NOT ALL SOIL CARBON IS EQUAL

A Conceptual Framework for Soil Health as Regulated by Soil Organic Matter and Carbon

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PROJECT OVERVIEW

This project will aim to explore soil health and carbon storage under regenerative compared to conventional agricultural management. This will be done through assessment of the integrated physical, chemical and biological soil features in these different regimes. By interfacing the importance of these soil features with soil policy, emphasis will be on the acknowledgement of the importance of regenerative management practices for the sustainability of farming.

SOIL CARBON AND LAND MANAGEMENT

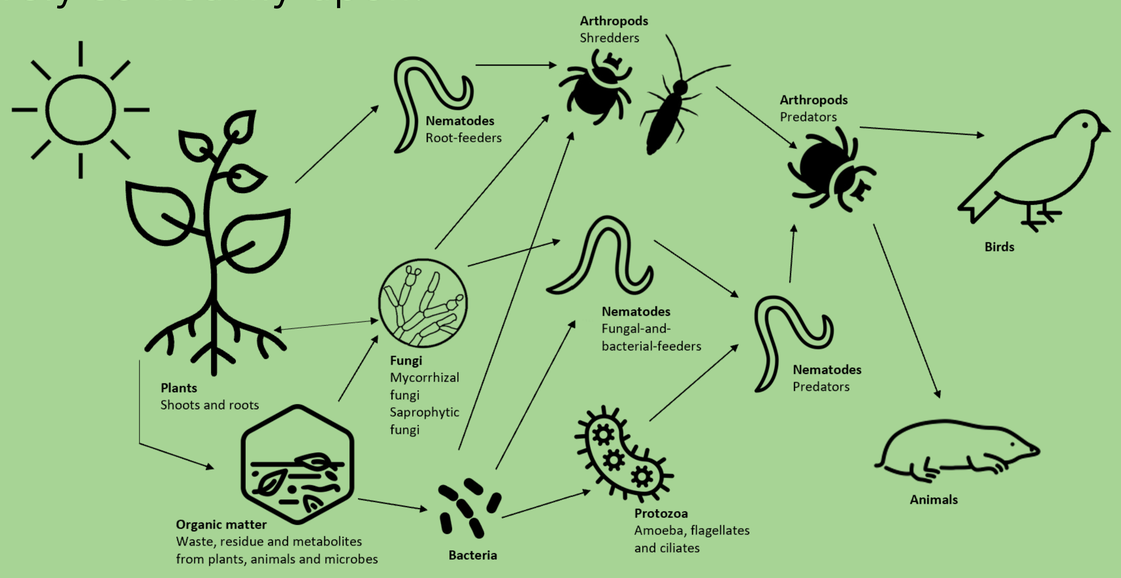
REGENERATIVE	CONVENTIONAL
• no/minimum till	• tillage and ploughing
• cover cropping	• chemical applications
• soil amendments	• heavy machinery
• land conversion	• mono-cropping

enhanced carbon storage and permanence

carbon losses from soil system

THE SOIL ECOSYSTEM

the soil is a thriving ecosystem, with a diversity of organisms that sustain the functions and processes we rely so heavily upon.

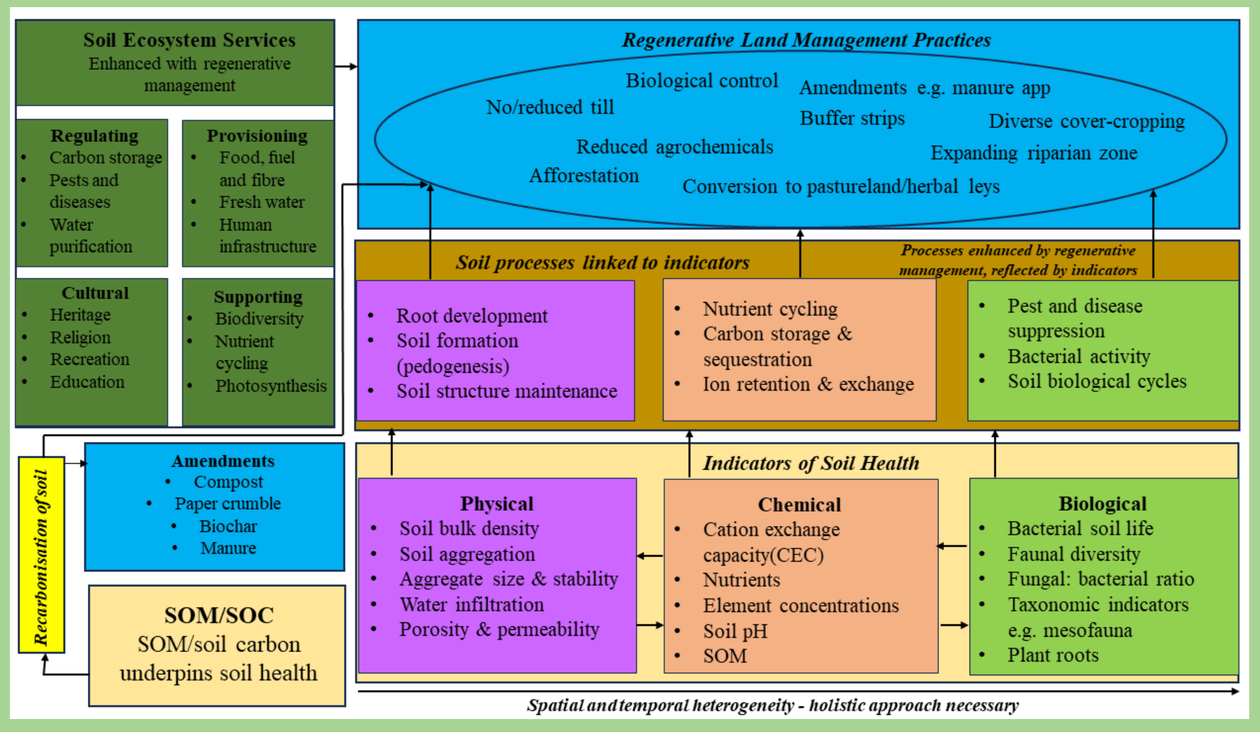


First trophic level	Second trophic level	Third trophic level	Fourth trophic level	Fifth+ trophic levels
Photosynthesizers	Decomposers , Mutualists, Pathogens, Parasites, Root-feeders	Shredders, Predators, Grazers	Higher level predators	Higher level predators

Mesofauna are an essential group of organisms between 0.2-2mm, yet are very underexplored in soil research. They contribute to soil health through nutrient cycling and pest suppression.

Mesofauna species from samples including two Entomobryidae family springtails and two different clades of mite, scale is in the bottom right corner: (a) Lepidocyrtus lignorum. (b) Entomobrya multifasciata. (c) Mesostigmata mite (d) Prostigmata mite

CONCEPTUAL FRAMEWORK



RESEARCH QUESTIONS

- Is there a difference in carbon storage and permanence under different land management practices?
- Are mesofauna assemblages indicative of overall soil health?
- How do traditional invertebrate collection methods compare to modern approaches?
- How does this research tie to decisions and policy regulating soil carbon and soil health?

STUDY SITES

THE MORLEY AGRICULTURAL FOUNDATION

A charity which hosts scientific agricultural research, aiming to understand and mitigate environmental damage. This is done with a focus on soil management and improvement.

WENDLING BECK

A pioneering habitat creation, nature restoration and regenerative farming project, aiming to transform land use for environmental benefit.

METHODOLOGY

TRADITIONAL	MODERN
• Hypogean pitfall trapping	• eDNA and metagenomics
• Loss on ignition (LOI) for SOM	• Soil calorimetry
• Microscopy	• Carbon stability monitoring