

Regenerative agriculture in Aotearoa – research pathways

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Introduction

Regenerative agriculture (RA) is proposed as a solution to mitigate climate change, biodiversity loss, declining water quality and health of freshwater ecosystems, wellbeing crisis in rural and farming communities and food system dysfunctions^[1,2]. RA may also open overseas premium and niche markets^[3]. However, there is a lack of clarity about what RA actually is, scepticism about its claimed benefits, and uncertainty as to whether the concept is even relevant to Aotearoa New Zealand (NZ)^[4].

Earlier this year, a project led to the public release of a white paper^[5], presenting the results of an intensive collaboration and consultation which occurred during June to November 2020, and involved more than 70 NZ-based organisations and 200 people. The project was funded by the New Zealand National Science Challenge Our Land and Water, The NEXT Foundation, Manaaki Whenua – Landcare Research and the generous in-kind support of many organisations and individuals. Contributors and research participants included a wide range of professionals: farmers and growers, researchers, private consultants, veterinarians, industry levy bodies, banks, retailers, not-for-profit organisations, overseas academics, and educators. A series of peer-reviewed topic reports was prepared during the project, to support the assembly of the white paper. These will be released to the public in the coming weeks. Each report addresses a particular topic of research relevant to regenerative agriculture.

The project overall aimed to:

- better understand what RA means for NZ
- develop a scientific framework for guiding RA research in NZ.

The main findings of this project are summarized here.

Methodology

A range of methodologies were deployed during the project, including qualitative and quantitative online surveys, online focus groups, theme analyses, review of academic and popular literature and website searches. The project focused on developing a framework for understanding RA and its impact within the farmgate.

Findings

RA principles:

11 principles emerged from consultation with leading RA practitioners: (1) The farm is a living system; (2) Make context-specific decisions; (3) Question everything; (4) Learn together; (5) Failure is part of the journey; (6) Open and flexible toolbox; (7) Plan for what you want; start with what you have; (8) Maximise photosynthesis (year-round); (9) Minimise disturbance; (10) Harness diversity; (11) Manage livestock strategically.

RA practices:

Examination of practices deployed by RA practitioners indicated that there is no hard and fast distinction between mainstream and RA systems and practices. There is instead a continuum of practices with significant overlap between mainstream and RA. However, some practices commonly employed by RA practitioners in NZ are RA-specific and some mainstream practices are inconsistent with RA principles. RA grazing managements such as holistic planned grazing differ from mainstream rotational grazing.

What does 'regenerative' mean?

Representatives from four NZ agricultural sectors (dairy, sheep & beef, arable, viticulture) identified the following aspects of NZ farming systems as key to assessing whether they are 'regenerative': social wellbeing, soils, integrated circular systems and marketability of 'regenerative' produce (see figure 1). When individuals were asked to rank expected outcomes of 'regenerative' farming by importance, the top sought-after outcomes included achieving pride in farming, decisions based on long-term outcomes, increasing profitability and financial expertise rather than merely increasing production, continuous learning and the positioning of NZ as a world leader in RA.

NZ specific biophysical and trade context:

NZ agricultural sector is performing well and demonstrating leadership in some respects but with regards to water, soils, and native biodiversity, agricultural activities are contributing to NZ environmental and social challenges. Parts of the country are ill-equipped to cope with predicted frequent/intense drought and flooding. NZ's carbon-rich soils, the extreme contrast between NZ native biodiversity and the species supporting its agriculture, and its high propensity to soil erosion sets NZ apart from other countries promoting the adoption of RA. Hence NZ should evolve its own RA narrative, based as much on soil carbon retention as on its possible increase and functionality, reduction of sediment losses, and the development of its farming systems to foster both 'total' and native biodiversity^[6]. The latter point is particularly relevant to sheep & beef farms where ca. 25% of the total area of native vegetation cover is found, 3% of which only are protected by covenants^[7]. Examination of domestic and overseas consumers' preferences and their willingness to pay extra for specific environmental outcomes suggest RA could increase the export value/overseas marketability of NZ food and fibre produce.

Research needs:

Representatives of NZ's main ag sectors, professionals in the wider NZ agri-food system and RA practitioner are asking for research on how RA impact (1) Freshwater outcomes; (2) Food quality and safety; (3) Farmer empowerment and mindset; (4) Long-term viability of whole systems; (5) Animal welfare; (6) On-farm all taxa (total) biodiversity; (7) Soil carbon. They also asked researchers to assess how RA might increase (8) resilience; (9) accountability in our food systems and (10) access to premium/niche markets; (11) soil health; (12) profitability and production; (13) whole-of-system environment, social and economic outcomes at farm-scale. The professionals consulted also highlighted a need for (14) data to de-risk investment and transition to RA; (15) 'conventional-style' practice guides for RA, customised for different sectors and NZ contexts; (16) an understanding of the 'RA continuum' and (17) clarity around the need for a definition/certification for RA (or the lack thereof).

Knowledge gaps:

A consortium of 50+ scientists and independent experts examined the claims made by RA protagonists to highlight key knowledge gaps for RA in NZ and to propose sets of indicators and experimental approaches suitable to close these gaps. The consortium focused on the following topics: farmers' wellbeing; RA economics and marketability; productivity; produce quality and safety; animal welfare; reduction of greenhouse gas emissions; soil health; resilience to extreme weather events; freshwater outcomes; biodiversity; adaptation to global change; and an integrated one whenua one health framework.

RA and animal welfare:

Animal welfare in the context of RA was examined by a group of scientists and veterinarian experts using the 'Five Domains' framework^[8]: (I) good nutrition; (II) good environment; (III) good health; (IV) appropriate behaviour, all of which, contribute to the provision of the fifth domain (V) opportunities for positive mental experiences and 'healthy' emotional states.

Key knowledge gaps were identified for the impact of RA on options for wintering livestock; farming infrastructure and livestock management to improve freshwater outcomes; disease (incidence, surveillance, options for disease-free animals); post-calving/lambing health, nutrition.

Conclusion

Research on RA should be designed to not only test and/or explain RA claims, but also to inform/support the futureproofing of NZ's agriculture and food system against changes in climate and global trade trends, and to inform NZ's own RA narrative.

The success and impact of RA research on the NZ agri-food system can be accelerated by it being undertaken in an adaptive, transparent and agile manner in genuine partnership with iwi, successful RA practitioners and the wider farming community, industry and decision makers, scientists, and representatives of market/brands – to enable the rapid uptake of research findings by both consumers and producers.

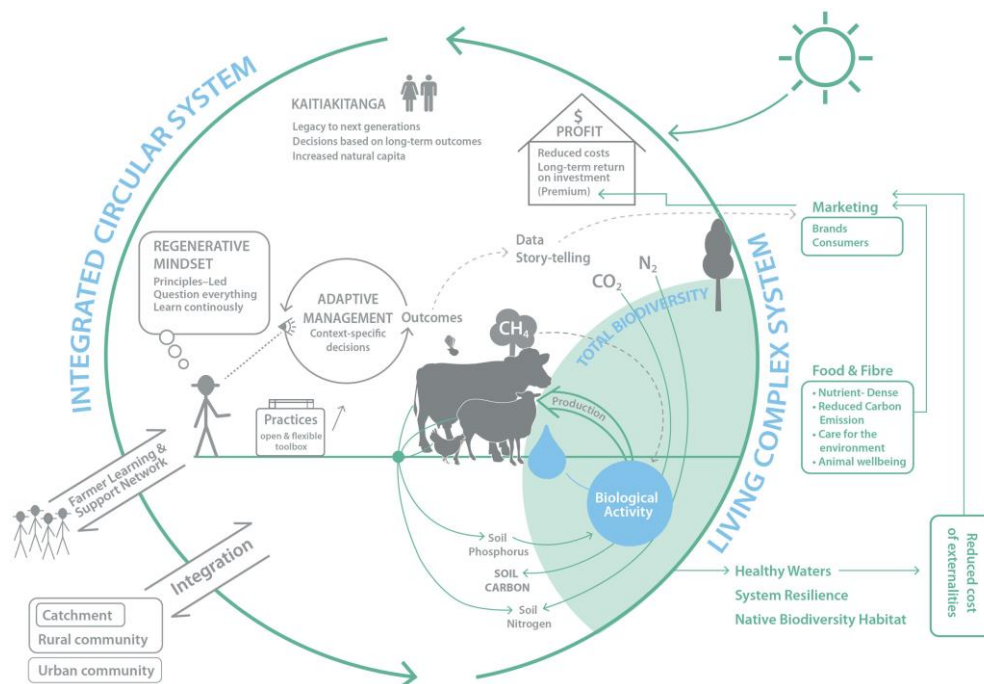


Figure 1. A western science view of a regenerative farming system in New Zealand.

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