

INSIDE DAIRY

Your levy in action

Mountains of change

Farming then and now



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Milk alternatives: fact vs froth 26



OVER THE FENCE...

Resilient, hard-working and adaptable.

Those have always been strengths of our dairy farmers and our sector as a whole.

We talk a lot about challenges and opportunities in dairying. Based on experience, we know a bit about them, and there's no doubt that 2022 was a challenge for many.

The resilience of our farmers and demand for our great dairy products led to dairy exports hitting new highs of \$22 billion, resulting in our sector contributing around \$50 billion to NZ's economy.

Kiwi farmers are world-leading in milk production, despite confronting challenges in recent years. Why? Because we have decades of expertise on-farm, underpinned by R&D, and on top of that, Kiwi farmers are incredibly resilient and hard-working. Some of those farmers feature in *Inside Dairy*, sharing how they manage the challenges of people, weather and regulations.

I'm picking the year ahead will be no less dynamic and challenging. Top of mind for many is inflation, with expenses up around \$1/kg MS on last season alone. No one knows with certainty where the milk price will land, but we do know that high-performing farmers begin thinking about changes ahead of time.

We know there'll be continued strong demand for staff on-farm, regulatory changes including the climate change policy and water plans, and likely impacts of variable weather patterns. Off-farm, alternative dairy products aren't going away, but it's critical we understand and share the science – see our 'fact from froth' story on page 26.

With these issues on the minds of many, DairyNZ is on a mission to better connect with our dairy farmers, which includes broadening our range of support and events for you. This support is particularly geared at helping you manage the years ahead to ensure we have profitable and sustainable businesses.

Dairy, in my opinion, has a very positive future. We just need to work together through these challenges first!

I always appreciate your feedback, so please get in touch at tim.mackle@ceo.dairynz.co.nz

Tim Mackle
Chief executive | DairyNZ

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On the cover:

Taranaki's Ben and Belinda Price (2nd and 3rd from left) and their farm team from this edition's cover story.



Reader survey – be in to win

What are you enjoying about *Inside Dairy* and how could we make it a better read for you? Complete our quick survey and go in the draw to win one of five \$100 Farm Source store vouchers. Head to bit.ly/insidedairyfeedback. Terms and conditions apply.



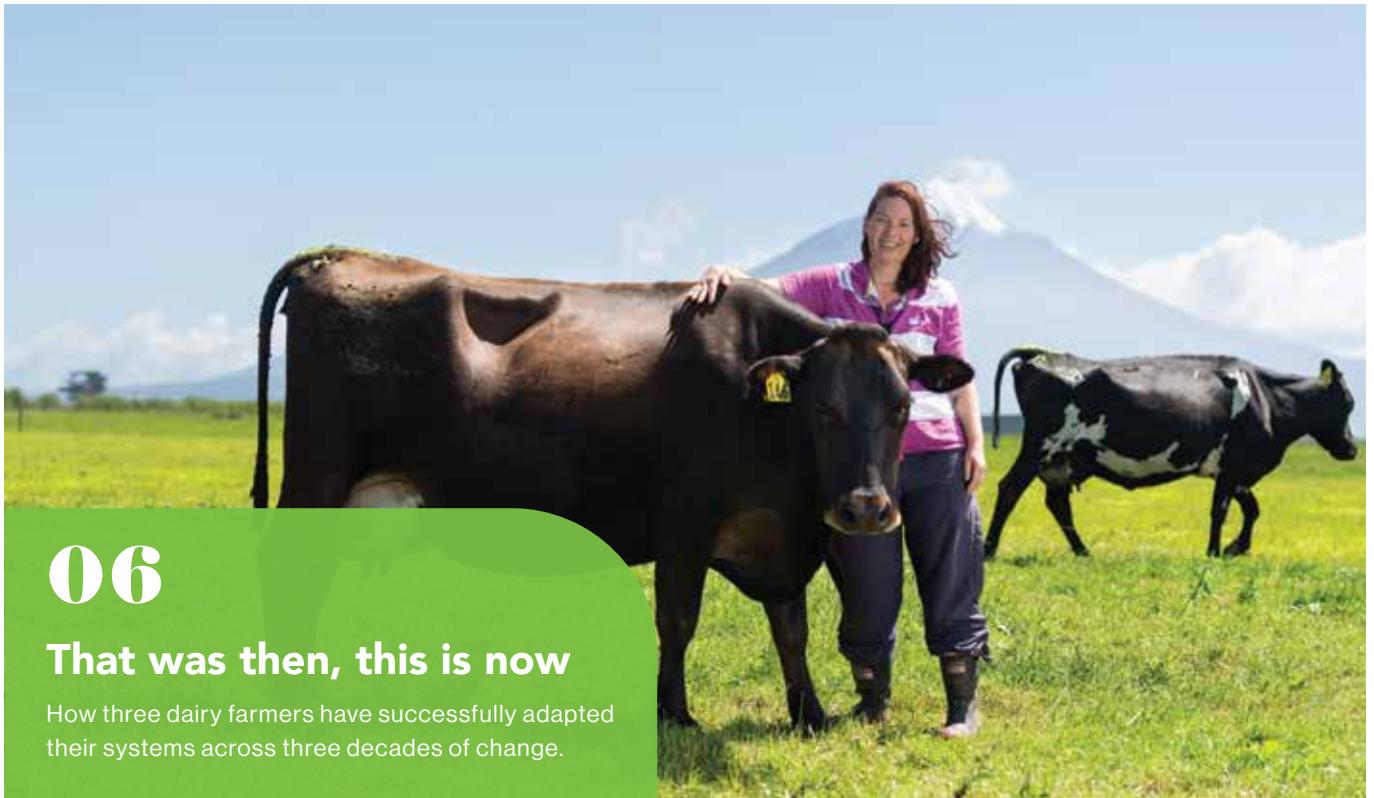
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How three dairy farmers have successfully adapted their systems across three decades of change.



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Are bigger cows better?

Our latest mythbuster looks at whether a herd with bigger cows boosts your profitability.

26 Milk alternatives — separating fact from froth

Exploring claims being made about milk alternatives and how those claims relate to our sector's competitiveness.



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

Post your vacancy today

We know many farmers are under huge pressure to fill roles this season, so DairyNZ is starting a new drive to inspire young people into dairy farming roles in time for calving.

We encourage you to post your vacancies as soon as possible on nzfarmsource.co.nz/jobs

From late March, we'll be running advertisements on our social media and online platforms, giving people information on how to apply. This is part of our GoDairy campaign.



If you're looking for staff, you can also check our recruitment resources at dairynz.co.nz/people-resources

Upskill in 2023 with Dairy Training

Whether you need a plan for 2023 or the tools and motivation to make personal or farming goals happen, Dairy Training has a short course for you.

Dairy Training courses kick off in February across the country. All tutors are farmers or rural professionals and love helping farmers to succeed in the industry they love.

Make 2023 your year to upskill with Dairy Training, subsidiary of DairyNZ.

Visit dairytraining.co.nz today.



Brighter. Braver. Bolder.

That's the theme of the 2023 Dairy Women's Network (DWN) conference in Invercargill on May 3 and 4.

"All rural women are welcome, and we want them to leave the conference feeling energised, with the tools to help their farming businesses be profitable and sustainable," says DWN CEO Jules Benton.

That goal is supported by DWN founding partner, DairyNZ, which provides its expertise to the organisation and, like DWN, works to connect with women across the sector.

Keynote speaker at this year's DWN conference is Lucy Bloom, an award-winning business leader/author. The Fonterra Dairy Woman of the Year will also be announced.

Head to dwn.co.nz/dwn2023 for more details.

Develop your governance

Registrations are now open for DairyNZ and Business Torque's widely respected Rural Governance Development Programme 2023.

Take part in this multi-day programme over 10 months to grow your understanding of governance disciplines and your confidence in applying them.

Suitable for dairy businesses of all sizes and structures, the course begins in June in Christchurch and July in Taupo.

Visit businessstorque.co.nz/#rg to see what other farmers say about the programme and to secure your spot.



Moth



Eggs



Larvae

Checked your crops for fall armyworm?

Fall armyworm (FAW) is believed to have blown into New Zealand on winds from Australia in early 2022, a reminder that threats can bypass our border.

This insect pest can threaten crops in its larvae stage. Although it prefers maize and sweetcorn, it can survive on other plant species.

Fall armyworm has been reported in parts of the North and South Island. Further spread is likely as moths can fly long distances.

So, it's important to know how to identify and report it, and be supported to manage it if you find fall armyworm on your property.

- For information, including how to identify and report fall armyworm, visit mpi.govt.nz/fall-armyworm
- If you suspect you've found fall armyworm, take a photo and call Biosecurity New Zealand 0800 80 99 66 or report it online at report.mpi.govt.nz/pest or email FAW@mpi.govt.nz
- There are approved pesticides to manage fall armyworm. Contact your agrichemical agent for advice. For information on management and latest updates, visit far.org.nz

Workforce efficiency study sparked by staff shortages

How can we create more modern, productive and safe dairy farm workplaces now and in the future?

That's the focus of a new Workforce Productivity study examining farm practices and technology in the workplace.

DairyNZ senior scientist Callum Eastwood says one in three farms continue to be short-staffed, and many farmers and their teams are looking for ways to address this issue.

"The study's data will enable New Zealand dairy farmers to benchmark the productivity of their farms' systems, technology, management and teams, to help identify ways to improve efficiency and save time."



DairyNZ, with delivery partner QCONZ, will conduct the on-farm survey this summer (early 2023), with around 150 dairy farms owners and managers nationwide.

"We'll analyse dairy farm activities at different periods of the year, including time spent on milking and herding cows, pasture assessment, calving and general day-to-day planning. We're also estimating the total hours per year it

takes to run each farm," says Callum.

"By working with and listening to farmers, we want to develop the right farm workplace solutions that will improve farm systems, productivity, work/life balance and wellbeing."

Farmers can still register for the survey by emailing callum.eastwood@dairynz.co.nz



Plantain is one promising tool DairyNZ is investigating with farmers.

DairyNZ science in the spotlight

An overview of DairyNZ's current research focus and how we're maximising every dollar of levy investment, from DairyNZ's Bridget Maclean.

Bridget, farmers are facing some tough challenges: new regulations, inflation, adapting to climate change, and significant staff shortages. What scientific advances are on the horizon that will help farmers to meet these challenges?

There are some complex issues to tackle, but we're making headway with solutions that are practical and keep us internationally competitive, regionally resilient and locally responsible.

One of our largest research programmes is focused on helping farmers reduce methane emissions, while maintaining profitability. Most of the methane inhibitors in development worldwide have been designed to suit indoor farming systems or feedlots. We're investigating options that will work in pasture-based grazing systems. We're planning on having these options ready for testing on farms by 2025.

Plantain is proving to be a helpful tool for reducing nitrogen leaching. We're currently working closely with farmers to determine by how much it can reduce nitrogen leaching — and have councils recognise this. We're also developing resources so farmers can use plantain confidently on farms across New Zealand.

As part of our new Frontier Farms research programme, we're looking ahead to see what our international competitors will be doing in ten years' time. We're planning to then trial innovative tools and strategies on demonstration farms, so farmers have practical options to use in their own operations. This will allow us to maintain our advantage in international markets. A couple of key issues we want to address are reducing labour requirements and production costs on farms. Frontier Farms will also help test options to address competition from plant-based alternative 'milks' (see pages 26-29 of this *Inside Dairy*) and explore new opportunities for bobby calves.



Farmers are alongside us, testing our ideas and giving us feedback ...”

We haven't forgotten about the more traditional research areas either. DairyNZ is funding NZAEL to continue improving our animal evaluation systems, so we can keep improving genetic gain in our herds and farmers can meet their business goals. Our Advancing Forages research is developing feed supply systems, fit for purpose for regional climate resilience, including farmer-led evaluation and system design.

How do you turn the research into something practical for farmers to use?

Farmers are involved in about 80% of our projects from the time we have a solution concept onwards. So, in most cases, farmers are alongside us in testing our ideas and giving us feedback on what works on-farm, and what doesn't, throughout each research programme.

We also use a co-design model for some of our projects. This means farmers help us to identify science solutions, then develop and assess them.

This year, we're also launching a new end-user farmer group to ensure we're working on the most relevant science problems.

How do you get the greatest value from every research dollar invested?

We're highly focused on trying to maximise the value out of each investment dollar by working closely with partner organisations. Many of our research programmes receive significant Government funding, and funding from other research organisations, achieving good leverage for the levy spend.

Overall, 67% of our research work is funded from DairyNZ levies, and 33% is funded from other sources. Our plantain research programme is a great example of this. It's jointly funded by DairyNZ, MPI's Sustainable Farming Fund, PGG Wrightson Seeds and Fonterra.

We also work together with other research organisations to draw on their expertise, and our team assists other organisations if there's a benefit to dairy farmers.

This year, we're introducing a new science panel, a group of independent scientists who'll oversee our research programme.



Bridget Maclean, DairyNZ general manager new systems and competitiveness.

This will help ensure our science investment and methodologies are world-class.

Lastly, tell us a little bit about yourself.

I'm originally from Northland and farming is in my blood. I've worked in agricultural science research for more than 25 years. I'm proud to be leading an excellent team of researchers who are internationally recognised and absolutely passionate about helping farmers.



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To find out more about DairyNZ's research programme, visit dairynz.co.nz/research



FARM FACTS

Ben and Belinda Price

ROLE:

Farm owners and farm lessees

LOCATION:

Auroa/Otakeho, Taranaki

FARM SIZE:

93.5ha (own farm) and 129ha (leased farm with runoff)

HERD:

600 crossbreed cows (two properties)

PRODUCTION:

230,000kg MS/year (two properties)

That was then, this is now

In every challenge, there's opportunity. That's if you can adapt, as these farmers have done.

When former travel agent Belinda Price joined husband Ben to go dairying back in the early 2000s, she went from booking others' journeys to crafting her own. Proving the sky's the limit, she went on to win Fonterra's Dairy Woman of the Year in 2021.

Belinda and Ben have seen big changes in workplaces across the sector as they've worked their way up from sharemilkers to farm ownership. They're now in their fifth season on their own Taranaki farm, and added a leased farm to the mix 18 months ago. However, back in their early days as employees, maintaining relationships with "the farm owner, stakeholders and the team" could get tricky.

"As a sharemilker, you're kind of like 'piggy in the middle', trying to keep everybody happy at the same time," explains Belinda.

By the time they became farm owners, they'd seen all kinds of complex behaviours from people at every level.

Nevertheless, becoming 'the boss' was another big learning curve.

"I think some of the staff knew more about HR and what their entitlements were than I did," smiles Belinda. "I got pulled up by them a few times!

"The key to everything now is work-life balance. You can't do 12-hour days all year and not have a break. Now it's a more inclusive environment. Everyone takes a lot more responsibility, things have to be talked about, communicated about."



Managing the people

Given the current sector-wide labour shortage, successfully recruiting and retaining people on-farm is important. That's something Belinda and Ben are hot on. A key part of choosing their employees involves selecting people who are a good team fit. It's a major reason they're enjoying working with their current staff, who've told them the feeling is mutual.

Their approach also lines up with the sector's *Great Futures in Dairying 10-year plan (dairynz.co.nz/GFID)* which is focused on keeping dairying competitive by growing, attracting and retaining a wide range of people into modern, productive and safe workplaces.



We just try and be honest and truthful and have the right environment where they can flourish and achieve their goals."

"There are always challenges, even within really great teams," acknowledges Belinda. "We just try and be honest and truthful and have the right environment where they can flourish and achieve their goals. That's really important to us — that when they do leave us, they're better than when they came."

Having a great team is also "hugely powerful", she adds.

"When you've got that, it's really awesome. You know you can rely on them and, when you're having a tough time, they've got your back, they'll step up and take that pressure off you."

The Prices also make sure their team has rostered time off (they run six days on, two off, year round), plenty of food on hand, "warm, dry, up-to-spec" housing on-farm — and even free gym memberships. Team get-togethers and off-farm activities are an important focus too.

"I've even taken them to Surfing for Farmers each week over the summer," Belinda laughs, noting, "I was shocking at it!"

The Prices also provide and support their team into opportunities to get formal qualifications, attend learning events off-farm, and informal on-farm training.

"Ben went out with Harmony the other day to show her the different stages of the grass growth, the leaf stages and things like that. We're all learning together," says Belinda.

1. Belinda leads a team session.
2. Partners Tee (2IC) and Andrea (herd manager).

3. On-farm training on how to use the defibrillator.
4. Tractor fan and eldest son Hayden Price changing oil.

Managing the dry and wet

Learning and adapting over time is something Northland dairy farmers Murray and Helen Jagger have also been doing. Murray's family has owned and worked on their Whangarei Heads farm since the 1850s. Murray's been tweaking its system since the 1980s to cope with warmer temperatures and changing rainfall patterns.

That's mainly been through trialling different kinds of pasture species better suited to today's conditions there, says Murray. He also runs Jerseys as, in his words, they adapt really well to hotter drier temperatures.

"In the 1980s, we were part a farm scheme similar to the Extension 350 programme," explains Murray, who was also an early mentor when E350 was set up. (E350 was a Northland partner farm network that ran from 2016 to 2022).

"We captured quite a lot of data then and since, and we've got quite a lot to draw on, including weather data and growth rates."

Murray says annual rainfall volumes haven't changed much: it's the frequency and intensity of rain events that's different.

"Now we have more extremes, the dries are starting a bit earlier and going a bit harder, the wets are wetter and there are more of them."

They used to get massive soil cracking in summer in the 1970s, but not now.

"Dad regularly used to put wheat bait on to kill the cricket populations too," remembers Murray. "We haven't needed to do that for many years. I'd put that down to soil structure and root capacity improvement."

Murray says ryegrass plants are unsuitable for the dry conditions and have weak root systems. They also damage easily in wet conditions, which leads to soil structures breaking down. Kikuyu is their pasture of choice now, alongside fescue and cocksfoot for renewals.

Murray also sees managing climate change as part of a partnership between the regulators and farmers.

"Learning from experience and staying adaptable is where industry and farmers come together," he says.

"We've been doing this for 30 years. We can't change weather events, but we can change the decisions we make on-farm and how we adapt to that changing data. Whether that's temperature recording, rainfall recording, whatever, we can become more resilient with what we can control. You can only influence that if you know what the challenges are and what's happening."



Former Kikuyu Action Group leader Murray says pasture renewal fescues and cocksfoot are now softer and more palatable to cows.



Murray (R) and Duncan Bayne do a weekly C-Dax pasture meter ride.



We can't change weather events, but we can change the decisions we make on-farm..."

FARM FACTS

Murray and Helen Jagger

ROLE:

Farm owners

LOCATION:

Whangarei Heads, Northland

FARM SIZE:

230ha (effective dairy platform);
320ha beef

HERD:

650 Jersey cows

PRODUCTION:

200,000kg MS/year



The Sleees say the way they irrigate their farm has completely changed.

FARM FACTS

Devon and Mark Slee

ROLE:
Farm owners

LOCATION:
Ashburton, Canterbury

FARM SIZE:
1109ha (effective) (across three farms, including 751ha total milking platform)

HERD:
2850 Crossbreeds (approx. 950 cows per farm)

PRODUCTION:
440-470kg MS/cow/year

Managing the rules

Canterbury farmers Mark and Devon Slee also have decades of dairying experience under their belts, which makes adapting to change second nature. The Sleees have been farming in the Hinds Plains catchment in Canterbury for 33 years, including buying Mark’s parents’ farm in 1995. Now they own three properties, with a lower-order sharemilking couple on each farm.

“Back then, there weren’t a lot of environmental regulations and things were more production-oriented. There were some rules around effluent management, but really, it was a different scenario,” notes Mark.

Since then, water management and efficiency has become a big focus for Canterbury farmers of all kinds, alongside winter grazing, climate change, water quality, and operating within the regional council’s N-cap (190kg N/ha/year), says Mark .

“Over that time, we’ve changed our water management from flooding irrigation to border dyke manual and labour-intensive irrigation, and finally to centre pivots plus

soil moisture monitoring. It’s all about putting the right amount of water on.”

Since the 2017/18 season, the Sleees have managed to:

- reduce the farm’s fertiliser use from 258kg N/ha/year to 178kg N/ha/year (without a significant impact on milk production)
- reduce the farms’ N-loss from 91kg N/ha/year in the 2016/17 season to 73kg N/ha/year by the 2020/21 season (they’re now sitting under the N-cap)
- drop their purchased N surplus from 141kg N/ha/year in 2018/19 to 72kg N/ha/year in 2021/22.

“It’s about being proactive, getting the right advice, talking to farm advisers, going to discussion groups, getting some good advice on what to do to achieve today’s nitrogen reduction targets,” explains Mark. “Use expert knowledge so you know what the next steps are, and use background information gathered off your farm.”

He’s also big on seeing challenges as opportunities.



If you’re not in the black, it’s hard to be green.”

"I think the N cap one is a good example. While it's better for the environment, you're actually getting a better return by using nitrogen efficiently; it's potentially more profitable than what you were doing in the past.

"Focus on keeping your cost structure tidy, so that over time you can make changes. If you're not in the black, it's hard to be green."



Mark addresses farmers at a recent open day on their farm, outlining the Slee's environmental achievements.



Mark says centre pivots not only irrigate efficiently, they save on labour too.



Change tools and resources

- Learn about managing your team at dairynz.co.nz/people
- See on-farm actions at dairynz.co.nz/environment
- Get GHG and climate change info at dairynz.co.nz/climate-change

Tip-ping points

Our farmers share their top tips on adaptability.



People

— the Prices:

1. Don't sweat the small stuff — choose your challenges.
2. Don't react to issues instantly — time your discussions carefully.
3. Ensure staff know what's needed. Step back when you can.



Climate change

— the Jaggers:

1. Understand your own environment: measure, monitor, understand.
2. Use the technology available to help you make those changes.
3. Stay continually adaptive to the conditions.



Environmental regulations

— the Slee's:

1. Make small incremental changes over time.
2. Pick up technology along the way.
3. Know your business — knowledge is power.

How to build a high-BW herd

Six steps to breeding cows that more efficiently convert feed into profit.

Developing a herd with a high Breeding Worth (BW) can significantly boost your long-term profitability. A herd in the top 10% of BW can contribute an extra \$25,086 in profit per year compared to a herd with a median BW.

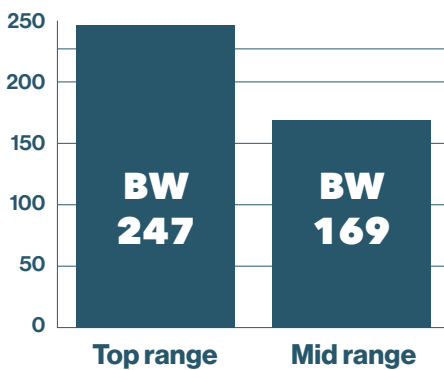
Here's how you can close that gap.

STEP

1

Use high-BW sires

Using a high-BW sire will increase the average BW of your herd.



Top-range herds tend to use a sire 60BW higher than mid-range herds, resulting in higher herd average BWs for top herds. Identify top-performing bulls using NZAEL's Ranking of Active Sires list at dairynz.co.nz/RAS

STEP

3

Use DNA sire verification

TWICE as many animals are DNA verified in top-ranking herds, compared to mid-range herds (top range 42%, mid range 24%)

Mix-ups with parentage slow the rate of genetic gain in your herd. A cow with uncertain parentage may not perform as well as you expect. DNA sire verification can help you identify and correct mistakes.

STEP

2

Keep accurate and detailed records

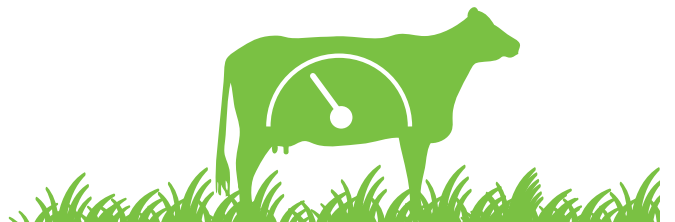


Calving and mating records assign a mother and a father to cows. Recording parentage helps you make better decisions about which cows to breed from and which to cull. It also helps to increase genetic gain across the national herd.

STEP

4

Measure cow performance



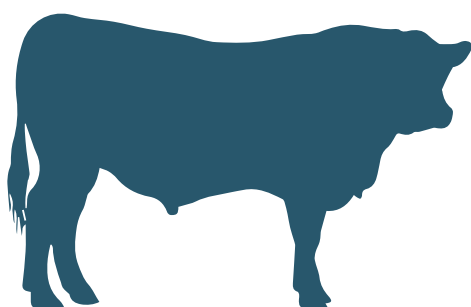
75% of top-BW herds are herd tested at least 3 times/season (compared to **60%** of mid-range herds)

Record herd testing, weighing, calving and mating information to help make decisions about your herd. List why cows are culled to help you track any potential issues affecting your herd.

STEP

5

Use AI over your best yearlings



Using AI over your best yearlings will give you more choice about which calves to rear. It also means calves from your top cows will be in the herd one year sooner.

STEP

6

Select replacements from top cows



Selecting replacements from your top BW cows will help you continue improving the genetics of your herd.

Working with your breeding partner

For your farming business to succeed, it's crucial to have the right cows to meet your needs. Choosing the wrong sires for mating can result in milk production falling, your herd BW declining, or health issues affecting your cows and increasing costs.

The starting point to ensure you select the right cows for your farm is building a strong relationship with your breeding partner, says NZAEL manager Andrew Fear.

"Talk with your breeding partner about your longer-term breeding strategy and what type of cows you need. Cover the traits you need for your farm in addition to production — traits like udder overall or fertility. This will help you select which sires to mate with which cows, to breed replacements that suit your farm's system and environment," says Andrew.

"You could also discuss the benefit of using a team of younger, high-genetic-merit sires as part of your breeding scheme. These sires often offer higher BWs, as they're typically one or two generations on from older, traditionally proven sires."

Andrew suggests farmers also talk with their breeding partner about how to ensure they have enough replacement cows to make informed decisions about which animals to keep and cull. This will allow you to avoid keeping replacements from lower-BW animals, so you can continue building your herd's BW.

Animal Evaluation

New Zealand Animal Evaluation Limited (NZAEL), a subsidiary of DairyNZ, manages the national breeding objective for New Zealand dairy cows.

Are bigger cows better?



NZAEL manager Andrew Fear tackles the question: does having a herd with bigger cows boost your profitability?

Appearance has a strong impression on all of us. We often equate good health with size and condition, in anything from babies to pets or farm animals.

In cows it's easy to make the same assumption — that a large cow will be in better health and produce more milk — and that makes them a better investment than buying a smaller cow.

The reality is more complex. Breeding for bigger cows, or buying bigger animals, has benefits and disadvantages. Larger cows may produce more milk and be sold for higher values. However, they're also likely to consume more feed and, therefore, are more expensive to keep.

The best cow for your farm is most efficient at producing milk, and meets any other requirements you need in your herd. So, for example, a 450kg cow producing 450kg milksolids may not be as good an investment as a 400kg cow producing 430kg milksolids.

Cow liveweight is just one of several measures used to assess an animal's Breeding Worth (BW). Liveweight contributes 15% to the BW ranking. Milk fat (at 23%) and protein (at 16%) contribute more to BW rankings than weight, while fertility makes up 15%, and a number of other factors also contribute to BW.

So, you may be looking for particular attributes in your herd — for example, cows with higher fertility. Or you might want lighter cows to reduce damage in particular paddocks, or bigger cows to generate more income from selling calves for beef rearing. It all comes down to your individual farm and herd.

Myth Larger cows are better and more profitable than smaller cows.

BUSTED



The best cow for you should be efficient at producing milk from feed, and also suits your needs.



400kg



450kg

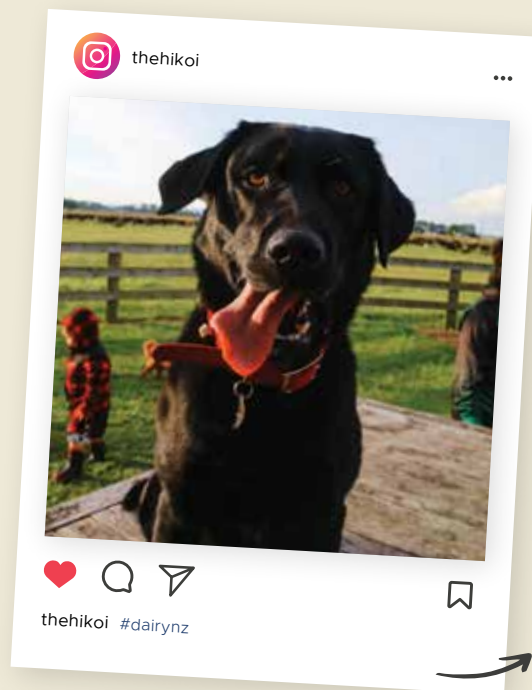


Snapped on-farm

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.



Make sure to keep hydrated this summer cos it's sure a warm one here in Southland.



Our mate Echo.



Hard to believe that I'm making silage in the middle of January!

What did we learn from the FVI trial?

DairyNZ senior scientist Wendy Griffiths looks at how predictions played out across the four-year study.

DairyNZ's Forage Value Index (FVI) is a widely used resource that helps farmers decide which forages best suit their farm and help them maximise profit. As part of the FVI's ongoing development, DairyNZ recently completed a four-year trial validating the index.



Design

In 2018, we established a farm systems trial with newly sown pastures of either high-FVI (4- and 5-star, late-flowering) or low-FVI (1- and 2-star, mid-flowering) diploid, perennial ryegrass. Both cultivars within each FVI treatment were sown with white clover and contained AR37 endophyte, so insect damage did not affect trial outcomes.

For the first three seasons, common management protocols were followed. In the fourth season (2021/22), tactical management decisions were revised to better utilise pasture in all farmlets. Calving date was brought forward one week, and winter round lengths were reduced to ensure average pasture covers at calving were met.

We predicted a greater gross margin (milk revenue minus direct costs associated with milk production) of approximately \$500/ha for farmlets sown with high-FVI cultivars. This outcome was modelled using Farmax and data collected from small plots trials on DairyNZ's Scott Farm, Waikato.

This advantage to the high-FVI farmlets would be driven by:

- greater total annual DM production (+600kg DM/ha)
- greater milksolids production (+39kg MS/ha)
 - more days in milk (+7 days)
 - greater daily production
- lower production costs
 - less purchased supplements (-500kg DM/ha)
 - less home-grown silage harvested (-600kg DM/ha).

Milk revenue

Over the four seasons, there was no significant difference in whole season milksolids production between high- and low-FVI farmlets.

We predicted more days in milk for cows on high-FVI farmlets, based on higher autumn pasture growth. However, dry conditions in all four seasons meant cows were dried off at similar times in both the high- and low-FVI farmlets.

In the first three seasons during peak lactation, milksolids production for cows grazing both high- and low-FVI cultivars was less than predicted.

Production expenses

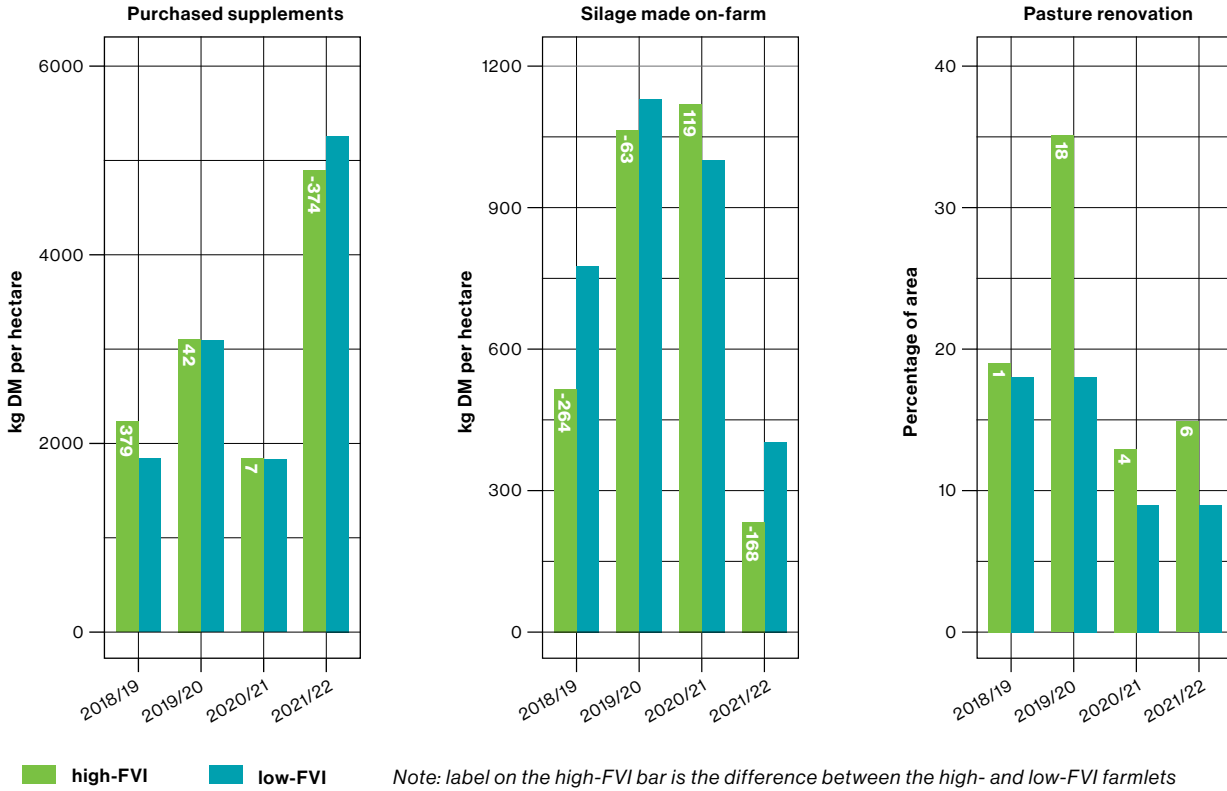
We predicted there'd be better alignment between pasture supply and demand in farmlets using high-FVI cultivars, resulting in less demand for purchased supplementary feed (-500kg DM/ha) and less need to harvest silage (-600kg DM/ha).

For the first three seasons, more supplementary feed was purchased in high- than low-FVI farmlets. In 2021/22, less supplementary feed was purchased in high-FVI farmlets (*Figure 1*), potentially because pasture management targets were altered in the last season.

The differences in silage harvested between farmlets with high- or low-FVI cultivars were less than predicted, and in 2020/21, more silage was harvested from high-FVI farmlets. Greater pasture renovation in farmlets with high-FVI cultivars in autumn 2020 resulted in nitrate toxicity levels preventing spring grazing.

Throughout the four-year trial, 71% of the high-FVI and 49% of the low-FVI area required pasture renovation (undersowing).

Figure 1. Production expenses for high- and low-FVI farmlets



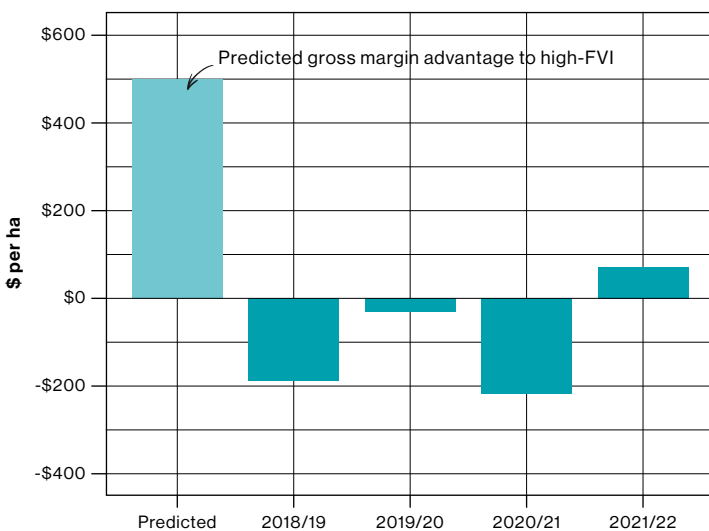
Gross margin

Our expectation of a greater gross margin (milk revenue minus milk production expenses; approx. \$500/ha) from high-FVI cultivars did not occur. There were numerical differences in gross margin between high- and low-FVI farmlets but these were not significantly different (Figure 2).

During the first three seasons, milk production and revenue were similar for all farmlets. However, the high-FVI farmlets incurred more costs than predicted for purchased supplementary feed, silage harvested and pasture renovation (Figure 1). Only in the last season (2021/22), with milksolids

revenue similar and expenses less, did the high-FVI farmlets return a numerically positive margin (+\$73/ha). This indicates that the change in tactical management in 2021/22 suited the performance of the high-FVI cultivars.

Figure 2. Gross margin (milk revenue minus production expenses) advantage to the high-FVI farmlets



What's next?

DairyNZ is working to understand:

- why milksolids production was lower during peak lactation, and whether it was due to differences in metabolisable energy (ME) intake between high- and low-FVI cultivars
- whether there were scaling interactions when data from small plot studies was used to predict farm system performance
- whether the limited plot trial data available for the low-FVI cultivars in the upper North Island prior to the trial starting led to an over-prediction of the performance gap between low- and high-FVI cultivars
- whether the dry summer/autumn conditions during the trial restricted the performance of the high-FVI cultivars.

DairyNZ will continue to improve the FVI to ensure it is a practical and robust resource for farmers.

Cluster strengthens Māori agribusiness



Māori farmers involved in an innovative Bay of Plenty project say they now have a plan for the future, and some are emerging as leaders for their whānau and communities.

“This is one of the best things I’ve been involved with.”

That’s one of a host of positive comments made by those taking part in the Eastern Bay of Plenty Māori Dairy Cluster project, which ended its three-year run in September 2022.

Grounded in te ao Māori and tikanga, the shared learning project focused on providing intensive support to Māori incorporations and trusts who either own or operate a farm or own the land where a dairy farm business was being run.

The main aim was to build the participants’ governance and on-farm teams’ confidence and capability, leading to measurable improvements for them and their farm businesses.

Farming for whānau

Many participants in the project are now leading the way for their whānau, from farm teams sharing their learnings with others, to governance group members mentoring future trustees.

The project was “definitely good for the farm teams but also good for the governance team as well,” commented one farmer.

“It’s about the future of our mokopuna,” said another.

Improved relationships within the cluster have also increased people’s confidence, knowledge, skills and wellbeing.

“The farm adviser ran everything ... now it’s all me,” said one participant. “I needed to take more responsibility with the farm. It was hard, but I started doing little bits and pieces on my own and it just became easy.”



Trustee Tau sharing cow welfare tips.

Tools of the trade

The project provided a supportive environment for participants to grow their knowledge of their business. This included carrying out Whole Farm Assessments and creating Farm Environment Plans. Using DairyNZ's DairyBase also led to improvements in decision-making.

On-farm wānanga (learning sessions) focused on timely seasonal information, while showing how Pasture Plus, Body Condition Scoring and MilkSmart could help improve labour and production efficiencies. As a result, many participants made farm system changes — one trust reduced their herd's somatic cell count from around 350,000 to 88,000.

Cluster passes muster

The DairyNZ/MPI co-funded project created a cluster of six Māori trusts, covering seven dairy farms in remote locations within the Eastern Bay of Plenty. There was also involvement from other local sharemilkers and farmers.

DairyNZ's Kaiakiaki (Māori development adviser) Sara Tairi says the project's achievements illustrate the power of community connection.

"We saw that within and across the six trusts, their farm staff and trustees. There was also greater engagement between the trusts and their people with DairyNZ and with rural professionals, including vets.

"The project demonstrates that DairyNZ and MPI can adapt the way we work with farmers to meet their specific needs and approach. It's about providing them with what they want to learn, and the best environment to do so."

Many participants are keen for the cluster to continue, and the project team will be working with the cluster group to look at future options around this.

"The commitment of the trusts involved has also been a key factor in what's been achieved," says Sara. "This project wouldn't have been the success it was without their willingness to welcome us onto their whenua and step out of their comfort zone to take part."



Cluster participants reconnect after a busy calving season.



Tunapahore B2A trustees and Hemi Dawson (R) share a moment.



DairyNZ Kaiakiaki – Māori development adviser Sara Tairi speaks at an on-farm wānanga.



If you'd like to find out more about this project, contact Sara.Tairi@dairynz.co.nz

Summer toolbox

Here are the hottest DairyNZ tools and resources for dairy farming over summer.



Strategies for summer

You never know what summer is going to throw at you, so we've pulled together some tips for managing different scenarios.

Find information on summer management strategies for pasture, supplementary feed and more at dairynz.co.nz/summer-strategies



Supplementary Feed Calculator

How much can you budget for supplementary feed over summer?

DairyNZ's Supplementary Feed Calculator is designed to help you make tactical decisions when buying feed. It factors in milk price, post-grazing residuals, supplement composition and what profit margin you need when using a supplement.

You'll not only get better accuracy in pinpointing the profitability of buying in feed – you'll get to compare the value of different types of feed too.

Try it out at dairynz.co.nz/supplementcalc



Budgeting with high inflation

When costs increase quickly, it's more challenging to stay on top of your budget and maintain profitability.

DairyNZ's Budget Case Studies show many farms can reduce their costs. However, there's no silver bullet that works for every farm. It takes time to consider your options and choose the ones that work best for you.

Any changes you make this season will likely carry into future seasons. Saving \$4000 this season may not sound like a lot, but it could translate into a saving of \$40,000 over the next decade.

What can you focus on to maintain profitability? Get some ideas at dairynz.co.nz/high-inflation



BCS Tracker App

Want an easy way to record and track cow body condition score (BCS) from the paddock on your smartphone?

With DairyNZ's BCS Tracker App, you can:

- view herd scores and see how they change over time
- use it on multiple herds
- flag cow ID numbers for a range of reasons (lameness, mastitis, etc.) for later reference.

The App also has a BCS field guide with information and images that'll help you make an accurate assessments.

Free to download from the App Store and Google Play. Find out more at dairynz.co.nz/BCS-app



Farmwatch

Keep an eye on what's happening on farms in your area and around the country. Farmwatch is a weekly summary of on-farm situations, and you can filter by region, farm, and system type.

Regular monitoring allows you to evaluate options available for stock and feed management based on the most accurate information.

Check it out now at dairynz.co.nz/farmwatch



7 habits of a great pasture manager

We've identified common habits followed by farmers with excellent pasture management. They:

1. consistently meet residual targets by always going into the correctly targeted pre-graze pasture cover
2. take regular farm walks (every week, or rotation length/3, e.g., 30 days = every 10 days), and use data to drive good feed management decisions
3. do feed budgets at key times of the year to know target APC at dry-off, start of winter and PSC
4. maintain APC in the target range (between 2000 and 2400kg DM/ha) from balance date to start of autumn
5. consider pasture to be a complete feed source
6. use supplements to maintain rotation length to optimise pasture growth
7. identify a pasture surplus and deal with it early.

Learn more at dairynz.co.nz/pasture-first

Innovations to lift farm safety



Farmer-inspired prototypes are being trialled to reduce sprains and strains on Kiwi dairy farms.

Farmers are ideas people, but how can the wider sector benefit from innovation happening on farms around the country?

DairyNZ has partnered with ACC to better understand the causes of sprains and strains and develop practical solutions. Working with QCONZ, we've interviewed farmers around New Zealand and we're refining their ideas, as well as solutions from other industries.

These first three prototypes are currently being developed and tested on farms.



Easy-entry calf trailer

Using equipment that is not ergonomically designed to transport calves often leads to back and knee injuries. So, DairyNZ is working with QCONZ and Kea Trailers to design, build and test a trailer with easy-entry gates.

We trialled the first version on Waikato farms in 2022, with some great feedback. At the end of the three-week trial period, Oaklea Farms manager

Carel Visagie didn't want to give the trailer back.

"It's so much easier to use. I think it would be a good option for a new trailer or as a retrofit."

He went on to say that he strongly believed the introduction of the self-closing saloon-type door would help to reduce injuries.

Flexible breast rail

Heifers and smaller cows in the herd often stand forward in the bail, meaning people cupping cows must reach to cup them. Over time, this leads to more strain on backs and shoulders.

Inspired by farmer ideas, the DairyNZ team is testing a flexible breast rail

concept. An elasticated rope is 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. We tested this concept in spring 2022, and are working on refinements.



Exosuits for calf pickup and feeding, and cupping cows

Increasingly, lightweight exosuits are being used in repetitive work environments to reduce strain. So, why not dairy farming? Farmers told us that picking up and caring for calves leads to back strain, while cupping large herds can strain shoulders.

We're testing three exosuits to see if they're effective for repetitive jobs in dairy farming. Initial testing has shown exosuits are probably most useful when worn for dedicated jobs on-farm, such as training calves to feed. Further testing is planned on farms and calf-rearing operations this autumn.



If you have any questions or feedback on this three-year project, please email callum.eastwood@dairynz.co.nz

Honing repro performance

Workshops offer Bay of Plenty farmers a chance to improve poor in-calf rates.

It's a problem DairyNZ's regional team has been aware of for some time: poor in-calf rates continuing to climb on Bay of Plenty dairy farms.

That's why we're running a series of workshops in March, giving farmers practical solutions targeted to their farm's specific repro challenges. Farmers will also learn what kinds of reports are available and which ones they need the most.

"The goal is to have them to walk out of the sessions with a tangible plan, having identified their top two challenges," says DairyNZ Bay of Plenty regional leader Mark Williams. "They'll be able to make more informed decisions about where they can spend money to solve their problems, who to go to, and when and why to make decisions on-farm."

The DairyNZ-led workshops, timed to coincide with on-farm pregnancy testing, will cover reducing empty rates, breeding a better herd and increasing operating profit. DairyNZ staff, vets, LIC, CRV and other sector partners will sit down with each farmer to work through their farm's reports.

Mark says it's difficult for farmers to find time to analyse what's truly leading to this issue on their farm. That can lead to costly mistakes.

“

It's important to ensure that money is being used where it'll make the biggest difference.”



The repro workshops will be extended nationwide after debuting in BOP first.

"Farmers are investing big dollars into their business. It's important to ensure that money is being used where it'll make the biggest difference."

Mark says that other workshop activities will include discussions around technology use on-farm, and how farmers can use DairyNZ's InCalf and other planning tools to draw their focus areas, goals and actions together.

"We're aiming to take these workshops nationwide, because there are other areas of the country having similar problems. Ultimately, we want to see farmers feeling more confident about their strategies to address repro performance."

Want a repro workshop in your region?

To register your interest in having a DairyNZ repro performance workshop in your area, contact Mark Williams at Mark.Williams@dairynz.co.nz



Southland / South Otago

Want to learn about tools that can help you mitigate greenhouse gases and nitrogen loss on your farm, while remaining productive and profitable? Head along to one of three 'Meeting the Environmental Future' events in Southland in March, where you'll hear from a panel of experts, including DairyNZ senior project manager Kate Fransen, LIC chief scientist Richard Spelman, and CRV product manager Peter Van Elzaker. Topics will include the latest research results on Ecotain plantain's environmental benefits, and how genetics research is shaping the future.

Register online today. Go to dairynz.co.nz/events and filter by 'Southland/South Otago'.

Feature
update

Waikato

DairyNZ is excited to be partnering with Smaller Milk and Supply Herds (SMASH) to deliver a field day for farmers, focused on managing profit under pressure and taking control of facial eczema. All are welcome at this free event (Monday, February 16 in Eureka) to hear from Emma Cuttance (EpiVets) and Phil Irvine (DairyNZ extension partner – Waikato South). Emma will talk about the causes and prevention options for facial eczema, and Phil will outline how to make informed decisions about where to spend and save.

Visit dairynz.co.nz/events to find out more about this event and other events near you in Waikato.

Northland

Connect with other local farmers and hear the latest updates on the Future Farm Systems Trial at the Northland Dairy Development Trust (NDDT) annual conference. Come along to learn more about future challenges and opportunities for the Northland region, with presentations from sector speakers including Fonterra Chair Peter McBride.

Visit the NDDT Facebook page for full details about this event, which will be run at the Northland Events Centre in Whangarei on February 21.

Correction:

We apologise for an error in *Inside Dairy* Dec-Jan, where we incorrectly named 'Suzanne Brocx, Quarry Road, Kaikohe' as the host farm of a Northland mastitis event. Our apologies to Suzanne and anyone else inconvenienced by this.

Taranaki

Keen to hear about the latest findings from Dairy Trust Taranaki's (DTT) diverse pasture research? Come along to DTT's Waimate Farm Open Day near Manaia on February 23. Get more details on DairyNZ's website, or contact your local DairyNZ extension partner Katie Starsmore at katie.starsmore@dairynz.co.nz or 027 180 03707.

Lower North Island

Get ready for calf-rearing season by attending Dairy Women's Network's 'Today's Calf, Tomorrow's Cow' workshop on Wednesday, February 15. You'll pick up plenty of tips on proper calf care and nutrition, and how to achieve liveweight gains for heifers. This event is for anyone interested in raising happy, healthy calves and keeping their team well this calving season.

Find out more and register at dwn.co.nz/events

Top of South

Interested in learning more about personal budgeting, planning for mental incapacity, and/or building your self-leadership skills? Tune in to Dairy Women's Network's webinars on these topics during February and March. Hear from a range of experts and build your confidence and skills across these key areas. Visit dairyevents.co.nz to find out more and register for one or all of the three webinars.

Canterbury / North Otago / West Coast

DairyNZ's Upper South Island team is pleased to introduce Tony Hutchison as our newest regional partner, here to support you with the tough issues. Tony has diverse experience across the agricultural sector, from working as a milking shed tester, through to sales of herd automation hardware and software and introducing cow wearable technology to farms across New Zealand. Tony is passionate about helping farmers navigate new legislation and work through queries and solutions around new farm technologies.

If you have questions for Tony, get in touch by calling 027 808 3292 or email tony.hutchison@dairynz.co.nz



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Milk alternatives — separating fact from froth

We explore some of the claims being made about milk alternatives and how those claims relate to the competitiveness of New Zealand's dairy sector.



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There has been plenty of interest in recent years regarding milk alternatives, questions about their sustainability and suggestions that they will disrupt the traditional dairy sector.

What do we mean by milk alternatives? In the context of this article, they are any product consumers consider to be substitutes for the traditional (mammalian) dairy category. Broadly, these milk alternatives can be divided into two groups: those originating from plants, such as soy, oat, almond and rice; and those produced using precision fermentation which uses genetically modified microbes to produce specific proteins.

Precision fermentation products are not currently available to New Zealand consumers, and neither group of alternatives currently have compositions that replace all of the components found in milk and dairy products.

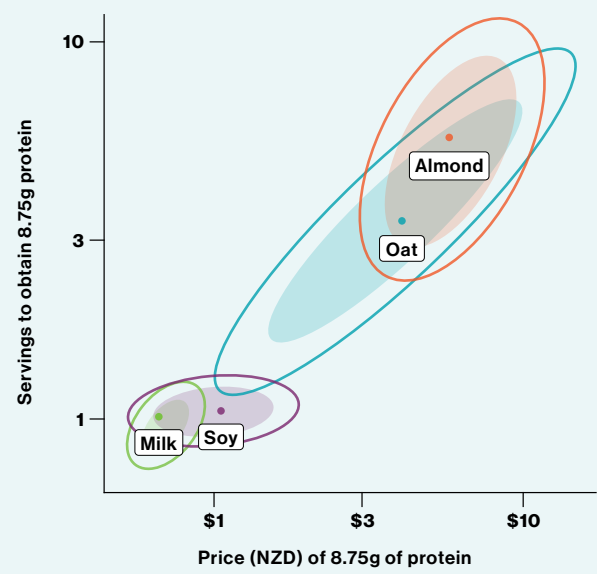
Nutrition

The Riddet Institute (a National Centre of Research Excellence in Food Science, located at Massey University) and Fonterra recently assessed the nutritional value of plant-based beverages and bovine milks¹. Their study identified a wide-range variation in nutrient content between plant-based milk products and between products within the same plant category (e.g., soy, oat).

Calcium-fortified soy was the only product approaching a similar protein composition to bovine milk, including comparable amino acid content bioavailability, and cost (Figure 1). The implication is that, with the exception of soy products, a lot more product must be consumed (and paid for) to achieve a similar nutritional value as traditional dairy products.

There is no comparable study for precision-fermented milks but, in theory, it is possible to match the nutritional profile of milk proteins and some of the other components with this method. However, this is complex and, therefore, costly.

Figure 1. Number of servings and the price to obtain 8.75g protein (equivalent to one serving of milk) from plant-based beverages relative to cows milk¹. Milk shows a relative advantage to alternatives because others are at a higher cost, require more servings to get protein, or both.



Note: A serving size of 250g was assumed for all products, and products with no protein content were omitted. Outer ring is 95% percentile, inner shaded area is the 80% percentile, and dot is the median value. Log transformed scale.

For many market segments, nutritional properties are unlikely to be the sole driver of individual consumer purchasing decisions². For example, consumers seeking a milk-like liquid for their coffee or breakfast cereal could be more focused on cost, taste, or sustainability and ethics of the production systems. Manufacturers of highly processed foods could also select ingredients that replace milk powder for similar reasons.

Sustainability

Sustainability is an increasingly important attribute, so how do we compare on this front? There are two aspects where animal production systems come under scrutiny.

The first consideration is the type of feed offered to the animals. If an animal eats 1kg of feed, it will produce less than 1kg of product for human consumption. This leads to the conclusion that animal production systems reduce global food production, when animals are offered feed that could be directly consumed by humans³.

From this perspective, New Zealand pasture-based dairy systems are at an advantage relative to dairy systems based on harvested crops. That's because our systems mostly utilise human-inedible grass, of which most grass is grown on land where arable or horticultural production is either not feasible or not profitable⁴.

The second consideration is greenhouse gas (GHG) footprint. In an analysis of products produced in Italy, researchers reported milk had roughly twice the footprint of soy beverages, though noted a 13% increase in consumption would be required for an equivalent protein intake, which would cost the consumer 66% more money compared with milk⁵. It's important to note that the footprint of NZ milk is 43% lower than that of Italy, meaning there's potentially a comparable footprint⁶ between soy beverages and NZ milk.



Manufacturers of fermented milk alternatives have made bold claims. Perfect Day, for example, says its whey protein has 91-97% lower GHG emissions, 29-60% lower energy demand, and 96-99% lower surface and groundwater consumption compared to bovine milks⁷.

However, Perfect Day allocated only 22% of that footprint to the whey protein; the remainder was allocated to the by-product, based on the weight ratio of protein and by-product. Typically, GHG footprint is allocated to each co-product by economic value, which would have allocated a much higher proportion to the whey protein. Perfect Day argued for footprint allocation by mass because the by-product's economic value was unknown. Using typical allocation methods, if the by-product had no economic value, the footprint of their product would be almost five times higher. Ironically, one way of generating value from the by-product could be as a feed for animals.

Another study, by the Technical Research Centre of Finland, Fonterra and AgResearch collaborators, likely provides a more balanced view⁸. Researchers compared the carbon footprint of beta-lactoglobulin (a common milk protein) produced by New Zealand dairy systems with precision fermentation. The study determined that precision fermentation's carbon footprint could be comparable but was highly dependent on the energy source for processing, and the carbon source (i.e., sugar) for the microbes. Precision fermentation could have a low footprint when produced with mostly renewable energy, as in New Zealand, and if a lower footprint carbon source (other than sugar) could be found. However, precision fermentation results mostly in long-lived GHGs, relative to shorter-lived GHGs (methane) produced in dairy systems. This has implications for long-term warming. The technology is relatively immature, so improvements are likely, which should provide a strong incentive for the dairy sector to continue striving to reduce its footprint.

Another sustainability consideration is the fundamental difference that dairy production systems require animals. Animal welfare standards must keep pace with new evidence-based knowledge and the expectations of consumers.

New Zealand pasture-based systems are, potentially, able to align more closely with biodiversity criteria than the monoculture carbon sources for milk alternatives. Also, our systems could be more desirable to some consumers because of their naturalness, compared to highly processed products.

Economics

Price is often the strongest driver for individual consumers and purchasers of dairy ingredients. If compared at a dollar per nutritional level (as in *Figure 1*), soy beverages are the only comparable product to bovine milk.

Understanding the economics of precision fermentation is more challenging due to the industry's immature state. Its

competitiveness will likely improve with cost reductions from improved processes and achieving scale. Commercial-scale plants are likely to be expensive, and this will make their total cost of production per unit of protein higher than dairy products⁹. Only a handful of start-ups have raised the large amounts of capital required (USD \$200M+), and the timeline to commercial production at large scale is still years away.

The target market of the final product is also key to competitiveness. Each precision fermentation process produces a single protein. So, to produce the six major proteins in bovine milk, six different fermentation lines would be required, without considering the other proteins, lactose and lipids. This would likely cost four times as much to produce than fresh dairy milk¹⁰. On the other hand, there are only two key proteins in ice cream, simplifying the process and likely cost.

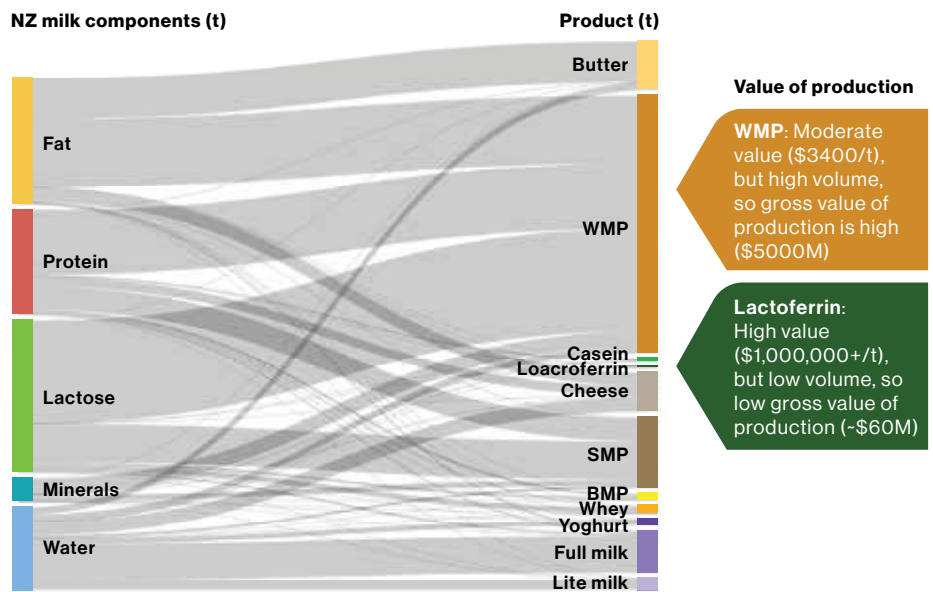
Another example is a 'simple' but high-value product like lactoferrin, which could possibly be produced at a competitive price using precision fermentation. Improvements to precision fermentation processes are likely to reduce costs; however, there may be limits to simplifying production because facilities may need to be at pharmaceutical-grade standard, compared to food-grade standard, to avoid contamination¹⁰. The implication is that traditional mammalian-derived dairy may compete in some product categories but not others.

It is not yet clear if any of these products could, in future, be disruptive to New Zealand dairy on the world market. This could be explored by determining the approximate volume of each product that can be produced from a kilo of milksolids under a range of market scenarios, and the subsequent value of each product. Examples of this are represented in *Figure 2*, where the largest end product (whole milk powder), also has the highest gross value of production, but is very difficult for alternatives to replicate. Alternatively, the highest-value product (lactoferrin) could potentially be replicated, though even if alternatives displaced dairy-sourced lactoferrin, the effect on New Zealand's gross value of production would be limited (due to its gross value). This type of analysis could identify the potential impact to milk price, should the value of any of these products be affected by alternatives.

Consumer trends

A final piece to the puzzle is trends in consumer preferences. A recent New Zealand survey found consumers perceived cows'

Figure 2. Indicative illustration of processing of New Zealand milk components (left) to products (middle), and compared with value (right).



WMP = whole milk powder; SMP = skim milk powder; BMP = butter milk powder.

milk to be better nutritional value, better value for money and better for the NZ economy, but that plant-based alternatives were better for the environment¹¹.

Global sales of milk alternatives have seen greater than 10% annual growth from 2017 to 2021 and reached USD\$25 billion in 2021¹². However, by value, the alternatives market is still relatively small – the dairy products category is about 20 times larger. So, while the traditional dairy products have grown at only 1% over recent years, that 1% growth represents twice as much in sales value compared to milk alternatives.

There are signs of stagnation in the growth of alternative proteins, in particular, meat. In one study of 100 plant-based meat brands in Europe, the US, Canada, Australia and New Zealand, not one brand was making a profit, even after five years in business¹³. This was because products were not delivering the taste and texture desired by consumers and, consequently, were not converting trials into repeat purchases. The authors commented that the size of the potential market had been overstated and that plant-based advocates had not been able to accelerate the number of consumers converting to meat alternatives. To be successful, milk alternatives will need to taste good and this may require novel products, rather than attempting to mimic traditional dairy.

A final point is that milk alternatives are highly processed. With consumer trends appearing to favour natural products, this may limit their appeal, at least in some market segments¹⁴.

Conclusions

By evaluating information in the public domain, New Zealand dairy appears well placed to compete with milk alternatives in the near- to medium-term. However, several questions remain for the long-term outlook. How much can precision fermentation costs be reduced? What is the value of the milk products most at risk of substitution? What will drive consumer demand for milk alternatives, and how large will the market be? DairyNZ's Frontier Farms project (see right) is investigating these questions and assessing the attributes our farm systems need to deliver in the future, to remain competitive.



Frontier Farms project

DairyNZ has recently launched an exciting project called Frontier Farms, which aims to design profitable and sustainable farm systems that are ahead of where the frontier of international competition will be in 2030. We forecast the attributes farm systems will need to deliver and started with an assessment of US 'mega' dairies. We are now investigating milk alternatives, as discussed in this article. Based on these assessments, we will co-design potential farm systems with farmers and test the most promising ones at a commercial scale to meet this frontier.

Find out more at dairynz.co.nz/frontier-farms

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