Research to Reality

Practical science for dairy farmers

27 APRIL | HAMILTON

Your name

DairyNZ FARMERS' FORUM 2023

CONTENTS

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Welcome to DairyNZ's Farmers' Forum 2023

Our DairyNZ team are excited to welcome you to Farmers' Forum.

This year's theme is from Research to Reality — and will focus on sharing the latest practical science to support farmers.

We know that farmers are facing many challenges — from rising inflation, to changing environmental requirements, to staffing shortages and the need to reduce greenhouse gas emissions in the future.

We want to stay ahead of the game by understanding and adopting new science, technology, and farming practices so we can remain the world's best dairy farmers in the coming decades.

Our science team are working closely with farmers to develop real world solutions to help Kiwi dairy farmers remain world leading.

Some of the key research areas you can hear about in information sessions today include options to reduce methane emissions, using plantain to reduce N loss, strategies to remain profitable in a high inflation environment and harnessing new technology.

Foresight practitioner Melissa Clark-Reynolds will be providing insights into signals and emerging trends for the dairy sector.

Our science team will also be sharing short snapshots on a range of research projects we have underway, including research to boost cow fertility, improve animal wellbeing and address environmental challenges.

We're looking forward to connecting with you, and I invite you to chat with our scientists and our wider DairyNZ team on any topics that interest you.

Ngā mihi,

Tim Mackle
Chief Executive | DairyNZ

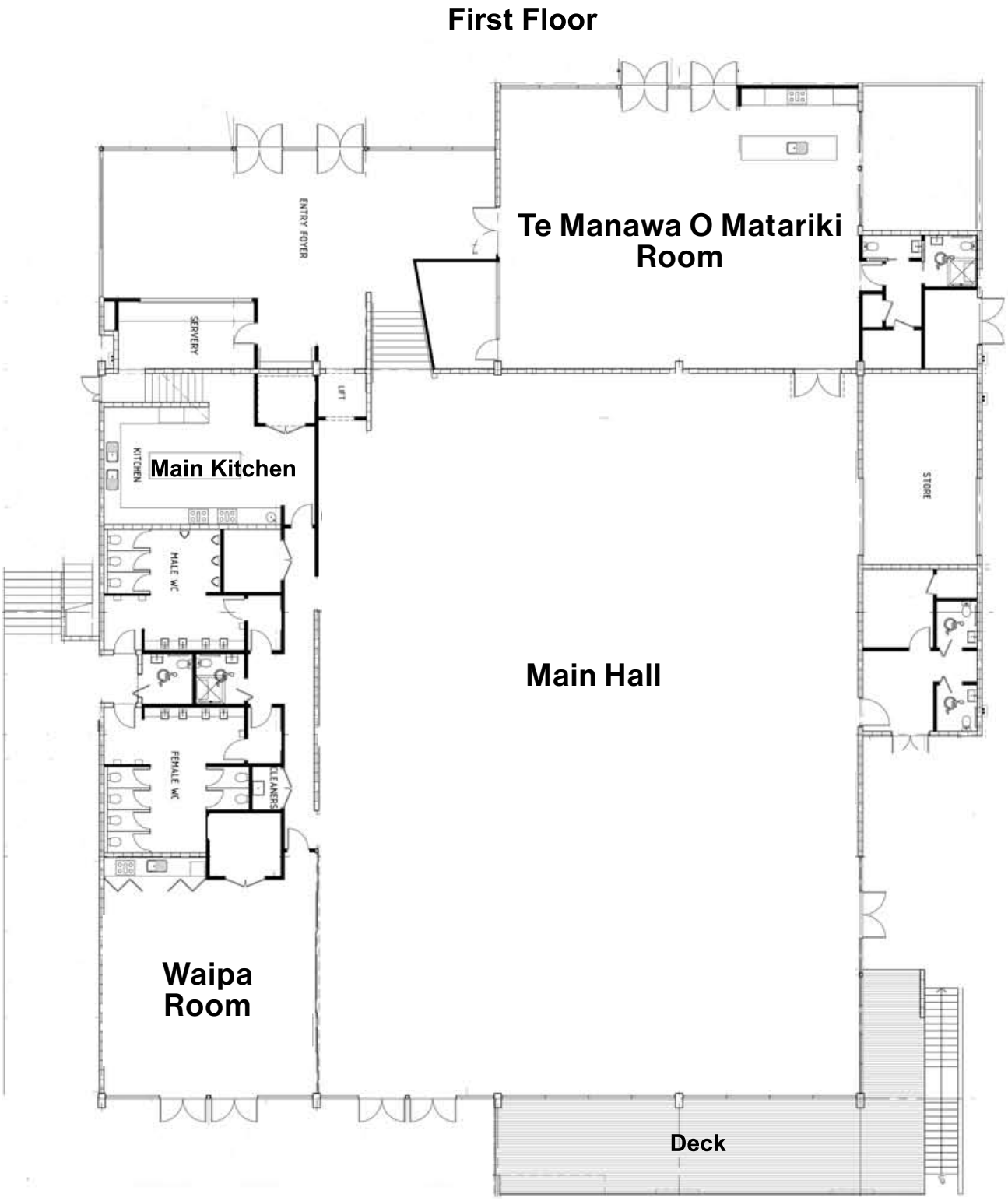
Programme

9.00am	Registration and morning tea	
9.30am	Welcome and housekeeping	Rowena Duncum (MC)
9.40am	Opening address	Jim van der Poel, *DairyNZ Chair*
9.50am	Headwinds and Tailwinds — challenges and opportunities for dairy	Melissa Clark-Reynolds, *Foresight Practitioner and Strategist*
10.25am	Science-based solutions — now and the future	Bridget Maclean, *General Manager, New Systems & Competitiveness, DairyNZ*
11.00am	Break	
11.20am	**Speed Science**	
	1. Better breeding worth, the next generation of genetic evaluation	Andrew Fear
	2. Boosting reproduction through new measures to better predict cow fertility	Dr Susanne Meier
	3. Addressing heat stress in dairy cattle	Dr Kirsty Verhoek
	4. Strategies to minimise the impact of climate change on animals	Dr Jenny Jago
	5. Evaluating animal welfare in our current and future farming systems	Dr Jenny Jago
	6. Low N systems — stacking nitrogen mitigation options for transformational impact	Dr Claire Phyn
	7. Measuring and improving stream ecosystem health in dairy catchments	Dr Craig Depree
	8. Can automated in-paddock supplement feeders help deliver methane inhibitors to grazing cows?	Dr Elena Minnee
	9. Te Whenua Hou, Te Whenua Whitiora — the new land, the new horizon. Regenerating agriculture for Ngāi Tahu Farming	Dr Ina Pinxterhuis
	10. What we've learned from the Forage Value Index validation trial	Dr Wendy Griffiths

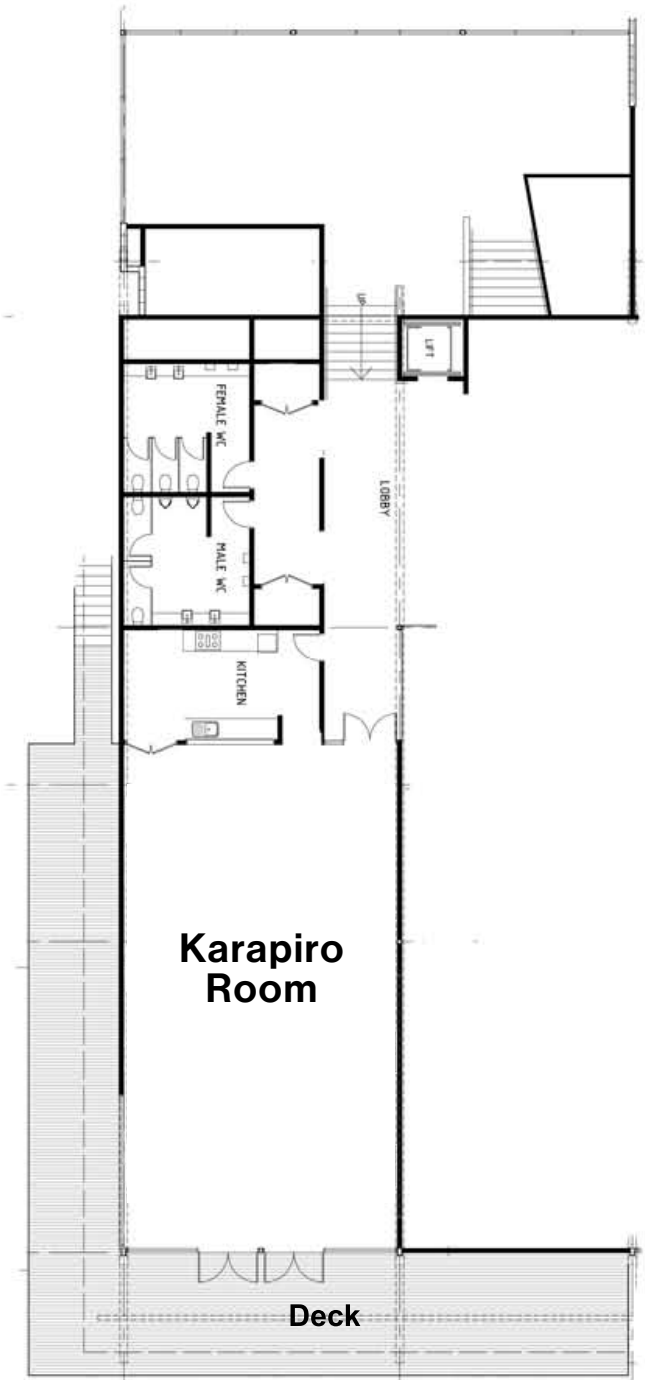
11.50am	**Science Expo and Lunch** Science projects displayed and an opportunity to connect directly with the scientists and researchers.	
12.50pm	**Information sessions - Round 1** (Choose 1 option from below)	
	1. Designing internationally competitive farming systems for the future	Dr Paul Edwards *(Te Manawa O Matariki Room)*
	2. Strategies for remaining profitable in a high inflation environment	Paul Bird *(Main Hall)*
	3. Can technology help solve farming challenges? Making the most of technology investments for your farm	Dr Callum Eastwood and Brian Dela Rue *(Karapiro Room - upstairs)*
1.40pm	**Information sessions - Round 2** (Choose 1 option from below)	
	1. Changing the job: Improving workplace productivity and attractiveness for the whole farm team	Dr Callum Eastwood and Dr Paul Edwards *(Karapiro Room - upstairs)*
	2. Working together to reduce N loss — how plantain can help	Kate Fransen *(Te Manawa O Matariki Room)*
	3. Getting fit for the future — tackling the challenge of reducing greenhouse gas emissions on-farm	Dr Elena Minnee *(Main Hall)*
2.30pm	DairyNZ summary	Brigitte Meier, *DairyNZ Regional Leader, Waikato*
2.40pm	Wrap-up	Rowena Duncum
2.50pm	**Afternoon tea** Scientists available for further discussion	

Venue map

Don Rowlands Centre



Second Floor



Meet your host, opening and keynote speakers

Rowena Duncum — your host

From 'The Country'

Rowena Duncum is a passionate advocate for the agricultural industry. A former dairy farmer and 2013 Taranaki Farm Manager of the Year, she hung up the milking apron and swapped her red bands for radio in 2016 to become Executive Producer of The Country – NZME's long-standing rural radio show, hosted by Jamie Mackay. Outside of work, Rowena presents a fortnightly rural update on TV3's Early AM Show and is the sideline commentator for Dunedin-based Super Rugby and NPC games. She is also the current Runner-Up World Boot-Throwing Champion (I promise you — this is a thing!) and is on the board of the NZ Boot Throwing Association (again, this is a thing!), New Zealand Masters Games — Dunedin and the Whanganui Rugby Football Union, plus a former chair of Women in Sport Otago.

Jim van der Poel — Opening speaker

DairyNZ Chair

DairyNZ chairman Jim van der Poel was elected onto the Fonterra board in 2002 and stepped down in 2014. Jim also served on the board of New Zealand Co-operative Dairies Ltd.

In 2000, Jim was appointed to the foundation board of DairyNZ's predecessor organisation, Dexcel, and was elected as Dexcel's chairman in 2003. Jim was a farmer-elected director on DairyNZ's first board in 2007 and stepped down in 2009. He was re-elected to the DairyNZ board in 2013.

Previously, Jim was an inaugural director on the Fonterra Shareholders Fund and has won a number of industry awards including the AC Cameron Award, 2002 Nuffield Scholarship, Sharemilker of the Year and Dairy Exporter Primary Performer Award.

Jim and his wife Sue live in Ngahinapouri in the Waikato and have farming interests in Waikato, Southland, Canterbury and the United States.

Melissa Clark-Reynolds — Keynote speaker

Foresight practitioner and strategist

Melissa Clark-Reynolds became a Foresight Practitioner and Professional Director after 25 plus years' experience as an entrepreneur and CEO of a number of technology companies.

She was awarded the ONZM for Services to Technology in 2015. Melissa is a director of Atkins Ranch Lamb and Alpine Energy, and on the Advisory Board of Flux Federation, with previous roles including deputy chair of Radio NZ, Chair of Little Yellow Bird, and the first independent director on Beef and Lamb NZ.

Melissa works with food companies to execute transformational strategies, through futurecentre.nz. A beekeeper and keen gardener, she tweets as @HoneyBeeGeek.

Bridget Maclean – Keynote speaker

General Manager for New Systems and Competitiveness, DairyNZ

Bridget leads a team of research farm staff, technicians, scientists, modellers and economists who provide farmers with new solutions to remain competitive, responsible and resilient.

Bridget previously held the role of Head of Science at DairyNZ before being promoted into the General Manager role in May 2022.

She has worked in research management in agricultural science organisations for more than 25 years, including with Ballance, Waikato Regional Council and Fonterra. At Fonterra she led pre-manufacture research as General Manager On-Farm Research and Development before joining the DairyNZ team in 2020. Bridget has a Bachelor of Agricultural Science (Hons), Agronomy and Crop Science from Massey University.

Meet DairyNZ's science presenters

DairyNZ invites you to chat with our science team presenters over morning tea, lunch and afternoon tea. Our team are keen to share their research with you and answer your questions.

DairyNZ speed science presenters

Andrew Fear

Manager New Zealand Animal Evaluation Limited (NZAEL)

Andrew leads New Zealand Animal Evaluation Limited (NZAEL) - a subsidiary of DairyNZ that manages the national breeding objective for New Zealand dairy cows. Andrew previously worked as General Manager for two New Zealand based HRL businesses: Analytica Laboratories and Precise Consulting & Laboratory. Andrew also worked for LIC for 17 years, where his roles included working as the General Manager of Operations and Service.

Dr Susanne Meier

Science Lead

Susanne has a technical background in understanding dairy cows – focussing on how the animal is managed and performs, how genetics help achieve farmer goals, and how farm systems can be improved to achieve better animal and farm system outcomes. She has long history of supporting New Zealand dairy farmers by researching and delivering solutions that can be applied on-farm.

Dr Kirsty Verhoek

Senior Scientist

Kirsty works across a number of research areas including heat stress, less methane, Frontier Farms, Southern Dairy Hub wintering infrastructure, and cow nutrition. She is also a 50/50 sharemilker on a farm with 750 cows.

Dr Jenny Jago

Principal Scientist

Jenny is a part of the team researching the animal welfare risks and opportunities in our farming systems, adapting to climate change, and the role of technology in supporting modern workplaces. Jenny has worked in research and strategy and investment roles at DairyNZ. She has also been a representative on International Dairy Federation committees for farm management, and animal health and welfare.

Dr Claire Phyn

Principal Scientist

Claire leads DairyNZ's 'Low N Systems' project. Her work has ranged from farm systems research into once-a-day milking, to investigating the biology underpinning cow health and productivity during the transition period. Claire previously led the multi-organisation 'Pillars of a New Dairy System' research programme. This programme developed genetics and management solutions to improve dairy cow fertility, health and longevity.

Dr Craig Depree

Principal Scientist Water Quality

Craig is responsible for developing DairyNZ's water quality research programme, and often leads freshwater science evidence preparation in plan change hearings and the environment court. Craig came to DairyNZ after spending 18 years as a water quality scientist at NIWA.

Dr Elena Minnee

Senior Scientist

Elena is currently involved in forage, methane mitigation, and climate adaptation research programmes. She is part of the research team developing and testing technologies for dairy farmers to reduce enteric methane emissions. Their aim is to create solutions that are safe, effective, and adoptable on New Zealand pasture-based farms.

Dr Ina Pinxterhuis

Principal Scientist

Ina is interested in participatory research and co-innovation to enable science to help farmers adapt to changing demands from society and environmental regulations. Her research areas of interest include farm system research, with a focus on nutrient management, co-development and stakeholder participation and multi-stakeholder processes. Ina is also interested in regional development, grassland ecology, and organic and regenerative farming.

Dr Wendy Griffiths

Senior Scientist

Wendy has been at the grassroots of DairyNZ's Forage Value Index research, which remains a big part of her current work. Her research interests lie in the ecology and management of grazing systems and the impact of climate variability on farm system performance.

DairyNZ information session presenters

Paul Bird

Lead Advisor Responsible Dairy

Paul has been involved in developing and delivering DairyNZ's Mark and Measure business courses. His recent work includes key success factors for contract milkers and variable order sharemilkers. Paul has previously worked as a rural banker, and a consulting officer and farm advisor in Ireland and the United Kingdom.

Brian Dela Rue

Research Engineer

Brian's focus is on studying technology adoption, workplace design and productivity, reducing injuries on-farm, future farms systems, and novel off-paddock wintering system design. His research areas of interest include applications of technology and labour productivity on dairy farms.

Dr Callum Eastwood

Senior Scientist

A social scientist, Callum leads projects on workplace design, workplace productivity, reducing dairy sprains and strains, and technology adoption. His research areas of interest include people in dairy, use of new technologies and tech innovation in dairy systems, effective co-design in agriculture, and integrating data into farm decision making.

Dr Paul Edwards

Science Lead, Senior Scientist

Paul is a farm systems scientist who works with farmers and stakeholders to maximise the value and applicability of new knowledge. His research areas of interest include extended milking intervals, milking efficiency, dairy design and type, technology use on farms, farm systems and sustainability.

Kate Fransen

Senior Project Manager

Kate's focus is on plantain research and water quality. Kate comes from a farming background and is passionate about working with scientists and farmers to develop systems that work to meet environmental and profit outcomes. Kate has led several large farm systems research, development and extension initiatives in New Zealand and Australia.

Dr Elena Minnee

Senior Scientist

Elena is currently involved in forage, methane mitigation, and climate adaptation research programmes. She is part of the research team developing and testing technologies for dairy farmers to reduce enteric methane emissions. Their aim is to create solutions that are safe, effective, and adoptable on New Zealand pasture-based farms.

Better breeding worth, the next generation of genetic evaluation

For over a decade farmers have used DNA to predict traits to identify good bulls faster, rather than waiting for offspring. NZAEL, a subsidiary of DairyNZ is currently working to include genomic information in their animal evaluation to build a better breeding worth (BW) for bulls, and help farmers boost profitability.

Current State of Play

Genomics uses DNA from animals to determine parentage and estimate breeding values for the traits that make up breeding worth.

NZAEL believes that the inclusion of genomics into its evaluation system is needed to help improve genetic gain rates in herds. Ideally, all of New Zealand's existing genomics information would be included in NZAEL's animal evaluation system to calculate BW. This system needs to be independent, fair, and accurate and we will consult with the industry to find the right way to achieve this.

We will generate a genomic informed cow BW and expect it to be delivered for the sector.

NZAEL is in the process of collecting 40,000 genotypes and phenotypes to help build and test this BW model. Farmers across New Zealand are part of the collection process.

What's next

NZAEL is also working on data quality standards to improve the precision of bull BW. This will help give farmer's greater confidence in the accuracy of animal evaluation over time.

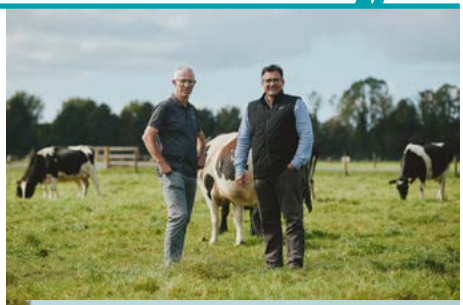
NZAEL will include genomics in its breeding worth.

How this will help farmers

Including all genomic information from New Zealand dairy farms into a single BW measure will help us achieve a better rate of genetic gain.

Using one BW measure for bulls will allow farmers to compare bulls using the same data, and decide which will help them achieve their farm goals. By using the most efficient animals, farmers can maximise their profits.

Using genomics will help the dairy sector become more agile and resilient. For example, farmers can more easily refocus on breeding for environmental traits rather than production traits if required.



PROJECT LEAD

Andrew Fear

NZAEL Manager

Andrew has 17 years' experience in the dairy sector. Andrew was responsible for the delivery of LIC services to farmers. He brings both sector and commercial experience to NZAEL.

"Being able to return to the dairy sector to add value really drives me.

Genetics is important for farmers as it's one of the best opportunities to improve profit and efficiency.

Genomics has been used successfully in other countries and NZAEL is working to help NZ farmers take advantage of it here.

Boosting reproduction through new measures to better predict cow fertility

As part of a programme to improve herd reproduction performance, we are studying two heifer traits that could provide early measures of cow fertility. This will improve on current methods which use mating and calving records during lactation.

What we've learned so far

Both 'puberty' and 'heifer reproductive' measures are potential early predictors of later cow fertility. This research is measuring these traits in heifers and their link to animal fertility when lactating. The research aims to ensure farmers have the right cows to be profitable and sustainable through current and future challenges.

Trial Phase 1: focused on Holstein-Friesian heifers, with over 5,000 heifers born in 2018 enrolled, from 54 herds.

Trial Phase 2: currently includes 5,000 2022-born Jersey heifers from 53 herds. The trial is currently in the data collection phase of research.

What's next

We are planning to complete data collection from the Jersey group when they calve in mid-2024. We should have a better understanding of results in 2025.

How are farmers involved

Farmer involvement is critical to the success of this research as investigating new phenotypes requires large numbers of animals.

For this study farmers and their graziers are giving us access to their heifers twice over two months. We're taking body measurements and a DNA tissue sample.

How this will help farmers

Our aim is to improve how we identify sires with high fertility genetics (Fertility Breeding Value). They will pass the DNA for high fertility onto their daughters, leading to improvements in herd reproduction performance. Better herd reproduction performance will mean cows are easier to get in calf, achieving higher 6-week in-calf rates.

PROJECT SCIENCE LEAD

Susanne Meier

Science Lead

Susanne has a long history supporting New Zealand dairy farmers, researching and delivering solutions that can be applied on-farm. She has a technical background in understanding dairy cows – focussing on how the animal is managed and performs, how genetics help achieve farmer goals, and how farm systems can be improved to achieve better animal and farm system outcomes.

There will be future opportunities for farmers to become involved in similar research in future.

If you are interested in being involved, email **susanne.meier@dairynz.co.nz**. See **dairynz.co.nz/pillars** for more on this project or visit here. →

To listen to a two part podcast on improving your herd fertility (episodes 18 and 21) visit here. →

Addressing heat stress in dairy cattle

Heat stress negatively affects dairy cows in many ways; it causes discomfort, lowers cows' milk production, and it is an increasing problem due to global warming. DairyNZ is researching methods of identifying when heat stress might occur to help farmers manage their herds and lessen its impact.

What we've learned so far

One of the most visible signs of heat stress in dairy cattle is heavy breathing or panting, which is a way for cows to cool themselves. Together with AgResearch and Fonterra, we have developed a grazing heat load index tool to assess the potential heat stress risks in dairy cattle grazing pasture. So far most of the research has taken place in the Waikato.

Visit **dairynz.co.nz/heatstress** for more.

What's next

We are widening the scope of our research to:

- refine and increase the accuracy of the grazing heat load index by collecting data from more locations and conditions, and
- investigate the use of existing on-farm technology to identify indicators of heat stress before and after it occurs. Technology will allow us to gather data from larger herds without needing to manually observe cow respiration.

Grazing Heat Load Index

We are developing a grazing heat load index for New Zealand to predict which weather conditions will create heat stress events. We are also looking at how we can use this information to help farmers improve animal welfare.

We are collecting data from farms across New Zealand and have existing on-farm sensor technology. In the future we hope to use the grazing heat-load index and the sensor technology to better understand how effective different mitigation measures are.

How this will help farmers

The results of this research will help us to develop digital technologies that monitor and inform farmers when cows are likely to experience heat stress, so they can take preventative action.

PROJECT SCIENCE LEAD

Dr Kirsty Verhoek

Senior Scientist

Kirsty is part of the DairyNZ team working on developing farm systems and sector scale solutions for farmers to be competitive, responsible and locally and globally resilient. Kirsty has a PhD in ruminant nutrition and greenhouse gas emissions. She is also a sharemilker. She works with DairyNZ's research teams on a number of projects.

"Heat stress in cows is a major seasonal problem in NZ. Digital technologies can give us the ability to detect or predict the onset of heat stress and provide us with an exciting opportunity to improve animal welfare.

More about this research

This work is a part of the New Zealand Bioeconomy in the Digital Age (NZBIDA) programme, a four-year collaboration with AgResearch and Fonterra, which aims to use digital technologies to provide new solutions to issues for farmers.

Strategies to minimise the impact of climate change on animals

We have not previously had a good understanding of how predicted changes to climate will affect cow health and welfare. DairyNZ is summarising existing knowledge on this topic, and identifying research and development gaps. We're also identifying potential strategies to reduce the negative impacts of climate change on cows while strenghthening the sectors resilience to climate change.

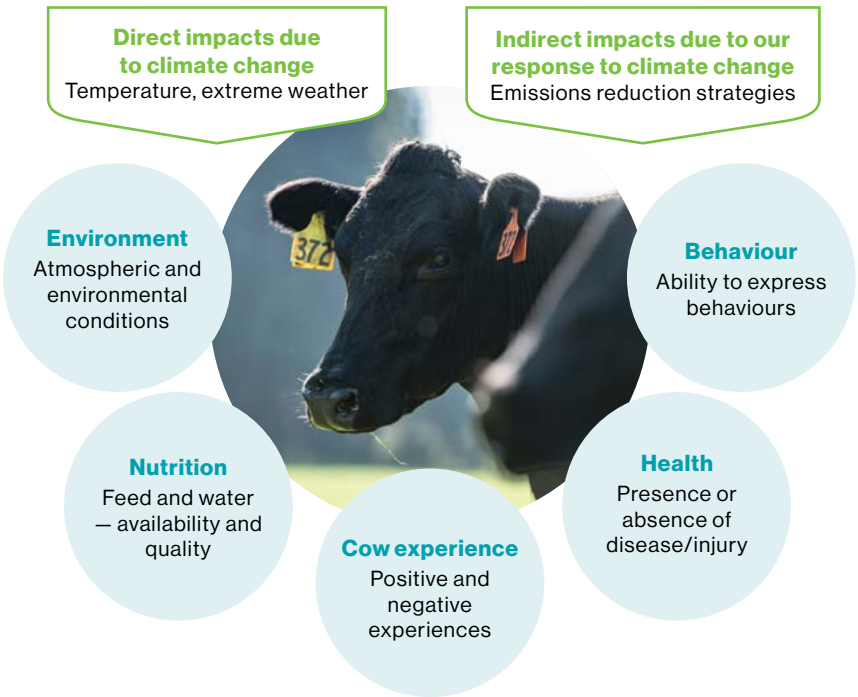
What we've learned so far

We have identified the following high-level strategies that can help manage and reduce climate change impacts on cows:

- ensure the effects of greenhouse gas mitigations on animal welfare are considered during their development
- engage with the public and end users to ensure solutions to reduce climate change effects and weather variability are accepted by consumers and communities
- identify and measure areas where improving animal health can contribute to reducing greenhouse gas emissions from dairy production
- ensure those supporting farmers to develop and manage their farm systems understand what good quality of life for dairy cows looks like
- ensure effective surveillance of animal disease, monitoring of welfare outcomes and farm system performance in response to climate change and greenhouse gas mitigations.

What's next

Continue to research climate change impacts and adaptation, especially farm system performance. We will use this information to influence policy development at a national level and implement research that contributes to positive outcomes for dairy farmers over the longer term.



How this will help farmers

This research is being shared with industry leaders, researchers, and policy developers to inform future policy as they shape the dairy sector response to climate change.

SCIENCE LEAD

Jenny Jago

Principal Scientist

Jenny is a part of the teams researching the animal welfare risks and opportunities in our farming systems, adapting to climate change, and the role of technology in supporting modern workplaces.

Jenny has worked in research, strategy and investment roles at DairyNZ. She has also been a representative on International Dairy Federation committees for farm management, and animal health and welfare.

Evaluating animal welfare in our current and future farming systems

New Zealand pasture-based dairy farms have many advantages, like being outdoors and grazing pasture which meets expectations around cows living a 'natural' lifestyle and achieving good animal health and welfare outcomes. However, there are still risks we need to manage to ensure cows can stay comfortable through extreme hot and wet weather.

What we've learned so far

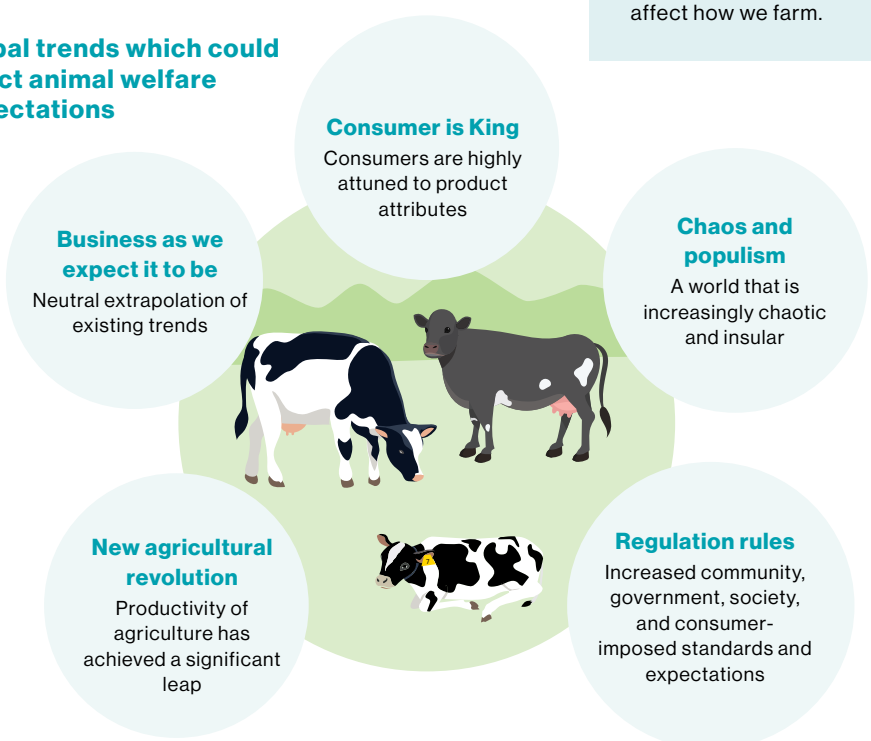
Through this DairyNZ research project, led by Perrin Ag, we have:

- developed a way to describe and compare global farm systems, based on features that affect cow welfare
- considered likely future influences on our production systems, how they might change, and what this might mean for animal welfare. This includes identifying where New Zealand dairy farms have an advantage, and issues we need to address to maintain animal welfare in the future.

What's next

DairyNZ plans to continue to assess emerging trends affecting animal welfare, so that we build our understanding of how global challenges may affect how we farm.

Global trends which could affect animal welfare expectations



PROJECT SCIENCE LEAD

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Jenny has worked in research, strategy and investment roles at DairyNZ. She has also been a representative on International Dairy Federation committees for farm management, and animal health and welfare.

How this will help farmers

This research will assist planning in the dairy sector to help farmers maintain their reputation for providing high standards of animal care and innovation. This will be critical to enable our farming systems to stay internationally competitive and meet changing expectations.

Low N Systems

Stacking nitrogen mitigation options for transformational impact

The DairyNZ-led, Low N Systems research programme investigates stacking (or combining) management strategies and mitigation technologies on dairy farms to deliver reductions in nitrate leaching of over 40%.

Project Overview

We are designing and setting up a farmlet trial to demonstrate how a profitable and practical stacked Low N system can significantly reduce nitrogen losses.

We are using a combination of tactical management practices and mitigation strategies. For example, combining lower N fertiliser use, diverse pastures containing plantain and Italian ryegrass, and wintering on pasture and baleage instead of crops.

We are also working with 38 farmers in Waikato and Canterbury to understand key management factors that influence bulk milk composition in relation to the herd's dietary N throughout the milking season.

What's next

The farmlet trial will start in the spring of 2023 at Lincoln University Research Dairy Farm.

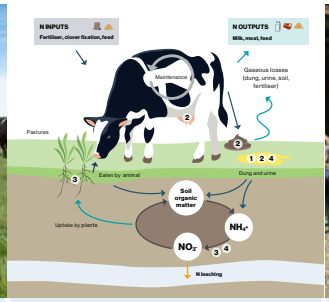
How this will help farmers

- Using a suite of complementary mitigation strategies and tactical management options will help farmers to improve nitrogen use efficiency, reduce excess N loss, and improve water quality in dairy catchments.
- Our bulk milk investigation will help develop a milk-based indicator tool farmers can use to manage their herd's nitrogen surplus and reduce the risk of urinary N losses.

Nitrogen optimisation

Develop a real-time milk-based indicator to monitor excess N & reduce urinary N loss risk

Stacking technologies



Modelling, measuring & achieving N leaching reductions of over 40-60%

Stakeholder engagement

Facilitating adoption of stacked low N systems

PROJECT SCIENCE LEAD

Dr. Claire Phyn

Principal Scientist

Claire has over 20 years' experience in dairy science. Her work has ranged from farm systems research into once-a-day milking to investigating the biology underpinning cow health and productivity during the transition period. Claire previously led the multi-organisation "Pillars of a New Dairy System" research programme. This developed genetics and management solutions to improve dairy cow fertility, health and longevity.

More about this research

Low N Systems is funded through DairyNZ, and by the Ministry for Business, Innovation, and Employment with co-funding and in-kind support from Fonterra and CRV. The programme started in mid-2021 and runs until 2025. DairyNZ is collaborating with Lincoln University, Fonterra, AgResearch, and AbacusBio on this research.

Measuring and improving stream ecosystem health in dairy catchments

Indicators of aquatic life are new measurements within the national policy for freshwater management . Our research aims to improve the way farmers and the sector assess and report ecosystem health in pastoral streams. It also aims to highlight the positive effects of on-farm riparian planting on stream ecosystem health.

What we've learned so far

This project is relatively new, but farmers and catchment groups can now use state-of-the-art monitoring that detects fish, insects, microbes, aquatic plants, terrestrial plants and even birds from their genetic material being present in stream water. This genetic material (unique to each organism) is called environmental DNA (or eDNA for short). This method is useful to provide an overall measure of stream condition or 'ecosystem health'.

Farmers in the Tararua catchment have found information from eDNA more informative than conventional water quality monitoring results.

What's next

By mid 2023 DairyNZ will have a report completed presenting evidence that riparian planting and restoration is one of the most effective on-farm actions to help improve stream habitat and ecosystem health in agricultural catchments.

All living things in or near streams can add traces of genetic material to the water (scientists call this genetic material environmental DNA or eDNA).

Sampled eDNA provides a list of all living things and a measure of overall stream health.

How this will help farmers

Farmers are stewards of the land and want to see healthy local streams. This project will provide farmers with a low cost, scientifically robust method to assess and monitor ecosystem health in their local streams and rivers. This project will provide a strong evidence base to inform council limit setting processes by providing robust information on the factors contributing to ecosystem health. It will also show how riparian planting and restoration can significantly improve stream health.

Tararua farmers being shown how to deploy eDNA sampler

PROJECT SCIENCE LEAD

Dr Craig Depree

Principal Scientist

Craig Depree came to DairyNZ four years ago, after spending 18 years as a water quality scientist at NIWA. He leads DairyNZ's freshwater programme, and the preparation of scientific evidence for regulatory processes.

"Through this project we want to develop better measures of stream ecological health that reflect community and farmer values around freshwater."

How are farmers involved

Currently, DairyNZ has farmers monitoring stream ecosystem health using eDNA in Manawatū -Whanganui, and the Pokaiwhenua catchment (Waikato).

Using automated in-paddock supplement feeders to deliver methane inhibitors

We've been working with the New Zealand Agricultural Greenhouse Gas Research Consortium (NZAGRC) on developing practical and cost-effective ways for farmers to reduce greenhouse gases. Some promising methane inhibitors have been identified, and the next step is to find effective ways of delivering them to dairy cows, like re-purposing in-paddock feeders to deliver methane inhibitors in supplementary feed.

What we've learned so far

In this two-year study DairyNZ looked at how animals used the feeders, their potential for farm systems integration, and economic feasibility. We discovered:

- cows will readily use in-paddock feeders
- very dominant cows can steal other cows' supplement which compromises the feeder's precision needed for safely reducing methane emissions
- supplementary feed cost and herd size affect this delivery mechanism's economy viability. Farms with herds sized close to the machine's capacity may find this option more affordable.

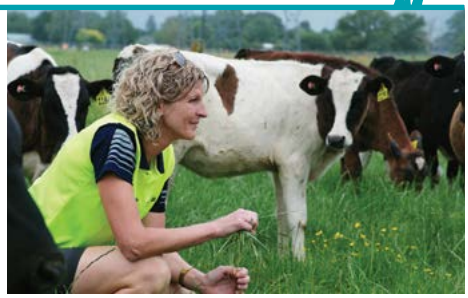
What's next?

This research found that it was challenging to deliver a supplementary feed containing inhibitors to grazing livestock precisely and frequently enough for safe and effective methane reduction.

The next step is to identify ways of overcoming this issue, and research will continue to look at alternative ways to deliver compounds to reduce emissions.

How have farmers been involved

DairyNZ's team ran workshops to gain farmer feedback on this delivery mechanism, this feedback helped design this research and develop this technology. Farmers will continue to be involved in designing future methane mitigation solutions.



More about this research

To find out more about about this research programme, visit **dairynz.co.nz/lessmethane**

PROJECT SCIENCE LEAD

Dr Elena Minnee

Senior Scientist

Elena has a PhD from Lincoln University and is currently involved in forage, methane mitigation, and climate adaptation research programmes.

She is in the research team developing and testing methods for dairy farmers to reduce enteric methane emissions. Their aim is to create solutions that are safe, effective, and adoptable on farms.

Regenerative agriculture for Ngāi Tahu Farming

Te Whenua Hou Te Whenua Whitiora - the new land the new horizon is a regenerative agriculture project that aims to develop a future-proof dairy farm system that incorporates mātauranga Māori (indigenous knowledge).

What we aim for

The goal of the project is to develop a system which has positive impacts on soil, staff, animals, and the environment (in comparison with a conventional system) including:

- halving the nitrate load and concentration from the root zone,
- reducing irrigation use by 20%,
- reducing greenhouse gas emissions by 20%,
- improving animal health and wellbeing,
- improving staff health and wellbeing,
- retaining productivity levels, and
- setting the foundation for regenerative dairy farming systems that produce high-value milk products.

The project will apply principles and practices from mātauranga Māori and regenerative agriculture on a commercial dairy farm.

What's next

The regenerative and conventional farms currently undertake baseline measurements and prepare the infrastructure. Monitoring will start in the 2023/24 season and will run for seven years.

How this will help farmers

This project aims to utilise mātauranga Māori and regenerative principles to demonstrate positive system changes which farmers can assess and potentially incorporate into their own systems.

The research farm is 286 ha, milking 915 cows. Its performance will be compared with the adjacent 325 ha conventional farm, milking 1040 cows. The farms are on a stony soil in Canterbury, north of the Waimakariri river.

PROJECT SCIENCE LEAD

Dr. Ina Pinxterhuis

Principal Scientist

Ina Pinxterhuis gained a PhD from Wageningen University (The Netherlands) from research she conducted at AgResearch Grasslands. She joined DairyNZ's research team nearly twelve years ago.

According to the Regenerative Agriculture Foundation, any practice that makes the land, community and bottom-line healthier year after year is regenerative. I like this viewpoint – it encourages farmers to experiment, observe, and learn how to improve their farm, and it doesn't prescribe or preclude particular actions.

More about this research

The project is led by Ngāi Tahu Farming in partnership with Ngāi Tūāhuriri. It is co-funded by Ngāi Tahu Farming and MPI's Sustainable Food and Fibre Futures Fund. DairyNZ is collaborating with Manaaki Whenua – Landcare Research, AgResearch, Soil Connection, and the AgriBusiness Group to deliver the research.

What we've learned from the Forage Value Index validation trial

The Forage Value Index (FVI) is a tool designed to help farmers select the best-performing ryegrass cultivars for their region. Our 4 year trial validating the FVI under typical farm management conditions predicted high-FVI cultivars would generate more profit through better alignment of pasture supply and demand.

What we've learned so far

DairyNZ completed a four-year farm systems trial in the Waikato in 2022. Pastures were sown with either high-FVI (4 and 5 star, late-flowering) or low-FVI (1 and 2 star, mid-flowering) diploid perennial ryegrass. All cultivars were sown with white clover and contained AR37 endophyte.

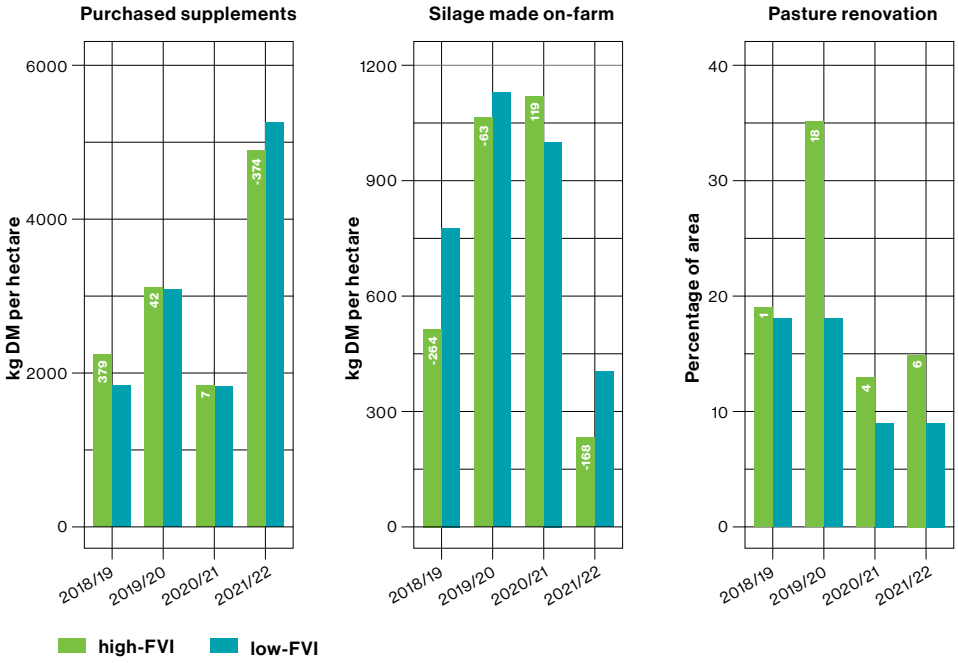
There were differences in the gross margin (milk revenue minus direct costs associated with production) between high - and low-FVI farmlets, but these were not significant.

During the first three seasons, milk production and revenue were similar for all farmlets. However, the high-FVI farmlets incurred more costs than predicted from purchased supplementary feed, silage harvested, and pasture renovation. Tactical management changes were made in the final season in attempt to better capture the dry matter grown. The high-FVI farmlets returned a positive margin in the last season, but this was lower than predicted and not significantly different.

How this will help farmers

The FVI allows dairy farmers to select cultivars based on expected economic value to their business. Farmers need to have confidence that the FVI is robust, so testing the assumptions underlying the FVI under common, realistic farm management conditions is essential to ensure the FVI delivers the best possible results.

Performance of high and low-FVI farmlets



Note: label on the high-FVI bar is the difference between the high- and low-FVI farmlets

What's next

DairyNZ is investigating the reasons for the trial results. We're exploring the impacts of climate, model assumptions, pasture performance and quality, and scaling up from small plots to realistic farm conditions. We will share findings with farmers once they're available.

DairyNZ is committed to the FVI's ongoing development to ensure it is a practical and robust resource for farmers.

For more on the FVI and trial results see **dairynz.co.nz/FVI**

PROJECT SCIENCE LEAD

Dr Wendy Griffiths

Senior Scientist

Wendy's research interests focus on the ecology and management of grazing systems. She's involved in projects to help develop DairyNZ's Forage Value Index, including pasture persistence, and grazing efficiency traits. She also contributes to the Forage Value Index lists.

Designing internationally competitive farming systems for the future

DairyNZ's Frontier Farms project aims to build our global competitiveness by identifying the attributes likely to be important for a farm in the future. We will then co-develop with farmers technologies, and farm systems, that deliver these attributes and carry out on-farm testing of these systems.

What this session will cover

- Common themes from our competitor analyses that are likely to be important for future systems.
- Co-designed frontier farm system components in response to US mega dairies analysis.
- Where to next for the project in 2023/24 and beyond.

Find out more

Stay up to date with project progress and listen to the latest podcast: **dairynz.co.nz/frontierfarms**

Check out the cover story in our April 2023 edition of *Inside Dairy* to find out more about this project at **dairynz.co.nz/inside-dairy**

PRESENTER

Dr Paul Edwards

Senior scientist and Frontier Farms project lead

Paul is a farm systems scientist who works with farmers and stakeholders to maximise the value and applicability of new knowledge. His research areas of interest include extended milking intervals, milking efficiency, dairy design and type, technology use on farms, farm systems and sustainability.

About the Frontier Farms project

Approximately 95% of New Zealand's milk is exported, and consumer demands and international markets change rapidly. We need to ensure that our farmers stay ahead of global markets to remain internationally competitive.

Frontier Farms

Frontier Farms is a research project launched in 2021 that aims to inspire farmers and give confidence in the future of the industry.

Frontier Farm design and development process

1. **Analysis** The project team analyse New Zealand's competitiveness relative to a global exporter under a range of potential futures and predict what attributes and outcomes our future systems will need to deliver to maintain or improve our competitiveness.
2. **Evaluation** Co-design a system to meet this brief.
3. **On-farm testing** Establish a farm scale demonstration to test, refine and evolve systems.

Working together with farmers

New Zealand dairy farmers and rural professionals are working alongside our science team to help develop new farming systems which respond to global challenges, and monitor how they perform.

Where we're at

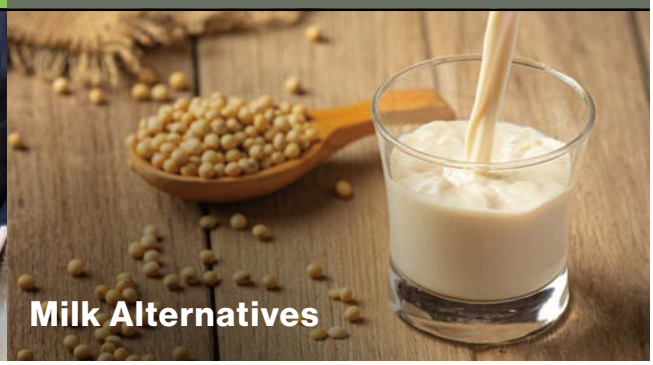
UNDERWAY

United States (US) mega-dairy farms

US mega-dairy farms were chosen because they have demonstrated the ability to achieve a high operating profit margin, with an ability to scale up.

An assessment of the relative competitiveness of US and New Zealand dairy sector has been completed. This also identified the attributes New Zealand farms need to make progress on to remain competitive and a farm system has been co-designed. Testing of this system will take place in 2023/24 and 2024/25.

COMING SOON



Milk Alternatives

A competitive analysis comparing the New Zealand dairy sector with milk alternatives will be completed mid- 2023.

Milk alternatives include beverages that are plant-based or from precision fermentation.

Notes

Strategies for remaining profitable in a high inflation environment

Find out more about strategies that can help protect profit in a high inflation environment, drawing on experiences and strategies from farmers working through these challenges.

Three high performing farm business owners, with farm systems ranging from 2 to 5, will share their thoughts on how they are managing the current inflationary environment.

Our farming panel will discuss

- What the overall view of dairy farming is currently. Are you positive for the next 10 years?
- Does anything keep you awake at night — relating to dairy farming in general, and if so, how are you addressing this?
- What are your overall business and farming principles and do these change over time depending on the current payout, interest rates etc?
- What milk price are you budgeting on for next season?
- Are you cutting anything from your budget for next season and if so why?
- People: how are you managing wage inflation — and their overall philosophy of getting and keeping good people

Find out more

Join DairyBase to access all the information you need to make confident and effective farm management decisions:
dairynz.co.nz/dairybase

PRESENTERS

Paul Bird

Farm Business Lead Advisor

Paul has been involved in developing and delivering DairyNZ's Mark and Measure business courses. His recent work includes key success factors for contract milkers and variable order sharemilkers. Paul has previously worked as a rural banker, and a consulting officer and farm advisor in Ireland and the United Kingdom.

Aleisha Broomfield

Herd owning sharemilker, Te Aroha

Aleisha is the recent winner of the Waikato sharemilker of the year. She has been sharemilking 250 cows in Te Aroha for the last four seasons operating a system 2 farm.

Bryce Anderton

Farm owner, Tirau

Bryce, his wife and two sons operate 2 farms totalling 420ha in the Matamata-Tirau area.

James Houghton

Farm owner, Pukeatua

James in partnership with his wife Carolyn farms at Pukeatua on a 114 Ha rolling property milking 400 cows.

About DairyBase

DairyNZ has developed DairyBase to allow you to access all the information you need to make confident and effective farm management decisions.

DairyBase helps you better understand your farm system and its performance, by comparing KPIs (key performance indicators) and determining what is working well, then identifying opportunities for improvement.

DairyBase overview

With DairyBase you can:

- Better understand your farm's performance
- Identify opportunities to drive profit
- Make confident and effective decisions
- Track progress towards long and short-term goals
- Draw comparisons against other farms
- Keep a tight rein on farm working expenses.

Benchmarking:

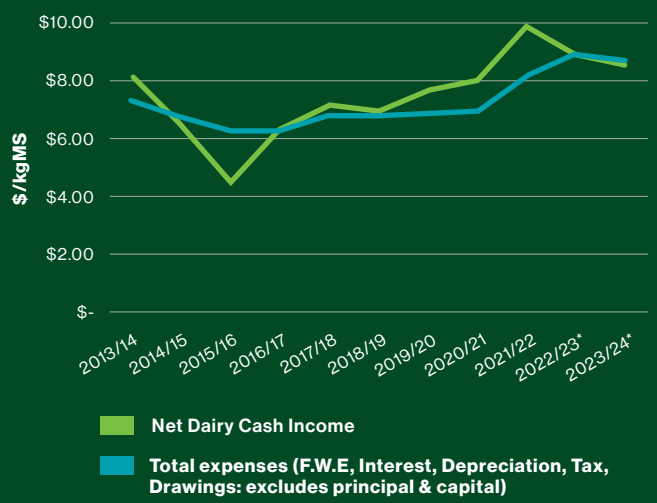
DairyBase offers two types of benchmarking — the business's financial performance and the farm's physical aspects — and compares them to industry standards or targets.

Both set out farm information in a standard way to make comparisons easy. To get the most out of benchmarking use the financial and the physical reports together.

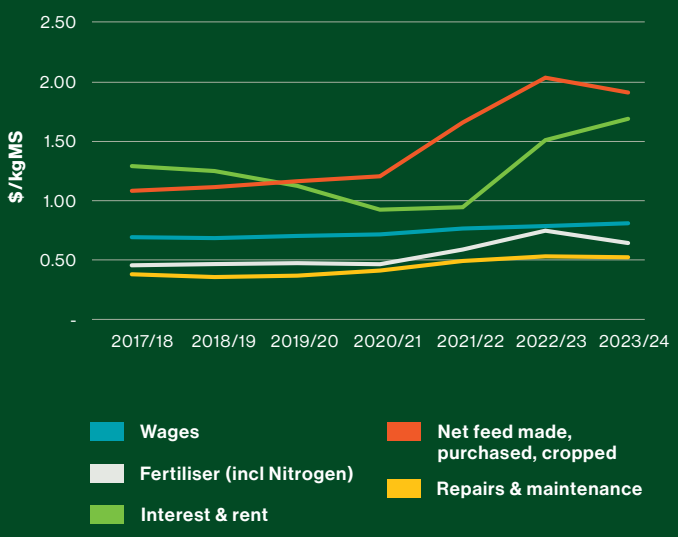
DairyBase forecasting

The following information is from DairyBase and the forecast has been generated from the DairyNZ Economics team. All figures are for NZ owner operators.

Net Dairy Cash Income vs Total Expenses
(excludes principal and capital)



Top Five Expenses



* forecast

Notes

Can technology help solve farming challenges? Making the most of technology investments on your farm

On-farm technology has been a hot topic for farmers in recent years. This session digs into DairyNZ research on the technology farmers are currently using, and examines the factors that can influence the value of technology investments.

What the session will cover

- The main on-farm challenges we're facing and where technology could play a role.
- A summary of findings from the 2023 DairyNZ technology and workplace practices survey.
- An overview of major technology options, and what could work best for you.
- How farmers are using technologies on their farms.
- The future of dairy technology.

PRESENTERS

Dr Callum Eastwood

Senior Scientist

A social scientist, Callum leads projects on workplace design, workplace productivity, reducing dairy sprains and strains, and technology adoption. His research areas of interest include people in dairy, use of new technologies and tech innovation in dairy systems, effective co-design in agriculture, and integrating data into farm decision making.

Brian Dela Rue

Research Engineer

Brian's focus is on studying technology adoption, workplace design and productivity, reducing injuries on-farm, future farms systems, and novel off-paddock wintering system design. His research areas of interest include applications of technology and labour productivity on dairy farms.

Find out more

For more background on technology options see

To hear more about technology options listen to episode 22 of our Talking Dairy podcast, at **dairynz.co.nz/podcast** or visit

Read more in these free scientific articles:

Technologies and milking practices that reduce hours of work and increase flexibility through milking efficiency in pasture-based dairy farm systems.

Innovation Uncertainty Impacts the Adoption of Smarter Farming Approaches

Responsible robotics design–A systems approach to developing design guides for robotics in pasture-grazed dairy farming

DairyNZ plays a key role in providing farmers with independent and credible information about technology options and the potential value of these technologies on your farm. Some examples of DairyNZ research are below.

DairyNZ 5-yearly technology and workplace practices survey

Since 2008, DairyNZ has surveyed farmers on their technology use. This survey of 500 farmers every 5 years is the most comprehensive and credible data captured on technology adoption in NZ, and potentially across all major dairying nations.

Our 2023 survey has just concluded, and the data shows increases in automation technologies such as cup removers and automated drafting. There was increased adoption of animal 'wearable' sensors such as collars, leg tags and boluses.

Review of robotic milking options

Robotic milking is popular in Europe, and is used on 30% of Swedish farms, 22% of Danish farms and 23% of Dutch farms. Few NZ dairy farms use the technology, but there is a high level of interest in robotic milking.

DairyNZ recently engaged with milking technology companies and dairy technology experts in New Zealand and overseas to better understand future milking robotic options. We heard that batch milking using the traditional 'box' robots was a focus on larger farms overseas. Additionally, commercial robotic rotaries have been installed in Australia and North America. DairyNZ is examining robotic milking further through the 'Frontier Farms' research project.

Examining opportunities to leverage animal sensor data

Many farmers have technologies that collect animal sensor data. These devices could provide an untapped opportunity to gather objective, automatically captured, and near real-time information about pasture management and availability.

The DairyNZ research team has recently worked with AgResearch and Fonterra on a project called the NZ Bioeconomy in the Digital Age (NZBIDA).

An initial experiment was run in 2021/22 to determine the relationship between daily feed allocation, post-grazing residual and apparent pasture intake (pre minus post) and behaviour classifications reported by animal sensors. A key insight was that rumination time was the best single predictor of pasture allocation, being responsible for about 35-40% of the variability in pasture metrics. In the next phase we will work with two commercial farms to research the use of animal sensor data in real time.

To find out more scan this QR code to read an article in our August 2022 edition of Inside Dairy, or visit **dairynz.co.nz/insidedairy** The article is on page 12.

Augmented Reality Glasses

How can this technology help on future farms?

What if dairy farmers could tell a paddock's pasture cover and how much dry matter per cow it contained, just by looking at it? Or access information about a cow's body condition score the same way? Augmented Reality (AR) may one day make this, and more, possible.

Project Overview

AR is a fast-growing technology that adds information to what people can perceive with their senses. For example, using an AR headset you can see any relevant information, voice record data or connect with an off-farm expert who can also see what you are looking at. DairyNZ has collaborated with Lincoln Agritech to investigate how AR could make a difference on dairy farms, including potential benefits and limitations. Investigation is being carried out into how AR technology can be used for:

- Pasture management
- Farm machine maintenance
- Body condition scoring

What's next

This pilot project has demonstrated the potential of AR technology. Further opportunities for supporting on-farm tasks, training and remote supervision will be explored.

AR test cases

Pasture management

Working with a Canterbury farmer, the AR equipment was set up to identify and display useful data about his paddocks.

BCS

A team with no experience in condition scoring were able to assess the BCS of cows using information loaded into the AR headset. The data was recorded with a few swipes of a finger in the air.

Vehicle Maintenance:

The AR headset was programmed to visually locate the grease points on a tractor.

TASK: Find 20 grease points on a tractor	Grease Points Located	Time Taken
Farm employee with tractor maintenance experience using the manual	17/20	15mins
Inexperienced person using the manual	8/20	13:15mins
Inexperienced person using the AR headset	20/20	7:20 mins

PROJECT SCIENCE LEADS

Brian Dela Rue

Scientist
Brian is part of the DairyNZ science team contributing to projects on technology adoption, workplace design and productivity, reducing injuries and future farms. Earlier work included robotic milking research, and evaluation of heat detection and health monitoring systems.

Dr Callum Eastwood

Senior Scientist
A social scientist, Callum leads projects on workplace design, workplace productivity, reducing dairy sprains and strains, and technology adoption.

Notes

Changing the job: Improving workplace productivity and attractiveness for the whole farm team

The Great Futures in Dairying Plan was developed in 2022 in collaboration with farmers, sector stakeholders and DairyNZ. The plan sets out how we can attract, retain and grow our workforce on farm. The DairyNZ research team is focussed on the design of productive and attractive workplaces to help identify options where farmers can, in the words of the Great Futures in Dairying Plan, 'change the job'.

What the session will cover

- The major challenges for dairy workplaces, identified through the Great Futures in Dairying plan.
- What are the features of productive and attractive workplaces, for now and the next decade?
- Research DairyNZ has been doing to address challenges:
  - How to reduce total hours to run our farms.
  - Enhancing safety on-farm through design.
  - Reducing hours worked per day, and the impact of start times (including research on sleep and wellbeing)
  - Making the most of technology to provide flexibility and reduce physicality.

PRESENTERS

Dr Callum Eastwood

Senior Scientist

A social scientist, Callum leads projects on workplace design, workplace productivity, reducing dairy sprains and strains, and technology adoption. His research areas of interest include people in dairy, use of new technologies and tech innovation in dairy systems, effective co-design in agriculture, and integrating data into farm decision making.

Dr Paul Edwards

Senior Scientist

Paul is a farm systems scientist who works with farmers and stakeholders to maximise the value and applicability of new knowledge. His research areas of interest include extended milking intervals, milking efficiency, dairy design and type, technology use on farms, farm systems and sustainability.

Find out more

Great Futures in Dairying Plan:
dairynz.co.nz/great-futures

Workplace design research:
dairynz.co.nz/new-workplace-design

Flexible milking:
dairynz.co.nz/flexible-milking

Kanban boards for communication and workflow management:
dairynz.co.nz/kanban

Wellbeing on farm:
dairynz.co.nz/stay-well

About the Changing the job project

DairyNZ has a range of research projects focused on helping farmers provide modern, productive and safe workplaces. This includes examining new technology and strategies to improve work-life balance. Examples of research projects are below.

Benchmarking workforce productivity

When we think of dairy farm efficiency, we often use cows/FTE, or milking time metrics. New DairyNZ research seeks to expand the measures we can use to assess productivity within dairy workplaces.

The Workforce Productivity study of 150 farms across NZ, will provide a national dataset to allow New Zealand dairy farmers to benchmark their farm — including productivity, identifying ways to improve efficiency and save time. Farmers will also be able to benchmark against similar farms to see the potential impact of different practices and technologies.

In partnership with QCONZ, we have finalised data collection in March 2023, and are now analysing the data to create benchmarks.

Assessing the impact of farm systems on sleep

DairyNZ has been working with dairy farmers over the last three years to better understand their sleep patterns and how these relate to different farm systems and milking schedules. We are currently working with over 30 farmers from Pāmu's Central North Island dairy farms.

In spring 2022, farmers averaged seven hours' sleep per night at the start of the study (one week before calving), but this dropped by half an hour per night by the end of the season.

Results so far highlight the need to put strategies in place to make sure everyone has enough time off to rest and recharge, especially during busy times like calving.

Find out more — see the *Inside Dairy* (Dec/Jan 2022) article on page 18.

Reducing sprains and strains on dairy farms

DairyNZ is working with ACC, through their Injury Prevention Grants, to understand the main causes of sprain and strain injuries on farm, and to work alongside farmers to co-design injury prevention solutions. The research has highlighted that 40% of injuries on dairy farms are sprains and strains, with the highest risk from August to October. Survey data also indicated that people who were injured needed 12 days off work, but took around 27 days to fully recover.

Working with farmers and other workplace experts, the research team (including key delivery partner QCONZ) have developed and tested several concepts. These include working with Kea Trailers to design, build and test a trailer with easy-entry gates. Another concept is a flexible breast rail used at the front of the bail to encourage smaller cows to stand further back, while larger cows can still comfortably stand in the bail. The potential solutions will be further tested on farms in spring 2023, and if proven successful, will be available for farmers later next season.

Find out more — see the *Inside Dairy* (Feb/March 2023) article on page 22.

Easy-entry calf trailer

Farmer-inspired prototype

We know dairy farmers experience higher rates of sprains and strains over the busy calving period. Many injuries are a result of lifting calves. In a project funded in partnership with ACC, the research team at DairyNZ has designed a new trailer which aims to reduce injuries associated with lifting and carrying calves on dairy farms.

Project Overview

DairyNZ's three-year project, funded through ACC's Injury Prevention Grants Programme and DairyNZ's levy, aims to identify the causes of sprains and strains on dairy farms and develop practical, easy to implement solutions to reduce these.

We're working with farmers to develop ideas and test and refine the prototypes on farm, like this easy-entry calf trailer.

About the easy-entry calf trailer

- DairyNZ is working with our delivery partner QCONZ and Kea Trailers to design, build and test a trailer with easy-entry gates.
- The trailer gate has been trialled on farms in 2022 and 2023, with great feedback.
- "It's so much easier to use. I think it would be a good option for a new trailer or as a retrofit," Carel Visagie, Oaklea Farms manager.

What's next

DairyNZ will continue to refine and improve the trailer design, taking on board feedback from farmers. We are also working to develop other solutions to help further reduce sprains and strains, and test them with farmers.

Features and Benefits

- A spring-loaded, self-closing saloon door
- High reinforcing bar to prevent stooping when loading calves
- Latch function to prevent gate opening during transport
- Off-set hinges to allow 180 degree opening for ease of unloading
- Easy, faster and safer calf loading
- Reduces awkward bending and lifting compared to when loading calves on other calf trailers

Scan here to view a video of the trailer

PROJECT SCIENCE LEAD

Dr Callum Eastwood

Senior Scientist

A social scientist, Callum leads projects on workplace design, workplace productivity, reducing dairy sprains and strains, and technology adoption. His research areas of interest include people in dairy, use of new technologies and tech innovation in dairy systems, effective co-design in agriculture, and integrating data into farm decision making.

More about this research

Funding for this project is through the DairyNZ levy and ACC's Injury Prevention Grants programme. This project is being undertaken with the support of the delivery partner QCONZ.

For more information visit **dairynz.co.nz/calving-safety**

Notes

Working together to reduce N loss — how plantain can help

Many farmers are facing the need to reduce N loss while maintaining profitability. DairyNZ is working with partners and farmers to test Ecotain® plantain as a low-cost solution and develop management strategies for successful adoption on-farm.

What the session will cover

- Explanation of how Ecotain® plantain works to reduce N loss.
- Latest research results from farm system experiments, including N loss and production.
- What the Plantain programme is doing to identify and manage any market risk with high levels of plantain adoption.
- Practical advice for establishing and managing plantain on the farm — including farmer advice and experience.
- How regional councils around the country are recognising plantain in regulatory frameworks.

Find out more

Learn more about plantain and keep up to date with the latest research: **dairynz.co.nz/plantain**

PRESENTERS

Kate Fransen

Senior Project Manager

Kate's focus is on plantain research and water quality. Kate comes from a farming background and is passionate about working with scientists and farmers to develop systems that meet environmental and profit outcomes. Kate has led several large farm systems research, development and extension initiatives in New Zealand and Australia.

Wim and Maria Makker

Farmers — Morrinsville

Wim and Maria Makker are farm owners of a 108 hectare dairy farm near Morrinsville. This year they become partner farmers of the Plantain Potency and Practice Programme. Through the programme, the DairyNZ team are monitoring their pastures, primarily to understand more about establishment and management for successful persistence of plantain.

About the Plantain project

DairyNZ is working with partners* on a seven-year research and development programme to quantify the nitrogen(N) leaching reduction potential of plantain (Ecotain®) pastures at a farm and catchment scale. The programme will also assess market risk and develop tools and management strategies to support widespread plantain adoption.

Programme overview

- Partner farms in Waikato, Bay of Plenty, Manawatu, Canterbury, and Southland.
- Lincoln and Massey University farmlet experiments measuring production and N leaching on mixed pastures with different plantain levels compared to perennial ryegrass/clover.
- Hydroponic, lysimeter and field trials to understand how plantain reduces N leaching, and leaching reduction with varying levels of plantain in pasture on seven soils and differing climates.
- Regional management strategies for plantain establishment and persistence.
- Studies on the effects of using plantain on milk, meat and animal health.
- Farm and catchment scale modelling.

What we've found

- Mixed pasture containing 30-50% Ecotain® had **20-60% less N leaching** than perennial ryegrass/ clover
- No negative impacts on production
- Milk trials confirmed **no human health risks** from dairy cows consuming plantain or any other significant effects on milk composition
- Establishment and persistence success varies with environment.
- A Visual Assessment Guide is effective for determining the amount of plantain in a pasture.
- Nitrate leaching reduction potential may vary between cultivars. We're developing an evaluation system to test cultivar effectiveness.

How we're working with farmers on this project

Regionally specific management strategies and tools

22 partner farms and associated communities of interest, made up of farmers and other stakeholders across five regions, are helping to develop management strategies for different regional climates and farm systems.

Advisory group: Made up of farmers and other stakeholders, the advisory group will provide advice on tools and the information required to improve plantain adoption and regulatory recognition.

*The programme is jointly funded by DairyNZ, the Ministry of Primary Industries (through the Sustainable Food and Fibre Futures Fund), PGG Wrightson Seeds and Fonterra. Additional delivery partners include Agricom, Lincoln University, Massey University, Manaaki Whenua Landcare Research, Plant and Food Research, Lincoln Agritech, and AgResearch.

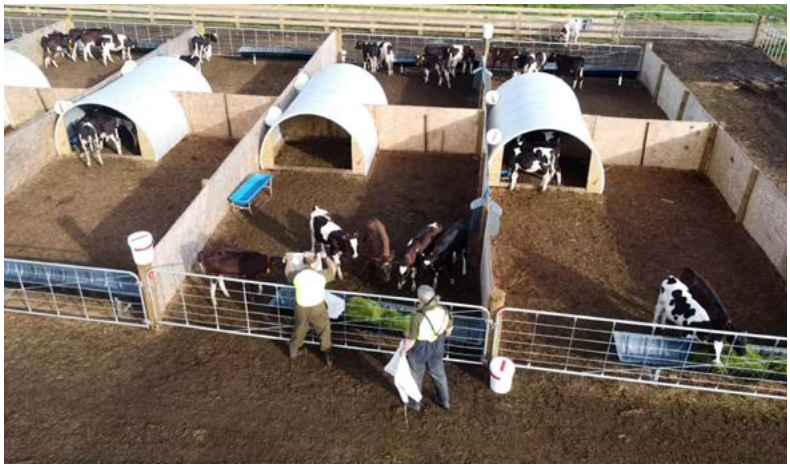
Notes

Getting fit for the future – tackling the challenge of reducing greenhouse gas emissions on-farm

DairyNZ's research is aimed at developing scalable and viable methane mitigation solutions for NZ dairy farmers.

What this session will cover

- Regional farm-systems research.
- Progress and challenges of methane reduction technology:
  - diet
  - methane reducing compounds
  - vaccine
  - genetics



Find out more

Learn more about reducing greenhouse gas emssions:
dairynz.co.nz/lessmethane

PRESENTER

Dr Elena Minnee

Senior Scientist

Elena is currently involved in forage, methane mitigation, and climate adaptation research programmes. She is part of the research team developing and testing technologies for dairy farmers to reduce enteric methane emissions. Their aim is to create solutions that are safe, effective, and adoptable on New Zealand pasture-based farms.

About the less methane project

DairyNZ is working together with other research organisations and commercial companies to develop viable and scalable options that reduce methane emissions on New Zealand dairy farms.

The key driver of cow methane emissions is feed intake. Mitigation options can involve changing farm systems to reduce total feed intake - while maintaining productivity and profitability — or developing technologies that alter the link between feed eaten and methane emitted.

Programme overview

- Evaluating the efficacy, animal safety and product (e.g. milk and meat) integrity from cows fed methane reducing compounds via different delivery mechanisms.
- Investigating delivery mechanisms (such as slow-release boluses, supplementary feed offered during milking, or automated, transportable in-paddock feeding stations) to deliver methane reducing compounds to cows while grazing.
- Determining the short- and long-terms effects on methane production when feeding methane reducing compounds to calves.
- Assessing methane emissions when cows graze different forages (e.g. plantain or spring/summer ryegrass) and receive common supplements (e.g. silage and grain) to improve accounting of on farm emissions.
- Understanding the effect of diet on base methane emissions and response to methane reducing compounds.
- Supporting regional research to determine the effects of farm-system changes that reduce methane emissions.
- Supporting genetic research into breeding low methane cows.
- Supporting development of methanogen vaccines.

Our challenge

To meet consumer and market demands and achieve domestic and international greenhouse gas targets, the NZ dairy industry needs to reduce methane emissions.

Compounds that reduce methane emissions are being used successfully overseas when they can be continuously delivered to cows in feedlot or housed farming systems through rations delivered continuously throughout the day. A key challenge we have in New Zealand is incorporating these compounds into our unique pasture-based dairy farms in an effective manner.

How we're working with farmers on this project

Farmers have provided advice on the potential adoptability and barriers of the different mitigation options being evaluated.

Farmers have provided feedback on the different delivery options under investigation.

From 2025-2030, as we roll out farm-scale research with potential mitigation options, we will be working closely with farmers to ensure the solutions are viable and scalable on New Zealand dairy farms.

What's next

We aim to have methane mitigation options ready to be tested on farms by 2025, with adoptable solutions ready for farmers to use by 2030. Our goal is to have effective solutions for New Zealand dairy farmers to help reduce emissions across the dairy sector by 10% by 2030.

Notes

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We want your feedback on this event to keep improving!

Please complete our quick online survey of this event using the QR code.

Your feedback is important as it helps us plan to keep improving future events we host for you.

DairyNZ

FARMERS' FORUM

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