Agriculture & Investment Services
Ministry for Primary Industries
Manatū Ahu Matua

Regenerating Aotearoa: Investigating the impacts of regenerative farming practices

Te Kāwanatanga o Aotearoa
New Zealand Government

Contents

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Message from the Minister

Our food and fibre sector is constantly improving the way it produces food, and New Zealand's food producers are already among some of the most efficient in the world.

As we shift to a low-emissions and sustainable economy, the way we produce food, and the kinds of food products that businesses choose to sell, will change.

Regenerative farming is an evolving concept focused on reducing the impacts of food production on our environment. These practices are also recognised in the Government and sector's Fit for a Better World roadmap for our food and fibre businesses.

A key recent focus has been investigating what regenerative agriculture means from New Zealand's perspective. Through its Sustainable Food and Fibre Futures (SFF Futures) fund, the Ministry for Primary Industries (MPI) put out a call in December 2020 for proposals aimed at developing a sound evidence base for what works well with our soils, climates, and farming systems. This will aid our efforts to transition to a more sustainable future for our food and fibre sector.

It's my pleasure to present this publication, which outlines MPI's regenerative agriculture journey so far. You'll read about our portfolio of 11 research projects under way through SFF Futures. These partnerships amount to a total investment of $54.74 million. MPI is assessing further research proposals.

This publication also touches on the other work in regenerative agriculture that MPI is supporting, and introduces the work of MPI's Technical Advisory Group (TAG) for Regenerating Aotearoa. The TAG was set up in September 2020 to help define what regenerative agriculture means in New Zealand. It consists of more than 25 representatives from Māori and the scientific, farming, farm advisory, and business sectors.

Some of the practices New Zealand farmers are using can already be considered regenerative and they should be recognised for these efforts. The research projects we're co-funding will help to grow our evidence base on the effectiveness of applying other regenerative agriculture practices in New Zealand. Armed with this knowledge, we'll be able to share successful outcomes widely with farmers.

Potential outcomes could include increasing the resilience of our production systems to climate impacts, reducing their environmental footprint, increasing plant and animal health and productivity, and improving water-use efficiency and retention.

Recent global market insights research has also revealed that regeneratively-produced foods have strong potential to address consumer preferences around health and the environment, and social impacts. It also suggested some consumers are willing to pay more for socially responsible and environmentally sustainable foods produced in New Zealand.

Together with our farmers and growers, we will continue to strive to find ways to improve our productive land, our freshwater and marine environments, and the health of our animals. This will aid our efforts to grow food and fibre products that are enjoyed in New Zealand and around the world.

Hon Damien O'Connor
Minister of Agriculture

Message from the Director-General

There's no question that climate change is altering the world we live in. This presents us with new opportunities and challenges.

To keep pace with our changing world and the demands of consumers, we'll need to feed a growing global population in ways that create a smaller environmental footprint.

We need smarter ways of producing food, so we're not contributing to atmospheric warming. This means we need agricultural practices that increase productivity and production, help maintain ecosystems, progressively improve land and soil quality, and strengthen our capacity to adapt to climate change. We must have the right tools and processes to respond to extreme weather, drought, flooding, and other adverse events.

Such practices align with many regenerative agriculture principles, which are all about restoring or enhancing natural ecological systems and improving environmental outcomes. This includes improving water quality and biodiversity, as well as soil and animal health. By supporting regenerative farming practices, MPI is backing our food and fibre sector to succeed by finding out what practices work well in New Zealand. We can't simply lift a solution 'off the shelf' from another country.

Many of our farmers and growers are already undertaking numerous positive practices, like rotational grazing, wetland restoration, fencing setback from waterways, riparian planting and low-till cultivation. We've received strong interest from farmers in individual conversations and at well-attended regenerative agriculture workshops held around the country. There's a lot that's already being done, and there's clearly an appetite to learn more.

The projects we're co-funding are helping to deepen our understanding of what regenerative agriculture means for New Zealand – and what does and doesn't work.

Importantly, we won't wait for the projects to be completed. We'll publish and communicate the findings regularly, so farmers and growers are well-informed about regenerative farming practices that could work for them.

Our investment into regenerative farming practices research is part of MPI's commitment towards the sustainability goals within Fit for a Better World – Taiao Ora, Tangata Ora – healthy world, healthy people. It sits alongside the Government's 2022 Budget commitments, including $710 million to tackle agricultural emissions. Almost half of that funding will help accelerate the development of high-impact technologies and practices to reduce agricultural greenhouse gas emissions, including the establishment of the new Centre for Climate Action on Agricultural Emissions. An additional $190 million has been allocated to support new integrated advisory services for farmers, foresters, and growers, supporting innovation and strengthening the animal welfare system.

This publication shows just one of the pathways New Zealand is taking as we transition to a more sustainable future for our food and fibre sector. We hope it will pave the way for more conversations about potential alternative methods for farming the land and acting as kaitiaki (guardians) for generations to come.

Ray Smith
Director-General
Ministry for Primary Industries

From the Chief Departmental Science Adviser

Aotearoa New Zealand has a long, proud history of agricultural science. It is this, along with the latitudinal and climatic advantages that our position in the South Pacific allows us, which makes us the envy of the food production world.

Our agricultural successes are borne out of a tradition of open collaboration between farmers and scientists. Farmers identified problems, proffered solutions, and scientists tested these for applicability and context, and to expand their reach.

For example, Ron Sharp, a farmer in Gordonton, frustrated by the slow pace of milking in a walk-through shed, designed the world's first herringbone shed – revolutionising the milking process. Merv Hicks, a Taranaki farmer, recognised Sharp's genius and developed things further, creating the first rotary milking shed. Similarly, Bill Gallagher, a North Waikato farmer, pioneered the use of electrical fences in dairy farming, which was built upon by Dr Doug Phillips, who developed the 'unshortable' electric fence. Then there was the quantification of the benefits of rotational grazing by Dr Campbell McMeekan, and the exceptional – by their simplicity – pasture management protocols designed by Dr Arnold Bryant.

These simple developments that we now take for granted increased per hectare productivity by 25–30 percent and provided farmers with ways to manage seasonal highs and lows more effectively. Together, farmers and scientists created the biologically resilient system synonymous with New Zealand.

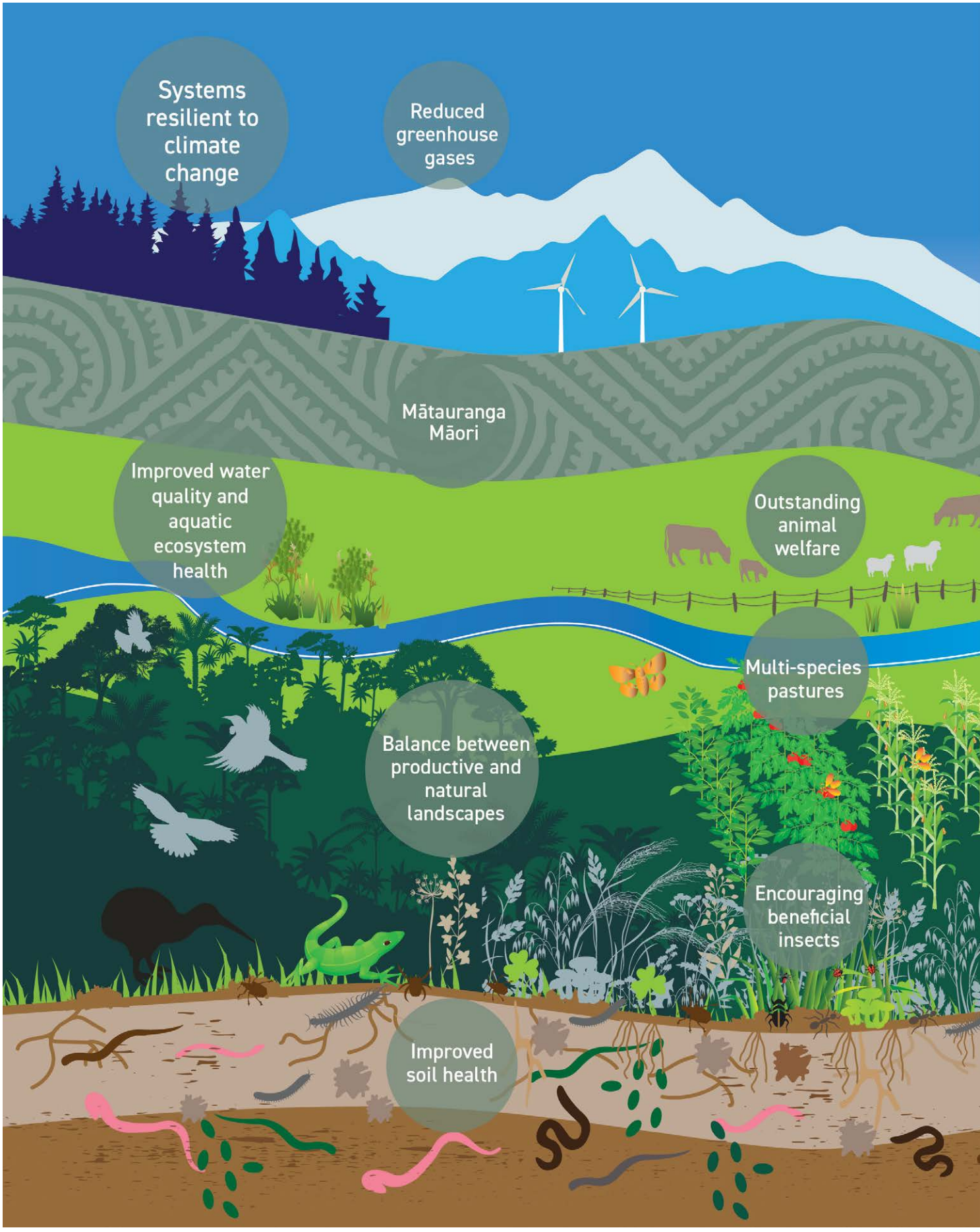
And yet, we have our challenges too. We produce wholesome, premium foods, with a lower environmental impact than virtually any nation on Earth; but we need to improve water quality in many lowland catchments and reduce our greenhouse gas footprint. Farmers recognise this and want to act.

So, once again it is time for farmers and scientists to join forces and solve the problems of today. How can we: reduce losses of contaminants to receiving waterbodies; reduce our net contribution to atmospheric warming, by both reducing our greenhouse gas emissions and sequestering carbon on our whenua; ensure our farmers and growers are rewarded for their efforts; and consistently provide our consumers with the most sustainable and wholesome foods they want?

At MPI, we're supporting Regenerating Aotearoa to identify solutions to our unique problems. Regenerating Aotearoa is an outcome-based philosophy designed specifically with New Zealand in mind, dealing with our problems and providing opportunities. It aligns with the goals of our Government and sector Fit for a Better World roadmap, including recognising the value of mātauranga Māori and the 'in place' knowledge of farmers in their rohe.

Most importantly, it is evidence based, with hypotheses induced and tested, data collated, and evidence for or against change identified. We are not following a fad; together, we are designing systems that will meet the broad, long-term sustainability needs of all New Zealanders.

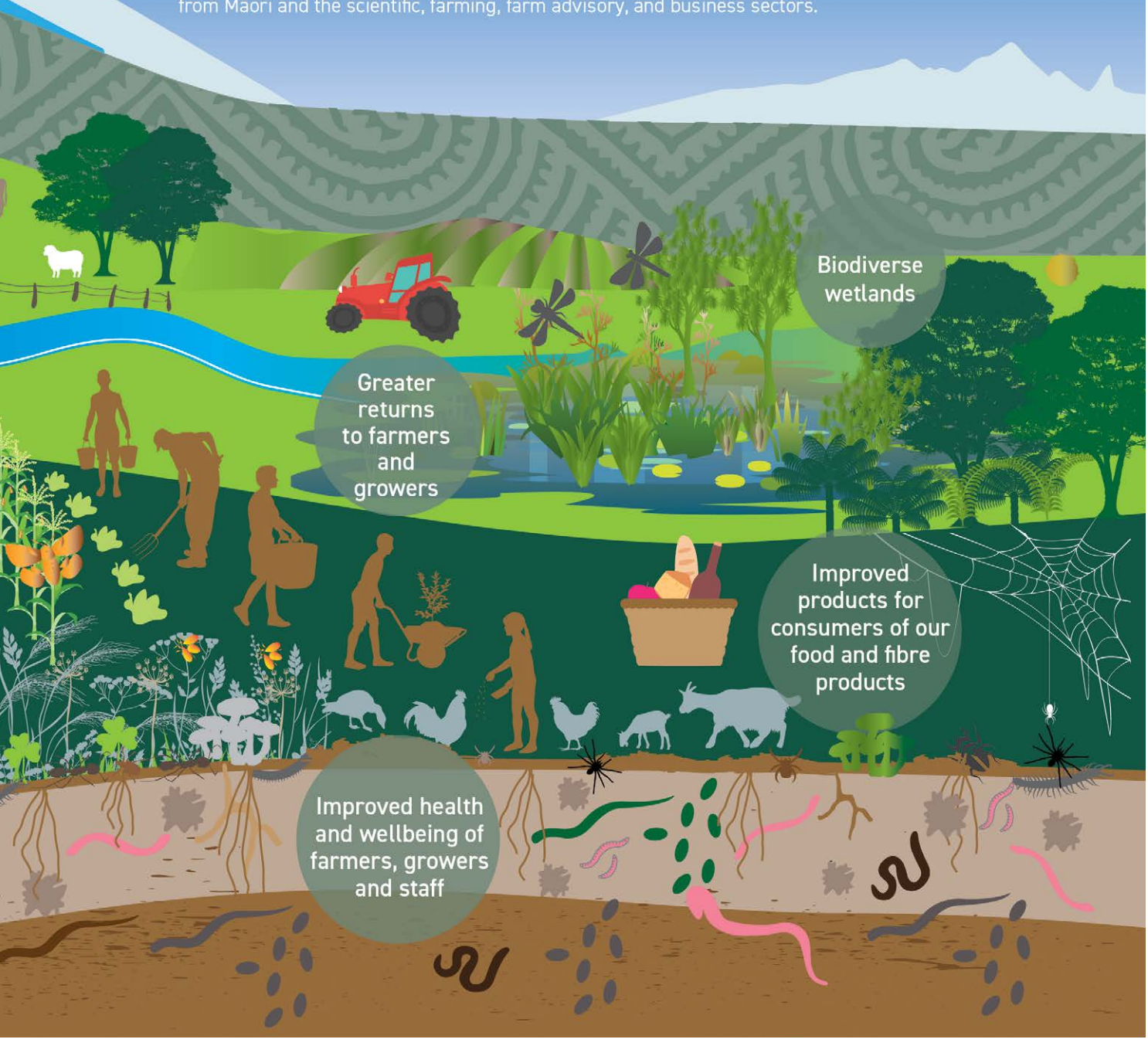
Dr John Roche
Chief Departmental Science Adviser
Ministry for Primary Industries


Systems resilient to climate change
Reduced greenhouse gases
Mātauranga Māori
Improved water quality and aquatic ecosystem health
Outstanding animal welfare
Multi-species pastures
Balance between productive and natural landscapes
Encouraging beneficial insects
Improved soil health

A vision for Regenerating Aotearoa

Practices that, in isolation or collectively, can achieve improved outcomes for our productive landscapes, rivers, coastal and marine environments, biodiversity and natural ecosystems, improve animal welfare, have potential to increase profitability and add value, promote health and wellbeing for humans, whilst ensuring we can grow and consume our food and fibre products sustainably, and meet goals of taiao, whenua ora, mauri ora, and te ao tūroa.

Vision statement developed by members of the MPI-facilitated Technical Advisory Group (TAG) for regenerative agriculture. The TAG is comprised of more than 25 representatives from Māori and the scientific, farming, farm advisory, and business sectors.



Our story so far

2019

DECEMBER
Primary Sector Council announces its vision for New Zealand's agriculture, food and fibre sector to be a world-leader in modern regenerative production systems that are Fit for a Better World.

JULY
Regenerative agriculture identified as a cornerstone of the 'Sustainability' goal in the Government and sector's Fit for a Better World roadmap for the food and fibre sector.

2020

JULY
Quorum Sense receives $1.87 million for farmer peer-to-peer learning on regenerative agriculture practices through MPI's Productive and Sustainable Land Use – Extension Services programme.

SEPTEMBER
Technical Advisory Group established to develop a New Zealand-relevant vision for regenerative agriculture.

DECEMBER
MPI's Sustainable Food and Fibre Futures (SFF Futures) fund calls for research proposals that support the establishment of an evidence base for regenerative farming practices.

2021

MARCH
MPI's Māori Agribusiness Extension programme 'Discovery Phase' on regenerative agriculture and mātauranga Māori project commences.

APRIL
Two-day hui on regenerative agriculture held in collaboration with the Agricultural and Marketing Research and Development Trust (AGMARDT), attended by approximately 150 participants from across New Zealand.

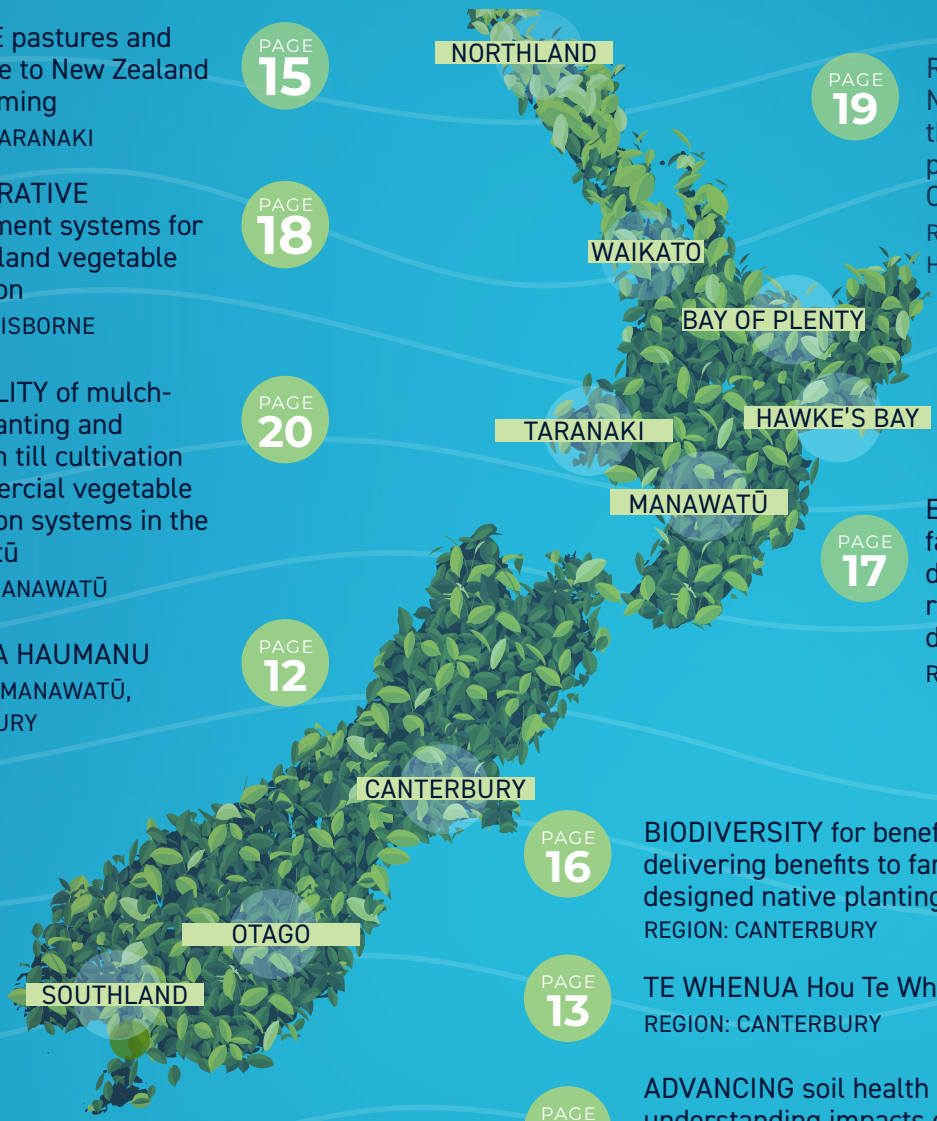
JUNE
First SFF Futures project from the call for research proposals begins, titled 'Evaluating regenerative farming principles and developing farmer resilience on a dryland demonstration farm'.

JUNE
MPI's Māori Agribusiness Extension programme's three-year 'Accelerator Phase' project on regenerative agriculture and mātauranga Māori commences.

2022

SEPTEMBER
Whenua Haumanu, MPI's largest research project on regenerative farming practices, commences.

Regenerative farming practices research across Aotearoa



Investigating global market potential

Early research suggests regenerative agriculture could present a significant marketing opportunity for New Zealand's farmers and growers.

In July 2021, MPI contributed $390,000 through the Sustainable Food and Fibre Futures fund to research the global market potential of regenerative agriculture for New Zealand's sheep, beef and wine sectors. It aimed to understand consumers' attitudes within three of New Zealand's international markets – the United States, Germany and the United Kingdom. The project was led by Beef + Lamb New Zealand and Bragato Research Institute.

The research found:

- Regenerative agriculture, though still in its infancy, is gathering momentum and is set to become a significant trend in food and fibre products internationally.
- Brands and multi-national businesses are starting to follow farmers' leads in the uptake of regenerative agriculture.
- While the concept of regenerative agriculture has yet to properly take hold among consumers as a driver of their choices, there is a growing consumer interest in regenerative agriculture.
- Consumers indicate willingness to pay more for regeneratively produced food, especially if science can show its taste, wellbeing and environmental benefits. There are opportunities to link regenerative agriculture with solutions to climate change.
- There are some regenerative practices that may be worth adopting within New Zealand farming systems. Further research and testing are required to test their applicability and quantify the benefits.

Extension research under way

Beef + Lamb New Zealand and Bragato Research Institute's research recommended a targeted communications approach to educate consumers on the benefits of regenerative agriculture. Following on from the 2021 research, MPI's Market Insights team is investigating international consumers' views on regenerative agriculture, with a focus on dairy products. The research seeks to identify what positioning is needed for consumers to pay a premium price for goods produced through regenerative farming practices. As part of this, consumers in the United States, Japan, China and Indonesia will be surveyed.

Farming for the future

Golden Bay dairy farmer Wayne Langford opened his farm up to his local community, to collectively develop a holistic sustainable farming model.

"I wanted to address the increasing divide between the farming community and the rest of the community, and draw on our collective knowledge," says Wayne.

Wayne set up a project called 'Farming 2030' to connect with his local community.

The starting point was an ad in the local paper inviting locals of all ages, skills and experience to help him run his farm more sustainably.

"I got a huge response from people of all ages wanting to be involved – from 13 years old to 85," says Wayne.

Wayne and his wife Tyler own a traditional dairy farm of 120 hectares. Ninety hectares is grazed by their herd of 250 cows.

Alongside conventional farming practices, the community group started to experiment with regenerative practices. "We planted out mixed pasture species and our first crops were a 'learning opportunity' – in other words they failed! From there we adjusted and evolved.

"We've done a lot of work on soil structure and biology, as well as riparian planting and wetland work.

"We've planted 2000 trees along the waterways and three to four years later it's starting to look good. Having 20 to 30 community members passionate about riparian planting showing up to help with the planting is a pretty humbling experience."

Wayne says regenerative agriculture has moved on considerably in the past three years. At the start it was hard to find good advice and data. "We've been flying blind a bit and learning through trial and error. Every farm, region and community is different, whether it's Southland or Waikato, so it's important to bear that in mind.

"It's also important to remember that regenerative agriculture takes time. If you plant a crop and it doesn't work, you have to try it again next year, so it takes time to see results. There's a big learning curve, and taking a community on the journey with you and maintaining their interest over such a long period of time is a challenge.

"We also realised early on that we wouldn't be able to achieve all the bright ideas. It's better to pick a couple of options and see them through."

Wayne says the project has been a big help on a personal level. "Farming can be lonely and challenging, and I've observed a lot of farmers with mental health challenges, including myself. One of the benefits of this community group is being surrounded by interested people who become your support network."

Wayne says he's starting to see some results three years on. "I'm settling on a preferred pasture mix now that works on my land, which has enabled us to decrease our herbicide and pesticide use. We've also managed to decrease our use of fertiliser while maintaining good soil. We've been seeing some positive changes in soil biology through visual soil assessments."

Although he's committed to continuing to experiment with regenerative farming practices, he says the proof will be in the data. "Anything we do needs to be profitable and sustainable.

"I'm hopeful that eventually the data will show benefits to our bottom line."

Regenerative farming practices research

The following projects are funded through MPI's Sustainable Food and Fibre Futures fund. They form part of a portfolio of regenerative farming projects that will collectively contribute to an evidence base on the effectiveness of applying regenerative farming practices in New Zealand.

Testing claims around regenerative agriculture

Whenua Haumanu (Nurturing the land through exploring pastoral farming) is MPI's most comprehensive project on the effects of both conventional and regenerative agricultural practices.

The programme focuses on both standard and diverse pastures and conventional and regenerative management practices. It's taking place across several research sites to assess the suitability and relevance of regenerative agriculture in New Zealand.

The project will measure multiple aspects across the farm system, exploring the impact on soils, pasture performance, animal production and welfare (dairy and sheep), nutrient levels and losses, carbon production and storage, and product quality.

Whenua Haumanu is the cornerstone of MPI's portfolio of regenerative agriculture projects, bringing together universities, Crown Research Institutes, and industry.

The results gained from the project will provide a robust evidence base for both conventional and regenerative practices. Results will be incorporated into scientific and industry models, and tested across a wide range of partner sites across New Zealand, to inform the international marketing of our agricultural products.

Research sites

- Massey University's Dairy 1 farm grazed by lactating dairy cows;
- Massey University's Pasture and Crop Research Unit (PCRU) grazed by sheep;
- Lincoln University's Field Research Centre (FRC) grazed by sheep;
- Additional monitoring sites are planned on some Pāmu farms and pastoral industry demonstration farms.

Whenua Haumanu

PROJECT START: 2 September 2022

PROJECT LENGTH: 7 years

MPI FUNDING: $17,581,000

INDUSTRY FUNDING: $8,540,000

RESEARCH PARTNERS: Massey University, AgResearch, Dairy Trust Taranaki, Lincoln University, Manaaki Whenua – Landcare Research, Riddet Institute

INDUSTRY PARTNERS: Fonterra, Synlait, Beef + Lamb New Zealand, DairyNZ, Pāmu, Northland Dairy Development Trust, Fertiliser Association of NZ, Ravensdown Fertiliser Cooperative, Ballance Agri-Nutrients, Livestock Improvement Corporation, PGG Wrightson Seeds, Agricom, Barenbrug, On-Farm Research, AgFirst and Quorum Sense.

REGIONS: Manawatū, Canterbury

Photo: David Wiltshire, Massey University.

Validating the science behind regenerative farming practices

In Te Ao Māori, soil is a taonga (treasure). This project investigates the impacts of regenerative farming practices on dairy farming, with an emphasis on restoring and enhancing soil health.

The whole farm-scale study will trial regenerative practices at Ngāi Tahu Farming's Te Whenua Hou farming operations in North Canterbury, and compare results with a conventional dairy farm next door. The scientific measurements will be overseen by leading research providers.

The project aims to demonstrate a viable alternative system that enhances soil health, has a lower environmental footprint, reduces water use, promotes kaimahi wellbeing, complements the mātauranga Māori (knowledge) of Māori landowners, and is financially profitable.

The study will also assess the impacts of regenerative approaches on the dairy farm workers, through a range of metrics including worker wellbeing, engagement, sleep and fatigue, and task diversity and productivity.

In partnership with MPI, Ngāi Tahu Farming Limited and Ngāi Tūāhuriri will work closely with AgResearch, Manaaki Whenua, DairyNZ, and The AgriBusiness Group on this project.

Key activities

- Set up and implement a range of measurements on both farms to compare outcomes from conventional versus regenerative practices.
- Investigate historical values and uses of Te Whenua Hou with a focus on soil management practices.
- Compare impacts on dairy workers' health and wellbeing through surveys and interviews.

Ngāi Tūāhuriri kaumātua Joan Burgman, Ngāi Tahu Farming representative Barry Bragg and Agriculture Minister Damien O'Connor at the launch of Te Whenua Hou Te Whenua Whitiora.

Te Whenua Hou Te Whenua Whitiora (The New Land, The New Horizon)

PROJECT START: 5 August 2022

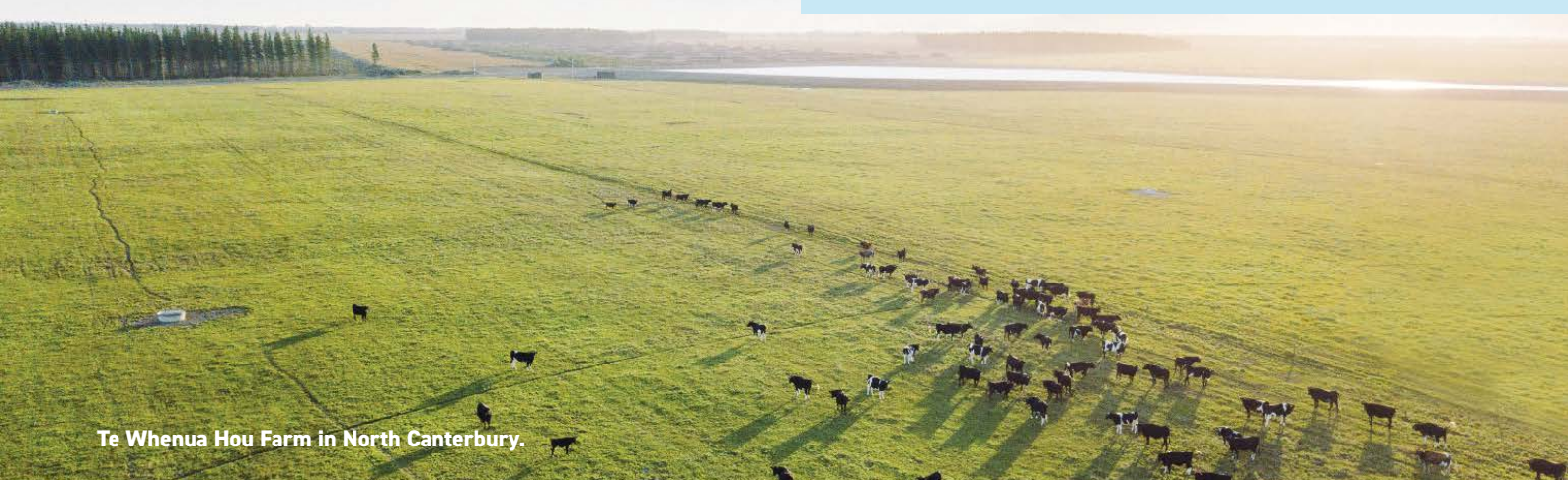
PROJECT LENGTH: 7 years

MPI FUNDING: $8,036,535

INDUSTRY FUNDING: $3,548,720

INDUSTRY PARTNER: Ngāi Tahu Farming Limited, Ngāi Tūāhuriri

REGION: Canterbury



Te Whenua Hou Farm in North Canterbury.

Advancing soil health on-farm

Synlait and Danone are partnering with AgResearch to benchmark and optimise soil health across 10 of their supplier farms.

Soil health is the basis of our food system and New Zealand's economic health. This project seeks to understand how to measure and manage soil health to boost environmental and economic performance on New Zealand farms.

AgResearch is working with Synlait Milk and Danone supplier farmers on the project, which runs across 10 commercial dairy farms in Canterbury, Otago and Waikato.

In each region the farms have been paired for comparison based on location, soil type and farm performance. Soil health will be measured across each farm. In addition, two paddocks on each farm, one managed conventionally and the other using various regenerative farming practices, will be evaluated.

Key activities

- Compare practices such as hyper-diverse pastures and limits on synthetic nitrogen fertilisers (which are used within regenerative systems) with conventional practices.
- Improve knowledge on how to measure soil health routinely on-farm.
- Enhance understanding of managing soil health to positively impact on-farm environmental and economic performance.

Advancing soil health on-farm and understanding impacts on dairy farm economic and environmental performance

PROJECT START: 1 September 2021

PROJECT LENGTH: 5 years

MPI FUNDING: $2,815,500

INDUSTRY FUNDING: $1,040,400

INDUSTRY PARTNERS: Synlait Milk Ltd, Danone Nutricia New Zealand Ltd

REGIONS: Canterbury, Otago, Waikato

Photo: Synlait.

Developing an evidence base for diverse pastures on dairy farms in dry climates

A seven-year trial of diverse pasture species on a commercial dairy farm aims to scientifically test key assumptions behind regenerative agriculture.

Dairy farmers in Taranaki are already feeling the negative impacts of climate change. Warmer winters, and frequent summer dry spells and droughts are creating challenging conditions for dairy systems based on conventional ryegrass-based pastures. This project will identify whether diverse pasture species might help Taranaki dairy farmers increase the resilience of their farms to climate change.

The project will run for seven years at the Dairy Trust's Taranaki Waimate West farm in South Taranaki. Two self-contained farmlets will be established: one with conventional ryegrass-based pastures, and one with diverse pastures as recommended for a regenerative farming system.

The project will assess the economic and environmental impacts of adopting regenerative diverse pastures in a Taranaki dairy farming system. An evidence base will be developed to determine if diverse pastures reduce nutrient loss and greenhouse gas emissions, increase soil water retention and soil carbon sequestration, and increase production and profits. It will also test cow milk for micro and macro nutrient differences to see if there are health benefits, such as higher Omega-3, and sensory testing to ensure the diverse pasture milk is still fit for purpose for local and global customers.

The project aims to scientifically test key assumptions behind regenerative agriculture, providing evidence for or against any financial and environmental differences between alternative and conventional systems. Results are expected to apply to systems across New Zealand that are prone to summer dry conditions.

Diverse pastures and relevance to New Zealand dairy farming

PROJECT START: 28 February 2022

PROJECT LENGTH: 7 years

MPI FUNDING: $2,286,371

INDUSTRY FUNDING: $1,027,210

INDUSTRY PARTNERS: Dairy Trust Taranaki, DairyNZ

REGION: Taranaki

Boosting farm yield through beneficial insects

Biodiversity for beneficial insects; delivering benefits to farmers from designed native plantings.

This project aims to boost New Zealand farm yields by attracting beneficial insects to farms using specifically designed native planting.

By looking at the relationship that specific native plants have with insects, researchers will be able to see which ones increase pollination and tackle pests most effectively.

Forty-five arable, dairy and sheep farms in Canterbury are planting on a variety of areas – such as fence lines, road verges and watercourses – with local native plants proven to support and maintain beneficial insect life.

By increasing the number of pollinating insects, the project team expects to see increased yields across the farms, which will lead to improved economic and environmental outcomes for the farmers involved.

Increasing the number of predator insects to tackle pests could also reduce the use of pesticides and insecticides.

Key activities

- Undertaking designed native planting on farms.
- Surveying the number of pollinators and beneficial predators at the time of planting natives and surveying again two to three years later.
- Researching the optimal mix of plant species, planting area, and planting landscapes to maximise the number of beneficial insects without creating refuges for insect pests.
- Pollination and natural pest suppression ecosystem services on farms with native plantings will be quantified and compared to those services on farms without such plantings.
- Determine whether increasing farmers' knowledge about the contribution that native plantings have on beneficial insect ecosystem services will improve uptake of such plantings.

Boosting farm yield through beneficial insects

PROJECT START: 13 August 2021

PROJECT LENGTH: 5 years

MPI FUNDING: $2,209,030

INDUSTRY FUNDING: $1,002,420

INDUSTRY PARTNERS: Plant & Food Research, Foundation of Arable Research, Synlait Milk Ltd, Southern Pastures, Pāmu Landcorp, Beef + Lamb New Zealand, Brailsfords Ltd, Selwyn District Council and ECan, several retired arable farmers.

REGION: Canterbury

Photographer: Brian Cutting.

Regenerative farming in drought-prone areas

A demonstration farm in Hawke's Bay aims to improve the resilience of dryland sheep and beef farm systems.

The Hawke's Bay drought in 2020 had a severe impact on farmers. With droughts becoming more frequent and threatening the financial and environmental sustainability of many farms, this project seeks viable and resilient long-term farming systems.

It will also scientifically test and validate claims promoting regenerative agriculture in New Zealand, which suggest regenerative agriculture can boost resilience to climate instability and increase yields. The project will examine the use of regenerative practices, such as diverse species mixtures, different grazing management, and alternative fertiliser strategies.

The programme focused on component research in the first year, and is moving into farmlet studies in the second year.

Key activities

- Evidence based trials to define the role and profitability of regenerative agriculture, including diverse pasture species mixes, lax and deferred grazing.
- Comparing regenerative with conventional practices and principles.
- Developing an extension programme involving workshops, observation walks and economic analysis.

Evaluating regenerative farming principles and developing farmer resilience on a dryland demonstration farm

PROJECT START: 22 June 2021

PROJECT LENGTH: 4.5 years

MPI FUNDING: $1,530,000

INDUSTRY FUNDING: $550,000

INDUSTRY PARTNERS: On-Farm Research, AgFirst, Hawke's Bay Regional Council, Barenbrug, Poukawa Research Foundation, AGMARDT, Ravensdown

REGION: Hawke's Bay

Trial plots at the Poukawa Research Farm, September 2021.

Photographer: Noel Smith.

Evaluating the impact of growing vegetables regeneratively

What impacts do regenerative agriculture practices have on vegetable farming, particularly in relation to productivity, profitability, people, and environment? A unique partnership across government, food retail, horticulture production, and research aims to find out.

The project will run for three years at LeaderBrand's vegetable production operation in Gisborne. A demonstration trial site will be established to evaluate the impacts of using compost and cover crops across two crop rotations – winter salads and a main summer crop. The trial site will run alongside a control site operating under current management practices.

Both the conventional and regenerative trial sites will be subject to a range of soil and crop measures to analyse soil chemistry, soil physics, soil biology, and soil quality metrics. These measures will evaluate the effects of the regenerative management practices on production and soil health outcomes, while providing insights into associated environmental risks such as nitrate leaching.

Regenerative agriculture practices that will be tested

- The use of compost as a supplementary nutrient source and soil conditioner to improve soil quality and health.
- The strategic use of cover crops to improve soil quality and health, and recycle nutrients.
- The role of perennial plantings in the farmscape to facilitate ecosystem restoration.

The project will also look at how the implementation of the above regenerative agriculture practices and principles affect local communities, iwi and workers on-farm – and will integrate feedback from those stakeholders throughout.

Regenerative management systems for New Zealand vegetable production

PROJECT START: May 2022

PROJECT LENGTH: 3 years

MPI FUNDING: $404,965

INDUSTRY FUNDING: $600,000

INDUSTRY PARTNERS: Woolworths New Zealand, LeaderBrand Produce, Plant & Food Research

REGION: Gisborne

Identifying the value of regenerative horticultural production

What do consumers want when it comes to growing kiwifruit, apples and berries? That's what Zespri, T&G Global and Plant & Food Research want to find out.

This project is the first stage of a proposed six-year partnership, which seeks to define, validate and implement regenerative horticultural practices valued by New Zealand growers and consumers.

The aim, through co-design methods with growers, is to improve the environmental and social performance of growing kiwifruit, apples and berries while maintaining high production and quality.

Through the use of surveys, workshops and other collaborative methods, project leaders will collect data to understand the opportunities and differences of regenerative practices in horticulture. A range of possible practices is being assessed through scientific, grower and consumer perspectives.

The primary outcome of the first stage is identifying the opportunities and benefits regenerative practices may bring to horticulture. Another outcome is creating an engaged project group including growers, industry representatives, mana whenua, and scientists to explore the regenerative horticulture opportunities for the sector and develop a plan to move forward with.

One of the key objectives for the proposed six-year programme is for the kiwifruit, apple and berry sectors to improve across a wide range of sustainability measures. Stage 2 of the programme is currently in development.

RegenHort – Boosting New Zealand horticulture through regenerative practices (Stage 1 – Opportunity Discovery)

PROJECT START: 17 August 2021

PROJECT LENGTH: 1 year

MPI FUNDING: $100,000

INDUSTRY FUNDING: $100,000

INDUSTRY PARTNERS: Zespri International, Turners & Growers Global, Plant & Food Research

REGIONS: Bay of Plenty, Hawke's Bay

Other Sustainable Food and Fibre Futures regenerative projects

Below are other projects with a focus on regenerative farming practices that were funded by SFF Futures prior to the official call for regenerative agriculture research proposals.

Future dairy farm systems for Northland

PROJECT START: 18 May 2020

PROJECT LENGTH: 5 years

MPI FUNDING: $776,114

INDUSTRY FUNDING: $917,920

INDUSTRY PARTNER: Northland Dairy Development Trust

REGION: Northland

This project will demonstrate strategies to help farmers adapt their farm systems to mitigate the effects of climate change and reduce their greenhouse gas footprint and impact on freshwater. It will test the effectiveness of three different dairy farm systems.

Feasibility of mulch-direct planting and minimum till cultivation in commercial vegetable production systems in the Manawatū

PROJECT START: 27 July 2021

PROJECT LENGTH: 3 years 10 months

MPI FUNDING: $89,369

INDUSTRY FUNDING: $160,620

INDUSTRY PARTNER: Wholegrain Organics

REGION: Manawatū

This project's mission is to support the transition of commercial vegetable production operations in New Zealand to regenerative farming practices, with the lowest risk possible to the farmer and maximum benefits to the environment. It will undertake a proof-of-concept trial of mulch-direct planting for commercial vegetable production in New Zealand conditions and provide robust measures of the environmental benefits.

Farming with native biodiversity

PROJECT START: 19 October 2021

PROJECT LENGTH: 20 months

MPI FUNDING: $998,200

INDUSTRY FUNDING: $430,000

INDUSTRY PARTNERS: New Zealand Landcare Trust, Silver Fern Farms, Living Water Partnership

REGIONS: Northland, Waikato, Bay of Plenty, Hawke's Bay, Canterbury, Otago, Southland

This is a project pilot to develop science-based resources that enable farmers to take long-term affirmative action for biodiversity on their farm. The project is working with farmers, catchment groups, councils and others to develop case studies in different regions, build people capability, and co-develop resources that will bring biodiversity into farm-systems thinking, and provide a proof-of-concept that can be applied nationally.

Helping farmers learn from each other

MPI is supporting peer-to-peer farmer learning through Quorum Sense.

In July 2020, MPI invested $1.87 million in the Quorum Sense Extension Project, a three-year national initiative supporting farmers and the wider community to share knowledge and ideas about regenerative farming systems and practices, as well as successes and setbacks.

Quorum Sense is a network led by farmers. Its mission is 'generating and sharing practical knowledge to support regenerative farm systems and vibrant rural communities'. This includes arable, dairy, deer, beef and sheep farmers as well as horticulturalists and viticulturalists.

People can share information openly through Quorum Sense's WhatsApp and Facebook community groups.

Quorum Sense's website is also becoming a knowledge hub of information and inspiration to encourage those in the process of transitioning to regenerative farming systems. The hub provides links to a library of podcasts and case studies featuring farmers who are leading practitioners of regenerative agriculture.

Quorum Sense also hosts popular field days, 'Quorum Exchange' events, and webinars open to all. The network has just begun directly supporting regional farmer groups with their own activities.

Quorum Sense's Board sets the strategy and vision for the network, and a farmer steering group helps guide the choice of topics, practices, and principles covered by their knowledge hub and associated extension activities. This ensures the focus remains on the goal of increasing the connectivity, wellbeing and resilience of farmers, rural communities, and rural ecosystems.

Below: Canterbury Field day with farmers teaching farmers.

Regenerative agriculture and mātauranga Māori

MPI is helping Māori farmers explore how to implement regenerative farming practices alongside traditional Māori practices.

MPI's Māori Agribusiness Extension programme funded a $50,000 six-month 'Discovery Phase' project in March 2021 to introduce regenerative agriculture practices to Māori landowners, and discuss how these could work alongside mātauranga Māori concepts. This may include Māori traditions of kaitiakitanga (guardianship) and maramataka (planting and harvesting according to the lunar cycle).

Activities included:

- workshop presentations from regenerative agriculture experts and scientists;
- wānanga on marae with mātauranga Māori experts;
- participating in on-farm demonstrations by regenerative agriculture experts;
- visiting farms that have transitioned to regenerative farming practices.

In June 2021, $263,000 was committed for the first year of an 'Accelerator Phase' project. As well as continuing to build on this phase and reach out to Māori landowners through workshops and wānanga, the three-year project is trialling regenerative methods that may have positive flow-on effects to other parts of the farm system, such as soil, freshwater and animal health.

This initiative includes a cluster of 12 Māori land trusts and incorporations, comprising 9100 hectares of land between Mōkau and Whanganui. Farming activities on these land blocks include dairy farming, cattle farming and mixed cropping.

Outcomes to date include:

- surveying all the landowners about their regenerative agriculture aspirations;
- collecting, analysing and recording baseline data for each land block, and developing action plans to monitor these data regularly;
- collating a 'Kete of Practices' for Māori landowners to use (including visual assessment tools for soils, pasture and farm practices, and guidelines on various regenerative farming practices).

Whenua case studies under way

- Araukuku B Trust, an 80-hectare farm block near Hāwera, introduced regenerative farm practices in April 2021. This included planting a mix of 12 grass species and using fish oil and seaweed-based fertiliser instead of conventional fertilisers. Visual soil assessments undertaken in April 2022 show better soil structure and texture. Rooting depth had increased as well as the nodule counts on the three species of clover planted. Increased worm count and size were also noticed.
- Ngāti Tu No 1 Whānau Trust, an 80-hectare dairy farm near Manaia, recently planted its paddocks in a diverse dairy seed mix. Baseline data recorded in March 2022 will be monitored, and evaluations conducted regularly to assess the performance of the grasses, stock and soil.
- Ngāti Tu 22D Trust, a 60-hectare dairy farm near Manaia, has ordered a dairy seed mix for planting out this winter.
- Te Manea Takutaimoana Kauika Stevens Whānau Trust is also looking to incorporate regenerative farming practices on one of the land blocks they manage at Waitōtara. They are currently working with a seed company to identify the best seed mix to plant on the Turereao land block.

The Māori Agribusiness Extension programme provides tools, information and advisory services to cluster members. The cost of implementing regenerative farming practices is borne by the individual land blocks.

"We believe regenerative farming practices align closely with the kaitiakitanga responsibilities that Māori have, to care for the land and hand it onto the next generation in the same or better condition than we received it."

BILLY TIPENE, Chair, Ngāti Tanewai 12A Trust/Te Tai Hauāuru Whenua Ora Collective member

"Regen ag practices reflect aspects of mātauranga. Māori framework principles in their entirety are identified as Mauri Whenua, Mauri Awa, Mauri Tāngata and take a holistic approach to the land, water and people. It highlights the inter-relationship that exists between these three, and not just soil health."

TURAKE MANUIRIRANGI, Chair, Araukuku B Trust

Investing for impact

Working with private impact investors

Investing alongside private impact investors will help increase investor confidence and incentivise more investors to support regenerative agriculture practices.

MPI is exploring a collaboration with Toha, an impact investment marketplace, through a pilot with six North Island farming families, as they transition to regenerative farming practices.

The six-month pilot will include on-farm scientific measurement and data reporting tools. It aims to increase the quality of self-reported data to show how certain actions are leading to improved on-farm outcomes and performance.

MPI is planning to invest just under $113,000 in the pilot, with the majority of funding going directly to farmers on a pay-for-results basis and the remainder of the investment contributing to a blended finance structure. The blended finance approach, including the private investment, will provide funding for farmers to help cover costs associated with practice change, such as re-seeding multispecies pastures.

Hawke's Bay impact investment pilot

MPI is exploring a partnership with The Nature Conservancy (TNC) New Zealand and its impact investment arm, NatureVest, and the Hawke's Bay Regional Council, to establish an innovative investment model for the pastoral farming sector.

The programme, currently called Right Tree Right Place, will involve working with the farming community to plant trees on marginal land to earn a return and enhance regenerative farming practices.

The project aims to deliver significant environmental benefits at a whole-of-system scale, as well as a proof-of-concept new model for sheep and beef farming in New Zealand that is financially viable.

The pilot will involve up to 50 farms comprising about 37,450 hectares, with a view to scaling this up within Hawke's Bay. If successful, the model could be adapted for other regions.

Activities will include:

- developing an engagement and extension programme with farmers;
- developing integrated farm plans;
- monitoring impacts;
- building the knowledge base for regenerative agriculture and exploring potential regenerative agriculture market mechanisms;
- testing interest with potential investors and establishing an impact investment model that is ready to go to market.

The pilot is expected to begin in the first half of 2023.

Farming to meet international regenerative standards

Interest in food that's produced using regenerative practices is gaining momentum across the globe.

New Zealand-owned company Atkins Ranch has been a partner of the US Savory Institute's Land to Market Programme since 2019 to promote and support regenerative production of lamb meat and by-products. Land to Market is the world's first outcomes-based verified regenerative certification. It requires partners to undertake a range of measures annually, which cover soil health, biodiversity, water infiltration, and ground cover.

"I see regenerative agriculture as leaving the land in a better state for future generations," says Atkins Ranch Chief Executive Officer Pat Maher.

"That includes improving soil health, minimising tillage, and encouraging biodiversity rather than monocultures.

"Atkins Ranch was one of the first companies in the world to join the Savory programme. Part of the reason the programme piqued my interest is that I believe we already have a competitive advantage over other countries due to the way we farm in New Zealand. By showing that we meet internationally recognised regenerative agriculture standards we're able to access high-value markets overseas."

Atkins Ranch sells premium grass-fed lamb into the US market and has supply contracts across five regions of New Zealand. The company has been piloting regenerative farming practices since 2019 with a core group of 23 farmers. This is now expanding to more than 70 farms.

'Lifelong farmer' Stuart Ellingham was one of the first farmers to sign up to the pilot. He is Managing Director of Horizon Farming, which comprises eight farms on 10,000 hectares in Hawke's Bay, and has a degree in agricultural commerce from Lincoln University.

"I was sceptical at first," says Stuart. "However, I saw it as an opportunity to put the microscope on New Zealand to see how we stack up under the Savory Institute's measurement systems.

"With conventional farming practices in New Zealand I believe most farmers are undertaking continuous improvement anyway. To meet the Savory programme requirements we just needed to tweak a few things, such as not undertaking full tillage cultivation, and being more aware of the soil.

"We're in the third year of trials with mixed results.

"This new way of farming isn't perfect – and we're still making mistakes, but if we can tweak our practices to make improvements then happy days."

In July 2022, MPI committed $142,480 towards a two-year, $356,200 project through its Sustainable Food and Fibre Futures fund to rapidly scale-up the number of verified lamb producers in the Atkins Ranch 'producer group' in the Land to Market Programme.

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