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The U.S. Government's Global Hunger & Food Security Initiative

Soil ecosystem services assessment under vegetable production



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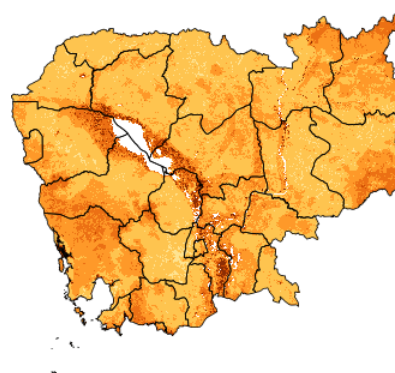
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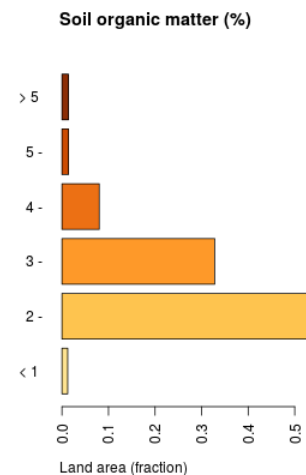
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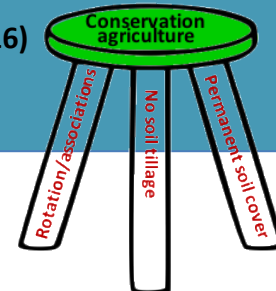
Introduction

- Vegetables are **difficult to grow** due to seasonal changes, but bring **higher price in the market**, and remain important for nutrition at home.
- Modify environment to improve drainage (**soil improvement**) and keep rain off of the plants.



SoilGrids.org





Methods

CA vs. CT: soil ecosystem service & soil health

- **CA:** Conservation Agriculture
+ Drip irrigation
 - Started in January, 2017
 - Plot size: 200 m²
 - Crop rotation + mulching
- **CT:** Conventional Tillage
 - Plough: 1 – 2 for each crop
 - Crop rotation – not always
 - No mulching

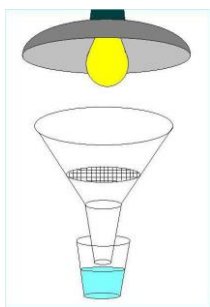




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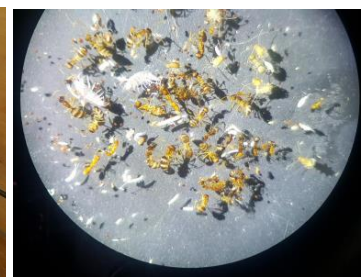
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- Soil sampling: Dec, 2017
- 10 plots: 5 CA & 5 CT
- Soil fauna: Berlese method (Berlese 1905)
- 16 plots: 8 CA & 8 CT: Soil health (Biofunctool)



Berlese funnel

Soil fauna classification: Phylum > Class > Order



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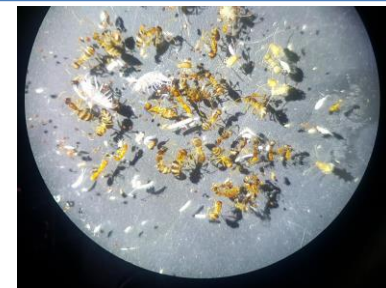
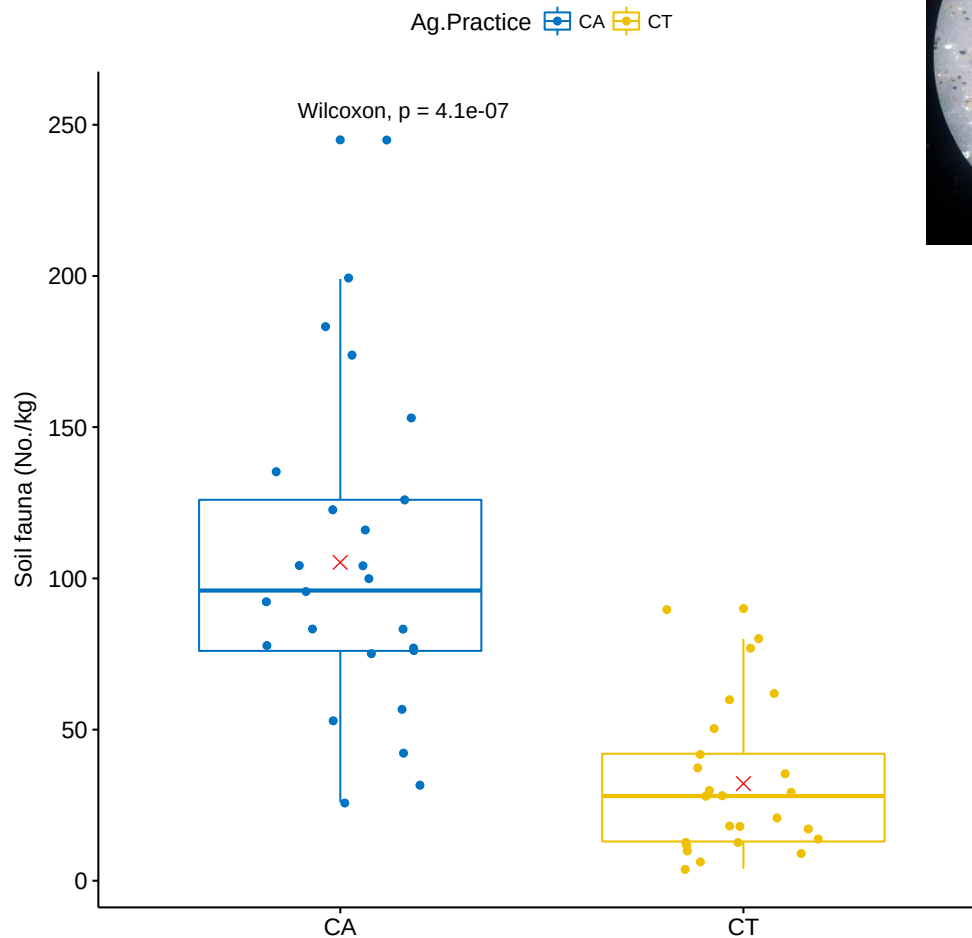


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Results

- Soil fauna:
Order level



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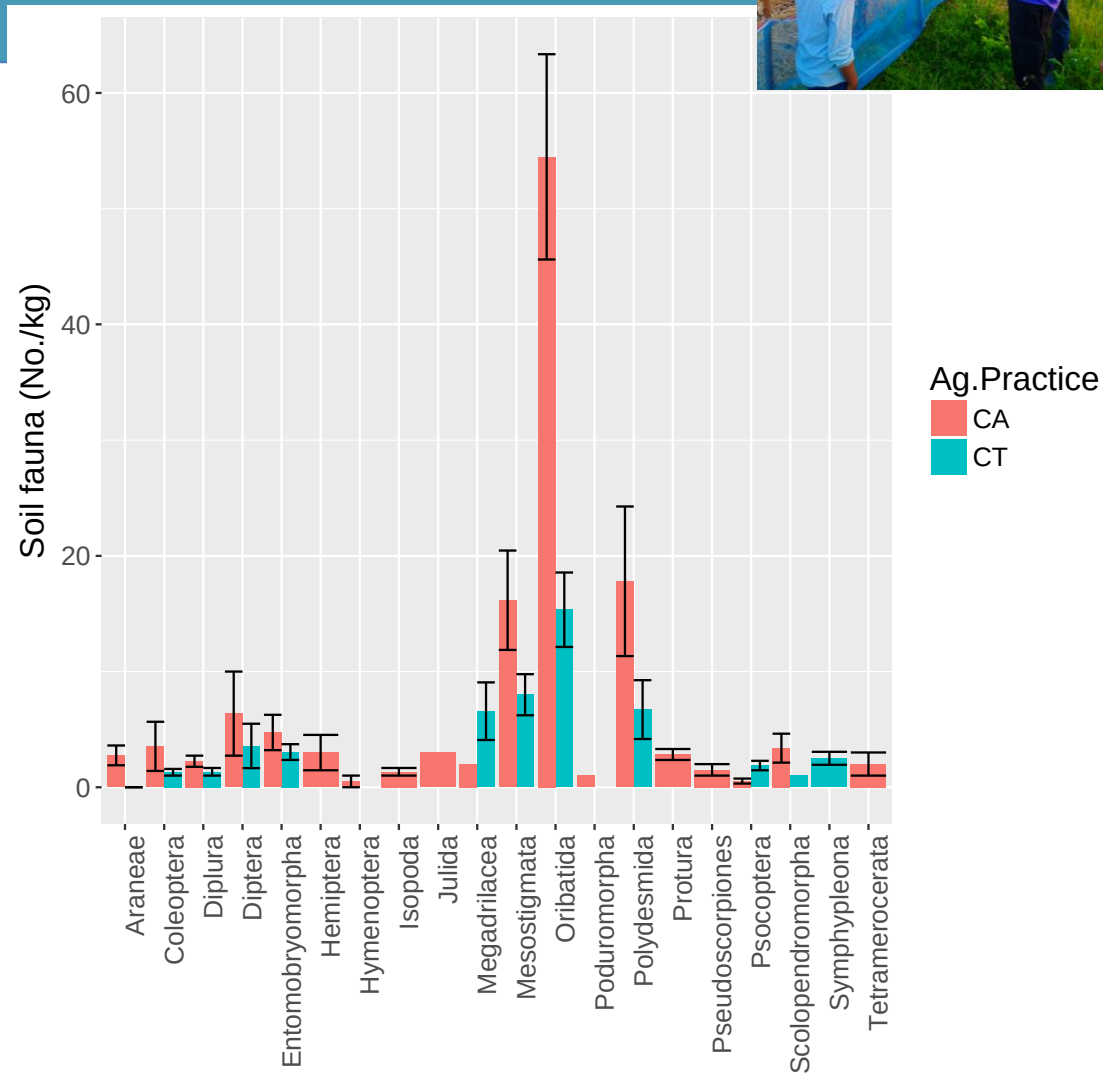


a) Abundance in CA

1. Oribatida  Mites
2. Mesostigmata  Beetle mites
3. Polydesmida  Keeled millipedes
4. Diptera  Springtails
5. Entomobryomorpha  Springtails
6. Coleoptera  Ground beetle

b) Absence in CT

1. Araneae 
2. Hemiptera 
3. Hymenoptera 
4. Isopoda 
5. Julida 
6. Poduromorpha 
7. Protura 
8. Pseudoscorpiones 
9. Tetramerocerata 



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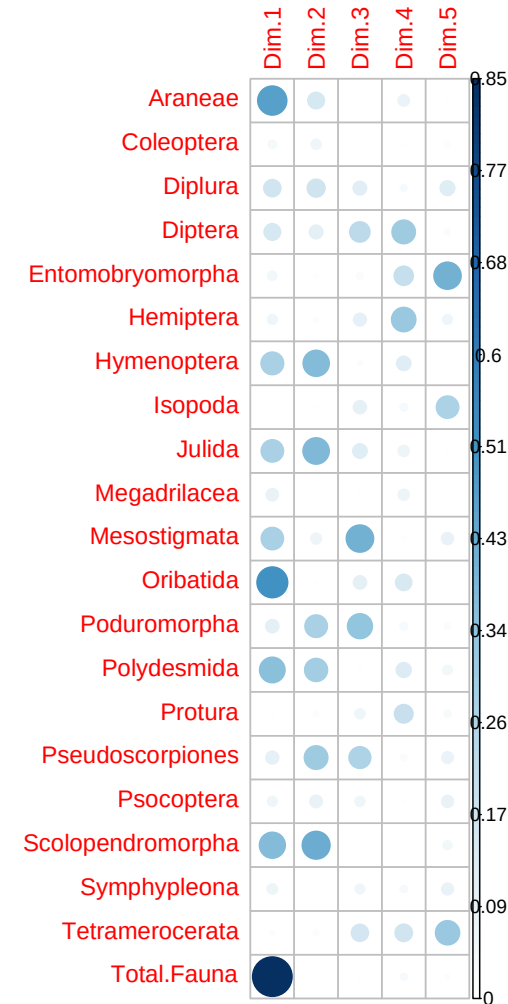
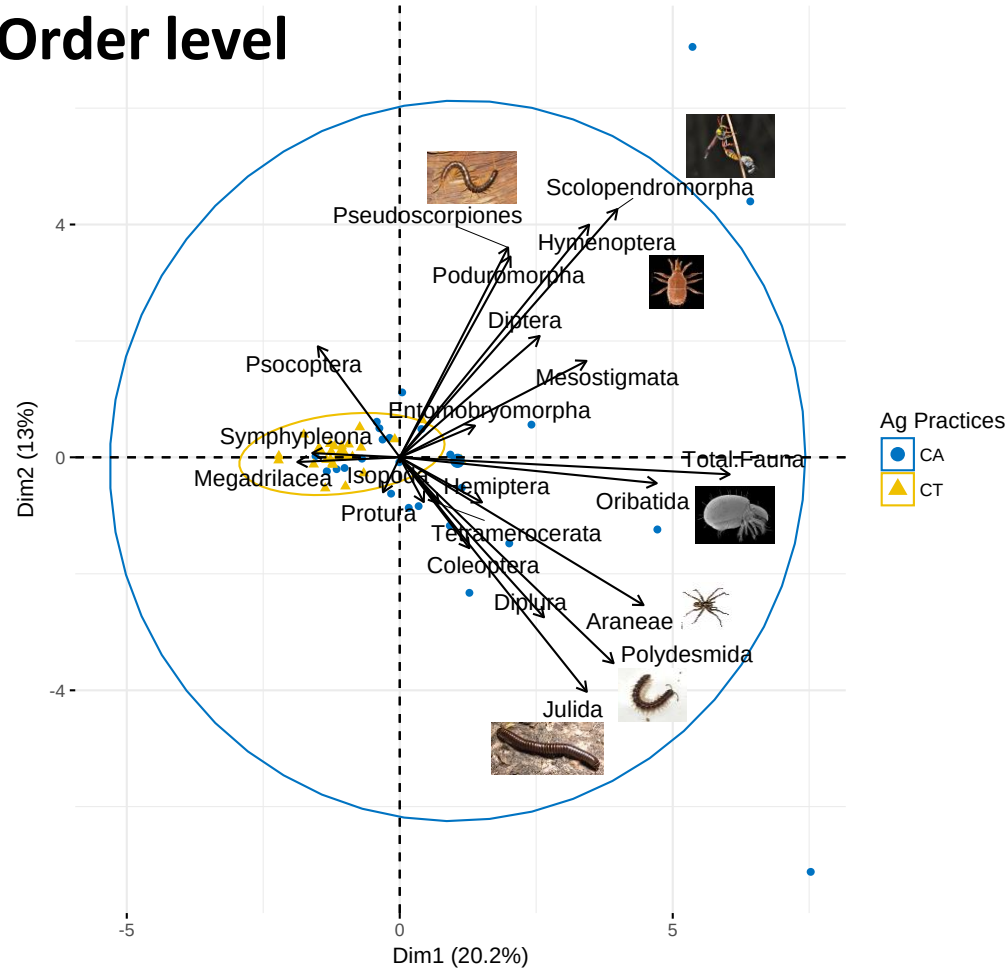


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PCA - Biplot

Soil fauna: Order level



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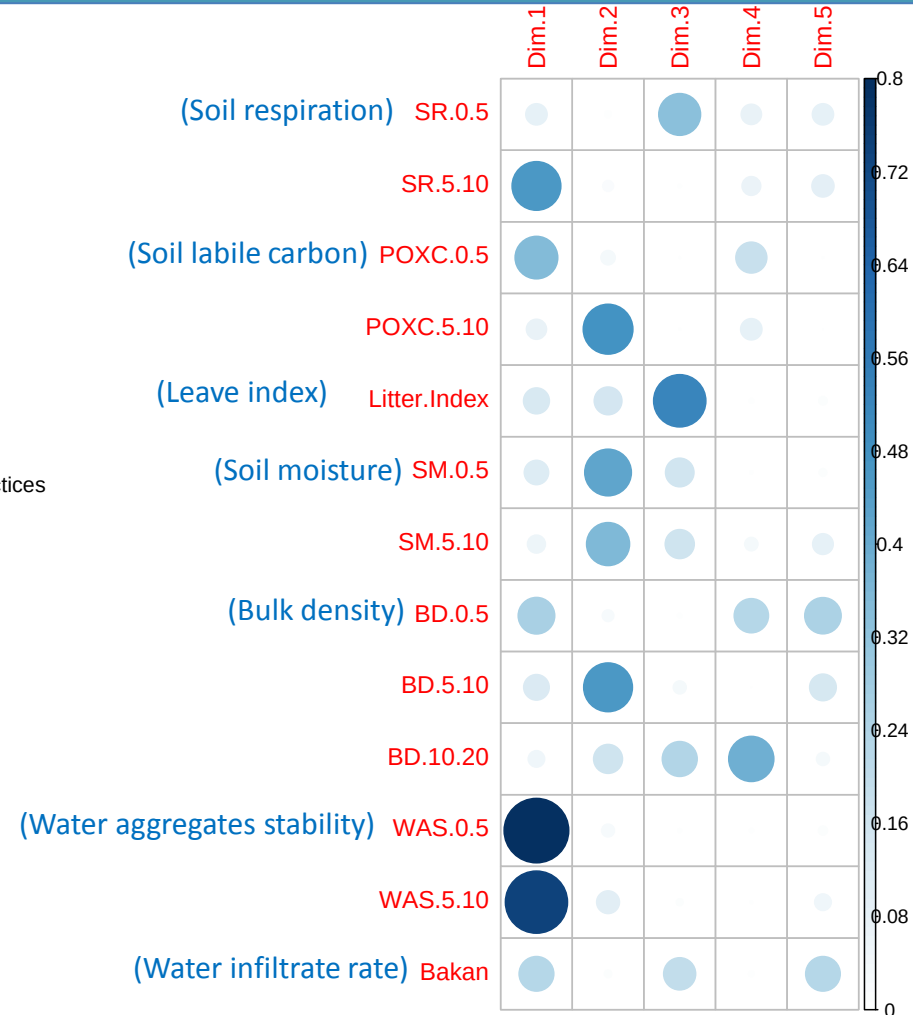
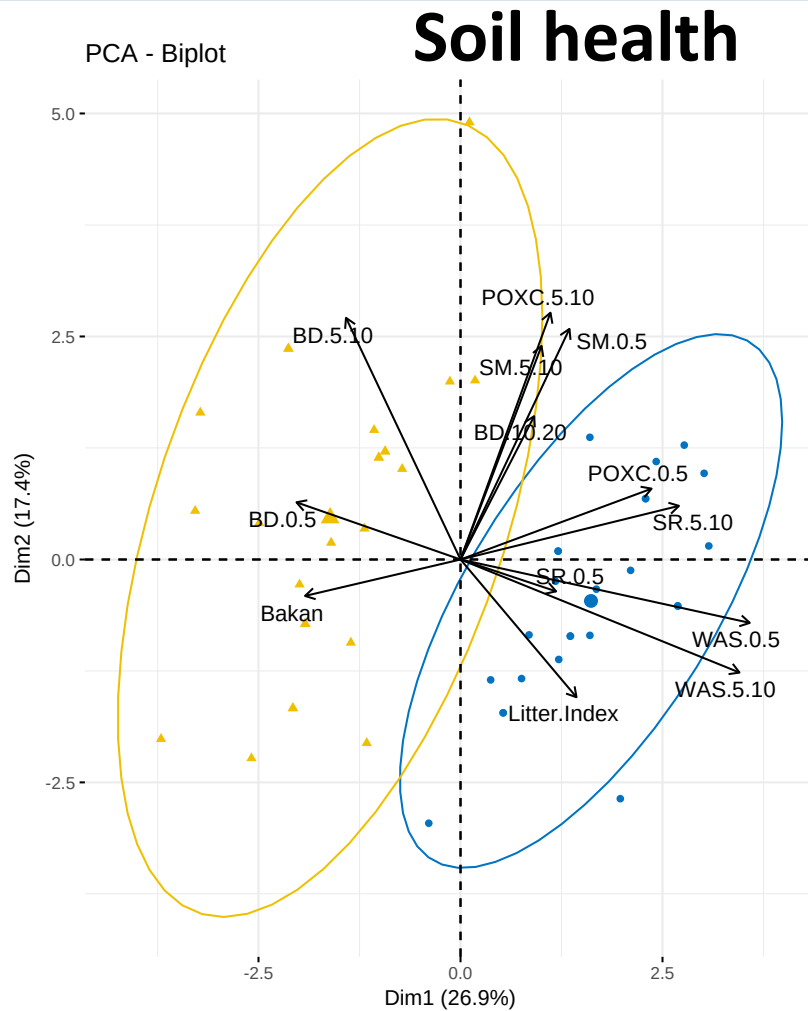


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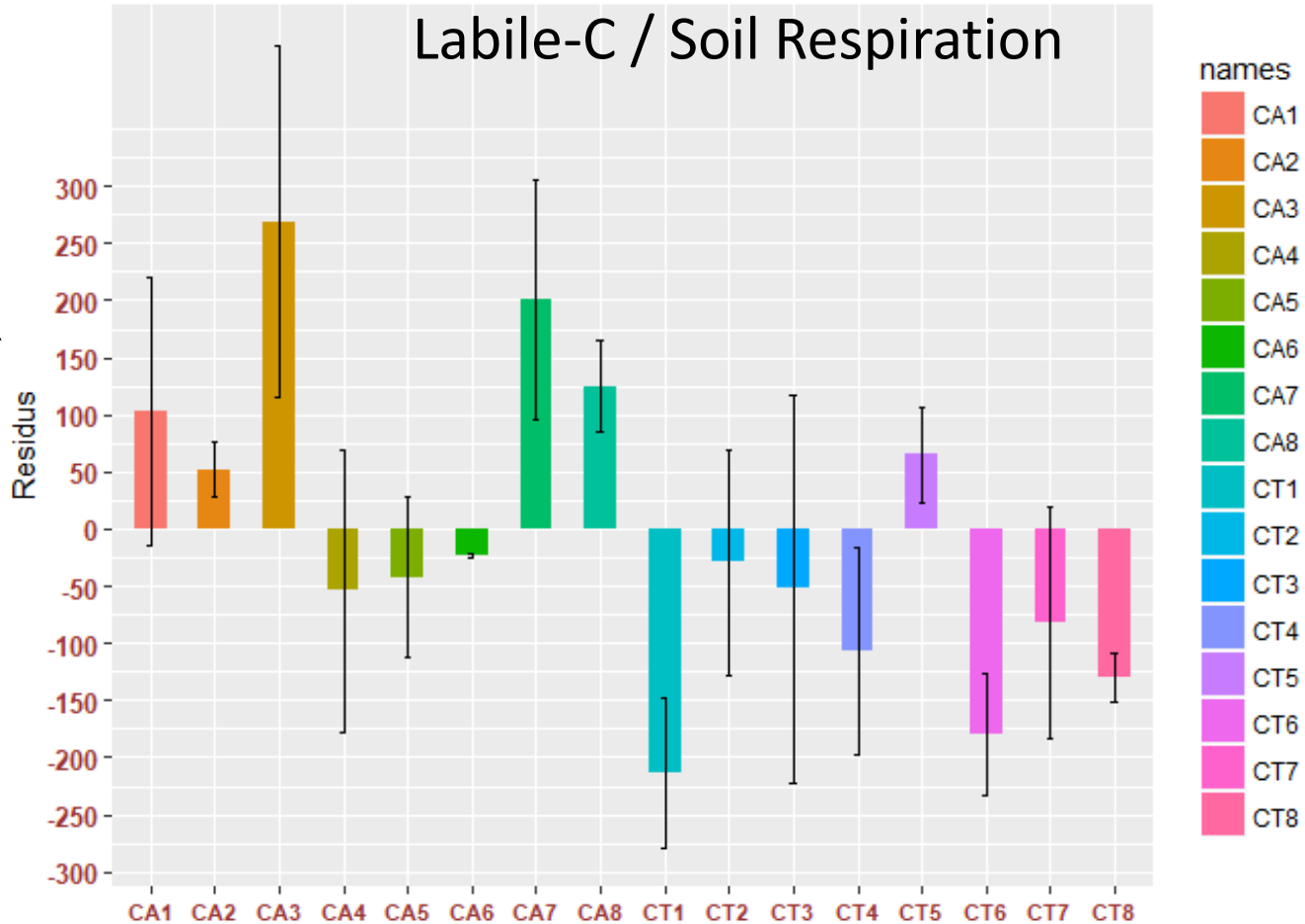
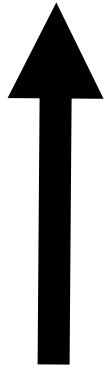
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Positive values = Trend to C
accumulation



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Summary

- CA improves soil biodiversity richness and soil health.
- Soil improvement is an activity that address improved resilience in the face of changing or uncertain weather/seasonal changes (too much water, or drought).



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