

SOIL HEALTH IN THE CONTEXT OF REGENERATIVE AGRICULTURE

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Context: There are studies or reviews of the impact of individual practices that are used in Regenerative Agriculture (RA), but few studies on the effect/ impact of implementation of multiple sets of practices as commonly occurs in RA, at paddock or farm system level. Below we identify the main “unknowns” for soil health under RA management and how to fill those knowledge gaps.

Key indicators of soil health:

1. There is no universal standard set of indicators for soil health assessment because:
 - ▶ soils are inherently heterogenous
 - ▶ fulfil a wide range of purposes
 - ▶ support multiple services with conflicting needs
2. A core list of soil health indicators applicable to New Zealand soils including those under RA is proposed in the supporting report. The set includes measures suitable for both on-farm monitoring and research, and includes indicators used by RA practitioners.

SOILS ARE KEY - Soil health and security underpin intergenerational wellbeing

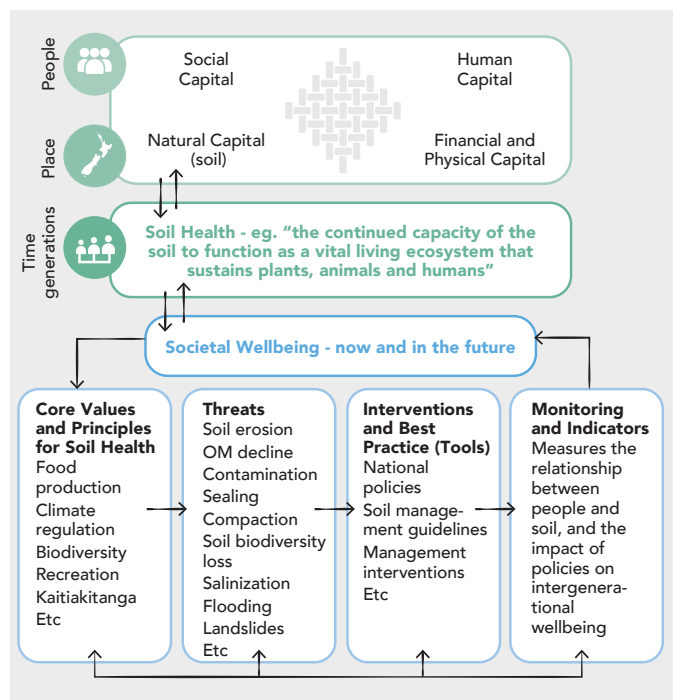


Figure 1. Conceptual framework showing how soil supports planetary capitals and wellbeing (after Stronge et al., 2020). A healthy soil is one that is “fit-for-purpose” and has ‘good ecological status’.

Source:

Schon N, Fraser T, Masters N, Stevenson B, Cavanagh J, Harmsworth G, Grelet GA 2021. Soil health in the context of regenerative agriculture. Manaaki Whenua – Landcare Research Contract Report LC3954-13 for Our Land and Water National Science Challenge & The NEXT Foundation.

What are the knowledge gaps for soil health specific to RA?:

Technological gaps

Lack of NZ-specific calibration or commercial availability for many biological indicators and for some of the Indicators used by RA practitioners.

Fundamental knowledge gaps

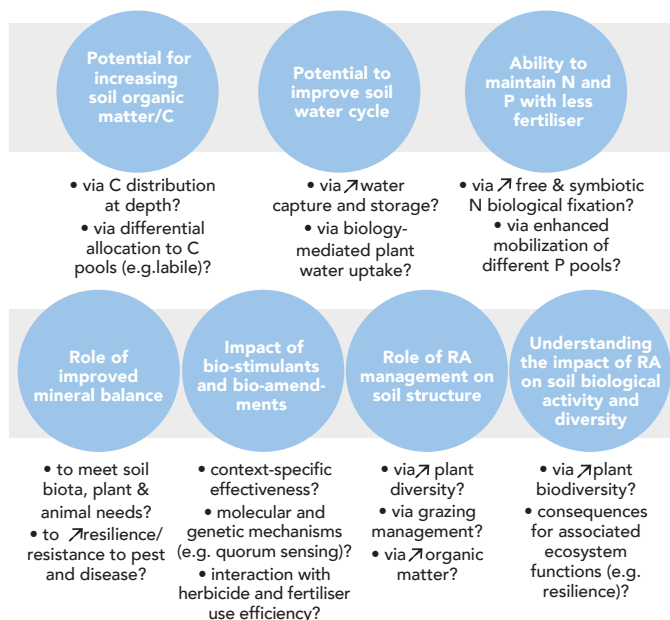


Figure 2. Key knowledge gaps for soil health in regenerative agricultural systems.

Methodological approaches to close knowledge gaps:

- ▶ Measurements & observations must be linked to both management and outcomes.
- ▶ Co-design and co-implementation of research projects with RA practitioners.
- ▶ Different temporal and spatial scales must be considered.
- ▶ Choice of experimental design and indicators depends on the research question and may include:
 - Comparisons of established RA operations with current management.
 - Field-based and lab-based experiments to test cause-effects hypotheses.