agresearch
āta mātai, mātai whetū

G36

2024 RĪPOATA Ā-TAU

Annual Report

RĀRANGI TAKE

Contents

KO WAI MĀTOU

About Us

We are one of seven Crown Research Institutes who collectively bring in approximate revenue of $1b to spend on science to improve Aotearoa New Zealand.

We use research to enhance the value, productivity, and profitability of Aotearoa New Zealand's pastoral, agri-food and agri-technology sector.

8 Research farms

201 Live patents

547 Research projects

401 **Scientists (FTE)**

70,000 stored seed samples from **100** different countries

348 Academic Papers [1]

STORED DATA

1.5 Petabytes

[1] *2023 Calendar Year*

The food and fibre sector in the New Zealand economy creates

$56.4b

In export revenue which is

10.5%

of New Zealand's GDP.

This equates to

80.9%

of all merchandise exports.

The sector employs

359,000

people, representing

12.8%

of the total workforce.

7% to $24.2b

DAIRY

Dairy export revenue is expected to decrease 7 percent to $24.2b in the year to 30 June 2024 due to lower global dairy prices. This is driven by a weakening of global demand and an increase in supply, specifically improved milk production in China. A weaker NZD against the USD offers some support to export revenue. Milk production is forecast to increase 0.7 percent driven by better-than-expected weather conditions. The drop in export prices is expected to lead to a lower farmgate milk price of $7.90 per kilogram of milksolids for the current season. The lower farmgate price combined with high farm expenses, especially greater debt servicing expenses, is likely to reduce farm profitability.

6% to $11.4b

MEAT AND WOOL

Meat and wool export revenue is expected to decrease 6 percent to $11.4b in the year to 30 June 2024. Key meat export prices are expected to fall due to higher global red meat production and weaker global economic conditions. Lower export prices for beef, lamb, mutton, and wool are forecast to be partially offset by higher prices for petfood and venison. Higher lamb and beef export volumes are also expected to help partially offset export price falls. Sheep and beef farm profit before tax is forecast to fall 54 percent in 2023/24, following a 29 percent decline in 2022/23, due to lower revenue and higher input costs.

Find out more about us online by scanning this code or visiting www.agresearch.co.nz/about-us

All figures are forecasts by the Ministry for Primary Industries for the year to 30 June 2024

TE AROTAKE A TE HEAMANA ME TE MANAHAUTŪ

Chair and Chief Executive's review

Delivering research and scientific excellence that catalyses the New Zealand economy.

It is with great pleasure that we present AgResearch's Annual Report for the 2023/24.

During the financial year we made substantial progress towards our dual objectives: ensuring we have a thriving and growing economy and an agricultural sector that is efficient, sustainable and profitable, and making inroads on our journey to building a sustainable business platform.

In the face of significant commercial headwinds, like many New Zealand businesses we have been diligently refining and working on our business fundamentals.

AgResearch has not made a profit for a number of years and our reported financial loss of $25.3m for FY24 includes several large one-off items.

A legislative change regarding tax depreciation on our buildings has resulted in a one-off $15.4m impact. Additionally, we have accounted for $5.5m in other one-off impairments. These combined factors have significantly impacted our FY24 result.

Our total operating revenue reached $178m, showing a slight increase on FY23. Notably, our commercial revenue continues its upward trajectory, rising to $97.9m from $90.2m in FY23 - a bright spot in an otherwise challenging financial year.

Acknowledging that routinely making deficits is unsustainable, the Board has initiated a series of strategic measures aimed at achieving an operational surplus within the next 2-3 years. Our comprehensive 'Business Improvement Programme' targets key areas including costing, pricing, contracting, overheads, utilisation, planning, forecasting, and project delivery, which collectively enhance our operational and financial performance.

Collaboration with industry partners remains a cornerstone of our approach, ensuring that our research and development efforts meet their needs while being fully costed and appropriately charged. We are intensifying our commercialisation efforts to maximise the impact of our research, generate alternative revenue streams, and provide clear commercialisation pathways for our scientists and their innovations.

Concurrently, we have made tough decisions to curtail costs and exit underfunded research areas, allowing us to focus on our key research priorities. These adjustments, while challenging, will have an impact on the breadth of research we have

traditionally delivered but they are essential for our financial sustainability and the continued delivery of impactful research.

While times are tough, AgResearch continues to offer substantial returns on investment for the New Zealand taxpayer. Our Strategic Science Investment Funding (SSIF), amounting to approximately $44m annually, is judiciously allocated to align with our strategic goals, balancing foundational research with the ability to address emerging issues promptly. Our total revenue for FY24, predominantly derived from contracted science services to both public and private sectors, underscores the broad applicability and demand for our expertise.

Our research continues to deliver real value and impact.

For example, our Plant Genetics team's use of genomic technology has significantly enhanced forage breeding efficiency, predicting breeding values earlier and thereby accelerating yield gains. To put this in context, AbacusBio, on behalf of the team, calculated that an increase in ryegrass dry matter yield from 0.7% to 2% could yield a return of $0.5b to $1.3b for the dairy industry by 2040. Similarly, our Food Integrity team's work on food safety research is estimated to generate an annual economic benefit of $41.7m, representing a 515% return on SSIF invested into the research.

Our newly established Research Priorities, formulated with extensive stakeholder input, reflect our commitment to addressing the major challenges facing the pastoral industry. These priorities aim to concentrate our efforts where we can make the most significant impact, maintain national and global leadership, and ensure the long-term financial sustainability of AgResearch.

We invite you to delve deeper into these priorities within this report, confident that they articulate our vision and strategy for the next five years. They are aligned with our Minister's expectations for a technology and future-focused organisation, aimed at driving the New Zealand economy and enhancing the sustainability of our pastoral farming stakeholders.

Our commitment to excellence was further demonstrated in FY23/24 through our investment in state-of-the-art facilities, particularly in Lincoln. Our new Tuhiraki building, a 7,600 square metre research facility based on the Lincoln University campus, demonstrates our dedication to creating optimal workspaces that foster collaboration and innovation.

Moving forward, our focus remains on providing impactful solutions and technologies to tackle climate change, improve food systems, and establish mutually beneficial relationships with farmers. Our contributions to the New Zealand research ecosystem are invaluable, and we look forward to participating and helping to shape the Government's review of the science sector. We are ready to navigate the rapid advancements in knowledge and technology, ensuring our strategies and structures align with our Core Purpose, to support the primary sector and the Government's science and innovation priorities.

In conclusion, AgResearch is committed to enhancing the value, productivity, and profitability of New Zealand's pastoral, agri-food, and agri-technology sectors through effective science. Our research drives economic growth and delivers beneficial environmental and social outcomes for New Zealand.

Dr Paul Reynolds QSO
Chair
30 June 2024

Dr Sue Bidrose
Chief Executive Officer
30 June 2024

Dr Paul Reynolds

Our chairman Dr Paul Reynolds retired from the AgResearch Board at the end of FY24.

Paul joined AgResearch in 2015 and took the reins as chairman in 2019.

During this time he has been our strongest advocate and built a legacy as a science sector doyen. Paul helped shape AgResearch's physical future reinforcing our commitment to our four-campus model.

In 2019, we successfully relocated AgResearch's corporate headquarters from Hamilton to Lincoln, and in the following year, we proudly opened Te Ohu Rangahau Kai, the joint food science facility in Palmerston North.

Last year, we opened our new research centre and corporate headquarters, Tuhiraki, co-located on the Lincoln University campus. Paul always strongly advocated for partnerships and collaboration, particularly with the tertiary education sector, as evidenced by our campus co-location strategy.

He also signed several Memorandums of Understanding, which formalised our relationships with private and public sector organisations and iwi, strengthening our collaborative efforts.

The current AgResearch Board played a crucial role in the most recent iteration and expression of our organisational strategy, as reflected in our Research Priorities. We initiated the review due to concerns about resources being spread too thinly. AgResearch's refreshed research strategy–the Research Priorities and flagships–is designed to better respond to the rapidly evolving challenges in the agriculture, agri-food, and agri-tech sectors, setting us on a path to becoming a more financially sustainable organisation.

We thank Paul for his dedication, advocacy, expertise and service.

"As I bid farewell, I am confident that AgResearch is well-positioned to continue its journey of excellence and innovation. I am incredibly proud of what we have accomplished together and excited about the future for AgResearch."

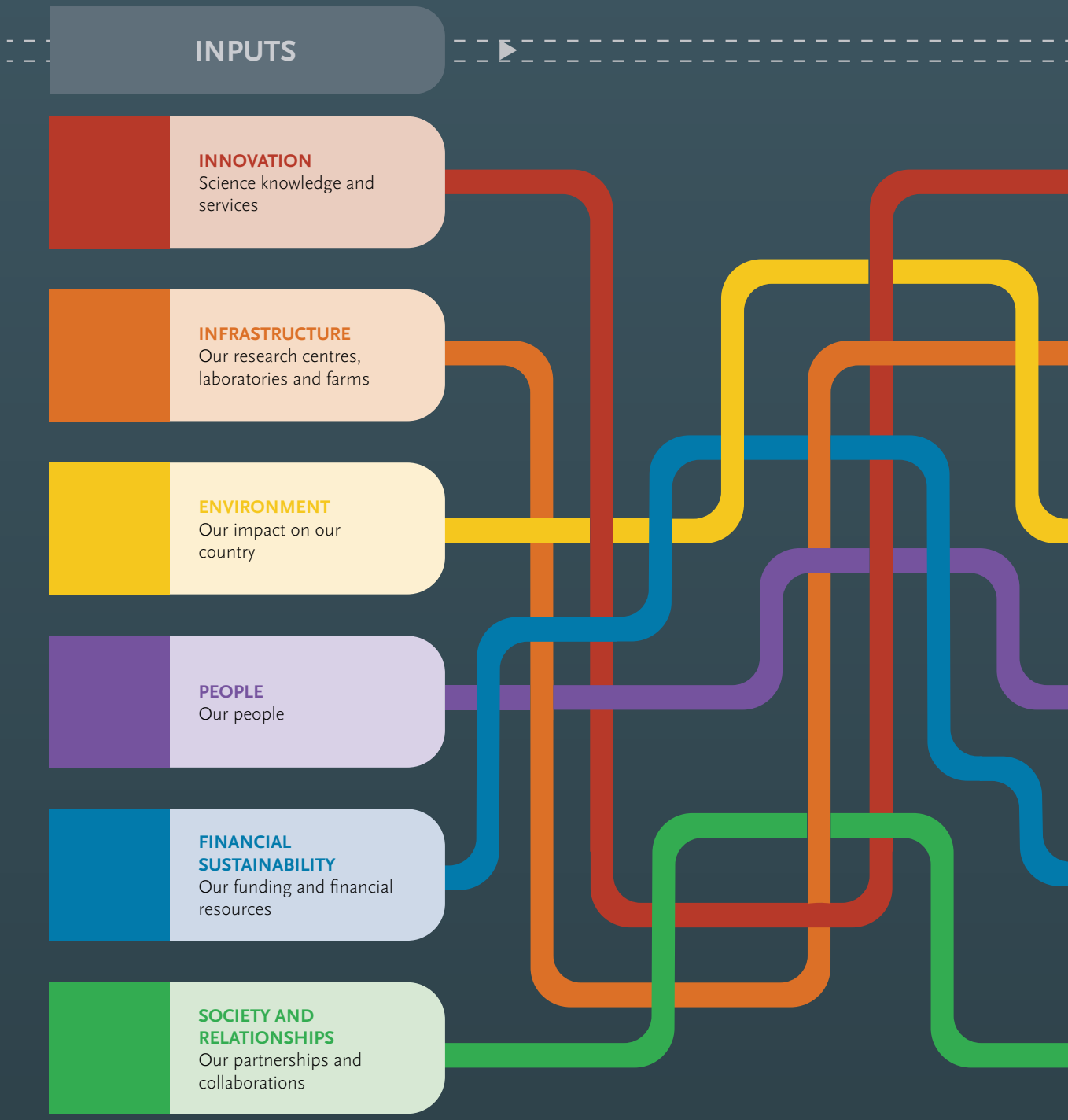
– DR PAUL REYNOLDS

Ā MĀTOU WHAKAAROTAU RANGAHAU

Our Research Priorities

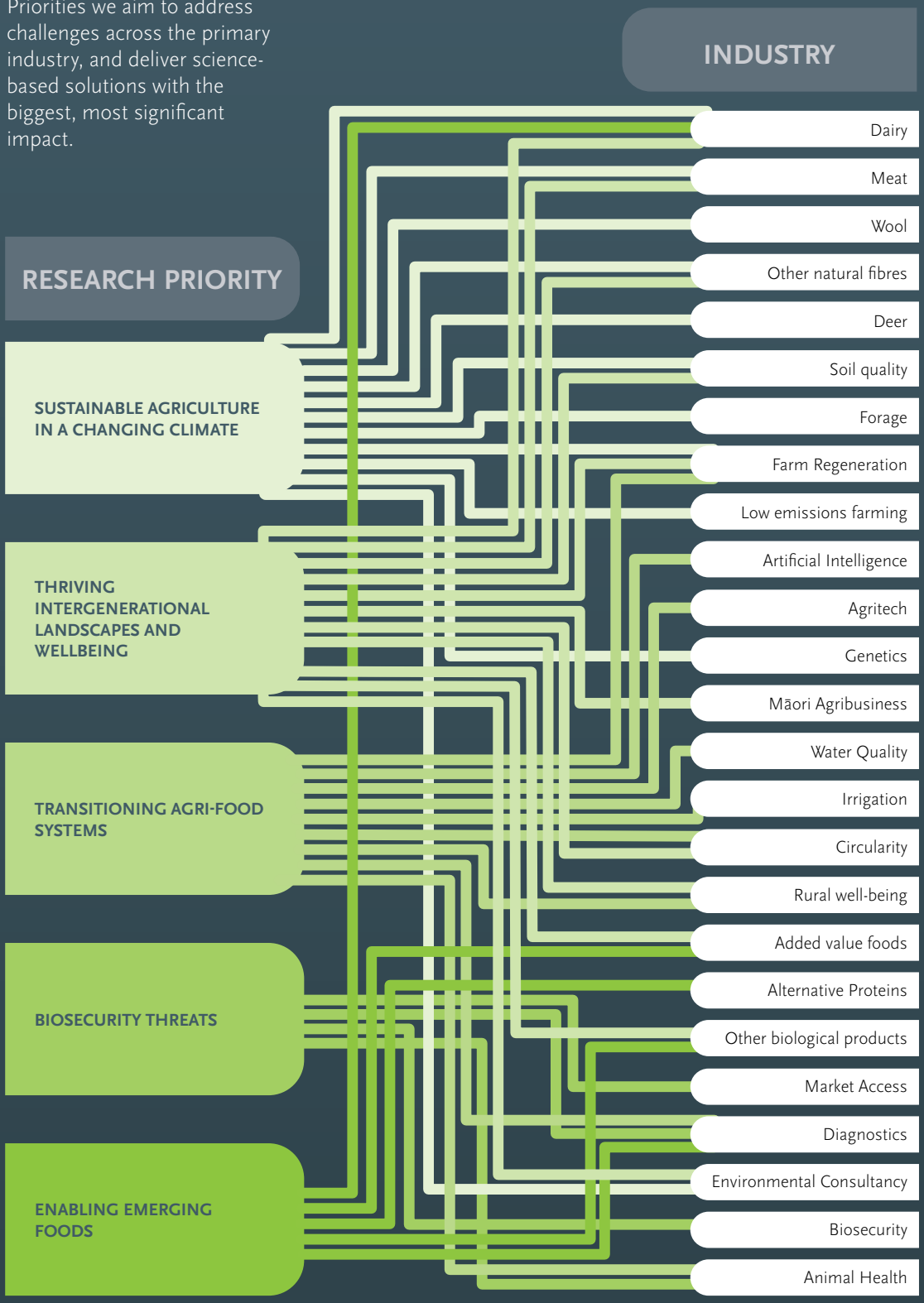
Creating impact and value

AgResearch is an organisation that aims to create value and impact not only for its people, but for the betterment of the agricultural sector and Aotearoa New Zealand.



OUTPUTS	IMPACT
Research that is strategic, designed with, and aligned to, our science end-users, and delivers and provides value for our commercial partners. Our science contributes to scientific understanding, thought leadership, and return on investment.	**CREATE THE WORLD'S MOST SUSTAINABLE FOOD PRODUCTION SYSTEMS THROUGH THE INTEGRATION OF WESTERN SCIENCE AND MĀTAURANGA MĀORI.**
Innovation created in places and spaces that are modern, cutting edge, and co-located with New Zealand's emerging and leading researchers, and thought leaders.	**WORKPLACES THAT INCUBATE INNOVATION, COMMERCIAL OPPORTUNITIES AND PUBLIC GOOD OUTCOMES.**
A commitment to sustainability and lighter footprint on the planet.	**AGRESEARCH PROVIDES AN EXAMPLE AND LEADERSHIP FOR OUR PARTNERS TO FOLLOW.**
Creative and innovative thinkers who work in a safe supportive and inclusive setting that fosters success.	**VALUES AND A COMPANY CULTURE THAT ENHANCES AND FOSTERS THE WORLD'S MOST IMPACTFUL AND ESTEEMED RESEARCHERS.**
Sustainable business operations that strive to be responsible, efficient and mitigate risk.	**ROBUST AND RESILIENT REVENUE STREAMS THAT ENABLE SMART INVESTMENTS.**
Deep and enduring stakeholder relationships. Commercial partners and research funders who are valued and engaged in our research.	**A RESPONSIVE AND AGILE ENTITY THAT IS COMMERCIALLY AND CULTURALLY FOCUSED ON PROVIDING SOLUTIONS TO THE PROBLEMS OF TODAY AND TOMORROW.**

With our new Research Priorities we aim to address challenges across the primary industry, and deliver science-based solutions with the biggest, most significant impact.



CAPABILITY

Aotearoa New Zealand is a leader in the production of premium food and fibre, and design and development of novel agri-food innovations. Our science capability spans the agricultural value chain with a focus on integrated systems - all aspects of our research can be linked.

In February 2023, we began a programme of work to refresh our research strategy to better respond to the rapidly evolving challenges affecting the agriculture, agri-food, and agri-tech sectors.

Our aim was to:

- Address the major challenges facing the pastoral industry, both currently and in the foreseeable future.
- Narrow the breadth of our research to focus on areas where we can have the most significant impact on the agriculture, agri-food, and agri-tech sectors.
- Build depth in these key areas to maintain or gain national and global leadership in the field and be the preferred research provider.
- Demonstrate thought leadership in agriculture, agri-food and agri-tech related science.
- Prepare and position our workforce for future challenges and opportunities.
- Ensure long-term financial sustainability for AgResearch.

We undertook an iterative consultative process involving extensive engagement with both scientific and other staff members within our organisation as well as external stakeholders and thought leaders.

This extensive process has resulted in five new research priorities (see below). With these priorities clearly defined, we aim to address primary industry challenges and deliver science-based solutions with the biggest, most significant impact.

Our five new Research Priorities

SUSTAINABLE AGRICULTURE IN A CHANGING CLIMATE
Dedicated to addressing the challenges and increasing threats from climate change faced by dairy, sheep, goat, deer and beef farmers, this priority delivers actionable, science-based solutions, tools, and knowledge to maintain both environmental and financial sustainability in farming practices.

THRIVING INTERGENERATIONAL LANDSCAPES AND WELLBEING
Grounded in kaupapa Māori principles and led by Māori, this priority is centred on creating resilient, thriving whenua Māori farming landscapes that are not only productive and sustainable but also cater to the cultural and social wellbeing of future generations.

TRANSITIONING AGRI-FOOD SYSTEMS
Transcending the scope of individual farms to catchments and regions, this priority challenges the paradigms of land use with community-centric sustainable design and practices that prioritise long-term environmental and community health, stability, and wellbeing.

BIOSECURITY THREATS
Safeguarding plant and animal health, this priority reinforces biosecurity defences by being squarely focused on establishing more resilient and environmentally responsible farming systems that can withstand the biosecurity challenges of today and tomorrow.

ENABLING EMERGING FOODS
Taking a highly partnered approach, this priority provides Aotearoa New Zealand with alternative proteins and technology-led production systems while ensuring food safety, quality, health and nutrition are not compromised.

A scientist inspects our Hi-Ct White Clover plants in our containment facility based in Palmerston North

Excellent science, where it matters most

By focusing on areas where we can be most impactful, our five Research Priorities ensure that our scientific endeavours remain at the forefront of innovation and relevance. This approach enables us to continue producing high-quality, cutting-edge research that not only responds to current challenges but anticipates future trends in agriculture, and delivers to the evolving needs of both the agricultural sector and consumers.

Our research priorities also emphasise the formation of robust partnerships. By co-designing with Māori, other CRIs, industry, farmers, Government and other research institutions, we can create synergistic teams that bring diverse expertise and perspectives. This collaborative approach is pivotal to ensure that the outcomes of our research are comprehensive, inclusive, and have the greatest, positive impact on the sector and communities.

We choose to promote a kaupapa Māori research priority ('Thriving intergenerational landscapes and wellbeing') alongside others that offer opportunities to align traditional mātauranga Māori with contemporary scientific methods. With that, we aim to enrich our science in a way that is uniquely Aotearoa-based. This approach not only respects and preserves indigenous knowledge but also provides innovative perspectives to agricultural and agri-food science.

By identifying and focusing on key areas of research, we ensure that our resources are allocated effectively, maximising the return on investment. This approach allows us to deliver the most relevant and impactful science to meet Aotearoa New Zealand's needs, while also fostering a skilled and knowledgeable workforce.

It's important to note that our new research priorities are also focused on achieving financial sustainability for AgResearch and a stronger return on investment for Aotearoa New Zealand. By focusing on areas with the highest potential for impact and return, and making smart, forward-thinking investments in technology and people, we aim to create a more financially robust and sustainable organisation. This approach enables us to continue delivering high-quality research and development, while maintaining financial health and resilience.

Flagship Research Programmes

AgResearch reached a significant milestone for our organisation during FY24 when we successfully set up all eight of our new Flagship Research programmes in time for the start of the 2025 financial year and started work on all eight of the new science programmes.

The SSIF-funded flagships, which align with our new Research Priorities, are:

- Plants and Microbiomes of the Future
- Animals of the Future
- Strategic Partnerships
- Supporting the Re-indigenisation of Whenua Māori for Wellbeing
- Transitioning Agri-Food Systems
- Biosecurity
- Enabling Emerging Foods
- Early-Stage Product Development

Reaching this milestone was the result of extensive collaboration and effort from many team members. It began after and launched off the work we completed when we redesigned our new Research Priorities.

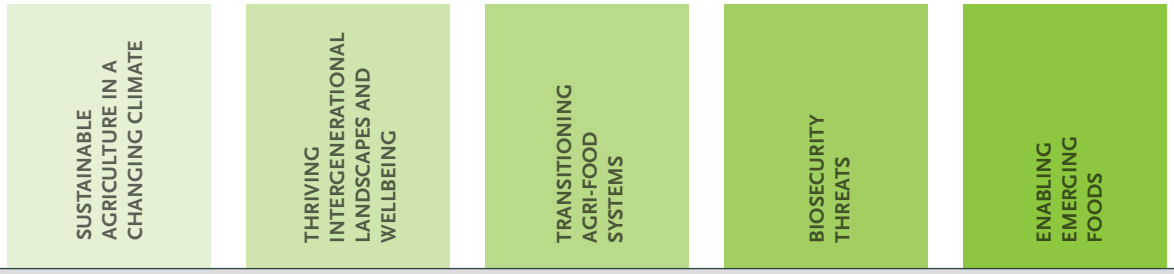
From June 2024, most of our research, including our commercial, contestable, and SSIF-funded research will be clustered under our five Research Priorities. Although there will be plenty of research that cuts across more than one priority area, for simplicity, most projects will be aligned to a particular theme.

The flagships contain and describe in detail the science we are going to deliver. They optimise our research capabilities and are our way of backing ourselves as a research organisation in our priority theme areas where we believe we can best make a significant research contribution for the greatest potential impact.

The Research Priorities have come a long way from our first workshop at the Christchurch Town Hall in 2023.

Integrated traverse themes for AgResearch's research priorities

In the realm of agricultural research and innovation, the integration of traverse themes transcends our Flagship Programmes, applying universally across all research priorities. This inclusive approach underscores our commitment to addressing the multifaceted challenges and opportunities within the sector, guided by the expertise of distinguished leaders in five key areas: Te Ao Māori, Systems Biology, Data Science and Digital Technology, Social Science and Farmer Engagement.



SYSTEMS BIOLOGY

Systems Biology adopts a holistic approach to understanding and improving the intricate interactions within ecosystems. This theme is pivotal for achieving ecological balance, promoting sustainable land use and enhancing the health of ecosystems. By embracing systems thinking, we aim to foster resilience and sustainability in agriculture, ensuring that our practices contribute positively to the well-being of both the environment and communities.

DATA SCIENCE AND DIGITAL TECHNOLOGY

This is all about harnessing the power of Data Science and Digital Technology to drive innovation and enhance decision-making across all research priorities. From predictive modelling and supply chain analytics to the early detection of biosecurity threats, this theme plays a crucial role in transforming agricultural practices through cutting-edge technologies and data-driven insights.

SOCIAL SCIENCE (INCLUDING ECONOMICS)

The Social Science theme, including Economics, enriches our research by embedding human behaviour and economic considerations into our strategies. This theme is essential for informing policy recommendations, addressing social and cultural factors, and understanding market dynamics. Our expertise ensures that our research is not only scientifically sound but also economically viable and socially responsible.

FARMER ENGAGEMENT

Our Farmer Engagement theme emphasises the importance of connecting with and understanding the needs of the farming community. This theme is dedicated to ensuring that our research is grounded in the realities of agricultural practice, fostering collaboration and communication that address the aspirations and challenges of farmers. We aim to create research outcomes that are directly relevant and beneficial to those at the heart of the agricultural sector.

TE AO MĀORI

The principles of Te Ao Māori are woven throughout our research endeavours, reflecting a deep respect for the cultural values and knowledge systems unique to Aotearoa. This theme champions the integration of indigenous perspectives across our research priorities, ensuring that our scientific pursuits honour Māori values and practices and incorporate them when appropriate.

Innovation

Science excellence is our primary focus at AgResearch and underpins our contribution to ensuring we have a thriving and growing economy and an agricultural sector that is efficient, sustainable and profitable. We do this by being a science consultancy that offers real commercial value and a return on investment to customers.

To ensure our science remains fit-for-purpose, we have conducted a detailed review of our research priorities. The process, designed to ensure that our science and services are focused on and aligned to what our shareholders require, has created an organisational strategic roadmap and structure upon which all key decisions moving forward are based, including how we use Government funding.

OBJECTIVES			FY24 Target	FY24 Result
i	Drive and demonstrate research impact	Commercial reports per scientist FTE *	1.00	1.1***
		Independent evidence-based impact analyses	10	11
		Continue to grow impact-enabling capability and culture	Achieved	Achieved
ii	Adopt a Tiriti-led approach	Enabling Māori Strategic Science Investment Fund (SSIF) allocation	$4.8m	$4.8m
iii	Creative Collaboration	People have easy access to colleagues to explore ideas or receive feedback	> 70%	75%
iv	Peer-reviewed publications	Impact of scientific publications (mean citation score *)	2.70 **	4.18

* *KPIs that are mandated by MBIE across CRIs*

** *By signing DORA, AgResearch made a public commitment to valuing the scientific content of a paper over and above any publication metrics or journal indices. The Metrics Toolkit (https://www.metrics-toolkit.org/metrics/citations_articles/) advises, "Citation counts should never be interpreted as a direct measure of research quality".*

*** *This figure is based on an estimate of FY24 publication outputs*

Research funding and the commercial benefits for New Zealand

AgResearch receives approximately $44m of Strategic Science Investment Funding (SSIF) per annum, contracted by the Ministry of Business, Innovation & Employment. In 2023-24, the remainder, and bulk of our total revenue $178m was derived from contracted science services to clients in both the public and private sectors.

Our SSIF distribution prioritises areas crucial for AgResearch's strategic goals and the funding structure has been carefully crafted to balance the need for foundational scientific research, the ability to respond quickly to emerging issues, support for underpinning resources and public service, and substantial investment in flagship programmes.

For completeness, SSIF was earlier this year contracted by MBIE at $44,418,647 p.a. until June 2026. This amount has not been inflation-adjusted since it was first awarded as Core Funding in 2011. The only exception was a 'Cost Pressure Adjustment' of $6m p.a. in 2020 because of the COVID-19 pandemic.

Our SSIF distribution prioritises areas crucial for AgResearch's strategic goals. It ensures a balanced investment in flagship programmes ($31,168,647) and other areas core to our research portfolio.

A total of $4.8m is allocated to our Enabling Māori Fund. This is directed at supporting and developing our kaupapa Māori and mātauranga Māori capability relevant to the Research Priorities. Of this, $3.6m is being used to support Flagship Programmes in the Thriving Intergenerational Landscapes and Wellbeing Research Priorities.

We've also chosen to fund our agility and responsiveness to new challenges (via our Agility Fund, $4.6m) for key resources required to deliver our research priorities, as well as public service research (via our Underpinning Resources and Public Service Fund, $3.5m).

Given our research often combines different strands of private and public sector funding, we do not calculate a return on SSIF investment to New Zealand. However, AgResearch has conducted 'economic benefit' assessments of many of our research programmes (some of which were funded in part or in whole by SSIF).

For example, AgResearch's industry leading Plant Genetics team use genomic technology to dramatically improve the efficiency of forage breeding. The team use DNA markers to create genomic selection models to predict the breeding value of a plant. Because genomic selection identifies the best plants earlier, at a seedling stage, this leads to an increase from 0.7% to 2% in yield gains, nearly trebling genetic gain. Leading agribusiness consultancy, AbacusBio, calculated that a lift in ryegrass dry matter yield from 0.7% to 2% would result in a $0.5b to $1.3b return to the dairy industry by 2040.

Using SSIF and drawing on private sector support, AgResearch is working with Grasslands Innovation, Barenbrug, Cropmark and DairyNZ, to develop genomic tools to accelerate breeding for environmental and climate resilience trait benefits in both ryegrass and white clover.

AgResearch's pioneering endophytes research has made a huge contribution to pastoral farming. New endophyte strains alone contribute about $200m every year to the New Zealand economy. In New Zealand, the endophyte strain AR37 was found by AgResearch to confer a wide range of tolerance to insect pests, including Argentine stem weevil, African black beetle, root aphid, pasture mealy bug, and porina. It has been estimated that it will contribute $3.6b to the economy through the life of the AR37 patent. Our ongoing endophyte research and development is funded by SSIF and commercial partners.

Our Food Integrity team recently evaluated their contribution to the meat industry. Overall the estimated annual economic benefit to New Zealand from the tools and research they have developed totals $41.7m. The total investment in the programme from SSIF was $8.1m (over 20 years). That makes the annual return on investment 515%.

Our subsidiaries and business units, Grasslanz Technology Ltd and GenomNZ, focus on providing commercialisation pathways for our science and scientists. We strongly leverage KiwiNet Innovation Network and its pre-seed funds for commercialisation activities to ensure the services we provide, and the intellectual property we own, are maximised to their full commercial potential. We also derive revenue from royalties (provided by licensees of patented technological advances, for example, in the seed sector).

Over the last 20 years, AgResearch's Food Integrity Programme has established a reputation for delivering quality science and genuine engagement with partners, building confidence and trust in the research undertaken by the team and the advice they provide.

RESPONDING TO EMERGENT FOOD SAFETY AND REGULATORY ISSUES THAT PLACE NEW ZEALAND'S EXPORTS AND REPUTATION AT RISK.

MPI introduced **US OMAR CCP Validation** after our success in retaining at risk export certification for meat processors

Creation and introduction of **Assurance GDS screen method** for testing carcasses reduces the likelihood of STEC detection at the US Border

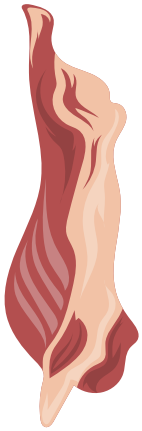
Assisted meat processors in retaining certification to the value of

$100m

Protection of US bobby veal market valued at

$360m

over the last 10 years



IMPROVEMENTS IN PROCESSES AND PRACTICES HAVE REDUCED PRODUCT RISK FROM PREMATURE SPOILAGE AND IMPROVE MEAT QUALITY THROUGH EXTENSION OF SHELF LIFE.

Shelf-life of beef enroute to Europe extended from

63 to **90** days

Challenges associated with slow-steaming during transit overcome

Research into frozen meat defects (mould, freezer burn) saved a loss of **$100k**

Alternative packaging solutions still used today to maintain market access for commercial meat processor worth

$10m p.a.

Service testing for blown pack clostridia generates AgResearch

$800K p.a.

World class innovators

Science excellence is traditionally defined by scholarly achievement. At AgResearch, we consider science excellence to be more than traditional academic outputs. We are building a culture of creativity, collaboration and inclusiveness through our new research priorities and a refresh of our career descriptor framework.

Our Science Team Leaders, working with Science Group Managers, our Strategy and Communications Team and others, provide direction, oversight and monitoring as part of assessing our delivery of impact. They work collaboratively with internal and external stakeholders to identify, plan for, deliver and ensure next and end-user uptake of current and future science opportunities through a fit-for-purpose portfolio of projects, programmes and integrated initiatives. This is delivered via national and international scientific collaborations and internally co-ordinated science projects across multiple objectives.

We recognise excellence by awarding annual prizes funded by SSIF (see our achievements section). Traditionally, the AgResearch Science Prize has rewarded outstanding achievement in research quality, i.e. our foremost publication in the last five years. We have diversified this prize and added a foremost field-weighted publication to recognise publications that have a significant impact in their research field. An Impact Prize recognises the achievement of outstanding scientific output(s) that deliver and/or contribute to sector impact(s). A Student Prize recognises excellence among students working on research projects within AgResearch.

Our International Science Advisory Panel (SAP) remains an important voice in our evolution and continues to be a key influencer on science. The panel is made up of Emily Parker (Victoria University of Wellington Te Herenga Waka), Henning Steinfield (now retired and formerly from the Food and Agriculture Organisation of the United Nations), Rickey Yada (University of British Columbia) and Laurens Klerkx (Universidad de Talca, Chile). The SAP provided important feedback on our Research Priorities and we thank them for their expertise and wise counsel in FY24.

Other key influences on our science excellence include our Emeritus Scientist cohort, who provide their collective experience and wisdom, and our Science Council which, on behalf of AgResearch staff, provides a 'bottom up' science voice to our Senior Leadership Team. Both groups embody what successful science looks like.

Some of our Emeritus Scientists clockwise from top left, Barbara Barratt, Stephen Goldson, Tony Conner, Liz Wedderburn

Intellectual Property and Impact

Our AI driven weed eradication solution, Map and Zap®, has been showcased to investors at Canterbury vineyards during FY24

AgResearch aims to strategically manage and transfer intellectual assets in ways that ensure optimal benefit to New Zealand, as well as benefit and impact for stakeholders. To accelerate adoption of innovation, AgResearch uses a range of technology transfer pathways. These include a mix of partnering, providing contract research and development services, executing licensing deals with industry, or (if necessary) forming new ventures to deliver impacts.

For example, in FY24 we leveraged the AgriFutures grow^{AG} platform to market two leading pieces of our research. AgriFutures grow^{AG} is a hub for global agrifood innovation. Investors and venture capitalists can explore research, technology, and commercialisation opportunities in one place and connect with a diverse ecosystem including startups and discover funding avenues, list projects, and engage with over 400 organisations.

Map and Zap® is an AI driven early growth stage weed identification and laser-zapping solution that reduces the need for chemical herbicides for controlling weeds. AgResearch partnered with AgriFutures grow^{AG} and several investors have shown an interest in the technology.

Our approach to commercialisation and dissemination of knowledge varies, given the many and varied types of intellectual property rights which are generated, accessed and used across the financial year. The most effective method of managing them to achieve maximum impact will vary on a case-by-case basis. In some instances, the best impact may be through widespread public release via publication or in conjunction with an industry body.

Commercialising science requires a financial return to justify that approach and attract external investment. So it is essential that we protect the core technology appropriately, on a case by case basis, through patents or other intellectual property rights, where needed.

Achieving impact through knowledge transfer is a key goal. But where the knowledge and technology has a market application and is expected to generate commercial returns, an equitable return from the commercial exploitation of intellectual property rights should be expected. This is important in enabling AgResearch to operate as a sustainable business and to continue to provide capability and expertise to support the pastoral sector.

Open Science Initiative

In the past financial year, AgResearch committed to the principles and practices of Open Science, which aim to make scientific research accessible for the benefit of scientists and society. Recognising the international movement towards Open Science by funders, governments, and publishers, a dedicated team worked on an Open Science strategy over 18 months.

The strategy focused on ensuring science quality, managing risks, and enhancing ease of use. Key outputs of this initiative included the development of tools tailored to our needs. Among the new resources made available were a refreshed Output Release Process, a comprehensive Open Science Policy, and an Open Science Toolkit.

These resources were designed to establish clear expectations and responsibilities across various roles within the organisation. The Output Release Process, for instance, was not a complex technical solution but a pragmatic approach to maintaining our high standards of science quality.

A soft rollout of these resources occurred across June and July, with training materials being developed for a full launch in the next financial year. This initiative underscores AgResearch's commitment to fostering a culture of openness while balancing appropriate access controls to support Māori Data Sovereignty, commercial confidentiality, intellectual property rights, and commercialisation opportunities.

Thought leadership

AgResearch is actively involved in providing thought leadership to increase the impact of science by engaging with traditional and non-traditional stakeholders.

While our core purpose is dedicated to increasing the efficiency and productivity of the pastoral food producing sector, we continue to play a role in knowledge transfer in areas such as genetic technologies.

We took a strategic approach on engagement with next and end-users of our science, releasing public facing updates on our use of genetic modification and gene editing technologies to enhance pasture that forms the foundation of our livestock farming industries in New Zealand.

Opportunities from these technologies include greater farm productivity, better animal health and improved environmental results that may include reduced greenhouse gas emissions and less nitrogen loss that has the potential to contaminate waterways. Work is underway to understand the potential benefits of these technologies and to ensure that those benefits outweigh any potential risks.

Farmers are an important part of this strategy. While much of our research is about building scientific understanding, that is shared with other researchers (or 'next users' of science) to help make the incremental advances needed to tackle large and small problems. AgResearch also made a contribution to one of the Government's key priorities–strengthening the backbone of our economy–by liaising directly with farmers at National Fieldays, where we shared practical advice on pasture management and other climate change initiatives.

We augmented our messaging using print and digital media, publicity campaigns, stakeholder events, farmer forums, our links to and through memberships of farmer industry bodies and via hands-on field work, which our scientists often conduct with farmers directly involved or in the paddock next door. This work is a key part of maximising the impact of our research and assisting farmers to maintain their social licence to operate.

Advanced tech

AgResearch's digital and data research capability reached an important milestone in FY24. We now have over 50 research programmes that use Artificial Intelligence to power their research in either the funded or planning stage. AgResearch was an early adopter of Artificial Intelligence (AI).

Our scientists were programming computers, and writing bespoke code, over 20 years ago. We were harnessing what were then the cutting edge digital technologies of the day. Since then, through the evolution of computing power, which has grown exponentially, a new generation of researcher is using huge and complex datasets, and a combination of off-the-shelf AI products in an agricultural context, and in keeping with our pioneering past, creating our own machine learning algorithms to make sense and order of data. All in a farming context.

We have forged a close relationship with the AI Institute at Waikato University that has paired our practical applications of AI with our expertise in animal health and welfare. This partnership has delved into the realms of Explainable AI, that aims to demystify the inner workings of neural networks, paving the way for more transparent and understandable AI systems. This research has far-reaching implications, particularly in fields like agriculture, where AI can revolutionise traditional methodologies.

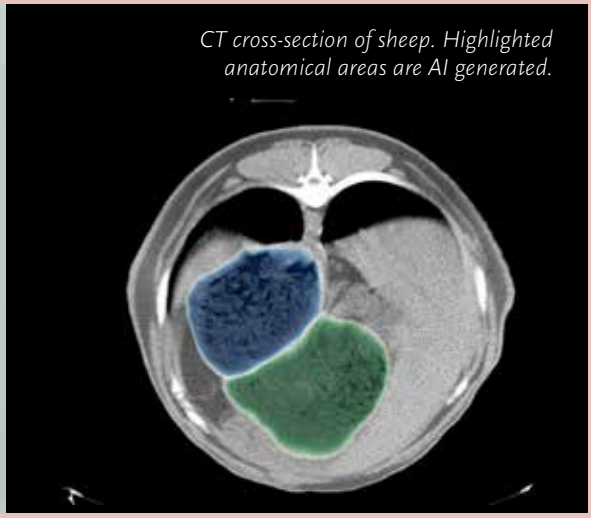
In an ultra-modern approach that marries advanced remote sensing technologies with the power of artificial intelligence, AgResearch is helping to support surveillance of costly biosecurity threats to New Zealand agriculture. The research utilises remote sensing technology to identify maize crops from a combination of satellite and aerial imageries. By harnessing open-source satellite images and employing semi-automatic, image labelling techniques using computer vision, we have been able to glean invaluable insights into maize crop locations.

A key component of this strategy lies in the integration of more than 1 million samples of multi-temporal high-resolution satellite images associated to 16 crop types. By combining this pixel-based dataset with high-resolution aerial imagery, our team can provide stakeholders with advice to authorities so they can swiftly respond to emerging threats. This Better Border Biosecurity (B3) research has been shared with the Ministry for Primary Industries and the Foundation for Arable Research so they can fine-tune their surveillance efforts.

AGRESEARCH ANIMAL GENOMICS RESEARCHERS ARE UNLOCKING THE POTENTIAL OF AI TO REVOLUTIONISE THE WAY WE UNDERSTAND AND OPTIMISE LIVESTOCK PRODUCTION.

We're using CT scanning coupled with AI to achieve transformative advancements in our understanding of important animal traits that have previously been out of reach due to the complexity of their measurement.

3D render of a rumen.



CT cross-section of sheep. Highlighted anatomical areas are AI generated.

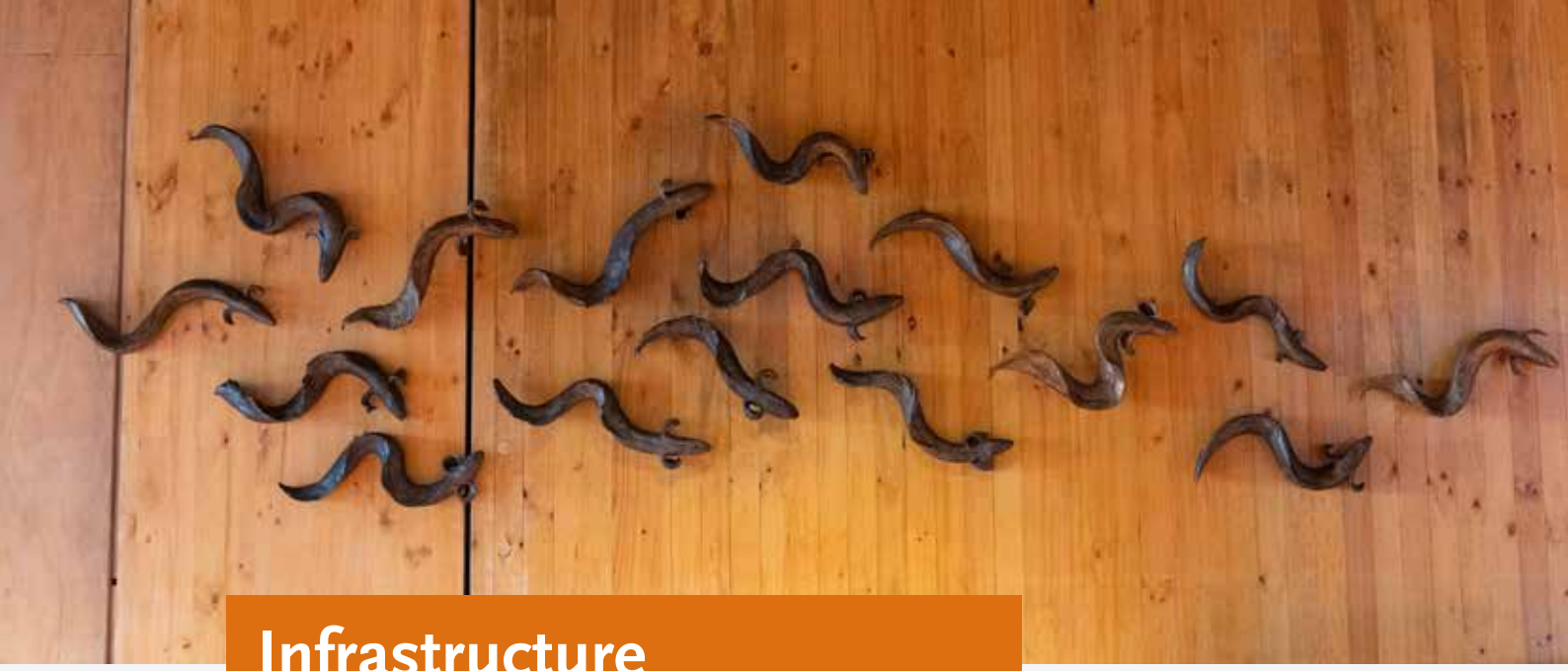
Grasslanz reaches milestone

AgResearch subsidiary Grasslanz Technology Ltd celebrated the 20th anniversary of its incorporation with a symposium that included past and present staff and all of Grasslanz's key stakeholders at is headquarters in Palmerston North. The event recognised the important contribution the company has made to the pastoral farming sector and how its future, thanks to its technological and commercial focus, is bright.

Grasslanz started as a business unit inside AgResearch, called the Cultivar, Development and Management Unit. It licenced forage cultivars, generally for clients involved in the pastoral sector who paid a royalty. The unit then used that income to invest in further breeding of new cultivars, and grew from there.

The business unit was turning over about $3m a year when it was incorporated. It has now grown to about $11.3m per annum. Its product range has changed from forage cultivars through to Epichloë endophytes in grasses and is now expanding microbial bioprotectants (biopesticides, biofungicides and biostimulants) as the next suite of technologies that will continue to build impact. Grasslanz has 14 staff and outsources Research and Development work largely to AgResearch.

Ivan Baird from the Grasslanz Technology Seed Production Team cares for white clover plots at AgResearch's Lincoln Farm, Canterbury.



Infrastructure

In the 2023/24 financial year, AgResearch achieved significant milestones in its infrastructure development. These advancements underscore our commitment to fostering cutting-edge research environments and supporting our strategic objectives. Key highlights include the inauguration of the Tuhiraki research facility at Lincoln, the expansion of the New Zealand Ruminant Methane Measurement Centre (NZRMMC), and the strategic decision to close the Large Animal Containment Facility in Ruakura.

OBJECTIVES			FY24 Target	FY24 Result
1	**Effective and efficient use of infrastructure**	New Lincoln workplace and laboratory buildings complete and fully operational	Achieved	Achieved

New Zealand Ruminant Methane Measurement Centre (NZRMMC) Upgrade

AgResearch has initiated a significant expansion and upgrade of the NZRMMC at Grasslands. This project will double our capacity to measure methane emissions from cattle by increasing the number of respiration chambers from four to eight. Additionally, the facility will be upgraded to meet PC2 containment levels, accommodating the more rigorous requirements of early-phase research with novel compounds and other interventions.

Established in 2011, the NZRMMC plays a crucial role in measuring methane emissions from ruminants, aiding New Zealand's inventory reporting. This multi-million-dollar investment, funded by AgResearch and the New Zealand Agricultural Greenhouse Gas Research Centre (NZAGRC), aims to address demand and enhance our research capabilities.

A methane chamber inside the NZRMMC

Animal Containment Facility Closure

In a strategic shift regarding our animal and genetic modification research, the AgResearch Board and management decided not to replace the large Animal Containment Facility (ACF). Located on leased land owned by Tainui Holdings Ltd, the site is slated for development into a housing subdivision. This decision followed a comprehensive assessment of risks, benefits, and stakeholder views. Staff involved in ACF research were informed, and the facility will wind down operations as current projects are completed, ceasing entirely by the end of June 2025.

Tuhiraki Research Facility

A major milestone for AgResearch was the successful relocation to our new research facility, Tuhiraki, in late 2023. This transition, completed in two phases, marked a significant step forward for our organisation. Initially, 135 science and support staff moved into the administrative wing of Tuhiraki. By early 2024, the 3,928m² laboratory wing, which houses both non-Physical Containment (non-PC) and Physical Containment level 2 (PC2) laboratories, was completed, allowing 65 lab-based staff and their equipment to relocate to the state-of-the-art facility.

Situated on the Lincoln University campus, Tuhiraki's laboratories are equipped with advanced technologies. For instance, the plant growth rooms feature programmable lighting technology to simulate solar days, while the PC2 labs facilitate biocontrol programs and DNA extraction from a variety of sources. Non-PC2 labs support formulation and fermentation activities, as well as sensory skin tests. Additionally, the facility boasts mass spectrometers, an industrial-scale nitrogen generation plant, reverse osmosis water supply, and sophisticated containment zones.

The laboratories are designed for flexibility, enabling seamless changes in usage with minimal disruption. The facility is augmented by PC2-level greenhouses and an insectary, completed in June 2024. Tuhiraki fosters internal collaboration and partnerships with other Crown Research Institutes (CRIs), universities, and external organisations, driving forward the research agenda and addressing complex agricultural challenges.

On September 1, 2023, the new building was blessed during a Whakatau Whare ceremony, celebrating the contributions of mana whenua, staff, the board, artists, designers, construction crew, and key stakeholders. This new facility will help attract top talent, explore shared facility opportunities, and align with our Research Priorities.

Board members, Lincoln based staff and the Naylor Love project team were a part of the Whakatau Whare which formally marked the settling of Tuhiraki, preparing the building to welcome those working in and looking after it. Attendees took part in the kaikarakia, where kaikaranga and kaumatua led a procession through the building before sharing kai in the Whare Kai.

Environment

In the 2023/24 financial year, AgResearch made significant strides in advancing our sustainability agenda. Our strategic approach, focusing on environmental stewardship and emissions reduction, underscores our commitment to sustainability.

Our key achievement for the year was the adoption of the Future-Fit Business Benchmark (FFBB). The framework is based on over 30–years of scientific research and assesses all operational aspects of a business and aligns with our objective to embed sustainability into our business-as-usual activities.

The benchmark includes 23 break-even goals, and we have successfully achieved the first tier of certification: 'Future-Fit Engaged,' which provides third-party validation of our sustainability performance.

Our immediate focus under this certification is on waste reduction. We are assessing various types and quantities of waste generated by AgResearch and exploring disposal, recycling, and reuse options. Our ultimate goal is to achieve the highest tier of certification, 'System Changer,' by 2026.

OBJECTIVES			FY24 Target	FY24 Result
i	Commitment to sustainability	On track to achieve our target greenhouse gas emissions reductions by 2030	Achieved	Achieved
		On track to achieve FFBB 'System Changer' status by 2026	Achieved	Achieved

Emissions Reduction Targets

Significant progress was made in our emissions reduction program. In July, our Board approved targets aligning with the Paris Climate Agreement's goal to limit global warming to 1.5°C. By 2030, we aim to reduce emissions by 42% of two thirds of emissions from across energy use (fossil fuels and electricity) and business travel, including staff commuting, relative to our 2018/19 baseline levels.

Toitū Envirocare, a subsidiary of Manaaki Whenua Landcare Research, independently certified our baseline emissions for 2018/19. Our total emissions for the baseline year were 17,582 tonnes of CO2 equivalent, with over 10,000 tonnes from livestock and farm operations. Electricity consumption accounted for 1,242 tonnes, fossil fuel assets for 1,300 tonnes, and air travel and staff commute for 2,000 tonnes. Future emissions reductions will focus on decommissioning outdated facilities and transitioning our vehicle fleet to electric.

AGRESEARCH BASELINE EMISSIONS

Livestock and Farm Operations
10,000 tonnes

+ Electricity Consumption
1,242 tonnes

+ Fossil Fuel Assets
1,300 tonnes

+ Air Travel and Staff Commute
2,000 tonnes

= Total Emissions
17,582 tonnes

Stakeholder Engagement and Double Materiality Assessment

Understanding and integrating stakeholder perspectives is pivotal in our strategic planning. In FY23/24 we initiated a double materiality assessment to evaluate our impact on people and the planet (impact materiality) and how sustainability issues pose risks to our business (financial materiality). This ongoing work will inform our sustainability plans and target-setting, particularly in farming activities.

We are also collaborating with research providers and Toitū Envirocare to set an on-farm emissions reduction target. This collective effort aims to balance the need for climate mitigation solutions with the practical constraints of the pastoral sector. We aim to establish this target by the end of 2024.

Looking ahead, AgResearch aims to achieve the following goals publish our first working dashboard tracking progress across all benchmarks; obtain certification for greenhouse gas emissions post-benchmark years; set specific emissions reduction targets for business mobility and farm-related emissions; enhance transparency of air travel emissions (both projected and historical); implement fuel-switching projects at our sites to reduce carbon emissions.

AgResearch is a world leader in biological emissions research. We share knowledge and provide leadership to the industry on all matters related to farming and climate change. So it is important that we 'walk the talk' when it comes to how we operate as a business.

AgResearch's achievements in the 2023/24 financial year reflect our unwavering commitment to sustainability. Through rigorous assessment, ambitious targets, and strategic collaboration, we are advancing towards a more sustainable future, setting a benchmark for environmental stewardship within the industry.

People

We recognise that our employees, with their diverse skills, backgrounds and areas of research, are our greatest strength. AgResearch aims to create a work environment that values equality, diversity and inclusion by appreciating our differences and supporting every employee to perform at their best.

OBJECTIVES				FY24 Target	FY24 Result
i	Employee experience	Strong Engagement Index		> 70%	76%
		Strong employee participation in employee engagement survey		> 70%	82%
ii	Workforce stability and retention	Stable unplanned annual people turnover		< 10%	7.4%
iii	Reduce workplace inequalities	Implementation of our *Kia Toipoto Action Plan* FY25 goals		Achieved	Achieved
		Gender pay gap reduced		< 12.5%	12.2%
		Employees feel that the organisation values and respects individuals from diverse backgrounds and cultures, and creates a welcoming environment for all employees		> 70%	87%
iv	Health and Safety culture	Hazard and incident prevention	Safety observations	> 200	202
			Notifiable injuries and notifiable events	0, <2	0, 1
		My manager shows by his/her behaviour a commitment to Health and Safety		> 90%	93%
v	Capability and culture in te ao Māori	Strong participation in cultural development programme for te ao Māori (Kia Manawanui)		> 50%	33%
		Continue Te Puāwaitanga internship programme		Achieved	Achieved
		Invest SSIF to build capability of Māori research and advisor staff and Māori partners		Achieved	Achieved
vi	Digital capability	Progress implementation as outlined in *Te Mahere Matihiko*		Achieved	Achieved

Pay Gaps and Equity, Diversity, and Inclusion

AgResearch has made pleasing progress on the implementation of the pan Public Service Toipoto Action Plan that focuses on closing gender and ethnic pay gaps to create a fairer workplace. Since 2020, we have been proactively addressing historical issues that contributed to our pay gap and have managed to reduce it year-on-year. We calculate our pay gap annually in February and publicly report it via the Mind the Gap pay registry and on our external website. AgResearch's pay gap in FY24 was 12.2%. Last year it was 14.3%. In comparison, from 2018-2021, the Public Service gender pay gap dropped from 12.2% to 8.6%. The Aotearoa New Zealand national gender pay gap is 11.9%

mindthegap.nz

We share our Gender Pay Gap information on our Website. Scan here for more information.

Health and Safety

AgResearch's internal Health and Safety culture has gone from strength-to-strength in FY24 with our 'Our Voice Survey' results trending in upwards directions. 98% of our people have stated they understand their responsibilities in creating a healthy and safe workplace, which is well above the national average. 91% of our people have also indicated that their manager shows a commitment to health and safety through their own behaviour.

AgResearch joined with Safer Farms in FY24. As a member, alongside other leading agriculture organisations, Safer Farms enables us to deliver on our joint mission: everyday farming people protecting one another from preventable harm. Safer Farms is working across the agricultural sector to implement the Farm Without Harm strategy. Pleasingly, AgResearch's Health and Safety record was exemplary in FY24 with no recorded serious accidents, and excellent staff compliance with protocols and preventative training, some of which is compulsory.

Pan CRI Impact

iPEN Turbocharging Impact

AgResearch has been a key contributor since co-establishing a pan-CRI Impact Planning and Evaluation Network (iPEN) which has been active since 2016–aiding impact through collaborative capability building. Through both iPEN and internal training we have continued to build capacity and capabilities to embed Monitoring, Evaluation, Reflection and Learning (MERL) within individual programmes where we can–an important part of achieving impact. Our new priorities offer us an opportunity to focus on maximising delivery and demonstration of impact across a portfolio of research.

Pathway planning

We rewrote and refreshed the AgResearch Science Career Descriptors in FY24. The new descriptors have been designed to increase transparency and simplicity around the promotion process and recognise the wider contribution to science excellence and outcomes beyond traditional academic measures. The information, which sits within our HRIS, can now be integrated with key information from our Research Priority refresh and other sources to provide meaningful reporting on our current strengths and inform decision making to ensure we are retaining the right people, utilising key talent, and building the capabilities needed for the future. The update resulted in the creation of a new Senior Research Associate role.

Following on from the work we completed on our core research capabilities, we have developed a draft view of how these capabilities might align to our Research Priorities. Alongside this we have also formed an initial picture of how these capability areas are funded. We tested these pieces of information on a matrix with a view to identifying where supply requirements are strong and stable, and where vulnerabilities might exist. As our Flagship Programmes mature under our research priorities, these models will be used to help inform the supply and demand requirements of researchers over the next 3-5 years.

Te Ao Māori Capability

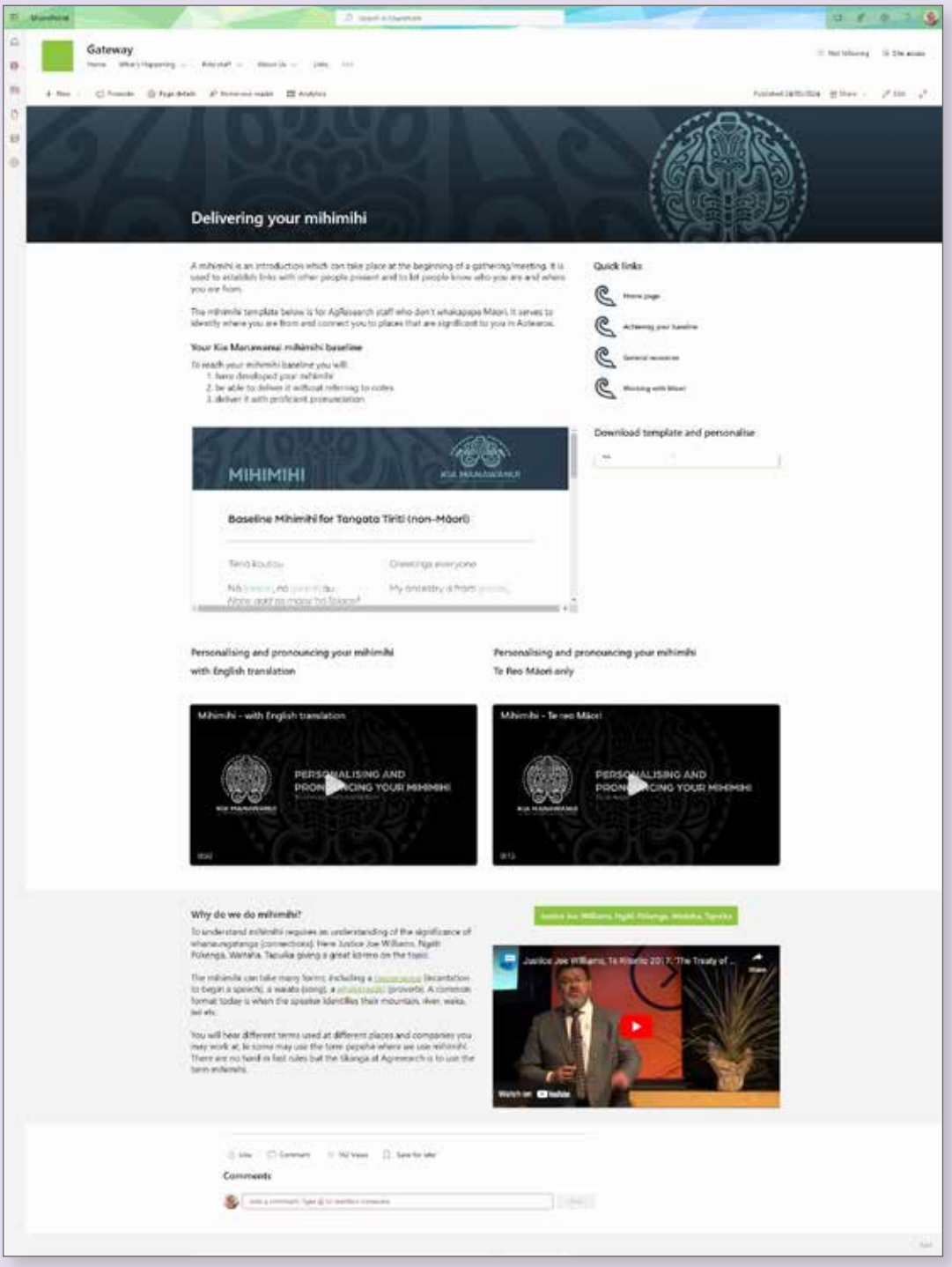
The importance of the Māori agribusiness economy is growing annually and to ensure AgResearch is supporting this strategically importance part of the sector we work in, we are committed to making sure our people have the right skills and cultural competencies to navigate and build partnerships with Māori successfully and safely.

AgResearch has offered formal Te Reo and tikanga training for learners as well as te Tiriti o Waitangi guidance. During FY24 we developed our bi-cultural capability programme and gave it its own identity –Kia Manawanui–which will act as a programme to develop a bi-cultural capability baseline for our people. This will provide a clear guide to all staff as to bi-cultural capability expectations as representatives of the Crown in our Crown-Māori partnership.

Whilst we continue to grow our offering, we note a relative decline in the number of people taking up at least one of these courses. This is a trend across other learning and development opportunities and is not limited to our organisation. This is not unusual as we go through a period of more rapid organisation change. Secondly, we have been offering an extensive range of courses for several years now and some people feel like they have reached a reasonable level with their Māori cultural capability.

KIA MANAWANUI
Our Māori cultural development programme

In the spirit of collaboration, our bi-cultural capability programme leverages off a similar programme within Manaaki Whenua Landcare Research. Our key bi-cultural capability advisor works for both organisations. The programme also aligns with changes to our Research Priorities and refreshed *Te Ara Tika* strategy, and our AgResearch tikanga guide. Our involvement with the cross-CRI group on Mā te Ara Pūtaiao Ka Taea continues to provide valuable knowledge and resources to our organisation.



The Kia Manawanui programme is available to staff through our Intranet, Gateway. The portal offers a series of videos, audio, and written resources to assist each individuals learning.

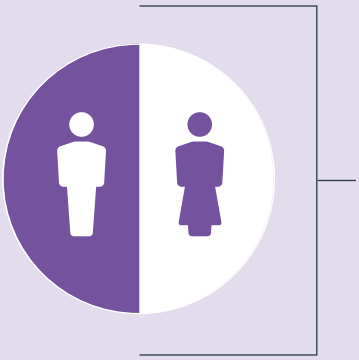
Snapshot of our people

The following provides a snapshot of our people as at June 2024. Reporting is for AgResearch only. It excludes any subsidiaries as at 30 June 2024.

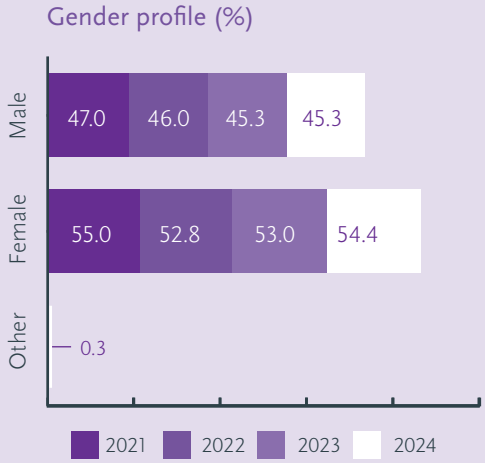
As at June 2024, AgResearch had 790 permanent, fixed term and casual employees, studentships and contractors.

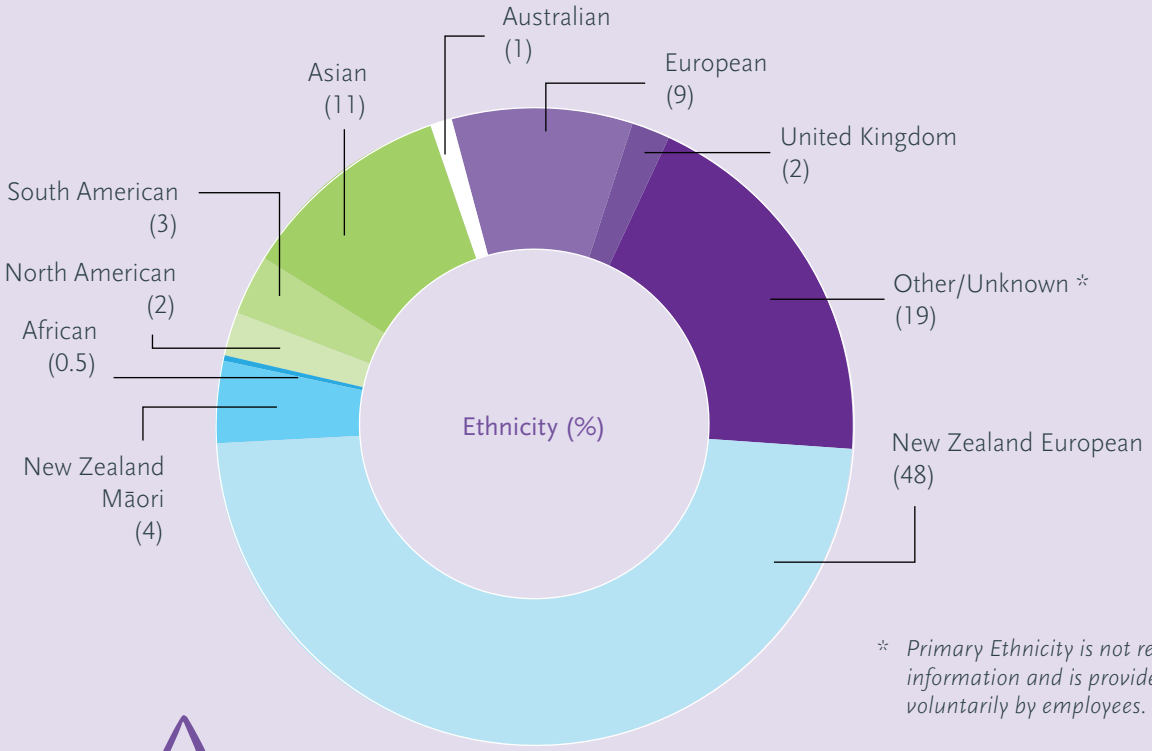
790

Our people are diverse, originating from all corners of the globe. 55 percent are female and 45 percent are male.

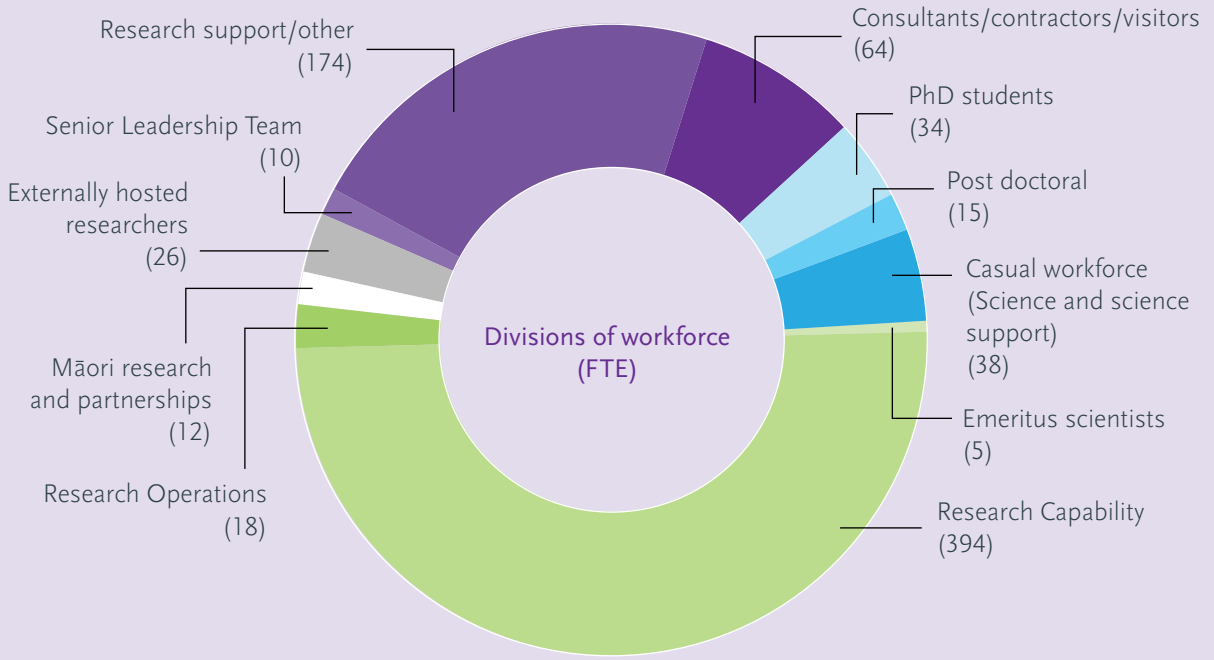


Senior Leadership Team Gender profile (%)
Our Senior Leadership Team is comprised of 50% females and 50% males.

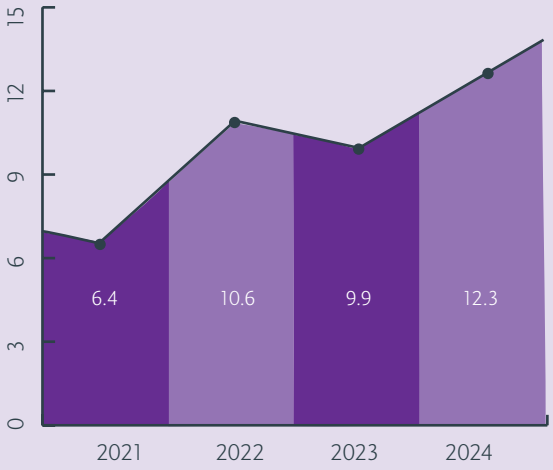




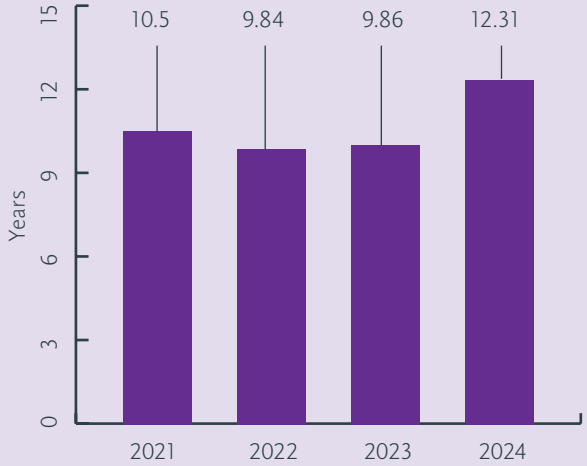
* *Primary Ethnicity is not required information and is provided voluntarily by employees.*



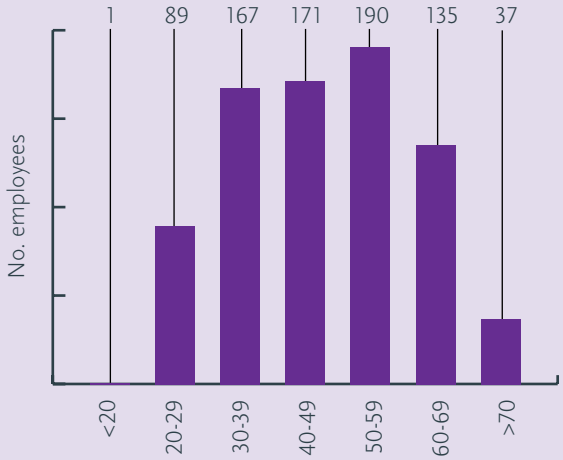
Employment Turnover (%)



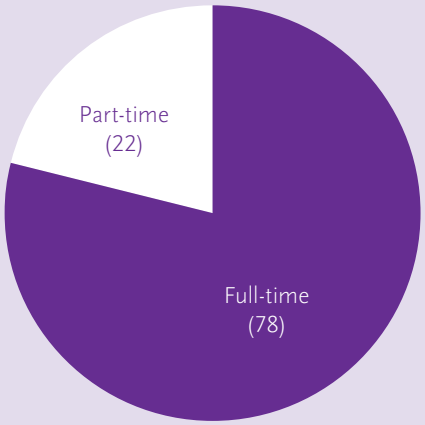
Average Tenure



Age Profile



Employment Type (%)



Our Voice

Our annual employee engagement survey, 'Our Voice', provides valuable insights into how we are tracking as we build the culture we need to succeed.

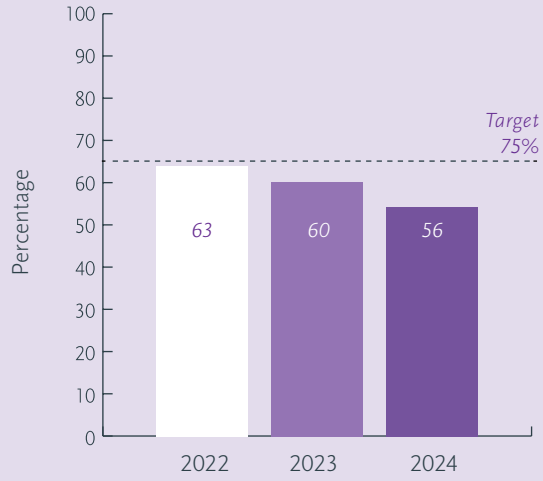
The Senior Leadership Team (SLT) continue to focus on transparency around communication and decision making to create a high trust, inclusive and transparent culture.

	PERCENTAGE FY23 > FY24
Communication is open and honest	60 > 65
Confidence in senior leadership	60 > 63
Decision making is clearly being informed by our strategy	35 > 53

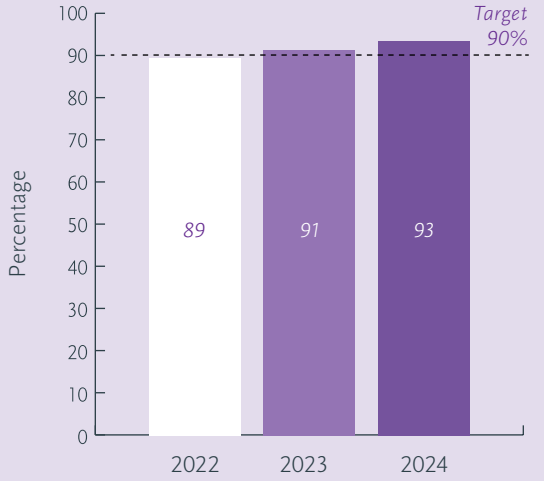
How poor performance is managed within the organisation is one of our lowest rated questions, with just 22% (2023) and 24% (2024) agreeing that poor performance is managed well. Over the last 12 months, the SLT with support from People & Culture have been working with people managers to define what good performance management looks like. We have, however, seen improvements in our approach to performance management through other survey questions that relate to how we manage our people.

	PERCENTAGE FY23 > FY24
My immediate manager has provided support for my development and performance through regular coaching and feedback	72 > 76
I have clearly defined performance goals	71 > 73
We expect high standards of performance from our people	73 > 77
People's responsibilities, accountabilities and roles are clear	41 > 59

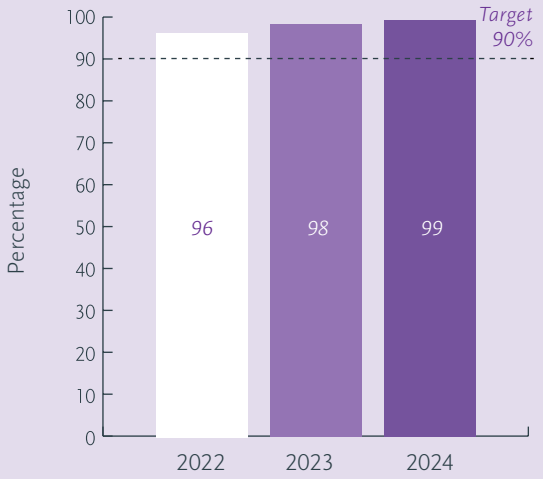
I have confidence in the senior leadership of AgResearch.



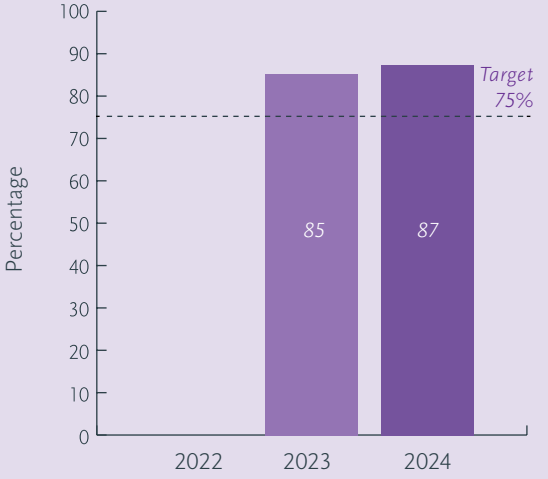
My Manager shows by his or her behaviour a commitment to Health & Safety.



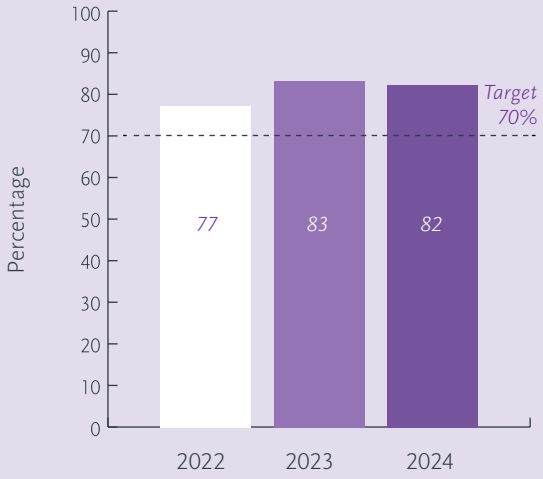
I understand my responsibilities in creating a healthy and safe workplace.



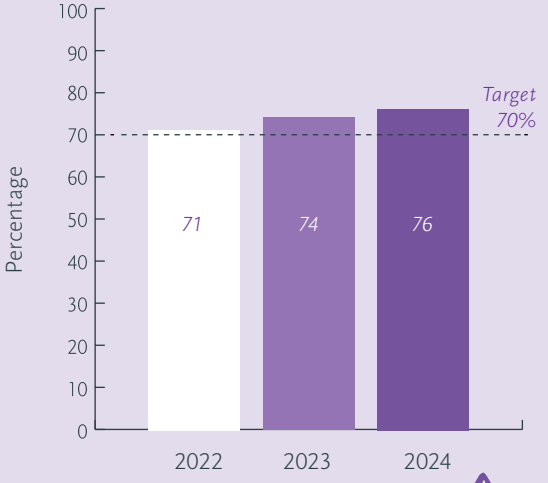
I feel that the organisation values and respects individuals from diverse backgrounds and cultures, and creates a welcoming environment for all staff.



Strong employee participation in the employee engagement survey.



Engagement Index.



Celebrating Success

AgResearch achieved several notable achievements during the year, which highlighted our commitment to science excellence.

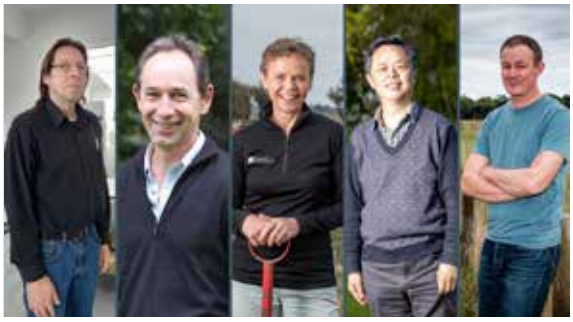
AgResearch Triumphs at Science New Zealand Awards

AgResearch finished 2023 on a high by celebrating success at the ScienceNZ Awards. Emeritus Scientist Stephen Goldson received the AgResearch Individual/Lifetime Achievement Award, and was honoured with the Supreme Award, covering all categories across all CRIs (as well as Callaghan Innovation).

Stephen is the first individual to receive the Supreme Award. It was also the third year in a row that AgResearch won the top honour. No other CRI has won the Supreme Award more than once. This was an outstanding achievement and further validation of our science excellence. Fittingly, Dr Goldson's win and career received publicity and plaudits in the media. Dr Aswathi Soni was awarded the AgResearch Early Career Researcher Award while our Animal Biosecurity Research Team were recipients of the AgResearch Team Award. In FY24 Stephen was also awarded the esteemed Ray Brougham Trophy by the New Zealand Grassland Trust.

Methane research wins further plaudits

The Low Methane Sheep Breeding team was awarded the Royal Society Te Apārangi's prestigious Pickering Medal, as part of the 2023 Research Honours Aotearoa. This medal is awarded annually to a person or team who, while in New Zealand, has through research and development, performed innovative technological work which has had a significant impact, and/or led to significant commercial success. The Low Methane Sheep Genetics Programme was also awarded the Ballance Agri-Nutrients Science and Research Award at the Beef and Lamb NZ Awards. Award judges commented that this was world-leading research and globally significant in its application for New Zealand sheep farming.



Greenhouse Gas Inventory Team Honoured

The Agricultural Greenhouse Gas Inventory Development Team was awarded the Shorland Medal from the New Zealand Association of Scientists in recognition of "major and continued contribution to basic or applied research that has added significantly to scientific understanding or resulted in significant benefits to society". This work is focused on the development of country-specific emission factors to improve the accuracy of NZ agricultural greenhouse gas (GHG) emissions estimates.

Companion honour for Emeritus Scientist Liz Wedderburn

Liz Wedderburn (Emeritus scientist) has been awarded a Royal Society Te Apārangi Companion honour, which recognises outstanding leadership or eminent contributions to promoting and advancing humanities, science, or technology in New Zealand.

Dodds wins recognition

Ken Dodds (Senior Statistician, Digital Agriculture) was elected as a Fellow of the Academy of the Royal Society Te Apārangi. Fellowship recognises researchers, scholars, and innovators throughout Aotearoa New Zealand who have achieved excellence in their various disciplines across science, technology, and the humanities.

Fellows can use the post-nominal 'FRSNZ' after their name to indicate this honour. Ken was elected for developing and implementing statistical tools for genetics and breeding, especially in livestock and said he was delighted at the accolade.

Ken was also named a Fellow of the Association for the Advancement of Animal Breeding and Genetics at its conference in Perth in July for his outstanding contributions to the science of genetics and animal improvement.

Val Snow wins biennial medal for modelling

Val Snow from the Bioinformatics, Analytics and Modelling and Analytics Team was awarded the Modelling and Simulation Society of Australia and New Zealand 2023 biennial medal for her excellent record in research contributions within the field of Modelling and Simulation and her contribution to the Society over many years.

Tanu appointed as Global Ambassador

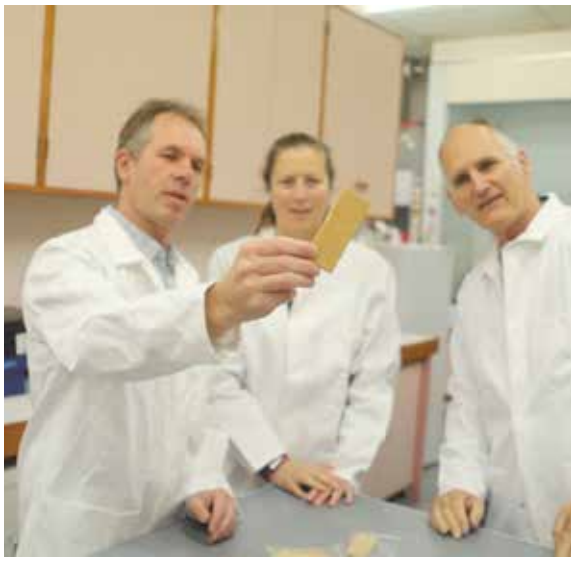
Tanu Gupta (Food System Integrity Team, Smart Foods & Bioproducts) has been appointed as the Global Ambassador–Oceania Pacific of Applied Microbiology International (Society) to enhance the engagement of researchers in microbiology internationally. As a Global Ambassador, she will help the society to reach New Zealand audiences, attract new members and engage experience and expertise to deliver impact.

Weed work wins society honour

Trevor James was awarded the prestigious New Zealand Plant Protection Medal. It was instituted by the New Zealand Plant Protection Society to honour "those who have made exceptional contributions to plant protection in the widest sense".

AgResearch wins for innovative cattle urine sensor

AgResearch has developed new award-winning technology to tackle the problem of nitrogen loss from the urine of cattle, which affects water quality and leads to emissions of nitrous oxide, a potent greenhouse gas - winning the Science and Technology Award at the 2023 Kudos Awards in Hamilton. The acoustic urine sensors device attaches to the rear leg of dairy cattle to enable recording and identification of distinct sound patterns in "urination events", including timing and volume. Data from the recordings is analysed using technologies that include machine learning.



Paul Middlewood's Keratinite work recognised

Paul Middlewood, a Research Engineer with the Bioproduct and Fibre Technology Team, won the Sustainability Award at the Food, Fibre and Agritech Challenge in 2023.

His award was presented at the completion of the eight-week pre-accelerator initiative that aims to equip individuals and teams with a venture idea, research, or a non-commercialised product to develop. Paul was accepted onto the accelerator to help development of Keratinite, a natural binder that can replace the formaldehyde-based resins in particleboards.

Sharing knowledge brings recognition

Grasslanz Technology chief executive John Caradus and his team won the 2023 AGMARDT Knowledge & Technology Transfer Award. The award was presented at the New Zealand Institute of Agricultural & Horticultural Science Plant Science Central Meeting in June. John was on hand to accept the award as recognition for, according to the citation, "the team's long-term sustained adoption of science innovation by the pastoral agriculture sector, in the form of novel plant and endophyte germplasm". NZIAHS president Professor, Julian Heyes, added: "This has led to enormous on-farm productivity and profitability gains, mitigated pest challenges and supported the expansion of agricultural exports."

AgResearch Triumphs at Primary Industries New Zealand Awards

AgResearch enjoyed significant success at the 2023 Primary Industries New Zealand Awards with all three of our finalists winning their categories. Louise Hennessy won the Emerging Leader Award for her leadership associated with science delivery and communication.

The Endophyte Discovery Team won Science & Research Award for their world-leading research, development and commercialisation of novel Epichloë strains in pastures. Dave Leathwick won the Champion Award which was acknowledgement of a career developing understanding regarding the selection and development of anthelmintic (drug) resistance in nematode parasites of grazing livestock.

United Nations utilise Ledgard's knowledge

AgResearch Principal Scientist Stewart Ledgard has been named on an international Technical Advisory Group for the Food and Agriculture Organisation of the United Nations (FAO) tasked with developing Guidelines for "Integrating circular bioeconomy into the environmental assessment of livestock supply chains."

Statistical application excellence recognised

Neil Cox, a statistician, was presented with the Jean Thompson Award at the New Zealand Statistical Association (NZSA) annual conference in Christchurch. The Jean Thompson Award recognises excellence in the application of statistics in New Zealand industry, including business, Crown Research Institutes, Government agencies and departments, and media. The award celebrates the insightful use of statistical thinking and practice in solving practical problems and creating value. The breadth of his work can be seen in the 78 research papers, published between 1974 and 2023, on which he is the author or a co-author.

Blaise Forrester-Gauntlett Receives STEM Fellowship Honour

Blaise Forrester-Gauntlett was a recipient of the Royal Society Te Apārangi Ngā Puanga Pūtaiao Fellowship. These fellowships were awarded to 18 early-career and three/mid-career scientific (Pūtaiao) researchers to help to build and strengthen a diverse Science, Technology, Engineering and Mathematics (STEM) research workforce by investing in talented Māori and Pacific researchers to realise their potential (Puanga).

Blaise's focus is on stem cell research which offers the opportunity for improved assisted reproductive technologies for cattle, leading to accelerated genetic gain for the animals. Animal welfare is an increasingly concerning topic for many in Aotearoa as the understanding of the processes and practices being carried out on-farm become more widely available and undergo closer scrutiny.

Fellowship recognises contribution to pastoral industry

Dr Robyn Dynes was appointed a Fellow of the New Zealand Institute of Agricultural and Horticultural Science. Robyn is a Science Strategy Leader and farming systems Senior Scientist with AgResearch at Lincoln. Robyn was nominated based on her highly regarded science career devoted to the interface between forage science and animal science and her contribution to New Zealand's pastoral industry.

AgResearch Awards

The winners of AgResearch's Outstanding Science, Impact, Te Ao Māori, Student, Employee Advocate and Values awards were announced in the first quarter of FY24.

Outstanding Science Award

The Outstanding Science Award, which recognises outstanding achievement in scientific input, went to a multi-disciplinary, world-leading, and award-winning team of scientists responsible for the 'Dissection of the epoxyjanthitrem pathway in *Epichloë sp*. LpTG-3 strain AR37 by CRISPR gene editing'. The team conducted the first-ever field trials utilising CRISPR gene editing technology in Australia with DLF Seeds and developed a toolkit from which continuously novel research can be delivered. The AgResearch team members were: Taryn Miller, Debbie Hudson, Richard Johnson, Jaspreet Singh, Wade Mace, Natasha Forester, Paul Maclean, Christine Voisey, Linda Johnson, Pranav Chettri, Nazanin Noorifar, Alison Popay, and Sarah Finch.

Employee Advocate and Values Award

The first ever Employee Advocate and Values Award was won by Rachel Stewart, Business Planning and Performance Manager (Finance and Business Performance) who has led many initiatives to improve our financial planning.

Impact Award

The Impact Award recognises outstanding scientific output that contributes to sector impacts and was won by Marian Price-Carter for her leadership on the Whole Genome Sequencing (WGS) for Bovine Tuberculosis Control (bTB) and Freedom in New Zealand. The successful integration of WGS into bTB control strategies has informed more accurate decision making at OSPRI, enabling more effective progress toward eradication targets, improving strategy and operational response, and ultimately leading to significant financial savings via the enhanced accuracy of outbreak source analysis.

Student Award

The Student Award recognises the best scientific paper from a student within AgResearch and was won by Rose Collis in our Food System Integrity Team of the: "Prevalence and distribution of extended-spectrum b-lactamase and AmpC-producing *Escherichia coli* in two New Zealand dairy farm environments".

Te Ao Māori Award

The first ever AgResearch Te Ao Māori Award was won by Estelle Dominati. Estelle has a strong track record of quality engagement and the support she has provided to our Māori partners, who have significant confidence in her cultural capability, appreciation of mātauranga Māori, and science excellence.

Financial Sustainability

AgResearch has recently reviewed its research priorities to ensure that they are aligned to our primary role of enabling our pastoral farming stakeholders to be profitable and more sustainable and while this important strategic work was taking place during FY24, there was a significant corresponding focus on fiscal responsibility.

OBJECTIVES			FY24 Target	FY24 Result
i	Investment in our research	Net revenue per FTE from all sources	$238.2k	$224.9k
ii	Investment in our infrastructure	Refresh capital investment driven by 5-year horizon Capital Expenditure Plan	Achieved	Achieved

AgResearch has not routinely recorded a financial surplus, and while this has not had a material impact on our research, the Board took the position that was not sustainable or prudent, and directed management to take measures to return the group to a more stable financial footing.

With that goal in mind, we implemented in FY24 a fully costed approach to costing/pricing of our services. AgResearch uses a supply model based on chargeable hours assumptions for the calculation of time-based revenue as the key contributor to total revenue. This is calculated by the number and rank of science research staff available to deliver work for customers through the year.

TIME-BASED REVENUE IS UNDERPINNED BY ASSUMPTIONS THAT:

1. Government funding mechanisms and the market outlook for the dairy and red meat sectors will continue to support consistent investments in primary sector research.
2. Demand for Climate Change research, and available funding (including international funding), will compensate for the reduction in National Science Challenge revenue.
3. The economic and competitive environment will allow AgResearch to charge customers the full costs of the goods and services provided to them.

Approximately 20% of our Net Revenue is attributable to sources other than delivery by science projects through, for example, leases, royalties and patents, and livestock and produce sales.

Therefore, a clear and consistent costing methodology was required for Board and management to plan for our future, make key strategic decisions, and because of the significant amounts of infrastructure AgResearch has available to deliver research.

In FY24, AgResearch completed a significant new building 'Tuhiraki' at our Lincoln campus as well as investment in e-Research infrastructure. This resulted in increased future depreciation costs.

While there are no material future strategic capital investments planned and annual investment will reduce well below the annual depreciation expense, all of the measures above were taken to help redress the substantial challenges we are facing, not least in the current economic climate.

To that end, the Board also made the difficult decision needed to get the organisation to financial sustainability. This includes reducing organisational costs and overheads, and exiting some areas of unfunded or underfunded research in the next few months as we deepen our focus on our key Research Priorities. We are updating agencies, other CRIs and stakeholders on our final research priorities and will discuss any significant changes with them. These decisions, inevitably, will have an impact on the breadth of research we have traditionally delivered to help accelerate the performance of the New Zealand economy.

Business Improvement Programme

A key part of our plan to put our business on a more sustainable financial footing is our Business Improvement Programme. It was designed to improve the overall operational and financial performance of our business. This requires a strategic focus on ensuring role and process clarity across the organisation, plus process and system improvements.

Our Business Improvement Programme is broad. It includes costing, pricing, contracting, overheads, utilisation, planning, forecasting, IT systems and project delivery.

The work to become financially sustainable will be ongoing and interwoven into normal business operations.

However, we made meaningful progress in FY24.

As well as development of the new costing and pricing methodology, we also developed and implemented new contract wording to allow for renegotiation of terms because of scope creep or unanticipated cost increases. This contract improvement is now embedded into our business operations and we will continue to identify opportunities to reduce organisational costs so that AgResearch costing rates remain competitive.

Substantial attention was also given to documenting the processes relating to the lifespan of our research projects to ensure a consistent approach and that roles and responsibilities are clear.

Commercialisation

Science and research institutes can use commercialisation as one of several pathways to achieve an outcome or create impact. Many of our scientists still use this route as an avenue to further their research by, for example, partnering with our subsidiary Grasslanz Technology Ltd, to gain a commercial return from an idea or solution, and thereby further their research. We are also placing a greater emphasis on using commercialisation as a pathway to generate alternative revenue streams, which is a priority of our shareholding Minister. This return can then be reinvested into our business to make it more sustainable.

Our research is world-class, and we are working to ensure the advice and services we provide, and the intellectual property we own, is maximised to its full commercial potential. The latter is one of the keys to building financial resilience at AgResearch.

AgResearch is part of the KiwiNet Innovation Network. This network funds scientific research, prepares it to go to market and progresses technology toward investor readiness. All Crown Research Institutes and universities use the KiwiNet Innovation Network to leverage pre-seed funds for commercialisation activities. The science and research could be commercialised through intellectual property (IP) in the form of licence agreements for royalties or IP asset sales and, in some cases, start-up ventures. Advances in technology are changing the way scientists work.

THE KEY ACTIVITIES OF OUR COMMERCIALISATION TEAM DURING FY24 WERE:

1. Building a pipeline of commercialisation opportunities through business development
2. Providing leadership for IP commercialisation that supports the achievement of AgResearch's strategic goals
3. Proactively leveraging AgResearch's existing and future IP portfolio
4. Contributing to organisation-wide commercialisation capability and culture
5. Delivering IP commercialisation associated revenue and investment targets
6. Deliver future royalty revenue streams and explore new avenues and opportunities.

Society and Relationships

At the heart of every successful research organisation lies strong relationships. These relationships enhance our scientific impact and fortify our business. Several key drivers underpin the relationships we forge and maintain, including balancing commercial imperatives, science delivery and uptake, impact, and public expectations. All of these must align with the expectations and research priorities of our Government shareholders.

In FY24, we defined how our strategy-led approach to research will deepen these relationships, and grow our commercial revenue: by maintaining and improving our service standards, prioritising our stakeholder needs and their voice within our organisation, increasing stakeholder understanding of our research capability, leveraging and commercialising our critical capabilities built by enabling funds (SSIF), committing to co-develop research programmes, and expanding and growing our international commercial revenue.

OBJECTIVES			FY24 Target	FY24 Result
i	Commercial investment in our research	Net revenue per FTE from industry *	$116.9k	$102.2k
ii	Collaboration with New Zealand and international researchers	Co-authorship with collaborators	> 80% of journal papers	80%
iii	Maintaining strategic relationships with stakeholders and partners	Contribution to stakeholder/partner strategy "very good" or "excellent"	> 70%	37% **
		Preference to work with AgResearch	> 70%	51% **
		Initiate co-design, co-led activities with Māori partners	Achieved	Achieved

* *KPIs that are mandated by MBIE across CRIs*

** *For completeness, it is important to acknowledge that financial pressures and reduced profitability across the sector have significantly influenced the Key Performance Indicator results (above). 54% of AgResearch stakeholders have indicated that financial constraints have prevented further engagement in the past 12 months.*

Despite these challenges, we are pleased to report several strong outcomes in our annual survey of stakeholders. Our Contribution to Strategy achieved a 74% "Good or Better" rating from respondents and our Client Satisfaction, combining the key "Clear Preference" and "Happy to Work With" metrics, reached an impressive 96%.

Our Service Delivery recorded a 70% rating in the "Very Good or Excellent" category, and an outstanding 94% in the "Good or Better" class — matching our highest result on record. Furthermore, a pleasing 74% of our stakeholders rated our relationship as either "Very Good or Excellent" and 98% categorised it as "Good or Better".

In summary, the results for FY24 were impacted by three key factors. The overarching influence of reduced sector profitability; an internal focus, acknowledged by both AgResearch and our stakeholders in response to profitability challenges which affected engagement, particularly in terms of contribution to strategy. Additionally, our rising business costs, coupled with those of our stakeholders, directly influenced their preference to invest in research.

Te Ara Tika refresh

The economic importance of Māori farms

Māori farms are geographical units belonging to Māori authorities or other Māori enterprises. *

THE TOP FIVE FARMING ACTIVITIES FOR MĀORI FARMS

(Number of farms)

Beef	Dairy	Sheep + Beef	Forestry	Kiwifruit
156	150	120	105	69

HECTARES OF MĀORI FREEHOLD LAND AVAILABLE FOR PRIMARY INDUSTRY USE

1,515,071

MĀORI AUTHORITY EXPORTS

$760m of goods in 2022

23% exported to China

MILK POWDER
BUTTER
CHEESE

1/4 of all exports
Consistently 21-27% between 2017 and 2022

Therefore, having an AgResearch plan and strategy to ensure our relationships are fit-for-purpose is essential to helping grow the Aotearoa New Zealand economy.

In a significant highlight for FY24, AgResearch revamped our *Te Ara Tika* strategy, our plan to strengthen our commitment to our Tiriti o Waitangi partners. The refresh was shaped by internal and external stakeholders, and our Māori research and partnerships team.

We'd received feedback that *Te Ara Tika*, the main aim of which is to lift AgResearch's ability to deliver to Māori and whenua-based agribusinesses, should be integrated into our overall AgResearch strategy (that is updated and published annually in our *Statement of Corporate Intent*). That they in effect should be integrated and be one. This aligned with our goal and journey to make our Tiriti partnership business as normal behaviour.

The revamp was also timely in the sense that our relationship can and should contribute to the rapidly expanding Māori economy. Māori authorities are expected to reach $100b in net assets by 2030 illustrating their strategic importance, and the impact they could have on future research related revenue streams, not least the wider export sector in general.

Four of the *Te Ara Tika* pou (pillars) are continuations from the previous iteration, but with a new emphasis, and there is one new pou.

** Figures from Statistics New Zealand Agricultural Production Census (2022)*

THE FIVE POU

CULTURAL INTELLIGENCE

The 'Cultural Intelligence' pou focuses on understanding what it means to be Tangata Te Tiriti (a person of the Treaty) by building a relationship with te ao Māori and tangata whenua, understanding the history of how Aotearoa New Zealand was formed, and to understand Māori aspirations for self-sovereignty. This pou is closely associated with our 'Te Tiriti commitment' pou.

KIA MANAWANUI

PLACE OF BELONGING

Our 'Place of belonging' pou strives to make AgResearch an attractive and engaging environment that looks and feels bicultural. This new pou places prominence on creating a place of belonging. Our Lincoln research centre, Tuhiraki, is being held up as a physical exemplar because of both the cultural narrative throughout and the genuine relationship that has been developed with mana whenua, Ngāi Te Ruahikihiki. This is an aspiration for all AgResearch campuses.

RESPECTING KNOWLEDGE SYSTEMS

Our 'Respecting Knowledge Systems' pou highlights the value of both AgResearch science and kaupapa Māori research approaches involving mātauranga Māori. This pou is also closely aligned with the 'Cultural Intelligence' pou. It will be collectively led by the Chief Scientist, Director Research Capability and Director Māori Research and Partnerships.

OUR COMMITMENT TO TE TIRITI

Our 'Te Tiriti Commitment' pou is the opportunity for the organisation to make a broader commitment to Tiriti o Waitangi in all that we do by focusing on our organisational capability and our systems to be effective partners. This is increasingly becoming an expectation of Māori organisations as a prerequisite to partnership. The pou will focus on implementing the pan-CRI Māori Data Sovereignty principles at AgResearch, completing the Wai262 principles case study for Margot Forde Germplasm centre, and extending the learnings to other important biological collections.

PATHWAYS TO LEADERSHIP

AgResearch supports 'Pathways for Māori leadership' – the final pou - to engage in science and research. AgResearch continues to address this challenge by establishing pathways for Māori into AgResearch including Te Puāwaitanga, lifting capability of existing Māori staff and making AgResearch an attractive employer for Māori. The key action under this pou is to enable science pathways for Māori by leveraging Te Puāwaitanga, our strategic alliance with Pūhoro STEMM, and the pan-CRI collaboration opportunities.

Relationship with Lincoln University flourishing

AgResearch and Lincoln University (LU) agreed on terms of reference for a new combined senior leadership group–an important milestone that will help further cement and grow the mutual benefits of campus co-location.

AgResearch moved into Tuhiraki, located on Lincoln University, in September 2023. The leadership groups from both organisations have agreed to meet quarterly and work towards alignment of shared services; enhance strategic engagement; strategic capital asset planning; and research collaboration. The Group will report to and receive directions from the Vice-Chancellor of the University and the Chief Executive of AgResearch.

A number of possible benefits and workstreams have already been formally identified. They include alignment of IT and Library operations; operational synergies at sustainability management level; the development of a master contract between LU and AgResearch for collaborative research; mutual engagement to ensure efficiency in research capital asset planning.

Our relationships with the tertiary sector are also of profound importance. Our strategy of physical co-location with Lincoln and Massey universities to maximise the potential of our common research interests is a major focus. Our new research centre, Tuhiraki, in Lincoln will help us further integrate with the tertiary sector to ensure the next generation of researchers is empowered to tackle huge challenges and opportunities in climate change research.

Preserving impact from the Our Land and Water Science Challenge

The Our Land & Water (OLW) National Science Challenge, which we hosted for the last decade, formally came to an end on June 30.

Before the Challenge was disbanded, leaders from OLW and AgResearch came together and collaborated in a bid to preserve the best parts of the organisation and key lessons.

We have woven many of the lessons from OLW into our Research Priorities and flagship design process and saved key outputs from OLW, including key data into Figshare, the system AgResearch uses for output management. We are considering a future project to link the pan-CRI National Environment Data Catalogue (NEDC) to the relevant OLW environmental data sets.

OUR LAND AND WATER | Toitū te Whenua, Toiora te Wai | National SCIENCE Challenges

Our Land and Water is one of 11 National Science Challenges established in 2014 as ten-year, mission-led research programmes. The Challenges were funded through MBIE to strategically plan and fund research, drawing scientists together from different institutions and disciplines to make progress toward solving large and complex issues of wide public importance. All 11 Challenges were time-bound and set to end on 30 June 2024.

Most research projects funded by Our Land and Water were contracted to be completed by the end of March 2024. A small number of projects will remain active until June 2024.

Small delays are possible that may delay the delivery of some research outputs, and peer-reviewed academic outputs will continue to be published after the end of the National Science Challenges, due to journal processes and publishing schedules.

Over 1000 people have been part of collaborative Our Land and Water research teams and will continue their important work in new projects funded by other funders.

OUR LAND AND WATER REPORTS AND RESOURCES WILL BE AVAILABLE FROM:

1. **Figshare** has been selected as the long-term data repository for Our Land and Water. The repository includes all technical reports and other research outputs
2. **Research-informed tools and resources** have been shared with ACE (Aotearoa Catchment Extension) programme and NZARM's capability improvement project. The majority are free-use with the exception of some journal articles that are in copyright.
3. All resources will continue to also be hosted (and searchable) on the **Our Land and Water website** which will remain live through to May 2028.
4. **Videos** will continue to be held on the Our Land and Water Vimeo channel.

VISIT OUR LAND AND WATER AT
www.ourlandandwater.nz

Agrisea and AgResearch seal connection

A Memorandum of Understanding (MoU) with partner Agrisea was signed at Paeroa in November by our respective Chief Executives Clare Bradley and Sue Bidrose. The MoU marks a significant milestone in our partnership with Agrisea and through the MoU we will seek to establish a meaningful, enduring, and impactful relationship. Potential collaboration areas within this partnership include regenerative agriculture, soils and ecosystems and other seaweed R&D research opportunities.

Miraka formalise partnership with AgResearch

An MoU with partner Miraka was also signed in November by Miraka Chief Executive Karl Gradon and Sue Bidrose. The event was attended by our Māori Partnerships Team and Miraka members including Brendan Haigh (Kaitiaki). Following almost two years of development, this MoU marks a significant milestone in our partnership. This agreement and partnership are based on a foundation of shared values and potential collaboration areas that includes climate change and GHG emissions, biodiversity, and added value foods. Please note we have MoUs in place with Waikato Tainui, Farmlands, Lincoln University, Yili and New Zealand eScience Infrastructure (NeSI).

New partnership begins with Ngāti Hineaute

Our Māori partnerships team formalised a relationship with Ngāti Hineaute o Rangitāne, who are the mana whenua of the Grasslands campus. AgResearch will invest in this partnership through SSIF to enable the opportunity to build mutual capability. Ngāti Hineaute have committed to several meetings with our science teams including our GE Technologies Enabling Platform programme to gain an understanding of the research we are doing in this area and AgResearch's science capability in general.

New agreement with Pūhoro Charitable Trust

AgResearch is increasing opportunities for rangatahi Māori in Science, Technology, Engineering, Mathematics and Mātauranga (STEMM). A new formal partnership between AgResearch and the Pūhoro Charitable Trust including funding for a new AgResearch scholarship, will help develop a more diverse workforce for Aotearoa that taps into many sources of knowledge, including that which has been built and passed on by Māori over many generations. Pūhoro's acting Manahautū (Chief Executive) Kemp Reweti says the formalised partnership with AgResearch is a culmination of many years working together for the benefit of rangatahi.

New International partnerships

AgResearch in FY24 created an international partnership poised to play a part in climate resilience in New Zealand. AgResearch has been trying to collaborate with researchers in Serbia, Croatia, Bosnia and Herzegovina and Albania for several years to fill gaps in the Margot Forde Genebank (New Zealand's forage and genebank seedbank collection). The Balkans and North Africa are two areas of increasing strategic importance given our east coast climate is set to mirror theirs due to global warming.

Genebank Director Kioumars Ghamkhar arranged a meeting with a genebank in Bosnia led by Dr Marina Antic which also led to a face-to-face meeting with Bosnia's Minister of Agriculture, who is interested in the proposed collaboration. Dr Antic facilitated a connection to Serbian and Albanian genebanks. Dr Maja Jecmenica (the head of the Serbian genebank) hosted the meeting in Belgrade which was also attended by Dr Antic and Dr Alban Ibralio (Head of Albanian Genebank).

Kioumars also met with the Czech National genebank in Prague. The genebank leaders are now planning to develop an EU Horizon-New Zealand joint project.

Slovenia, Slovakia, and colleagues from INRAE in France also want to join the EU-NZ project while Ireland (Teagasc), UK (Aberystwyth University) and Switzerland (ETH Zurich) also all showed interest in getting involved.

WE CONTINUE TO WORK CLOSELY WITH OUR INTERNATIONAL PARTNERS

In FY24 we had visits from some of our international partners to Tuhiraki, our new Lincoln based facility, and Te Ohu Rangahau Kai in Palmerston North. Left: In February we hosted representatives from Teagasc, Irelands agri-food agency, including former AgResearc Science Advisory Panel member Frank O'Mara. Right: United States Department of Homeland Security and Technology visited with the support of MBIE International after successful discussions in 2023.

Stakeholder strategy

To be financially sustainable we must create deep and enduring relationships with our primary sector commercial partners and provide solutions that they need to improve their businesses.

We plan to deliver value to all parties by acquiring a deep understanding of, and tailoring our services to, their needs.

Our stakeholder strategy ensures that we are positioned to support the Government's science and innovation priority areas while at the same time creating value for our stakeholders, many of whom are developing new plans to meet the same challenges that we are.

WE ARE COMMITTED TO:

1. Transitioning New Zealand's primary industries into higher value products and exports.
2. Understanding and mitigating the effects of climate change.
3. Maintaining the health of land, water, and living systems.
4. Maintaining biosecurity, including a focus on pests and weeds.

Our relationships with our stakeholders help prepare us for a future where policy, consumer, technology, and market drivers (existing and yet to be imagined) interact and offer opportunities for transformed agri-food systems. To support the primary sector's path to transformation, we must develop new ideas, scan the horizon, position our research accordingly and, where needed, shift its balance, and invest more resources.

To that end, Government investment to accelerate development of high-impact technologies and practices to reduce agricultural greenhouse gas emissions will be a major focus for the foreseeable future.

We see a number of opportunities to combine the respective strengths of the private and public sectors to tackle this global challenge and to help channel resources and ideas into the right places. The joint venture, called AgriZeroNZ, is an example of this.

Industry were invited to a demonstration day to showcase Map and Zap® at Straight8 Winery in Canterbury.

Public outreach

AgResearch remains committed to increasing the impact of our research by engaging with next and end-users of our science. We have a broad stakeholder base, and farmers are an important part of this strategy. Much of our research is about building scientific understanding, which is then shared with other researchers (or 'next users' of science) to help make the incremental advances needed to tackle large and small problems. AgResearch can make a direct difference to one of the Government's key priorities–strengthening the backbone of our economy–by liaising directly with farmers. We plan to do this by using digital media, publicity campaigns, stakeholder events, farmer forums, our links to and through memberships of farmer industry bodies and via hands-on field work, which our scientists often conduct with farmers directly involved or in the paddock next door. This work is a key pathway to maximising the impact of our research and assisting farmers to maintain their social licence to operate.

International partnerships

In FY24, AgResearch focused on building international global science collaborations to help position our research for the future and explore commercial opportunities abroad. We plan to further strengthen key relationships in the European Union, including with strategic research partners like Teagasc and INRAE and leverage international funding opportunities. AgResearch science staff can tap into a European fund that addresses major global challenges, such as climate change, energy, and health, and addressing the UN's Sustainable Development Goals.

The European Union's largest-ever research and innovation programme, Horizon Europe, is open to applications from New Zealand-based researchers who can now join or lead Horizon Europe projects.

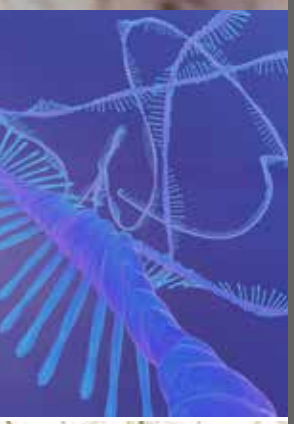
Horizon Europe has funding of €53.5 billion (approximately NZD$90 billion) over the 2021 to 2027 period. New Zealand is now an associated member of Horizon Europe which means New Zealand receives funding on equal terms with European counterparts. The New Zealand Government pays into Horizon Europe and then contributes to our scientists' time and overhead expenses. We also have plans to secure resources from the Global Methane Hub and explore partnerships with philanthropic organisations which fund public good research.

We also support, directly and indirectly, Aotearoa New Zealand stakeholders abroad and work with international companies. This helps us develop worldclass capability exposing our researchers to international trends and connections. In addition, we support Aotearoa New Zealand's connectedness through science diplomacy by working with government agencies, such as New Zealand Trade and Enterprise and the Ministry of Foreign Affairs and Trade, to support government trade and policy goals.

Through collaboration with the Global Research Alliance on Agricultural Greenhouse Gas Emissions, we have grown our connections with research providers worldwide. Highlights include our world-leading, low methane-emitting, breeding research which has created global interest, and our New Zealand designed and built portable accumulation chambers for measuring and ranking sheep for methane output. These are now in use in the United Kingdom and elsewhere.














Science in review

This chapter presents the science highlights of the year at AgResearch, showcasing our most impactful research and developments. Each story is aligned with our Integrated Elements, indicated by color-coded tabs for easy reference. These highlights reflect our commitment to advancing agricultural science and supporting sustainable farming practices. From groundbreaking genetic research to innovative environmental solutions, our work during the financial year has been recognised for setting new standards in the industry.

INTEGRATIVE REPORTING KEY

- Innovation
- Infrastructure
- Environment
- People
- Financial Sustainability
- Society and Relationships

New technology to combat climate change

AgPAC Trailer

AgResearch has developed Portable Accumulation Chambers, a pioneering technology to measure methane emissions from cattle directly on farms.

These chambers, transportable by road, allow quick and efficient testing of cattle to determine their methane emissions, aiding farmers in understanding their herd's climate change impact and breeding strategies for lower-emission animals. The work is an extension of award-winning technology successfully implemented, and embraced by industry, to test sheep emissions.

Methane, a potent greenhouse gas emitted by ruminant animals like cattle, is targeted for reduction in climate change legislation. Breeding animals with lower methane emissions presents a strategy to achieve reductions without reducing stock numbers.

The portable chambers offer a novel approach compared to fixed 'respiration chambers', allowing testing at the animal's location without the need for transportation to a central facility. Dr. Suzanne Rowe, AgResearch senior scientist, highlights the chambers' simplicity and effectiveness, ensuring accurate measurements while prioritising animal welfare.

These chambers complement existing testing methods and hold promise for evaluating feed intake and efficiency alongside methane emissions. Partnering with industry stakeholders and Government agencies, the technology's potential extends beyond New Zealand, with applications in other livestock farming nations lacking fixed chamber infrastructure. AgResearch anticipates trialling the portable chambers internationally to support global efforts in emission reduction.

AG:PAC from AgResearch

FIND OUT MORE ONLINE

Methane vaccine research gets lift

A new methane vaccine venture with AgriZeroNZ added fresh impetus to the work AgResearch scientists have been doing for years to provide a tool for farmers to reduce emissions from their livestock.

The venture announced by Agriculture Minister Todd McClay in early 2024 rolled up more than 15–years of pioneering research into one entity, to support a stronger focus on vaccine development and attract international funding to help deliver a world-first solution to market.

Research progress led by AgResearch scientists was supported by the New Zealand Government and New Zealand Agricultural Greenhouse Gas Research Centre, and by farmers through the Pastoral Greenhouse Gas Research Consortium.

The new venture follows AgriZeroNZ's earlier commitment of up to $1.5m into AgResearch's methane vaccine development programme while it explored ways to accelerate it. It is now investing an additional $1m to set up the new venture which will operate as a standalone entity but continue to be co-funded by AgriZeroNZ.

AgriZeroNZ Director Fraser Whineray says: "A methane vaccine is highly sought-after as a low cost, high-impact solution to reduce agricultural emissions and Kiwi scientists have done some ground-breaking work in this space over the years. We're confident this new venture will significantly boost their work and help get the vaccine into farmers' hands sooner".

FIND OUT MORE ONLINE

Finding answers to soil sequestration

An AgResearch soil carbon measurement experiment at the Southern Dairy Hub aims to provide valuable insights into carbon sequestration practices on New Zealand dairy farms.

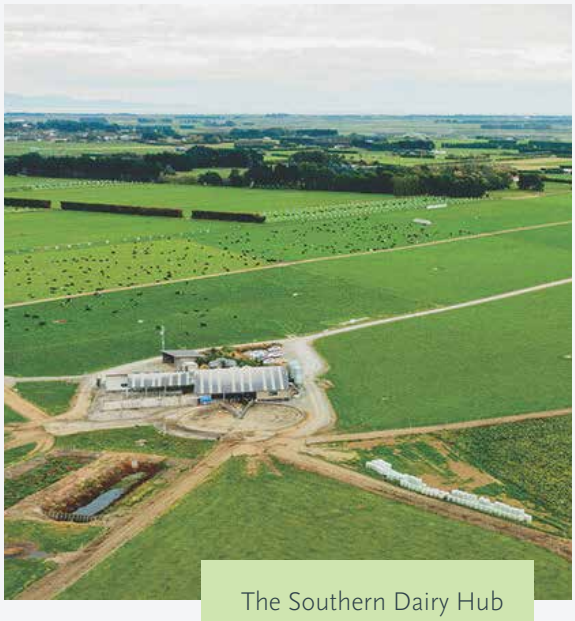
Led by Senior Scientist Mike Dodd, the research addresses the need for more comprehensive data on carbon mass in farmed soils, beyond just carbon concentration levels.

The Southern Dairy Hub, a 350 ha research facility jointly owned by AgResearch, DairyNZ, and Southern Dairy Development Trust, offers an ideal setting for this study. Divided into four units operating under different winter management techniques, the farm provides a diverse range of soil and farming practices for analysis.

Using a hydraulic soil coring machine developed by AgResearch scientists based at Ruakura, soil samples have been collected from 44 paddocks at the Hub, reaching depths of up to 600 millimetres. These samples undergo analysis at the AgResearch Ruakura lab, employing innovative hot water testing techniques to extract carbon and nitrogen. This analysis enables researchers to determine both total carbon and 'working carbon', shedding light on carbon dynamics within the soil system.

The research is motivated by the growing interest in utilising soil carbon pools as a potential tool for mitigating climate change. By enhancing carbon sequestration processes through improved pastoral management, there is potential to reverse the effects of global climate change and answers questions regarding the ability to further increase carbon stocks, especially in systems like permanent pastures that already exhibit high levels of carbon storage.

Funded by SSIF, this research project aims to address these questions and provide valuable insights into the potential of New Zealand soils for carbon sequestration. The findings will be disseminated through the Southern Dairy Hub website, facilitating knowledge sharing and informing future policy decisions regarding carbon storage in agricultural systems.



The Southern Dairy Hub

AgResearch hunts for deadly infection

AgResearch scientists searched for on-farm sources of a deadly infection affecting children and jeopardizing New Zealand's $1.6 billion raw ground beef exports to the US.

A report by the New Zealand Food Safety, Science and Research Centre (NZFSSRC) indicated rising hospitalisations for campylobacteriosis, yersiniosis, and STEC infections. STEC, associated with haemolytic uraemic syndrome (a leading cause of acute renal failure in children), often requires lengthy hospital stays and intensive care.

The report called for more research to understand the link between rural communities and STEC, especially in Taranaki, where health officials launched an awareness campaign following a spike in infections. In response, AgResearch's Food System Integrity Team conducted experiments on two dairy farms to study the ecology of Shiga toxin-producing Escherichia coli (Top 7 STEC).

AgResearch scientist Delphine Rapp explained that identifying on-farm sources and contamination points could reduce animal infections and human illness, thus protecting US export access. The USDA has zero tolerance for seven specific STEC, classifying them as food adulterants.

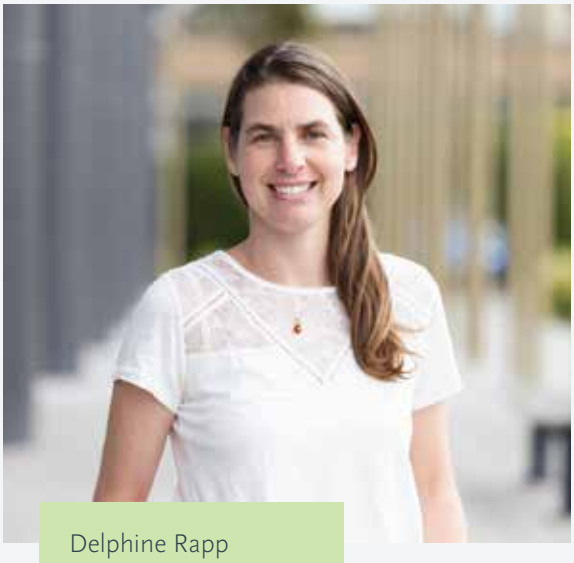
The study, published in Microbial Ecology, involved collecting 235 composite environmental samples (soil, bedding, pasture, water, bird droppings, flies, and animal faeces) from two dairy farms over two years. Findings showed widespread dispersion of STEC virulence genes, especially in dairy animal faeces and animal housing facilities. Wildlife samples, water troughs, and paddock soils also contained these genes.

Whole genome sequencing revealed multiple transmission routes and high transmission rates between dairy animals and wildlife. The research highlighted pest control, feed management, and maintaining clean water troughs as key strategies for farmers to mitigate STEC risks.

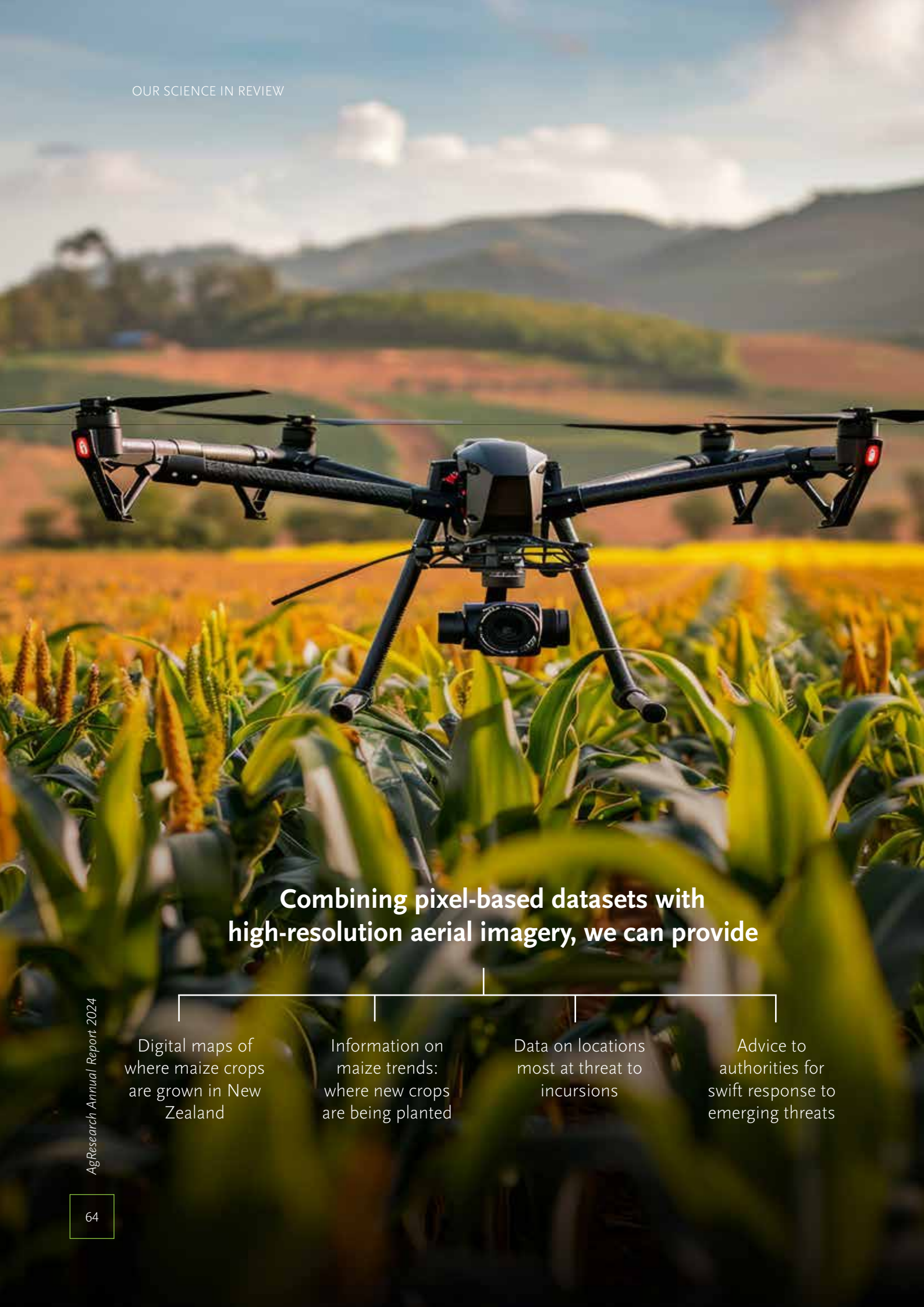
The study improved understanding of STEC ecology on farms, crucial for developing intervention strategies to control these zoonoses. Further research is needed to identify factors contributing to animal transmission.

New Zealand FOOD SAFETY SCIENCE & RESEARCH CENTRE

FIND OUT MORE ONLINE



Delphine Rapp



Combining pixel-based datasets with high-resolution aerial imagery, we can provide

- Digital maps of where maize crops are grown in New Zealand
- Information on maize trends: where new crops are being planted
- Data on locations most at threat to incursions
- Advice to authorities for swift response to emerging threats

The Marriage of Remote Sensing and AI

In an ultra-modern approach that marries advanced remote sensing technologies with the power of artificial intelligence (AI), AgResearch is helping to support surveillance of costly biosecurity threats to New Zealand agriculture.

The research, led by senior scientist Dr Federico Tomasetto, utilises remote sensing technology to identify maize crops from a combination of satellite and aerial imageries. It is one of 50 research projects using AI in AgResearch's portfolio of research.

By harnessing open-source satellite images and employing semi-automatic, image labelling techniques using computer vision, Federico has been able to glean invaluable insights into maize crop locations.

A key component of their strategy lies in the integration of more than 1 million samples of multi-temporal high-resolution satellite images associated to 16 crop types. By combining this pixel-based dataset with high-resolution aerial imagery, Federico and his team can provide stakeholders with:

- Digital maps of where New Zealand maize crops are grown
- Information on maize trends: where new maize crops are being planted
- Data on locations most at threat to incursions
- Advice to authorities so they can swiftly respond to emerging threats

B3 Science Solutions for Better Border Biosecurity AOTEAROA NEW ZEALAND

This Better Border Biosecurity (B3) research has been shared with the Ministry for Primary Industries and the Foundation for Arable Research so they can fine-tune their surveillance efforts. Federico explains: "The data we have been able to generate will help with decisions on where we need to focus our efforts to control pests such as Fall Armyworm. It arrived in New Zealand in the early 2022 and is now widespread particularly in the North Island. One of the main host plants for Fall Armyworm is maize and sweetcorn so our research is timely and will provide everyone with much more precise and accurate data on where the pests main host plants are and help to focus to long-term management of the pest by industry. We could not have done this without AI and we are now looking at other ways we can use large data sets to tackle other biosecurity threats here in New Zealand."

Host plants are a common way of identifying and zeroing in on biosecurity threats, and as industries like agriculture navigate an increasingly interconnected global landscape, the need for innovative solutions to safeguard ecosystems has never been more pressing.

Dr Frederico Tomasetto

New investment for RNA vaccine research

AgResearch scientists have begun a proof-of-concept for the application of RNA vaccines in livestock, specifically to address Bovine Viral Diarrhoea (BVD). BVD is a highly contagious disease causing significant economic losses in the livestock industry, with estimates putting the annual losses for dairy farmers at around $127 million.

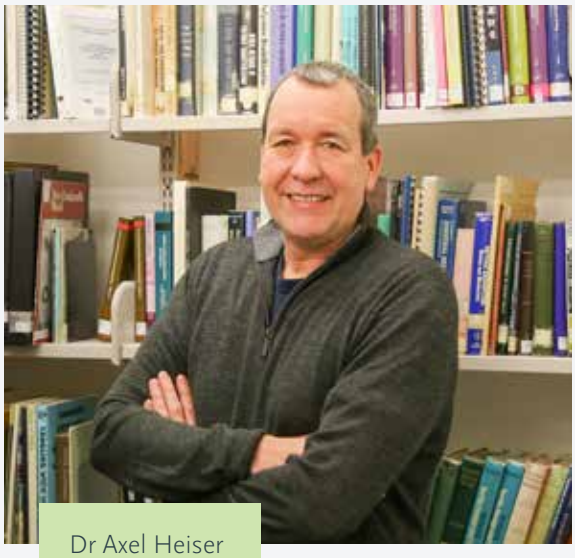
This work is part of MBIE's new SSIF funded RNA Platform which aims to identify and support opportunities for New Zealand in areas such as human health and animals. It builds on global progress in use of these technologies, most notably the development of mRNA vaccines that saved numerous lives through the COVID-19 pandemic.

AgResearch chief scientist and animal health researcher Axel Heiser says the investment is an exciting opportunity to utilise the technology for the benefit of the agriculture sector and build on the research done to date.

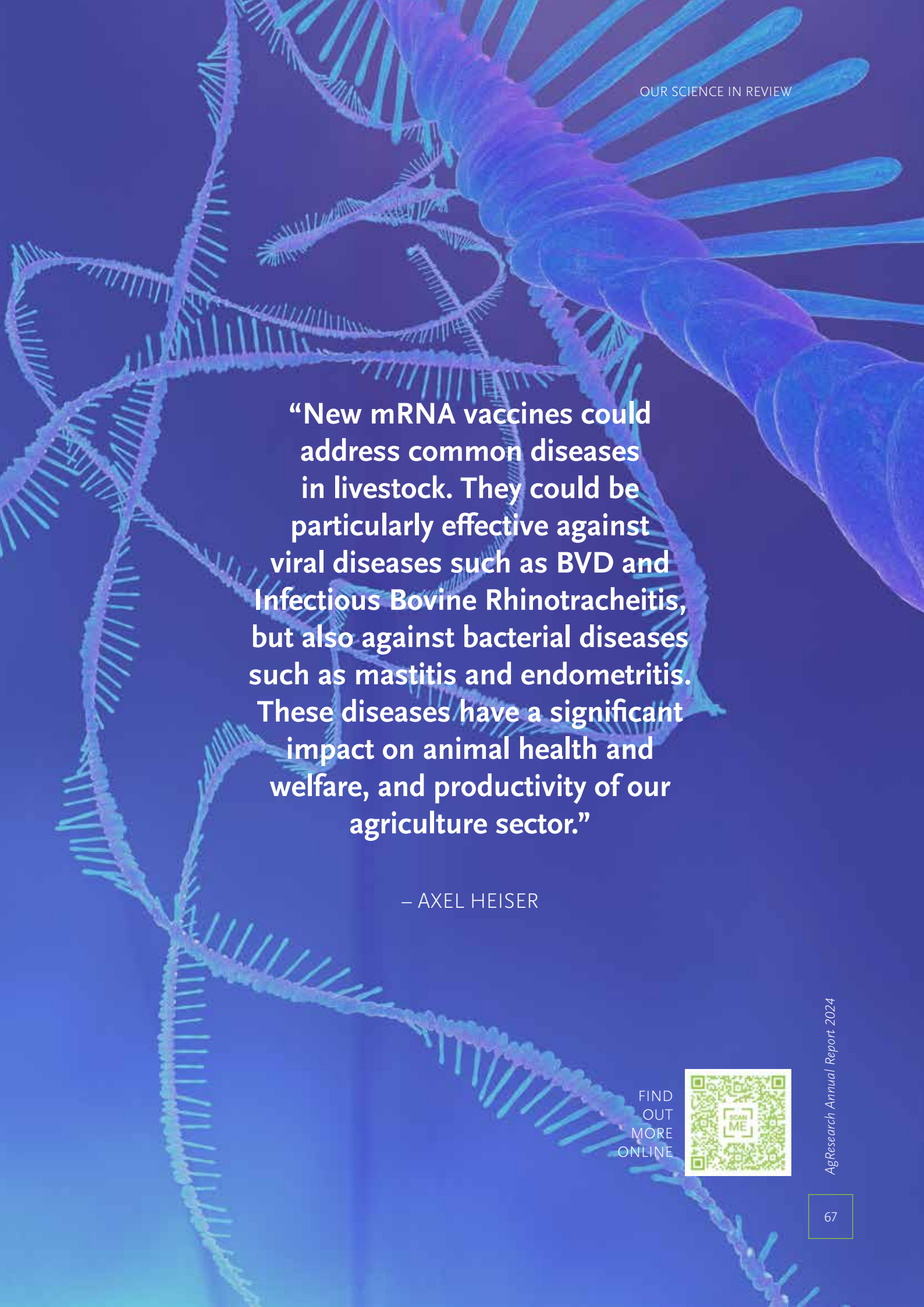
"New mRNA vaccines could address common diseases in livestock. They could be particularly effective against viral diseases such as BVD and Infectious Bovine Rhinotracheitis, but also against bacterial diseases such as mastitis and endometritis. These diseases have a significant impact on animal health and welfare, and productivity of our agriculture sector."

RNA (Ribonucleic acid), often considered the lesser-known relative of DNA (Deoxyribonucleic acid), plays a vital role in the processes of cells in living things.

While DNA contains the complete genetic information necessary for building and maintaining an organism, RNA serves as a messenger and facilitator of genetic instructions (hence mRNA for 'messenger RNA'). RNA is responsible for transcribing genetic information from DNA and carrying it to the machinery in cells involved in the creation of proteins. It delivers instructions for constructing cells or responding to immune challenges.



Dr Axel Heiser



"New mRNA vaccines could address common diseases in livestock. They could be particularly effective against viral diseases such as BVD and Infectious Bovine Rhinotracheitis, but also against bacterial diseases such as mastitis and endometritis. These diseases have a significant impact on animal health and welfare, and productivity of our agriculture sector."

– AXEL HEISER

FIND OUT MORE ONLINE

SCAN ME

Ugly pastures, beautiful returns

AgResearch is championing deferred grazing as a transformative practice for pasture management, with promising implications for pasture quality enhancement and climate resilience in agriculture.

The practice involves temporarily excluding paddocks from grazing rotation to optimize grazing pressure on remaining paddocks, thus preserving or enhancing pasture quality.

Studies conducted by AgResearch, in collaboration with livestock farmers, have shown notable benefits of deferred grazing. FARMAX modelling estimated an 8% increase in total farm and per-hectare gross margins on a summer dry beef and sheep hill country farm in Waikato. Encouraged by positive farmer feedback, the Government and industry have allocated new funding through the Sustainable Food and Fibre Futures fund to further explore the potential of extended deferred grazing periods.

Senior scientist Katherine Tozer underscores deferred grazing as a low-risk, cost-effective strategy for pasture rejuvenation, backed by encouraging results observed on farms. Farmers like Rick Burke and Allen Coster have attested to the financial gains and practical benefits of deferred grazing in their operations.

"Deferred pastures might look ugly, but the result is outstanding and puts money in your pocket."

RICK BURKE

Comparative studies conducted by AgResearch demonstrated the superiority of deferred grazing over standard rotational grazing in terms of pasture performance, including increased quality, production, ground cover, tiller densities, and topsoil moisture. Additionally, deferred grazing showed promise in reducing weed content and facial eczema spore count in pastures.

Moving forward, AgResearch aims to delve deeper into the benefits of deferred grazing, particularly in enhancing root mass and depth, soil carbon sequestration, and mitigating environmental impacts such as greenhouse gas emissions and nutrient loss. Collaboration with farmers, industry bodies, and the government ensures that research findings are swiftly translated into practical solutions, fostering a mutually beneficial partnership in advancing sustainable agricultural practices.

FIND OUT MORE ONLINE

Dr Katherine Tozer

Deferred grazing has shown:

3x

root mass *

* Simulated grazing (glasshouse) study

8%

estimate increase in whole farm gross margin

Growth rates averaging

15%

more for 18 months after the deferred period

Benefits

Providing a feed wedge at the end of summer

Reducing the facial eczema spore count in the autumn after the deferred grazing period

Maintaining pasture quality across the whole farm

Increasing pasture persistence

Sleeper weed poses potential billion-dollar threat

The 'sleeper weed' Chilean needle grass, if nothing was done to stop it, could spread through most of New Zealand and eventually cost the country over a billion dollars, according to new scientific paper authored by AgResearch.

Chilean needle grass (*Nassella neesiana*) is known to have already taken hold in Hawke's Bay, Canterbury, and Marlborough. Its sharp penetrating seeds cause blindness in livestock, pelt and carcass damage, and the loss in pasture quality and grazing access leads to farm production taking a financial hit.

It is one of approximately 22,000 species of introduced plants in New Zealand. The scientific challenge is to identify those that pose an economic or environmental threat before they become widespread. These sleeper weeds can then be prioritised by authorities such as regional councils and the Department of Conservation for management to prevent their spread.

The newly published research about Chilean needle grass in the science journal PLOS One, by AgResearch's Dr Graeme Bourdôt and Dr Chris Buddenhagen, combined climate niche modelling (to estimate the potential range of the species in New Zealand) and a spread model (to estimate the future economic losses under a 'do nothing' scenario) to determine the benefits of stopping the spread.

FIND OUT MORE ONLINE

Earlier detection to boost battle against parasites

AgResearch scientists have confirmed a 'clear timeline of changes' in livestock that could help in the early identification and management of the costly burden of intestinal parasites.

Now the scientists want to test these potential early indicators of infection to prove they can be relied upon in any future diagnostic tools.

These parasites, or gastrointestinal nematodes, are a global problem impacting on livestock health, welfare, and production. Infection can cause anorexia (reduced appetite), diarrhoea, anaemia, nutritional deficiencies, and parasitic gastroenteritis, which can result in reduced liveweight gain, milk yield, or wool production. At worst, high burdens of these parasites can lead to death. These negative impacts contribute to financial losses estimated to be tens of billions of dollars for sheep, goat, cattle, and pig production globally.

Adding to this challenge for livestock industries is the growing issue of parasites becoming resistant to drugs that have traditionally been used to control them. New diagnostic tools are now sought after to help farmers and industries manage the problem in New Zealand.

While some of these changes have been previously documented as related to internal parasites, this may be the first research to show changes in lipids associated with worm infection in sheep and highlights a potential indicator of disease.

FIND OUT MORE ONLINE

AgResearch-designed testing method unlocks healthy soil

A collaborative study between AgResearch, Ravensdown, and Ngāi Tahu Farming, funded by the Our Land and Water National Science Challenge, has developed a comprehensive approach to soil health assessment.

Led by Dr Ants Roberts, Ravensdown's Chief Scientist, the study introduced a suite of holistic tests designed by AgResearch and Ravensdown to evaluate soil health at Ngāi Tahu Farming sites in Canterbury. This approach offers a deeper understanding of soil health beyond traditional nutrient testing.

The study, conducted across five sites including forestry and irrigated dairy pasture, assessed soil fertility, organic matter, physical condition, and biological activity. Findings indicated that a broader range of indicators enhances soil management across all pasture systems, ensuring well-functioning and productive soil.

Dr Nicole Schon

Dr Nicole Schon, an AgResearch soil biology scientist, highlights the importance of accurate soil assessment in supporting efficient farming practices. The collaboration aimed to evaluate Ngāi Tahu Farming's impact on soil fertility and health, ensuring long-term land productivity.

Ngāi Tahu Farming General Manager Matthew Keen emphasised the study's role in enhancing environmental outcomes and soil health at their North Canterbury sites. He underscores the significance of scientific solutions in advancing sustainable farming practices, aligning with Ngāi Tahu Farming's commitment to building healthy soil for future generations.

OUR LAND AND WATER Toitū te Whenua, Toiora te Wai National SCIENCE Challenges

ravensdown

NGĀI TAHU Farming

Unlocking the potential of AI innovations to help reshape New Zealand farming

In a world where Artificial Intelligence is revolutionising every aspect of our lives, from the courtroom to the classroom, it's no surprise that the agricultural sector is bracing itself for change.

Large Language Models (LLMs) like ChatGPT, Electra, and T5 are at the forefront of this transformation, and promise profound benefits for New Zealand farmers. However, the full extent of these benefits remains, as yet, largely untapped.

A research collaboration between the University of Canterbury's School of Product Design and AgResearch is exploring whether Chatbots, which are powered by LLMs, can accelerate change while addressing whether farmers are ready to place their trust in AI tools.

The work is being led by PhD student Mamehgol (Mimi) Yousefidashliboroun under the supervision of AgResearch Senior Science Engineer Mos Sharifi.

Mimi embarked on her project by engaging with dairy farmers across Southland, Canterbury, and Gore regions. Her aim was to gain insights into how farmers navigate data generated by modern farms, spanning weather forecasts, soil moisture levels, irrigation needs, livestock health, and overall farm management.

Mimi says, "A consistent theme across the interviews is the balance between the wealth of experience and intuition farmers have and what technology's role is. While farmers are using various applications as a direct input in their decision-making, more advanced systems such as intelligent decision support systems appear to be used by mainly farm consultants."

Farmers, and farm consultants, have a large number of digital tools at their disposal. Overseer, part owned by AgResearch, is one such example. Mimi said:

"There's a pretty complex interplay between data, technology, and expert knowledge in facilitating informed and timely actions on farms. That is why from the insights gained during the interview and workshop with users, we identified that there is a need for conversational agents."

The next phase of Mimi's research will look at "how to create intelligent interfaces for conversational agents, designing interfaces that foster user trust and increase adoption in the New Zealand agricultural sector."

Exploring the seed microbiome

AgResearch scientists, in collaboration with French counterparts, launched a research project focused on the seed microbiome to enhance climate resilience in crops.

More than 30 scientists from France and New Zealand will work on 12 collaborative projects under a multi-year cooperation agreement between France's INRAE and Science New Zealand.

One key project, "Determining the Seed Microbiome of Cultivated Crops Required for Plant Resilience," is led by Dr. Sandeep Kumar from AgResearch and Dr. Matthieu Barret from INRAE. The project aims to explore the role of the seed microbiome - communities of microbes such as bacteria, fungi, and viruses - in making crops more resilient against climate change and reducing agrichemical dependency.

Dr Kumar stated:

"We want to identify and understand beneficial microbes from the seeds of domesticated crops and their wild relatives. The goal is to develop enhanced microbial communities that can be added to seeds to boost crop yields and their ability to handle stresses such as a warming climate."

Dr Kumar brings expertise in endophyte discovery and microbiome research, while Dr Barret leads the EmerSys Group at INRAE, focusing on plant-associated bacteria. They will use molecular and genomic techniques in their research.

The project includes reciprocal visits, targeted workshops, and the co-writing of a white paper outlining strategies for future joint research. Dr Kumar emphasized: "We aim to open new pathways for sustainable agriculture by leveraging natural microorganisms to support plant growth and disease protection, ultimately contributing to global food security amid environmental challenges."

This research initiative is part of broader partnerships between New Zealand and French scientists, as announced by Science New Zealand.

New path for null segregants

A decision by the Environmental Protection Authority (EPA) paved the way for AgResearch and others like Plant and Food Research to progress new avenues of biotech research for the benefit of New Zealand.

The EPA in March ruled that organisms known as null segregants are not considered genetically modified organisms (GMOs) and are not subject to the Hazardous Substances and New Organisms Act 1996.

Until recently, null segregant organisms have been treated by researchers and industry as if they are genetically modified, stopping any commercial pathway. This may allow AgResearch to accelerate breeding efforts of our genetically modified or gene edited forages by allowing us to plant null segregants outside of a contained glasshouse.

The EPA says the introduction of any specific null segregant into the environment will still be verified case by case by the Ministry for Primary Industries.

"This clarification does not change the way we treat genetically modified organisms used in research in New Zealand, but what it does do is give us clarity on the use of organisms that we saw as being a grey area within the regulations," says AgResearch science team leader Richard Scott. "We had a clear view as researchers that these null segregants were not GMOs, but now we have certainty from the EPA to support this."

"The way is now cleared for researchers to consider the opportunities to use null segregants to deliver additional research and benefits to New Zealand's productive industries and in areas such as health, nutrition, and wellbeing."

Opportunities may include enhanced or speed breeding of productive plant species in New Zealand, and use of null segregants in conventional breeding programmes to develop new varieties of New Zealand-adapted ryegrass for example.

Gene Edited Hi-CT white clover is currently grown in containment.

Many hands make light work

Water sampling in the Manawatū River

Dr Adrian Cookson helps with plant preparation

AgResearch, in collaboration with local community groups, is conducting comprehensive water quality assessments at Te Miro farm, situated in the Ruahine Ranges near the headwaters of the Manawatū River.

Led by Dr. Rose Collis and Dr. Adrian Cookson, the project involves collecting water samples from various points along the river and analyzing them in collaboration with Wilderlab NZ, an award-winning environmental DNA (eDNA) testing laboratory.

The project engages a diverse range of participants, including school children, farmers, hapū members, and scientists, to monitor changes in water quality over time and assess the impact of ecological restoration efforts. Initial findings indicate a resilient ecosystem, with post-Cyclone Gabrielle samples showing minimal adverse effects on water quality.

The collaboration with Wilderlab NZ enables the detection of a wide variety of flora and fauna present in the waterway, providing valuable insights into ecosystem health. These findings not only inform on-farm management practices but also empower local communities by offering tangible evidence of waterway health.

AgResearch's transdisciplinary approach involves employing advanced sequencing techniques to delve deeper into microbial eDNA components, identifying potential risks associated with pathogens and antibiotic resistance genes.

The research not only aims to enhance the ecological resilience of Te Miro farm but also fosters collaboration with local communities, acknowledging the cultural significance of the Manawatū River to hapū members. By working together, AgResearch and its partners are committed to restoring the mana of this vital waterway while advancing scientific knowledge for sustainable land management practices.

WILDERLAB

‘Living labs’ promote farm resilience

AgResearch scientists proposed ‘living labs’ or regional hubs to model climate-resilient farming in New Zealand.

These hubs aim to reduce greenhouse gas emissions and adapt to changing climate conditions, drawing inspiration from similar initiatives in countries like Canada and Australia.

The concept emerged from strategic discussions involving various sectors, highlighting the need for integrated efforts across communities. AgResearch principal scientist Cecile de Klein emphasised the importance of aligning with farmers and industries to address their challenges while meeting Government policies and community needs.

Living labs would adopt a user-centric approach, recognising regional differences and focusing on comprehensive, science-grounded solutions incorporating mātauranga Māori (Māori knowledge) and Te Ao Māori principles. This approach aligns with the philosophy of kaitiakitanga (guardianship), emphasising a holistic view of the land and people.

New Zealand already leads in greenhouse gas research and mitigation, such as breeding low methane-emitting livestock. AgResearch senior scientist Robyn Dynes noted the need to maintain these strengths while increasing focus on climate adaptation and future-proofing farming systems.

The initiative also sees potential in partnerships for on-farm carbon sequestration, which could positively impact environmental sustainability and business costs. Recent collaborations between Government and industry, like the Centre for Climate Action on Agricultural Emissions and AgriZeroNZ, have accelerated research into tools for reducing agricultural emissions, such as a methane-reducing vaccine.

David Pacheco, principal science advisor for the New Zealand Agricultural Greenhouse Gas Research Centre, stressed the importance of ongoing research funding to achieve climate resilience. The strategy discussions revealed a shared commitment across sectors to this goal.

NEW ZEALAND AGRICULTURAL GREENHOUSE GAS Research Centre

AgriZero NZ

Centre for Climate Action on Agricultural Emissions

FIND OUT MORE ONLINE

Responding to Cyclone Gabrielle

In response to recent devastating events of Cyclone Gabrielle, AgResearch committed $270,000 to a Cyclone Response Advisory Group (CRAG) that provided relevant technical expertise to listen to stakeholder issues and requirements and identify opportunities for scientific input to deliver solutions to our farmers, sector bodies, and rural communities in the flood impacted regions.

The CRAG, led by Dr David Stevens, participated in an initial technical response led by Ministry for Primary Industries (MPI), and helped AgResearch's Senior Leadership Team respond to requests from MBIE and the then Minister for Science, Research & Innovation. AgResearch provided previously developed decision-making tools for Silt Recovery and Slip Recovery to be added to the MPI recovery toolbox.

AgResearch was involved in a multi-party monitoring programme led by LandWise in Hawke's Bay. This pan-sector team included two independent research organisations, four industry bodies, four CRIs, one university and two regional councils. Soils under cropping, vineyards and orchards were the primary focus, documenting flooding, wetness, sediment deposition depth, soil physical and nutrient status, potential contamination, and grower responses at 115 sites across the Northland, Gisborne and Hawkes Bay regions (Cyclone Gabrielle Baseline Sampling 2023, report to MPI). These samples are available for further study, such as mineralogy, to define the actual source of sediment which has accumulated. A Masters study is continuing which is documenting recovery practices and their success. Further development of a research programme "Adaptation towards Resilience", informing landscape design for resilience to climate change impacts combining the functional traits of plants, is being considered by AgResearch and Plant and Food Research for MBIE Endeavour Funding.

AgResearch also provided support to Te Runanganui o Ngati Porou Taiao team through two hui regarding building resilience and provided advice regarding soil testing for local hapu. AgResearch also provided support to the Tairawhiti Tomorrow Together Hui with two staff members attending. Finally, AgResearch is developing a collaborative bid with South China Agricultural University investigating the use of drones to revegetate hill-country slip scars, using a range of options to enhance land stability, biodiversity and animal nutrition.

Dr David Stevens

Helping the next generation of researchers

Te Rūnanga o Ngā Wairiki Ngāti Apa, in collaboration with the Pūhoro STEMM Academy and AgResearch, provided rangatahi Māori from rural communities like Marton with a firsthand experience of STEMM careers.

The partnership aims to broaden their understanding and engagement in Science, Technology, Engineering, Mathematics, and Mātauranga (STEMM). Visiting Te Ohu Rangahau Kai, a science facility shared by AgResearch, Massey University, and the Riddet Institute, the rangatahi interacted with Māori professionals in STEMM and participated in hands-on science activities.

Katarina Hina, General Manager for Rūnanga Operations, highlighted the importance of such collaborations in facilitating access to opportunities for local whānau. Pūhoro's Manahautū, Kemp Reweti, emphasised the privilege of supporting rangatahi in exploring STEMM careers and the significance of partnerships like that with AgResearch in expanding these opportunities.

The day included activities like a taonga hunt through the taiao and a sensory trial, showcasing the application of knowledge learned in the bush. AgResearch's Kaitūhono, Tai Harmer, aimed to nurture rangatahi curiosity and reconnect them with their identity as the original scientists of Aotearoa. The initiative aims to inspire rangatahi to pursue diverse opportunities in STEMM, emphasising their intrinsic connection to science and innovation.

TE RŪNANGA O NGĀ WAIRIKI NGĀTI APA

PŪHORO

New research sheds light on water quality from sheep grazing

Dr Richard Muirhead, a prominent researcher in agricultural water quality, has conducted experiments challenging assumptions about contaminant runoff into waterways, particularly concerning sheep farming practices.

Published in the Journal of Environmental Quality, Muirhead's recent research unveils surprising findings: sheep grazing yields four times higher levels of *E. coli* in runoff compared to dairy cows. While not entirely unexpected in scientific circles, these results carry significant implications for grazing animal management.

Based at the Invermay Agricultural Centre, Muirhead and his team conducted experiments comparing *E. coli* concentrations from sheep and cow-grazed plots, revealing sheep-grazed plots to have substantially higher runoff concentrations. This challenges the common belief that dairy cows are the primary contributors to water contamination.

The study, funded by MBIE and AgResearch, underscores the importance of evidence-based insights to dispel misconceptions and raise awareness among sheep farmers about their role in water contamination. Muirhead hopes his research will prompt greater vigilance and awareness in the sheep grazing sector, similar to that seen in the dairy industry.

Further research is necessary to comprehend the factors influencing *E. coli* concentration in runoff and its impact on water quality standards. However, Muirhead's work marks a significant step toward understanding and addressing water quality challenges in agricultural settings.

FIND OUT MORE ONLINE

Key insights for pasture systems

Nitrogen fertiliser plays a vital role in sustaining high productivity in New Zealand's grazed pasture systems, but understanding its management requires a comprehensive overview of decades of research.

Senior scientist Dr Col Gray, with support from the Fertiliser Association of New Zealand, conducted a thorough review spanning 50 years of nitrogen fertiliser research.

Published in the New Zealand Journal of Agricultural Research, the review aims to consolidate key findings and identify knowledge gaps for future inquiry. It emphasises that grass/clover pastures often lack nitrogen, necessitating fertiliser application for optimal growth. However, the response to nitrogen varies based on factors like rate, timing, and site conditions.

The study highlights the importance of timing nitrogen application to match feed requirements and pasture response. Spring applications generally yield higher and more reliable results than autumn. Nonetheless, excessive nitrogen can suppress clover content, necessitating tight grazing to maintain balance.

Environmental considerations loom large, with nitrogen losses via leaching and emissions presenting challenges. While direct leaching is minimal under optimal conditions, urine excretion by animals significantly impacts nitrate leaching. Ammonia volatilisation and nitrous oxide emissions also contribute to environmental concerns.

The review underscores the potential of emerging technologies like coated fertilisers and precision agriculture to mitigate environmental impacts while enhancing nitrogen efficiency. It concludes that ongoing innovation is crucial to developing sustainable nitrogen fertiliser products and practices amidst evolving consumer expectations and regulatory constraints.

Fertiliser Association
Shaping profitable and sustainable farming

Urine sensors for cattle to reduce nitrogen loss

The acoustic urine sensor that attaches to the rear leg of the cow.

AgResearch has developed acoustic urine sensors to address the significant environmental impact of nitrogen loss from cattle urine.

These sensors, attached to dairy cattle's rear legs, record and identify distinct sound patterns during urination events, providing valuable data on timing, volume, and nitrogen load.

Studies have shown a close relationship between urination frequency, volume, and nitrogen deposition in urine patches on pasture. AgResearch's concept of an environmental nitrogen herd test utilises this knowledge to manage cows based on their urinary nitrogen loss potential, similar to routine milk quality testing. By deploying urine sensor technology on dairy farms, farmers can access accurate estimates of individual cow's urination patterns, informing decisions on breeding and culling to reduce nitrogen loss.

The sensor development team received recognition at the 2023 Kudos Awards, underscoring five years of innovative research. These lightweight, cost-effective sensors offer scalability and minimal impact on farm infrastructure, providing practical solutions for farmers. Ongoing research, supported by the Ministry for Primary Industries, aims to assess farm-level benefits and promote large-scale adoption of this technology among New Zealand dairy farmers as a tool to mitigate nitrogen loss.

Ministry for Primary Industries
Manatū Ahu Matua

(the) KuDos Science Trust

Crunching the numbers on quality research

To measure and illustrate the impact of our long-term investment, with the help of an economist, AgResearch calculated the return on investment in our food safety research, and the results were impressive.

"When we crunch the numbers, the estimated annual economic benefit to New Zealand from our research totals $41.7m from an investment in the programme of $8.1m (over 20 years)," says the head of our Food Integrity Team, Gale Brightwell.

"That's annual return on investment of 515%"

The Food Integrity Team was a finalist in the Science & Research Award category at the 2024 Primary Industries New Zealand Awards, and the number crunching was done to show how the team has supported the meat processing and export industry for decades.

Gale says measuring science impact is difficult.

"The definition of success for a team like mine is making sure nothing is going wrong for the meat industry and our markets remain profitable. Working with the industry and Ministry for Primary Industries (MPI) New Zealand Food Safety, we try and solve problems before they materialise. But we have been using an economist to analyse some of our work and the numbers, as you will see, are impressive."

Research on alternative packaging solutions and improved logistics practices for New Zealand's lamb exports has yielded significant economic benefits. By testing and adopting environmentally friendly packaging materials, New Zealand exporters have safeguarded their $90m market share in the EU/UK. Additionally, advancements in chilling and meat processing have help to extend the shelf life of chilled lamb from 63 to 77 days, preserving an $81m market and contributing $498m over 20 years. The team's consultancy services have prevented product defects, saving $100,000 per container, and facilitated continued exports by validating antimicrobial interventions, crucial for accessing the lucrative US manufacturing beef market worth over $1b p.a.

Overall, these innovations have enhanced product quality, ensured compliance with international standards, and secured higher market prices, significantly boosting the meat export industry's economic resilience and profitability.

FIND OUT MORE ONLINE

New research funding for burgeoning industries

AgResearch has secured nearly $13m in Government funding to propel New Zealand into the forefront of plant-based food ingredient and cell-based protein markets.

The investment, part of the Government's Endeavour Fund, supports two key AgResearch-led initiatives aimed at revolutionising food production.

The first programme, "Plant-Based Food Ingredients: a Systems Approach to Sustainable Design," received close to $12m over five years. Dr Alistair Carr, a senior scientist at AgResearch, highlights the need for more sustainable and nutritious plant-based foods. The research will focus on locally grown crops like green peas, oats, and hemp, aiming to develop innovative plant-based products that retain their nutritional value while minimising environmental impact.

The second programme, funded with just under $1m over three years, targets advancements in cell-based protein industries. AgResearch will leverage cutting-edge technologies such as cold plasma and hyperspectral imaging to address challenges like cost-effective manufacturing and food safety testing in cell-based protein production.

Gale Brightwell, AgResearch science team leader, emphasises the significance of this research in enhancing the sustainability, safety, and ethical appeal of New Zealand's emerging cellular agriculture sector. These initiatives aim to position New Zealand as a global leader in both plant-based food ingredients and cell-based proteins, driving innovation and economic growth in the burgeoning food industry.

Dr Alistair Carr

Dr Gale Brightwell

FIND OUT MORE ONLINE

Big opportunities in wellness for red meat

New research shows that overseas consumers are keen to improve their wellbeing through red meat consumption, highlighting opportunities for premium products with proven health benefits.

AgResearch, in partnership with Meat & Livestock Australia (MLA), surveyed red meat eaters in Australia and the United States about their attitudes towards physical and mental wellness related to red meat consumption.

Both the United States and Australia are major players in the red meat market, with significant production, export, and per capita consumption. The survey found that over 90% of participants were interested in purchasing red meat to enhance their wellness, and about 85% were willing to pay more for potential wellness benefits.

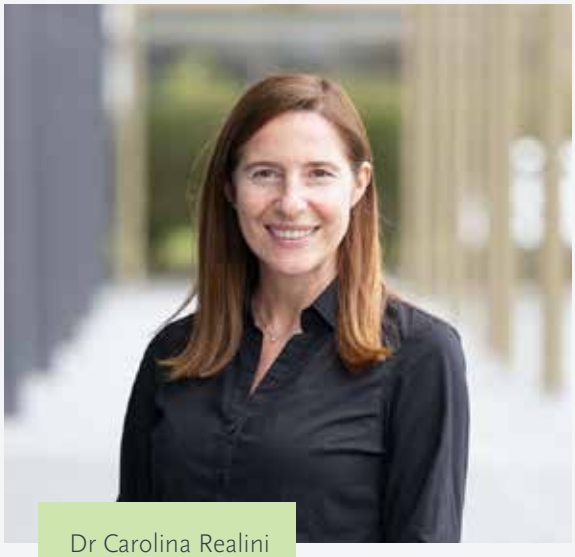
AgResearch senior scientist Carolina Realini noted that while participants from both countries valued improved physical energy, their specific interests varied. American respondents were more focused on cognitive function and mood enhancement, whereas Australians prioritised joint and gut health.

Dr. Realini highlighted the well-documented nutritional benefits of red meat, including high-quality protein, vitamins, and minerals essential for good health and linked to brain function and mood. However, she acknowledged the need for more compelling evidence to support specific physical and mental wellness benefits from red meat consumption.

The survey results suggest a promising opportunity for New Zealand red meat producers to develop tailored products that align with consumers' wellness preferences and needs. Communicating these benefits effectively could improve prospects for the industry.

Researchers emphasise the importance of providing robust scientific evidence to support health claims about red meat, enabling the industry to promote their products confidently and encouraging policymakers to advocate for healthier food choices.

This research was jointly funded by AgResearch and the MLA Donor Company, with support from the Australian Government. The study involved collaboration with researchers from Spain's Centre for Agro-food Economy & Development, Polytechnic University of Catalonia, Otago University's Department of Psychology, and Delytics Ltd.



Dr Carolina Realini

90%

of survey participants interested in purchasing red meat to enhance their wellness

85%

of survey participants were willing to pay more for potential wellness benefits

FIND OUT MORE ONLINE


The percentage of molecular features that vary between New Zealand and Australian manuka
50%

Honey country of origin breakthrough

A recent scientific study, published in Science Direct, led by researchers Dr Alastair Ross from AgResearch and Dr Terry Braggins from Analytica Laboratories, has brought new insights into the chemical composition of New Zealand and Australian mānuka honey.

Using advanced laser-assisted-rapid evaporative ionisation mass spectrometry (REIMS), the study analysed mānuka-labelled honey samples from both countries, revealing distinct molecular composition fingerprints based on geographical origin.

Mānuka honey, derived from the nectar of the *Leptospermum scoparium* tree in New Zealand, is renowned for its unique antibacterial properties. However, debates have persisted regarding the inclusion of honey from other *Leptospermum* species in Australia under the mānuka honey label. This study provided compelling evidence of notable differences between honey samples from the two countries, indicating that regional botanical and environmental factors influence honey composition.

Key findings of the study include:

- REIMS analysis effectively differentiated between honey from New Zealand and Australia, with over 50% of molecular features varying between the two countries, irrespective of similarities in methylglyoxal (MGO) content.
- REIMS features, particularly in negative ionisation mode, showed strong correlations with established molecular markers used for mānuka honey quality assessment. This suggests the potential of REIMS as a valuable tool for verifying honey authenticity and quality.

In New Zealand, the Ministry for Primary Industries (MPI) has established a molecular definition for mānuka honey verification, incorporating DNA analysis of *Leptospermum scoparium* pollen and specific metabolites such as 2'-methoxyacetophenone (2'-MAP) and 2-methoxybenzoic acid (2-MBA). The study supports the use of these markers, unique to mānuka honey, in determining its geographic origin.

The study's implications are significant for the honey industry, consumers, and regulatory bodies, offering a means to combat honey fraud and mislabeling. Dr Ross emphasised the importance of understanding the geographical origin's influence on mānuka honey's molecular makeup, underscoring its role in ensuring authenticity and quality, thus safeguarding both consumers and the industry.

Dr Alastair Ross

FIND OUT MORE ONLINE

Pork taste under microscope

AgResearch, in collaboration with NZPork, has uncovered the key factors influencing the taste of pork, shedding light on how animal gender and muscle pH levels affect eating quality.

Consumer testing revealed a preference for pork with normal pH levels, slightly acidic, while low pH levels resulted in less favourable scores. Interestingly, while gender didn't impact eating quality for pigs with normal pH levels, entire males showed the highest fail rate for pork with low pH levels.

Led by AgResearch's Senior Food Scientist Dr Carolina Realini, the project identified aroma as the most enjoyable aspect of pork for consumers, followed by flavour, tenderness, and juiciness.

These insights offer valuable guidance for farmers, enabling them to consistently deliver top-quality New Zealand pork products aligned with consumer preferences.

NZPork CEO Brent Kleiss emphasised the importance of understanding these factors in maintaining pork quality throughout the supply chain. Consumer expectations, particularly regarding juiciness, highlight the need for effective cooking methods. NZPork advocates the 6+2+2 method, ensuring succulent, juicy pork steaks and chops every time, debunking misconceptions about pork cooking and encouraging consumers to enjoy it with a slight pinkness in the middle for optimal flavour and texture.

NZ PORK

FIND OUT MORE ONLINE

New joint venture promotes science commercialisation

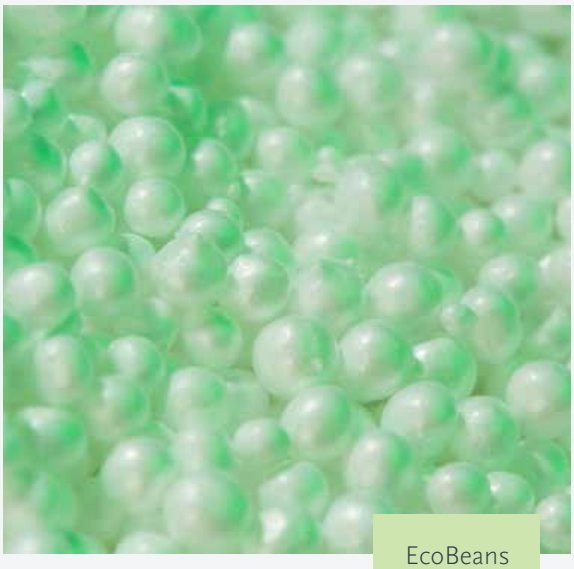
A new company, ZealaFoam Holdings Limited, was established in early 2024 to market ZealaFoam, a sustainable plant-based alternative to polystyrene.

Developed by the Biopolymer Network Limited (BPN), a joint venture between AgResearch, Plant & Food Research, and Scion, ZealaFoam addresses environmental challenges in the packaging industry. BPN will retain a shareholding in the new company, supported by investments from both New Zealand and international investors, to bring the technology into global commercial production.

BPN, founded in 2005, has focused on creating bio-based materials, with ZealaFoam emerging as the most commercially promising product. This 100% plant-based foam has the same functional attributes as polystyrene. The first commercial product, EcoBeans bean bag fill, was launched in 2022 and is now sold in New Zealand and Australia.

ZealaFoam, made from Polylactic Acid (PLA) sourced from plants like maize, cassava, and sugar cane, is industrially compostable. It matches the performance of polystyrene beads and can be used for loose fill packaging. The product is also nearing commercialisation for use in moulded items such as chilled produce and fish boxes, helmets, bee boxes, and printable film.

BPN CEO Sarah Heine highlighted the potential of ZealaFoam to revolutionize the packaging industry by reducing reliance on fossil fuels and addressing waste disposal issues. The investment in ZealaFoam Holdings will advance the commercialisation of this innovative technology, showcasing New Zealand research on an international stage and providing a sustainable alternative to traditional polystyrene.



EcoBeans

Moulded Zealafoam

AgResearch and LASRA innovate early Defect Detection Technology

AgResearch and the Leather & Shoe Research Association of New Zealand (LASRA) started developing a new technology to transform hides unsuitable for premium leather into valuable proteins for nutraceutical and biomaterial applications.

Traditionally, defects in hides are identified after extensive processing. This new approach detects faults early, optimising resource use and creating new value. Combining early-stage fault detection with leather processing expertise, the project leverages deep-learning techniques to analyse spectral signatures in real-time. According to Dr Sujay Prabakar, Science Team Leader at LASRA, this innovation could benefit the industry by $35m annually. “Intrinsic faults in processed hides cause downgrading, increased costs, and quality inconsistencies,” he explains. “By avoiding processing defective hides, we optimise resources and improve the environmental footprint.”

AgResearch Senior Scientists Yash Dixit and Marlon dos Reis are using non-invasive hyperspectral imaging to address this issue. Yash highlights the significant value generated by transforming cow hides and sheep skins into premium leather and other valuable products. Preliminary tests show hyperspectral imaging can detect defects before processing, offering a promising solution.

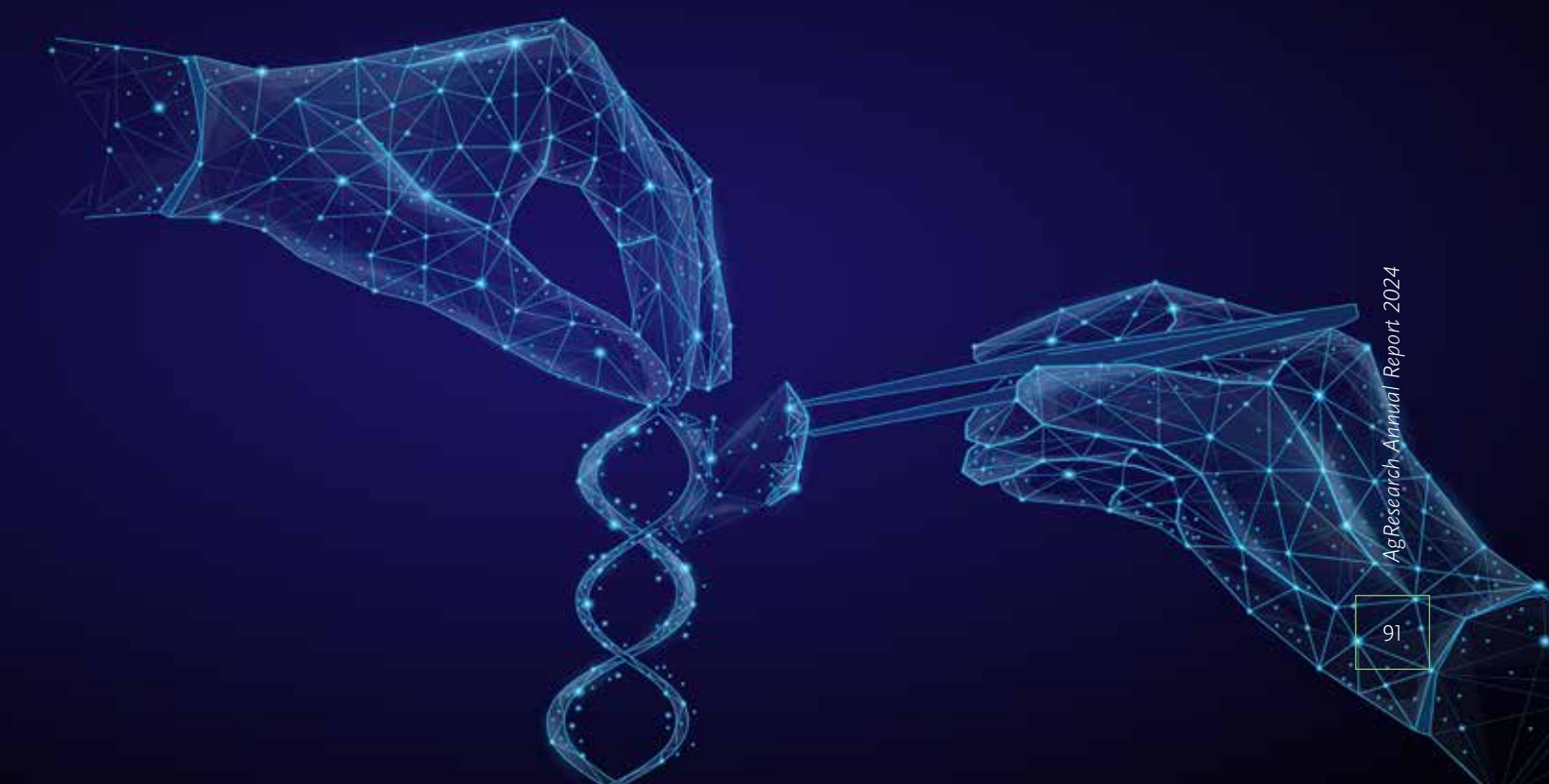
The Smart Ideas programme, funded by MBIE, supports this research. New Zealand fellmongers and tanneries are keenly following these developments. Dr. Prabakar notes that while fault detection is currently possible at the Wet Blue stage, early-stage detection in raw hides would be groundbreaking, providing immense benefits globally. The hides and skins processing industry generates over $380m in foreign exchange earnings annually, with LASRA members processing all of New Zealand’s hides and deerskins, and over 85% of lamb and sheepskins.

Yash Dixit

Marlon dos Reis

Genetic technologies

In FY24 AgResearch provided thought-leadership and expert commentary into the ongoing public discourse about genetic and pasture biotechnologies. We proactively published two well-received genetic technology newsletters to key stakeholders. The work aligned with our exhibits at National Fieldays and our ongoing conversation with farmers and the wider general public on our genetic research for the enrichment of agriculture.



The work is part of our broader work to actively support the delivery of impacts from genetic technologies and our SSIF Genetic Technologies Enabling Platform. We are involved in three genetic technologies forage programmes (gene edited endophytes, High Metabolisable Energy (HME) Ryegrass, High Condensed Tannins (Hi CT) White clover) that would, for farmer uptake, need to go through an appropriate regulatory process, currently through Environmental Protection Authority (EPA).

Public outreach

Our current focus includes three pasture programs conducted either in containment in New Zealand or in field trials abroad. Notably, AgResearch is progressing towards the first outdoor trial of gene-edited ryegrass in New Zealand in over a decade. This ryegrass, featuring gene-edited *Epichloë* endophytes, aims to reduce the need for chemical pesticides and increase efficiencies in milk and meat production. The approval process involves extensive engagement with stakeholders and the EPA.

KEY DEVELOPMENTS

Gene-Edited *Epichloë* Endophytes

Economic impact of selected endophytes, like AR37, has been significant, estimated at NZ$3.6 billion over 20 years.

Ryegrass with gene-edited endophytes reduces the need for pesticides and enhances plant growth.

Addressing concerns about toxins harmful to livestock, targeted DNA changes have been made to enhance plant protection and reduce livestock harm.

High Metabolisable Energy (HME) Ryegrass

- Genetic modifications aim to reduce environmental impacts while boosting nutrition and productivity.
- Modifications include increasing leaf fat content and enhancing photosynthesis, potentially reducing methane emissions by 10-15%.
- A shift from sesame oleosin to rice oleosin addresses allergen concerns, ensuring safety without compromising functionality.
- Upcoming trials will test the modified ryegrass' effects on methane emissions and nitrogen excretion.

High Condensed Tannin (HiCT) White Clover

- Modified to boost condensed tannins in leaves, which naturally occur in clover flowers and other plants.
- Expected benefits include reduced methane emissions and improved livestock health, particularly in reducing bloat.
- Field trials in Australia have shown promising results, with further trials and potential commercialisation in the future.

AgResearch continues to pioneer advancements in pasture development, ensuring the benefits outweigh potential risks through rigorous research and stakeholder engagement. These initiatives promise to deliver significant economic, environmental, and health benefits, positioning New Zealand's livestock farming industry for a sustainable future.

TE KAWANATANGA Ā-RANGATŌPU

Corporate Governance

Our Board

The Board promotes the highest standards of corporate governance practice and ethical conduct by all Directors and employees of AgResearch Limited and its subsidiaries. The Board endorses the overall principles embodied in the New Zealand Institute of Directors' 'Code of Practice for Directors'. It has only independent Directors on the Board whose skills and experience bring balance and diversity to decision making.

Dr Paul Reynolds QSO

Chair

Retired 30 June 2024

Dr Paul Reynolds served as Chief Executive of the Ministry for the Environment from 2008 until 2015. Prior to that he worked at the Ministry of Research, Science and Technology (1998–2002) as Chief Policy Adviser and then, from 2002–2008, was Deputy Director General (Policy) at the Ministry of Agriculture and Forestry.

Paul has a background in scientific research, holding a PhD in Biochemistry from the University of Otago. He is also Chair of Waka Kotahi and Deputy Chair of Manaaki Whenua–Landcare Research.

Paul was made Companion of the Queen's Service Order in the Queen's Birthday Honours, 2018.

Kim Wallace

Deputy Chair, Chair–Audit and Risk Committee

FY25: Acting Chair

Kim Wallace is an experienced independent director who currently serves on the boards of Te Manawataki o Te Papa (Chair); AgResearch (Deputy Chair); Port Nelson and Origin Capital Partners. Previous governance appointments include Quotable Value. Before pursuing a full-time career in governance in 2017, Kim enjoyed a 24-year career in the global dairy industry, which included working in senior executive roles based in New Zealand, the USA, Germany and Australia. Kim is a Chartered Member of the Institute of Directors and a member of Global Women.

Jackie Lloyd

Director, Chair–People and Culture Committee

Retired 29 September 2023

Jackie Lloyd is currently Chair of Naylor Love Enterprises Ltd, a director of CentrePort Limited, a board member of Te Papa Tongarewa and a trustee of the Lion Foundation. Previous governance appointments include New Zealand Post, Kiwi Group Holdings Limited, New Zealand Cricket and chair of Wellington Museums Trust. She is President and a Chartered Fellow of the Institute of Directors and a member of Global Women, Chapter Zero and the National Association of Women in Construction.

Dr Louise Cullen

Director

Chair–People and Culture Committee (from 30 September 2023)

Louise Cullen combines her environmental science and dairy farming backgrounds to bring a pragmatic, evidence-based focus to the businesses and organisations she works with. Louise is currently a director for the Tatua Co-operative Dairy Company and a member of a number of agricultural industry groups.

Rukumoana Schaafhausen

Director

Retired 30 June 2024

Rukumoana Schaafhausen is an experienced independent director. She was recently the Chair of Waikato-Tainui and is currently serving across a number of iwi, community, private, and public organisations in governance roles. These include Contact Energy, Te Waharoa Investments, Water Governance Board, Miro Berries, The Tindall Foundation, and The Prince's Trust. She has received the Sir Peter Blake Award and the US Embassy Wahine Toa Award for Leadership. Rukumoana practised as a commercial and property lawyer and holds a Bachelors in Law.

Mary-Anne Macleod

Director

Mary-Anne is a professional director and provides strategic advice, principally to local and central government agencies. She is currently on the boards of NIWA, the Environmental Protection Authority, DairyNZ, University of Waikato Council and Fire and Emergency New Zealand and has previously served on the boards of Bay Venues Limited and Quayside Holdings Ltd. She was the Chief Executive of the Bay of Plenty Regional Council for seven years. She has a Master of Science (Hons) in Earth Sciences and Geography.

Jessie Chan MNZM

Director

FY25: Acting Chair–Audit and Risk Committee

Jessie joined the AgResearch Board on 1 June 2023. She has an Honours Degree in Animal Science and has worked in a range of primary sector management positions over a twenty-year period including Central Government, Local Government, non-profit and commercial organisations. She is currently a director of Oritain Global Ltd, NZPork, and the Centre for Climate Action Joint Venture. Jessie has completed the Fonterra Governance Development Programme and the Te Hono Bootcamp at Stanford University. She was awarded a Member of the NZ Order of Merit in 2022 for services to dairy and agriculture. She also received the Women in Governance Award for Inspiring Governance Leader in 2021, and Dairy Woman of the Year in 2017.

Emily Walker

Board observer

Emily brings a unique perspective to any conversation, blending an urban upbringing, rural life, and a professional career in civil/structural engineering and public investment management. She has supported a diverse range of clients and stakeholders, including local and central government, mana whenua and local communities, to make great decisions. She is currently the Board intern for WAI Wanaka.

Role of the Board

The Board is responsible to shareholders for charting the direction of the company by setting objectives, strategy and key policies and monitoring management's running of the business to ensure it is aligned with the direction set.

The Board delegates the conduct of the day-to-day affairs of the company to the Chief Executive. The Board is responsible for the appointment, from time to time, of the Chief Executive and annually reviews their performance.

The workings of the Board and its code of conduct are governed by the Companies Act 1993, AgResearch's constitution, the Crown Research Institutes Act 1992, the Crown Entities Act 2004, the annual Statement of Corporate Intent and the Board's manual. This manual sets out all the functions and operating procedures of the Board. The policies approved by the Board clearly set out those matters on which only the Board can make decisions. These include dividend payments, solvency certificates, raising new capital, major borrowings, approval of the annual financial statements, appointment of Directors to subsidiaries and associates, major capital expenditure and acquisitions.

Each year, the company produces a Statement of Corporate Intent and an operating budget, which are reviewed and approved by the Board. Monthly management accounts are prepared and these are reviewed by the Board throughout the year to monitor management's performance against the budget and the Statement of Corporate Intent.

Independent professional advice

With the prior approval of the Chair, each Director has the right to seek independent legal and other professional advice at the company's expense concerning any aspect of its operations or undertakings to help them fulfill their duties and responsibilities as a Director.

Director education

The Board had a budget of $17,500 to assist Directors with the financial costs of attending courses and conferences on governance matters. Directors who attend report back at Board meetings on matters learnt that would improve the governance of the company. The Chair authorises expenditure from this budget.

Board membership

The constitution currently sets the size of the Board at a minimum of two Directors and a maximum of nine Directors.

Jackie Lloyd ceased as a director on 29 September 2023, and Dr Paul Reynolds and Rukumoana Schaafhausen ceased as directors on 30 June 2024. Directors are generally appointed for a three-year term and may be reappointed for further terms.

Board and standing committee meetings

The following table sets out the Board and committee meetings that Directors attended during the financial year. The Board has established two standing committees to guide and assist the Board with overseeing certain aspects of corporate governance–the Audit and Risk Committee and the People and Culture Committee.

The Board and each committee are empowered to seek any information they require from employees in pursuing their duties and to obtain independent legal or other professional advice.

Board of Directors	Board meetings attended	Audit and Risk Committee
Dr Paul Reynolds (Chair)	9	5
Kim Wallace (Deputy Chair, Chair–Audit and Risk Committee)	9	5
Jackie Lloyd (Chair–People and Culture Committee)	2	
Dr Louise Cullen	9	
Rukumoana Schaafhausen	7	
Mary-Anne Macleod	9	2
Jessie Chan	8	3
Number of meetings held	**10**	**5**

Statutory reporting - Board

To our shareholders and stakeholders

The Directors are pleased to report that AgResearch Limited met its obligations in all material aspects under the Crown Research Institutes Act 1992 for the year ended 30 June 2024.

Dividends

No dividends were declared during the year to 30 June 2024.

Director Fees

Board of Directors	2024	2023
Dr Paul Reynolds (Chair)	95,737	73,315
Kim Wallace	64,233	50,286
Jackie Lloyd	11,811	40,944
Dr Louise Cullen	52,065	35,943
Rukumoana Schaafhausen	47,065	35,943
Lain Jager	-	35,943
Mary-Anne Macleod	47,065	35,943
Jessie Rose Chan	47,065	2,995
	$ 365,040	$ 311,315

Grasslanz Technology Limited		
Robert John Hay (Chair until 31 December 2022)	-	10,000
Ian Boddy (Chair from 1 January 2023)	25,000	18,125
Elizabeth Gisela Harrison	15,000	15,000
	$ 40,000	$ 43,125
Total	$ 405,040	$ 354,440

Directors' interests

The Board received no notices during the year from Directors requesting the use of company information that would not otherwise have been available to them. There were no share dealings by Directors with the company.

Directors' interests disclosed during the year to 30 June 2024 are set out in the table below. The 'Director' and 'Trustee' columns also identify Chair and Deputy Chair roles where relevant. Interests do not include trusteeships, directorships or shareholdings in private trusts and small companies with whom no transactions have occurred during the year. These interests have been appropriately recorded within the interest register, which is updated regularly.

AgResearch Interest List Financial Year '24

Board of Directors	Director of	Trustee of	Shareholder of
REYNOLDS, Paul (Chair)	Landcare Research New Zealand Limited (Deputy Chair) M. Bovis Free New Zealand Limited National Animal Identification and Tracing (NAIT) Limited OSPRI New Zealand Limited TBfree New Zealand Limited		
CHAN, Jessie	Centre for Climate Action Joint Venture Cranley Farms (Chair) Gold Stream Farming Limited Jenodam Investments Limited NZPork Pharmazen Limited Riverstone Farming Limited		Gold Stream Farming Limited Jenodam Investments Limited Riverstone Farming Limited
CULLEN, Louise	Acorn Goats Limited Balachraggan Farms Limited Capra Farming Limited Cookson Trust Farms Limited Tatua Co-operative Dairy Company Limited	Acorn Trust Limited	Balachraggan Farms Limited Ballance Agri-Nutrients Limited Capra Farming Limited Cookson Trust Farms Limited Dairy Goat Co-operative (NZ) Limited Fonterra Co-operative Group Livestock Improvement Corporation Limited Ravensdown Limited Tatua Co-operative Dairy Company Limited
LLOYD, Jackie	CentrePort Limited Museum of New Zealand Te Papa Tongarewa National Council of the Institute of Directors in New Zealand Incorporated (President) Naylor Love Limited (Chair)	Lion Foundation Limited	

Board of Directors	Director of	Trustee of	Shareholder of
MACLEOD, Mary-Anne	DairyNZ Inc Fire and Emergency NZ Limited Environmental Protection Authority Limited MacMacleod Limited National Institute of Water and Atmospheric Research Limited NIWA Vessel Management Limited	Araneacattus Family Trust	MacMacleod Limited
SCHAAFHAUSEN, Rukumoana	Alvarium Investments (NZ) Limited Alvarium (NZ) Wealth Management Holdings Limited AINZ Holdings Limited Contact Energy Limited Department of Internal Affairs Strategic Advisory Committee Equippers Church Trust Kaitiaki Guardian Services Limited Kiwi Group Capital Limited KGS Limited Ministry of Housing and Urban Development's Strategic Advisory Committee Pathfinder Asset Management Limited Schaafhausen Inc Limited Te Rau O Te Korimako Limited Te Wharaoa Investments GP Limited Te Whata A Tamihana Limited Water Governance Board, Waikato District Council	The Prince's Trust The Tindall Foundation	Kaitiaki Guardian Services Limited Schaafhausen Inc Limited
WALLACE, Kim	Kim Wallace Consulting Limited Origin Capital Partners Management Limited (Audit Chair) Port Nelson Limited (Finance and Risk Committee Chair) Te Manawataki o Te Papa Limited (Chair) Seahorse Beach Investments Limited		Kim Wallace Limited Seahorse Beach Investments Limited

Our Senior Leadership Team

Dr Sue Bidrose

Chief Executive

Dr Sue Bidrose joined AgResearch as CEO in July 2020. She started her working life with the Ministry of Agriculture and Fisheries as a laboratory technician specialising in metabolic diseases of dairy cattle.

She then worked in the community sector and, after completing her Doctorate in Psychology, worked in central government in research, policy and operational leadership roles.

Sue then moved across to local government, most recently as Chief Executive of Dunedin City Council, before returning to the agricultural science sector here at AgResearch.

Stuart Hall

Deputy Chief Executive: Commercial Partnerships

Stuart Hall's key areas of experience include sales and marketing, leadership and strategy development. He has extensive experience in a number of executive sales and commercial roles.

Fleur Evans
People and Culture Director

Fleur Evans is an experienced organisational development professional with a proven track record in leading organisational culture change programmes, developing strategies to build critical skills and leadership capability, and strategic workforce planning.

Tony Hickmott
Finance and Business Performance Director
Until 05 April 2024

Prior to joining AgResearch as Finance and Business Performance Director in October 2017, Tony Hickmott was the Chief Financial Officer at Capital and Coast District Health Board in Wellington where he provided leadership for the DHB. He has a wealth of experience in finance, audit and risk, government funding models, and finance team leadership.

Greg Rossiter
Information Technology and Property Director

Greg Rossiter is an experienced IT professional with an extensive background leading cross-functional teams to deliver major change projects.

Ariana Estoras
Māori Research, Strategy and Partnerships Director

Ariana hails from Ngāti Uekaha and Ngāti Maniapoto. She has a master's degree in biochemistry. Her vision is to have the knowledge system of mātauranga Māori on an equal footing with western science and "build Māori capacity and beneficial Māori-centred research".

Dr Sara Edwards
Research Operations Director

Sara focuses on project delivery and how our portfolio of projects is strategically aligned to delivering AgResearch's Science Plan. Sara's background is in genetics and she has held leadership roles within AgResearch as Science Team Leader for Reproduction and as acting Science Group Leader for Animal Science.

Dr Marie Bradley
Strategy and Communications Director

Marie has a background in molecular biology and is an experienced government policy and strategy sector manager. Marie once worked for Plant and Food Research, MBIE, and held various operational and strategy roles at the Foundation for Research, Science and Technology.

Dr Dave Houlbrooke
Research Capability Director

Dave oversees and leads AgResearch's science capability in our four Science Groups – both personnel and science-based infrastructure and equipment. Dave's background is in Environmental Sciences including farm management practices for mitigating contaminant losses and treatment of dairy effluent and soil physical management.

Dr Axel Heiser
Chief Scientist

Axel's time is split between research as Principal Scientist and serving as Chief Scientist. As Chief Scientist, Axel is a member of the Senior Leadership Team and represents and advocates for AgResearch scientists and science internally and externally. Axel's own research is about providing solutions for animal health issues through understanding the immunology of animals, e.g., by developing novel diagnostics and vaccines. Axel is also involved in research about how food strengthens people's immune system.

Statutory reporting - Company

For the year ended 30 June 2024

Remuneration greater than $100,000

During the year to 30 June 2024, 307 staff received remuneration of or exceeding $100,000 per annum, as shown in the table below. Remuneration included performance awards, superannuation benefits, vehicle benefits, and severance and exit payments.

Remuneration band	Number of employees	Remuneration band	Number of employees
$100,000 to $110,000	73	$230,000 to $240,000	1
$110,000 to $120,000	46	$250,000 to $260,000	0
$120,000 to $130,000	36	$260,000 to $270,000	4
$130,000 to $140,000	37	$270,000 to $280,000	0
$140,000 to $150,000	40	$280,000 to $290,000	0
$150,000 to $160,000	23	$290,000 to $300,000	1
$160,000 to $170,000	16	$310,000 to $320,000	1
$170,000 to $180,000	6	$320,000 to $330,000	1
$180,000 to $190,000	4	$330,000 to $340,000	1
$190,000 to $200,000	6	$380,000 to $390,000	0
$200,000 to $210,000	2	$410,000 to $420,000	1
$210,000 to $220,000	4	$470,000 to $480,000	1
$220,000 to $230,000	2	$550,000 to $560,000	1
		Total	307

Termination payments

During the year, the Group made the following payments to former employees in respect of termination of their employment with the Group.

	2024	2023
Total amount paid	$ 705,752	$ 335,491
Number of employees	12	8

Executive remuneration reporting

AgResearch's remuneration policy is to reward employees at all levels of the organisation fairly and consistently under the following principles:

Market relativity
Market practice Market position Labour market conditions
Internal relativity
Recognising different levels of complexity and accountability between roles
Ability to pay
Balancing company responsibilities with commitment to competitive market positioning
Performance
Reward for delivery and high performance

Donations

There were no donations paid during the year ended 30 June 2024. (2023: $420)

Directors and employees indemnity and insurance

During the year, the company indemnified Directors and certain employees to the fullest extent permissible by law. The company also has Directors and officers insurance.

Auditor

Anthony Smith of Deloitte Limited is the appointed auditor of the company under contract from the Office of the Auditor-General and under section 21 of the Crown Research Institutes Act 1992.

PŪRONGO PŪTEA

Financials

Financial performance indicators
For the year ended 30 June 2024

Cash flow	Actual 2024	Budget 2024	Actual 2023
Net cash flow from operating activities $k	**(1,835)**	(5,610)	3,445
Net cash flow from investing activities $k	**(44,947)**	(48,661)	(55,440)
Net cash flow from financing activities $k	**(3,089)**	(2,643)	27,734
Total net cash flow $k	**(49,871)**	(56,914)	(24,261)
Effect of exchange rate changes $k	**31**	-	(39)
Cash at the beginning of the year $k	**72,907**	72,168	97,168
Cash at the end of the year $k	**23,036**	15,254	72,907

Operating margin %	**1.3%**	6.9%	7.3%
Operating margin per FTE $k	**3.5**	18.3	19.1
Revenue growth %	**0.2%**	(1.0%)	13.6%
Quick ratio	**2.2**	1.6	3.7
Interest coverage	**3.2**	16.5	15.9
Operating margin volatility %	**96.6%**	66.0%	76.2%
Forecasting risk %	**1.6%**	0.0%	2.9%
Adjusted return on equity %	**(12.9%)**	(1.6%)	0.8%
Capital renewal	**2.5**	2.8	3.9
Equity ratio %	**72.5%**	76.0%	72.8%

Indicator definitions:

Adjusted return on equity: Surplus after tax (excluding fair value movements net of associated tax impact) ÷ average shareholder's funds excluding asset revaluation reserve, expressed as a percentage.

All other indicators are based on the Treasury prescribed calculations, which may differ from normal accounting calculations for that indicator.

Consolidated statement of comprehensive income
For the year ended 30 June 2024

in thousands of New Zealand dollars	Note	Actual 2024	Budget 2024	Actual 2023
Revenue				
Ministry of Business, Innovation and Employment				
Strategic science funding		**44,963**	44,963	44,963
Our Land and Water National Challenge		**4,816**	4,816	7,491
Other		**7,677**	7,960	11,083
Commercial		**97,962**	93,444	90,216
Farm produce		**4,230**	4,297	4,411
Other revenue	1	**18,559**	17,898	19,614
Total operating revenue		**178,207**	173,378	177,778
Operating expenditure	2	**(183,643)**	(177,695)	(180,454)
Operating surplus/(deficit)		**(5,436)**	(4,317)	(2,676)
Other gains/(losses)	3	**(5,526)**	-	5,129
Finance costs	4	**(729)**	(715)	(797)
Share of deficit of associates	5	**(393)**	-	(433)
Surplus/(deficit) before tax		**(12,084)**	(5,032)	1,223
Tax expense/(benefit)	6	**13,197**	-	(403)
Net surplus/(deficit) after tax for the year		**(25,281)**	(5,032)	1,626
Other comprehensive income				
Items that will not be reclassified subsequently to surplus or deficit:				
Revaluation of properties	8	**4,907**	-	6,430
Income tax relating to components of other comprehensive income	6	**(1,529)**	-	(1,461)
Other comprehensive income for the year net of tax		**3,378**	-	4,969
Total comprehensive income for the year net of tax		**(21,903)**	(5,032)	6,595
Net surplus/(deficit) is attributable to:				
Equity holders of the parent		**(25,281)**	(5,032)	1,626
Total comprehensive income is attributable to:				
Equity holders of the parent		**(21,903)**	(5,032)	6,595

The statement of accounting policies and the accompanying notes form an integral part of these financial statements.

Consolidated statement of financial position
For the year ended 30 June 2024

in thousands of New Zealand dollars	Note	Actual 2024	Budget 2024	Actual 2023
Current assets				
Cash and cash equivalents		**12,036**	4,254	10,907
Short term investments		**11,000**	11,000	62,000
Trade and other receivables	10	**30,934**	32,568	37,497
Prepayments		**3,130**	4,636	3,646
Biological assets - livestock	12	**3,425**	3,579	3,773
Inventory		**1,800**	1,442	1,608
Property held for sale	8.1	**526**	43	-
Current tax	6	**154**	-	27
Total current assets		**63,005**	57,522	119,458
Non-current assets				
Future tax benefit	6	**1,895**	-	804
Investments in associates and joint ventures	5	**4,451**	7,180	5,443
Other investments	15	**2,793**	4,487	4,487
Property, plant and equipment	8	**339,335**	329,767	311,654
Biological assets - forestry	14	**1,410**	1,398	1,398
Intangible assets	9	**2,681**	1,879	2,098
Right-of-use assets	13	**23,735**	21,638	21,424
Total non-current assets		**376,300**	366,349	347,308
Total assets		**439,305**	423,871	466,766
Less:				
Current liabilities				
Trade and other payables	11	**51,970**	43,123	75,276
Employee entitlements	17	**6,804**	6,718	6,850
Lease liabilities	16	**2,047**	4,432	1,883
Total current liabilities		**60,821**	54,273	84,009

The statement of accounting policies and the accompanying notes form an integral part of these financial statements.

in thousands of New Zealand dollars	Note	Actual 2024	Budget 2024	Actual 2023
Non-current liabilities				
Deferred tax	6	**34,215**	16,580	18,549
Lease liabilities	16	**22,904**	20,143	20,880
Other non-current liabilities	18	**268**	328	328
Total non-current liabilities		**57,387**	37,051	39,757
Total liabilities		**118,208**	91,324	123,766
Net assets		**321,097**	332,547	343,000
Equity				
Share capital	7	**92,268**	92,268	92,268
Revaluation reserves	7	**122,295**	113,823	118,917
Retained earnings		**106,534**	126,456	131,815
Total equity		**321,097**	332,547	343,000

Kim Wallace
Acting Chair
29 August 2024

Jessie Chan
Acting Chair–Audit and Risk Committee
29 August 2024

The statement of accounting policies and the accompanying notes form an integral part of these financial statements.

Consolidated statement of cash flows

For the year ended 30 June 2024

in thousands of New Zealand dollars	Note	Actual 2024	Budget 2024	Actual 2023
Cash received from operating activities				
Receipts from customers		**161,999**	172,022	163,985
Interest received		**3,320**	1,478	2,735
Dividends received		**275**	-	139
Income tax received		**155**	(30)	429
Total cash received from operating activities		**165,749**	173,470	167,288
Cash disbursed on operating activities				
Payments to employees		**74,690**	75,168	72,669
Payments to suppliers		**92,166**	103,197	90,377
Interest paid		**728**	715	797
Total cash disbursed on operating activities		**167,584**	179,080	163,843
Net cash flow from operating activities	20	**(1,835)**	(5,610)	3,445
Cash received from investing activities				
Disposal of property, plant and equipment		**890**	4,200	86
Disposal of investments and intangible assets		**-**	-	5,213
Distribution from investments		**236**	-	-
Total cash received from investing activities		**1,126**	4,200	5,299
Cash disbursed on investing activities				
Investment in property, plant and equipment		**46,008**	51,496	60,209
Purchase of other investments and intangible assets		**65**	1,365	500
Partner contribution to research consortiums		**-**	-	30
Total cash disbursed on investing activities		**46,073**	52,861	60,739
Net cash flow from investing activities		**(44,947)**	(48,661)	(55,440)
Cash received from financing activities				
Capital drawdown	7	**-**	-	30,000
Total cash received from financing activities		**-**	-	30,000
Cash disbursed on financing activities				
Loan to associates/joint ventures		**-**	-	140
Repayment of the lease liabilities		**3,089**	2,643	2,126
Total cash disbursed on financing activities		**3,089**	2,643	2,266
Net cash flow from financing activities		**(3,089)**	(2,643)	27,734
Total net cash flow		**(49,871)**	(56,914)	(24,261)
Cash at beginning of year		**72,907**	72,168	97,168
Cash at end of year *		**23,036**	15,254	72,907

* Cash includes $16,956k (2023: $1,911k), which belongs to NZ Agricultural Greenhouse Gas Trust, $1,158k (2023: $17,474k) which belongs to the Our Land and Water National Science Challenge and $903k (2023: $1,208k) funds retained in relation to major capital expenditure projects.

The statement of accounting policies and the accompanying notes form an integral part of these financial statements.

Consolidated statement of changes in equity
For the year ended 30 June 2024

in thousands of New Zealand dollars	Note	Share capital	Revaluation reserves, property, plant and equipment	Retained earnings	Total equity
Balance at 1 July 2022		62,268	113,948	130,189	306,405
Issue of new shares	7	30,000	-	-	30,000
Profit/(loss) after tax for the year		-	-	1,626	1,626
Revaluation of properties	8	-	6,430	-	6,430
Income tax relating to components of other comprehensive income	6	-	(1,461)	-	(1,461)
Total comprehensive income		30,000	4,969	1,626	36,595
Balance at 30 June 2023		92,268	118,917	131,815	343,000
Balance at 1 July 2023		**92,268**	**118,917**	**131,815**	**343,000**
Profit/(loss) after tax for the year		-	-	(25,281)	(25,281)
Revaluation of properties	8	-	4,907	-	4,907
Income tax relating to components of other comprehensive income	6	-	(1,529)	-	(1,529)
Total comprehensive income		-	3,378	(25,281)	(21,903)
Balance at 30 June 2024		92,268	122,295	106,534	321,097

The statement of accounting policies and the accompanying notes form an integral part of these financial statements.

Notes to the consolidated financial statements
For the year ended 30 June 2024

Reporting entity

AgResearch Limited is a Crown Research Institute, its principal activity is research and development in the pastoral sector of New Zealand. The consolidated financial statements of AgResearch Limited and its subsidiaries, associates and joint arrangement interests (together referred to as "the Group") have been prepared in accordance with the requirements of the Companies Act 1993, the Financial Reporting Act 2013, the Crown Research Institutes Act 1992, the Crown Entities Act 2004 and the Public Finance Act 1989.

Basis of preparation

The financial statements have been prepared in accordance with New Zealand Generally Accepted Accounting Principles (GAAP). They comply with the New Zealand Equivalents to International Financial Reporting Standards (NZ IFRS) and other applicable financial reporting standards as appropriate for tier 1 profit-orientated entities.

The financial statements are presented in New Zealand dollars rounded to the nearest thousand. The financial statements were authorised for issue by the directors on 29 August 2024.

Estimates and judgements which are considered material to understand the performance of AgResearch are found in the following notes:

Revenue: Note 1
Property, plant and equipment: Note 8
Livestock: Note 12
Forestry: Note 14

Basis of consolidation

The financial statements of members of the Group are prepared for the same reporting period as AgResearch Limited, using consistent accounting policies.

In preparing the Group's financial statements, intra-group balances, and any unrealised income and expenses arising from intra-group transactions are eliminated. Unrealised gains arising from transactions with equity accounted investees are eliminated against the investment to the extent of AgResearch's interest in the investee. Unrealised losses are eliminated in the same way as unrealised gains, but only to the extent that there is no evidence of impairment.

Goods and services tax (GST)

The consolidated financial statements are prepared on a GST exclusive basis with the exception of receivables and payables which include GST.

Inventories

Inventories are valued at the lower of cost, determined on a first-in first-out basis and net realisable value. The cost of harvested agricultural produce is measured at fair value less estimated point-of-sale costs at the point of harvest.

Statement of cash flows

- **Cash and cash equivalents**

  Cash and cash equivalents include cash on hand, cash in banks, demand deposits and other highly liquid investments readily convertible into cash.

- **Operating activities**

  Operating activities include all transactions and other events that are not investing or financing activities.

- **Investing activities**

  Investing activities are those activities relating to the acquisition and disposal of current and non-current investments and any other non-current assets.

- **Financing activities**

  Financing activities are those activities relating to changes in the equity and debt structure of the Group.

The Group as lessor

The Group enters into lease arrangements as a lessor. Leases for which the Group is a lessor are classified as finance or operating leases. Whenever the terms of the lease substantially transfer all the risks and rewards of ownership to the lessee, the contract is classified as a finance lease. All other leases are classified as operating leases.

Budget figures

The unaudited budget figures are those approved by the Board and presented in the Statement of Corporate Intent, noting that the Board approval is of the Statement of Comprehensive Income, Statement of Financial Position and Capital Expenditure budget. The budget has been prepared using the same accounting policies as for these Consolidated Financial Statements.

Changes in accounting policies and disclosures

Accounting policies are changed only if the change is required by a standard or interpretation or otherwise provides more reliable and more relevant information. There were no changes to accounting policies in the 2024 year.

Standards and interpretations effective in the current period

In the current year the Group has adopted all mandatory new and amended standards and interpretations applicable to the Group. There are no standards or interpretations issued, but not yet effective, that are expected to have a material impact on the Group.

Comparatives

Where necessary, comparative figures have been adjusted to confirm to current disclosures and reclassification of balances. This has not resulted in any adjustment to net assets or retained earnings.

Notes to and forming part of the consolidated financial statements
For the year ended 30 June 2024

1 Revenue

Revenue from contracts with customers

The Group applied the following judgements that significantly affect the determination of the amount and timing of revenue from contracts with customers:

- Identifying performance obligations in a contract

  The Group provides research services that are either for an entire project or part of a project that is managed by the Group for customers. The research services are a promise to report findings and related intellectual property in the future and are part of the negotiated work performed between the Group and the customer.

  The Group determined that the milestones within each contract are generally not capable of being distinct. The fact that the Group would not be able to sell the individual milestones on a stand-alone basis indicates that a customer could not benefit from an individual milestone. In addition, the individual milestones are highly correlated, because the Group would not be able to transfer the work performed to date if the customer terminated the contract prior to completion.

  The Group determined that the input method is the best method in measuring progress of the research services because there is a direct relationship between the effort (i.e., cost of hours incurred) and the transfer of service to the customer. The Group recognises revenue on the basis of the cost incurred relative to the total expected cost to complete the contract.

- Principal versus agent consideration

  The Group occasionally enters into contracts with its customers that require a third party to perform the work, on the customer's behalf, with the third party receiving full consideration and autonomy. Under these contracts, the Group provides hosting services (i.e., coordinating the selection of third parties and managing the delivery of the contract). The Group determined that it does not control the service, and it does not obtain benefits from the services performed, therefore it is an agent in these contracts.

- Government grants

  Revenue received from New Zealand's Strategic Science Investment Fund (SSIF) is considered to be a government grant for research purposes and is accounted for under NZ IAS 20, *Accounting for Government Grants and Disclosure of Government Assistance*. The Fund is recognised as revenue in the year it is received. The primary condition is that the Group should undertake research activities as defined under the contractual agreement that awards the funding.

- Our Land and Water National Science Challenge

  Revenue received in respect of "Our Land and Water" National Science Challenge funding is accounted for as research revenue and brought to account as services are provided, based upon the proportion of completion of the contract at the end of the reporting period. The stage of completion is the proportion of contract costs incurred for work performed to date compared to the estimated total contract costs.

- Commercial revenue

  The Group derives revenue from the provision of research services to a range of agriculture-based customers in New Zealand. The Group determined that the milestones within each research contract are generally not capable of being distinct. These contracts are typically determined to have one single performance obligation that is integrated and fulfilled over time.

The transaction price is normally fixed at the start of the project. The nature of commercial contracts can sometimes lead to variations in the job scope, which is known as contract modification.

Under the terms of the written contracts, the Group is contractually restricted from redirecting research outcomes to another customer and has an enforceable right to payment for work done. Therefore NZ IFRS 15.35(c) is satisfied and the Group recognises revenue in relation to contracting services over time.

Contract assets are initially recognised at fair value. They are reviewed annually for impairment and subsequently adjusted if required. There were no contracts requiring impairment in 2024 (2023 $Nil).

The Group becomes entitled to invoice customers for research services based on achieving a series of performance-related milestones. The Group will previously have recognised a contract asset for any work performed. Any amount previously recognised as a contract asset is reclassified to trade receivables at the point at which it is invoiced to the customer. If the milestone payment exceeds the revenue recognised to date under the cost-to-complete method then the Group recognises a liability for the difference. There is not considered to be a significant financing component in contracts with customers as the period between the recognition of revenue under the cost-to-cost method and the milestone payment is always less than one year.

- Farm produce

  Revenue from the sale of goods is recognised when the Group has transferred the control of the goods to the buyers.

- Other revenue

  Royalty revenue is recognised on an accrual basis in accordance with the substance of the relevant agreement and usage volumes provided by licensees. Dividend revenue from investments is recognised in the financial period in which the right to receive payment is established. Interest revenue is recognised on a time-proportionate basis that takes into account the effective yield on the financial asset.

- Operating lease income

  The Group leases out its commercial properties to tenants under operating leases with rent payable monthly. The Group has classified these leases as operating leases because they do not transfer substantially all of the risks and rewards incidental to the ownership of the assets.

  Lease income from operating leases where the Group is a lessor is recognised in income, on a straight line basis over the lease term. Contracts that include variable lease payments are based on CPI increases. There are no other variable lease payments that depend on an index or rate.

in thousands of New Zealand dollars	2024	2023
Other revenue		
Interest	**2,682**	3,203
Dividends	**275**	139
Royalties	**11,084**	11,754
Operating lease income	**4,518**	4,518
	18,559	19,614

2 Operating expenditure

in thousands of New Zealand dollars	Note	2024	2023
Employee related			
Salary and wages *		**73,257**	71,570
Superannuation contribution		**2,039**	2,002
Operational			
Amortisation and impairment of intangible assets	9	**410**	286
Depreciation	8	**14,381**	11,664
Depreciation of right-of-use assets	13	**2,982**	2,412
Short-term and low-value lease expenses		**46**	264
Other operating expenses		**26,204**	27,699
Science third party sub-contracts		**39,852**	39,689
Site and property expenses		**8,132**	7,898
Supplies		**12,603**	13,612
Financial and administration			
Auditor's remuneration - for services as auditor **		**400**	381
Bad debts		**-**	1
Change in provision for expected credit loss		**9**	(8)
Directors' fees		**405**	354
Financial and legal expenses		**2,923**	2,630
		183,643	180,454

* Salary and wages includes $1,366k (2023: $324k) of costs relating to redundancy.

** The total audit fee for FY24 is $400k (2023: $381k); this comprises of AgResearch audit fee of $357k (2023: $337k), Office of the Auditor-General Audit Standards and Quality Support Charge contribution of $38k (2023: $35k), audit remuneration related to other subsidiaries of $5k (2023: $5k) and prior period Deloitte fees of $Nil (2023: $3.8k).

3 Other gains/(losses)

in thousands of New Zealand dollars	Note	2024	2023
Net gain/(loss) from foreign currency exchange		**(31)**	39
Net gain/(loss) on sale of property, plant and equipment		**(62)**	(37)
Net gain/(loss) on termination of capital work in progress contract *		**(1,449)**	-
Net gain (loss) on sale of intangible assets		**-**	5,211
Net gain (loss) on sale of software		**-**	(48)
Change in fair value of forestry	14	**12**	123
Change in fair value of livestock	12	**(137)**	(98)
Impairment of property, plant and equipment	8	**(1,762)**	(139)
Impairment of investments	15	**(1,458)**	78
Impairment of associates	5	**(639)**	-
		(5,526)	5,129

* In June 2024, AgResearch Limited agreed to the termination of the project for the development of a greenhouse gas measurement facility in Palmerston North. This was a joint decision by all parties including the project's co-funders, Ministry for Primary Industries and Centre For Climate Action Joint Venture Limited. These costs were held as capital work in progress, and have been disposed as at 30 June 2024 with a loss of $1,449k.

4 Finance cost

in thousands of New Zealand dollars	2024	2023
Interest expense on lease liabilities	**726**	775
Other interest expense	**3**	22
	729	797

5 Investments in associates and joint ventures

Associates are those entities in which the Group has significant influence, but not control, over the financial and operating policies. Joint ventures are those arrangements in which the Group has contractually agreed joint control and has rights to the net assets of the venture rather than having rights to assets and obligations for its liabilities. Associates and joint ventures are accounted for using the equity method (equity accounted investees).

Under the equity method, an investment in an associate is initially recognised in the consolidated statement of financial position at cost and adjusted thereafter to recognise the Group's share of the profit or loss and other comprehensive income of the associate. When the Group's share of losses of an associate exceeds the Group's interest in that associate, the Group discontinues recognising its share of further losses. Additional losses are recognised only to the extent that the Group has incurred legal or constructive obligations or made payments on behalf of the associate.

On acquisition of the investment in an associate, any excess of the cost of the investment over the Group's share of the net fair value of the identifiable assets and liabilities of the investee is recognised as goodwill, which is included within the carrying amount of the investment. The goodwill is assessed annually for impairment as part of the investment.

Associate company	Balance Date	Type of Investment	% of ownership interest and voting power held by the group 2024	2023	Principal activity
Biopolymer Network Limited	30 June	Associate	43	43	Research and development of high performance bio-based products
Encoate Holdings Limited	30 June	Associate	50	50	Research and development of bacteria and probiotics stabilisation technologies
Overseer Limited	30 June	Associate	50	50	Operating entity set up to sub-license the Overseer model to end users
MI8 Optics Limited	30 June	Associate	50	50	Rapid analysis of endophyte containing seeds
Southern Dairy Hub Limited Partnership	31 May	Associate	37.5	37.5	Promotion and development of dairy industry good activities
SDH GP Limited	31 May	Associate	37.5	37.5	General partner
Pastoral Greenhouse Gas Research Consortium held via (AgResearch [PPGR Consortia] Limited)	30 June	Joint Venture	22	22	Research into greenhouse gases produced by ruminants and exploit any resulting intellectual property

All associates are incorporated in New Zealand. There are no restrictions on the ability of any associate to pay dividends, repay loans or otherwise transfer funds to the investor company.

All associates are private entities and there is no quoted market price available for the investments.

Summarised financial information for associates and joint ventures

in thousands of New Zealand dollars	2024	2023
Share of loss from continuing operations and total comprehensive income	**(393)**	(433)
Share of total comprehensive loss	**(393)**	(433)

Aggregate carrying amount of the Group and company's interest in Southern Dairy Hub Limited Partnership	**3,673**	4,398
Aggregate carrying amount of the Group and company's interest in other associate investments	**754**	1,030
Aggregate carrying amount of the Group and company's interest in the joint ventures	**24**	15
	4,451	5,443

Valuation of associates

During the year an independent valuation was undertaken on Southern Dairy Hub Limited Partnership. As a result, AgResearch have accounted for an impairment to the value of the associate.

in thousands of New Zealand dollars	2024	2023
Southern Dairy Hub Limited Partnership gain/(loss) of associate	(639)	-
	(639)	-

6 Taxation

Current tax

Current tax is calculated by reference to the amount of income taxes payable or recoverable in respect of the taxable profit or tax loss for the period. It is calculated using tax rates and tax laws that have been enacted or substantively enacted by reporting date. Current tax for current and prior periods is recognised as a liability (or asset) to the extent that it is unpaid (or refundable).

Deferred tax

Deferred tax is accounted for using the comprehensive balance sheet liability method in respect of temporary differences arising from differences between the carrying amount of assets and liabilities in the financial statements and the corresponding tax base of those items.

In principle, deferred tax liabilities are recognised for all taxable temporary differences. Deferred tax assets are recognised to the extent that it is probable that sufficient taxable amounts will be available, against which deductible temporary differences or unused tax offsets (e.g., losses) can be utilised. However, deferred tax assets and liabilities are not recognised if the temporary differences giving rise to them arise from the initial recognition of assets and liabilities (other than as a result of a business combination), which affects neither taxable income nor accounting profit. Furthermore, a deferred tax liability is not recognised in relation to taxable temporary differences arising from goodwill.

Deferred tax liabilities are recognised for taxable temporary differences arising on investments in subsidiaries, associates and joint ventures except where the Group is able to control the reversal of the temporary differences and it is probable that the temporary differences will not reverse in the foreseeable future. Deferred tax assets arising from deductible temporary differences associated with these interests are only recognised to the extent that it is probable that there will be sufficient taxable profits against which to utilise the benefits of the temporary differences and they are expected to reverse in the foreseeable future.

Deferred tax assets and liabilities are measured at the tax rates that are expected to apply to the period(s) when the assets and liabilities giving rise to them are realised or settled, based on tax rates (and tax laws) that have been enacted or substantively enacted by reporting date. The measurement of deferred tax liabilities and assets reflects the tax consequences that would follow from the manner in which the Group expects, at the reporting date, to recover or settle the carrying amount of its assets and liabilities.

Deferred tax assets and liabilities are offset when they relate to the income taxes levied by the same taxation authority and the Group intends to settle its current tax assets and liabilities on a net tax basis.

Current and deferred tax for the period

Current and deferred tax is recognised as an expense or income in the profit and loss, except when:

- It relates to items recognised in equity, in which case the deferred tax or current tax is also recognised directly in equity; or
- It arises from the initial accounting for a business combination, in which case it is taken into account in the determination of goodwill or excess.

Tax expense comprises:

in thousands of New Zealand dollars	2024	2023
Current tax expense	**173**	194
Adjustments recognised in relation to the current tax of prior years	**(22)**	(511)
Deferred tax expense/(benefit) relating to the origination and reversal of temporary differences	**12,830**	(697)
Adjustments recognised in relation to deferred tax of prior years	**216**	611
Total tax expense/(benefit)	**13,197**	(403)

The total charge for the year can be reconciled to the accounting profit as follows:

in thousands of New Zealand dollars	2024	2023
Gain/(loss) from continuing operations	**(12,084)**	1,223
Income tax expense/(benefit) calculated at 28%	**(3,384)**	343
Origination and reversal of temporary differences	**(480)**	236
Effect of income that is non-assessable	**1,433**	(1,141)
Effect of change of law in regards to tax depreciation of buildings	**15,434**	-
Effect of foreign taxes paid	**-**	18
Associates' results reported net of tax	**-**	41
	13,003	(503)
Adjustments recognised in the current year in relation to the current and deferred tax of prior years	**194**	100
Income tax expense/(benefit) recognised in profit or loss	**13,197**	(403)

Current tax assets and liabilities

in thousands of New Zealand dollars	2024	2023
Current tax assets		
Tax receivable	**154**	27
	154	27

Deferred tax assets/(liabilities) arise from the following:

in thousands of New Zealand dollars	Opening balance	Charged to surplus	Charged to other comprehensive income	Closing balance
2024				
Temporary differences				
Biological assets	(719)	34	-	(685)
Property, plant and equipment	(19,517)	(14,244)	(1,529)	(35,290)
Intangible assets	764	(257)	-	507
Provisions	923	330	-	1,253
	(18,549)	(14,137)	(1,529)	(34,215)
Unused tax losses and credits				
Tax losses	804	1,091	-	1,895
	(17,745)	(13,046)	(1,529)	(32,320)
2023				
Temporary differences				
Biological assets	(803)	84	-	(719)
Property, plant and equipment	(17,866)	(190)	(1,461)	(19,517)
Intangible assets	772	(8)	-	764
Provisions	1,415	(492)	-	923
	(16,482)	(606)	(1,461)	(18,549)
Unused tax losses and credits				
Tax losses	114	690	-	804
	(16,368)	84	(1,461)	(17,745)

Income tax recognised directly in other comprehensive income:

in thousands of New Zealand dollars	2024	2023
Revaluation of properties	(1,529)	(1,461)
Total income tax recognised directly in other comprehensive income	(1,529)	(1,461)

7 Equity

Share capital

Capital consists of 92,268,000 fully paid ordinary shares of $1.00 each (2023: 92,268,000 fully paid ordinary shares). In 2023 the second and final contribution from the Crown was provided to progress the build of the new scientific research facility and corporate headquarters for AgResearch in Lincoln. These payments amounted to $45,000k (comprising 45,000,000 ordinary shares at $1.00 each).

Reserves

The asset revaluation reserve arises on the revaluation of land, land improvements and buildings. Where revalued assets are sold, the portion of the asset revaluation reserve relating to that asset and which is therefore effectively realised, is transferred directly to retained earnings.

8 Property, plant and equipment

The Group has the following classes of property, plant and equipment:

- Land and land improvements - campus/farms
- Buildings - campus/farms
- Leasehold improvements
- Plant and equipment
- Vehicles
- Capital work in progress.

Fair value measurement

Land, land improvements and buildings are measured at fair value. Fair value is determined on the basis of an independent valuation prepared by external valuation experts (using either market value or optimised depreciated replacement cost), less any subsequent accumulated depreciation and subsequent accumulated impairment losses. Land, land improvements and buildings are revalued at least every three years or whenever there has been an indicator of a significant movement in the fair value. The fair values are recognised in the consolidated financial statements of the Group and are reviewed at the end of each reporting period to ensure that the carrying value of land, land improvements and buildings is not materially different from their fair values.

Any revaluation increase arising on the revaluation of land, land improvements and buildings is accumulated in the asset revaluation reserve, except to the extent that it reverses a revaluation decrease for the same asset previously recognised as an expense in profit and loss, in which case the increase is credited to profit and loss to the extent of the decrease previously charged. A decrease in carrying amount on the revaluation of land, land improvements and buildings is charged as an expense in profit and loss to the extent that it exceeds the balance, if any, held in the asset revaluation reserve relating to a previous revaluation of that asset.

All other assets are recorded at cost less accumulated depreciation and accumulated impairment. Capital work in progress is recorded at cost.

Assets measured at fair value are classified as level 3 assets in the fair value hierarchy.

Depreciation is provided for on a straight-line basis on all tangible property, plant and equipment, other than freehold land and capital work in progress, at depreciation rates calculated to allocate the assets' cost or other revalued amount over their estimated useful lives. Leasehold improvements are depreciated over the period of the lease or estimated useful life, whichever is the shorter, using the straight-line method. The estimated useful lives, residual values and depreciation method are reviewed at the end of each annual reporting period.

Depreciation on revalued buildings is charged to the profit and loss. On the subsequent sale or retirement of a revalued property, the attributable revaluation surplus remaining in the asset revaluation reserve, net of any related deferred taxes, is transferred directly to retained earnings.

The following estimated useful lives are used in the calculation of depreciation:

- Land improvements 5-50 years
- Buildings (including farms) 5-80 years
- Leasehold Improvements 3-40 years
- Vehicles 3-13 years
- Plant and equipment
    - Dairy plant and equipment 5-25 years
    - Computer hardware 3-5 years
    - Other plant and equipment 2-15 years.

Fair value measurement of the Group's land, land improvements and buildings

The Group's land and buildings are stated at their "Fair Value" as defined in NZ IFRS 13, being the price that would be received on sale of the asset, less any subsequent depreciation and impairments.

The valuation was performed by independent valuers, Colliers Limited, under the requirements of NZ IAS 16 *Property, Plant and Equipment*. These valuations were performed using either market value or optimised depreciated replacement cost. For non-specialised assets where there is a comparable market for the same or a similar asset, value is determined by one or more of the following:

- Direct comparison
- Income
- Cost approach.

Assets that have a specialised use for the Group have been valued at optimised depreciated replacement cost. These assets include site improvements such as roads, fences and buildings. Optimised depreciated replacement cost is a method of valuation based on an estimate of the current gross replacement cost of an asset less allowances for physical deterioration and optimisation for obsolescence and surplus capacity. The Group's campus and farm assets have been classified by Colliers International as non-specialised assets and have, therefore, been assigned a market-based value.

The Group acquired 1.49 hectares of land from Lincoln University on the corner of Springs Road and Ellesmere Junction Road for $1.00 in 2020. Due to restrictions in place over this land, management has determined this to be its fair value.

8.1 Asset held for sale

Residential properties located in Lincoln East Belt are classified as held for sale as at 30 June 2024.

The assets are available for immediate sale in their present condition, sales are highly probably and expected to quality for recognition as completed sales within one year from 30 June 2024

Carrying value of the properties is $526k (Fair value less cost to sell $553k), the assets are classified as held for sale separately from other assets in the statement of financial position.

in thousands of New Zealand dollars	Land and Land Improve-ments[1]	Buildings[1]	Leasehold Improve-ments[2]	Plant & Equip-ment[2]	Vehicles[2]	Capital Work-in Progress[2]	Total
2024							
Balance at beginning of year	77,219	126,028	179	23,856	207	84,165	311,654
Additions	382	1,503	22	6,524	171	33,271	41,873
Disposals	-	(355)	-	(126)	-	(1,949)	(2,430)
Reclassification to assets held for sale (Note 8.1)	(380)	(146)	-	-	-	-	(526)
Revaluations	(795)	5,702	-	-	-	-	4,907
Impairments	15	(1,777)	-	-	-	-	(1,762)
Depreciation	(892)	(7,075)	(26)	(6,328)	(60)	-	(14,381)
Transfer from Capital Work-in-Progress	8,315	91,963	-	6,819	-	(107,097)	-
Balance at end of year	83,864	215,843	175	30,745	318	8,390	339,335
Cost or valuation	83,889	216,098	753	82,811	748	8,390	392,689
Accumulated depreciation	(25)	(255)	(578)	(52,066)	(430)	-	(53,354)
Balance at end of year	83,864	215,843	175	30,745	318	8,390	339,335
2023							
Balance at beginning of year	76,602	124,760	166	19,284	241	33,690	254,743
Additions	526	914	33	7,600	25	53,320	62,418
Disposals	(18)	(4)	-	(108)	(4)	-	(134)
Revaluations	1,087	5,343	-	-	-	-	6,430
Impairments	(185)	46	-	-	-	-	(139)
Depreciation	(794)	(5,256)	(20)	(5,539)	(55)	-	(11,664)
Transfer from Capital Work-in-Progress	-	225	-	2,619	-	(2,844)	-
Balance at end of year	77,219	126,028	179	23,856	207	84,165	311,654
Cost or valuation	77,241	126,312	740	73,063	661	84,165	362,182
Accumulated depreciation	(22)	(284)	(561)	(49,207)	(454)	-	(50,528)
Balance at end of year	77,219	126,028	179	23,856	207	84,165	311,654

The Group's assets[1] were revalued during the year resulting in a net increase of assets of $3,145k (2023: $6,291k)

in thousands of New Zealand dollars	2024	2023
Through the asset revaluation reserve	**4,907**	6,430
Through the profit and loss	**(1,762)**	(139)
	3,145	**6,291**

1 Assets are stated at their fair value
2 Assets are stated at their cost

Had the Group's land and buildings (other than land and buildings classified as held for sale or included in a disposal group) been measured on a historical cost basis, their carrying amount would have been as follows:

in thousands of New Zealand dollars	2024	2023
Land and land improvements	**30,414**	22,490
Buildings	**175,501**	85,886

9 Intangible assets

Purchased intangible assets

Purchased intangible assets such as intellectual property, patents, trademarks and licences are recorded at cost less accumulated amortisation and accumulated impairment losses. Amortisation is charged over their estimated useful lives, which varies between 2 and 20 years. The estimated useful life and amortisation method is reviewed at the end of each annual reporting period.

Acquired computer software licences are capitalised on the basis of the costs incurred to acquire and bring to use the specific software. These costs are amortised over their estimated useful lives (between two and five years on a straight-line basis). Costs associated with maintaining computer software programmes are recognised as an expense as incurred.

Access rights relate to an agreement between the Group and Massey University whereby the Group has access to the Dairy Research Farm and associated research facilities in the Manawatū for a period of 20 years from 1 July 2020. This is aligned with both parties desire to encourage synergies and closer collaborative working between their respective agricultural and dairy research activities with a view to enhancing the value each organisation adds to New Zealand through research, science and technology.

Internally generated intangible assets - research and development expenditure

Research expenditure is expensed in the period incurred.

The cost of an internally generated intangible asset represents expenditure incurred in the development phase of the asset only.

Development expenditure is expensed in the period incurred unless all of the following conditions have been demonstrated:

- The intention to complete the intangible asset and use or sell it
- How the asset created will generate future economic benefits
- The ability to measure reliably the expenditure attributable to the intangible asset during its development
- The availability of adequate technical, financial and other resources to complete the development and to use or sell the intangible asset.

Internally generated intangible assets that satisfy the asset recognition criteria above are amortised on a straight-line basis over future periods from which benefits are expected to accrue. These future periods are between five and seven years.

Computer software development costs that are directly associated with the production of identifiable and unique software products controlled by the Group, and that will probably generate economic benefits exceeding costs beyond one year, are recognised as intangible assets. Direct costs include the software development employee costs and an appropriate portion of relevant overheads.

Computer software development costs recognised as assets are amortised over their estimated useful lives (not exceeding five years).

Disposal of intangible assets

Realised gains and losses arising from disposal of intangible assets are recognised in the profit and loss in the period in which the transaction occurs.

in thousands of New Zealand Dollars	Software	Emission Trading Units	Access Rights	Total
2024				
Balance at beginning of year	**357**	**41**	**1,700**	**2,098**
Additions	**993**	**-**	**-**	**993**
Amortisation	**(310)**	**-**	**(100)**	**(410)**
Balance at end of year	**1,040**	**41**	**1,600**	**2,681**
Cost	**2,462**	**41**	**2,000**	**4,503**
Accumulated depreciation	**(1,422)**	**-**	**(400)**	**(1,822)**
Balance at end of year	**1,040**	**41**	**1,600**	**2,681**
2023				
Balance at beginning of year	338	41	1,800	2,179
Additions	253	-	-	253
Disposal arising from sale of subsidiary	(48)	-	-	(48)
Amortisation	(186)	-	(100)	(286)
Balance at end of year	357	41	1,700	2,098
Cost	1,469	41	2,000	3,510
Accumulated depreciation	(1,112)	-	(300)	(1,412)
Balance at end of year	357	41	1,700	2,098

10 Trade and other receivables

in thousands of New Zealand dollars	2024	2023
Trade receivables not past due	**309**	11,447
Past due 1 - 30 days	**13,599**	11,344
Past due more than 30 days	**5,891**	2,807
Less provision for impairment in receivables	**(13)**	(4)
Net trade receivables	**19,786**	25,594
Accrued income and other receivables	**11,148**	11,809
Receivables from associates	**-**	94
Total trade and other receivables	**30,934**	37,497

The fair value of trade and other receivables is approximately equal to their carrying value. Terms of trade vary according to individual customer contracts. As at 30 June 2024, trade receivables of $19,715k (2023: $14,119k) were past due. These relate to a number of independent customers for whom there is no recent history of defaults.

A provision for the impairment of receivables is established using simplified expected credit losses model which uses a lifetime expected loss allowance for all trade receivables.

11 Trade and other payables

Trade payables and other payables are recognised when the Group becomes obliged to make future payments resulting from the purchase of goods and services. Trade and other payables are subsequently measured at amortised cost using the effective interest method. This represents their fair value given the short-term nature of the liability.

A provision is recognised when the Group has a legal or constructive obligation as a result of a past event, it is probable that an outflow of economic benefits will be required to settle the obligation, and the provision can be reliably measured.

in thousands of New Zealand dollars	2024	2023
Trade payables	**16,642**	22,256
Income in advance	**34,475**	52,822
Provisions	**853**	198
Total payables	**51,970**	75,276

The fair value of trade payables is approximately equal to their carrying value as all amounts are expected to be settled within 90 days. No interest is charged on trade payables.

Financial risk management strategies

The Group has financial risk management policies in place to ensure that all payables are paid within the credit time frame.

12 Biological assets - livestock

Livestock are valued at their fair value less estimated point-of-sale costs by reference to the most relevant active market. An allowance is made for a reduction in the value of certain livestock held for research trials. Changes in the valuation of livestock are recognised through profit and loss.

in thousands of New Zealand dollars	Sheep	Beef cattle	Dairy cattle	Deer	Total
2024					
Reconciliation of changes in the carrying value					
Balance at beginning of year	**1,105**	**556**	**1,606**	**507**	**3,774**
Increases due to acquisitions	**230**	**297**	**106**	**-**	**633**
Decreases due to sales	**(746)**	**(542)**	**(371)**	**(114)**	**(1,773)**
Net increase due to births, growth and deaths	**447**	**189**	**207**	**85**	**928**
Changes in fair value less estimated point-of-sale costs	**(166)**	**(44)**	**33**	**40**	**(137)**
Balance at end of year	**870**	**456**	**1,581**	**518**	**3,425**
Quantity of livestock at end of year	**6,811**	**468**	**1,026**	**869**	
2023					
Reconciliation of changes in the carrying value					
Balance at beginning of year	1,129	757	1,649	524	4,059
Increases due to acquisitions	345	531	46	-	922
Decreases due to sales	(1,079)	(791)	(302)	(209)	(2,381)
Net increase due to births, growth and deaths	743	40	308	181	1,272
Changes in fair value less estimated point-of-sale costs	(33)	19	(95)	11	(98)
Balance at end of year	1,105	556	1,606	507	3,774
Quantity of livestock at end of year	7,133	651	1,062	921	

Livestock valuation method

Livestock was valued by PGG Wrightson Limited by reference to market evidence of recent transactions for similar livestock, taking into account the age, breed, type, condition and location of the animals.

Financial risk management strategies

The Group is exposed to financial risks relating to the damage to livestock from climatic changes, diseases and other natural forces. The Group has processes in place aimed at monitoring and mitigating those risks, including pest and disease monitoring and management strategies.

13 Right-of-use assets

The Group leases several assets including land and buildings and vehicles. Extension options are included in a number of property leases. In determining the lease term, management has considered all facts and circumstances that create an economic incentive to exercise an extension option. Extension options are only included in the lease term if the lease is reasonably certain to be extended.

Right of use assets are initially measured at cost. This comprises the initial amount of the lease liability adjusted for any lease payments made at or before the commencement date, plus any initial direct costs incurred, less any lease incentives received. The right of use asset is depreciated on a straight-line basis over the lease term.

The Group applies NZ IAS 36 to determine whether a right-of-use asset is impaired.

in thousands of New Zealand dollars	Property	Vehicles	Total
2024			
Cost			
Balance at beginning of year	**28,835**	**870**	**29,705**
Additions	**5,322**	**241**	**5,563**
Disposals	**(2,247)**	**(46)**	**(2,293)**
Balance at end of year	**31,910**	**1,065**	**32,975**
Accumulated depreciation			
Balance at beginning of year	**(7,742)**	**(539)**	**(8,281)**
Depreciation	**(2,726)**	**(256)**	**(2,982)**
Disposals	**1,977**	**46**	**2,023**
Balance at end of year	**(8,491)**	**(749)**	**(9,240)**
Carrying amount			
Balance at end of year	**23,419**	**316**	**23,735**
Average lease term (years)	**10**	**1**	
2023			
Cost			
Balance at beginning of year	27,797	654	28,451
Additions	1,384	256	1,640
Disposals	(346)	(40)	(386)
Balance at end of year	28,835	870	29,705
Accumulated depreciation			
Balance at beginning of year	(5,884)	(371)	(6,255)
Depreciation	(2,204)	(208)	(2,412)
Disposals	346	40	386
Balance at end of year	(7,742)	(539)	(8,281)
Carrying amount			
Balance at end of year	21,093	331	21,424
Average lease term (years)	10	1	

14 Biological assets–forestry

Forests are recorded at their fair value less point-of-sale costs on an annual basis using anticipated harvesting timing and yield and an applicable discount rate. Changes in the valuation of forests are accounted for through profit or loss. There was no income generated from forestry in the 2024 financial year (2023: $Nil).

Emissions trading scheme

Forestry land is subject to the provisions of the New Zealand Emissions Trading Scheme (ETS). Should the land be deforested (the land is changed from forestry to some other purpose), a deforestation liability will arise.

Compensation units are recognised based on their cost.

The Group has radiata pine tree crops at Ballantrae, Invermay and Woolford.

in thousands of New Zealand dollars	2024	2023
Reconciliation of changes in the carrying value		
Balance at beginning of year	**1,398**	1,275
Changes in fair value less estimated point-of-sale costs	**12**	123
Balance at end of year	**1,410**	1,398
Area (ha) of forest at end of year	**115**	115

Forestry valuations

Forestry was valued by Alan Bell & Associates as at 30 June 2024. The value of forestry at 30 June 2024 was $1,410k (2023: $1,398k).

The methodology used is "stand-based" in line with forestry management practices and harvesting. Where transactions have occurred for similar tree crops, value is based on those transactions. Where there have been no such transactions, value is based on:

- Estimates of future costs and returns for mature crops
- Standard investment costs for young crops
- A mixture of the above for intermediate crops.

Additional inputs to the value arrived at are:

- Anticipated harvest timing and yield
- A 8.5% real discount rate on pre-tax cash flows (2023: 8.5%)
- An assumed 3% compounding rate on standard costs (2023: 3%)
- Current market prices and long-term trends in log prices. Log prices used are based on current market prices and 12-quarter rolling average prices published by the Ministry of Primary Industries.

Emissions units

The Group held 18,975 ETS units as at 30 June 2024. There is no change to the ETS units during the 2024 financial year (2023: no change). All ETS units are carried at their original cost (Note 9).

Financial risk management strategies

The Group is exposed to financial risks arising from changes in timber prices. The Group is a long-term forestry investor and does not expect timber prices to decline significantly in the foreseeable future. It has, therefore, not taken any measures to manage the risks of a decline in timber prices.

Land value and contingency

In the event that the forest areas are harvested, a deforestation liability equivalent to the decrease in carbon will be incurred. This liability is not recognised on the balance sheet as there is no current intention of changing the land use subject to the ETS.

15 Other investments

in thousands of New Zealand dollars	2024	2023
Fonterra Co-operative Group Limited	**1,390**	1,541
Farm IQ Systems Limited	**605**	2,066
Other investments	**798**	880
Total	**2,793**	4,487

Valuation of other investments

- Fonterra shares are valued using the quoted market price on the NZX market.
- The investment in FarmIQ Systems Limited is presented at fair value on an enterprise value basis as defined in NZ IFRS 13.
- The valuation was performed by independent valuers, Lewis Tucker & Co, following the requirements of NZ IAS 13 Fair value measurement. These valuations were performed using a combination of comparable company revenue/EV ratios, the book value of FarmIQ's intangible assets and the book value of FarmIQ's enterprise value.
- All other investments are valued using the quoted market price on the NZX listed market, NZX unlisted market or the share prices set by the individual entities as appropriate.

Impairment on other investments

During the year, the gains/(losses) of other investments was recognised as follows:

in thousands of New Zealand dollars	2024	2023
FarmIQ Systems Limited gain/(loss) on investment	**(1,461)**	-
Other gains/(losses) on other investments	**3**	78
Total	**(1,458)**	78

16 Lease liabilities

The lease liability is initially measured at the present value of the lease payments that are not paid at the lease commencement date, discounted by using the rate implicit in the lease. If this rate cannot be readily determined, the Group uses its incremental borrowing rate.

The lease liability is subsequently measured by increasing the carrying amount to reflect interest on the lease liability (using effective interest rate method) and by reducing the carrying amount to reflect the lease payments made. It is remeasured when there is a change in future lease payments, or if the Group changes its assessment of whether it will exercise an extension or termination option.

in thousands of New Zealand dollars	2024	2023
Current	**2,047**	1,883
Non-current	**22,904**	20,880
Total	**24,951**	22,763

Amounts payable under leases	2024	2023
Within one year	**2,047**	1,883
Later than one year but not later than five years	**6,905**	5,815
Later than five years	**15,999**	15,065
Total	**24,951**	22,763

The total cash outflow for leases amounts to $3,459k (2023: $2,901k).

17 Employee Entitlements

in thousands of New Zealand dollars	2024	2023
Annual leave	**4,680**	4,688
Payroll accruals	**2,124**	**2,162**
Balance at end of year	**6,804**	**6,850**

Provision is made for entitlements owing to employees in respect of wages and salaries, annual leave, and alternative days leave. Provisions are recognised when it is probable they will be settled and can be measured reliably.

In the current year, the employee entitlements provision includes $119k (2023: $115k) to remediate former staff for historic payroll matters in relation to compliance with the Holidays Act 2003.

18 Other non-current liabilities

Key money

In 2015, AgResearch Limited sold a building and entered into a sub-lease of the land on which the building is located. The lessee has paid an upfront lump sum as key money in relation to the lease. The key money is being recognised as income over the term of the lease (including renewal periods).

in thousands of New Zealand dollars	2024	2023
Key money received in advance	**328**	387
Key money referable to lease in current period	**(60)**	(59)
Total Other non-current liabilities	**268**	328

19 Investments in subsidiaries

Subsidiaries are entities controlled by the Group.

The interests of any non-controlling shareholders are stated in proportion of the fair values of the identifiable assets and liabilities recognised on acquisition plus their share of post-acquisition surpluses.

		% of ownership interest and voting power held by the Group		
Subsidiary companies	Balance date	2024	2023	Principal activity
Celentis Limited	30 June	100	100	Holding company
Grasslanz Technology Limited	30 June	100	100	Cultivar development and management
AgResearch (USA) Limited	30 June	100	100	Cultivar development and management in the USA
Grasslanz Technology Australia Pty Limited	30 June	100	100	Cultivar development and management in the Australia
AgResearch (Pastoral Genomics Consortia) Limited	30 June	100	100	Holding company
AgResearch (PPGR Consortia) Limited	30 June	100	100	Holding company
Covita Limited	30 June	100	100	Holding company
Phytagro New Zealand Limited	30 June	100	100	Holding company

Grasslanz Technology Limited is a direct subsidiary of Celentis Limited. AgResearch (USA) Limited and Grasslanz Technology Australia Pty Limited are direct subsidiaries of Grasslanz Technology Limited. All other subsidiary companies are direct subsidiaries of AgResearch Limited.

All subsidiary companies are incorporated in New Zealand.

20 Reconciliation of surplus after tax with net cashflow from operating activities

in thousands of New Zealand dollars	2024	2023
Surplus/(deficit) after tax	(25,281)	1,626
Non-cash Items		
Depreciation	14,381	11,664
Intangible assets amortisation	410	286
Depreciation of right-of-use	2,977	2,412
Net (gain)/loss on sale of property, plant and equipment	1,511	37
Share of deficit of associates	393	433
Investment write down/revaluation	2,097	(78)
Change in fair value of forestry	(12)	(123)
Change in fair value of livestock	349	98
Net (gain)/loss on sale of intangible assets	-	(5,211)
Net (gain)/loss on sale of software	-	48
Property, plant and equipment and software impairment	1,762	139
Net (gain)/loss from foreign currency exchange	31	(39)
Bad and doubtful debt provision	9	(7)
Other non-cash items	(46)	(62)
Movements in working capital		
Change in current taxation	(127)	112
Change in deferred tax	13,048	(86)
(Increase)/decrease in inventory	(192)	(587)
(Increase)/decrease in livestock	-	187
(Increase)/decrease in receivables	6,524	(7,654)
(Increase)/decrease in prepayments	513	(70)
(Increase)/decrease in other current assets	-	77
Increase/(decrease) in provisions	647	(764)
Increase/(decrease) in payables	(24,058)	3,483
Items classified as investing activities		
Increase/(decrease) in property, plant & equipment, intangible assets and investment accruals	3,229	(2,476)
Net cash flow from operating activities	(1,835)	3,445

21 Operating lease arrangements

The Group as a lessor

in thousands of New Zealand dollars	2024	2023
Non-cancellable operating lease receivables		
Receivable no later than 1 year	**3,091**	2,573
Receivable later than 1 year and not longer than 5 years	**3,331**	2,197
Receivable later than 5 years	**418**	403
Total non-cancellable operating leases	**6,840**	5,173

Operating lease receivables relate to land and buildings leased on the four campuses owned by AgResearch Limited. The lease terms are between one month and 22 years, with one lease having an option to extend for a further five terms, each of five years. Lease income is recognised in profit or loss on the straight-line basis over the lease terms. Management constantly manage the risks associated with any rights retained in the leased assets. The following approaches have been taken to reduce the risks associated:

- All leases have the provisions for periodic rent reviews to market rates
- The lessees are liable for any damage or loss to the leased properties caused by careless or abnormal use
- No lessees have an option to purchase the property at the expiry of the lease period.

22 Joint operation investments

Joint operations are joint arrangements between the Group and another party in which there is a contractual agreement to undertake a specific business project and in which the joint parties are severally liable in respect of costs and liabilities of the project and share in any resulting output. The Group's share of the assets, liabilities, revenues and expenses of joint operations are incorporated into the Group financial statements on a line-by-line basis using the proportionate method. Where the Group transacts with its jointly controlled entities, unrealised profits and losses are eliminated to the extent of the Group's interest in the joint operation.

Details of the Group's material joint operations at the end of the year are as follows:

		% of ownership interest and voting power held by the Group		
Subsidiary companies	Balance date	2024	2023	Principal activity
Grasslands Innovation Limited	30 June	30	30	To identify, develop and exploit product opportunities in proprietary forage cultivars and other forage technologies

The 30% interest in Grasslands Innovation Limited is held via Grasslanz Technology Limited, a wholly-owned subsidiary of AgResearch Limited. Grasslands Innovation Limited is incorporated in New Zealand. Grasslands Innovation Limited is considered a joint operation by virtue of the contractual arrangements that specify the parties' rights to the economic inputs and outputs of the joint arrangement and retention of ownership rights to pre-existing IP contributed by the parties.

23 Transactions with related parties

The ultimate shareholder of the Group is the Crown. The Group undertakes many transactions with other Crown entities, state-owned enterprises and government departments, which are carried out on a commercial and arms-length basis. A summary of other related party transactions is detailed below.

Trading transactions with related parties

	Sale of services		Due from	
in thousands of New Zealand dollars	2024	2023	2024	2023
Research, development and other services				
Transactions between AgResearch and related parties:				
Subsidiaries	**3,515**	3,711	**-**	10
Associates and joint ventures	**37**	278	**-**	94
Joint operations	**894**	1,602	**359**	-
Transactions between the Group and related parties:				
Entities of which key management personnel are associated	**5,168**	4,162	**870**	140

Revenue from MBIE is disclosed in the Consolidated Statement of Comprehensive Income.

	Purchase of services		Due to	
in thousands of New Zealand dollars	2024	2023	2024	2023
Research, development and other services				
Transactions between AgResearch and related parties:				
Subsidiaries	**108**	395	**-**	-
Associates and joint ventures	**18**	450	**-**	1
Transactions between the Group and related parties:				
Entities of which key management personnel are associated *	**32,922**	46,292	**1,306**	9

* The purchases of services with entities which key management are associated includes $28,120k (2023: $40,962k) for transactions with Naylor Love. These transactions relates to the build of the new scientific research facility and corporate headquarters for AgResearch in Lincoln, which was completed in 2024.

The amounts outstanding are unsecured, on normal trade terms and will be settled in cash. No guarantees have been given or received. No expense has been recognised in the period for bad or doubtful debts in respect of the amounts owed by related parties.

Equity interest in related parties

Details of the percentage of interests held in related parties are disclosed in Notes 5 and 19 to the Consolidated Financial Statements.

Key management remuneration reporting

The compensation of the Directors and executives, being the key management personnel of the Group, comprised:

in thousands of New Zealand dollars	2024	2023
Chief Executive Officer	**553**	555
Directors' fees	**405**	354
Salaries and other short-term employee benefits	**3,005**	2,613
Termination payments	**172**	-
Total	**4,135**	3,522

24 Financial instruments

Financial instruments carried in the Consolidated statement of financial position include cash and cash equivalents, investments, derivative financial instruments, receivables and trade creditors. The particular recognition methods adopted are disclosed in the accounting policies where relevant.

Financial risk management

The Group has exposure to the following risks from its use of financial instruments:

- Credit risk
- Market risk
- Liquidity risk.

The Group has a Treasury policy, which it applies to actively manage these risks (refer below).

Credit risk

The financial instruments that potentially subject the Group to credit risk are cash, short-term deposits, forward-rate agreements and accounts receivable.

Credit risk is managed through the Treasury policy which:

- Places restrictions on the level of investment with any one counter-party
- Restricts the counter-parties that may be used to A Grade registered banks and the New Zealand Government
- Sets parameters within which short-term investments must be made.

The Group has no significant concentrations of credit risk. The maximum exposure to credit risk is represented by the carrying value of each financial asset in the statement of financial position.

Trade receivables consist of a large number of customers spread across diverse sectors and geographical areas. On-going credit evaluation is performed on the financial condition of the trade receivables. Credit assessments are undertaken to determine the credit quality of the customer, taking into account their financial position, past experience and other relevant factors. Individual risk limits are granted in accordance with the internal credit policy and authorised via appropriate personnel as defined by the Group's delegation of authority manual.

The carrying amount of financial assets recorded in the financial statements, net of any allowances for losses, represents the maximum exposure to AgResearch of any credit risk.

AgResearch does not have any significant credit risk exposure to any single counter party. The credit risk on liquid funds and derivative financial instruments is limited because the counter parties are banks with high credit ratings assigned by international credit rating agencies.

AgResearch has not changed its overall strategy regarding the management of risk during the financial year.

Market risk

Currency risk

Revenues and expenses in foreign currency are translated to New Zealand dollars at the exchange rates in effect at the time of the transaction or at rates approximating them. Assets and liabilities are converted to New Zealand dollars at the rates of exchange ruling at balance date.

Currency risk in respect of the Group's transactions is managed in accordance with the Group's Treasury policy and includes the use of forward foreign exchange contracts. It is estimated that a 10% decrease in the New Zealand dollar would increase profit and equity by $89k (2023: $83k). It is estimated that a 10% increase in the New Zealand dollar would reduce profit and equity by $72k (2023: $68k).

Cash flow risk

For those currency exposures less certain in their timing and extent, such as future sales and purchases, it is the Group's policy to manage the risk on a group wide basis. Under the Treasury policy the purchased cover is up to 100% depending on how far out the anticipated exposure is (to a maximum of 12 months).

The Group uses foreign currency forward exchange contracts, within the above Treasury policy limits, to manage these exposures.

There has been no change during the year to the Group's exposure to currency risks or the manner in which it measures the risks.

Interest rate risk

The Group has no borrowings and is, therefore, not exposed to interest rate risk other than in relation to its investments, which are not material.

Liquidity risk

Liquidity risk represents the Group's ability to meet its financial obligations on time. The Group generates sufficient cash flows from its operating activities to make timely payments.

Liquidity risk is managed through:

- Monitoring cash flow forecasts (both operational and anticipated non-recurring items) and aligning investment decisions with these
- Compliance with the Treasury policy, which sets a liquidity buffer for unforeseen cash flows
- Monthly review by senior management
- Regular oversight by the Audit and Risk Committee.

There has been no change during the year to the Group's exposure to liquidity risks or the manner in which it manages and measures the risks.

Maturity analysis–financial liabilities

in thousands of New Zealand dollars	On demand	Less than 1 year	Between 1 year and 5 years	Total
2024				
Trade and other payables	-	16,642	-	16,642
	-	16,642	-	16,642
2023				
Trade and other payables	-	22,256	-	22,256
	-	22,256	-	22,256

Fair value

Cash and cash equivalents, trade receivables, other receivables and payables

The carrying amounts of financial assets and financial liabilities recorded at cost in the financial statements approximate their fair value.

Investments

Investments, except for 'other investments', which are valued at fair value, are carried at cost. It is not practical to estimate the fair values of unlisted associates.

Derivative financial instruments

Foreign currency contracts are shown at fair value.

Fair value of financial assets and financial liabilities

in thousands of New Zealand dollars	Note	Loans and receivables	Fair value through profit and loss	Financial liabilities at amortised cost	Carrying amount	Fair value
2024						
Financial assets						
Cash and cash equivalents *		**12,036**	**-**	**-**	**12,036**	**12,036**
Trade and other receivables	10	**30,934**	**-**	**-**	**30,934**	**30,934**
Non-listed equity investments **		**-**	**1,013**	**-**	**1,013**	**1,013**
Listed equity investments **		**-**	**1,780**	**-**	**1,780**	**1,780**
		42,970	**2,793**	**-**	**45,763**	**45,763**
Financial liabilities						
Trade and other payables	11	**-**	**-**	**16,642**	**16,642**	**16,642**
		-	**-**	**16,642**	**16,642**	**16,642**
2023						
Financial assets						
Cash and cash equivalents		10,907	-	-	10,907	10,907
Trade and other receivables	10	37,497	-	-	37,497	37,497
Non-listed equity investments *		-	2,707	-	2,707	2,707
Listed equity investments *		-	1,780	-	1,780	1,780
		48,404	4,487	-	52,891	52,891
Financial liabilities						
Trade and other payables	11	-	-	22,256	22,256	22,256
		-	-	22,256	22,256	22,256

* Cash and cash equivalents includes $178k (2023: $1,911k), which belongs to NZ Agricultural Greenhouse Gas Trust. This fully offsets with the balance owing to NZ Agricultural Greenhouse Gas Trust in trade and other payables.

** Equity investments consist of Fonterra shares $1,390k (2023: $1,541k), FarmIQ Systems Limited investment of $605k (2023: $2,066k) and other investments of $798k (2023: $880k) as per Note 15. The level classification determined is based on the fair value within these investments.

25 Contingencies and commitments

in thousands of New Zealand dollars	2024	2023
Capital commitments		
Lincoln Tuhiraki building capital commitments	**115**	20,135
Other asset purchases committed to and contracted for at balance date	**682**	3,493
Total capital commitments	**797**	23,628

Litigation and other contingent liabilities

There are no known significant contingent liabilities or pending litigation.

Contingent assets

There are no known significant contingent assets in the current year.

26 Capital management

The Group's capital is its equity, which is made up of:

- Share capital
- Asset revaluation reserve
- Retained earnings.

The Crown Research Institutes Act 1992 requires AgResearch Limited to maintain its financial viability in order to undertake research for the benefit of New Zealand.

The Group manages its capital to ensure that entities in the Group will operate in a financially responsible manner, be financially viable and continue as a going concern. The Group is not subject to any externally imposed capital requirements.

The Group's policies in respect of capital management and allocation are reviewed regularly by the Board of Directors.

There have been no material changes in the Group's management of capital during the year.

27 Significant events after balance date

Subsequent to 30 June 2024, the subdivision for the old Lincoln Research Centre site was approved by Selwyn District Council, resulting in the asset being available for sale. As a result, a sale and purchase agreement is now unconditional for a portion of this asset, and the second portion is being actively marketed. This asset did not meet the necessary requirements to be an asset held for sale at 30 June 2024, as the subdivision was approved post balance date. The carrying value of this asset as at 30 June 2024 is $10,850k.

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INDEPENDENT AUDITOR'S REPORT

TO THE READERS OF AGRESEARCH LIMITED'S GROUP
FINANCIAL STATEMENTS FOR THE YEAR ENDED 30 JUNE 2024

The Auditor-General is the auditor of AgResearch Limited Group (the Group). The Auditor-General has appointed me, Anthony Smith, using the staff and resources of Deloitte Limited, to carry out the audit of the financial statements of the Group on his behalf.

Opinion

We have audited the financial statements of the Group on pages 111 to 145, that comprise the consolidated statement of financial position as at 30 June 2024, the consolidated statement of comprehensive income, consolidated statement of changes in equity and the consolidated statement of cash flows for the year ended on that date and the notes to the financial statements that include accounting policies and other explanatory information.

In our opinion, the financial statements of the Group:

- present fairly, in all material respects:
  - its financial position as at 30 June 2024; and
  - its financial performance and cash flows for the year then ended; and
- comply with generally accepted accounting practice in New Zealand in accordance with New Zealand equivalents to International Financial Reporting Standards.

Our audit was completed on 29 August 2024. This is the date at which our opinion is expressed.

The basis for our opinion is explained below. In addition, we outline the responsibilities of the Board of Directors and our responsibilities relating to the financial statements, we comment on other information, and we explain our independence.

Basis for our opinion

We carried out our audit in accordance with the Auditor-General's Auditing Standards, which incorporate the Professional and Ethical Standards and the International Standards on Auditing (New Zealand) issued by the New Zealand Auditing and Assurance Standards Board. Our responsibilities under those standards are further described in the Responsibilities of the auditor section of our report.

We have fulfilled our responsibilities in accordance with the Auditor-General's Auditing Standards.

We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinion.

Responsibilities of the Board of Directors for the financial statements

The Board of Directors is responsible on behalf of the Group for preparing financial statements that are fairly presented and that comply with generally accepted accounting practice in New Zealand.

The Board of Directors is responsible for such internal control as it determines is necessary to enable it to prepare financial statements that are free from material misstatement, whether due to fraud or error.

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In preparing the financial statements, the Board of Directors is responsible on behalf of the Group for assessing the Group's ability to continue as a going concern. The Board of Directors is also responsible for disclosing, as applicable, matters related to going concern and using the going concern basis of accounting, unless the Board of Directors has to cease operations, or has no realistic alternative but to do so.

The Board of Directors' responsibilities arise from the Crown Research Institutes Act 1992.

Responsibilities of the auditor for the audit of the financial statements

Our objectives are to obtain reasonable assurance about whether the financial statements, as a whole, are free from material misstatement, whether due to fraud or error, and to issue an auditor's report that includes our opinion.

Reasonable assurance is a high level of assurance, but it is not a guarantee that an audit carried out in accordance with the Auditor-General's Auditing Standards will always detect a material misstatement when it exists. Misstatements are differences or omissions of amounts or disclosures and can arise from fraud or error. Misstatements are considered material if, individually or in the aggregate, they could reasonably be expected to influence the decisions of readers taken on the basis of these financial statements.

For the budget information reported in the financial statements, our procedures were limited to checking that the information agreed to the Group's statement of corporate intent.

We did not evaluate the security and controls over the electronic publication of the financial statements.

As part of an audit in accordance with the Auditor-General's Auditing Standards, we exercise professional judgement and maintain professional scepticism throughout the audit. Also:

- We identify and assess the risks of material misstatement of the financial statements, whether due to fraud or error, design and perform audit procedures responsive to those risks, and obtain audit evidence that is sufficient and appropriate to provide a basis for our opinion. The risk of not detecting a material misstatement resulting from fraud is higher than for one resulting from error, as fraud may involve collusion, forgery, intentional omissions, misrepresentations, or the override of internal control.

- We obtain an understanding of internal control relevant to the audit in order to design audit procedures that are appropriate in the circumstances but not for the purpose of expressing an opinion on the effectiveness of the Group's internal control.

- We evaluate the appropriateness of accounting policies used and the reasonableness of accounting estimates and related disclosures made by the Board of Directors.

- We conclude on the appropriateness of the use of the going concern basis of accounting by the Board of Directors and, based on the audit evidence obtained, whether a material uncertainty exists related to events or conditions that may cast significant doubt on the Group's ability to continue as a going concern. If we conclude that a material uncertainty exists, we are required to draw attention in our auditor's report to the related disclosures in the financial statements or, if such disclosures are inadequate, to modify our opinion. Our conclusions are based on the audit evidence obtained up to the date of our auditor's report. However, future events or conditions may cause the Group to cease to continue as a going concern.

- We evaluate the overall presentation, structure and content of the financial statements, including the disclosures and whether the financial statements represent the underlying transactions and events in a manner that achieves fair presentation.

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- We obtain sufficient appropriate audit evidence regarding the financial statements of the entities or business activities within the Group to express an opinion on the consolidated financial statements. We are responsible for the direction, supervision and performance of the Group audit. We remain solely responsible for our audit opinion.

We communicate with the Board of Directors regarding, among other matters, the planned scope and timing of the audit and significant audit findings, including any significant deficiencies in internal control that we identify during our audit.

Our responsibilities arise from the Public Audit Act 2001.

Other Information

The Board of Directors is responsible for the other information. The other information comprises the information included on pages 1 to 110, but does not include the financial statements, and our auditor's report thereon.

Our opinion on the financial statements does not cover the other information and we do not express any form of audit opinion or assurance conclusion thereon.

In connection with our audit of the financial statements, our responsibility is to read the other information. In doing so, we consider whether the other information is materially inconsistent with the financial statements, or our knowledge obtained in the audit, or otherwise appears to be materially misstated. If, based on our work, we conclude that there is a material misstatement of this other information, we are required to report that fact. We have nothing to report in this regard.

Independence

We are independent of the Group in accordance with the independence requirements of the Auditor-General's Auditing Standards, which incorporate the independence requirements of Professional and Ethical Standard 1: *International Code of Ethics for Assurance Practitioners* issued by the New Zealand Auditing and Assurance Standards Board.

Other than the audit, we have no relationship with, or interests in, the Group.

Anthony Smith
Partner
for Deloitte Limited
On behalf of the Auditor-General
Christchurch, New Zealand

29 August 2024

Directory

Senior Leadership Team

Dr Sue Bidrose
Chief Executive Officer

Stuart Hall
Deputy Chief Executive, Commercial Partnerships

David Williams
Director Finance and Business Performance (Acting)

Fleur Evans
Director People and Culture

Greg Rossiter
Director Information Technology

Ariana Estoras
Director Māori Research and Partnerships

Dr Sara Edwards
Director Research Operations

Dr Marie Bradley
Director Strategy and Communications

Dr Dave Houlbrooke
Director Research Capability

Dr Axel Heiser
Chief Scientist

Board of Directors

Dr Paul Reynolds QSO
Chair

Kim Wallace
Deputy Chair
Chair – Audit and Risk Committee

Dr Louise Cullen
Chair – People and Culture Committee

Rukumoana Schaafhausen
Director

Mary-Anne Macleod
Director

Jessie Chan
Director

Information

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Deloitte Limited on behalf of the Auditor-General

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