

Our Land and Water

Annual Report Summary



July 2019 – June 2020

10 Things Our Land and Water Learned in 2019–2020

1

Around half the nitrogen and 80% of the phosphorus in our rivers and lakes comes from human actions.

2

NZ beef from the Taupō region has a significantly lower carbon footprint and freshwater eutrophication than European beef, and European consumers are willing to pay a 32% price premium.

3

Producing certified carbon-neutral dairy products can reduce nitrogen leaching (42%) and GHGs (20%) with potential to increase profit (15%).

4

If all known and developing mitigation actions were fully implemented by 2035, potential nitrogen, phosphorus and sediment losses could decrease by 34%, 39% and 66%, respectively, compared to 2015.

5

Visiting a farm builds trust and support for sustainable farming.

6

Government-proposed national bottom lines for dissolved inorganic nitrogen and dissolved reactive phosphorus (not included in final 2020 policy) would be exceeded in 6.7% and 25% of catchments, respectively.

7

Overseas customers are willing to pay a price premium for environmentally friendly dairy products ranging from 5.3% to 47.5%.

8

In 2019 primary sector leaders identified climate change as the most critical international issue affecting New Zealand agriculture, a significant leap in concern since 2017.

9

31% of the world's land mass surrounds rivers with poor water quality, affecting two billion people.

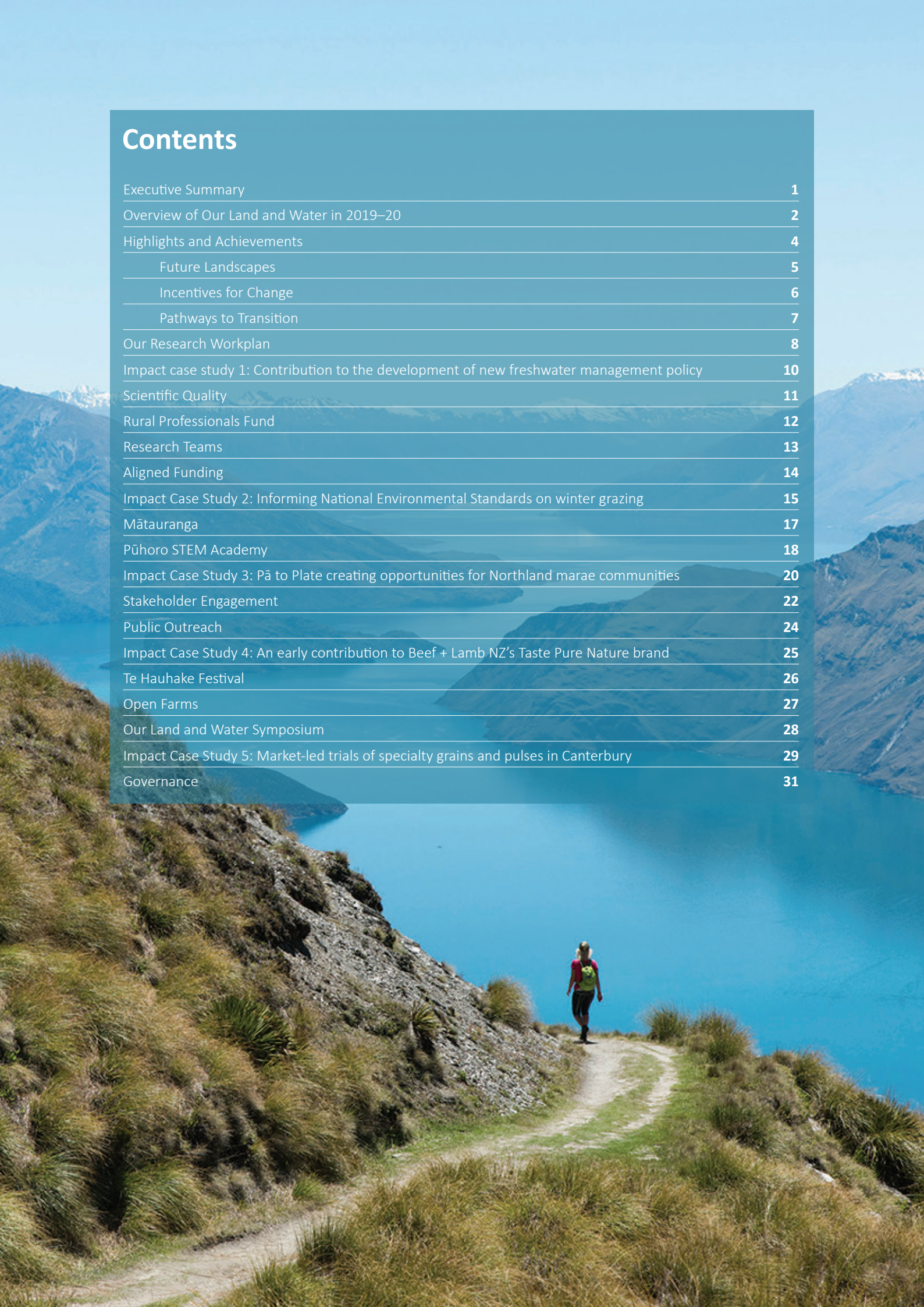
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Recently applied fertilizer can contribute 30–80% of total farm phosphorus loss through drainage, decreasing to <10% when fertilizer is well-managed by farmers.

- 1 doi.org/10.1021/acs.est.9b03120
- 2 doi.org/10.1016/j.scitotenv.2019.136120
- 3 doi.org/10.1016/j.agry.2019.102747
- 4 doi.org/10.1080/00288233.2020.1844763
- 5 ourlandandwater.nz/news/survey-shows-farm-days-build-urban-rural-trust
- 6 www.mfe.govt.nz/publications/fresh-water/essential-freshwater-impact-of-existing-periphyton-and-proposed-dissolved
- 7 doi.org/10.1111/1477-9552.12323
- 8 ourlandandwater.nz/matrix2019
- 9 nature.com/articles/s41598-020-60279-w
- 10 doi.org/10.2134/jeq2019.02.0085

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Executive Summary

Over the year from July 2019 to June 2020, highlights from the Our Land and Water National Science Challenge (Toitu te Whenua, Toiora te Wai) include:

The development of a 'conceptual model' of Aotearoa's agri-food and fibre system, depicting how it sits within and interacts with te Taiao.

The launch of 5 major research programmes, 2 think pieces and 2 working groups, plus a Rural Professionals Fund enabling farmers to partner with scientists.

Based on standard metrics of science quality, Our Land and Water has continued its upward performance trend, with a substantial increase in both the number of journal publications and the proportion published in high-impact journals.

An updated research workplan for 2020–24, reflecting a fast-changing regulatory landscape and the fundamental contribution of te ao Māori.

The successful merging of the Governance Board and Kahui into a single governing group for Our Land and Water. This arrangement for governance is consistent with our new conceptual model and the central role for te ao Māori in every aspect of Our Land and Water's operation.

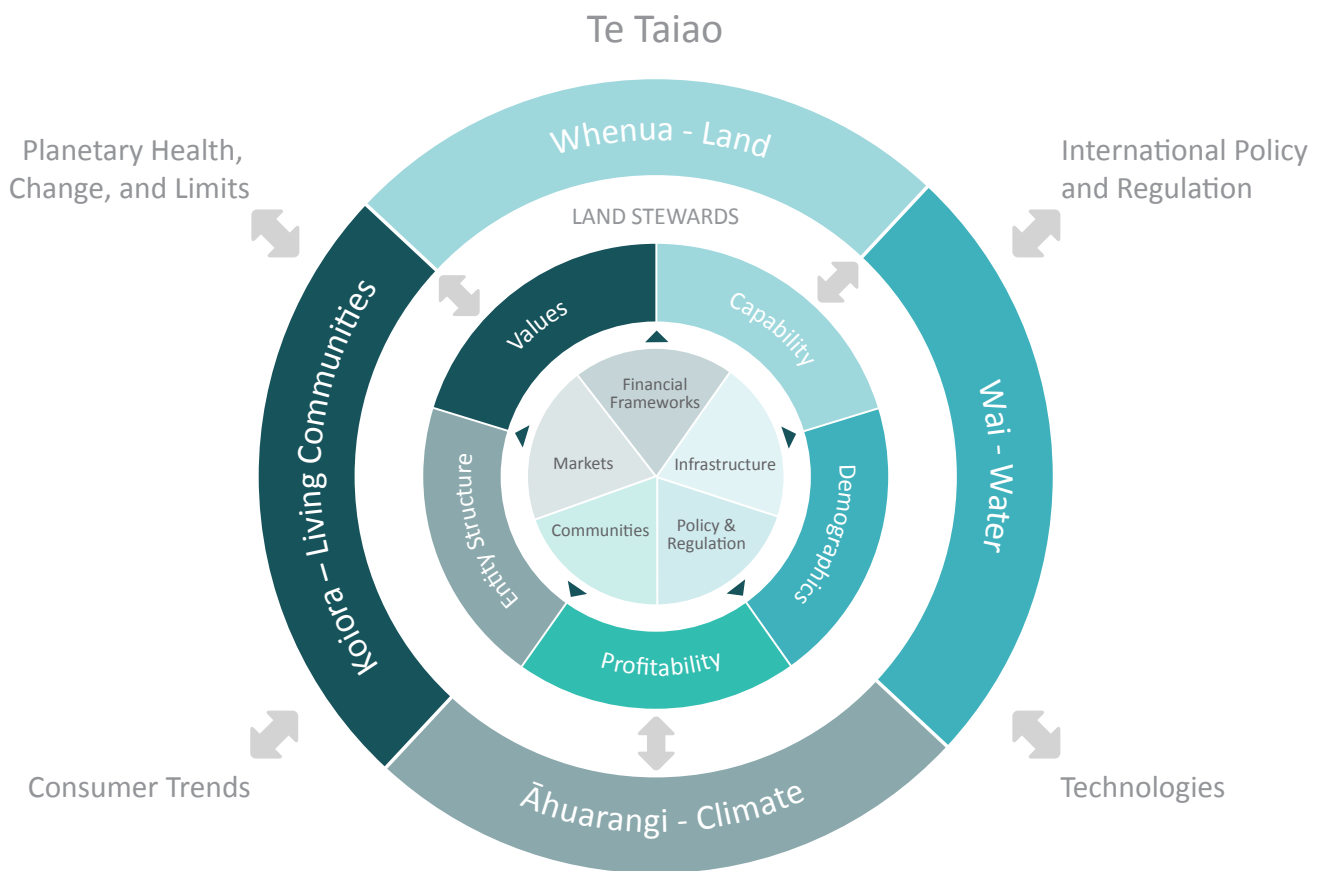
Dr Jenny Webster-Brown was appointed director following the retirement of Ken Taylor in May 2020. Naomi Aporo moved from the governance group to the new senior strategic role of Kaihapai Māori.

Hosting a broad range of highly engaged stakeholders at the Our Land and Water Symposium.

A greater level of interaction and engagement with the Our Land and Water website. Statistics relating to social media engagement and articles in the media demonstrate the increasing effectiveness of our public engagement.

The capability programmes we support are producing tangible results in terms of Māori student performance in STEM subjects (Pūhoro STEM Academy) and are creating opportunities for students and communities to participate in Our Land and Water research teams.

Overview of Our Land and Water in 2019–20



The Our Land and Water National Science Challenge (Toitū te Whenua, Toiora te Wai) (OLW) is working towards an agri-food and fibre system that enhances the vitality of te Taiao with a diverse mosaic of land uses that improve the health of land, water and people.

The OLW objective is to maintain and improve our land and water quality for future generations, while enhancing the value of the primary sector to New Zealand. The objective holds te ao Māori (a Māori world view) at its heart as a central unifying concept, recognising our fundamental connection to our land and water, to which we give and receive benefits in a reciprocal way.

We embrace a concept of value creation from agriculture that is much broader than growth in production or productivity. Our goal is for all New Zealanders to be proud of our genuinely healthy land and water, and for Aotearoa to be world-renowned for its sustainable food and fibre production. This will require a change in our relationship with te Taiao.



OLW has been operational for four years. The 2019–20 year represents the first year of the second phase of funding for OLW (2019–2024). Over the year, the OLW investment approach has been guided by two new drivers:

1. The development of a new conceptual model of Aotearoa's agri-food and fibre system, depicting how it sits within and interacts with te Taiao (whenua/land, wai/water, āhuarangi/climate and koiora/living communities). This guides our way of working and creates context and incentive for merging western science with mātauranga Maori approaches to get the best possible outcomes in our research. It also demonstrates why land stewards and other stakeholders need to be an integral part of research design and implementation, in order to create meaningful impact in our primary production systems.

2. A shifting emphasis from developing a deeper understanding of the biophysical constraints on land use (a Phase 1 priority), to communicating and implementing that knowledge to create impact. A higher proportion of funding is being directed to research that extends our understanding of how market forces could incentivise land use and practise change, and to research that identifies and facilitates the best pathways to such change.

Over this first year of Phase 2 funding, OLW launched 5 major research programmes, 2 think pieces and 2 working groups, plus a Rural Professionals Fund enabling farmers to partner with scientists. While the focus was new research, OLW also acted to ensure the potential impacts of completed Phase 1 research are realised. An Impact Extension Fund was offered to help Phase 1 researchers take further steps to create impact from their research.

It is very early to measure the success of OLW's new investment approach, but as demonstrated in the following pages, there have been several achievements in 2019–20 across all research themes. Some of these relate to Phase 1 research for which impacts are now being realised, but there have also been achievements related to early research.



Highlights and Achievements





FUTURE LANDSCAPES

The anticipated impact of Theme 1 research (Future Landscapes) is that decisions on land use change and management practises can be made with confidence that they will lead to improvements in te Taiao. The following achievements signal progress towards these anticipated Theme 1 impacts.

The two keystone research programmes of the theme, Land Use Opportunities: Whitiwhiti Ora and Pohewa Pae Tawhiti (Visualising Horizons), concluded their co-design process towards the end of 2019-20 year. These are the first OLV research programmes to undergo the more comprehensive co-design and co-development process inherent in our new conceptual model. These programmes involve multi-organisation research teams and a comprehensive programme of research co-designed with iwi, central and local government, industry bodies and rural banks.

Two working groups were convened to investigate monitoring designs and technologies to track measurable changes in te Taiao over 5 years or less. A third monitoring working group was developed to focus on Te Mana o te Wai and using Māori knowledge and reporting systems to address short-term changes in the state of freshwater systems.

OLW directorate staff, researchers and research outcomes played a significant role in the development and decisions behind the Essential Freshwater policy package announced in May 2019 (see Impact Case Study 1, page 10). OLV Directorate staff chaired and participated in the deliberations of the Science and Technical Advisory Group, as well as providing updated assessments of the implications of nutrient limit setting for New Zealand.

A Land Use Suitability partnership with the Deep South National Science Challenge explored the potential impacts of climate change on the suitability of some primary production activities, and on receiving environments. The wine industry, for example, should consider planting novel grape varieties that enjoy more heat. This report was used to inform MPI's Sustainable Land Information Portal.

The new Physiographic Environment Classification system that uses landscape and geological/hydrological features to better assess and manage the effects of land use on the environment, is being actively employed. In 2019-20, it was used to inform the National Environmental Standards on winter grazing, and is now being routinely used by Northland Regional Council, Bay of Plenty Regional Council and Dunedin City Council in their land and water management operations.

Research from Our Land and Water's chief scientist added scientific credibility to the 4R nutrient management guidelines, demonstrating that New Zealand farmers can keep up to 70% more phosphorus in their soil by understanding how nutrients move from land to water on their type of land, and where their Critical Source Areas (CSAs) are located.

A Benign Denitrification in Groundwater paper on the water-quality issues facing dairy farming showed that mapping and effectively utilising existing natural and new built-in nitrate-attenuation capacity could potentially achieve a >25% reduction in river nitrate loads from dairy-farming areas – and allow strategic intensification in some areas.

A paper on assessing the yield and load of contaminants with stream order (which received significant media attention when published in 2017) won the JEQ 2019 Best Paper Award, for the best paper published in the last three years by the Journal of Environmental Quality.

In the first global analysis of freshwater quality, a paper in Nature's Scientific Reports showed that 31% of the world's land mass surrounds rivers with poor water quality, affecting two billion people.

The Specialty Grains & Pulses Report produced by the Next Generation Systems programme identified opportunities to expand the grain and pulse crops grown in New Zealand. From a long list of 22 possible grains and pulses, the research team identified six crops with the most potential for New Zealand farmers: soy, hemp, chickpeas, oats, buckwheat and quinoa. Some of these crops entered trials (see Impact Case Study 5, page 28).



INCENTIVES FOR CHANGE

The anticipated impact of Theme 2 research (Incentives for Change) is that new incentive approaches and value chains are motivating people and organisations to make better decisions for te Taiao. It is too early to identify potential improvements, but the following achievements signal progress towards these anticipated impacts.

Research programmes are underway to identify structures and processes that can share value from environmental improvements with producers, and they have recruited case studies to provide evidence of successful approaches.

Research to identify successful catchment governance approaches has identified significant obstacles to community engagement, and the key role that catchment groups will play in creating a better future for freshwater systems.

The Pā to Plate research project has begun the process of creating a stand-alone commercial entity to implement the research outcomes (see Impact Case Study 3, page 23).

The environmental and production benefits of regenerative agriculture are being investigated in a think piece, and communication via a webinar attracted over 600 viewers.

Collecting and providing robust data on actions that are being taken, and their effects, is critical to identifying the way forward to achieve OLW objectives. Research to create a National Register of Land Management Actions commenced in 2019, to make such data available and useful for producers and participants in agribusiness schemes who seek to improve environmental, social and cultural outcomes.

The Credence Attributes On Farm project completed its investigation of the environmental impact, cost and potential price premium for organic, pasture-fed and carbon-neutral farm systems. The research showed that overseas consumers are willing to pay an 'eco-friendly' price premium that could increase farm profits if a fair share of the premium is returned to the producer. Modelling suggested that converting a dairy farm to organic production can decrease nitrogen leaching (20%) and carbon footprint (20%) while profits increase (67%). Producing certified carbon-neutral dairy products can also reduce nitrogen leaching (42%) and GHGs (20%) while increasing profit (15%).

Our biannual Matrix of Drivers analysis asked stakeholders to prioritise the global issues, trends and innovations with potential to affect New Zealand's agri-food sector. Climate change emerged as the most pressing issue by far, with a dramatic increase in concern from the last time the survey was conducted (in 2017). The 2019 update has produced a report, 34 fact sheets and an open-access evidence base, making it a useful reference tool for New Zealand's agri-food sector.

A paper on indicators of resilience for rural communities provided a method to measure community resilience at a point in time. This better understanding of the resilience of NZ proved useful when the Covid-19 pandemic struck, and will be useful in the current regulatory environment.

Dr Sandra Payen, from the Eutrophication Product Footprinting team, was appointed co-chair of the United Nations Environmental Programme/Society of Environmental Toxicology and Chemistry (UNEP/SETAC) Life Cycle Initiative Task Force on Eutrophication in January 2018. Through this, the Product Eutrophication Footprinting project has contributed to the global recommendations for lifecycle impact assessment published by the UNEP in October 2019. This report is expected to influence market assurance schemes.



PATHWAYS FOR TRANSITION

The anticipated impact of Theme 3 research (Pathway to Transition) is that new options and pathways to enhance te Taiao are being explored by land stewards and organisations in the agri-food and fibre system. The longer-term impact is that the agri-food and fibre system is configuring to enable resilient, healthy and prosperous land uses that improve the vitality of te Taiao.

There is currently less research funded in this theme, which is a consequence of needing to wait until information has been made available by Themes 1 and 2. Preparations are underway for a large research programme to demonstrate and scale-up place-based case studies of land use change, and to make the evidence base widely available. Nevertheless, there were some significant achievements in this theme in the year to July 2020:

The CSIRO-developed ADOPT Tool, for measuring the time to peak adoption of innovative practices, has been successfully used to assess likely adoption times for some Phase 1 research outcomes. Despite Covid-19-related delays in planned trans-Tasman workshops, some key areas where changes need to be made to the tool to apply in a New Zealand context have been identified, and the tool is currently being updated through the OLW-CSIRO collaboration.

OLW supported the Open Farms event in March 2020. OLW's survey of 322 of the 3500 visitors which showed that visiting a farm builds trust and support for sustainable farming. The survey also gathered information on how connected visitors felt to farmers and farming, how they felt about sustainability of the primary production sector, and whether they felt practices such as excluding stock from waterways and reducing fertiliser use were effective for improving water quality. OLW will repeat this survey at subsequent Open Farms events to track changes in public opinion that can affect farming's social license to operate.

Storying Kaitiakitanga research contributed to a new book, *Te Mahi Oneone Hua Parakore: A Māori Soil Sovereignty and Wellbeing Handbook*. This research project showed how existing and emerging Māori food production practices are creating an 'upward spiral' of connected outcomes. Many groups, including the wine industry's Bragato Research Institute, continue to follow up on their interest in how this could inform a national approach to farming, food and hospitality that improves Aotearoa's land, water and food systems.

Scientists from the Collaboration Lab and Sources and Flows programmes worked together to design 12 questions to help biophysical scientists understand the social variables influencing adoption and uptake of research. This can help scientists understand why research that 'works' in one place may not work when applied more widely. For research that aims to demonstrate impact – such as the adoption of a tool or changing practices – social variables that influence behaviour and decisions can be make or break.

The National Science Challenges are an experiment in achieving both science excellence and wider impact, and researchers are struggling to balance these competing demands, found Collaboration Lab research. A well-read paper highlighted the challenges of achieving impact within the current science system, and produced a tool for researchers to assist with impact planning and funding applications.

A new website, Kohuratia (www.kohuratia.nz), was launched to enable Māori agribusinesses to identify the priority actions that will help meet their goals, while staying true to four core values that work together to grow health, relationships, leadership and profitability.

Our Research Workplan

In the coming year, OLW intends to launch 5 new research programmes, 5 working groups and produce 4 think pieces. Our focus is delivering research that supports land stewards, and the stakeholders that influence them, to live and work in ways that are more connected to te Taiao.

Our research programme continues to have three key themes relating to options for (Theme 1), incentives for (Theme 2), and enablers of (Theme 3) land use change, as in previous years. However, we have updated our research workplan, recrafting it over the second half of the year.

This fresh approach to research investment ensures all research is aligned with the new conceptual model, provides better integration across the themes, can respond to recent policy changes in freshwater management, and is specifically designed to deliver impact. Over 50% of the research budget is now dedicated to Theme 2 and 3 research to incentivise and implement land use changes.

Te Ao Māori is now embedded in the research workplan, with just over 30% of current research Māori-led or kaupapa Māori research. All new research is co-designed and co-developed with stakeholders, critically with Māori landowners and land stewards, but also with other individuals and agencies in the agri-food and fibre system.



Read the Research Workplan Update at ourlandandwater.nz/workplan-pdf

To ensure that the new OLW conceptual model and emphasis on impact retain their importance during the research process, all large research programmes are now required to have a leadership team with four distinct roles: Project Manager, Science Lead, Implementation Lead and Te Ao Māori Lead.

The leadership team is responsible for ensuring that workplans, milestones and deliverables from the research represent all these focus areas, and that there is strong integration between them to deliver a cohesive focus.

Research Workplan:

**FUTURE
LANDSCAPES**

Research Workplan:

**INCENTIVES FOR
CHANGE**

Research Workplan:

**PATHWAYS TO
TRANSITION**

Flagship Concept

Providing tools for land stewards to assess diverse land use options, to identify the best land use to support the vitality of te Taiao.

Flagship Concept

Identifying rewards, signals and approaches that motivate beneficial behaviours and reciprocal relationships in the agri-food and fibre system.

Flagship Concept

Working with land stewards/ organisations in the agri-food and fibre system to design new options and pathways to achieve future landscapes.

Theme Impact by 2024

Decisions on land-use change and management practises can be made with confidence that they will lead to improvement in te Taiao.

Theme Impact by 2024

New incentive approaches and value chains are motivating people and organisations to make “better decisions for te Taiao.

Theme Impact by 2024

New options and pathways to enhance te Taiao are being explored by land stewards and organisations in the agri-food and fibre system.

Theme Impact by 2030

The vitality of te Taiao is improving in response to our decisions as land stewards.

Theme Impact by 2030

People and organisations in the agri-food and fibre system feel rewarded for prioritising the vitality of te Taiao.

Theme Impact by 2030

The agri-food & fibre system is reconfiguring to enable resilient, healthy and prosperous land uses that improve the vitality of te Taiao.

Contribution to the development of new freshwater management policy

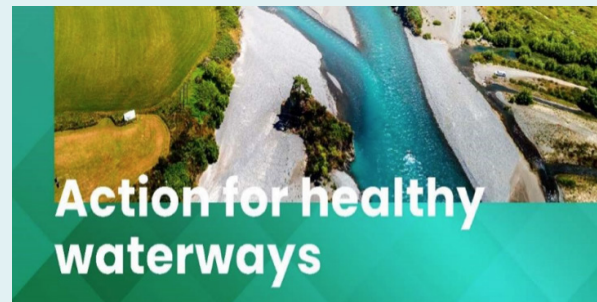
Our Land and Water (OLW) scientists, staff and research made a significant contribution to the Ministry for the Environment's development of the Essential Freshwater policy package, over the year 2019–20. The National Policy Statement for Freshwater Management 2020 came into force on 3 September 2020 and will have significant impact on freshwater quality by providing local authorities with updated direction on how they should manage freshwater.

Essential Freshwater aims to stop further degradation of New Zealand's freshwater resources, and bring New Zealand's freshwater resources, waterways and ecosystems to a healthy state within a generation. It was important that OLW contribute to the Essential Freshwater policy development, given our strongly aligned objectives. OLW brought a valuable whole-systems perspective.

OLW's contribution was three-fold: contributing expertise and experience through participation in advisory groups, generating new evidence, and using OLW-funded science to assess the implications of implementing various new regulations proposed.

OLW's former Director chaired the Science and Technical Advisory Group (STAG), while the current Director (from May 2020) was a member of this group. The OLW Chief Scientist participated in the Freshwater Leaders Group.

OLW research was used in a Ministry for the Environment commissioned report on the implications of using existing periphyton and proposed dissolved inorganic nitrogen (DIN) bottom lines, for the government's Action for Healthy Waterways proposal. Methods developed in the Land Use Suitability research programme were used in this analysis, as well as OLW research which had been used to establish baselines and to update Australia/New Zealand guidelines for water quality. OLW-funded research also contributed to a NIWA report to set bottom lines for sediment and clarity and predict how much sediment load can be mitigated.



OLW science also contributed to analysis of the impact of the proposed new policy. OLW science and scientists helped officials with the design of methodology for the Regulatory Impact Statement and Analysis in May 2020, which was evaluated by Cabinet. The analysis drew upon OLW research which was later published.

An assessment was made of the implications of applying proposed national bottom lines for DIN and dissolved reactive phosphorus (DRP) concentrations in rivers and streams. It showed that the proposed bottom lines would be exceeded in 6.7% of New Zealand catchments for DIN, and 25% for DRP. Even if all available and developing mitigation strategies were applied, there would still be substantial catchment areas that exceeded the proposed bottom lines (4.2% for DIN and 13% for DRP). Additional work showed some of these decreases could take 26–55 years to achieve. These bottom lines were not included in the final policy.

The Ministry for the Environment also requested a report from OLW researchers on consumer willingness-to-pay for environmental attributes, to support its economic impact assessment. This report suggests a premium of around 20% may be reasonable, based on the previous research including several OLW-funded papers, reports and consumer surveys.

Scientific Quality

Based on standard metrics of science quality, OLV has continued its upward performance trend, with a substantial increase in both the number of journal publications and the proportion published in “high impact” journals.

38 articles were published in academic journals in 2019–20.

14 articles were in the top 25% of journals in their field worldwide – including two in the Nature publishing group.

5 international conferences invited OLV’s world-leading researchers to give keynote presentations.

Professor Caroline Saunders, inaugural member of our science leadership team, was appointed to the board of the Reserve Bank.

3 OLV directorate staff chaired or participated in the Essential Freshwater Advisory groups (Science and Technical, Freshwater Leaders, Kahui Wai Māori).

20,000 members represented by the American societies of soil, crop and agronomy awarded an OLV paper as the best paper of the last three years published by the Journal of Environmental Quality.

5 large research programmes were initiated, **3** of which commenced their research within 2019–20. The 2 remaining (and largest) programmes went through a comprehensive redevelopment and co-design process and will commence before the end of 2020.

60% of our Phase 2 research investment has been committed, and we anticipate committing **80%** by the end of 2020–21.

Delays caused by Covid-19 were investigated. Although some research programmes were disrupted, our overall assessment is that the research has not been significantly delayed and can be made up over the next 12–18 months.



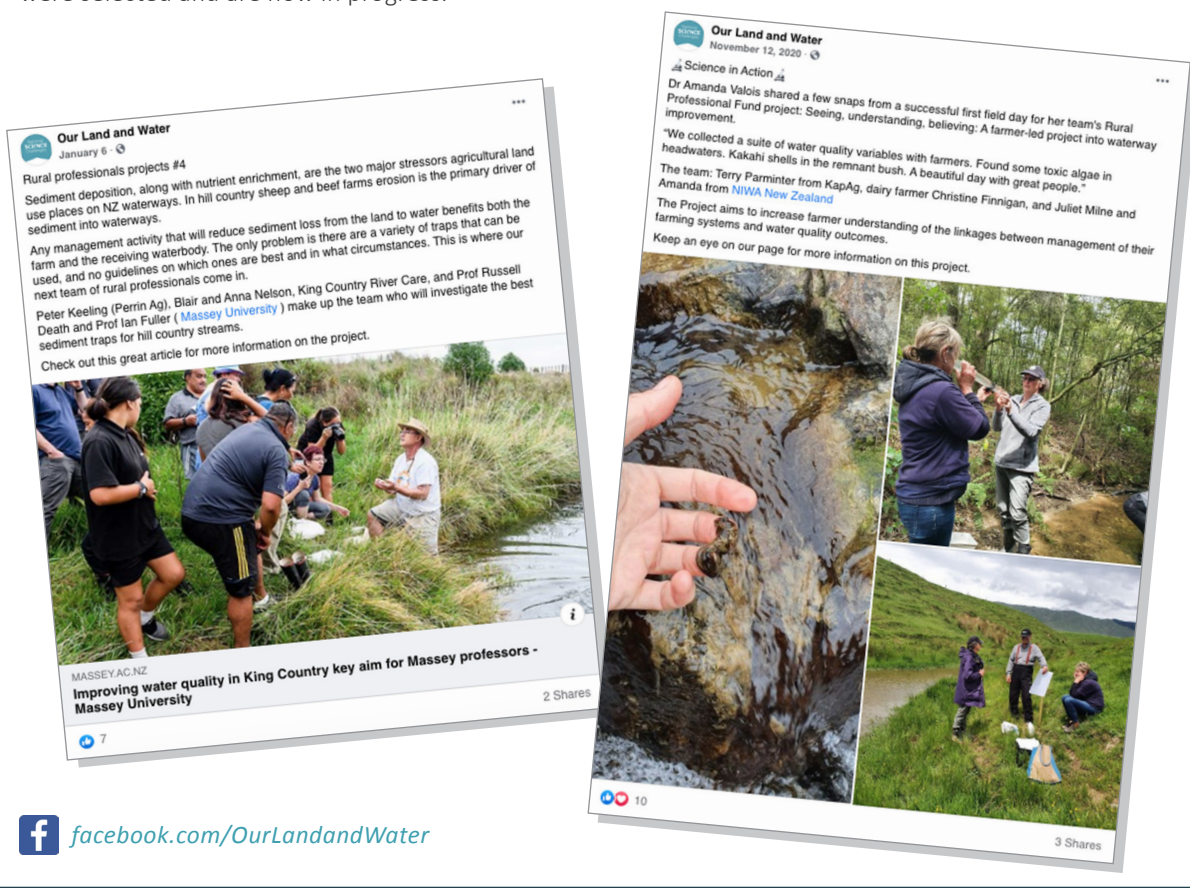
Rural Professionals Fund

We regularly update key stakeholders who have an interest in and can extend our research through their networks. These discussions led directly to OLW offering a ‘Rural Professionals’ contestable investment fund in 2019–20.

The Rural Professionals Fund was designed to encourage farmers, scientists and rural professionals to team up to quickly test innovative ideas. The initiative aims to foster collaboration and use participant networks to broaden implementation of the findings.

The Rural Professionals Fund was widely supported among the primary sectors. Media engagement enabled the launch to reach an audience of approximately 30,000 rural New Zealanders.

OLW received 31 complete applications, oversubscribing the funds available by 100%. Fifteen projects were selected and are now in progress.



Research Teams

OLW research teams bring people together from a range of disciplines, from across universities, all of the Crown Research Institutes, businesses, industry bodies, Māori, government and non-government organisations, private citizens and regional councils.

Stakeholders are collaborators and co-innovators in all our research design and implementation, either in advisory or research roles. This builds capability and increases the rate of research understanding and outreach.

16 collaborating organisations per contracted research programme (up from 6.6 in 2018/2019 and 5.3 in 2018/17 and 3.5 in 2017/16), reflecting greater diversity of expertise.

80% of journal publications involved domestic collaboration, up from 68% last year.

37% of journal publications in 2019–20 included an international collaborator, up from 25%.

30% of journal articles and **7** technical reports were produced with stakeholders over 2019–20, ensuring OLW science is relevant and applicable.

31% of OLW investment includes either Māori-led or kaupapa Māori research, up from 13% at the end of Phase 1. On an FTE basis, Māori researchers make up **15%** of OLW researchers, in line with previous years.

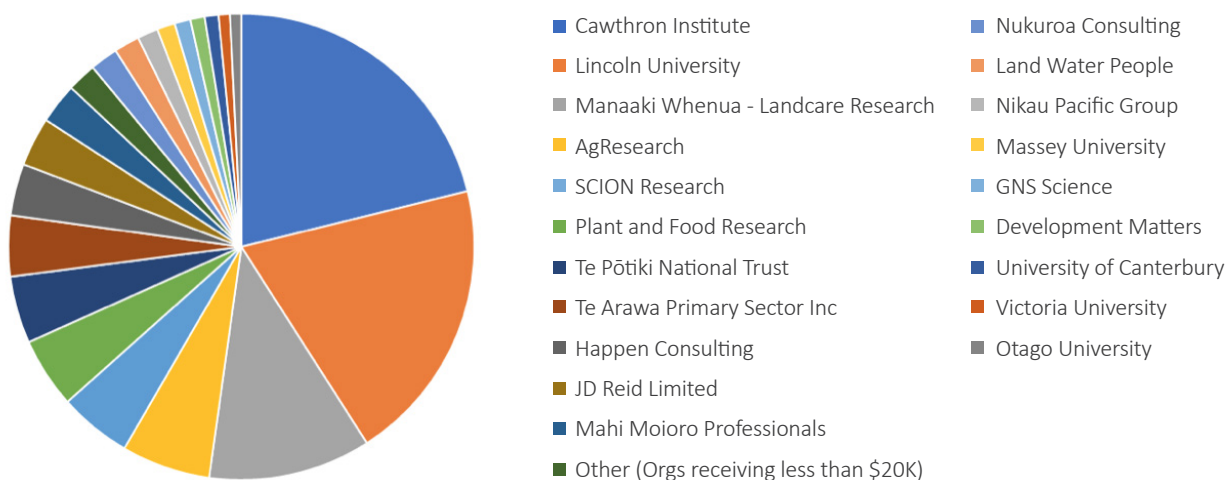
33% of research team members are stakeholders, and stakeholders co-lead 1 large research programme and 3 working groups.

19% of researchers in programme teams (excluding stakeholder members) are early career scientists, post-docs and students.

4 dedicated leads are now required in large research programmes, accountable for: science excellence, te ao Māori, implementation of the research, and project management.

Key international partnerships include: CSIRO (Australia) to help us measure the time to peak adoption of our science; International Bioeconomy Forum in the area of the microbiome research; Temperate Agriculture Network to enhance sustainability research among countries in the temperate region.

OLW Research Funded Research Organisations 2019/20



Aligned Funding

Every two years Our Land and Water (OLW) collects and analyses data for all accessible, active research programmes contributing directly to the OLW objective. This is published as a report called a Research Landscape Map.

Data from the 2019 Research Landscape Map identified 149 aligned research programmes (\$83 million p/a), compared to 226 programmes (\$97m) in 2017 and 350 programmes (\$108m) in 2015. This decrease over time may reflect increasing confidence in OLW to support research in this field.

Most of the alignment (\$25m p/a) is with our Future Landscapes theme, with \$2m p/a each aligned to our Incentives for Change and Pathway to Transition themes.

In 2019, 45 of the research programmes were assessed as likely to make a moderate to very high contribution towards the OLW objective (\$28.8 million p/a).

Importantly, CRI SSIF was the source of funding for most of the strongly aligned research, indicating that CRI strategy is increasingly aligning with the OLW objective, and a potential lack of alignment to OLW in MBIE-funding proposals.

Informing National Environmental Standards on winter grazing



The Ministry for Primary Industries (MPI) used physiographic science developed by Our Land and Water (OLW) to inform new National Environmental Standards (NES) around intensive winter grazing. The new standards come into force on 1 May 2021, requiring winter grazing to meet specified permitted activity conditions, or obtain a consent.

Poor management of winter grazing on forage crops can result in animals trampling a paddock to deep mud (pugging) and stripping the land of vegetative cover. Bare land and pugging can result in water pollution due to increased runoff, erosion, and leaching of contaminants to waterbodies.

To support good wintering practices, MPI commissioned OLW researchers at Invercargill environmental consultancy Land & Water Science to write a report using physiographic science to assess the effect on water quality of the options for winter grazing standards proposed in the Action for Healthy Waterways discussion document.

The report used data produced by the Physiographic Environments of New Zealand programme (PENZ), led by Lisa Pearson and Clint Rissmann of Land & Water Science. PENZ developed a method that brings together data for climate, topography, geology, soils, and hydrological controls with analytical chemistry at a national scale, to map and model the landscape processes that (along with land use) control variation in water quality between regions and catchments.

This approach clarifies the important role of landscape factors such as slope, soil structure and hydrology, and enables the identification of where risk is likely to be highest and where intensive winter grazing is likely to have minimal impact over water quality.

In a fast-changing regulatory environment, physiographic science provides farmers with certainty, because a farms' underlying soil and geology doesn't change significantly over our lifetime. For its report to MPI and the Ministry for the Environment, Land & Water Science used the predictive model and conceptual spatial map developed by PENZ to:

- evaluate the sensitivity of a range of landscape attributes (including overland flow, artificially drained soils, aquifer denitrification potential, slope, and soil pugging) to water quality contamination by intensive winter grazing,
- evaluate the sensitivity of proposed winter grazing slope thresholds, soil pugging risk and soil hydrological factors, using physiographic science to create a winter grazing risk framework for water quality (surface and ground water), and
- develop a national winter grazing risk map based on physiographic data, that ranks the landscape in terms of very low to very high risk to water quality from winter grazing.

A preliminary report with key recommendations was submitted to MPI in March 2020. One key recommendation was an upper slope threshold of 10° for intensive winter grazing. This information was used to support officials' recommendation to set an upper slope threshold of 10°, included as a condition of the permitted activity standards in the new National Environmental Standards for Freshwater.

While the NES uses a whole-property calculation for the assessment of slope, a finer 0.25ha resolution is possible when using a physiographic map. Identifying slope on this 0.25ha scale will be possible for farmers in the 2021–21 year when a prototype physiographic map website (www.landscapedna.org) will be complete, powered by multiple layers of land classifications that can be used to identify risk to water quality.

Physiographic maps are a useful tool to create clarity on how land use and land attributes contribute to water quality. The maps simply communicate a complex synthesis of data sources, showing how multiple natural processes combine with land use to influence water quality risk.

The new website will help inform farm management decisions and the placement of mitigations and interventions. For example, by knowing where water will drain through a winter forage crop paddock, grazing strategy can be managed accordingly, leaving high-risk water convergence areas until last or avoided altogether.

Mātauranga

Over 2019–20 OLW continued to strengthen its relationships with Māori – including iwi, Māori land incorporations, ahu whenua trusts, marae, hapu, and whānau groups – and significantly increased co-design with Māori stakeholders in research programmes.

The proportion of Māori-led or kaupapa Māori research within OLW has increased from 13% in Phase 1 to 31% in Phase 2.

One of the 3 research programmes active in 2019-20 is co-led by Māori. We currently have 2 research programmes that have been approved but are yet to commence; these programmes will be co-led by Māori.

Of our currently committed Phase 2 investment 31% is directly engaged with Māori entities (compared to 13% in Phase 1). Māori stakeholder groups that are currently involved in OLW research include:

Te Arawa Primary Sector Group
Te Arawa Lakes Trust
Wakatū Incorporation - AuOra
Miraka
Mea (Ngai Tahu)
Te Taihu Te Taiao Kaitiaki roopū
Northland hapu, marae and whānau growing collectives
Oromahoe and Te Tii marae through the Waitangi catchment group
Ngāti Kuia and Te Hora marae through Te Hoiere catchment group

Further discussions are underway with 6 other Māori entities and iwi or hapu groups for programmes that are currently in development.

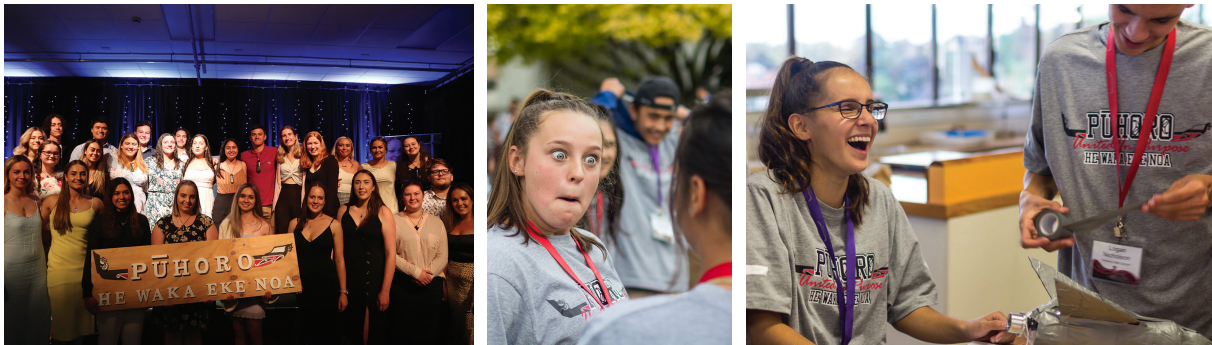
All research programmes approved since the beginning of 2020 have a te ao Māori lead as part of the programme management team. This role is responsible for leading and directing Māori engagement (including co-design processes) and resourcing within the programme. These roles are held by senior researchers or practitioners who are Māori and have extensive experience working with Māori.

OLW has identified 3 Māori PhD opportunities within existing research programmes. We have established a direct scholarship for one of these opportunities and are working with programme leadership on the realisation of the other 2 identified opportunities.

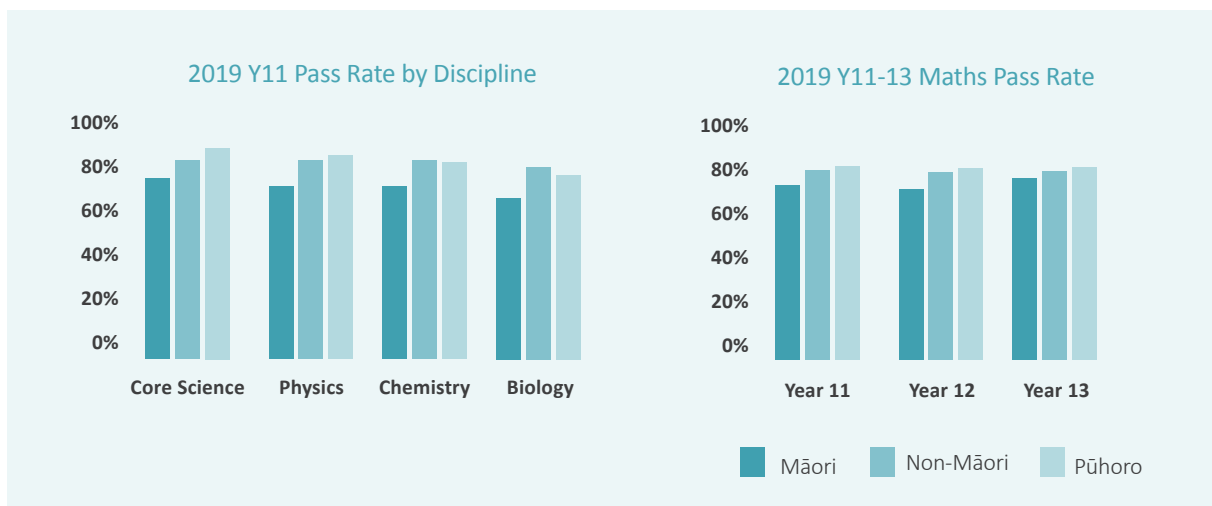
Leadership by Māori within the OLW Directorate including senior leadership and science theme leaders is currently 35% (of total FTE). A senior leadership position (Kaihāpai Māori) was established in January 2020.

Half the OLW Governance Group members are Māori. The Governance Group have agreed that at least 50% of Governance members must have depth of experience in te ao Māori at any given time.

Pūhoro STEM Academy



“Pūhoro is an incredible organisation that truly is life-changing. I will forever be grateful to everyone involved.” – Pūhoro student



Our Land and Water is a primary sponsor of the Pūhoro STEM Academy, which provides sustained support for Māori pupils from Year 11, through university and ultimately into the workforce. The programme is producing tangible results in terms of Māori student performance in STEM subjects.

There were 800 Pūhoro students in the 2019 academic year, affiliated to 85 iwi, across 27 high schools and 7 universities.

The high school students have weekly mentoring and attend an all-day wānanga each term, gaining access to university labs and teaching.

Six termly wānanga, 6 pou herenga (overnight noho), 449 science tutorials and 428 kaihautū (mentoring) sessions were delivered over the 2019 academic year. Kaihautū sessions offer personalised support for tauira in areas including examination preparation, study skills, Māori identity and te ao Māori. Tutorial sessions offer targeted support for students working through NCEA STEM subjects.

Internships

OLW provided funding for 8 internships and 5 work experience opportunities for Pūhoro students enrolled to start university in 2020, over and above our foundation funding for the programme.

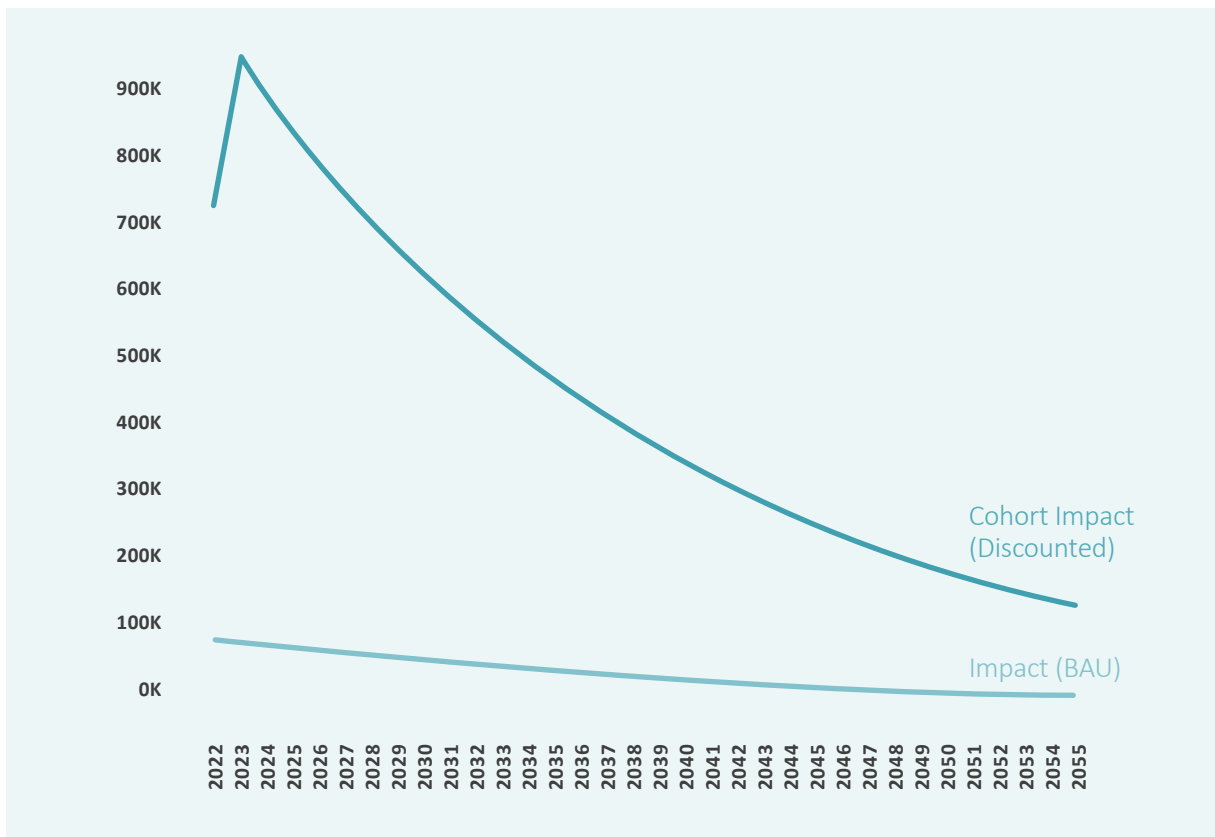
In May 2020, we encouraged OLW stakeholders to register their interest in hosting a tertiary student intern from the Pūhoro STEM Academy over summer 2020–21. Commitment to hosting a Pūhoro intern grew from 14 opportunities in 2019, to 65 opportunities in 2020. At least 17 were identified as closely aligned to OLW research themes, for which OLW provided funding.

There was also a large increase in co-funding, with over \$150,000 committed from 17 organisations (up from \$6000 from one organisation in addition to OLW in 2019).

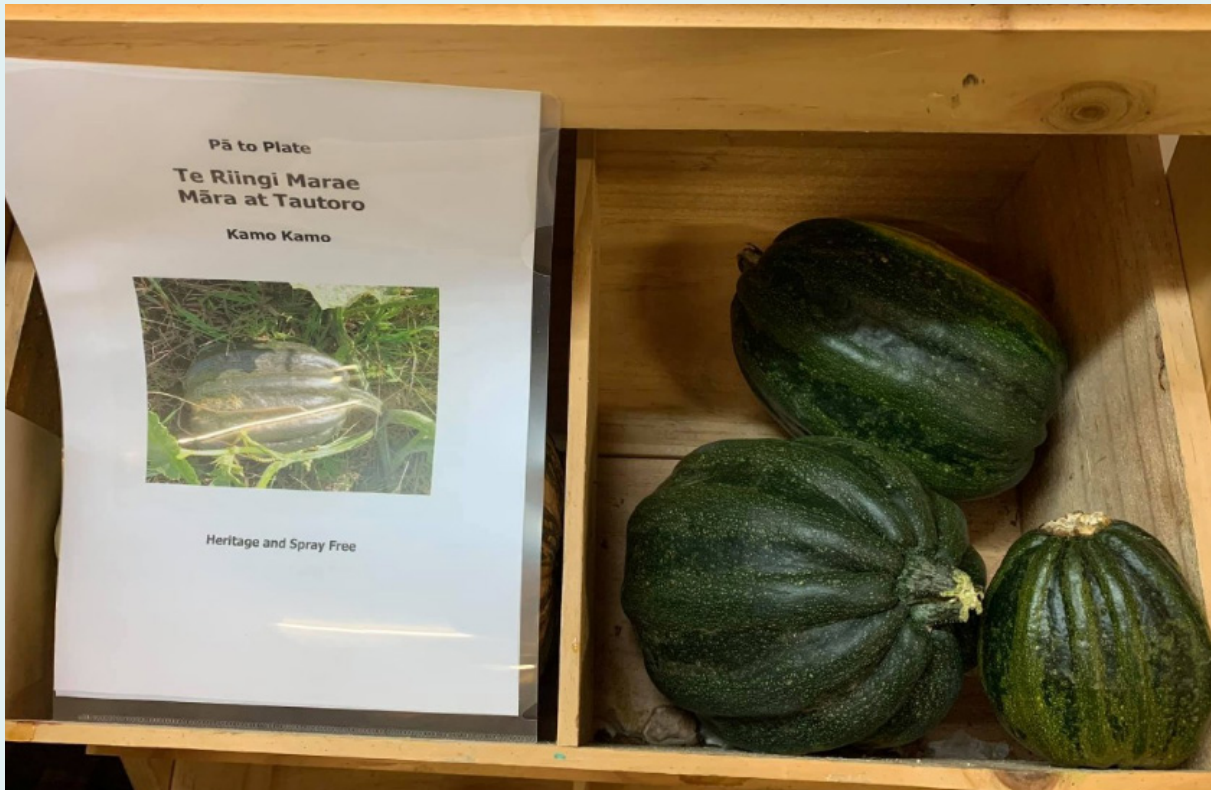
Lifetime Impact - Pūhoro vs Business as Usual

Business as Usual \$1,503,013 | Pūhoro Impact \$15,688,848

In 2019, ESR commissioned an analysis of the Pūhoro programme. This report focused on the potential economic value from increased tertiary education at a bachelor's degree level. Based on the increase in enrolments and accounting for the average pass rates, the net potential economic benefits (for one cohort of the Pūhoro programme, and at its most conservative level) are \$13,380,000.



Pā to Plate creating opportunities for Northland marae communities



Marae communities from coast to coast in the Bay of Islands through to the Hokianga are transforming their lands into market gardens, some for the first time in decades, due to their involvement in the Our Land and Water (OLW) Pā to Plate project

For example, Te Riingi Marae became a member of the Pā to Plate grower collective in 2019. In the marae's first growing season, growers applied customary management practices in their māra kai (garden) and were able to sell peruperu (Māori potato) and kamokamo (Māori squash) in a local store, Putiputi Rā Organics in Whangarei.

The Pā to Plate research team supported Te Riingi Marae to work with all players in the kai (food) system to identify and form a relationship with this local health food store, whose consumers are willing to pay a premium for fresh, local hua (produce). Opportunities were created to generate income and employment, bring multiple communities together, and increase knowledge about growing and ancestral lands.

Seven communities are involved in the Pā to Plate project: Waitangi, Oromāhoe, Tautoro, Whirinaki, North Hokianga, Kaikohe and Karetu. Pā to Plate researchers, led by Merata Kawharu of Otago University and Nukuroa Consulting, have observed that involvement in the project is reinvigorating these local marae communities – and descendants who live further away.

Many Māori from the Bay of Islands and Hokianga now live in cities to the south and are no longer strongly connected to their ancestral lands. Northland faces significant economic, cultural, health, justice and environmental problems that are complex and cross-generational.

Pā to Plate is a community-led initiative that provides research-backed support to help reverse these negative trends in Northland. By reconnecting descendants to kai grown in their ancestral landscapes, the project aims to give urban Māori a sense of belonging, security and identity as tangata whenua.

Pā to Plate was initiated by the Mauri Whenua Ora programme (2016–19) as a collaborative kaupapa Māori research project. It found that people wanted better employment opportunities in Northland, access to healthy kai and resources from home, and stronger connections to their ancestral homes.

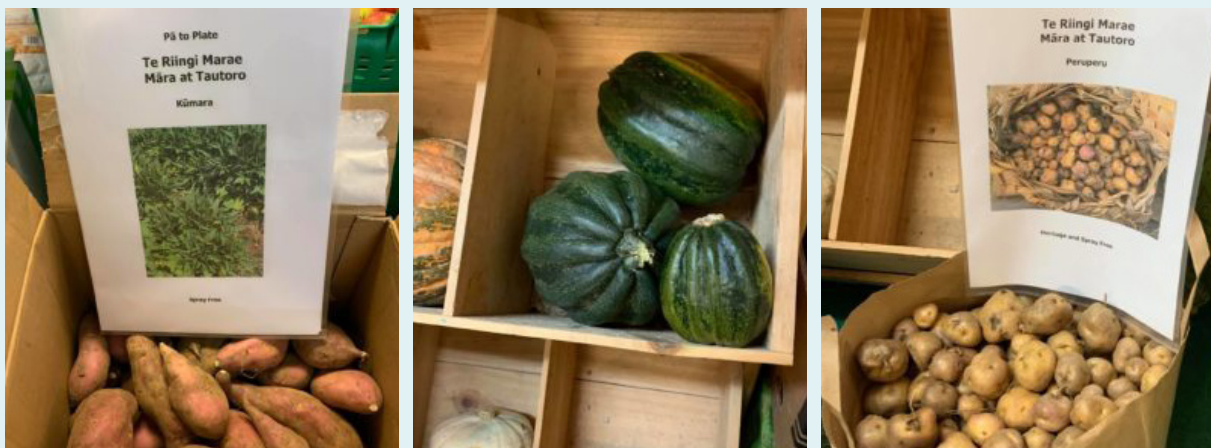
To meet these needs, Pā to Plate continues to be developed by the New Models for Collective Responsibility programme (2019–23). Producers in Oromāhoe and Tautoro have begun providing fruit and vegetables to shops in a trial of the readiness of producers to access markets. This is building grower capacity through learning about the role of quality and kōrero (stories) when marketing hua.

At its heart, Pā to Plate is harnessing and developing connections between non-local descendants and marae kāinga. A website (www.pa2plate.com) has been built and an online ordering system will be operational by 2020–21, enabling people to order foods from their ancestral marae. The website will also enable grower communities to share their experiences and challenges. Growers have already begun supporting others locally to return marae land to the thriving gardens that were there historically, sharing kōrero and mātauranga (knowledge of lands and growing) to build capacity.

OLW's mission to improve the vitality of te Taiao supports Pā to Plate's focus on foods that are not detrimental to land, water or climate, and improve human health while unlocking the economic potential of whenua (land) to support tangata whenua. Pā to Plate's approach to resolving this complexity provides important understanding and an exemplar for how OLW can achieve its objective.

Additional funding from Ministry for Social Development and Foundation North is beginning to seed business development. Chapman Tripp is establishing a legal entity (E Mara E Ltd) that will oversee Pā to Plate and provide mechanisms to alleviate the poverty that is prevalent in marae communities of Northland.

In time, Pā to Plate growers will develop value-added products from special recipes from the marae and will develop land opportunities such as indigenous saplings, Māori medicinal plants and berries found in indigenous forests. Once waterways are restored to good health, traditional foods from waters like koura and tuna will become part of the Pā to Plate value chain.



Stakeholder Engagement

Engagement with stakeholders underpins the transformational change required to achieve the Our Land and Water (OLW) objective and is essential to our success. All of the five OLW-funded research programmes developed in 2019-20 engaged with sector body, agribusiness, iwi, government or regional council collaborators, despite the Covid-19 lockdown reducing opportunities for stakeholder engagement. Many researchers also continued to engage with stakeholders after the completion of their Phase 1 research.

Examples of research influencing activities or being applied by stakeholders include:

DairyNZ is investigating using the typology approach developed in the **Sources & Flows** programme, which connects hydrology with land use. DairyNZ is also working with NIWA in an SSIF-funded project to explore the usefulness of the framework developed by Sources & Flows to link riparian and constructed wetland performance and design guidelines.

Record of Land Management Actions has advised DairyNZ on how to measure mitigations in the Aparima catchment in Southland.

Northland Regional Council is using the approach developed by the **Physiographic Environments of New Zealand** project, for National Objectives Framework assessments, policy development, and targeting environmental hot spots such as Hokianga. The approach is also being used by the Bay of Plenty Regional Council to model impacts on waterways, and by Dunedin City Council to work out wastewater and waste application guidance.

MPI contacted researchers involved with the **Indicators Working Group** for information about supporting thriving and connected communities after the Covid-19 lockdown. This group's resilience research also influenced thinking about rural proofing and rural communities at MPI, and the resilience framework was used in a Climate Change Commission workshop on impacts of climate mitigation policies on rural communities. NZIER funded an update of the resilience indicators analysis for Census 2018 data.

Manaaki Whenua Landcare Research has developed an integrative science toolkit that includes research from the **Collaboration Lab** programme, to encourage integrative science practice and build capability and capacity within this CRI. Research from the programme has also been included in the Network for Transdisciplinary Research toolkit, which assists the Swiss Academies of Arts and Sciences in facilitating exchange and collaboration between disciplines and between science and society.

People representing several Māori communities have reached out to the **Storying Kaitiakitanga** project team for guidance. The researchers observe their activities seem to be converging and aligning, guided by the project outputs and many presentations the researchers have delivered post-contract. The Bragato Research Institute hosted the research leads at a pinot workshop for grape growers from Te Taihū several months after the project ended, which subsequently enabled the connection of Māori researchers and practitioners with the Institute for field visits and knowledge exchange about kaitiaki principles and practices. Inquiries and invitations to speak about kaitiakitanga, Māori kai systems and food sovereignty were also received from Eat New Zealand, NZ Dietician Society, Te Putahi – Living Cities, several garden and food organisations and societies, whanau, hapū and Marae groups, Māori agribusinesses, schools and training institutions.

OLW has a formal strategic discussion every quarter with the Ministry for Primary Industries and the Ministry for the Environment. In 2019–20, OLW research contributed to the following central government policy documents: Essential Freshwater/Action for Healthy Waterways/National Policy Statement for Freshwater Management/Our Freshwater 2020/National Environmental Standards (winter grazing).

National Science Challenges

A BETTER
START

E Tipu e Rea

AGEING
WELL

Kia eke
kairangi ki te
taikaumātutanga

BUILDING BETTER
HOMES, TOWNS
AND CITIES

Ko ngā wā
kāinga hei
whakamahorahora

HEALTHIER
LIVES

He Oranga
Hauora

HIGH-VALUE
NUTRITION

Ko Ngā Kai
Whai Painga

NEW ZEALAND'S
BIOLOGICAL
HERITAGE

Ngā Koiroa
Tuku Iho

OUR LAND
AND WATER

Toitū te
Whenua, Toiora
te Wai

RESILIENCE TO
NATURE'S
CHALLENGES

Kia manawaroa
— Ngā Ākina o Te
Ao Turoa

SCIENCE FOR
TECHNOLOGICAL
INNOVATION

Kia kotahi mai - Te
Ao Pūtaiao me Te
Ao Hangarau

SUSTAINABLE
SEAS

Ko ngā moana
whakauka

THE DEEP
SOUTH

Te Kōmata o
Te tonga

Stakeholder Perceptions 2020

FINAL REPORT | AUGUST 2020

A QUALITATIVE STUDY

2020 MBIE 'Stakeholder Perspectives' survey

The 2020 MBIE 'Stakeholder Perspectives of the NSCs' survey showed a positive trend for OLW, with reported improved engagement overall, improved engagement with Māori, and improved experience with research priority setting. Stakeholders involved in research programmes consider OLW interactions "very useful".

The survey also reported satisfaction in knowledge exchange has improved through the new website providing access to research, but there is demand for more digestible, targeted information that is easier to find, access to interim results, plus more visual and two-way knowledge sharing.

End-user organisations (particularly farming industry) and landowners said they would like to be engaged earlier, be more directly involved in research, and have more engagement opportunities. There is room to be clearer about who research is for and how it will meet their needs.

To address these concerns, in 2019–20 we:

- Launched a new Rural Professionals Fund enabling rural professionals, food and fibre producers to partner with researchers to rapidly test innovative ideas.
- Required all new research programmes to have a communications and engagement plan, reviewed annually.
- Updated our research workplan to clearly identify how future research will fill knowledge gaps and be used by land stewards.
- Developed templates for 'Research Findings Briefs' to summarise and synthesise published findings, and 'OLW Guidance' to share practical interim results and expert opinion.
- Identified priority audiences and content themes to prioritise outreach to deliver more impact.
- Planned to deliver webinars in 2020–21, and to review our website user experience to provide a clearer pathway to relevant information for farmers and other priority audiences.

Public Outreach

Public communication and outreach are central to Our Land and Water (OLW), with effective outreach regarded as a key to success and a critical component of the National Science Challenges. Our intention is for OLW to connect science with land stewards, making our knowledge, research outputs and resources accessible to all.

In 2019–20 OLW researchers recorded 7 public outreach or participation activities related to their research, a decrease from 16 in 2018–19. This is because there were only 3 active research programmes, compared to 21 active programmes and projects in 2018–19.

OLW published 26 news articles on its website over the year, 15 of which (58%) summarised academic outputs in plain language. These were also sent directly to stakeholder groups with an interest in the research or the ability to put findings into action. In 2019–20, research summaries were circulated to: rural lending teams, primary industry bodies, agribusinesses, regional councils, dairy sector organisations, and other farming bodies.

The MBIE ‘Stakeholder Perspectives of the National Science Challenges’ survey indicated demand for digestible, targeted information and interim results. In response, OLW is now developing templates for ‘Research Findings Briefs’ to summarise and synthesise published academic findings, and ‘OLW Guidance’ to share practical interim results and expert opinion.

There was a significant increase in media coverage of OLW in 2019–20. We recorded 56 mentions of OLW in mainstream, industry and rural media, a 300% increase over the 14 mentions in each of 2018–19 and 2017–18.

The decision to write and develop a new website (in Q4 of 2018–19) was clearly validated over 2019–20. Year-on-year, three important website metrics more than doubled:

Page views increased **107%**

User numbers increased **127%**

Number of sessions increased **143%**

We plan to review our website user experience to provide a clearer pathway to relevant information for key stakeholder groups (eg farmers, regional councils).

There has been a steady increase in audience numbers across all OLW-owned social media channels. Over 2019–20, Twitter followers increased 40%, Facebook followers increased 18%, LinkedIn followers increased 209%, and e-newsletter subscribers increased 33%.

Nuts? Research says 'significant' potential for Rotorua nut crops

NZ Herald, 18 Oct 2019

Milk could be carbon-neutral now, says new study

Newsroom, 28 November 2019

Good farmers must change too

Farmer's Weekly, 30 October 2019

Hot cows, less delicious wine: The problems food growers face with climate change

Stuff, 27 February 2020

How Māori kai producers are decolonising the New Zealand food story

The Spinoff, 15 November 2019

New Study shows Profit for Green Dairying

Radio New Zealand, 29 November 2019

An early contribution to Beef + Lamb NZ's Taste Pure Nature brand



By collaborating with the sheep and beef industry, Our Land and Water (OLW) generated evidence supporting investment in a country-of-origin brand that reached at least 640 million people in the US and China in 2019–20, and could earn New Zealand hundreds of millions of dollars per year.

In late 2017, Beef + Lamb NZ commissioned six research projects from the Integrating Value Chains programme (IVC), to apply its research methodology to six target markets in the US and China. This research produced robust estimates of what consumers were willing to pay for attributes such as environmental stewardship associated with New Zealand beef. It found the potential to achieve a 20% price premium in the US market, equating to extra revenue of \$238 million p/a in export returns for the sector.

The research found it was possible to identify different preferences for attributes in different market segments, and identified current on-farm practices that could add

value (some with modification). This research validated other market research undertaken by Beef + Lamb NZ and contributed to its decision to focus on a market segment it labelled 'Conscious Foodie'.

In June 2018, Beef + Lamb NZ created a formal proposal to increase the sheepmeat and beef levy by \$4.1 million. Of this, \$2.7 million was to increase investment in the country-of-origin brand Taste Pure Nature. The proposal was accepted by the vote of levy payers and enabled promotion of Taste Pure Nature in key markets – starting with the US and China markets analysed by IVC.

Following a significant work programme by Beef + Lamb NZ to develop and validate the brand, Taste Pure Nature launched in California in March 2019, and in May 2020 launched in China through 200 supermarkets and China's two biggest e-commerce platforms, TMall.com (340.8 million daily unique visitors) and JD.com (85.2 million daily unique visitors).

Activities in the US over 2019–20 aimed to highlight the qualities of New Zealand grass-fed beef and lamb, and included a segment on Good Morning America by chef George Duran (72.5 million online and social reach), an influencer trip to New Zealand (social reach >40 million with >126,500 engagements) and a sustainable living survey (>102 million impressions).

Beef + Lamb NZ reports improvement in the US for every key metric it is tracking for consumer awareness and preference for New Zealand grass-fed meats. In China, social media monitoring of consumers' perceptions of protein origin shows Chinese consumers are increasingly positive about New Zealand beef, lamb and mutton following the Covid-19 pandemic.

The IVC programme tested whether New Zealand's world-renowned reputation for food and fibre would allow our producers and processors to capture higher returns for agri-food exports. Led by Paul Dalziel, deputy director of Lincoln University's Agricultural Economics Research Unit, the research team developed knowledge on how to bring more value from premium consumers back to New Zealand producers through improved value chains, rewarding good environmental, social and cultural practices.

This research reinforced Beef + Lamb NZ's decision to require users of the Taste Pure Nature brand to participate in the New Zealand Farm Assurance Programme (NZFAP), developed to provide quality assurance for the brand and enable any price premium to be shared with food producers. There are now 2588 NZFAP-assured farms (from >4000 farmers audited).

The knowledge developed by IVC, and applied by Beef + Lamb NZ, contributes to the development of better value chains that support the OLW objective: To maintain and improve our land and water quality for future generations, while enhancing the value of the primary sector to New Zealand.

From the early contribution of OLW research to the Taste Pure Nature brand launch, this work demonstrates that New Zealand producers and processors can work together to provide consumers with evidence supporting a product's claimed attributes, improve market access and deliver value to consumers. Ultimately, global value chains will capture higher returns for agri-food exports – an essential element in the transformation of New Zealand's primary sector from volume to value.

Te Hauhake Festival

The Te Hauhake Festival is an excellent example of a successful public engagement event, co-hosted by the Pā to Plate project team, as part of the New Models of Collective Responsibility research programme.

On Saturday 21 March 2020, the Whirinaki Kai Manawa Garden Group and Pā to Plate hosted a successful Te Hauhake Festival at the Matai Aranui Marae in Whirinaki, Northland.

There was a good turn-out from the Whirinaki and wider Hokianga community despite several cancellations from people who planned to travel

from Ōtepoti, Whakatane and Tamaki as a result of the pandemic threat looming over the country. The festival was a full day of sharing knowledge and building relationships. Commitments were made to build a stronger community in Whirinaki and in other Hokianga communities.

The host marae provided exceptional hospitality and nutritious kai, most grown locally at the Whirinaki Kai Manawa Gardens, a community garden less than a kilometre from the marae.

Open Farms

Open Farms is an initiative to reconnect urban and rural Kiwis through a nationwide open farm day, held on Sunday 1 March 2020, with core sponsorship from OLW, DairyNZ, Beef + Lamb NZ, Vodafone and MPI.

Visitor interest exceeded expectations (>3500 visitors) with the majority of the 45 farm events fully booked. There was widespread media coverage advancing OLW's goal to improve the quality of public debate about the future of land use in New Zealand.

OLW conducted post-event surveys that provided evidence that visiting a farm builds trust and support for sustainable farming. Visitors felt more connected to farmers, gained appreciation for the complexity of farming, and felt more positive about the environmental sustainability of farming.

Our summary and infographic of survey results were covered by media, shared in social media and at an event with over 1000 farmers, and shared by organisations including Beef + Lamb NZ, Eat New Zealand, Young Farmers, Waikato Federated Farmers, Rural Support Trust, Palliser Ridge, and Rural Leaders.

OLW will again be a primary sponsor of the second Open Farms day, to be held in 2021. We will repeat our survey at Open Farms 2021 to track changes in social license to operate.



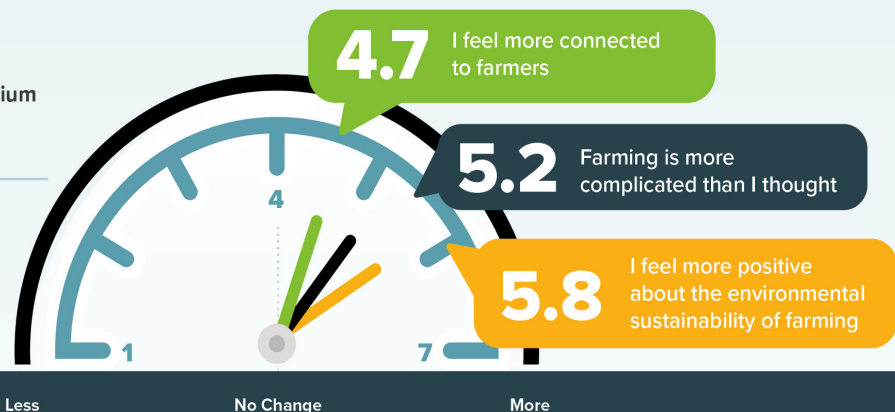
Visiting a farm builds trust & support for sustainable farming.

64%

Are more willing to pay a premium for sustainably grown food.

72%

Are more likely to buy food direct from a farmer



OUR LAND AND WATER SYMPOSIUM

Kia Mauri Ora te Whenua

12–13 August 2019 | Te Papa, Wellington

Our Land and Water Symposium

The OLW Symposium (12–13 August 2019) provided an opportunity for stakeholders, academics, likely end-users and high-profile thought leaders to connect with OLW research.

The Symposium attracted a diverse audience of stakeholders and end-users. Over 280 people registered, plus over 60 speakers and panellists, with 211 people attending the networking function. Audience members included representatives from every CRI and every NZ university, 9 regional councils, 6 government ministries and offices, and 18 primary industry organisations.

Quick-fire presentations focussed on solutions and impact, highlighting the progress being made by OLW research teams. We encouraged open, dynamic discussions by using an interactive Q&A app and allowing 50% of session time for audience questions. Over 80% of the total audience submitted questions, with 369 questions asked in total.

A post-event survey gave a 92% ‘Yes’ response to the question: “Did attending this event connect you to a person, idea or information that will help you in your future work?”

OLW researchers also presented at 63 other conferences over 2019–20.



Market-led trials of specialty grains and pulses in Canterbury



Trials of three novel crop types identified as having high potential by Our Land and Water (OLW) research were undertaken in Canterbury this year. Four on-farm buckwheat trials, supported by Carrfields Ltd, were initiated for a Japanese customer with exacting specifications for buckwheat noodles. Soybean lines were imported by Plant Research (NZ) Ltd as part of their ongoing trials to identify the best soybean lines for New Zealand conditions. Quinoa trials also got underway, with Kiwi Quinoa looking to expand its grower base.

These trial crops comprise three of the six 'star' specialty grains and pulses identified by OLW research as having high potential for New Zealand farmers: soy, chickpeas, buckwheat, hemp, oats and quinoa. All have minimal environmental impacts (and in some cases benefit land and water) and can be included as part of mixed farming systems that include animals.

Connections with these food companies, farmers and seed importers were supported by research completed by the speciality grains and pulses workstream, in OLW's Next Generation Systems (NGS) research programme. The workstream was led by Susan Goodfellow, director of Leftfield Innovation, and the research programme was led by AgResearch science impact leader, Robyn Dynes.

The programme aimed to support farmers to develop new farming systems and land use options that are feasible and practical in the eyes of rural communities, in response to intensifying demand to adapt to new market opportunities, technological innovations, regulatory limits and consumer demands.

The researchers connected with farmers who were interested in exploring new land uses associated with reliable water, provided by the new Central Plains Water irrigation scheme in Canterbury. Thirteen farmers participated in multicriteria decision-making interviews, a framework developed by NGS researchers to explore the drivers and barriers for land use diversification.

These interviews found the farmers generally considered financial factors more important than social, environmental and market factors, which were rated above regulatory and knowledge factors. They found most farmers understand what can be grown, but find it challenging to fit the pieces of the value chain together, such as consumer demand and the availability of processing capability to transform raw materials into desired food products.

Leftfield Innovation sought to connect market insights with these farmer insights. Speciality grains and pulses had previously been identified as a land-use opportunity of high interest to Central Plains Water farmers. Researchers gathered information on a wide range of ancient and specialty grain and pulse crops and looked at the market to determine which grains and pulses were increasing in demand, had attributes consumers desired, and potential as ingredients in high-value snack food products.

The resulting Specialty Grains and Pulses Report shortlisted six grain/pulse categories and identified further steps required for opportunities to be realised.

This work provided assessment criteria that Leftfield Innovation drew on in work with Plant Research Ltd, who evaluated 50 soybean seed varieties imported and grown for the Canterbury trial. Five soybean varieties were selected by Leftfield Innovation to fit their identified market and consumer expectations, and further trials will be planted by Plant Research (NZ) Ltd over 2020–21.

The report also supported Leftfield Innovation to communicate to farmers the exacting market specifications for buckwheat. The Japanese customer subsequently requested an increased tonnage of New Zealand-grown buckwheat to meet these standards in 2020–21.

The report later informed a Wairarapa Water Ltd report, supporting its proposal for the Wakamoekau Community Water Storage Scheme. This identified nine potential new land opportunities afforded by increased water storage. OLW then funded the research team to hold a workshop with Wairarapa farmers in July 2020.

The information and connections produced by this research will support Canterbury and Wairarapa farmers as they develop opportunities to create more value and diversity from their land.

Governance

The OLW Governance Group ensures OLW research is well aligned with strategic objectives. It consults with the Directorate regarding programme performance and delivery issues, and supports science quality. Both governance and management arrangements for OLW were altered in late 2019/early 2020. Changes were made to evolve the governance structure, and to better resource the management and operation of OLW.

The Director and Chair consider these changes have served their purpose, and OLW governance and management had performed well and with appropriate separation over the last 12 months. We believe the OLW Challenge is in a very strong position to meet its objectives.

Governance Group

The Kāhui and the Board of Governors were merged into a single Governance Group in 2019–20, due to the evolution of the Kāhui role from providing advice to more active strategic partnership. This was endorsed by the AgResearch Governance Board, the Challenge Parties Group and MBIE. A key requirement was to have at least 50% of the members with a deep understanding of te ao Māori, and this was achieved.

The merged Governance Group (GG) held its first meeting in September 2019, with a new Chair, and met 6 times in the 10 months remaining of the financial year.

Two of these meetings were in addition to the scheduled quarterly meetings, to make significant investment decisions and provide strategic guidance to shift the focus of OLW towards implementation and impact of the science. This led to a full refresh of the OLW research workplan to embody a higher level of commitment to providing practical and effective incentives and pathways to achieve more sustainable agricultural practices in Aotearoa (see page 8).

Management

There were significant changes made to the management of OLW over the review period. Directorate staffing was increased to meet the Phase 2 workload, adding a Kaihāpai Maori and a Senior Research Advisor to manage contracting. Both positions were filled by early 2020, and the new staff have had a major positive effect on research co-design and contract management respectively.

Together the Kaihāpai Māori and the VM theme leader (now Kaiarataki, with an increase in FTE from 0.2 to 0.7) have breathed life into OLW's commitment to embed te ao Māori within all research and work in partnership with Māori. The time allocated for all three science theme leader positions was doubled, allowing them to participate more actively in research development and interact more regularly with all members of the Directorate.

Finally, the inaugural OLW director retired at the end of May 2020, but the early recruitment of a new director allowed for a smooth transition.

Challenge Parties Group

There are 16 Challenge Parties engaged with OLW. The Challenge Parties Group meets with the Directorate quarterly, to encourage their involvement in research priorities, foster aligned research with their organisations, and mitigate the risks of misunderstandings regarding OLW processes.

A new collaboration agreement, incorporating details of the changed governance arrangements and other amendments relating to the second phase of OLW, has been drawn up.

Contact Us

E: ourlandandwater@agresearch.co.nz

Learn More

W: ourlandandwater.nz



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