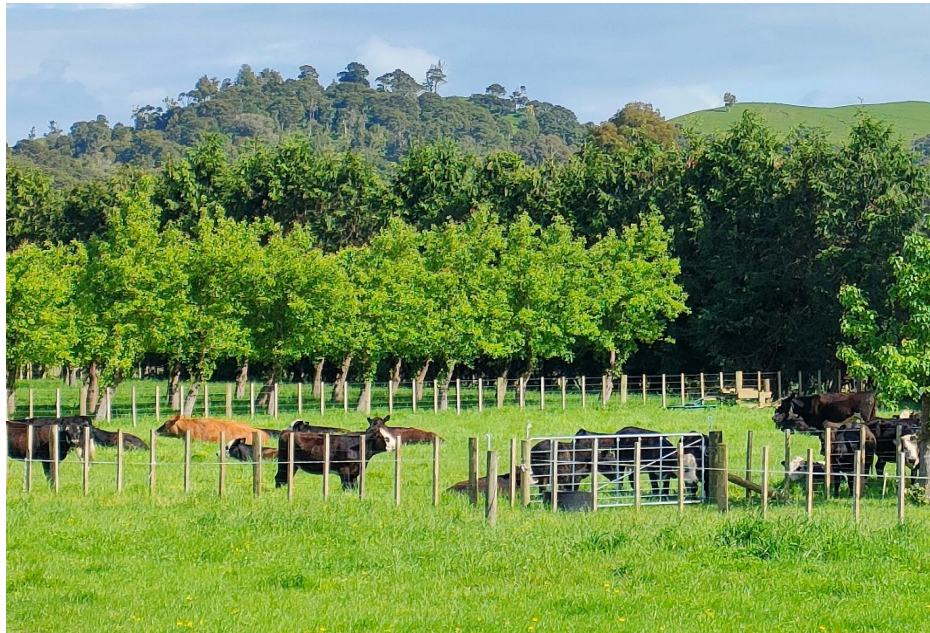




KELLOGG
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PROGRAMME



Organic, Regenerative and Sustainable

Organic, regenerative, and sustainable farming; can a farmer or grower be one or two or all three; or experiment while remaining conventional?

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Photos:

Photos are the authors own from Makahou Orchards, Turakina Valley Road, Rangitikei.

Executive summary

Research Topic: Organic, regenerative, and sustainable; can a farmer or grower be one or two or all three; or experiment while remaining conventional?

To answer the question, this report considers if these methods can be defined, it explores the main principles and drivers based on a comprehensive literature review. The baseline is conventional farming, and the research shows regenerative and organic farming is usually sustainable and conventional farming is often also sustainable.

Organic, regenerative, and sustainable are all buzz words and methods of farming, growing, and processing. They are also used in marketing for recognition and financial advantage. This report found that a farmer may align their identity with their chosen method. A consumer's decision to purchase may be based on their understanding of these terms and an alignment with their values, particularly where there is a premium paid. This report found consumers use the terms loosely and the complexities of farming methods are not understood by non-farmers.

There are no definitive definitions of organic, regenerative agriculture (RA), sustainable or conventional farming in New Zealand (NZ). Each method is guided by principles, and the report finds there are few differences between these, and this means that farmers can use principles from any method. Sustainable practices guide each of the methods and much conventional farming. NZ farming already has a *clean green* advantage, and many farmers are leaders in best practice which can be explored further. This report considers the new term, *regenerative organic* and found its meaning and the relationship with organic farming is not yet established in NZ.

The quick and simple answer is yes, a farmer may be across all these methods, but if claiming to be organic, must be certified by a recognised organic certification body in NZ.

Organics has had enormous success in becoming well established with stable export markets. New legislation is imminent in the form of the Organic Products and Production Bill, providing credibility and consumer protection. In view of its profile, it is odd that organics received little mention in the RA research projects or in strategic planning for the food and fibre sector. It is unclear where it fits into the bigger picture for food and fibre and its relationship with RA.

Progress on RA is at an impasse waiting for industry and or government leadership. The research journey has started, and announcements of research projects will provide much needed evidence and guidance on the extent that existing farm methods are already aligned with RA. Some leading NZ scientists claim this task has already been done and there is nothing more to be gained. If RA is to gain traction, time is of the essence and NZ cannot wait for research to be completed. NZ needs a strategy, purpose, and an agreed direction and there is an opportunity for NZ to lead RA.

The report briefly considers if there is a premium to be gained from these farming methods and how this is reflected in the export markets. This matters for NZ because, *"our economic security depends on the primary sector, which this year earned us a record \$53.3bn in exports"* announced Minister Damien O'Connor¹. In July 2022, red meat sales reached \$1.1 billion according to the Meat Industry Association ([Red meat exports reach \\$1.1b., 2022](#)), NZ needs to continue to add value to its exports,

¹ 19 August 2022, Beehive.govt.nz

rather than rely on volume of production. This is achieved by identifying its advantage, guaranteeing the quality of its farming systems, and marketing its story or journey of production from the paddock or orchard to the consumer purchase, whether this be RA, organic or sustainable farming. Traceability of produce is positive in this regard.

The food and fibre sector must act quickly, otherwise another nation will take the lead in regenerative and sustainable farming and the potential market advantage to NZ is lost.

Recommendations

The project provided clarity that there needs to be a collaborative way forward. This involves the various sector groups, the government and farmers combining to form a leadership group (the Group). The following actions are recommended to achieve a unified direction:

Strategy to establish the role and future of New Zealand farming methods –

- The Government to facilitate a collaborative effort from industry organisations, the Ministry for Primary Industries (MPI) and research organisations to establish a representative leadership Group.
- The Group to deliver a Strategy for organic, regenerative, and sustainable farming for the short and long term; this should align with, other sector specific strategies and address sustainable practices across New Zealand farming.

Research

- The Group should develop a methodology across all farming systems linking production, product quality, livestock, health and well-being, adopt a holistic view, including evaluation of environmental, social and health impacts. This work must align with existing research programmes.
- The Group will distinguish between organic and regenerative farming, address the meaning of organic regenerative and sustainable, and include the outcomes in the overarching strategy.

Trade and Export

- The Group will further develop a New Zealand food and fibre story for consumers from origin to final product to explain and promote the method of farming. The Group will investigate new markets, grow existing ones, and optimise what New Zealand does well.

1. Introduction

Organic, regenerative, and sustainable farming; can a farmer or grower be one or two or all three; or experiment while remaining conventional?

The purpose of this paper is to explore some of the key principles and drivers behind organic, regenerative, and sustainable farming with reference to a baseline of conventional New Zealand farming. The identification of the principles enables analysis to see if a farmer can be across these methods or must be specialised. The report includes a summary of what each method involves, the principles that underpin each method and notes any overlaps, similarities, or divergences. From the analysis, the report looks at several key themes across each method as a mechanism to identify similarities or differences.

The second purpose is to briefly consider if there are premium markets available, and if NZ is marketing its potential to build on and maximise the benefits for both its domestic and international markets. This involves identifying what is the potential or advantage and then establish if more can be done to market this.

The farming sector is facing challenges and criticism from within NZ and internationally. Farming produces high methane emissions and is blamed for other negative environmental outcomes such as water quality, nitrate leaching and soil erosion. A recent international publication claims a plant-based diet is necessary to fix environmental problems and identified a need to get rid of all types of free-range animal farming which is a significant problem in NZ, (Monbiot, 2022). Monbiot, 2022 claims farm waste from dairy farming devastates river life, threatens native fish, contaminates ground water, and closes beaches with toxic algae and questions the marketing of NZ pure food. The media also frequently blames climate change or poor water quality on farming. The sector can respond and demonstrate improvement and explain discrepancies, but a negative perception has already circulated.

Another more balanced view from the EAT Lancet Report considered a planetary health diet and recommended a reduction of red meat and sugar by 50% and double nuts, fruits, and legumes by 2050. Dr Fabrice De Clerk, EAT Science Director had a different approach to farming, *“There is no regenerative agriculture without animal agriculture.....removing animals from grassland biomass will produce more harm. So, we need to employ more holistic management as a source of quality protein and biodiversity restoration. Eat less meat but better,”* (EAT Lancet Commission, 2019).

Each farm is unique (climate, topography, and soil type) and the appropriate way to farm it will depend on a range of factors so therefore one size or system will not fit all. As John Rockefeller (n.d.) said, *“Don’t be afraid to give up the good to go for the great,”* but for NZ starting in such an advantageous position, this could be a high-risk approach. *“The great”* will have some benefits but may not deliver all that is claimed or be of widespread application.

Policy Direction and Context

The food and fibre sector operates in a fast-paced environment, it is difficult to keep up with change let alone, set direction. A range of groups and studies provide context but not necessarily a unified direction. The Primary Sector Council (PSC) provides a Vision – *Fit for a Better World* and strategy (MPI,

2020; Primary Sector Council, 2020) for the food and fibre sector. This strategy includes increasing productivity by \$44 billion over the next decade and employing 10% more New Zealanders by 2030. There is a variety of initiatives with industry bodies partnering with Government. Our Land and Water National Science Challenge 2019-2024² is one of these and provides further strategy and vision. The most common aspirations across the visions are:

*No 2: **Sustainability**- an aspiration for sustainable sectors, production, and value-extraction*

*No 7: **Environment** – an aspiration to be environmentally sustainable, to be stewards of the environment and to reduce environmental impacts*

These aspirations can then be linked to the PSC Vision which questions what success looks like; this is answered as follows:

- sustainable farming systems
- optimal land use
- a national commitment to environmental sustainability; and
- a strong focus on environmental sustainability is strategically appropriate and developing environmentally sustainable farming systems is critical.

High quality policy and advice was identified as necessary by the PSC, to achieve the changes required to farming systems, technology, and land use, *“One outcome will be that sustainable practices are the norm in primary production”*, (PSC, 2020). This suggests a move towards increasingly important roles for RA and all types of sustainable farming.

Global Context

The increasingly important roles for RA and sustainable farming are captured by the UN. In 2015, the UN Sustainable Development Summit adopted 17 Sustainable Development Goals (SDG) the main aim is to *“End hunger, achieve food security and improved nutrition and promote sustainable agriculture”* (SDG2). They identified extreme poverty and hunger as mainly rural.

“Agriculture systems worldwide must become more productive and less wasteful. Sustainable agricultural practices and food systems, including both production and consumption, must be pursued from a holistic and integrated perspective,” (UN Division for Sustainable Development, 2015).

NZ with a low population, helps feeds the world in line with UN SDG2 exporting 95% of all dairy production and 74% of beef and lamb in 2018. This rate is three times higher than other OECD countries (Grelat et al., 2021). Global food security is identified as a major issue aggravated by war and pandemic.

NZ as a signatory to the Paris Agreement³ (the Agreement), the purpose of which is to keep the global average temperature increase well below 2°C above pre-industrial levels. The government has committed the agricultural sector to the Agreement and becoming carbon neutral by 2050. In fact, *net zero* is the preferred option instead of relying on offsetting and it is preferable to reduce the emissions in the first place, according to Dr Victoria Hatton, Director of sustainability at PricewaterhouseCoopers

² Launched on 26 January 2016 and received funding of \$96.9 million over ten years

³ The Paris Agreement is an international treaty on climate change adopted by 196 parties on 12 December 2015 entering into force on 4 November 2016.

(PwC). Existing legislation requires a reduction of methane of 10% by 2030 and between 24-47% by 2050⁴.

This report provides a glimpse into the busy context in which the agricultural sector is operating. There is pressure to find solutions to problems and a call for change, measures such as reducing stock, moving to a plant-based diet and regenerative farming are popular in the media.

2. Method and logic/ Project scope and objectives

2.1 Scope

The scope is a review of organic, regenerative, and sustainable farming mainly within NZ. There is a variety of other specialised sustainable farming practices, but it is not possible to consider all of these in this limited study. In this report, sustainability is considered alongside conventional, organic and RA, on occasion the term is used on its own in the literature and is sometimes used as equivalent to RA. The analytical process involved an evaluation of the principles of the farming methods and thematic analysis.

2.2 Literature Review

A literature review was conducted of industry publications, books, journals social media, blogs, YouTube clips, TV, and radio interviews. There was a high volume of material and for analysis the report looked at identifying the key principles and themes arising from the literature review.

Some of the leading practitioners, particularly in RA are based overseas and international publications were considered for comparison. The report considers the three RA reports prepared by Alpha Foods for Beef + Lamb NZ (“B+LNZ”) to considering their research findings into RA, the consumer and key international markets, these reports are the [Summary Report](#), [Consumer Insights](#) and [Market Scan](#) in abbreviated format. The *Regenerative Agriculture in Aotearoa NZ – research pathways to build science-based evidence and national narratives, 2021* known as the [White Paper](#) is frequently referenced in this report and is the first key study on RA within NZ informing the development of eleven guiding principles.

This project also considered NZ government guidelines and publications, initiatives, international guidelines, trading requirements, EU publications and regulation, and recent amendments.

2.3 Thematic analysis

The volume of material and the speed at which new material is appearing means that the review is a snapshot at the time of writing. The analysis of the material involved coding the research material and identifying the main themes for thematic analysis as a qualitative analytic method, ([Braun and Clarke, 2006](#)). The key themes emerging from the literature review guided the report and include:

- The farming types, method, and guiding principles
- Getting started and advice
- Soil health and storage of carbon
- Emissions and Environment
- Health and nutrient density
- Chemical toxicity and residue
- Wellbeing of farmers

⁴ This is the sustainability target for the [Fit for a better world](#) provided by the Food and Fibre Partnership Group (FFFG). The latest science requires a 10% reduction by 2050 for methane to contribute no additional warming - Andrew Morrison, Rural News September 13, 2022.

- Trade and Export.

2.4 Assumptions

Most of the farming referred to in this report is sheep and beef production. As this report considers farming principles it has a wider scope and some of the organic farming principles are thoroughly explained in horticulture. Overseas discussion also tends to be across the full range of farming and growing (Brown, 2022). The material from the EU is particularly general and at an elevated level (European Union, 2021).

2.5 Objectives

The review aims to:

- consider principles applicable to each farming method
- consider the farming methods and identify similarities, overlaps and differences
- review published material regarding conventional, organic, regenerative, and sustainable farming to see if they can be defined
- demonstrate the pace of development and consumer trends to provide context
- signal if there is potential for premiums for producers in domestic and export markets
- consider results and provide recommendations to optimise the way forward, develop a strategy and provide a story for NZ farming.

2.6 Order of review

- Overview of each method concentrating on conventional, organic, and regenerative⁵
- Literature analysis focusing on methods and principles
- Review of themes from analysis for comparison of farming systems
- Trade and Export considers the export markets and the potential (if any) for a premium
- Findings and Discussion
- Conclusion
- Recommendations.

3 Literature Review

3.1 Conventional and sustainable farming

What is conventional or a usual method of farming?

As the baseline for this study is conventional farming, this approach is considered first, and then leads into a discussion of sustainable farming. There is no clear definition of “*conventional agriculture*” (Edlin, 2022). The use of chemical inputs such as synthetic fertiliser and herbicides is often assumed, in fact, this is not always the case. There are new regulatory limits on the application of synthetic nitrogen (N) to no more than 190 kilograms per hectare per year from 1 July 2022⁶. The high cost of inputs, a tendency to reduce and the use of highly specialised precision equipment for most farming processes

⁵ At this point in the analysis sustainable farming is not considered further as separate model.

⁶ National Environmental Standards (NES) application to synthetic nitrogen fertiliser is implemented and enforced by Councils. There is an additional reporting requirement. Higher amounts require expert evidence and resource consent. Most applicable to dairy farming.

means conventional farming can be low input sustainable agriculture. In NZ this is usually in the context of an integrated farming system (popular model in Europe) or a mixed farm.

NZ farming “*is built around extensive low-impact grassland grazing systems. We are widely recognized as having one of the most environmentally efficient farming systems in the world*”, [Summary Report, \(Alpha Foods, 2021b\)](#).

Trying to define conventional farming has led to “*weaponising the term*,” [\(Sumberg & Giller, 2021\)](#). There is some criticism of conventional farmers associated with over grazing on shorter fast-growing grass (with short roots)⁷. In comparison, RA has a faster rotation of stock and organics specify lower stocking rates. Other criticisms include limited pasture diversity (rye and clover), leading to excess protein⁸, bare ground, monoculture (more so overseas), excess N leaching to air and water, and application of inputs compromising soil pH, excessive N, and phosphorus (P) fertilisers leads to soil degradation, a decline in soil biodiversity (meaning that trace elements and supplements are required) and a negative impact on biodiversity.

There is criticism over the use of synthetic fertilisers and fertiliser pellets are coated with plastic film which disintegrate into microplastics contaminating the soil [\(Calabi-Floody et al., 2018\)](#). It has been claimed that NZ has the world’s greatest hunger for land with free-range everything, this criticism is also levelled at any form of free-range farming anywhere, [\(George Monbiot, 2022\)](#).

An analysis of farm practices and environmental orientation from NZ national farm survey results, identified a pro-environment cluster of farmers in each sector and the research served to “*challenge the assumption*” that alternative agriculture is the only source of “*agricultural sustainability*.” The research found, “*The presence of shades of greenness among conventional farmers*” [\(Fairweather et al., 2009\)](#).

3.2 Good farming practice

Conventional farming and production are the backbone of the NZ economy, and the beef and lamb industry are getting a lot right [\(beef+lamb New Zealand, 2021\)](#). In comparison to international systems, NZ operations are far superior for animal welfare, avoiding the use of feedlots⁹ and indoor housing in general. Animals are fed outside on pasture with better health outcomes. NZ avoids huge monoculture cropping areas and vast areas of wind-swept dust, with cropping comprising 2% of NZ land use and 54% in grassland [\(Statistics New Zealand, 2018\)](#). Also, some verification of good practice is available through NZ National Farm level assurance programmes (NZFAP and NZFAP Plus). Participation is voluntary and farmers expect to receive a premium for compliance¹⁰. Horticulture can certify sustainable practice with GLOBAL G.A.P Standards.

A study in 2009, found that biodiversity conservation, less intense use of inputs, improved animal and ecosystem welfare is not in opposition to conventional agriculture. The emergence of farmer groups has allowed the spread of alternative views and practices and demonstrates a need to go beyond grouping

⁷ Most minerals and trace elements live in the top half of the plant hence need regular movement to obtain best quality feed.

⁸ MUN (milk, urea, and nitrogen) test can be 26-32%, a dairy cow needs 12-18% therefore too high

⁹ This is rare in NZ but there are some.

¹⁰ These are now managed by NZ Farm assured but developed from a joint initiative between a Primary Growth Partnership between the red meat sector and MPI which ensures that claims made can be verified.

farmers as conventional, (Fairweather et al., 2009). Many environmental initiatives are willingly explored on farm including the regeneration of natives.

3.3 New Zealand grass fed advantage

The Consumer Insights, Alpha Foods, 2021a study found that the taste benefit of grass-fed/pasture-raised beef seems to have wider awareness in the United States (US) than in the United Kingdom (UK) and Germany. In all three countries, there were numerous positive associations with ‘happiness’ of the animal. As with ‘organic,’ the terms ‘grass-fed’ or ‘pasture-raised’ are favourable for encouraging the RA movement.

This follows an investigation in 2011 by the USDA of the benefits of grass-based dairies and finding they were better for the environment in every regard especially for soils and water, and the grass-fed farms sequestered higher rates of carbon. Also, total emissions for GHG methane, nitrous oxide and carbon dioxide were 8% lower and ammonia emissions were 30% lower (Niman, 2021). This is the opposite of the claims made by Monbiot, 2022.

Dr Victoria Hatton, Director Of Sustainability at PwC considers that NZ failed to lead the grass-fed beef story for decades and missed the early advantage associated with it. It is important that this does not happen again for RA.

3.4 Science, research, and development have optimised farming production

Science and research are ongoing and conventional farming has the benefit of years of scientific input. A recent AgResearch Summer Safe trial of multi species feed for dry stock farmers in the Waikato, to address yearly summer feed shortages, involved eleven species of grasses (“*hyper diverse*”). (Farmers Weekly, 2022). The trial resulted in costs of 60% more in terms of energy content than the comparator which was rape seed brassica crops syntax¹¹. Further trials are required, and the diverse pasture trial is aligned with RA principles. Further research on diversity will be picked up in the Whenua Haumanu research (Massey University, 2022) discussed on page 13 in this report.

New Zealand has been significantly increasing its farming efficiency, despite a 32% decline in sheep and beef grassland of 3.9M ha between 1990 and 2018; a 70% increase in dairy and a 39% increase in forestry (Rys et al., 2020)¹². Dairy cows increased by 86%, sheep declined by 53% and beef declined by 19%, but there is a significant increase in dry matter (“DM”) feed content and quality on less animals. Carcase weights show significant gains as does the lambing percent, (Rys et al., 2020). It is likely that this growth will plateau out at some point.

There is a DM yield increase due to CO₂ fertilisation and this has been quantified at 526,000 tDM/yr.) between 1990 and 2018. In the same period, an estimated 3.985M t DM/yr. was produced due to additional N fertiliser application and a net increase between 1990 and 2017 of 2.645Mt/yr. from an expanded irrigation area. The impact of P is hard to measure long term beyond the application year; the mean of measurements taken suggest it makes a significant contribution to pasture production (Rys et al., 2020). Despite the impacts of invertebrate pests causing losses on pastoral production between

¹¹ Funded by Our Land and Water National Science Challenge

¹² Total of 514,841 ha has been converted to planted forestry between 1990 and 2018 lessening DM yield of 4.119M t DM/yr. in 2018. (Rys et al., 2020)

\$1.7B and \$2.3B and weeds \$1,778 adjusted with CPI to 2020 (Fergusson et al., 2019) the overall position was one of considerable gain.

The push towards RA is compatible with many existing NZ systems, Sam McIvor, CEO of Beef and Lamb NZ (B+LNZ) considered that,

“New Zealand is better placed than other countries to meet these requirements. Our farming systems are so different from conventional Agriculture such as in North America with their feedlot-raised beef and sheep meat.....Fortunately, we believe the majority of NZ’s sheep and beef farming practices naturally align with key pillars of regenerative products or production.”

3.5 Obtain marketing advantage for environmental progress

The Market Scan, Alpha Foods, 2021c reported that NZ sheep and beef farms are home to the second largest area of indigenous biodiversity after DOC, estimated at 24%. Many farmers plant riparian strips, plant areas of the farm in natives and may gift or covenant their land. Some farmers allow access to the public and align with NZ Forest and Bird and tramping organisations. This to date is rewarded by a feel-good factor for the farmer and user appreciation. Farmers are hoping to see some value and offsetting attached to these activities via the He Waka Eke Noa mechanism or potentially via some other biodiversity credit as proposed in Australia.

3.6 Success of New Zealand Farming

This is demonstrated by the level of exports, and the variety of trading partners paying a premium for NZ primary produce (includes kiwi fruit and the fast-growing demand for organic wine) reflecting its superiority. The existing global campaign for red meat is “Taste Pure Nature” headed by B+LNZ. NZ is also recognised as having some of the best policies on genetics and breeding.

With the highly controversial goal of becoming carbon neutral, the sector has already reduced its absolute greenhouse gas emissions by over 30% since 1990, and this was before many of the formal initiatives and regulation have been implemented (Alpha Foods, 2021c). Dairy farming is heavily regulated by industry organisations and legislation, and most of the earlier criticisms against the industry are redundant, but not forgotten. Farmers of all types are showing evidence of a protective stewardship role. With an overall strong position, conventional farmers need to know there are environmental and economic benefits in conversion to RA, (Grelat et al., 2021).

3.7 More variants of sustainable farming

All farming, and in particular RA and organic, incorporate at least some sustainable practices so it does not exist as a separate identified element. Variants of sustainable farming include animal integration, holistic management, managed grazing, intercropping, no till farming, compost and compost tea, permaculture, agroforestry and silvopasture (strategies to mitigate slips and landslides), agroecology, cover cropping, perennial agriculture, organic and biodynamic. These variants are adopted by conventional, organic, and regenerative farmers in whole or more commonly in part, progressive implementation may then follow. Lower input and organic systems fall under the headings “sustainable” and “alternative” (Edwards et al., 1990). The reduced use, but not elimination of chemical inputs is a key factor distinguishing low input sustainable agriculture, RA, and integrated farming systems from organic farming (Stockdale & Watson, 2008).

When an animal is grown quickly, it is on the farm for a shorter time. Rapid growth is sustainable production as it reduces methane production. Farming an animal for a reduced period means it is not using additional feed or water.

Intensification increases productivity and decreases methane production and is one of the outputs of RA. Often mistakenly it is thought that RA operates on a lower stocking rate, its efficiency comes from high intense stocking regularly moved, often several times a day. Organic farming operates on a lower stocking rate and is a less sustainable model as it requires more land and time to produce stock (Monbiot, 2022).

4 Organic Farming

4.1 What is organic farming?

Organics looks at an “*integrated view of nature and ethics*” (Stockdale & Watson, 2008). “*The movement starting in the late 19th century focused on “issues of human diet, nutrition and health, as well as the promotion of soil fertility through the use of composts and other organic fertilisers”* (Stockdale & Watson, 2008). Lady Eve Balfour began the Haughley Experiment to investigate the way food is produced, food quality and human health from 1939 to 1969. *The health of soil, plant, animal, and man is one and indivisible*” (Lady Eve Balfour, n.d.). Some farmers choose to convert their farming method to organic following a health crisis or ill health within their family.

The intensification of agriculture made food an industrial product and was considered to displace “*regulation of the agroecosystem through biological processes*” (Stockdale & Watson, 2008). The International Federation of Organic Agriculture Movements (IFOAM) provided four principles applicable to the organic food system:

- *Principle of health should sustain and enhance the health of soil, plant, animal, human and planet as one and indivisible.*
- *Principle of ecology should be based upon living ecological systems and cycles work with them, emulate them, and help sustain them.*
- *Principle of fairness should build upon relationships that ensure fairness regarding the common environment and life opportunities.*
- *Principle of care should be based on a precautionary and responsible manner to protect the health and well-being of the current and future generations and the environment (IFOAM, 2005).*

Organic farming is successful in meeting the principles, but the yield levels are lower than conventional systems. Arable crops yield 60 to 80% of conventional systems (Stockdale & Watson, 2001). In developing countries, the United Nations Development Program concluded that organic farming methods provide similar outputs. Generally, yields from organic farming are 25% lower than conventional, the productivity gap is 29-44% (Rowarth, 2021a). The world population is increasing faster than food provision and food scarcity is a concern and reflected in the FAO global food price index. Organic farming is labour intensive and higher cost, it tends to appeal more to the affluent in society.

4.2 New Zealand Organic Farming

In 2020, the area under organic certification in NZ was estimated as 86,000 ha producing \$723 million with 58% exported. Of this area, approximately 64% was used for livestock, 22% for horticulture, 7% for cropping, 2% viticulture (the fastest growing export) and the rest in mixed or other use. In the same

year, about 1,000 new farms and businesses were certified for organic production, ([Organics Aotearoa New Zealand, 2022](#)). There is no data on how many farms are operating without certification. The NZ organic sector is well defined, but the farming method causes confusion in some markets. Some consumers are unclear about what organic production entails and the value in buying certified organic produce, as opposed to simply buying NZ produce.

In NZ, organic is not a defined term and relates to the production method. It has an established market base both in NZ and internationally. The world's top 25 organic markets are all regulated apart from NZ¹³ and Australia (developed mandatory domestic standards). Most NZ organic export goes to the US or EU.

The MPI discussion document *Would NZ benefit from new organic regulation* was released on 14 May 2018...*The rationale was that a national organic standard and associated regulatory regime would provide businesses and consumers with increased certainty in making or relying on organic claims. It would also put NZ in a better position to trade its organic products.* Following public consultation and due process the outcome is the Organics Products and Production Bill 2020 (the Bill) which is before the Primary Production Committee for its second reading.

The Bill does not define organic, instead it provides a framework for Regulations that will set organic standards covering the products or classes of products which will link to the relevant standard.

The MPI discussion document sets out that *organic is used to describe products made or grown using methods that follow some key principles:*

- *Organics are produced without the routine use of artificial chemicals – instead, preference is given to on-farm nutrient recycling (e.g., compost) and non-chemical methods for managing pests and diseases. Only when those methods prove inadequate may a farmer resort to a restricted list of fertilisers or pesticides¹⁴*
- *Organics are produced without the use of genetically modified organisms (GMO). For example, GM seeds, animals or medications are not acceptable. It is not permissible to use GM or GE crops and processed foods may not contain GM ingredients*
- *An emphasis is put on animal welfare, for example animals must be able to express natural behaviour, and access to pasture is usually mandatory*
- *Organic production can also include adherence to certain ethical principles, for example those relating to health, ecology, fairness, and care, (MPI, 2018, p. 3).*

The word regenerative is not in the MPI discussion document but it has been recently adopted by Organics Aotearoa NZ. The most recent Organics Aotearoa NZ Strategy adopts the term “*regenerative organic*”, but this requires due consideration and incorporation to have value. The term is included in the embedded decisions underpinning the organic strategy which are:

- uplift Mātauranga Māori
- address the big environmental issues through ***regenerative organics***

¹³ There is a NZSA 8410.2003 – NZ Organic Standard for Production that is not used for a variety of reasons.

¹⁴ The Organics Aotearoa New Zealand website is clear that no use of synthetic chemicals (pesticides, herbicides, or antibiotics) or fertilisers.

- provide clear pathways for producers including better linkages with regenerative agriculture and “*help a new generation of farmers to shift to regenerative organic*”
- mainstream organics – is regenerative organic “*an integral part of New Zealand’s regenerative agricultural future,*” ([Organics Aotearoa NZ, 2022](#)).

Organic farming varies from RA with the use of tillage on organic farms as a weed control mechanism, reduced stock numbers and a prohibition on agrochemicals. As with RA, rotation design (rotational grazing and growth cycles) is critically important for nutrient cycling and conservation as well as weed, pest, and disease control. Crop diversity in space and time is at the heart of a well-designed organic cropping system as with many low input systems ([Stockdale & Watson, 2005](#)). The principles adopted by the organic Strategy are:

- Hauora Health: healthy soil and pure water supports healthy plants and animals
- Hauropi Ecology: healthy farming based on emulating and sustaining natural regenerative systems
- Matatika Fairness: healthy societies are based on equality, respect, and justice for living things
- Tiakitangi Care: catering for generations to come protecting and restoring land and water, ([Organics Aotearoa NZ, 2022](#)).

Both Conventional and RA may use herbicides and experiments found a “*disappointing truth, there was no way round herbicides*” ([Little, 2019](#)). An engineering venture intended to develop an organic solution to weeds (herbicide resistant weeds infest 70 million acres of crops). The inventions showed that using electricity or hot liquid used more energy and time than chemicals. The engineer found the organic approved methods could not guarantee to work and get to the roots and he determined it was better overall to apply chemicals with radical precision, ([Little, 2019](#)).

Some of the problems blamed on conventional farming are not fixed by farming organically. As herbicides are not used to control weeds, tillage is often used but RA promotes minimum or no tillage ([Kempf, 2021b](#)). There is a new suggestion of “*conservation tillage*” in the Strategy ([Organics Aotearoa NZ, 2022](#)). The aim articulated by the CEO, Tiffany Tompkins, is to use methods that try and do better and they are siding with regenerative as lots of principles are aligned. Organic farming also creates N pollution and possibly higher levels ([Monbiot, 2022](#)). Phosphate from free range chickens can be washed off the land and into rivers following weather events and the implication is that if housed this would not happen.

4.3 Certification

Certification is of the whole organic production system rather than the product; this provides market integrity and permission to market produce as organic. This process requires a farm to be certified, regular monitoring and cost.

Although farmers may grow organically, avoid sprays, or employ other principles, only certified farmers or growers can claim to be organic. Until the Bill becomes law, certification is administered by several bodies¹⁵.

¹⁵ AssureQuality, BioGro NZ, Biodynamics NZ, OrganicFarmNZ (small producers for NZ only) and Hua Parakora-the world’s first indigenous organic verification.

It is not possible to immediately transform a farming system to organic as was attempted in Sri Lanka resulting in a catastrophe for farming and the economy. In April 2021, the Sri Lankan government banned the importation and use of synthetic fertilisers and pesticides and production plummeted. The length of time it takes to convert depends on several farm specific factors. Generally, the process of conversion takes 3 years following soil testing and monitoring. In the early years after conversion, it is expected that production will be lower. For this reason, the EU provides financial assistance for farmers converting. There is no similar assistance in NZ.

4.4 New regulatory framework

The rationale for the new Organic Bill and Standards is that demand has *grown exponentially in recent years and the global market is now worth over \$116 billion annually* (MPI, 2018). The \$723 million produced is a small but important part of total exports. The Bill's coverage includes organically produced food, beverages, live animals, unprocessed plant products and wool. Until the Bill is in force, certification is voluntary but organic claims must be able to be substantiated and not be misleading as per the Fair-Trading Act 1986. The NZ Government provides Official Assurances for export purposes, but to date organic Standards have varied and caused difficulties for assessment.

4.5 Māori and Te Taiao

Te Waka Kai Ora is the National Māori Organics Authority representing Māori interests in the organic sector driven by the vision: “Ko te kai te rongoā, ko te rongoā te kai” (food is medicine, and medicine is food).” This forms part of the Organics Strategy (NZ Organic Sector Strategy, 2022, p. 32). Te Waka Kai Ora is developing a direction of travel for organics and RA..

Māori owned agribusinesses are significant producers using solutions that encompass tikanga Māori. Closely aligned with organic and many sustainable and regenerative systems, it taps into ancestral wisdom. In NZ, traditional kaupapa Māori growing practices can represent a distinct indigenous approach to organic production. (NZ Organic Sector Strategy, 2022, p. 30, 32, 52).

The *Fit for a Better World* plan considers establishing Te Taiao framework as an enabler including for RA. They will adopt the practices, “including principles of enriching soil health, holistic management, balance, diversity, respect and connection with past and future generations,” (MPI, 2020).

We should, “embrace the Māori concept of Te Taiao, a deep relationship of respect and reciprocity with the natural world. The health of the climate, land, water and living systems comes first. And when nature thrives so do our families, communities, and businesses,” (MPI, 2020).

4.6 Obstacles and constraints to growth of organics in NZ

Following regional workshops, obstacles and constraints were identified by Organics Aotearoa NZ. These include:

- the need for further and sustained support from government, along with more industry and government collaboration.
- lack of a shared knowledge base of best practice in organic agriculture, challenges to direct learning from the small and geographically distributed community and lack of any extension services support model. This is associated with a lack of focus on organic agriculture in educational and research institutes.

- lack of a shared and concrete knowledge base regarding environmental benefits of organic agriculture – little New Zealand research is done comparing organic, regenerative agricultural and conventional farming systems.
- lack of shared financial resources – there is no organics levy and most agricultural organisations that receive levies e.g., DairyNZ, B+LNZ, HortNZ, do not invest it in matters specific to certified organics. NZ Winegrowers is the notable exception.
- lack of measurement tools to demonstrate the benefits of organic agriculture – there is a need to work with a range of organisations that can develop, bring in or adapt such tools.
- lack of labour, although this is common across all agriculture.
- direct challenges from synthetic chemical production and distribution companies in the media, claiming that organic agriculture has no environmental or health benefits.
- profit models that do not include full cost accounting – land costs in New Zealand force a level of land-use intensity that organic agriculture may not support. However, full cost accounting would include the downstream benefits of using fewer chemical inputs and optimising soil health and could be used by government to provide incentives for organic agriculture.
- in the meat sector, there is a lack of organic processors in the value chain.
- exporters believe simplifying export documentation will also assist trade. ([NZ Organic Sector Strategy, 2022, p. 34](#)).

These issues provide a useful starting point for what needs to be improved. It follows this should be aligned with the other sustainable sector groups and achieve greater collaboration. Tiffany Tompkins said the new Organic Strategy takes a wholistic view of the value chain, but they struggle to find funding. They need to tell the Organics story beyond chemical free and talk on the outcomes of organic farming.

4.7 Positive structured network

There are several supporting bodies and groups in NZ including regional groups providing support, information, and open days, see Appendix 1.

5 Regenerative Agriculture

5.1 What is Regenerative Agriculture?

There is no simple definition of RA, and it is at the development stage. It involves high yields, minimal inputs, increased soil productivity, no or minimal synthetic fertilisers and no hormones. One description is, “*Beyond organic- increase productivity*,” ([Moot & Davison, 2021](#)). There are many reasons to change to RA. A leading Australian regenerative farmer, Charlie Massey converted to RA following a series of devastating Australian droughts and imminent financial ruin. Similar themes are common to individual farmer journeys.

The dust bowls on vast cleared cropping areas in the US led to the development of the regenerative movement ([Cummings, 2021](#)). The Global Sequestration Potential of Increased Organic Carbon in Cropland Soils found “*every year the US loses approximately 996 million metric tons of soil through erosion*”. [Statistics New Zealand, 2012](#) published that NZ loses 192M t of soil per year by erosion in 2012, 44% of this is from introduced pasture. In 2020, only 2% of land use in NZ is cropland, as opposed to 391.5M acres in the US ([Merrill & Leatherby, 2018](#)) whereas in NZ, 54% is grassland, 29% natural forest, 8% planted forest, 3% wetlands, 1% settlements and the remaining 3% as other ([Statistics New Zealand, 2018](#)).

The [Summary Report, Alpha Foods, 2021b](#) on RA trends has recognised and outlined the opportunity for NZ to take the lead in the global interest in RA. There is not yet a clear definition providing the opportunity for NZ to define and shape it. [Sam McIvor](#) considered, *“there could be a significant opportunity for NZ sheep and beef farmers and wine growers to capture the value in the marketplace.”*

The Whenua Haumana research of RA has identified that first it must deal with what it means ([Massey University, 2022](#)). The term RA was first used in 1979 by Gabel then in 1983 by Robert Rodale¹⁶ who created the Regenerative Agriculture Association. In 2014, it was modified to Regenerative Organic and in 2018 a *Regenerative Organic Certification structure* was launched. In the US, its popularity is replacing organic and sustainable to the concern of organic growers ([Grelat et al., 2021](#)).

RA is proposed as the *“solution to reverse climate change, biodiversity loss, declining water quality and health of freshwater ecosystems, wellbeing crisis in rural and farming communities and food system dysfunctions,”* ([Grelat et al., 2021](#)).

5.2 Background

The health of soil is the basis of all farming. Gabe Brown, a US rancher converted to regenerative farming following challenging times, a series of devastating storms and imminent disaster. The five principles of RA from Gabe Brown focus on the health of the soil and are considered under Soil Health in this study, *“The goal for a sustainable system is soil health..... sense of what constitutes soil health, including the proper cycling of water and nutrients, the quantity of sunlight harvested, the diversity of biological life in the soil, how much carbon is being stored, and how resistant the soil is to erosion”* ([Brown, 2018](#)).

Experiments show you can never produce the same biomass with urea as with pasture or crop diversity. If using companion planting less irrigation is required. The use of Round up changes the soil biology to be disease enhancing in the future ([Kempfr, 2021b](#)).

5.3 Whenua Haumanu Programme

A research programme will investigate the claim that NZ already does RA. The programme is based at Massey University and will according to Minister O'Connor be *“the most comprehensive study ever undertaken of pastoral systems, both conventional and those incorporating regenerative farming practices.”* ([Massey University, 2022](#)). It will explore regenerative alongside conventional and will test the claims made that many current pastoral practices are regenerative. The programme will take seven years. The [White Paper](#) queried the claim that NZ farmers already are regenerative ([Grelat et al., 2021](#)). It does not mention organics at this stage.

5.4 Rotational grazing

This process is the crux of optimising regenerative pasture production. Short pulse grazing builds carbon rich soils using high densities of stock, and new topsoil develops in 12 months ([Jones, 2006](#)). There is a need to work with the source of energy (photosynthesis) and grazing too long or returning to pasture pre optimal recovery will not facilitate growth. A recovery period can also be too long and excessive, it needs to be optimised. Over grazing and the separate issue of over stocking caused by too long grazing periods need to be managed, ([Gerrish, 2022](#)). Plants cannot use N in soil in organic form, and a natural ecosystem is never N deficient. The claim by RA is that compared with conventional grazing

¹⁶ His father launched the Rodale Institute in the US.

management practices, the cattle will be offered longer pasture and grazed at higher stocking intensity for a shorter time, leaving greater 'residual' pasture after grazing, (Grelat et al., 2021).

5.5 Discussion of Circle of Principles (Figure 1 below)

In the [White Paper, Grelat et al., 2021](#) sets out 17 priority research topics and introduces eleven principles for regenerative farming in NZ. The high-level principles identified, are derived from 21 leading RA practitioners from pastoral, arable and viticulture. The paper insists there is a pressing need and demand to test the claims made, using robust scientific methodology. The study is quite small but a good start, it found that RA is principles based and can be distinguished from mainstream farming. It identifies differences between practice focused and principles led systems.

The 20th century embodied *"the industrial approach thatstrove to maximise efficiency by prescribing and enforcing certain practices,"* and *"industrial approaches focus on best practices and rely on high energy inputs"*. RA is *"centred on principles and optimised for flexibility and self-maintenance, and it requires less non-renewable energy"*, it encourages *"holism and recognises interdependence"*. (Grelat et al., 2021). Much of the content resembles the early development of organics.

The principles on the left of the figure relate to social and psychological behaviours (mindset and attitude) and those on the right relate to the implementation of farm practice (instructional). Some principles like the current soil health framework taught are used in the US therefore, although every farm is unique there are some universal social and ecological principles.

The more centrally aligned principles show that converting to RA is a process and the journey is specific to the farmer and the challenges needing addressing in their farming model. As with converting to organics, the transition takes time and will pose challenges, *"They reinforce the importance of the context of a given farm or farmer (including strengths and limiting factors), goal-based planning and the exploration of new tools/practices while not abandoning the safe and familiar."*

The understanding is that *"following only a few of these principles can deliver positive outcomes, although the full potential comes from working with all of them."* (Grelat et al., 2021). Organics is more prescriptive and soon to be regulated. It is not possible to obtain certification with partial compliance and this regulation of organics can put off farmers.



Figure 1: Regenerative principles being applied in NZ. (From Lang et al., 2021, p.15).

5.6 Confusion and overlap

The [Consumer Insights, Alpha Foods, 2021a](#), report found, *giving consumers a concrete definition can help overcome this potential barrier of confusion*. Despite embracing RA, the Organic community struggle with the definition, *“There is a lack of clarity about which practices comprise ‘regen ag’ and associated scepticism about its benefits. There is variable use of toxic agrochemicals and biocides in regen ag, whereas organic producers are totally committed to their elimination. Regen ag urgently requires a robust, data-led approach to demonstrating its methods and benefits; there is an urgent need for ongoing collaboration on this between research providers and practitioners. Those in the organics sector are vital partners to this work”*, ([Organics Aotearoa New Zealand, 2022](#)).

It has been *“bracketed with organics by groups such as Greenpeace, Rodale, and the Soil Association, and has been welcomed by Organics Aotearoa New Zealand as a steppingstone to organic farming...”*, ([Rowarth, 2021a](#)). RA is in the initial stages and comparisons are made to the early days of organics, it has a following and is developing but not yet at any significant scale in NZ.

Overlap with Conventional

Dr Carey’s research at Lincoln claimed that for RA, *“many aspects are already in place in NZ farms, albeit unacknowledged.”* If this is the case, there are significant implications for NZ to capture any international premium and niche markets, ([Edlin, 2020](#)).

Regenerative v Sustainable

McGuire, (2018) explored how RA can be reconciled with science. McGuire, 2018 found “multiple versions of these principles, each with a different flavour. Rodale and partners (Rodale Institute, 2020) offer their strictly organic version with a new certification program attached.” Columns 1,3 and 5 of Table 1 from McGuire, 2018 (below) are identifiable to NZ and demonstrate a similarity of key principles. McGuire’s research considered that:

“extraordinary claims require extraordinary evidence. What counts as evidence are peer-reviewed publications in scientific journals – I have looked for the evidence to support the claims of regenerative agriculture. What I have found are lots of YouTube videos, testimonials, articles, and interviews. None of these sources are extraordinary evidence.

Extraordinary claims also require scrutiny,reasons why people like me, scientists, and researchers, and those who believe in the scientific process, are sceptical of their claims.”

Table 1. Principles, Practices, and Restrictions of Regenerative Agriculture Versions, compared with Conservation Agriculture.

Principles/Practices	Versions of Regenerative Agriculture				Conservation Agriculture
	Gabe Brown	Drawdown.org	Regenerative Organic	Chico State University	
Limit tillage	✓	✓	✓	✓	✓
Protect the soil					
Plants or crop residues on soil surface	✓				✓
Controlled traffic					✓
Maintain living roots in the soil	✓			✓	
Increase biodiversity					
Diverse crop rotations	✓	✓	✓	✓	✓
Multi-species cover crops	✓	✓		✓	
Cover crops			✓		✓
Inoculation of soils				✓	
Integrate livestock	✓		✓	✓	
Restrictions					
Input limitations		On-farm fertility (no external nutrients) No pesticides or synthetic fertilizers	No Synthetic Inputs No GMOs or Gene Editing	Soil fertility through biological systems	
Other			No Soilless Systems		

Rowarth, 2021a also provides persuasive argument and scientific evidence to refute most of the claims made by those pushing for RA, “this is wonderful in theory but doesn’t work in practice.”

Monbiot, 2022 cannot accept the claims made or find any scientific proof behind Zimbabwean regenerative rancher and ecologist, Allan Savory. In his opinion, the RA system performed no better than conventional but well managed grazing.

5.7 Next steps for Regenerative Agriculture

The Whenua Haumana research (Massey University, 2022) is led by Massey University School of Agriculture and Environment with partners, AgResearch, Lincoln University and Dairy Trust Taranaki. The Government is a key partner through the Sustainable Food and Fibres Futures fund. It will conduct the most comprehensive study of pastoral farming in NZ from field to fork, *“It will scientifically build a picture that includes soil biodiversity, pasture performance, animal production and welfare, and the quality of the food produced.”* The programme cost is \$26.12 million including the sum of \$17.6m committed over seven years through a MPI Sustainable Food and Fibre Futures (SFF Fund) funding partnership. The results will help farmers to make informed decisions on the benefits of adopting RA. Results of this research can address the controversy and assess some of the claims made.

Nick Beeby, General Manager Market Development at B+LNZ identified for RA, *“B+LNZ role will be to develop the framework in consultation with meat processing and marketing companies who can then work with farmers to take advantage of this opportunity”*. The research will inform the framework, but B+LNZ are in a difficult position of not having the luxury of time to wait for the research findings.

McDonalds also share an interest in positively influencing the sustainability of pasture-based beef production. A pilot study, undertaken by AgResearch in partnership with McDonalds soon to launch in Hawkes Bay, focuses on alternative stock grazing management to boost the cycling of nutrients through the soil. They intend to identify sustainability factors and one driver is consumer expectations.

The need to quantify RA with scientific data is the same for horticulture. This is to avoid vague unsubstantiated claims. Dr Brent Clothier at Plant and Food Research said¹⁷, *“For Aotearoa, regenerative horticulture is less about better engagement with workers, linking with communities, and the principles of Te Taiao and the matauranga that underpins it. If our sector wants to remain competitive in the global marketplace, it’s important that we use scientific analysis to quantify the impact of our horticultural practices on the land and soil health in the long term and align our practices and our reporting with what the consumer expects for our premium produce”*.

RA will take a direction once evidence is obtained from the research. In the meantime, it is small scale in NZ but has great potential. The difficulty is assessing its role and how to market it now whilst meeting consumer expectations particularly with the traction it has gained in the US.

6 Other themes from the literature

The RA reports by [AlpaFoods, 2021a](#), [2021b](#) and [2021c](#) for B+LNZ looked at three key international export markets, the UK, Germany, and the US. The research considered the themes of potential taste, health, and environmental benefits as these are strongly aligned with consumer interest, especially if it forms part of the climate change solution. The study is helpful for understanding our external trading partners but does not provide insight for our domestic market. In this report following the thematic analysis the following themes are considered.

¹⁷ November 22, 2021, Principal Scientist at the NZ Institute for Plant & Food Research Ltd & President-Elect of the Society Te Aparangi.

6.1 Getting started and advice for farmers

Conventional farmers generally belong to a levy organisation including Federated Farmers, B+LNZ (includes Red Meat Profit Partnership Groups) or HortNZ. They have representatives on behalf of the group's members (providing advocacy and representation), run training sessions and offer lots of guidance material together with hosting regional groups.

To encourage conventional farmers to move to regenerative agriculture requires *“above all, designing infrastructure, financing, and training mechanisms to help de-risk framers’ wishing to transition toward more regenerative practices will be a crucial step that NZ must take,”* [Market Scan, \(Alpha Foods, 2021\)](#).

Existing farmer interest groups for RA include Quorum Sense, a farmer network that became a charitable trust in mid-2018. Its mission is *“generating and sharing practical knowledge to support regenerative farm systems and vibrant rural communities.”* ([Quorum Sense, n.d.](#)). It offers a WhatsApp community and Facebook sharing systems, practices, successes, failures, and learnings. Key principles of the group include supporting and generating research and sharing knowledge.

Organic farming systems have several representative organisations, see Appendix 1. The constraints identified in the Strategy, [Organics Aotearoa New Zealand, 2022](#), show that there is a lack of support from government and a lack of shared knowledge and evidence. Organics Aotearoa New Zealand are keen to partner up with the RA movement and be involved in the journey. Organic certification introduces compliance and cost which will deter some, particularly smaller operators.

6.2 Soil health and storage of carbon

Soil quality is fundamental to farming, *“Soil is our most underappreciated, least valued, and yet essential natural resource,”* ([Montgomery, 2007](#)). Soil health outcomes are measured by organic matter accumulation, water infiltration rates, and carbon sequestration. NZ soils have a high carbon content it can be three times as high as in the UK or Australia, ([FAO Soils Portal, 2020](#)).

The Whenua Haumanu research programme will look at the impact of regenerative practices on soil. Particularly if it can change soil structure and influence water infiltration rates, holding capacity and nutrient wrenching. A soil scientist at Lincoln University, Dr Carey found that *“...NZ soils are not generally in decline and demonising fertiliser use ignores its importance”* ([Edlin, 2020](#)). Studies have shown that the application of fertiliser increases pasture production and builds quality soil organic matter by returning residues and excreta back to the soil. Dr Carey suggests that deeper rooted and mixed forage based on legumes like lucerne will help shallower rooted ryegrass and clover and drier summers.

The consumer assumption in the marketplace is that soils are degraded and need regeneration, which is the case in areas of the US and Europe but less so in NZ. The [Consumer Insights, Alpha Foods, 2021a](#) showed there is some negative perception and feedback in some of the international consumer comments on farming style.

Regardless of farming type, good farming requires skill and building in farm system resilience to the numerous challenges and weather extremities. [Pfeiffer, 1983](#) explained, *“every region, soil type, climate, and set of marketing conditions requires its own special crop rotation”*. With fertiliser application, a paddock can produce out of proportion to its capacity and a farmer must correctly understand, *the natural load capacity of his soil.* Over production can be associated with conventional farming via

excessive fertiliser application affecting the composition of organic matter. Any input applied out of proportion may have a detrimental impact in all types of farming and lead to leaching, this includes manure and organic applications.

The [Consumer Insights, Alpha Foods, 2021a](#) found, the top two associations across all three countries are 'soil' and 'sustainable,' demonstrating progress has been made in building understanding. Soil biology is complex, and it is unlikely that consumers have a great understanding, and they had no interest or understanding in methods such as tillage.

The EU has proposed new regulations to reduce soil nutrient losses by at least 50%. The [EU Soil Strategy for 2030](#) has a vision and framework to protect and restore soils by 2050 with actions by 2030, and delivery of a biodiversity strategy, ([European Union, 2021](#)).

The five principles of RA from [Brown, 2018](#), considered to be a pioneer of the soil-health movement and RA in the US, all focus on the health of soil and are summarised below:

- limit Disturbance - tilling, amounts of fertiliser and herbicides, fungicide, or pesticide *“nature cannot handle chronic stress, such as the yearly use of tillage, synthetic fertilizers, pesticides and fungicides”*
- no bare soil as represents a dysfunctional ecosystem, avoid overgrazing, grow high carbon cover crop, protect from run off and buffers temperature extremes
- build diversity for both crop and grazing land, monocrops are the opposite of diversity and common in US Midwest¹⁸. A natural pasture habitat has over 100 distinct species
- keep living roots in the soil, do not leave cropped land idle, pumping in carbon sustains soil biology, feeding underground livestock; convert solar energy into biological energy, seed once harvested, this enhances mycorrhizal fungi
- integrate animals – concern with fads to eradicate and grazing is preferable to feedlots, ([Brown, 2018, p107-120](#)).

These principles serve to protect and improve the soil and are the foundation for good outcomes with minimal intervention. This is consistent with most organic and sustainable farming.

In 2020, Landcare Research-Manaaki Whenua conducted a soil carbon monitoring study ([Manaaki Whenua Landcare Research, 2020](#)) across 500 sites in NZ recording five land use classes (cropland, horticulture, dairy pasture, flat-rolling drystock pasture and hill country drystock pasture) but not the farming method (such as organic or RA). It is not possible to compare how conventional, organic, or regenerative farming methods affects the sequestration rate. This point was made by the Soil and Health Association of NZ in their submission on the Emissions Reduction Plan (ERP) ([Soil and Health Association, 2021](#)). This submission also suggested that the agricultural section of the ERP needs to focus more on soil and soil health. It noted that international agreements such as the Kyoto protocol do not recognise soil carbon in carbon accounting procedures and favour monoculture pine plantation. This negatively impacts biodiversity and the potential of natives.

Soil contains large amounts of carbon. In NZ agricultural soil the carbon stocks are higher than most other countries at just over 100 tonnes per Ha. ([AgMatters, 2020](#)). It holds three times as much as what

¹⁸ The US Midwest is known for growing corn or soybeans, southeast cotton, and pacific northwest wheat.

is held in the atmosphere (Niman, 2021). Healthy soil has an additional function in that healthy soil pulls methane out of the atmosphere down into the soil where it is stored as a sink (currently this is not measured or rewarded in NZ). At a national level, research has shown pasture production has increased 30% due to carbon dioxide fertilisation (Rhys et al., 2020).

6.3 Greenhouse gas emissions and the environment

The NZ Merino CEO, John Brakenridge said on-farm emissions could be reduced to zero by adopting regenerative practices that store more carbon and emit less. In fact, it is preferable to achieve net zero carbon emissions rather than becoming carbon neutral by offsetting. This point of difference is providing a marketing advantage for those supplying Danone, Nestle and Tesco in the UK. There is no clear path or tool for farming to achieve net zero. An analysis of national farm survey results for NZ sheep and beef, dairy and horticulture identifies a pro environmental cluster of farmers in each sector:

“The presence of shades of greenness among conventional farmers has important implications for environmental management and for our understanding of the various and complex pathways toward the greening of agrofood systems,” (Fairweather et al., 2009).

Further, no statistical differences were found between conventional and organic farmers’ attitudes to environmental practices (Lockie & Halpin, 2005). Cattle farming leads to much discussion,

“There are those who blame cattle for climate change. That viewpoint is too simplistic, it does not consider the larger picture of how ecosystems function”, (Niman, 2021). Integrating multiple species leads to larger amounts of carbon in an ecosystem as is done in NZ, *“the best proven way to transfer massive amounts of carbon dioxide out of the atmosphere and into the soil is by maintaining a landscape that includes grazing animals”, (Niman, 2021).*

All farming methods produce emissions. Organic raises different challenges associated with lower production. Rowarth, 2021b, has found that due to low yields, organic farmers require more land leading to expansion and deforestation. Organics can be more damaging than conventional (Monbiot, 2022) as low yields mean the land footprint must grow by 40% in England and Wales and the GHG emissions from organic produce tend to be the same or higher than conventional. An organic beef animal would take longer to grow and needs more land so losing twice as much nitrogen per kilo of meat as a conventional farm. The feeding of certain proteins and supplements can reduce emissions (Leng, 1993).

To farm organically needs higher labour demands, this is bad for the environment as workers travel in by vehicles using fuel energy and increasing GHG emissions. All agriculture can pollute waterways and using compost and manure as fertiliser also causes runs off, (Monbiot, 2022, Rowarth, 2021b). All types of farming are facing a deluge of new regulation and reporting to enable monitoring as one outcome.

6.4 Health and nutrient density

Industrial production had implications on human health and the nutrient density of food and led to the development of organics. An assessment of nutritional concentrations of 43 crops (mostly fruit and veg) revealed a decline in most nutrients, including calcium, potassium, iron, riboflavin, and vitamin C have declined from 6 to 38%, (Rodale Institute, 2020). The claim made by both RA and organics is that food is better and of higher nutrient density, but this is an area lacking any evidence, (Grelat et al., 2021).

The [Market Scan, Alpha Foods, 2021c](#) combines scientific data and potential connections between ecosystem health in NZ and increased nutrient density in food and *“Health is the top association, by far, for the United States,.....; across all three, though, other than healthy, organic, and natural are at the top of the list”*.

Soil deficiencies are being linked to poor health outcomes including, heart disease, cancer, Alzheimer’s, children’s high rates of chronic disease, autism, over 80 auto immune disorders, rheumatoid arthritis, diabetes, and dementia is linked to lacking microbes, ([Steffan et al., 2018](#)).

There are no facts or evidence to support that organic or regenerative food are better, safer, healthier, or kinder to the environment. Research indicates there is no conclusive evidence that organic food is more or less nutritious than conventionally produced food. Analysis of food shows that the production system, organic or conventional has no effect on the nutritional profile, the concept of nutritional density applies to processed food, not harvested produce, ([Rowarth, 2021b](#)). The [Consumer Insights report, Alpha Foods, 2021a](#), found that regardless of science, consumers associate organic and regenerative food as a healthier option.

6.5 Chemical toxicity and residue

Rachel Carson’s book *Silent spring*, in 1962 warned against the effects of pesticides in the environment, adding to the drive for organic farming. There was a growing concern that toxic agricultural chemicals such as DDT had become widespread and persistent in the environment, in food, and in humans. This publication seems to have been the start of the escalating concern, ([Carson, 1962](#)). The book is considered to have started the global environmental movement. It focused on negative effects of chemical pesticides that were widely used in the US.

In the US, toxicity from residues has been found in 70% of water ([Alpha Foods, 2021c](#)). The USDA found pesticide residues on 73% of fresh fruit and veg and on 61% of processed fruit and vegetables ([Alpha Foods, 2021c](#)). There are consequential costs for the health system in the US. In the EU, The European Green Deal has a dedicated food strategy *“Farm to Fork Strategy,”* with new Regulations requiring a reduction in the use of chemical and more hazardous pesticides by 50%. The EU Soil strategy intends to *“Reduce nutrient losses by at least 50%, the overall use and risk of chemical pesticides by 50% and the use of more hazardous pesticides by 50% by 2030”*.

The US has observed a mass disappearance of insects (70%) in the last 20 years, and this is blamed on agricultural chemicals ([Lundgren & Mogren, 2019](#)). New Zealand apiculture has shown that bees are adversely impacted by agricultural chemicals containing surfactants, ([Siviter, 2021](#)).

In conventional farming, Agri chemicals reduce damage, loss, disease, and pests. The residue in vegetables and food is negligible and of no risk and their use leads to providing greater food security. RA minimises the use of Agri chemical inputs, and some practitioners do not use inputs. Organic farming does not use any chemical inputs.

The *“implication is that organic growers and farmers do not use chemicals. This is not the case.”* ([Rowarth, 2021b](#)). Agricultural chemicals certified for use in modern organic agriculture can be far more toxic than conventional and toxic to more species. In France, there have been cases of elevated levels of copper and Sulphur in soils (approved organic treatment), it would have been better in those instances to have used targeted modern chemicals. Modern chemicals target the problem and use low rates of

active ingredients subject to standards set by the Environmental Protection Authority (“EPA”) and MPI under the Agricultural Compounds and Veterinary Medicines (ACVM) Act 1997. Organics can therefore have a detrimental impact on health from toxic chemicals and pesticides (Rowarth, 2021b). The use of any input in all types of farming requires care, management, and constant monitoring.

6.6 Wellbeing

Viv Williams, on the Advisory Board of Organics Aotearoa NZ¹⁹ explained how organics covers a diverse sector from Fonterra and Zespri across to community initiatives; 91% of the community garden sector use organic practices to promote food security and mental wellness, *“Our social value serves the entire supply chain by giving farmers and producers more satisfaction as well as providing assurances to consumers through an internationally recognised certification system”*.

One of the principles of the Quorum Sense farmer network on RA is to, *“Connect people to communities of practice that help enhance their well-being.”* (Quorum Sense, n.d). Many rural communities are experiencing decline, disconnection from health services and connectivity, competing land uses such as forestry conversion and media portraying urban rural divide and sharing the most negative of farming stories.

A farmer’s mental health is claimed to improve with organic and RA farming (Mzoughi, 2014). Some who converted were open about experiencing depression, then converting and improving. Research from the University of Canberra has produced evidence of improved well-being; subjective well-being measures provide meaningful insight into wellbeing impacts of different agricultural systems and include the measures in sustainability frameworks. The RA philosophy recognises that the wellbeing of a farmer does not rely solely on the production value of land but is also influenced by social and ecological factors (Van den Berg, 2018). A *“good quality of life (high wellbeing) is considered by regenerative farmers as an explicit objective that is achieved through having all components of the farm functioning well as a whole,* (Rigby & Caceres, 2001). Engaging in organic farming is also associated with higher levels of life satisfaction (Mzoughi, 2014).

Interestingly, the White Paper participants in the 15 major themes had social wellbeing as the most frequent and a description of a RA outcome, (Grelat et al., 2021).

7 Trade and Export

7.1 Oversight

NZ representatives work hard to obtain export agreements. The 2022 Free Trade Agreement (FTA) with the EU was *“the first ever agreement where we have enforceable provisions on the Paris climate agreement”*, Nina Obermaier, the EU ambassador to NZ. Any opening up of export quotas means NZ produce will need to demonstrate equivalence and compliance with EU regulation. Other key markets are with Australia, China, Japan, most Asian markets, US, and a recently signed FTA with the UK.

7.2 Organics

The Organic sector is now a \$723m industry²⁰ having grown from 460m in 2006. New Zealand exports 58% of its organic production. The sector grew by 20% from 2017 to 2020 with the largest amount

¹⁹ Previously the CEO of Organics Aotearoa NZ from 2019-2022

²⁰ Organics Aotearoa New Zealand website and reported Stuff April 14, 2021, Esther Taunton

attributed to organic dairy at \$153.8m having increased by 55%. The second highest growth area is organic wine which has increased by 40% to \$64m. Highest total demand in order of quantity exported is to US \$86.8m, China \$81.8m, Europe \$73.4m, Australia \$66.4m and Japan \$31.5m.

The EU Council Regulation (EEC) No.2092/91 refers to the organic production of agricultural products. The key requirement is traceability for the flow of goods from the producer via processing and trade to consumer. Organic products entering the EU from third countries must have equivalent production standards and inspection arrangements.

However, while Asia is a rapidly growing market for NZ produce, consumers are far less clear about what organic production entails and the value in buying certified organic produce, as opposed to simply buying NZ produce, (Yang & Renwick, 2019).

Research undertaken by Our Land and Water National Science Challenge investigated international consumer willingness to pay (WTP) for product attributes, using choice experiments. The research found the highest WTP for red meat and dairy was for certified organic products. WTP was highest in Australia, moderate in Asia and the EU and lowest in North America. It is notable that the 'conscious consumers' segment has a higher WTP. Research indicates that conscious consumers are willing to pay 31% more for red meat and 29% more for dairy products that are certified organic, (Yang & Renwick, 2019).

Based on WTP, Organic dairy was getting the highest premium despite falling behind carbon neutral farming for nitrogen leaching and behind pasture fed for carbon footprint. The second highest premium consumers would pay was for pasture-fed which had the lowest nitrogen leaching and the lowest carbon footprint (Lucci et al., 2020).

7.3 Regenerative Produce

There is not yet an associated premium paid internationally or on the domestic markets. The journey is at an *“early stage ...there are not yet any meaningful markets, price premiums, or certifications that can allow any food producer to easily start selling regeneratively grown products and be rewarded,”* Market Scan, (Alpha Foods, 2021c). The EU did not mention RA in its 2021 Strategy. The Market Scan experiences were the same in the UK, Germany, and the US with *“low to no awareness amongst consumers.”* However, the White Paper referred to overseas niche markets (Grelat et al., 2021). There are isolated instances and Gabe Brown, operates the *“Nourished by Nature”* trademark. In NZ, Alan Richardson, a Nuffield scholar, and both a regenerative and organic farmer in Otago clarified there is no RA premium as such in NZ.

7.4 Subsidies

There are no subsidies in NZ paid direct to farmers for farming although there may be some assistance in crisis such as cases of TB and M. bovis. Trade partners in the EU receive farm subsidies under the EU Common Agricultural Policy (CAP) for both conventional and organic farming, but not RA. A study found they represent 40% of a farm's annual income (Cwienk J., n.d.). There are additional subsidies for green practices; new reform measures in 2021 provide stronger incentives for sustainability in the *Farm to Fork Strategy*. The EU, via council regulation 2078/92 provides aid for farmers during the conversion to organic farming. Where more direct support from government is provided to organic farming systems the area under organic production has expanded more rapidly (Paddel et al., 1999).

7.5 The Consumer

The [Consumer Insights, Alpha Foods, 2021a](#) shows international consumers are willing to pay more if food tastes better and is associated with better health and environmental outcomes. Consumers liked organic, good wages for workers, soil benefits and sustainable concepts. These international consumers assume farmers are profit driven. The research showed that across all three countries, '*Regenerative Organic*' is the preferred term when purchasing a food product grown or raised through regenerative agriculture. Consumers do not understand farming therefore, 'low-till farming'/'no-till farming' is *not* an angle to lead with, given the existing consumer confusion.

The [White Paper, Grelat et al., 2021](#) suggests 90% of New Zealanders are willing to pay to increase native diversity and freshwater quality. The intent is that from this data, a niche premium market can be developed. Perceptions of health and safety are the main reasons why consumers choose to purchase organic produce. Many also identify organic food to be a marker of a quality product that tastes better and fulfils nutritional needs.

7.6 Consumer markets and brand

The existing national branding places emphasis on purity and greenness. The [Consumer Insights, Alpha Foods, 2021a](#) suggested a national brand should incorporate a Taiao ora, Tangata ora message. This reflects the idea that if the natural world is healthy, so too are the people. This is NZ-specific and would also embrace a Tangata whenua perspective. Consumers are interested in connections between RA as a solution for climate change and to restore ecosystems. For beef and lamb consumers are interested in grass-fed/pasture-raised connection to RA. Research suggested funding additional research into making the RA health-taste connection. A challenge raised in the consumer feedback, is overcoming a strong preference for local grown. There is a need to educate about the disproportionate carbon footprint for food miles for NZ produce as opposed to an overall lower carbon footprint from its farming footprint.

8 Key Findings

Farmers deciding to change to organic and RA methods can be motivated by major life events. This may be a response to a health crisis, following extreme drought, weather disaster or economic collapse and farms on the verge of being sold, Examples are ranchers, Gabe Brown (US), and Charlie Massey (Australia), and a NZ organic cafe owner having experienced family health issues being unable to source organic produce and ingredients and then became a grower.

The potential for high income is not the main driver for many; however, the NZ economy relies on primary production to sustain it. Food supplies are threatened particularly with the recent pandemic, war, and extreme weather events, and the UN require increased and sustainable production.

This study highlighted the problem of grouping farmers as conventional with an associated negative connotation. There is then a tendency for criticism to fall on the whole group and it overstates the homogeneity of conventional practice especially in relation to its environmental impacts. It also serves to subject alternative practices to unnecessarily strict or overly ambitious interpretations of success or failure, ([Fairweather et al., 2009](#)). The research showed that most conventional farmers were taking positive sustainable and environmental steps, the principles they followed were often aligned with organic or RA. These pitfalls of assuming environmental attitudes of organic farmers are distinct from conventional is the same in the Australian context ([Lockie & Halpin, 2005](#)).

Organic farming adheres to well-defined principles with national and international guidance. The commonalities with RA are many, the differences are few. Each method emphasises improved soil health and better holistic outcomes. The obvious difference would be the application of Agri chemicals, permitted for RA, stocking rates and the wider use of tillage by organic farming. For conventional farmers and in times of rising costs there would be few farmers applying high inputs (Murphy, 2022). Organic farming is regulated and the need for compliance and associated costs can deter growers, and some RA practitioners are concerned that RA could copy this pattern, White Paper, (Grelat et al., 2021). There is yet no real solution for weed control for organic farmers other than arduous work and a variety of management methods aimed at reduction.

RA and organic farming claim to increase soil carbon content, improve health, and nutrient density (no evidence), eliminate or reduce inputs. Both highlight farmer wellbeing as crucial. There are few differences in a farmer's outlook towards the environment and improving biosecurity. This was also the case for conventional farmers.

The term *regenerative organic* is an attempt to align the two, but it needs much work to see where exactly RA and organic align. The term itself is misleading for non-organic regenerative farmers. Likewise organic farming is not RA. Both methods aspire to an outcome of overall improvement. The term is popular with consumers.

Summary of Findings from this study

Table 2 below (p 27) shows a concise summary of this report's findings for organic and RA and research projects. There are a variety of research projects for RA and as knowledge increases and evidence obtained this will aid its development.

This study found that a farmer may experiment or specialise in a particular method, but it is likely that by engaging in organic or RA or other sustainable methods that many of the same principles applicable to another method are used. Both organic and RA are guided by principles, neither term is clearly defined, and RA in NZ is at an early development stage. Examples of sustainable farming and practice are found throughout all types of NZ farming, and these should be acknowledged and form part of the NZ story. The report found that there were numerous examples of conventional farmers following sustainable methods and optimising best practice.

Partnerships among farmers, researchers and other stakeholders can effectively respond to environmental concerns and facilitate the development of alternative practices (Warner, 2006). Success and change rely on the emergence of social networks of farmers and agroecology research. The adoption of sustainable practices is enhanced through organising and sharing new forms of on farm research. Organics has done this well and RA is following, indeed all farming responds to sharing ideas.

The *Consumer Insights, Alpha Foods, 2021a* found some consumers had little confidence in the farmer as they feel *they got us into this mess*, with GMO etc., (a US issue and not NZ except for imported food). Responses from the US, UK, and Germany show consumers consider farmers to be profit driven. We do not know what NZ consumers think but there are negative stories and slants in the media which portray farming negatively and social media quickly portrays negative and often inaccurate messages.

The survey showed a worrying disconnect between consumers and farming methods. Consumers are concerned about climate change and like an identifiable link from their food choice to a climate benefit.

NZ must provide the story of its food production and provide the linkage demonstrating the lower carbon footprint. A customer is motivated by taste and quality and is prepared to pay a premium for produce which meets these claims. One difficulty is the positive association by consumers with local produce as NZ must export to distant markets. Exporters must convince the consumer that the carbon footprint is still lower, reflecting efficient farming. The consumer interest in '*Healthy soil*' has potential to be leveraged in connection with taste benefits. This is the highest-ranking factor in consumers' food choices.

The world of marketing and trends is changeable. School children learn about the environment and want to help. The fact that consumers do not understand the farming system will not stop them adopting wild and scientifically unsubstantiated claims about helping the planet. The implication by clever marketing is that an alternative product is bad for it. An example of the confusion and lack of knowledge over production would be the suggestion that soy milk is preferable to local dairy milk.

The *Taste Pure Nature* (B+LNZ, 2019) campaign could be tired, and the dynamics of the marketing world and the consumer society need constant stimulation. This could be provided by building and linking to RA and adhered to a NZ story (Market Scan, Alpha Foods, 2021c). The story must be told and updated with an emphasis on what we do well and be verified by international comparison. Opportunities could be the sale of the regenerative story and the award of those aligning farming methods, and it could be the growth of organics which could also combine with the regenerative story.

The research projects will help provide definitive science. There are a variety of industry, government and research programmes, and initiatives that need to capture the full farming landscape and not compartmentalise or exclude parts. Concentrating on RA to the detriment of other sustainable methods and organics may be too limiting. The evidence may be that RA is not delivering on the promises made of significant environmental benefits, better soil, and great farming returns. It is likely that the consumer will not care and will already have decided on the alternative view that RA deserves support. There are claims from industry (non-farming) and political groups that RA will fix all manner of problems and should be adopted. The bulk of NZ farming is in danger of being left behind without a voice and being overtaken by aggressive marketing promoting RA. In fact, mainstream NZ farming has much to be promoted and it is a wholistic picture that is needed to be promoted.

The constraints identified by the organics group are the same challenges facing other farming groups trying to navigate in this developing environment. These include a labour shortage, the lack of a shared knowledge base regarding environmental benefits and comparison of farming systems. Organics seems to have found a niche but is in danger of being left out of the RA movement, despite its willingness to be involved.

The export markets are difficult to establish, and a premium exists for organic produce only. NZ does not market itself on volume, but on the superior quality of its primary produce, its point of difference and the something extra. NZ does this well but cannot rely on previous success, the food and fibre sector must constantly strive to adapt and meet demand. Consumers like stories of sustainable farming and linkages to benefitting the climate. The food and fibre leadership groups must own and provide direction on how to do this.

Table 2 Summary of Comparison of Organic and RA findings

Factor	Org	Detail	RA	Detail
Definition clarified	No	Standards to supply detail	No	Not yet defined
Principles specified	No	Comprehensive guidelines but not yet nationally agreed. International guidance	No	Not nationally, International and White Paper suggestions
Legislation and Standards. NZ and International	Yes	International - Codex 1999, EU 2092/91 NZ Bill at second reading Standards (via Regulations) are being developed with industry	No	None - concern expressed in White Paper at stipulation and certification like Organic regime
Certification	Yes	Different schemes available new legislation will standardise criteria	No	Not specifically RA but Assurance scheme
Importance of Māori values and Hua Parakore	Yes	Recognised, incorporated, and respected Significant potential in Organic farming	No	Research question found significant support for indigenous recognition Significant potential in RA
Try and reduce costs for small operators	Yes	Has been potential for group registration for small operators. It is unclear how smaller operators will be treated under new legislation	NA	Not applicable
International framework	Yes	IFOAM in 1972 provided international framework Codex 1999 EU Regulations including 2092/91, 834/2007, 331/2000	No	Rodale Institute (Organic Regenerative) does offer certification
Government funding	Yes	February 2021 Organics Aotearoa granted \$212,500 funding from MPI Sustainable Food and Fibres (SFF) Future Fund to develop a 3-year organic sector strategy	Yes	Research Programmes detail below
Social value	Yes	Important to members, groups, farmers	Yes	Groups set up, important to farmers
Stocking and growing rates	Less	Less stock density Greater spaces in orchards between trees	High	Higher stocking rates
Addition of Synthetic fert	No	Organic options, Self-reliant for N – N fixation	Yes	Reduced rates if at all, move to position of N fixation from diversity
Herbicides	No	Prohibited	Yes	Minimised
Recent Research	Yes	Works with Future Farming Centre	Yes	Whenua Haumanu \$17.6m research programme announced, “the most comprehensive study of pastoral farming in NZ.” SFF Futures Fund co-investing in 11 research projects evaluating Regen total \$54.74m
	Yes	Good international linkage with Rodale Institute and the Organic Research Forum (UK)	Yes	McDonald’s and AgResearch regen 2-year farming trial in Hawkes Bay to improve soil health and environmental performance
			Yes	Alpha Food Labs US by BLNZ and NZW with funding MPI SFF Futures as part of Fit for a Better World
			Yes	AgResearch details 11 projects on RA on MPI website
			Yes	T&G Global and Zespri teaming up with Plant & Food Research and others to research, develop and define and promote sustainable and regen horticulture within kiwifruit, apple, and berry. Partially funded by MPI SFFFF. CE T&G Global Gareth Edgcombe

9 Conclusions

The greatest risk New Zealand's Agriculture, Food and Fibre Sector faces just now is under-estimating how much we need to change," (MPI, 2020).

The food and fibre sector needs to work with the consumer and codesign a future (as B+LNZ did with the RA studies). Consumers have choices and are interested in the story of how food is produced, *"the carbon footprint, the water footprint, the biodiversity impact"*, [Consumer Insights, \(Alpha Foods, 2021a\)](#). NZ is not a volume producer and needs to diversify its markets, identify niches, and add value. NZ needs to be quick or will get overtaken by another country keen to take the lead.

There is a stage of progress or transition with any changes to farming methods. Farm production is normally impacted by change and initially production tends to reduce. It can be disastrous to do a sweeping complete change such as the approach taken in Sri Lanka where failure arising from wholesale change to organic farming and plummeting production was inevitable. Even with a planned and staged introduction of a new farming system, most participants refer to experiencing failure and learnings along the way. The evidence states that organic production is lower than conventional farming. Research will provide the extent of RA production in comparison to conventional farming. Overseas farmers who follow RA such as Gabe Brown have had remarkable success, but NZ is a different environment with different land and soils.

The grouping and demonising of conventional farmers is of concern. Some have raised concerns with Minister O'Connor about a lack of scientific evaluation driving positive publicity about RA and diversion of limited agricultural science resources mainstream production to a new fad. There is an implication from following this route that NZ *"conventional agricultural practices are degenerative."* Changes resulting in a drop in production can only be accepted if a farmer is financially able to do this. Many farmers in NZ carry considerable amounts of debt where a reduction in income is not an option. Progress must be inclusive and open to mainstream NZ farming.

Competitiveness between methods of farming serves to prevent growth and experimentation and considering how to identify and maximise the benefits. The high standard of NZ farming distinguishes it from other nations and there is no benefit to criticise those NZ farmers performing well. The potential from other methods can serve to further promote NZ leading position but it is preferable to be inclusive.

The seven-year Whenua Haumanu project will no doubt produce results, but the sector cannot wait without an interim position. Positively, Professor Danny Donaghy expects to give farmers results within a year on aspects of carbon capture, but it will take longer to understand all aspects. A website will be dedicated for the project and regular field days scheduled. In the meantime, sector leaders need to drive a strategy and work collaboratively across the sector. Government assistance can help facilitate this.

It became obvious when conducting this study, that a holistic method of reviewing and assessing the various farming methods is needed. The review should consider, all sustainable and conventional types of farming to form an accurate overview. The review will assist in forming the NZ story of its food production, the advantages of its farming methods and add value to NZ products for its export markets.

Kate Underwood, Communication Specialist and Kaitiaki Lead at EAT NZ spoke at an online summit on unpacking how we can communicate better in our food system. She recommended a need to, *"Walk the*

talk: Telling the true story of food,” you need to figure out your why and connection to Te Taio and connect the food system to the natural world. She also promoted a theme of “*collective association*” bringing together industry organisations who connect and take people along on the journey. The link between the person behind the brand provides connection. This advice sits well with looking at the future of farming in NZ and the environmental challenges and the pace of trends and change.

A collaborative approach between conventional, sustainable, organics and RA would strengthen the sector and look to a unified direction rather than separate and divergent limbs. The agreement and unification of common principles for the farming methods can be a starting point. Most importantly strong leadership needs to take a unified sector forward.

10 Recommendations

The project provided clarity that there needs to be a collaborative way forward. This involves the various sector groups, the government and farmers combining to form a leadership group (the Group). The following actions are recommended to achieve a unified direction:

Strategy to establish the role and future of New Zealand farming methods –

- The Government to facilitate a collaborative effort from industry organisations, the Ministry for Primary Industries (MPI) and research organisations to establish a representative leadership Group.
- The Group to deliver a Strategy for organic, regenerative, and sustainable farming for the short and long term; this should align with, other sector specific strategies and address sustainable practices across New Zealand farming.

Research

- The Group should develop a methodology across all farming systems linking production, product quality, livestock, health, and well-being, adopt a holistic view, including evaluation of environmental, social and health impacts. This work must align with existing research programmes
- The Group will distinguish between organic and regenerative farming, address the meaning of organic regenerative and sustainable and include findings in the overarching strategy.

Trade and Export

- The Group will further develop a New Zealand food and fibre story for consumers from origin to final product to explain and promote the method of farming. The Group will investigate new markets, grow existing ones, and optimise what New Zealand does well.



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Appendix 1

Extract from New Zealand Organic Sector Strategy (p31)

New Zealand Organic Supporting Organisations

The following are some of the main organisations supporting organics in Aotearoa New Zealand, with brief descriptions of their general roles in terms of certification, dissemination of information beyond organic practitioners (including lobbying and marketing), research and extension for organic practitioners.

- AsureQuality – a NZ government-owned, food assurance service supplier providing organic certification.
- BioGro NZ – a company owned by the Soil & Health Association of NZ, BioGro certifies around 850 organic growers.
- Biodynamics NZ – NZ’s oldest organic organisation, with 800 members. It provides the internationally recognised Demeter organic certification, a range of publications and makes submissions to the government.
- Community Gardens Aotearoa – an informal cluster of community garden practitioners supporting each other and creating a network of community gardens. Community gardens have much in common with the organic agriculture philosophy.
- New Zealand Certified Organic Kiwifruit Growers Association – COKA provides a united voice for certified organic kiwifruit growers, including marketing, research, and extension services.
- Organic Dairy and Pastoral Group – this incorporated society and national representative body explores opportunities to help farmers. It encourages anyone interested in organic and regenerative farming, represents the sector’s voice to industry and government and provides research and extension services.
- Organic Exporters Association – this organisation serves over 140 NZ organic exporters or organisations related to exporting. It is the representative voice for organic exporters with government, working with MPI on prioritisation of work undertaken in the sector, and foreign buyers.
- OrganicFarmNZ – a not-for-profit organisation that runs an organic certification participatory guarantee scheme for domestic-only producers, provides and promotes use and benefits of organics.
- Organic Traders Association of NZ – this association works to advance trade in certified organic produce and products and promotes discussion within the industry. It has assisted the industry with standardisation of labelling, marketing, and packaging.
- Organic Winegrowers NZ – is actively engaged in education, research, advocacy, and public communications regarding organic wine. It collaborates with and receives support from NZ Winegrowers.
- Soil & Health Association of NZ – the largest membership organisation supporting organic food and growing in NZ. It publishes Organic NZ magazine and owns BioGro. It advocates on behalf of its members, consumers and the organic industry, and lobbies government.
- Te Waka Kai Ora – TWKO are the kaitiaki of the Hua Parakore Indigenous Validation and Verification system for Kai Atua (pure food). It is a kaupapa Māori, community-based organisation involving growers and those with an interest in Māori organics. It operates the Hua Parakore Indigenous system to engage mātauranga (knowledge) practices that build thriving Māori communities, ecosystems, and diverse Māori economies.
- Organics Aotearoa New Zealand – the peak sector body for organics, collaboratively advocating for organic policies that are good for the health of New Zealand’s people, communities, environment, and economy

Other Māori organic orientated organisations include:

- Tahuri Whenua Inc, formed in the early 2000s, is the National Māori Vegetable Growers Collective with a strong emphasis on Indigenous and organic production systems. They represent interests in the horticulture sector.
- Waiū Dairy is a business invested in by Māori with Māori farms as milk suppliers. The Māori CEO leads a team of Māori in establishing and growing Waiū Dairy as a high-value producer of healthy and nutritional dairy foods. The dairy plant is powered by renewable geothermal energy.
- Tuku Māori Winemakers Collective promotes sustainability and intergenerational cultural values. It brings award-winning Māori wine companies together based on their shared values of the land, family, and hospitality, to offer a wide range of varieties.

