

Oct-Nov 2023

Inside Dairy

Your levy in action

Farm tech trends

*Wearables, automation and
getting value from the spend*



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Sector making gains in milking efficiency **16**

Spring tools backed by science **22**

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Dairynz 



Over the fence...

The opportunity to work with, and represent, Kiwi dairy farmers is something I'm genuinely excited and humbled by. This month is my first with DairyNZ and, in the months ahead, I look forward to hearing what our farmers want to see from us.

We know the sector is vital – when dairy ticks along well, New Zealand hums too. With that comes employment, positive perception and healthy land, water and animals. These are all the more important in the face of inflation and post-Covid recovery.

Along with the good stuff come the challenges too. Managing milk price, attracting quality staff, regulations and our emissions are issues sharply in focus right now, and rightly so.

Industry-good is here first and foremost for farmers. I know dairy farmers believe in the purpose of DairyNZ and see real value in industry-good. That's something I'm particularly heartened by.

I believe it's acutely important DairyNZ delivers value to farmers – that's what you expect from us.

I'm keen to see DairyNZ focused and prioritising both short- and long-term, to deliver the best value for farmers.

I look forward to speaking with many of you, getting out on the road, hearing what matters and what you'd like to see from us.

Further inside this month's *Inside Dairy* we explore the reduced milk price and ways to manage the challenging months ahead, along with a subject close to my heart – technology, the trends and how it can support farms.

I welcome feedback or views on DairyNZ and its work – please feel free to reach out to me at campbell.parker@ceo.dairynz.co.nz.

Nga mihi,

Campbell Parker
DairyNZ chief executive

About Campbell

As chief executive, Campbell is excited about leading DairyNZ at a pivotal time for the NZ dairy industry. With over 25 years' leadership experience in agriculture, Campbell has held previous roles with PGG Wrightson, Bank of New Zealand (BNZ), Ballance Agri-Nutrients, Waikato Milking Systems, and GEA Farm Technologies. He holds a Bachelor of Agriculture majoring in Rural Valuation from Massey University. He grew up on a sheep, beef, and dairy grazing farm in the Waikato.

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On the cover:

Awhitu farm owners Liisa and Andrew Hamilton.



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Going high-tech for cow efficiency

Andrew and Liisa Hamilton's wearable animal monitoring technology is helping them deliver on their cow efficiency goals. We also outline our latest tech survey results.



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Dr Paul Edwards outlines the trends emerging from three years' milk vat monitoring data.



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Good practice has flow-on effects

Find out how farmers in a 20-year project have significantly improved catchment water quality, and why continuous improvement is key in reaching targets.



We appreciate your feedback

Email insidedairy@dairynz.co.nz or call us on 0800 4 DairyNZ (0800 4 324 7969).



To find out how to recycle the plastic wrap used to protect this magazine during postage, visit dairynz.co.nz/insidedairy



Will Green, budget case study farmer.

Open books

Want to see how top operators are managing the drop in milk price?

We've updated some of our budget case studies, with commentary from these farmers on how they're adjusting to the milk price reduction.

See the management decisions these farmers have made to meet their budgets. We've gathered information from farms that focus on lower 'per unit (kg/MS)' cost of production, in all systems, to help you identify opportunities for your own farm.

Some of these farms have been a budget case study since 2015, another low milk price year, so have proven experience in managing tight times.

Go to dairynz.co.nz/budget-case-studies

Understand the numbers making your business tick

Learn alongside and from other farmers at Dairy Training's popular Business by the Numbers course.

At this three-day course for new budgeters and those needing a refresher, you'll focus on end-to-end budgeting, cashflow planning and monitoring.

Starting in October and November, courses run throughout the country. Class sizes are small, so don't miss out. Register now at dairytraining.co.nz



Courses start in Nov and Oct

Free training Business by the Numbers

Get your cashflow under control or simply learn the basics of budgeting.



Need a break?

After dipping a toe in the water last season, DairyNZ is stoked to continue supporting Surfing for Farmers this summer.

Unleash your inner Maz Quinn and head to a beach near you to get a break from the farm, have fun, learn something new, and meet some new mates. The whole whānau and farm team is welcome. No experience necessary and all gear is provided.

Visit surfingforfarmers.com today to find an event near you.



Surfing for Farmers – helping you take the beach back to the paddock this summer.



Rural people helping rural people

Looking after your people is vital if you want to grow a dedicated team and retain great staff. But good leadership starts with looking after yourself, particularly your mental wellbeing in the face of the current financial challenges.

Rural Support Trust operates nationwide, with local, rural people who know from experience that stress can mount up. They can help you get through all kinds of challenges, from

financial pressure to adverse weather events, and they support anyone on-farm – employees included.

If you're feeling a bit wobbly, reach out for a chat early, before things become overwhelming.

Call your local trust now on 0800 787 254 for confidential support.

rural-support.org.nz



Ahuwhenua Trophy entries open

Tataiwhetu Trust accepting the 2021 Trophy: dairy (photo: Alphapix.co.nz).

DairyNZ is a proud sponsor of the Ahuwhenua Trophy competition, which celebrates excellence in Māori farming, as well as young Māori farmers.

Next year the competition focuses on dairying. Entries are open now for the:

- 2024 Ahuwhenua Trophy (for farm entities) – entries close 5pm, Friday, December 8, 2023.
- 2024 Ahuwhenua Young Māori Farmer Award – entries close Friday, February 9, 2024.

Going through the Awards' supportive judging process reaps multiple and ongoing benefits for entrants, finalists and winners.

For full details and entry criteria, visit ahuwhenuatrophy.maori.nz

To chat about the Awards before entering, contact Clinton.Hemana@dairynz.co.nz or phone 027 1800 4505.

Finding opportunity in tough times



With the right approach, we can get through it and come out stronger, writes DairyNZ's Sarah Speight.

We've faced a tough start to the season, with a low forecast milk payout announced during the busy calving period, while farmers experience high inflation costs and ongoing labour issues. Adding to the mix is a highly likely El Niño weather system that will bring its own challenges.

Having been through this before as a sector – more than once – we have learnt a lot and have a range of tactics and actions to cut costs (see the next page for some of these tactics). Having spoken to a lot of farmers recently, we're aware many of you are already adjusting your budgets and taking action.

In challenging seasons like these, it's important to pay attention to detail and focus on the things within your control and that you're good at. Use

this time as an opportunity to refine your farm business. This includes assessing every corner of your business, identifying what works well, and finding areas for improvement. Look to make farm system changes that lead to positive long-term outcomes, so when grass growth and milk payouts improve, your business is set to make the most of it.

Our recent research into technology trends (see pages 14-15) shows many farmers have made investments. Those who have should work with their providers to optimise farm technology, ensuring it's delivering maximum benefit. Our cover story farmers Andrew and Liisa Hamilton are a good example of this.

Looking ahead, the potential El Niño weather pattern may bring westerly winds and more rain in the west, while most of the North Island, and east coast of the South Island, could face a moderate to severe drought.

Plan now for a possible summer feed deficit, identifying the most cost-effective way to meet a shortfall. This could include strategic use of nitrogen, buying supplementary feed, or planting summer crops. Good preparation now will help to achieve better outcomes later.

Farms backed by strong plans, good processes and happy teams will prosper through tight times. DairyNZ is here to support you every step of the way. If you'd like some advice on changes you can make to retain a viable farm business, keep an eye out for events we'll be running in every region.

We believe that with these approaches, and working together as a sector, we can make it through the challenges ahead.

Sarah Speight is DairyNZ's General Manager Farm Performance.



Quick wins to reduce costs

Cost squeezes are hitting farmers from all directions right now. That's why we've put together some solid tactics to help you reduce on-farm costs.

We've identified a variety of 'tactics for tight times' which have been developed based on DairyNZ research, data and learning from past seasons. These practical tactics will help you to reduce costs as soon as possible, alongside your usual medium- and long-term planning, so you can keep your farm business viable.

See the full list of tactics at dairynz.co.nz/business-tactics, but here are few below to get you started. Check out some of our DairyNZ tools which'll come in handy too (see sidebar).



Improving efficiencies around herd testing can save dollars without compromising cows' health.

Tactics snapshot

Financial

- Redo your budget line-by-line. Where can you remove or defer cost?
- Complete last financial year's accounts with your accountant now, to identify any tax liabilities.
- Talk to banks, vets, rural professionals and farm consultants early and often. Ask for their input on how to find efficiencies.

Animal health

Look for efficiencies: for example, you can save costs on herd testing, vaccines and treatment use, mineral nutrition, early prevention and treatment of lameness and mastitis.

Pasture, feed and supplements

- Explore options around pasture and supplement cost reductions with your farm adviser.
- Evaluate your re-grassing policy and area. Defer to essential-only re-grassing. Other options include deferred grazing as a low-cost way of dealing with surplus.

Fertiliser use

Be strategic in your use of nitrogen. Do some areas on-farm require less N than others?

People and productivity

Look after your farm team and their wellbeing. This includes involving them in identifying any opportunities for labour efficiencies and improving productivity. For example, can you manage labour costs through milking frequency, flexible milking or labour-sharing arrangements?

Impacts

Cost management decisions save on costs in the short term but they will have an impact on your farm system, staff, animals and long-term goals. It's important to keep sight of the long-term too and plan, monitor regularly, and adjust as needed.

Also, make sure your short-term decisions don't lead to negative environmental outcomes or any issues with regional regulations.

Finally, look after yourself and those around you. Connect, share the load and seek advice from trusted advisers and fellow farmers.

DairyNZ tools

Below are links to just some of our tools which you'll find useful for both short and long-term planning.

- Econ Tracker
dairynz.co.nz/econ-tracker
- Budget case studies
dairynz.co.nz/budget-case-studies
- Budgeting tools
dairynz.co.nz/budgeting-tools

Going high-tech for cow efficiency





Liisa and Andrew Hamilton, pictured here on their 70ha valley 'home' farm, are focused on cow efficiency rather than just production numbers.

As DairyNZ's latest farm tech survey shows a rapid uptake of cow wearable sensors, we meet a South Auckland couple using wearables to help make heat detection smoother and better manage their cow health.

Just over a year ago, Awhitu dairy farmers Andrew and Liisa Hamilton took a leap of faith with their herd's newly fitted wearable animal monitoring technology.

"We were told quite strongly by Afimilk not to tail paint at mating time and to leave heat detection to the technology when it came to identifying and drafting out the cows. It was quite a scary step to take," says Liisa.

But it turned what was almost a round-the-clock job into a simple morning task prior to the AI technician turning up, she says.

The couple were happy to achieve an historically low 11% empty rate, having mated them for only 10 weeks, with three weeks AI using sexed semen.

Their Afimilk system records activity data for heat alerts, monitors rumination and eating time, and is also linked to a walk-over weigher to record daily cow liveweight.

Andrew and Liisa's decision to install the tech was underpinned by a desire to use data to breed the most efficient cows possible on their two properties. Their farms' small scale at 70ha and 40ha, respectively, demands they get the most from properties unable to be joined, and on quite differing contours.

"Over the past five years, we've worked hard on the herd's production worth, and it now averages 320 – in the top 10%," says Andrew.

Liisa says the tech helps guide the type of cow needed to deliver on their efficiency goals.



1. *Liisa and Andrew's stunning coastal farm drops away sharply to the Tasman Sea, with the Manukau Heads to the north.*
2. *The cows needed a few milkings to get comfortable with their new collars banging against the feed bins.*
3. *Andrew says he'd probably have held off his tech investment if the payout had been lower at the time.*
4. *Liisa, formerly a builder at her family's wilderness resort in Canada, is in charge of calf rearing in the couple's purpose-built 12-bay shed.*





“

Our longer-term goal is to breed more efficient cows per kilo of bodyweight.

“We’ve typically worked towards a Kiwi-Cross, but we’ve started to move back a little towards some more Friesian genetics to get a solid, compact black cow.”

Having the weight data provides the valuable piece in this productivity jigsaw.

One year in, they’ve identified and culled the larger, poorer-performing cows that may have previously been seen as good herd members based simply on milksolids production.

“We definitely look at cows differently now,” says Liisa.

Collaring the benefits

Implementing the tech was a relatively seamless process, say the Hamiltons. Once their cows had been fitted with the collars, it took only a few milkings before they were accustomed to the noise from banging against the in-shed feed bins.

Andrew and Liisa have come to understand individual cow behaviour better with the tech, particularly regarding rumination.

“We’ve found cows tend to take a while to get into their rumination pattern post-calving – some build up quicker than others,” says Andrew.

“We’d never really thought about rumination before, but it is something that really affects their year’s production and fertility.”

But they’ve also learnt not to become overwhelmed by the data generated, lest they risk tripping up over the sheer number of ways it could be interpreted.

When it comes to measuring a rate of return from the technology, Andrew and Liisa cite its reliability for determining cow heats as a key indicator, particularly when getting labour skilled in this area is challenging in their district.

“And our longer-term goal is to breed more efficient cows per kilo of bodyweight,” says Andrew.

The couple has also joined the DairyNZ Connected Farms project, a collaboration with AgResearch and Fonterra, which aims to understand how different technologies can be integrated to help farmers make better decisions.

Tech trends

DairyNZ’s latest farm tech survey highlights how more farmers like the Hamiltons are opting for wearable animal monitoring technology.

In the survey, 12% of those with herringbone dairies have adopted wearable tech, up from only 2% in the last survey five years ago. The figure is even higher for rotary operators, with 31% now having wearable tech, up from 7% five years ago.

The technology is catching up to more accepted automation tech like auto cup removers, now found on 88% of rotary

dairies and 31% of herringbone dairies. Auto teat spray systems are also now on 83% of rotaries.

DairyNZ senior scientist Dr Callum Eastwood says technology adoption has been like a game of two halves.

“Investment in technology that generates a lot of data, like walk-over weighing and milk sensing, has plateaued. However, with automated technology like cup removers or auto teat sprayers, farmers are seeing more value for the time they can save, and they’ve adopted them rapidly.”

Justifying the spend

Callum says that without a clear reason for gathering the data generated by such systems, farmers can struggle to justify the cost outlay, given it usually requires additional time to analyse and act upon that analysis.

“Cow wearable tech tends to straddle data-gathering needs and automation because it usually offers heat detection, which in itself has a definable labour-saving benefit and can standardise heat detection performance regardless of who’s working on-farm each day.”

He says two years of critical labour shortages and better payouts prompted more farmers to make



Liisa and Andrew’s son Liam Phyll (wearing green beanie) took a break from his job as a tree planter in British Columbia, Canada, to help with calving this year. Behind him is Nadine Ngakuru, herd manager for the Hamilton Road farm.

the leap to such tech. However, he adds that the recent drop in forecast milk price has heightened the need for due diligence around potential investments.

“In the current milk price environment, farmers could be trying to balance long-term investment plans with an immediate focus on managing current cost of production.”

“As with any technology investment, farmers should do their numbers carefully, talk to other farmers and separate expected financial returns from other non-financial benefits.”

Andrew Hamilton admits he would probably have held off on his tech if the payout had been lower, and he’d consider adding in milk flow meters when the payout rises again.

He and Liisa have bridged the gap between tech that gathers data and tech that automates cow management by knowing what they wanted to achieve besides better mating outcomes. For them, that was being able to use the data to analyse cow efficiency and improve productivity.

Farmers open up on virtual fencing

DairyNZ researchers recently interviewed 15 farmers using the Halter system, which incorporates remote monitoring of cows, virtual fencing boundaries, cow behaviour monitoring and pasture management.

Callum Eastwood says while it’s early days in the development and use of such technology, farmer users identified the system’s ability to save time with tasks like break-fencing or getting cows into the dairy as particularly appealing.

While Halter provides the option for complete virtual fencing within the

farm boundary, few farmers had removed all fences entirely.

“Instead, many opted for removing some fences and using slightly larger paddocks to break-fence virtually with the system,” says Callum.

Some farmers highly valued the time of day that time was saved.

“Time saved during ‘unsociable hours’ was of value to tech users – such as getting 20-30 minutes more sleep in the mornings while the virtual herding brought cows to the dairy,” says Callum.

Saving time spent on more mundane tasks, such as break-fencing winter crops, was also highlighted by the farmers.

“Technologies that are app-based and, therefore, available on everyone’s phones, can have additional benefits of engaging the whole team in management decisions.”

See page 11 for tips on how to assess tech investments in a lower milk price environment.

“

As with any technology investment, farmers should do their numbers carefully and separate expected financial returns from other non-financial benefits.

Due diligence tips

Andrew and Liisa advise farmers considering a tech investment to be sure there's support available to back it up, and that the tech solves more than one problem.

Here are some tips DairyNZ has gathered from other farmers:

1. Carefully identify the need or opportunity for the technology, then consider if there are other options to address the need.
2. Assess the financial and non-financial benefits, and sense test these with other farmers already using the technology.
3. Consider other costs and the learning time required to implement the technology.
4. Review the tech's performance. Results can vary from season to season due to many factors. A good or poor result in one season may not be due to the tech alone.

The Hamiltons send all their cows to the coastal farm over winter, before bringing them back to calve on the valley farm.

More scope to improve workplace productivity



Similar-sized farms are showing big differences in hours worked per year, so where are the opportunities to improve productivity on-farm? DairyNZ's Dr Callum Eastwood explores.

With New Zealand's economy now one of the least productive in the OECD, the Productivity Commission says we need to be achieving 'more for less'.

But how do our dairy farm workplaces stack up in terms of productivity? And what exactly does it mean for farmers to do 'more for less'?

The DairyNZ Economic Survey shows there was a dramatic increase, from 110 to 140 cows/Full-Time Employee (FTE), on New Zealand dairy farms in the early 2000s. Since then, we've been relatively stable at 150 cows/FTE.

Recent research by DairyNZ, in partnership with Perrin Ag consultants and QCONZ, has focused on developing ways to measure productivity, and creating a dairy sector baseline.

Last season, with the help of over 150 dairy farmers across the country, the team conducted in-depth workplace assessments.

Large range in hours worked

An important measure we looked at was total hours worked across the season. The big takeaway is that we found a large range in hours worked between similar-sized farms. For example, one 500-cow farm was being run with around 5000 hours/year, while another 500-cow farm was being run with around 12,000 hours/year. This shows a potential opportunity for productivity gains.

The data also showed hours worked/cow/year is not influenced by kg MS/cow, and that some farms are achieving a greater kg MS/cow/year without increasing the number of hours worked.

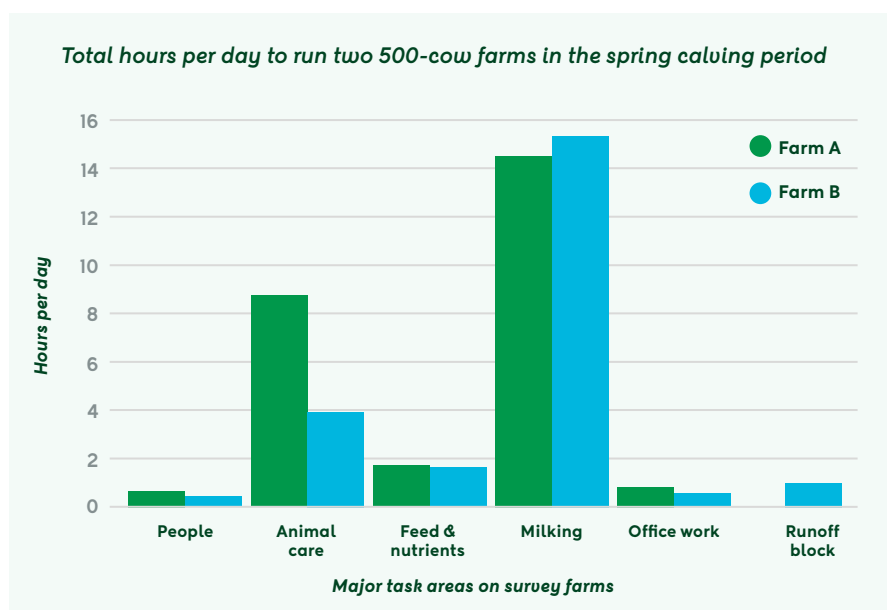
Where farmers save time

Finding where hours are being spent across the year, and per person, can be achieved using a task breakdown approach. Again, our study showed big differences between similar-size farms. For example, two 500-cow farms varied in time spent on animal care tasks, like calving, and work on a runoff block (see graph).

Our data from the 150 farms indicated that a greater level of shed automation (such as automated cup removers, auto teat spray and auto drafting) was linked with fewer hours worked/person/week.

What's next?

We'll be analysing the dataset to identify key drivers for improving workplace productivity. Look out for these findings and see more research results at dairynz.co.nz/wps



Where are the opportunities on your farm?

1. Calculate your workplace's hours worked/year using good timesheeting systems and apps.
2. Find efficiencies in your workplace using tools such as DairyNZ's Wastehunt and Farmtune.
3. Get some ideas to improve milking efficiency at dairynz.co.nz/milking-efficiently

Voting for DairyNZ director



Dairy farmers, make sure your voice is heard – vote for your DairyNZ directors now!

If you're a levy-paying dairy farmer, now's your chance to vote for your preferred candidates in this year's DairyNZ directors' election. There are two vacancies. The elected candidates will support DairyNZ's governance and leadership and how we advocate for our farmers at every level. Vote now and help shape our sector's future.

This year's candidates are:

Bryan Pedersen <i>Foxton</i>	Jim van der Poel <i>Ōhaupō</i>	Cameron Henderson <i>Swannanoa</i>	James Barron <i>Te Poi</i>
Shane Ardern <i>Ōpunake</i>	Seamus Barden <i>Auckland</i>	Jessie Chan <i>Rakaia</i>	Conall Buchanan <i>Paeroa</i>
Gray Baldwin <i>Putāruru</i>	Jeremy Savage <i>Ashburton</i>	Stu Muir <i>Aka Aka</i>	Jason Herrick <i>Lumsden</i>
Paul Manion <i>Morrinsville</i>			

The successful candidates will be announced at our Annual General Meeting (AGM) on October 11.

DairyNZ also invited nominations for one vacancy on the Directors' Remuneration Committee, which reviews directors' payments. There was one nomination for this position; therefore, Robbie Byars will be appointed at the AGM. Voting is open now and closes on **Tuesday, October 10, at midday**.



How to vote

1. As a DairyNZ levy-paying farmer, you'll have received a voting pack by mail containing voting credentials (password and PIN) as well as candidate information.
2. If you haven't received this pack, or if you have any other queries, please email us at iro@electionz.com or call us on freephone **0800 666 935**.
3. More information is also available at electionz.com



Join us at our AGM

As a levy payer, you're invited to attend our AGM to hear about DairyNZ's highlights over the past year. You'll also meet our new chief executive, Campbell Parker.

When: Wednesday, October 11, 2023.

Refreshments will be available from 10.30am and the AGM starts at 11.00am.

Where: Te Awamutu Library, Selwyn Lane, Te Awamutu.

Dairy tech trends in 2023



Automation investments remain a focus for farmers but wearables are on the rise, writes DairyNZ research engineer Brian Dela Rue.

New Zealand dairy farmers have been investing in more technology to help with automation in the dairy shed and herd management, according to DairyNZ's 2023 Technology Survey.

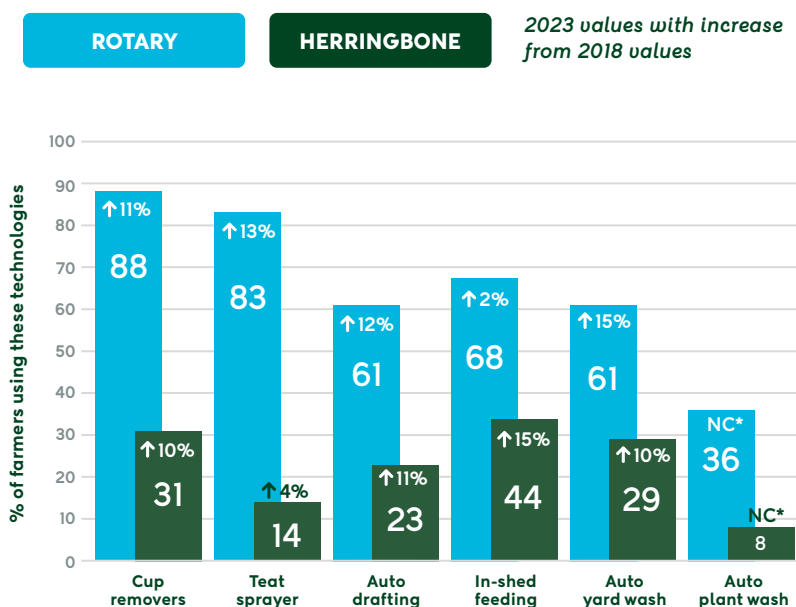
The five-yearly survey showed which technologies were being adopted – and how quickly – by Kiwi farmers.

From the data, we can better understand dairy farmers' milking practices, and how they're using technology to help with milking and animal management. In the 2023 survey, we also explored technology and infrastructure for grazing management, stand-off facilities, and heat stress management.

Results showed farmers are using automation technology to be more efficient in the dairy, meaning fewer people are required for milking.

We also saw a jump in farmers investing in animal monitoring technology (wearables) from the 2018 survey. A big reason is that farmers are looking to reduce the workload of key people on-farm and to provide consistent heat detection results. Using wearables for health monitoring, cow movement and pasture allocation are other motivations.

Which automation technologies are farmers using?



Deep dive
Automatic cup removers (ACRs)

ACRs were installed at every bail in 88% of rotary dairies, while 28% of herringbone dairies had ACRs installed at every bail and 3% had ACRs fitted in some bails.

Most new rotaries have automatic cup removers, teat sprayers and drafting, which reduces the need for a person at the cups-off position.

Deep dive
In-shed feeding systems

Our survey showed 44% of herringbone dairies had an in-shed feeding system, 38% of which were manual systems, and 6% were computerised systems allocating the same amount of feed to each cow.

For rotary dairies, 68% had an in-shed feeding system, 27% had computerised systems capable of allocating different feed amounts to each cow, 29% had computerised systems capable of allocating the same feed amount to each cow, and 12% were manual systems.

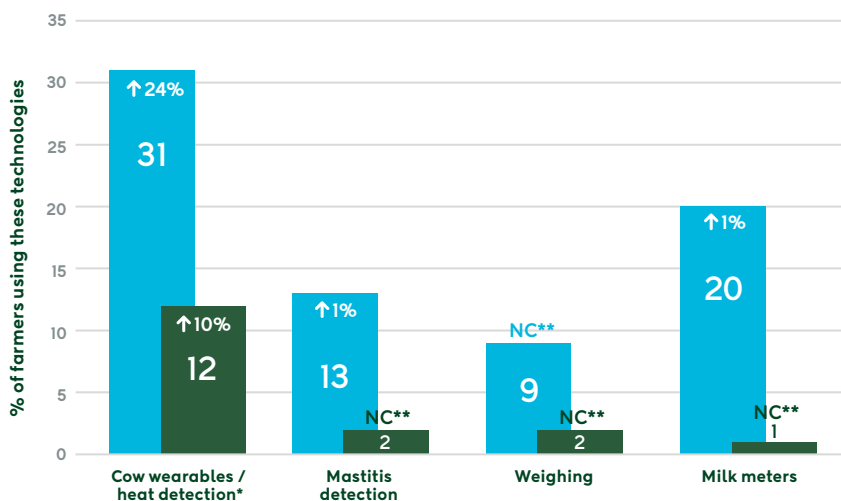
* NC indicates no change/increase from 2018.

Which animal monitoring technologies are farmers using?

ROTARY

HERRINGBONE

2023 values with increase from 2018 values*



* The 2018 survey included activity collars and camera-based systems.

** NC indicates no change/increase from 2018.

Rise of the wearables

Cow wearables were the main animal monitoring technology in which farmers invested significantly since 2018. We found 16% of all farms had cow wearable technology (up from 3% in 2018), the majority (13%) being collar-based sensors.

Farmers tell us that a benefit of wearable systems is they can be installed regardless of existing milking infrastructure, and that some systems can also integrate with drafting for extra labour savings.

Farmer wishlist

We asked farmers in March/April 2023 what would be at the top of their list if they were able to invest in one technology in the next two years.

33% cow wearables

11% auto drafting

5% ACRs

19% no tech investment

5% mastitis detection

4% in-shed feeding

4% teat spraying



Generator access

Power outages due to weather events or local incidents can be hugely disruptive, so we also asked farmers if they had access to a back-up generator to run their milking plant.

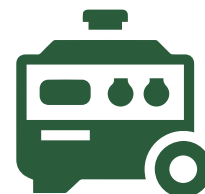
54% of all farms have access to a generator

Of those with access:

71% own a generator

20% share with other farmers

9% hire or borrow



The DairyNZ Technology Survey 2023 was conducted in March/April 2023, before the recent reduction in milk price, and involved 516 respondents. The values for 'all farms' have been weighted to represent the proportion of herringbone and rotary dairies in NZ at this time (68% v 32% of farms, respectively). Read the full report at dairynz.co.nz/tech-survey

Are we getting more efficient with milking?



DairyNZ science lead Dr Paul Edwards explores the trends emerging from three seasons of Fonterra’s milk vat monitoring data.

Milking is the task requiring the greatest labour on-farm. So, it’s not surprising that milking efficiency continues to be a popular topic, especially for farmers who aren’t in a position to replace staff.

Fonterra’s installation of milk vat monitoring systems, operative from 2020/21, has provided a rich dataset to benchmark milking efficiency. Previous research into this data has shown there’s a lot of variation between farms and, therefore, significant opportunity to be more efficient. Latest data, from the 2022/23 season, was no exception.

If we look at the month of peak production and define milking as the start to the end of milk flow into the vat, we can see noticeable increases in efficiency (Table 1) between 21/22 and 22/23. Two statistics stand out:

- The percentage of farms achieving 80% of their maximum potential jumped by about 20 percentage points.
- The average number of cows milked per hour rose by 18.

These improvements are a result of actual change on-farm because there was relatively little change in herd size, number of clusters or milk yield between these years.

Overall, since 20/21 there has been a saving of over 30-45 minutes of average milking time each day. However, as a sector, there are still opportunities to improve. For those not at 80% of their potential, there is an average of eight hours per week saving to be gained.

We’ve estimated this time saving based on the farm using a maximum milking time (MaxT – dairyNZ.co.nz/maxt), but there are other low-cost options to improve efficiency. These include adjusting pulsation ratio, liner selection, cluster attachment techniques, backing gate management, technology use and dairy design.

For more information and practical advice, visit:

- dairyNZ.co.nz/efficient-milking
- dairyNZ.co.nz/milking-duration

To benchmark your milking efficiency, download the Milksmart app from the Apple or Google Play Store.

Table 1. Key milking statistics calculated from Fonterra milk vat monitoring data for three seasons (averaged across all farms with data for their month of peak milk).

Season	20/21	21/22	22/23
Herringbone			
% of farms	67	69	68
Average number of clusters (n)	29	29	29
Average milk yield (kg/cow)	20.7	20.4	19.8
% above 80% efficiency	27	36	57
Average cows milked per hour	153	156	174
Average milking time (hours/day)	4.1	3.9	3.5
Average litres/cluster/hour	59	61	66
Rotary			
% of farms	33	31	32
Average number of clusters (n)	50	50	50
Average milk yield (kg/cow)	22.1	21.8	21.6
% above 80% efficiency	11	17	35
Average cows milked per hour	235	242	261
Average milking time (hours/day)	5.6	5.2	4.8
Average litres/cluster/hour	53	55	59

Big variation in performance

The number of litres harvested per cluster per hour is the fairest metric to benchmark across farms. While more difficult to visualise than cows milked per hour, it takes into account variation in the level of production and shed size.

This figure illustrates the range in performance, high level of milking efficiency being achieved in some of the smaller herringbones, and sizable opportunity to lift performance for others.



Drawing on tech to tackle cow heat stress

New tools are in the pipeline to help farmers predict and manage heat stress in their herds.

Heat stress in cows is a significant seasonal challenge in some regions, and hotter weather is expected to become more common in New Zealand.

Like people, cows also feel the effects of hot weather. Heat stress occurs when cows have more heat than they can shed, which creates discomfort and lowers milk production.

Farmers already use a range of strategies to reduce heat stress, like shade, access to more water troughs and/or changing the milking routine. However, if we can better predict

when heat stress will occur, farmers can adopt strategies to further reduce its impact.

With AgResearch and Fonterra, DairyNZ is working to improve a grazing heat load index tool developed as part of a New Zealand Bioeconomy in the Digital Age (NZBIDA) programme. This index predicts the potential heat stress risks in dairy cows. Scientists are improving the tool's accuracy across a range of environments by capturing additional data from New Zealand research and commercial farms.

Scientists are also exploring using existing on-farm technology such as rumen boluses and collars, which measure factors such as cows' rumen temperature and panting to identify heat stress indicators before and after stress occurs.

Technology can help us to gather data from many herds without needing to manually observe cow respiration rate, the global standard used as a heat stress indicator. Scientists may be able to use on-farm technologies to test a range of heat stress mitigation strategies in different regions. This work could help farmers optimise cow wellbeing and, consequently, milk production.

DairyNZ is also working with Lincoln University, Manaaki Whenua Landcare Research and NIWA as part of the Deep South National Science Challenge to understand how climate change will influence heat stress conditions in different regions in future.



1. Observing cow respiration rate as an indicator of heat stress; 2. Cow wears an AftCollar to assist with identifying heat stress; 3. Cows seek shade (photo: AgResearch).



How to identify heat stress

Look out for these changes:

- Cows breathing faster.
- Cows standing more but grazing less.
- Increased water intake and cows hanging around troughs.
- Cows walking slower to and from the shed.
- Less milk in the vat.

For more strategies and tools, visit dairynz.co.nz/heatstress

Snapped on-farm



A handful of dairy farming social media pics that have caught our eye over the past few months. If you'd like your photo to feature, share your snaps by tagging us on social media or using the **#dairynz** hashtag.



Happy calves.

Been a challenging start to the season. The team's all pulling together. Here's Lauren doing a great job with the calves.



@jamesr_burrows



@jamesr_burrows #dairynz

Indi teaching Beau the ins and outs of calf rearing.



@strongwomannz

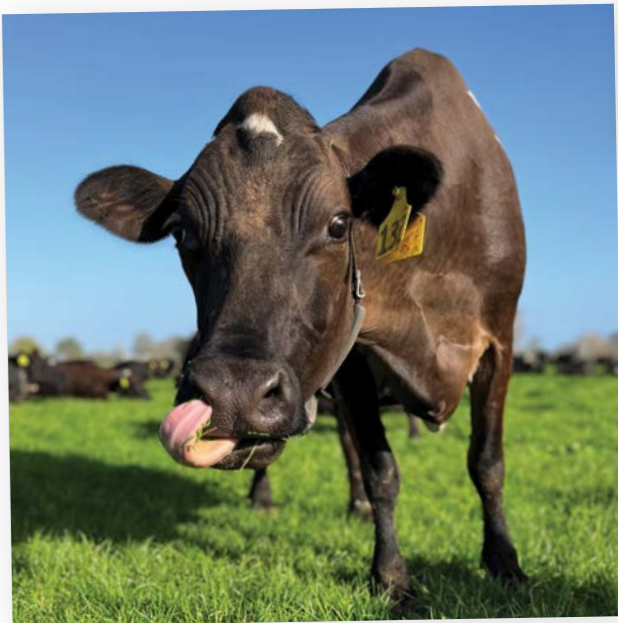


@strongwomannz #dairynz

Sunday afternoon on the farm, getting the cows in together.



@owlfarmnz



@owlfarmnz #dairynz

How fascinating is a cow's tongue?

Opening up the future

DairyNZ's post-graduate scholarships are helping smart people like Lucy Hall and Holly Hay to progress further in our sector.

Lucy Hall is sold on the value of her DairyNZ scholarship.

"I believe you won't get access to better projects and better people anywhere else in the world if you're interested in grass-based dairy farming systems," says Lucy.

She was a DairyNZ PhD scholar from 2020 to mid-2023 and is now a DairyNZ post-doctoral scientist. She's also worked with DairyNZ off and on since 2014, mainly as a consulting officer in Southland.

Lucy moved up to Lincoln in 2020 to do a PhD and contribute to DairyNZ's flexible milking research.

"I was focusing on 3-in-2 milking, but I also looked at the project's first year of data to examine the animal behaviour side of things.

"The DairyNZ scholarship's enabled me to have more scope in my PhD and gain access to much bigger and more detailed projects that are exciting and relevant for farmers – and for me."

Lucy's now focusing on improving on-farm safety, and farmer sleep studies. The latter is a bit different from dealing with cows, she laughs.

"You can't permanently attach a monitor to a person!"



Former dairy farmer Lucy Hall's combining her real-world experience with science.

Holly Hay (Ngāti Tūwharetoa, Ngāti Turumakina) kick-started her dairying career through DairyNZ by taking up a Māori summer internship as an undergraduate, before becoming a casual research technician.

Lately she's been working outdoors, taking samples and feeding cows for DairyNZ's Less-Methane research trials at Lye Farm near Hamilton.

Her DairyNZ post-graduate scholarship is now helping Holly achieve one of her major goals: completing her Master of Science by 2024.

It's "an awesome opportunity", says Holly, who is the first from her whānau to go to university. "Having DairyNZ's Māori adviser Sara Tairi along the way has also made a huge difference to me."

She's also proud to be contributing to DairyNZ's efforts to help farmers and the sector achieve environmental goals while maintaining profitability.

"Opportunities like this get more Māori students into both the science and dairy sectors. From a Te Ao Māori perspective, protecting the Earth for the generations to come is very important."



Holly Hay's Masters is on the importance of dung returns for building soil carbon.

What's in it for you?

Whether you're a young person or a mature career-switcher, DairyNZ can support you and your post-graduate study towards your dairying career. We also offer opportunities specifically aimed at encouraging Māori into agricultural science. Together, these initiatives aim to achieve better outcomes for our farmers and the dairy sector.

Find out more at dairynz.co.nz/scholarships

Talk of the townie

After “herding cats” as a big-city events manager, Lauren Randall says cows are easier. She’s loving dairying – and regular chats with boss Pete Morgan.



Technically, Lauren’s old Auckland job involved herding humans rather than felines. However, “trying to herd a bunch of drunk people is very similar to herding stock!” she says.

Her career switch came after locking down at Pete Morgan and Ann Bouma’s Te Awamutu farm due to COVID-19 in March 2020. She started working alongside partner Petra Burgess (the farm’s manager) and two other farm workers.

“What I saw on-farm encouraged me to give it a try. Then Pete got me involved in a Primary ITO Dairy Farming Apprenticeship in June 2021,” explains Lauren.

“In the past, I was in jobs I didn’t fully enjoy. So now it’s very important to me to go to work wanting 100% to be there. Pete is very encouraging around that.”

Pete’s career conversations with his team include one-on-one chats, after-work social catchups, fortnightly team meetings and six-monthly performance reviews. “We use our own on-farm messaging systems too,” says Pete, “plus we’re always together doing jobs.”

This creates motivated, engaged, productive and loyal people who stay. That’s important, because losing an employee can cost a business between 33% to 100% of that person’s salary (including recruitment and lost productivity costs).



We have each other’s interests at the heart of things.

Lauren says Pete’s always available to message or call, sits in on her Level 4 ITO training supervisor visits, and supports her recent AB technician training and new role as the farm’s full-time calf-rearer and young stock manager.

“We have each other’s interests at the heart of things,” says Lauren.

Moving from farm assistant to assistant farm manager in just one season, Lauren’s also brought in some “fantastic and quite unique” skills, says Pete.

“She trains the team on using our cow sensor collar system and makes the big decisions on its phone maps around moving the cows.”

He cites unflappability and agility as Lauren’s other “superpowers”.

“She’s quite good with people and at communicating what needs to be done and where, and in recording compliance. She can also understand what the big picture is,” says Pete.

Lauren aims to go on to Level 5 Primary ITO, and her long-term goal is to go contract milking with Petra.

“I’m very proud of myself,” says Lauren. “I didn’t think I’d take to farming as well as I have. A lot of that’s down to the people around me. I also wouldn’t have achieved the things I’ve done so far without that freedom to talk about and share ideas on how I want my role to look.”

Check out our templates and other resources to help you plan your team’s training at dairynz.co.nz/managing-your-team

Seasonal toolbox

Use these science-backed tools and resources to help with spring tasks.



Heifer development plan

This tool produces a progress plan for the first two years of a heifer's life to meet her weight-for-age targets.

Share it with your grazier to set expectations for the animal's weights, feed and health requirements.

Create your heifer development plan at dairynz.co.nz/hdp



Heat detection training

The best heat detection programmes start with careful planning, good observation and effectively using detection aids.

Distinguishing and interpreting cow behaviour and other signs are critical. So is good record-keeping and training those responsible for heat detection.

Check out our training tools and videos for heat detection aids and reading the signs – visit dairynz.co.nz/heat-detection



Managing BCS loss

All cows enter a state of negative energy balance for 6-8 weeks after they've calved and start to mobilise fat and muscle to meet the deficit. However, cows should be in a state of positive energy balance before mating starts.

If they're not at the desired Body Condition Score (BCS), achieve a positive energy balance through good feeding (e.g., feeding additional pasture or supplements to all or younger and/or thinner cows), and reducing energy demands (e.g., a period of OAD milking).

Access information about managing BCS loss in early lactation, nutrition and the *BCS Made Easy* field guide at dairynz.co.nz/bcs-loss



Effluent management

Don't get caught out with limited effluent storage over spring. Get the *Top Tips for Effluent Management* poster up at your shed for the team to follow.

Due to typically high soil moisture at this time of year, effluent application should be conducted with a 'little and often' approach. Effluent should be applied to land when conditions are suitable.

Although it can be a bit more work, reduce application depth to reduce any risk of ponding and/or runoff.

Download or order a poster at dairynz.co.nz/effluent-poster



Flexible milking

Have you considered reducing your milking frequency to ease pressure through the peak workload? Although there may be an impact on production, consider the benefits:

- More time to complete other tasks/take breaks.
- Improved work hours and start times.
- Improved energy status of cows.
- Some savings on shed and labour costs.

Read more about flexible milking research and try the Milking Time Planner tool at dairynz.co.nz/flexible-milking



Staff meetings and check-ins

Mid-year check-ins are a great way to reset, give and receive feedback on how each team member is doing, go over their career goals, and work together to plan what they and you need for the rest of the season.

These check-ins recognise their hard work while also providing a platform to openly discuss their performance and growth.

Get staff meeting resources and free templates to help make the job easier at dairynz.co.nz/people



NORTH WAIKATO

A climate of innovation

Matamata-Piako climate change pasture workshops have also unearthed a local farmer's multi-species summer crop solution.

Over the last three years, Springdale dairy farmers Anthony and Kerrie Pollock have been quietly managing their summer crops in response to rainfall changes and steadily rising temperatures.

"As a summer-dry farm, individual crops like turnips end up as expensive raisins because they shrivel up," explains Anthony. "Chicory's only good for a little while and then it doesn't get enough rain either. Yet, the crops seem to do better when mixed in together."

In spring 2022, the Pollocks attended a local climate change farmer workshop led by DairyNZ, and then spoke about their summer cropping trials. They're adapting to summer dry by growing 11 species in some of their pasture paddocks.

DairyNZ senior scientist Dr Pierre Beukes says the workshops were part of two pasture-focused climate change projects (see below right). Since 2021, research has been carried out on farms in the upper North Island (Matamata-Piako) and lower South Island (Edendale). Heat stress is another aspect looked at in these regions.

"Modelling has shown it's likely to be drier and hotter in Matamata-Piako, affecting ryegrass viability and leading to less pasture growth," says Pierre, "while the lower South

Anthony Pollock checks one of his mixed-species summer crop paddocks.



Island is likely to have more pasture, as they'll have the moisture alongside the higher temperatures."

The Pollocks' mixed pasture areas feature 11 species, including clovers, chicory and plantain, cocksfoot and prairie grass. So far, it's looking promising, says Anthony.

"Pierre also did some pasture growth scenarios for us – and told us there was extra profit to be made by calving six weeks earlier. So that's another way we're trying to adapt to the weather," says Anthony.

Pierre says that without effective adaptations to climate change, farm profitability in the Matamata-Piako District could drop from between 25% to 60% by the end of the century.

"Indications are that farmers should look at stocking rates, calving dates and feed management – including a plan for home-grown summer feed – while factoring in environmental and animal health considerations as well."

About these projects

The projects are part of 'Primary Sector Preparedness to Climate Change' under the Deep South National Science Challenge. Both projects are a partnership between Lincoln University, DairyNZ, Landcare Research Manaaki Whenua and NZ's National Institute of Water and Atmospheric Research (NIWA); with Tatua Co-operative Dairy Company being involved in Matamata-Piako.

Good practice has flow-on effects

While a 20-year research project indicates good farming practices have improved water quality, it's also shown more can be done by everyone within the sector to help all farmers meet targets.



Dr Katrina Macintosh
Senior scientist
DairyNZ



Prof Rich McDowell
Principal scientist
AgResearch



Dr Craig Depree
Principal scientist
DairyNZ

Most New Zealand dairy farmers are working hard to reduce contaminants being lost into waterways. Continual improvement is key, and that's where long-term studies like this one can help.

Over the 20-year study period, the project team found that good farming practices (GFPs) across five dairy catchments had improved the water quality trend direction in two-thirds of contaminant measures, despite significant dairy intensification over that time. However, there is still plenty of opportunity for the sector to work with farmers to use more GFPs if they are to meet some of the regulatory limits in these catchments.

About the project

The 'Best Practice Dairy Catchments 2001 to 2010' practice change project involved multiple stakeholders and funders, including the dairy sector¹ (see p. 29 for full list of those

involved). The project helped farmers reduce contaminant losses getting into waterways on or near their properties from key sources on their farms.

A variety of mitigation strategies were put in place, including but not limited to:

- transitioning from discharge of effluent (to waterways) to land-based application instead
- shifting from flood to spray irrigation
- minimising grazing or effluent application on wet soils
- stock exclusion from waterways (via fencing and stock crossings).

The project team at the time also provided support and advice to farmers via workshops and the development of well-thought-out farm environment plans.

Research took place in five dairy-dominated catchments selected for their representativeness of the soils, climates and farm systems found in New Zealand's major dairying regions (Figure 1). Two catchments were in the North Island; three were in the South Island.

After the 'Best Practice Dairy Catchments' project officially ended in 2010, monitoring of water quality and changes to farm practices continued as part of national long-term data collection. This meant the current project team could compare water quality trends over three time periods to see what effect practice change on-farm had on water quality over time. These were:

- (i) 2001 to 2010 (when GFPs were combined with support and advice).
- (ii) 2011 to 2020.
- (iii) Across the entire 20-year study period (2001 to 2020).

What we did

The five catchments are flat (<7°) to rolling (<15°), and had a wide range of rainfall, from 540mm in Waikakahi (plus irrigation) to 3600mm in Inchbonnie².

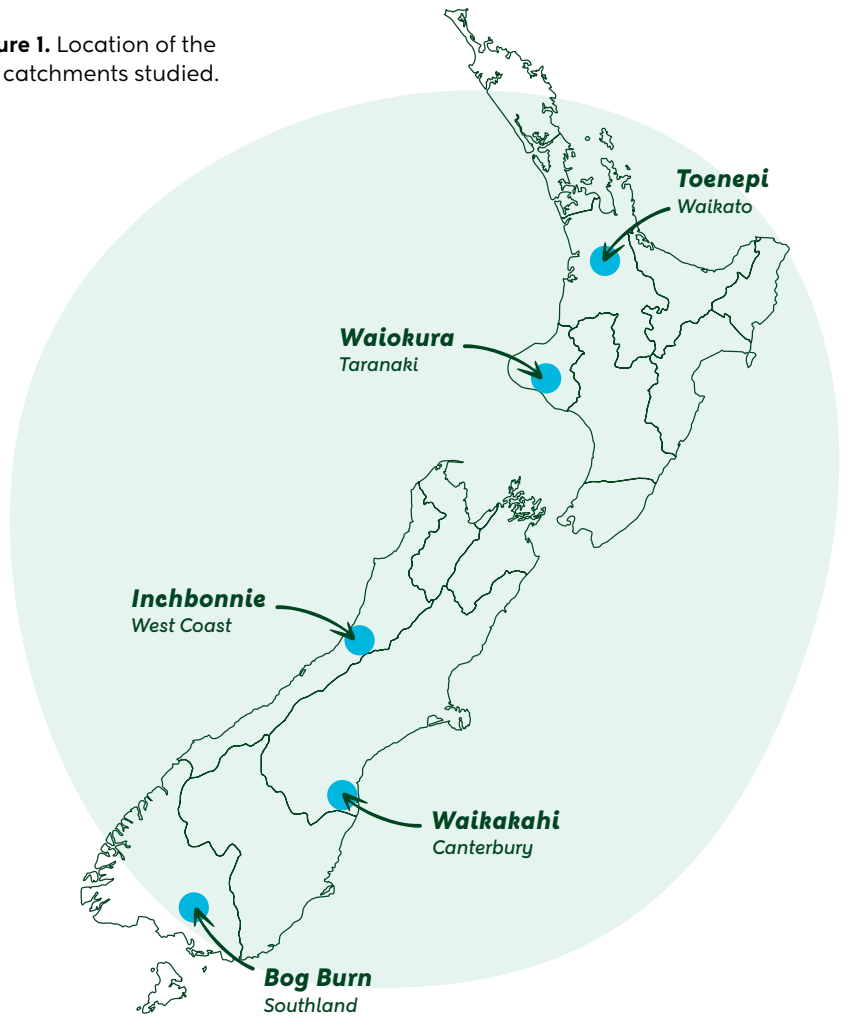
The North Island catchments, Toenepi (Waikato) and Waiokura (Taranaki), are on volcanic silt loam soils, while the South Island catchments, Inchbonnie (West Coast) and Waikakahi (South Canterbury), are free-draining alluvial, stony silt loams. Bog Burn (Southland) is dominated by poorly draining sedimentary silt loam soils that require artificial drainage to be productive.

Data collection

AgResearch staff collected farm practice data through surveys in 2001, 2003, 2006 and 2009. Survey data was also collected in 2016 (National Institute of Water and Atmospheric Research/NIWA) and 2021 (DairyNZ).

The data we analysed included animal stocking rates, purchased feed and milksolids produced, farm management practices such as nitrogen (N) and phosphorus (P)

Figure 1. Location of the five catchments studied.



fertiliser use, Olsen P (soil P levels), effluent, irrigation, and winter grazing practices. Regional councils provided us with effluent consent information.

The project team also analysed monthly water samples collected from the outlet of each catchment over the 20-year period.

For the analysis, we focused on key indicators of water quality, including two different forms of N (nitrate-N and ammonia-N) and P (dissolved-P and total-P), suspended sediments and the bacterial pathogen indicator *E. coli*.

The team identified water quality trends and mid-range levels of concentration for each contaminant, in each catchment, over the three time periods. More information on how these were calculated can be found in the online factsheet *Calculating water quality trends in rivers and lakes at lawa.org.nz*

What we found

Between 2001 to 2010, the project team found trends across 83% of the various waterway contaminant measures were either improving or showing no change. Between 2011 and 2020, almost 70% of water quality trend directions were either improving or showing no change. Across the entire study period, from 2001 to 2020, two-thirds of water quality trends were improving, but several were degrading (see Figure 4 on page 28), especially nitrate-N.

Climatic variation, and lag times in detecting a trend, can result in differing trend outcomes between periods. However, assessing water quality trends through research projects like this one with 20-year timeframes has been shown to be more robust. The long-term approach also means analysis of the data is less susceptible to the

Water quality trends

A trend in water quality data shows how measured values for contaminants have been increasing or decreasing over a time period. As the measures decrease, water quality improves; as the measures increase, water quality degrades.

Using the Waiokura catchment as an example, in *Figure 2* below, the green trend line shows that during the 20-year study period, ammonia-N measures have been decreasing, improving water quality from the baseline (dotted horizontal line).

Again, for the Waiokura catchment only, in *Figure 3* below, the red trend line shows that during the 20-year study period, nitrate-N measures have been increasing, indicating degrading water quality from the baseline.

The steeper the slope of the trend line, the greater the difference in water quality compared to the baseline.

Figure 2. Water quality improvement: 20-year water quality trends (ammonia-N measures, Waiokura catchment only).

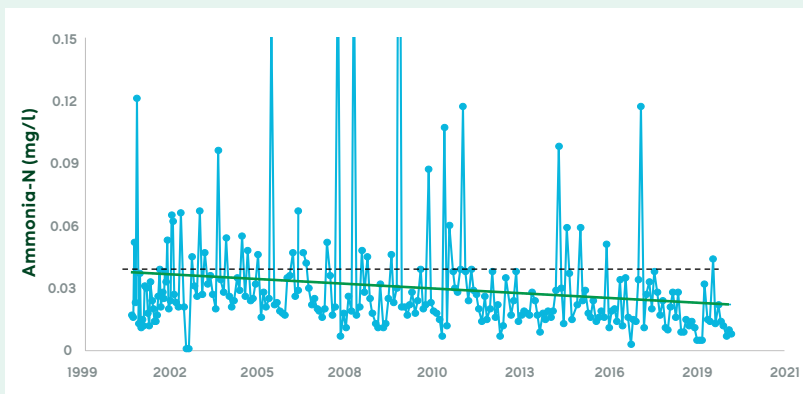
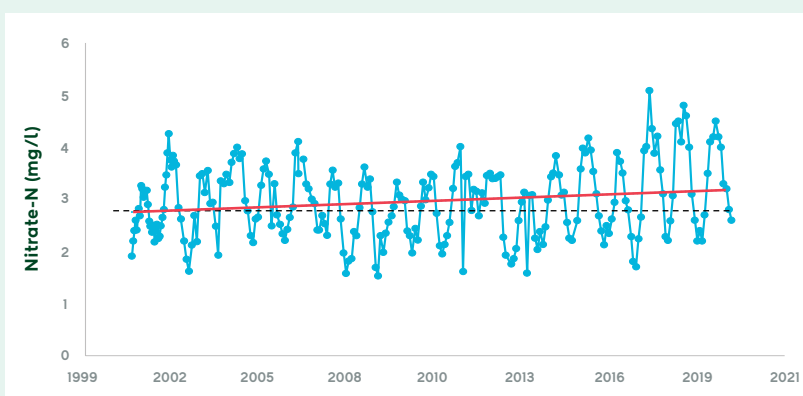


Figure 3. Water quality degradation: 20-year water quality trends (nitrate-N measures, Waiokura catchment only).



It's important to remember, however, that there are two aspects that make measuring water quality trends tricky:

- large variations in monthly measurements (blue circles)
- interference caused by longer-term seasonal patterns (or oscillations).

We now know these aspects can have major influences on trend direction, even when there is 10 years of water quality data. However, these climate oscillations tend to 'even out' over longer time periods (e.g., >15-20 years).

influence of variables other than land management practices (e.g., climate)².

Between 2001 and 2010, nitrate-N median concentration in Waikakahi was 1.8mg/L. This increased to 3.1mg/L between 2011 to 2020, which exceeds the latest regulatory bottom line for nitrate-N of 2.4mg-N/L³.

Increases in nitrate-N concentrations in the Waikakahi catchment was caused when farmers transitioned from flood to spray irrigation, which had an associated increase in stocking rate and nitrate leaching. On the other hand, the discharge of farm dairy effluent (to water) is a major source of ammonia-N to waterways, and, therefore, transitioning to land-based effluent application has resulted in improving ammonia-N trends in all five catchments.

On average, stocking rate and milksolids produced per hectare increased between the 2001 to 2010 and 2011 to 2021 periods. Farmers influenced these increases by using, on average, 20% more N fertiliser applied (but 37% less P fertiliser was used) and increasing purchased feed by 112% on average across the five catchments. See the end of this article's reference list for a link to where you can read full details of the project team's research and results.

Water quality improved significantly across all five catchments during the 20-year project.

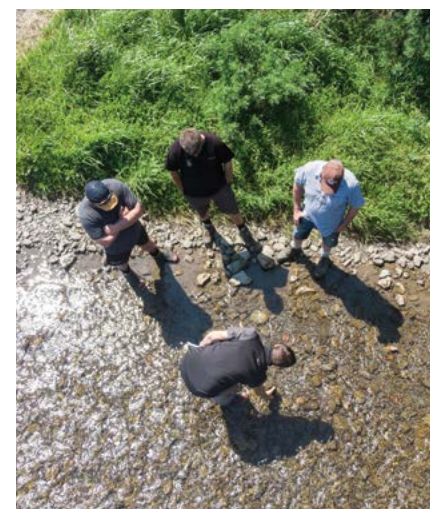
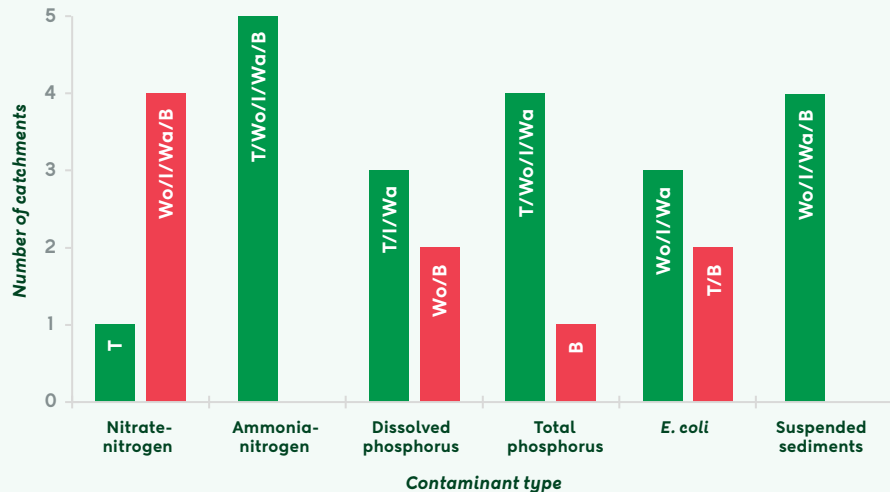


Figure 4. Number of catchments with improving (green) and degrading (red) water quality trends across the five catchments during the 20-year study period, 2001 to 2020. (Note: Toenepi showed no change for suspended sediments).

Green = improving trend (in-stream concentration has decreased)
Red = degrading trend (in-stream concentration has increased)

T = Toenepi
Wo = Waiokura
I = Inchbonnie
Wa = Waikakahi
B = Bog Burn



What farmers did and how it helped

At different times throughout the study period, our project team noted significant changes in farmers' GFPs. Across the five catchments these changes included:

- an increase in effluent pond storage and deferred application in Bog Burn and Waikakahi
- a transition from flood (i.e., border-dyke) to more water-efficient spray irrigation in Waikakahi
- the use and capture of effluent from stock wintered on off-paddock facilities in Inchbonnie
- a greater area receiving farm dairy effluent in Waiokura
- a change from discharge of effluent (to waterways) to land-based application in Inchbonnie and Toenepi
- better wintering practices.

Stock exclusion and riparian restoration also improved water quality trends⁴, as part of the Dairy Clean Streams Accord⁵.

Together, we can do even better

Other published research by Monaghan *et al.*, (2021) has demonstrated that, without mitigation, much more N (+45%) and P (+98%) would have been lost from dairy farmland between 1995 and 2015 if farmers hadn't changed their

practices⁶. Furthermore, McDowell *et al.*, (2021) estimate that nutrient losses can be further reduced by a third (on average) if farmers can carry out further mitigations by 2035⁷.

Despite the gains made by those farmers in the catchments who are using GFPs, there's still room for improvement. While these catchment farmers did improve water quality by using GFPs, some of the catchments studied still don't meet the latest regulatory national bottom lines for some contaminants (e.g., nitrate). So, there's plenty of opportunity for all farmers and the sector to work together on increasing the use of established and emerging/future GFPs to help meet those targets.

DairyNZ is continuing to develop practical, achievable and scalable solutions based on tangible evidence that will enable all farmers to reduce N losses.

What farmers do on the land does make a difference to what ends up in their waterways, so adopting established (and any new) GFPs is a genuine priority.

Having a comprehensive farm environment plan in place is another essential which will enable farmers to improve water quality in ways specific to their farm and, by association, its whole catchment.

Key Points

1. The 'Best Practice Dairy Catchments 2001 to 2010' practice change project ran in five dairy-dominated catchments in NZ, supported by the dairy sector.
2. We monitored farmers' good farming practices (GFPs), and six contaminant level trends in water quality for each catchment, across each of the 10-year periods (2001 to 2010, 2011 to 2021).
3. Most farmers in the surveyed catchments were involved in adopting GFPs on their farms.
4. Over the 20-year period and across the five catchments, GFPs had improved trend direction in two-thirds of the 30 sets of contaminant measures analysed in total.
5. Using and improving GFPs will help all NZ farmers meet regulatory targets while protecting the environment.

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For full details of this research, please refer to the following publication:

McDowell, R. W., K. A. Macintosh and C. Depree. (2023). Linking the uptake of best management practices on dairy farms to catchment water quality improvement over a 20-year period. *Science of the Total Environment* 895, 164963.

Open access online at:
<https://doi.org/10.1016/j.scitotenv.2023.164963>

This study involved the following organisations:

DairyNZ, Fonterra and Westland Milk Products, AgResearch, National Institute of Water and Atmospheric Research (NIWA), as well as regional councils relevant to the five catchment areas.

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Regional leader	Mark Laurence	027 704 5562
Senior extension partner	Janine Swansson	027 381 2025
Extension partner	Brianna Hull	021 244 3428
Extension partner	Francesca Bennett	027 702 3760
Extension partner	Tegan Pope	027 808 3411

Upper South Island

Regional leader	Anna Hall	027 411 5663
Regional partner	Antoinette Archer	027 1800 3122
Regional partner	Tony Hutchison	027 808 3292
Regional partner	Dan O'Keefe	027 808 0133
Senior extension partner	Mark Shadwick	021 287 7057
Senior extension partner	Ross Bishop	027 563 1785
Extension partner	Heather Donaldson	027 593 4124
Extension partner	Alex Perrott	027 379 8069
Extension partner	Nicola Blowey	027 1800 4721

Southland/South Otago

Regional leader	Guy Michaels	021 302 034
Regional partner	Stuart Evans	027 393 0114
Regional partner	Darren Smith	027 1800 4717
Senior extension partner	Nathan Nelson	021 225 6931
Senior extension partner	Nicole Cochrane	021 240 8529
Extension partner	Keely Buckingham	027 524 5890
Extension partner	Gareth Baynham	027 808 9425
Extension partner	Chris Wratt	022 850 1166

DairyNZ directors

Jim van der Poel	021 848 484
Chris Lewis	027 289 8942
Jacqueline Rowarth	027 694 4334
Tracy Brown	027 291 1716
Mary-Anne Macleod	021 923 332
Margaret Devlin	021 328 200
Mark Todd	021 271 1328



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