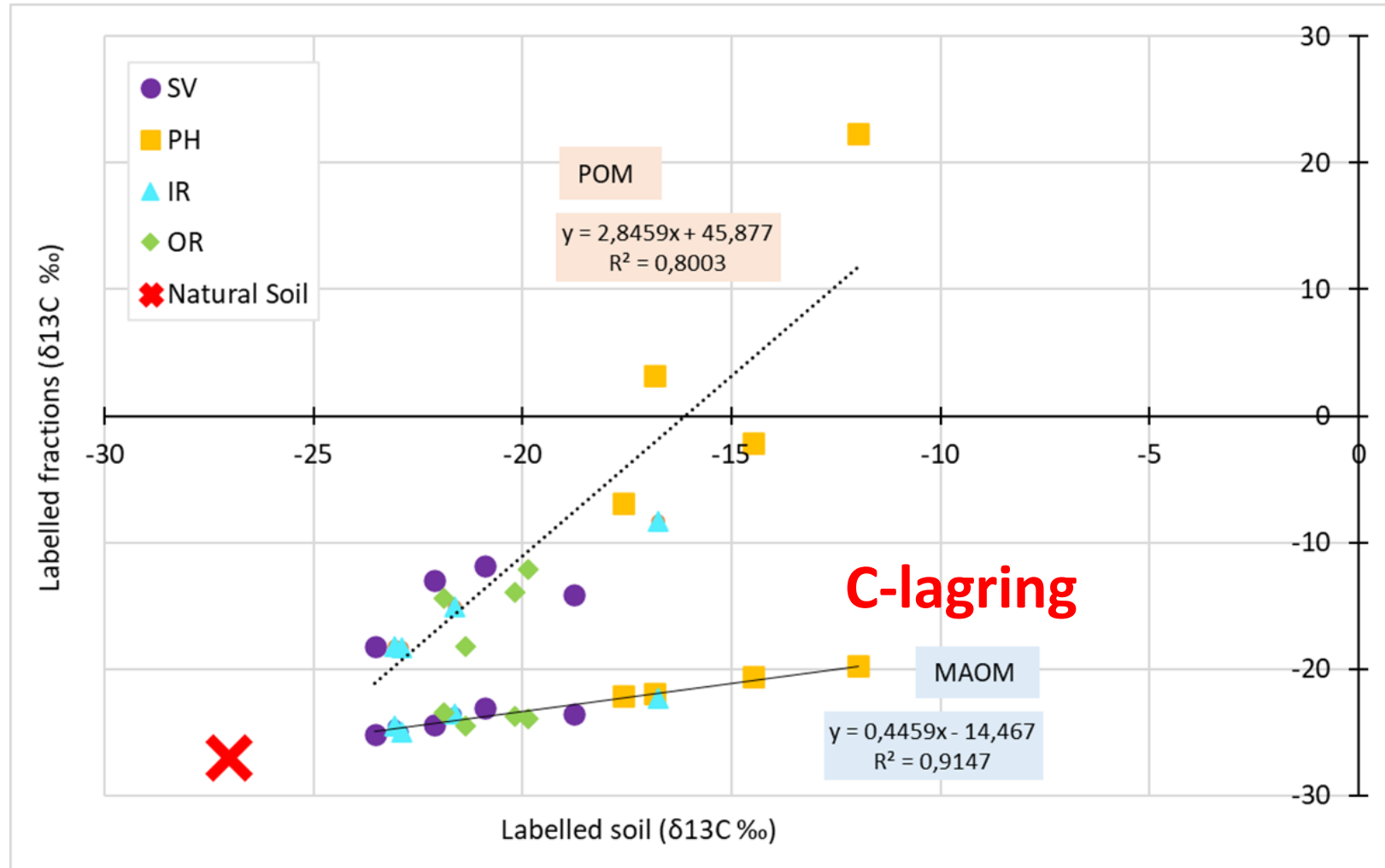
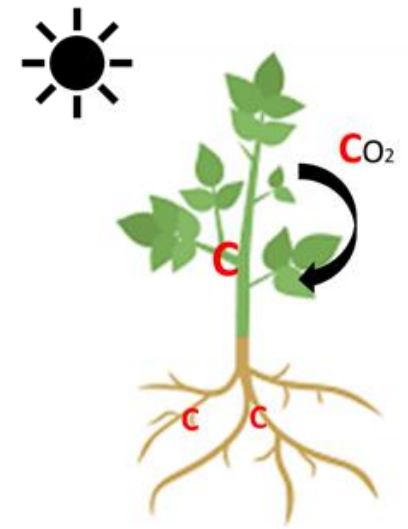


MAOM

C-lagring



Jordfraksjoner: ^{13}C i 2021



Tingvoll gard og SoilEffects: Lenge tid feltforsøk

Tingvoll gard (1990 -)

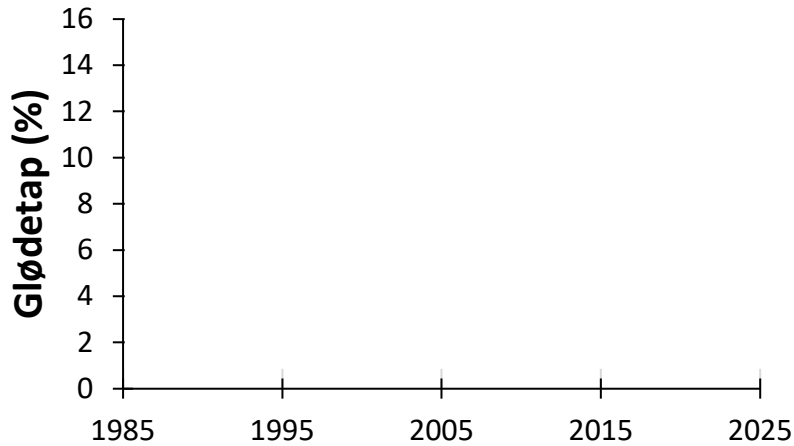


Soil effects feltforsøk (2011 -)



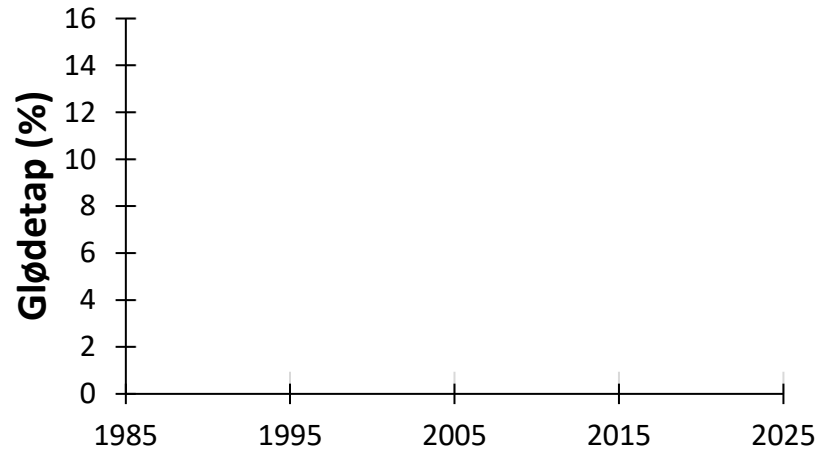
Tingvoll gard – økologisk melk gard

Veldig Høy

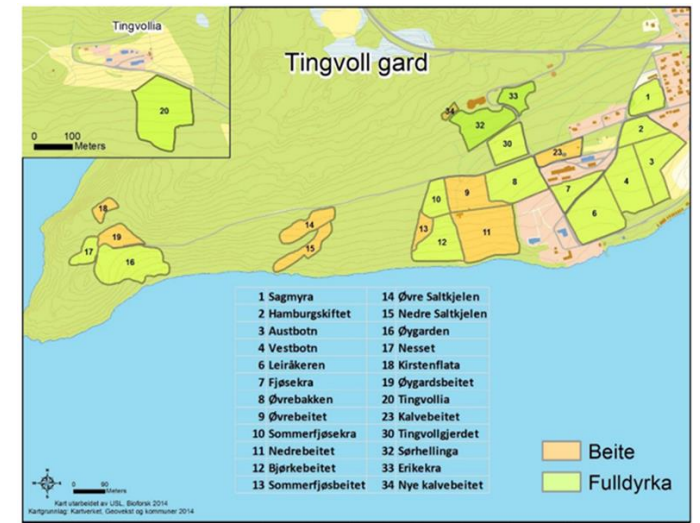
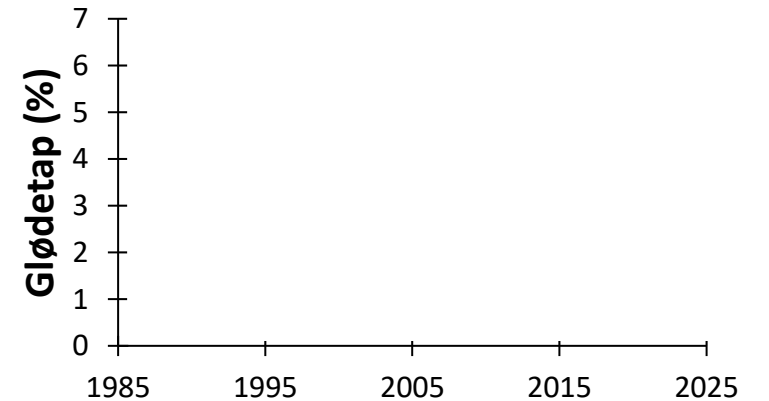


Veldig høy: GL >12%
 Høy: 6 < GL < 12%
 Lav: < 6%

Høy

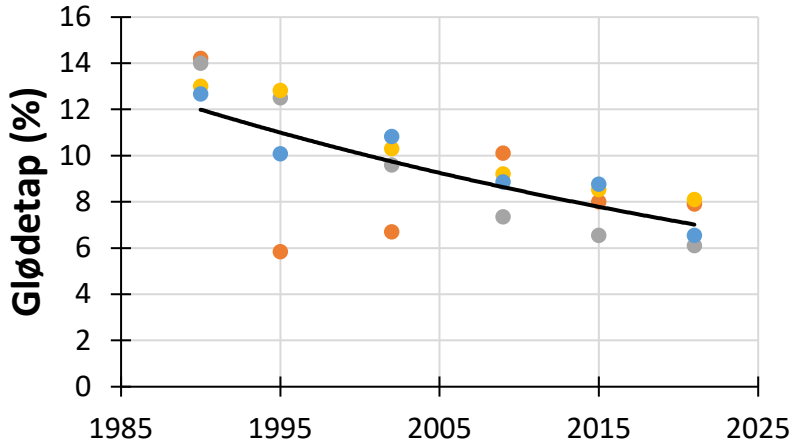


Lav



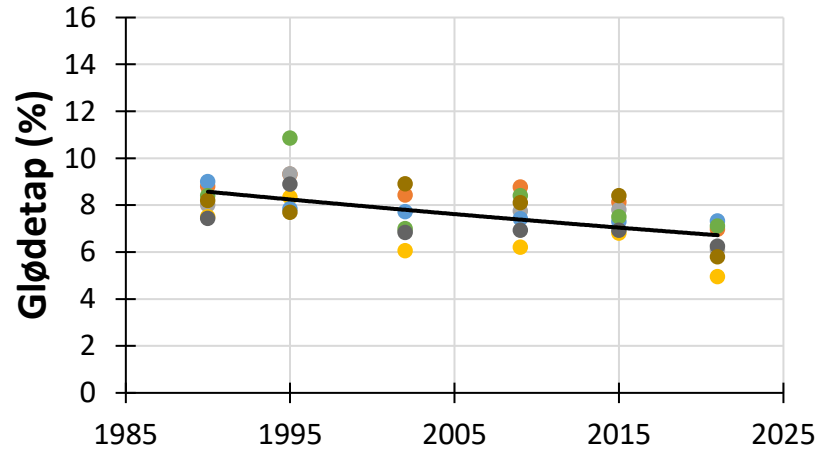
Tingvoll gard – økologisk melk gard

Veldig Høy

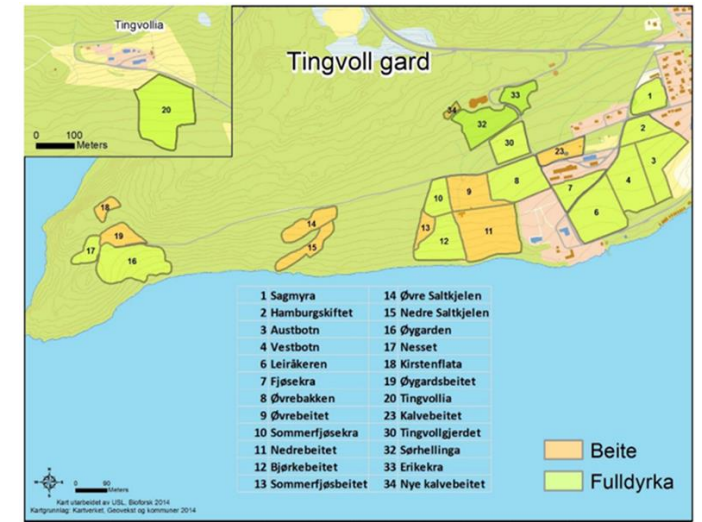
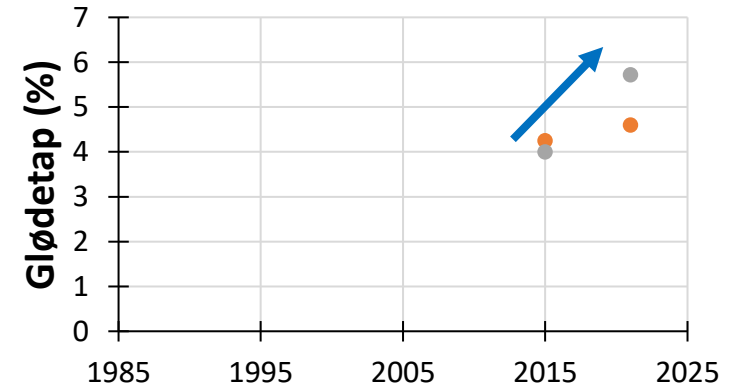


Veldig høy: SOM >12%
 Høy: 6 < SOM < 12%
 Lav: < 6%

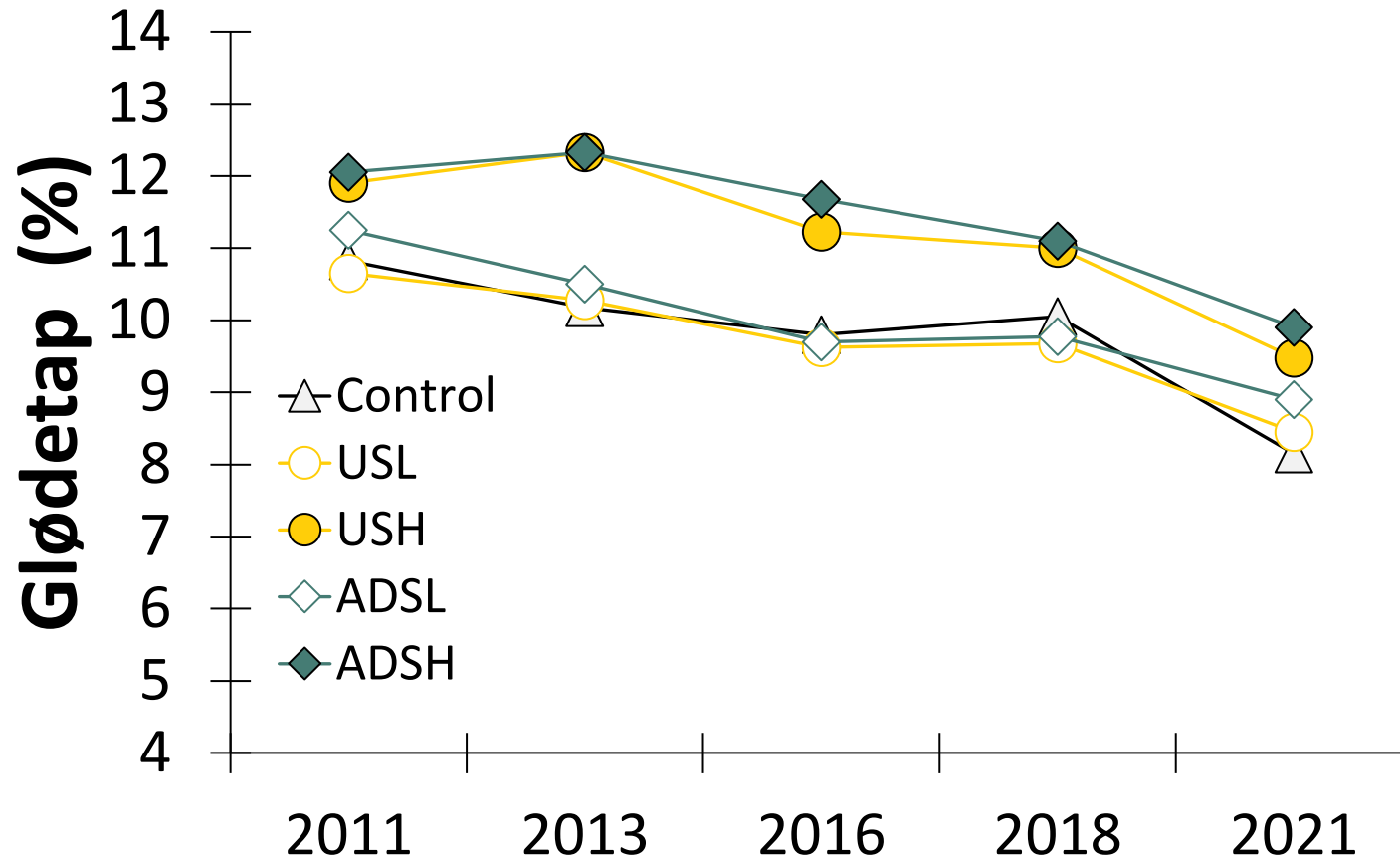
Høy



Lav



Soil Effects feltforsøk



Untreated Slurry (US)



Anaerobically Digested Slurry (ADS)



Lav C i jord:

Apelsvoll : **2-3 % SOC**

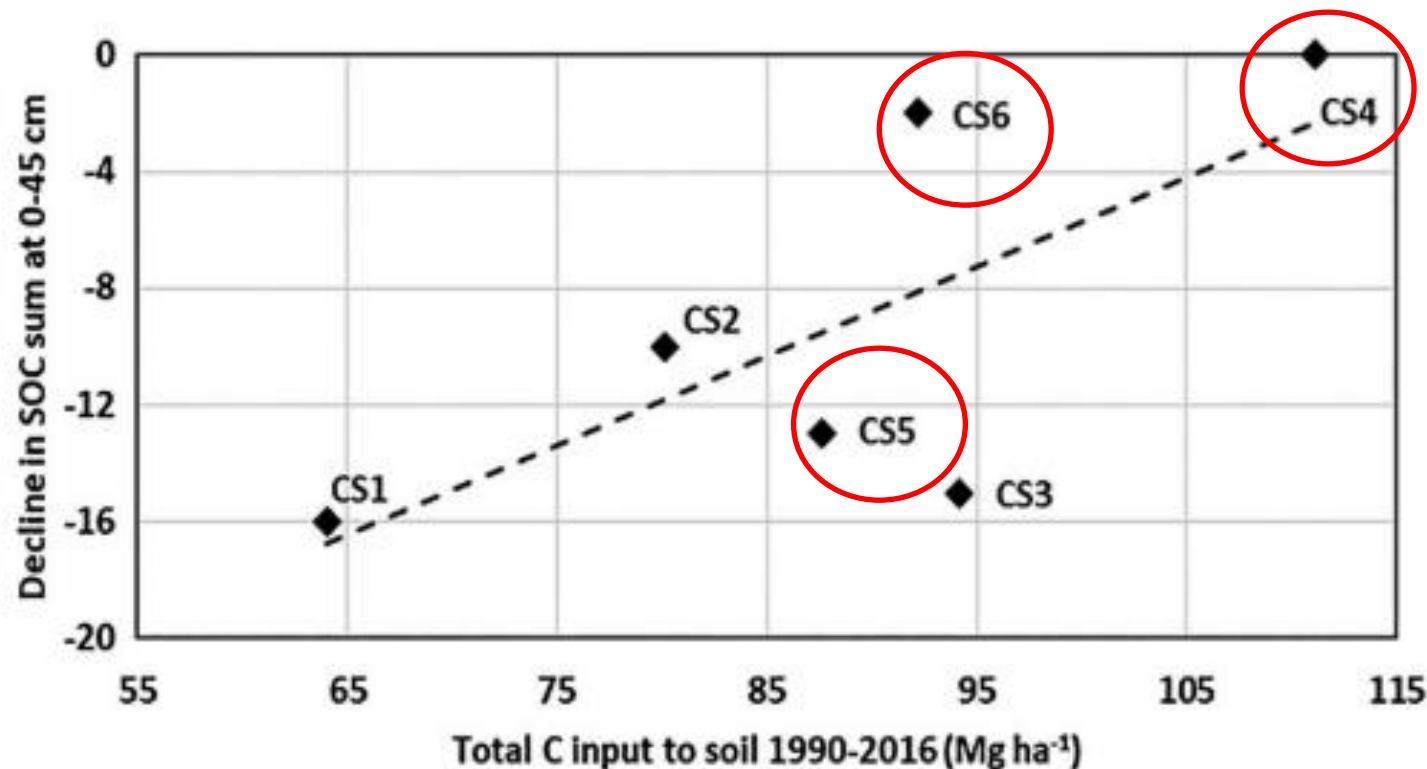


Table 1. Main management features of the six cropping systems (CS1–CS6).

| System name | Crop rotation | Tillage (arable) | Slurry use | Mineral fertiliser | Straw removal | Catch crops | |
|-------------|---------------------|------------------------------|---------------|--------------------|---------------|-------------|-----|
| CS1 | Reference arable | Wheat, oats, barley, potato | Autumn plough | None | Yes NPK | Yes | No |
| CS2 | Optimised arable | Wheat, oats, barley, potato | Spring harrow | None | Yes NPK | No | Yes |
| CS3 | Organic arable | Wheat, oats/pea, barley, ley | Spring plough | Some | None | No | Yes |
| CS4 | Optimised dairy | Wheat, barley, ley, ley | Spring plough | Annual | Yes NPK | No | Yes |
| CS5 | Organic dairy (50%) | Wheat, barley, ley, ley | Spring plough | Annual | None | No | Yes |
| CS6 | Organic dairy (75%) | Barley, ley, ley, ley | Spring plough | Annual | None | No | Yes |

C-arouNd

C-arouNd

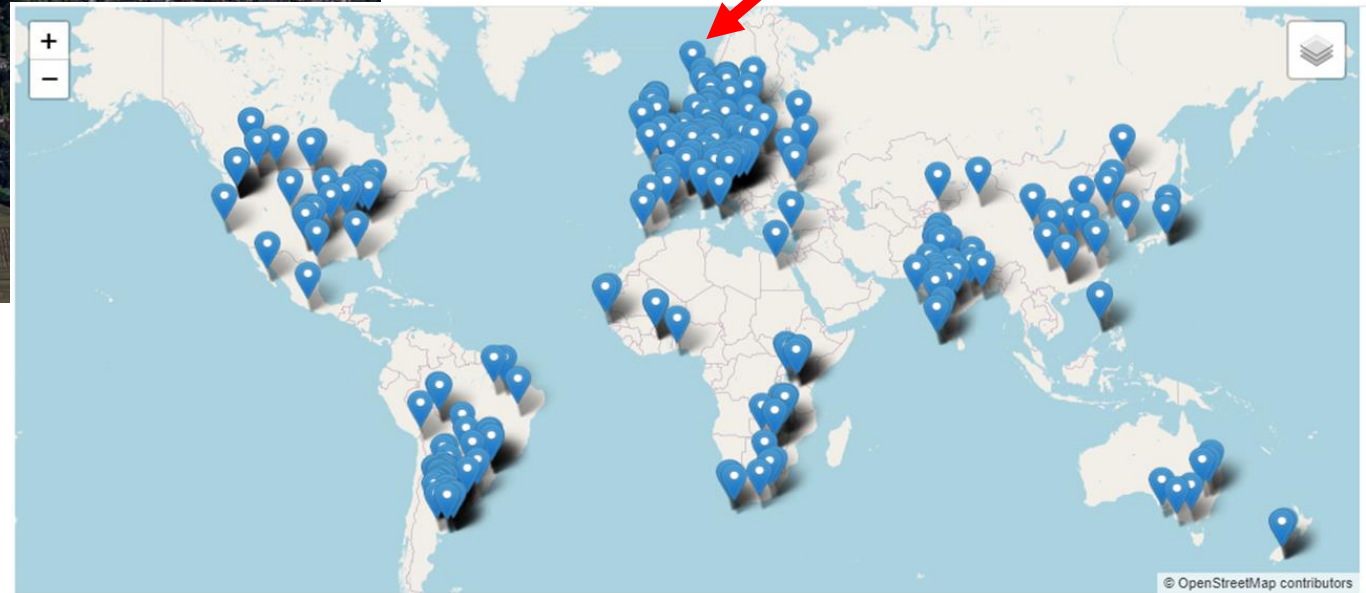


RESOURCE

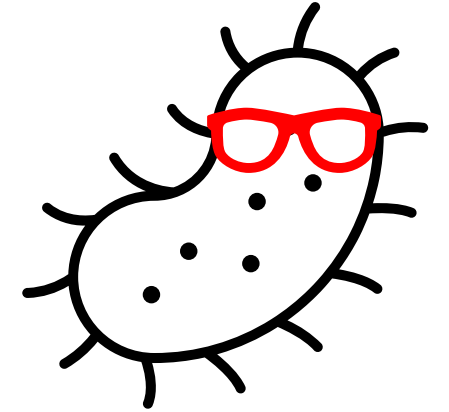
GLTEN: THE GLOBAL LONG-TERM AGRICULTURAL EXPERIMENT NETWORK

The Global Long-Term Agricultural Experiment Network (GLTEN) is a network of long-term agricultural experiments spanning five continents and representing numerous climates, environments, crop systems and farming practices.

soil effects



Hva vi lært



- Øke C-lagring i jord er ikke lette
- Initial innhold av jord karbon er viktig
- **C sequestration og persistence** er nøkkelen til klimaeffekt
- Vi trenger lang-tid C-lagring måling
- Nettverk av feltforsøkene er viktig å forstå prosessen og regionale forskjeller