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25-26 JUNE 2019 PROCEEDINGS
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LEAN all about it!

Sarah Watson, PeopleMAD; Ben Williams, Farm Manager The land Farm Group.

Introduction:

Most days somethings happens to frustrate us...a tool you can’t find, waiting for someone, information not up to date, running out of product, fixing something that’s broken or fixing someone else’s mistake...and the list goes on.

By the time we have dealt with these ‘time wasters’ you are lucky if you have done any REAL work!

How true is this? How often do we spend valuable time and energy on things that really don’t add VALUE? Do we really know what value looks like or are we blind to the waste in our day because we think it’s “part of how things get done”? Is this just the way things are? How do we escape this picture?

There are some key principles around raising productivity in your farm business that regardless of size or scale will help you to make your business sustainable and enjoyable for everyone involved for the long term. The challenge is how to get those systems in place, achieving quality results consistently... with the whole team on board, when we are already struggling to find enough time to do ‘normal’ stuff. Applying LEAN thinking to dairy farming really can help you to find all that lost time and improve your productivity! However, it’s not easy, it will require commitment and drive and an upfront investment of time and energy

How do we achieve the aim of long term, sustainable business productivity?

<table>
<thead>
<tr>
<th>Long term = over time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sustainable = repeatable consistently by different people</td>
</tr>
<tr>
<td>Productivity = value added activity</td>
</tr>
</tbody>
</table>

The answer includes a number of steps;

1. Leadership
2. Being prepared to change
3. Empowering our team
4. Identifying waste
5. Working out the root cause of waste
6. Standardising our solutions

Most importantly though is the need to INVEST in ‘finding time’

We will look at steps 4 to 6 first...

Finding Waste:

The reality is there is a lot of waste in our lives – often both work and personal. Often we are so used to it happening that we don’t even recognise it for what it is. When was the last time you went looking for some information and couldn’t find it straight away because it hadn’t been filed? Or the correct tool for the job hadn’t been put away in the right place so you had to go and look for it? Or you had to go and ask the boss what the next job was because he hadn’t written it up on the whiteboard?

Typically the definition of waste in business is “activity that doesn’t add value to the customer”. In a dairy situation that could be “activity that doesn’t add value to delivering as much high quality milk as we would expect from our system type, in a way that doesn’t compromise animal welfare, environment or people”. So reasonably complicated!
Waste can be categorised in to the following types:

Motion (searching for information, tools, materials)
Waiting (for people, products, animals, etc)
Transport (transfer of information and materials)
Storage (of information and materials)
Defect (of information, product and materials)
Over-producing (making too much product or doing it too soon)
Excessive or inadequate processing (inefficient processes and procedures)

So what are some real examples of waste?

Motion – putting up an electric fence but not having enough standards so have to go back to the shed to get more to finish the job
Waiting – the vat wash didn’t get done so can’t start milking until it is done
Transport – we’ve run out of product, so we can’t drench until someone goes to buy some more
Storage – bulk buying calf meal and then not using it all
Defect – holes in baleage not taped up so baleage spoils and can’t be fed to the cows
Over-producing – made too much supplement and still storing some that is 3 years old
Excessive or inadequate processing – using twice as much water and time to clean the yard as another person in the team

Can you think of some examples of each of these in your system?

Motion –
Waiting –
Transport –
Storage –
Defect –
Over-producing –
Excessive or inadequate processing –

When we start to identify waste we raise our awareness (and that of our team), it also means we can look at why this waste is happening so we can reduce it.

Identify the Cause vs Effect

Often our natural tendency is to immediately FIX problems when we see them. That’s our job as managers isn’t it? The trouble is this is often just a ‘Band-Aid’ fix as we don’t stop to figure out what is really causing the problem…we are just fixing the effect. For example; continuing to replace the fuse when it keeps blowing instead of calling the electrician to find out why it keeps blowing...

Understanding cause and effect is critical to successful problem or ‘waste’ solving.

Some tips to help you find the root cause of a problem:

Clearly define the problem
Before ‘blaming’ a person consider that in 90% of cases a problem is caused by a lack of knowledge, skill, resources or system, that is, the problem is with the PROCESS not the PERSON
Discuss the problem with the team, don’t just assume you know what’s going on
Consider things like where, when and how the problem occurs
Ask “why?” to get the bottom of the real cause
Finding a Solution

Once you have worked out the ‘Real Cause’ of the problem you need to decide if you can eliminate or just minimise the problem. Often problems can be solved with simple, low cost solutions. In fact many frustrating causes of waste on farm can be solved by getting organised and having better systems.

Key points when putting solutions in place include:

- Involve the team, they do the work every day and will often have ideas on how things can be improved
- Keep solutions simple, that way they are easy to keep doing
- Change takes time, you will be having to break old habits and create new ones so be patient
- Where possible use visual reminders at the point of use to help the team to remember the new way of doing things
- Pictures are worth a thousand words, especially when English is your second language
- Measure your progress to see if the changes you put in place work or not
- If your solution doesn’t work, go back and check what you decided was the cause of the problem. You might not have got to the correct root cause of the issue…

Once we identify the solution that works we turn that into a Standard Operating Procedure ideally with some visual controls. None of this is rocket science, in fact it is common sense really and if we stop and think through a problem we will take a lot of these steps without having to step through it like this. However, following a process enables us to ensure we apply the right thinking consistently to get sustainable results. More importantly it enables us to teach our people to use the same approach and start to solve some of their own problems. This is where steps 1 to 3 are important.

Steps 2 and 3…Being prepared to change and empowering our teams

Being Prepared to Change:

Achieving long term, sustainable business productivity requires good leadership, including being prepared to change and empower the team.

Change = different from previous state.

Change is more than just doing things differently. To get sustained change often means changing the culture of “how things are done around here”. You have to work hard to achieve sustained change. When you plan carefully and build the proper foundation, then implementing change can be much easier and you’ll improve the chances of success. If you are too impatient, and if you expect too many results too soon, your plans for change are more likely to fail.

Keys to success are; leadership, creating a sense of urgency (reason why), having others in the organisation who will embrace and drive change, build a vision (a picture of what good looks like) and communicate it to everyone, remove obstacles, create quick wins and build on your momentum. These steps will result in a culture that supports and encourages change and improvement.

Empowering the team:

Empowering the team is allowing them to own and drive how things will be done, often your team will be the best people to work out a successful solution to problems because they work with it all of the time. Surprisingly the solutions our team will often come up with tend to be low cost, highly effective and quick to put into practice. The other benefit is when they “own” the solution they are more likely to ensure it happens and that new people know how it works.

People are generally also happier in their work, more inclined to stay and will use their initiative.
Step 1 – Leadership

To successfully achieve steps 2 to 6 you must be prepared to guide, drive, coach, empower, support, encourage, provide boundaries, enforce consequences, set the standard and practice what you preach…in other words LEAD.

Changing from how things are done now to a culture where the focus is on continuously improving how things are done around here requires INVESTMENT. Investment in time and energy. We get short term change when we dictate the solution to our team. To get long term sustained change requires leadership, we need to give our team the chance to influence the solution.

Can LEAN principles apply to Dairy Farming?

DairyNZ has funded the development of FarmTune® a Dairy specific programme using LEAN principles to help farmers improve and implement greater efficiency in their business.

The programme has been running successfully across the country for the past 5 years. The results have shown that yes…LEAN principles can apply to Dairy Farming and they do provide on-going, sustainable results, including saving time and improving productivity.

Conclusion:

Yes, we can achieve improvements in efficiency and productivity in our business by applying LEAN principles. To achieve sustained improvement, you have to be committed to changing the way things are done in your business, including being prepared to let your team ‘own’ and drive some of the process. Following a programme like FarmTune® will improve your chances of success.

References:

www.peoplemad.co.nz/what-we-do/farm-tune/
www.dairynz.co.nz/farm/farmtune/
www.dairynz.co.nz/farm/farmtune/waste-hunt/
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Would you like safety with that?


Have a think about these statements…

No-one sets out to get injured on farm
All incidents are preventable
Make a decision to be safe
A ‘near miss’ (or ‘near hit’) is a gift
If something doesn’t look/sound right – say something, or do something about it
How do you feel if someone ‘calls you out’?
If you’re not sure how to do the job safely – Ask!

Safety is not:

Folders and paperwork that no-one looks at
Something to get around to when you have an office day
Big long lists of hazards
Signs and instructions that people ignore
Doing the job when you’re really tired, grumpy or in a big rush

Safety is:

Realising that most things go right most of the time
Agreeing on the ‘best’ way to do things
Planning and thinking ahead - what do we need?
  o  The right tools?
  o  Maintenance
  o  Training/experience?
  o  Thinking about what could go wrong?
  o  Time to do the job? Be ‘ON the job’
Communication
  o  What could go wrong? What am I doing about it? Is that enough?
  o  Toolbox meetings – a few minutes each day
Observation
  o  Something not quite right?
  o  Something changed? Or New?
Safety starts with a **decision**

Decisions determines **attitude**

Attitude affects **behaviour**

Behaviours repeated becomes **culture**

Culture is *how we do things around here...*  
*Ask yourself “How do you want things done around here?”*

---

**How do you make safety ‘part of business’?**

**Have a plan**

- **Communicate** – let people know what is going on (ideally notes, records, photos)
- Maps with No Go areas
- Team rules/Farm rules

**Have an emergency plan**

- So people know what you want them to do
- Farm location easy to describe
- First Aid kits – know how to use them
- Fire extinguishers too

**Checklists** – so we don’t miss something important

**Standard Operating Procedures** – How we want things done (with photos)

**Things in the right place** – safety equipment easy to find/use
Southern Dairy Hub Virtual Tour
The Farm

Climate
Up to the 23/5/19
Mean Annual Maximum Temperature - 17.7 °C
Mean Annual Minimum Temperature - 5.4 °C
Average Annual Soil Temperature – 11.0 °C
Average Annual Rainfall – 785.4 mm

Soil Types

<table>
<thead>
<tr>
<th>Soil type</th>
<th>Location</th>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Edendale</td>
<td>Top terrace</td>
<td>Well drained, high WHC, seldom dries out</td>
</tr>
<tr>
<td>Pukemutu</td>
<td>Through centre of farm</td>
<td>Poorly drained due to sub surface pan between 600 and 900 mm deep. Vulnerable to waterlogging.</td>
</tr>
<tr>
<td>Pukemutu/Makarewa</td>
<td>Bottom terrace</td>
<td></td>
</tr>
<tr>
<td>Makarewa</td>
<td></td>
<td>Poor aeration during wet periods due to poor sub surface drainage and slow permeability. Severely vulnerable to waterlogging in wet periods.</td>
</tr>
</tbody>
</table>

Farm Area
Milking platform: 309 ha
Support Block: 39 ha
Unproductive land: 2 ha

Soil Test Results (Winter 2018)
Data from 38 paddocks (17 support block, 87 milking platform)

<table>
<thead>
<tr>
<th></th>
<th>pH</th>
<th>P</th>
<th>K</th>
<th>S</th>
<th>Mg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Milking platform</td>
<td>6.2</td>
<td>27</td>
<td>6</td>
<td>9</td>
<td>14</td>
</tr>
<tr>
<td>Support Block</td>
<td>6.0</td>
<td>54</td>
<td>7</td>
<td>11</td>
<td>9</td>
</tr>
</tbody>
</table>

Pastures
220 ha (71%) of the milking platform was resown at conversion in 2017. Of this 160 ha was fully cultivated, 43 ha direct drilled and 17 ha undersown with annual; ~46.4 ha was sown in 5 star FVI pastures, and ~46.4 ha in 1 star FVI pastures. The following cultivars were used across the remainder of the farm: Prospect, Excess, Rely and Platform.

Staffing and management
Roster System – It has been 8 on 2 off, 8 on 3 off in the later part of 2019
Milking Times – cups on at 5 am / 2 pm

Effluent System
Two receiving ponds with weeping walls, leading into a storage pond. Effluent applied by travelling irrigator. Solids cleared out November 2018. Some effluent applied by umbilical system in March 2019.

Mating Programme Spring 2018
MA cows – Mostly crossbred semen, some Friesian. Short gestation (SG) Hereford semen used over identified culls. 6 weeks AB, 3 weeks with Hereford bulls, followed by 1-week AB to SG Hereford.
R2s – Synchronised, four days of AB to crossbred semen, followed by 27 days with Hereford bulls.

**Herd Details – May 2019**

<table>
<thead>
<tr>
<th></th>
<th>BW</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cows</strong></td>
<td>83/45</td>
<td>118/70</td>
</tr>
<tr>
<td><strong>Youngstock</strong></td>
<td>110/31</td>
<td>131/11</td>
</tr>
</tbody>
</table>

**Calving start date 2019**

- 6th August – rising 2-year olds
- 10th August – mixed age cows

**Wintering**

All mixed age cows and rising 2-yr olds wintered on kale or fodder beet on the milking platform
All rising 1-yr olds wintered on kale or fodder beet on the support block

**Milking infrastructure**

- 60 bale rotary dairy with DeLaval plant and Delpro Herd Management software
- Automatic cup removers and on-platform teat spray
- Automatic drafting and weighing in the exit race
- 3 backing gates
- Greenwash on the backing gate Four research holding pens Herringbone race and sampling area

**Mission and Strategic Direction of the Southern Dairy Hub**

Farmers in the Southland region took the initiative to establish the Southern Dairy Development Trust (SDDT) and its fully owned registered trading company, the Southland Demonstration Farm (SDF) in 2007. The Charitable Trust Deed outlines that the purpose of the trust is for “the promotion of dairy farming in Southland and West Otago, and to assist, support and encourage existing dairy farmers and those interested in joining the dairy industry for general educational purposes”.

Following the expiry of the lease on the Southland Demonstration Farm at Wallacetown in 2016 SDDT and SDF approached DairyNZ and AgResearch seeking agreement to establish a dedicated Southern Dairy Hub (SDH) to facilitate dairying research and extension in the region. The anticipated benefits are predominantly associated with the ability for farmers, researchers and the industry body DairyNZ to work together to create new solutions for the Southland/Otago and New Zealand Dairy industries.

AgResearch, DairyNZ and SDDT have recognised the current scale and growth potential for dairying in Southland. However, there are significant local issues faced by farmers dealing with wet soils, cold winters and unique environmental issues. The region will require new levels of research and development activity and resourcing to provide solutions that reflect the area’s unique climate and soil conditions. Failing to find solutions to address environmental concerns within the context of long-term sustainable farm systems will impact on the ability of the dairy industry to grow in the region.

**SDH Vision**: to be an internationally recognised, innovative and leading centre of excellence for dairy farming, comparative research, and extension
**SDH Mission:** providing economic, social and environmentally sustainable solutions for the southern South Island dairy farmers and community

**SDH Fundamental aims:**
- To improve the performance and protect the viability of existing dairy farms in the southern South Island.
- To help develop and test new options for dairying in the southern South Island.
- To support the responsible and sustainable growth of dairying in the southern South Island.
- To promote the Dairy Industry Strategy.

SDH has leased the farm to the Operating Company (SDRF) for dairy farming and to conduct the research related to dairy farming.

The Research Advisory Committee (RAC) and SDH, together with representatives from the Southern dairy community, then decided the most significant issues facing farmers currently and now we are one year into our first 3-year project. The following section will provide some background on the process taken, what the key outcomes were and the current systems comparison.

**Southern Dairy Hub Farm Systems Proposal 2018-2021**

**Background**

The Research Advisory Committee (RAC) held a series of meetings and workshops to discuss farm systems options for implementation from 1 June 2018 for 3 lactation seasons. A brainstorming session was used to identify issues facing dairy farmers in Southland and Otago. These issues were collated into 13 themes from which the top 3 were identified.

The top 3 issues were:
1. **Fodder beet**
2. **Nutrient loss reduction**
3. **Wintering**

There is a desire to understand crop vs **off-paddock wintering** and the impact of infrastructure on whole system performance, profitability and achieving environmental regulation. Realistically, however, it will be a 2-3 year timeline before this could be considered on the SDH farm due to the current lack of infrastructure and the tight budget situation.

The proposed systems have been designed to better understand crop-based wintering in relation to consequences for environmental impact and profit with the view that the best crop system would be used as the base farm in the next phase of farm systems comparisons (2021 onwards), that might include off paddock infrastructure.

**The Process**

The Standard kale system was set up as the base model in Farmax Dairy. The results of this were used to generate the key input parameters for the Standard fodder beet system.

Further management changes were considered (reduced N fertiliser, less supplementary feed, reduced stocking rate, dry off date) for each to generate the parameters of the two reduced impact systems.
During the modelling process we identified several physical aspects of the farm and a constraint of OVERSEER that could impede model results being achieved. These are:
1. The pasture growth of the farm (we may have been optimistic on the time to reach potential yield given the early stage of farm conversion).
2. Choice of in-shed supplement and amount that can be consumed during milking
3. The uncertainties associated with N leaching estimates for autumn-grazed fodder beet crops.

System Performance and Input Parameters

<table>
<thead>
<tr>
<th>Crop Type</th>
<th>All Systems</th>
<th>Standard Environmental Impact System</th>
<th>Reduced Environmental Impact System</th>
</tr>
</thead>
</table>
|           | 5-10 Aug Planned start of calving  
≥ 250 days in milk  
23% replacement rate  
No N applied after 10th April or if soil temperature <5 °C in spring  
Youngstock off | ≥1300 kg MS/ha (milking platform)  
Up to 250 kg N/ha for 2018-19; 200 kg N/ha thereafter; after each grazing  
Up to 700 kg/cow lactation supplement (home grown first, use driven off pasture deficit)  
Lactation supplement  
PKE/grain and pasture silage  
Winter crop – kale  
3.1 cows/ha | 30% lower N leaching  
Lactation supplement  
PKE/grain and pasture silage  
Up to 75 kg N/ha for 2018-19; 50 kg N/ha thereafter  
N applications – Sep, Dec, Feb/Mar  
Winter crop - kale  
2.6 cows/ha |
|           | 5-10 Aug planned start of calving  
≥ 250 days in milk  
23 % replacement rate  
No N applied after 10th April or if soil temperature <5 °C in spring  
Youngstock off | ≥1300 kg MS/ha (milking platform)  
Up to 250 kg N/ha for 2018-19  
200 kg N/ha thereafter; after each grazing  
Up to 700 kg/cow lactation supplement (home grown first, use driven off pasture deficit)  
Lactation supplement fodder beet and pasture silage  
Winter crop - fodder beet  
3.1 cows/ha | 30% lower N leaching  
Lactation supplement fodder beet and pasture silage  
Up to 75 kg N/ha for 2018-19; 50 kg N/ha thereafter  
N applications – Sep, Dec, Feb/Mar  
Winter crop – fodder beet  
2.6 cows/ha |

Several mitigations to reduce the environmental impact were also considered in the pre-experimental modelling and farmlet design. But the RAC opted to only consider system changes where there is high confidence in reducing the environmental impact, with current modelling available.
Current Research Activities at SDH

The farm systems comparison funded by DairyNZ forms the base research platform at the Southern Dairy Hub. Other research projects led and funded by a number of organisations are using this platform to address key research questions relating to the systems that are being implemented or the issues currently facing dairy farmers in Southern regions. The current suite of research projects is summarised in the diagram below.

Environmental Research

Measurement of N leaching losses from autumn- and winter-grazed crops

Pre-experimental modelling of the 4 research farmlets at SDH has incorporated autumn- and winter-grazed fodder beet (FB) crops as important feed supplies in the FB farmlets. Kale is included in the 2 remaining farmlets, although only as a winter feed supply. Given the potential environmental impacts of these grazed forage crops, N leaching losses are being measured in selected treatments during 2018 to provide:

Quantitative N leaching data for the crops, soils and climate of SDH.
N leaching comparisons between:
- autumn-grazed v lifted FB
- winter-grazed v lifted FB
- winter-grazed kale
- selected pastures on the milking platform.

1. Variable Width Waterway Protection

Rather than having a set buffer width along the entire length of the SDH stream, a variable width riparian plan has been developed with the aim of protecting areas that have the greatest risk of generating surface runoff – for example, locations such as critical source areas (CSA), laneways, drains, gullies. Stream protection using variable width buffer areas will reduce the amount of contaminants reaching waterways, particularly phosphorus (P), sediment and faecal microbes (such as E. coli).
The plan developed for the SDH has been designed to meet the aspirations of Iwi and the SDH community of interest, as well as satisfying Resource Consent requirements. Some pertinent features of the plan are:

The stream area occupies 1.4 ha and is currently fenced to encompass 2.6 ha in total. The proposed variable width riparian area is 3.8 ha, with a minimum buffer distance of 5m.

Progressive planting is planned for buffer areas over several years. Plantings are to be non-toxic native grasses and shrubs and flaxes. Allowance has been made for digger access as required.

2. Stream monitoring

The stream that drains the foot of the terrace at SDH has been monitored since spring 2017 to scope its usefulness as a catchment that could be used to monitor the general effects of SDH farming activity (i.e. considering other water quality parameters such as faecal microorganisms and sediment and phosphorus concentrations and loads). Preliminary analysis of results indicate that the stream itself is of limited value for this purpose, however, due to (i) the extremely complex stream hydrology (it gains and loses water along its flow path), and (ii) flows appear to likely include drainage discharges from surrounding farmland and historical landfill sites. Monitoring of the many tile drain inputs to the stream indicates that considerable quantities of N are discharged to the stream, potentially offering opportunity for attenuation using some form of end-of-pipe technology. Discussions are therefore underway to scope the potential for this attenuation to be realised.
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- Perspective and Intro
- Rural Communities
- The Wider NZ community: Our need to talk!
- Our own contexts
- The Environment

1. Perspective

God Is Watching Us! AND so are.....

God is watching us, so are global consumers, national authorities, various interest groups, regional and district councils, the media, our communities, neighbours, friends and most importantly... your kids, your staff’s kids, your neighbours’ kids...

The World is a Smaller Place

It’s not a bad thing, but the world is getting smaller! Whether we know, we understand, or we like it, people are more interested in others generally... and in us, both as food producers and as land users.
Technology is a contrary thing. The world sees more of us, we can see, and visit, more of the world AND conversely it getting much easier to be less connected with our own local communities.
It is getting easier to forget that our local and regional communities are vital to our personal and farming wellbeing.

The main thing that is different from the past is WHO knows about us, NOT the level of interest. e.g. I’m from the Hauraki Plains (near the Coromandel Peninsula). A generation ago a Hauraki Plains dairy farmer would have had very little knowledge of Southland farming, BUT probably known most people living within 5km of him or her, and what they were like.
Now... There are plenty of Hauraki plains farmers who know Southland well and some with equity interests here, but there will be plenty of people within 5km of home they don’t know, unless they are very good... or very bad!

2. Introduction

I’ll be talking about local communities, our roles in communities as farmers, connection with the wider New Zealand community, our own contexts, and how environmental stewardship can be a part of all of that.
Earl will cover Global perspectives and markets.
I don’t want to steal any of Earl’s thunder, but it won’t be much of a surprise to many here that around 95% of NZ Dairy production is exported. The percentage of those products that sell directly to global consumers with NZ branding is low. That doesn’t mean there isn’t interest or importance in the back-story, or provenance, but it is where we are today.

Back-story in the future
We also need to consider likely future directions. The need for confidence in food security and standards is increasing. Products that come from sound, safe and happy places will get deeper market access and probably premium on price.
“Our story of healthy pastoral production from a sound, stable, socially cohesive location will be increasingly valuable in the future.”
Community consciousness
Dairyfarming is predominantly a rural industry. Around 80% of dairy sector wages are earned in rural areas.
In rural areas Communities are important.
Our rural towns have changed, and will continue to change.
There are pros and cons with this. One thing that it does mean though is that we need to be more conscious about our communities than in the past, as less activity “Just happens as a matter of course”.

3. Rural Communities

Farmer’s roles in Rural Communities

Since the beginning of civilisation, farmers have been leaders in their communities. Whether they have been conscious of it or not. As farmers;
- We usually reach a point of stability after some time spent building assets and exploring.
- We run a business, so have a broader understanding than many others.
- We are connected to land and need to husband that well to be commercially sustainable.
- Most importantly, we tend take a medium to long term view.

This all means that we are well placed to have positive impact on our communities, and also that the health of our communities has an impact on our economic as well as personal wellbeing.

Furthermore, strong local and regional communities have a big impact on our “Social Licence to Operate”. More on that to come.

In rural areas Communities are important! The values of the people of the community determines the character of the community.
A quote from Martin Luther King, Jr. is relevant here:

“An individual has not started living until he can rise above the narrow confines of his individualistic concerns to the broader concerns of all humanity.”

Let’s look at some specific reasons why communities matter.

Community Character – It Matters!

I spent some years in Chile bringing a Dairy operation together. It’s a great place for pastoral farming. Spectacular soils, temperate climate and reasonable land values.
When we were looking to buy land, there were a number of things we considered. One factor that grew in importance as we understood the country was the local village or town. The local settlement was a very good indicator of the character of the local people:
- Some settlements had a thriving liquor shop, which normally went alongside shabby houses, junk spread around the place, people who were tied up in themselves and generally unhappy.
There was a real contrast to this. Most villages either fitted into one group or the other!
- Settlements that had a tidy church, usually had houses that were cared for, streets that looked OK, people with some confidence and were generally good places to be.
It wasn’t the shop or the church that were determining the character; they were the visible outcome of the character. Usually the surrounding farms fitted with the impression from the village both in appearance and how the teams worked together.

It’s pretty obvious where people preferred to live. That preference was reflected in land value. It reflected in the quality of life of farmers, staff and others. It definitely reflected in ability to attract staff and the calibre of local potential staff members.

Things aren’t quite as clear cut here in NZ, but the same principles apply.

Let’s look at some specifics in NZ.

The Value of Strong Rural communities - $

Starting with the money!
The capital value of our land asset is influenced by the health of our communities. Yes, productive potential and location are large drivers, but farms are also places where people live and work. When a district is a less attractive place to live and work, there are a number of consequences.

- Buyers find the area less attractive to invest in, so demand is lower, meaning lower land prices and more difficulty when selling.
- Attracting good calibre staff is more difficult, which has a serious impact on operational effectiveness and profit.
- Retaining staff is more difficult: increasing recruitment costs and staff turnover, with further impact on operational effectiveness and profit.
- The potential to attract top quality equity partners is decreased, limiting options for owners seeking to sell down their investment.
- There is an increased need for on farm security and theft prevention. This has operational costs and potential inconvenience. Also, a potential loss of management focus.

The Value of Strong Rural communities – Quality of Life

Quality of life is much less tangible, but probably has a bigger impact than the financials.

- Are YOU happy living in your district? Does your family enjoy being there? Are they proud of their community?
- Is there contentment? Are people pleased when they come home from a holiday? Or do they need to take a breath and brace themselves as they get back to the district?
- Is there a feeling of security? Does the community come together when threatened with theft, disorder or criminal activity? Few communities are free of this, but strong communities have less of it, and usually respond more quickly.
- Communities that are connected, where people can feel that they belong, have a higher sense of wellbeing. There is a real need for humans to feel a connection with others. Ensuring there is opportunity for that in rural areas is important. Helping others to see opportunities to belong is an important function of a healthy community.
- Stronger communities usually have fewer individuals with anxiety problems. There is less “fear”.
What can We do to Contribute to our Local Community?

How we as farmers operate, our attitude to staff and teams, to contractors and suppliers … makes a big difference to how healthy and happy a local community is.

2 main areas we can look at here.

1. Support Local….., which we will get to shortly
2. Be known as people who “Do the decent thing”.

Rule of thumb – “If farmers can be relied on to do the decent thing in any given situation, a community will be strong.”

There may be adverse things happen, but people wanting to make a place good will normally succeed in the long run.

What’s the decent thing?

- Reasonable (or good) wages, reasonable (or good) living conditions and reasonable (or good) working conditions for staff. (Reasonable is a relative term, consider what you are comparing to! Better than bad, doesn’t mean good! Comparing our practices to the best is much better than being happy with “not being as bad as ….”)
- We help set the tone with the people we employ who come and live in our communities. The points above impact the type of person we can attract not only onto our farms, but into our communities.
- Pride in property and responsible interaction with the environment. This is important for landowners, AND needs to go further, with clear expectations that all involved in the farm will work to uphold those standards.
- Contribute to and support local community structure. At least one of: School, sports group, local hall, kapa haka, car club… Your community will have others. If there aren’t many local organisations start one! Could be tiddlwyinks, cricket, monthly BBQ or a book club…
- Participate in community events and discussions. Participate in a way that encourages others to be there too.
- Encourage learning and training, Ref training, governance training, Career training.
- Encourage family, staff, neighbours…. There is a good chance you could be a mentor, Or if not a mentor, someone who encourages people.
- Deal with any problems, mishaps or mistakes in a fair, rational and predictable way.
- Don’t do dumb stuff… like being disrespectful to people, places or animals.
- Don’t be “that Grumpy farmer down that road”. Our local tractor guy mentioned one of his customers can be a bit “Yelly Shouty”! Not a term I’d heard before, but unfortunately I knew exactly what he meant. Most of us here will know someone that would fit the term. Hopefully it’s not ourselves. If it is you, and you do a bit of yelling and shouting, think about why talking hasn’t worked! That’s a subject for a whole other talk, but keep in mind that there are plenty of people in the world Yelling and Shouting without farmers joining in. It rarely helps a community… Or an on farm situation.
- Sponsorship, Donations, or some other financial contributions to community events, projects, individuals in need or trips, can be powerful. Particularly if a few entities or farming businesses pool their contributions.
- In small towns, the local businesses get hit up pretty regularly for sponsorship. Many of them service farming businesses which have a much higher turnover, but don’t get asked for sponsorship much because they don’t have the same “Shop Front” exposure. There is a lot of sense in farms having an annual budget line for “community good” and either allocating that ad hoc, or pooling with other farms as above, and making a combined larger sum regularly available.
Remember I talked about who is watching us? The decent thing is what you are happy for kids
to know you have done.
The sort of people that kids will grow up to be, is usually the same as the sort of people they
watch and learn from.
Kids see our actions, they see whether we are part of our community or not, they see our
mistakes and how we either work to fix them, or whether we simply blame others.

**Off Farm Owners**
These points are relevant even if you don’t live in the same community as the farm. With larger
farms, multiple ownership and growing numbers of corporate farms, this isn’t unusual. We
could easily head toward the situation of wealthy landowners living in the cities, with a working
class running the farms.
One of the reasons many of our ancestors came to NZ, 5 or 6 generations ago was to escape
that sort of unhealthy system in Europe. To be honest, it is common in Chile now and definitely
doesn’t help the rural communities.

If you don’t live in your farming community, or are part of a corporate structure, I encourage you
to support the rural community in a tangible way. That may be with money, or with practical
actions. It is good for the community to be aware of that support, as it shows you value the
place and the people.

**Support local**
Support local businesses where you can. On big jobs give the local guy a chance, if there is
only a few dollars in it, go for the local option. If they are a long way off, tell them why. There
may be nothing they can do, but it might help their understanding for next time.
Service and contracting businesses need turnover like anyone else, if they don’t get enough
work, they won’t be there in the long term.

**Community Consciousness**
The “reason for being” has changed for many of our rural towns. Think about the reality that a
lot of significant personal spending doesn’t happen in rural towns any more. Think about
clothes, sports gear, household stuff, and electronics. Visiting a city for shopping, or buying
online is easy.
Education can happen outside the community for a variety of reasons
We travel for entertainment and other social events.
Think of the old local A&P shows, horse racing, and even rugby to some degree.
Many small towns had regular events, which are now more centralised.

These changes are part of the bigger picture of social evolution, but an important thing we need
to remember is that we need to be more conscious about our communities than in the past, as
not as much local activity “Just happens as a matter of course”.

4. **Our Part in the NZ Community - Talking Matters!**
As an industry, we are part of the wider New Zealand community. We play a relevant part in NZ
in many ways… AND… One of the things we can improve on is our own promotion of the
industry.
I don’t just mean PR or standing on street corners.
Our world has moved to a place where many people form their views from information received
from people they know or trust.
The media is regarded with increasing scepticism and our younger people are generally much
more discerning. They are growing up with information everywhere and have learnt naturally, to
assess credibility, and pick and choose what they believe. Personally I think they will be better
at it than my generation.
So... **We as individuals are much more powerful than we realise.** Farmers tend to be credible
people as a rule. We are literally grounded and deal with reality daily. Let’s use that credibility.
We need to be confident about the value of simply talking with people. All people, starting with family, staff, neighbours, contractors, suppliers, customers, community and social connections. People we meet on planes, trains, or hitchhiking!

There is plenty to be proud of in 2019;
- As an industry we have come a long way in understanding our environmental impacts and have done a lot to mitigate them. There is still work to do on both, but we are making progress.
- Our contribution to both regional and national economies is massive, with $17 billion of direct revenue which is around 30% of our country's export income
- Our sector employs over 46,000 people
- We have the highest average salaries in agriculture and the 5th highest female salary level of 138 NZ industries.
- We currently have an estimated 10% of industry assets held in Maori ownership.
- Our production system is genuinely grass based. It is closer to nature than most of the world. Well over 80% of the milk produced in the world comes from cows that live under a roof. That means feed must be bought to them, and waste taken away. We have an inherent advantage there. Earl will touch on that, and whether there is much practical marketing value at the moment.
- And…. Around 80% of dairy sector wages are earned in rural areas.

New Zealanders need to know this stuff!

**Social Licence to Operate**
Farmers used to rank alongside Firemen and Ambulance staff on the most trusted professions lists!
That has changed, to the point where being regulated out of sustainability may not be likely, but it is a possibility.
Opinion polls are significant drivers of government action. If we let detractors of our industry fill any vacuum of information, we are walking the path to a place where we lose our social license to operate. Any industry needs to be accepted as a useful member of society. If the balance of negative views outweighs the positive views, that sector effectively loses its “right to exist” or social licence. We need to ensure the factual positives about our industry are known widely.

Farmers in the UK feel the reality of this. Their contribution to society is valued more as “Guardians of the rural landscape” rather than economic contributors to society. One example of this is the measures that are enforced, with strong community support, to protect badgers. I’ve been on a farm, where the main race access to a cowshed had to be diverted to protect a badger set (burrow) that was discovered under the original race. The cost and inconvenience for the farm was significant. Badgers can carry TB, so the potential for infection of livestock had increased.
That society clearly shows that wildlife is valued higher than the community, economic and employment contributions of dairy farming.

Having people or groups challenging aspects of our operating systems is a healthy thing. We always need to be thinking about whether current practice is right, but we must ensure that conversations are balanced and factually correct. We don’t do that only by disagreeing with detractors. Front footing things and sharing facts about our industry and actions are usually more effective.

Yes, industry organisations can play a part. Ensuring media is free of bias and truthful is important, but when we get right down to it: It starts with us…
Family, staff, neighbours, contractors, suppliers, customers, community, social connections. People we meet on planes, trains, or hitchhiking! Sound familiar?

“Never doubt that a small group of thoughtful committed citizens can change the world; indeed, it’s the only thing that ever has.” Margaret Mead
If we do end up speaking on some sort of platform, whether it is a media interview, facebook post, community meeting or forum… or some other option, keep in mind the impression we are giving;
A rough looking person in a ragged shirt with a complaining tone of voice sends a strong negative message before any words are heard.
Being presentable, positive, and stating facts and realities sends a strong message that people remember.
AND if another party or group has been untruthful, call it. No emotion required, no arguing required, just the truth. It’s powerful! The other side of that is to recognise the truth in any criticism of us. We need to acknowledge that too, and then work on what to do.

Rick Pridmore's Dictum;
1. Identify a problem,
2. Work out what to do about it,
3. Do it,
4. Tell the world what you have done.

Human characteristics haven’t changed much over history. Those who value the bible can see in the 2000 year old teachings of Christ, messages there are just as relevant today as they were then. Plato, Aristotle and Confucius all had perspectives that are as relevant now as they were in their lifetimes. Human fundamental character and desires don’t change, if anything, those lessons are more important now than they were in ancient times, as there are many, many more people around now.

5. Personal Context Matters

We all have opportunity to contribute to our communities. Yes, some of us can contribute more than others, and yes, some can do more now, and some will do more later. For some of us, simply participating is the best way we can contribute at the moment.

Think about yourself here though. Every one of us here has 3 aspects

1. **What we do:** Conall and Rowena Buchanan, 800 cow dairy farm + 330 cow SM job, Near Paeroa, Hauraki Plains
2. **How we reached this point:** Used multiple Sharemilking jobs to build capital. Past national chair Sharemilking Section. Founding member Fonterra Shareholders Council. Spent 3 years in Chile starting a Dairying Company which has since grown to 40,000 cows.
3. **The Human stuff:** 3 children from 13 to 15 years, a number of leadership roles in Community, Supporter of local, regional and national Community & Industry events, Generational links to the district.....

Think about your 3 aspects…. **Not a scorecard with your neighbour!** Simply - What we do, how we got to here, & the important Human stuff.

Now think about what you know, what you can do, and how that can benefit your community.
- Is it empowering your family or your staff to take an active role in a community?
- Is it making sure you are always involved in at least one community group?
- Is it providing some practical or physical support to a community group or organisation, maybe a sports group?
- Is it being a part of a catchment committee? Consultation group or working group? These can be hard going, but need sound farmer voices involved.
- Is it helping with some fundraising? Providing some sponsorship, or simply making a donation?
- Is it starting up, or supporting the start-up of a stream care group, a hiking group or taking kids to read to people in a rest home?
If the contribution you are making is financial, it makes sense to ensure that there is recognition of that. No need to be over the top, but it lets the world know that you, and farmers, care. Having your farm name or logo recognised in this way is simple common sense. It lets our communities know that we are doing our bit.

There are some simple things we can do to help our communities;
- Encouraging staff to go to school events and support school activities. We can often be flexible around work times.
- Offer to help community institutions. Even if we aren’t directly involved. Donations, sponsorship, the offer of physical or tractor type help, the offer of a venue or parking...... the offer is the important part. Let the Principal, President, Chairman or whoever, know that you are able and willing to contribute. The cost is often small, but the impact can be significant. The offer may need to happen once a year as these leadership roles turnover... and it doesn’t hurt to remind people.
- Don’t underestimate the contribution that farmers can make on committees and in governance roles in general. Farmers are decision makers. The nature of our work means we make decisions all the time. This is not as common as we might think, so we often add real value around a table.
- Simply being a steady hand involved in a community organisation can be very valuable. Some community organisations have natural life cycles, ups and downs in numbers. Particularly where young children are involved, parents need to follow their kids as they grow. The play group or toy library organisers need to move on, having a longer term person to keep things going and help convince the next group that they really are up to the job can be vital. Letting people learn and grow is important, but there are times when an experienced hand can temporarily fill some gaps!

Can I be a part of a decision making process?
There are a number of farmers from all around our country who have been a part of different panels, working groups or catchment committees. These groups often set the direction and contribute to decisions that can significant impact on farm operation systems. There is a very relevant saying;

“If you aren’t seated at the table, you will probably end up on the menu”

This activity is ongoing.
- Some regions are implementing environmental plans. Ongoing farmer input is important to keep the implementation on track.
- Some regions are still developing those plans. Ongoing farmer input is important to keep the plans focused on practical outcomes.

I was involved in a Stakeholder Working Group that developed a Marine Spatial plan for the Hauraki Gulf. This was a 3 year project driven by 16 people with very diverse perspectives. The plan we produced brings together actions that will make a very real difference for a highly productive and populated piece of NZ marine area. Importantly, because of the group that put it together, the consequences of the actions in the plan consider all the other groups involved. Because of this it is much more likely to work.

A key point on this though, in the initial stages land users were not even considered as being relevant enough to be a part of the stakeholder group. This is for a water body with over 500,000 hectares of catchment, which generates in excess of $2 Billion in milksolids alone. Point being, sometimes we need to be awake and fight for our place at the table.

Keep in mind that some of the farmers currently involved may reach the point where they are looking to “pass the baton on”. Taking turns when doing your bit is a good thing.

DNZ runs an annual Dairy Environment Leadership Group which brings together farmers and others from all over NZ. This is a strong support for those involved in different activities, or those who may become involved in those activities. I recommend it.

Taking Stock
I challenge you to think about your local community.
Am I doing the right amount as a member of my community?
What goes well? What do I do well in the community?  
What could be better? What could I do better in the community?  
Who can I encourage or support.

Connection and Belonging are important to humans. Sometimes it is us who need to help that  
connection happen… and either help others get to the place they feel they belong, or get to that  
place we belong ourselves.

6. Where does the Environment fit in all this?

Doing the right thing environmentally, both on and off farm, is good in and of itself.  
It is one of the “Decent things”

AND

Caring for the environment is often also a good way to bring people together and connect.

On farm in 2019 we all have a range of environmental initiatives that are now common (or  
compulsory) and “business as usual”. Things like nutrient budgets, enviro walks, fencing  
waterways, riparian planting, good winter crop management and planting for shelter and  
biodiversity. Some of these were not common 30+ years ago when I started farming, although,  
interestingly there are farms which have had versions of those things in place for generations.

Our on farm initiatives will continue to evolve. Farm environment plans are becoming common  
and a further step down that road. As farmers we need to continue working to minimise the  
negative, and maximise the positive environmental impacts we have. We need to be engaged  
in working out the methods used so that our production systems retain economic as well as  
environmental sustainability.

Being involved in formal processes, informal discussions and our community generally helps  
ensure that our voice is heard AND that our voice has the credibility to be listened to and  
considered, as some of the important decisions are made in this area. Environmental policy  
and regulation is an area where the decisions aren’t ours alone to make.

A huge amount of on farm environmental progress has happened, is happening and will  
continue to happen. Part of the reason for this presentation is to spark some thinking about  
how on farm actions can involve parts of local community, OR, about thinking to see if there are  
ways to take environmental activity out into the community, bringing people together while  
benefiting local ecology.

Planting riparian strips, fencing off and under planting stands of native trees, planting out less  
productive or reserve land can all be opportunities for community projects. They lead to further  
activities with things like releasing the trees later, preparing the site prior, social gatherings to  
plan.  
This can be like growth rings of a tree trunk. Plan, prepare, plant, release, monitor. Each one  
can be a coming together of people.

Pest control is becoming a real trend where communities in many different locations can work  
together.  
- Rats, stoats and even possums are now popular targets for some urban communities.  
People keep score and there is a degree of competition, always good where humans are involved.  
- There’s a history of competitive rabbit, possum and swan culling days, often as school  
fundraisers – although there have been a few perception issues with those in recent years.  
- Making and siting bird boxes is a long standing activity that children learn a lot from.

On our own farm we fenced off and under planted stands of Kahikatea. At about the same time  
our local primary school became an Enviroschool. As the school has developed that concept,  
they decided to grow seedlings, which has led to an annual day where they go out and under
plant Kahikatea stands that different local farmers have fenced off. This autumn was year five with up to 500 plants put in the ground most years. 7 or 8 stands are now fenced off and planted. These are stands that would probably have eventually grown too old and died out. The understorey is developing and in time will allow young trees to establish and keep the stands sustainable. Interestingly there is a noticeable increase of native birds visiting the area. While there are other factors involved with that, it is very rewarding for the young kids to see some real change happening. All going well it will be a long lived initiative with the school. The long term goal is for most landowners to a fence their stands, whether the school is involved or not. There is real power when children are involved in initiatives. I am sure that the work done in those stands of trees will be respected and maintained better because children were involved. We naturally lift our standards when we are aware of the continuing gaze of young people.

The Enviroschool concept delivers benefit for the children, but also can be a tool to bring communities closer together. It does need a motivated teacher to drive it, but their job is easier if there is support from others in the community. The support can be manpower, donation of materials, help with transport, help with ideas or local knowledge, or even some cash. With our school’s project the Regional Council has been a welcome supporter as well.

Suitable activities or projects will probably be different in your area, but calling into the school and offering to help could bring surprising outcomes!

7. Conclusion

If there is one thing that you take away from this presentation, it should be an idea or ideas about what you can do to contribute to your local community. It may be significant time or money, it may be supporting others. Be clear on what it is, and make sure you do it.

To conclude, I’ll rephrase an earlier comment:
Being an integral part of our communities, and being involved in environmental and regulatory discussions when the opportunities arise, ensures that our voice is heard AND that our voice has the credibility to be both listened to, and considered, when there are decisions that aren’t ours alone to make.

To Sell Globally

Please refer to the SIDE App for the full proceedings document.
(Due to a time delay, this did not make the printed copy).
Closer look at dairy prices, supply and demand

SIDE
June 25 2019
Invercargill

Dairy Link
Consultancy & Research

The Basics: Demand
The world is consuming more dairy

 Consumption * Change 2018-2023
To meet growing demand (excl. India and Pakistan)
31.5 bn litres more/a milk needed in 5 years time

75% of world dairy consumption growth in the next five years will be in South Asia

By 2023...
SEA will consume another 2.6 bn litres Maq
China will consume another 7.0 bn litres Maq

BUT in five years time, these markets will only be producing 3.2 bn litres more, needing to import the 6.3 bn litre shortfall. 1.2 bn litres each year!

Source: GDC 18

Asia’s milk deficit is growing

Indonesian Milk Deficit, 2007-2023f
(in thousand tons of standard milk equivalent)

Thailand Milk Deficit, 2007-2023f
(in thousand tons of standard milk equivalent)

Indonesia: 92% milk solids consumed across all dairy categories are sourced from imported dairy ingredients
Consumption 14 kg/milk eq per capita. Milk deficit 3.0 bn litres, growing at 100 m litres per year.

Thailand: 54% milk solids consumed across all dairy categories are sourced from imported dairy ingredients
Consumption 35 kg/milk eq per capita. Milk deficit 1.4 bn litres, growing at 50 m litres per year

Similar position across Asia, ingredient import dependency for manufacturing dairy products is high, and increasing
China 35%, Philippines 80%, Vietnam 75%, Malaysia 90%
Dairy Link
Consultancy & Research

Dairy products are made from imported milksolids
Milk is 'made' in the factory, rather than sourced from the farms

Dairy Link
Consultancy & Research

Raw milk production in Asia is expensive
Only a few product applications can recover the cost of producing milk in SE Asia

Factory gate milk prices across Asia are high!

<table>
<thead>
<tr>
<th>Country</th>
<th>Price (USD/kg)</th>
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<tbody>
<tr>
<td>China</td>
<td>5.5/100 kgs</td>
</tr>
<tr>
<td>Malaysia</td>
<td>6.1/100 kgs</td>
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<tr>
<td>Thailand</td>
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<td>6.0/100 kgs</td>
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<tr>
<td>Indonesia</td>
<td>5.0/100 kgs</td>
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Yet... dairy farming is barely profitable across Asia
milk supply gap will increase further

Typical Asia based dairy manufacturer faces a simple choice
when formulating dairy products:

Either:
- Pay 50-60 cents litre (USD) to use local milk (often with issues)
- Pay 40-45 cents litre (USD) equivalent for imported milksolids at
current prices in WMP or SMP + fat or WP + Fat

Affordable dairy nutrition ability is a key factor

Growth in demand for fresh fluid milk will absorb all SE Asia’s
domestic milk supply growth.
Growth in demand for nearly everything else will largely be filled
with imported ingredients

- Yogurt/ cultured drinks/ SCM flavoured milk/RTDs/
Ambient milk/ powdered drinks/ cream/ ice cream/ dairy spreads/ cheese/ butter/ fluid service.

Dairy Link
Consultancy & Research

...The Basics: Supply
but milk supply growth from exporters slowing near term

Change in annual milk production (bn litres) Calendar year
Major exporters (50% of world trade) and China (largest importer)

- The world (excl IN PK) needs 6 bn litres more milk (+1.5% pa) to meet demand growth, every year!
- Undersupply in 2012-13 created price spike, leading to massive oversupply in 2014-16.
- Prices crashed. The impact of oversupply lasted 5 years.
- 3.4 bn litres liquid equivalent of SMP was put in storage in US and EU, now cleared!
- All the milk fat associated with supply surge was absorbed!

Facing potentially tighter supply of key dairy ingredient commodities 2019-20
EU intervention shielded farmers from full effects of 2014-16 oversupply and caused price chaos!

WMP, Dairy Fats + SMP/2, Cheese

USD $3,000 - $3,500 WMP range is a sweet spot

Positive milk supply response

WMP or SMP + Fats prices above $3,500

Negative milk supply response

Extreme butter prices: Is it a supply or demand story?

NZ and EU Butter Prices (Euros), 2013-19

Increasing/strong butter demand
Use of milk in the EU, NZ & US
2017 butter production decline, despite greater milk supply...

EU, US & NZ Combined Milk & Commodity Production Change, 2015-19f

2015
2016
2017
2018e
2019f

EU SMP & cheese
Milk
SMP
Cheese
WMP
WP

Source: China Consultation

More milk + strong butter demand... yet milk flowed to cheese & WMP. Away from butter prices reflected shortage

2018 more milk to SMP/butter and cheese

NZ butter/AMF exports
China's got the taste for milk fat

Latest NZ trade data shows 2018 solid dairy fats exports to China passed 100 kt (beq.)... 7x a decade earlier

AMF Export Volumes (beq.) to Main Destinations

Butter Export Volumes to Main Destinations

Protein to fat price ratio in the EU: SMP & butter
Strong shift towards fat; ratio of 0.5 artificially low however

EU Protein to Fat Price Ratio v EU SMP Intervention Stocks, 2006 to Aug-18

EU SMP Stocks
P.F Ratio

EU SMP Public Intervention Stocks (000t)

Time article released
Markets move out of balance

Protein to Fat Price Ratio

EU SMP Stocks

EU SMP Public Intervention Stocks (000t)
For the last 15 years
Milk fat values have been rising on ave 20c/kg per year
Milk protein prices have been flat

Source: Dairy NZ, company announcements

Trade access defines where our markets are
NZ's markets are milk deficit countries with low trade barriers, and growing consumer expectations
Asian countries (exc Korea and Japan) are largely open to trade
Ingredient products enjoy lower trade barriers than finished consumer products
Manufacturers of dairy products in Asia favour using imported ingredients (except for fresh fluid products)
Finished consumer products are largely made in-country
Customer (manufacturer) demand for ingredients is driven by consumer preference expectations and purchasing power, as well as availability of alternatives.
The region is quickly gravitating from basic to sophisticated demand
1. Need for basic affordable nutrition
2. Convenience and choice
3. Health and wellbeing
4. Social values associated with products
The NZ provenance story will increasingly matter.

Export Destinations for NZ Dairy Products
(in fluid milk equivalent)

Source: Dairy Link analysis based on Statistics NZ data

Demand for what we produce is growing
- On our back door, in an increasingly unrestricted access market
- 1.2bn litres per year, export average demand growth in Asia
- NZ has a strong reputation for consistency and quality
- Prices would normally settle at the point of indifference between importing milk solids or sourcing more local milk.

But we are not the only producers of dairy ingredients
- EU is now the world's largest dairy exporter
- Us export product mix weighted to cheese/VP SMP
- High quality reliable supplier, making progress in trade agreements
- Can turn on milk supply when export price exceeds domestic price
- USA keeps producing more milk, and consuming it.
- USA is a net milk fat importer, but protein exporter
- Asian manufacturers of everything in dairy continue to be faced with dilemma of needing to support local industry, while paying 20-30% more for fat and protein by buying local milk, than they would pay buying it off the world market.
- Asia is only sustainable for limited uses of milk.

Consumers, processors, regulators are thinking about same things
- Food security, trade dependency, stable prices, food safety
  - Climate change, water, soil and air quality, plastics, animal welfare, environmental footprint

All opportunities, no threats!
NZ farmers alone cannot fill the milk supply gap developing in Asia but we can capture value from it.
WE’RE HERE, THERE, AND JUST ABOUT EVERYWHERE WHEN YOU NEED US.

Because there’s a local Farm Source near you, we can hit the ground running with help and advice.
Winning at wintering

Dawn Dalley, Nick Tait, Tony Dench, Helen Thoday
DairyNZ Ltd, Lincoln;

Executive Summary

Wintering cows on crop in the South Island is an activity that requires attention to detail in multiple areas to be done well, these include:
- Environmental management,
- Animal care,
- Feed allocation and planning,
- People management and
- Finance

Scientific research has provided:
- Options to reduce the environmental impact of crop grazing
- Key indicators of cow comfort and wellbeing
- Feed quality, utilisation and performance targets and
- A whole of system understanding of a range of wintering systems

This knowledge has resulted in good management practices for:
- Crop paddock selection and setup
- Crop establishment
- Grazing management
- Post-grazing management

Adopting wintering Good Management Practices (GMP’s) will result in better wintering outcomes for our animals, people and the environment. This will demonstrate to the regulators, our communities’ and consumers of our products, that as an industry, adopting good farming practices can make our industry more sustainable.

Why Is Wintering So Important?

Crop or paddock-based winter grazing of stock has gathered a lot of interest from government and the public in the last few years, so the adoption of good animal welfare and environmental wintering practices must become a priority for our farming operations.

The risk of not adhering to good management practices (GMP) is that we continue to come under increased scrutiny from our consumers and the public, local and central government will react with unnecessarily stringent, prescriptive regulations around winter cropping and farmers will lose their social license to farm the way they want.

Wintering Research

The last 10 years has seen significant investment in research to address the wintering challenges faced by farmers in southern regions of New Zealand. The research has taken a systems approach to ensure that change to wintering practices don’t have negative effects on other parts of the farming operation. Below is a summary of the key findings from three large systems projects.

Southern Wintering Systems
The Southern Wintering Systems Initiative monitored six different wintering systems (crops, pasture & silage; wintering pads; freestall barn; Herd Home and Loose housed barn with sawdust) from 2010 to 2014 (Dalley et al. 2013).
The most important lessons learnt were:

**Feed**
- Accurate determination of crop yield can only be achieved from regular monitoring and assessing the dry matter percentage of individual crops.
- Utilisation of fodder beet is generally higher than swedes or kale and all crops are utilised better when offered using long, narrow breaks. On heavy soils minimise crop damage from treading with more frequent allocation of crop with animals grazing under the front fence.
- Be realistic in the level of crop utilisation you target as high utilisation may come at the expense of energy intake, especially for kale crops. To achieve BCS gain over winter kale utilisation should not exceed 80%, swedes 85% and fodder beet 95%.
- Attention to detail with crop allocation is required to achieve target energy intakes.

**Animal**
- Whole herd body condition score assessment provides a powerful tool for proactive feed management during autumn and setting up mobs for differential feeding during winter.
- Herd average BCS is not a robust measure of wintering system success. Body condition score range and the percentage of cows not achieving the target are more informative measures.
- Weather has a major impact on lying times in grazed systems. Lying times as low as 3 hours per day were measured during a Southland snow even.
- The number of short lying bouts is a good indicator of how comfortable cows are on the surface they are lying on.

**Environment**
- Calculated nitrogen leaching losses relate well to farm nitrogen surplus, providing an opportunity to minimise losses through good practice nitrogen management.
- Most nitrogen losses to water from forage crops occurs during winter and early spring when drainage is high.
- Back fencing crop paddocks can reduce suspended sediment loss in runoff by up to 17%.

**People**
- Different wintering systems require different skills
- Work flow during the day and through winter is dictated by the wintering system being implemented.

**Financial**
- The price per kg DM paid for feed is the biggest contributor to direct costs associated with wintering.
- Indirect costs (depreciation and debt servicing) can significantly increase wintering costs in stand-off and housed systems.
- Potential exists to capitalise on the nutrient value from effluent/slurry and sludges from stand-off and housed systems to reduce fertiliser costs on farm.

**Pastoral 21 Telford**

From 2012-2015 DairyNZ and AgResearch conducted a farm system project at the Telford dairy farm with the aim of identifying future dairy systems with a 30% reduction in environmental footprint. A standard crop-based wintering system was compared with either a system integrating off paddock wintering and duration-controlled grazing utilising a Redpath composting barn OR a crop-based wintering system utilising less N fertiliser on the milking platform, calving later and including whole crop cereal silage and short rotation ryegrass in the diet.

Both alternative systems reduced the environmental footprint by the targeted 30% and had similar milk solids production, however this came at the expense of farm profitability for the off-paddock system due to increased operating costs relating to managing bedding, manure and effluent and the additional depreciation and maintenance costs associated with the infrastructure investment.
Research has shown that grazed winter forage crops contribute significantly to the risk of phosphorus (P), sediment and faecal losses to water. Critical source areas (CSAs) such as gullies and swales are a particularly important part of the landscape involved in the transport of these contaminants to water. The Telford research team measured the impact of strategic grazing and protection of CSAs in winter crop paddocks on subsequent runoff and nutrient loss (Monaghan et al. 2017). This research demonstrated that:

Strategic grazing and careful management of CSAs can reduce losses of sediment and phosphorus (P) by 80-90%.
The reduction is achieved by minimising stock movements and thus soil treading damage in the CSA. This means any rainfall and runoff that occurs is more likely to infiltrate the soil, minimising the amount of runoff and losses of sediment and P.
Strategic grazing will not greatly reduce nitrogen (N) losses observed from grazed winter forage crops, which are largely due to the urine patches.
Implementation of strategic grazing management is a low-cost mitigation option that returns a high environmental benefit.

**Southern Dairy Hub (SDH)**
The farm systems comparison at SDH is investigating the environmental footprint of dairy systems based on either fodder beet or kale wintering. The measurements of nitrogen leaching from autumn and winter grazed/lifted fodder beet and winter grazed kale is being compared across two winters. Initial results from Yr 1 indicate higher N leaching losses from autumn grazed and lifted fodder beet compared with winter grazing/lifting and this has been attributed to a longer period where urine patch N and soil mineral N are exposed to drainage. Leaching from winter grazed kale was higher than winter grazed/lifted fodder beet, likely reflecting the high N surplus in the diet of cows grazing kale.

**Animal Care Considerations**

Implementing GMP with paddock selection, establishment of the crop, and grazing management is an excellent way to reduce the risk to the environment and minimise animal welfare issues. Early and thorough planning when crop paddocks are selected will enable any tensions between good environmental outcomes and animal management to be addressed.

To achieve the dairy sector commitment to be world leading in animal care it is important to view wintering from a cow’s point of view. The following section extracts paragraphs from parts of “The welfare, health and productivity of dairy cattle managed in muddy conditions”, Schutz 2018. Karin Schutz AgResearch, took the latest research from within New Zealand and internationally to provide an overview of the impacts of cattle kept in muddy conditions.

*Extract from “The welfare, health and productivity of dairy cattle managed in muddy conditions”, Schutz 2018.*

There is abundant evidence that wet and muddy conditions have negative effects on the welfare, health and productivity of cattle, including:

- severely reduced lying times, which can lead to chronic stress and immunosuppression
- reduction of quantity and quality of sleep
- reduced production
- increased risk of mastitis
- increased risk of lameness

Also, when given a choice, cattle clearly avoid wet and muddy surfaces to the extent that they will choose to lie down on concrete (a surface they also find aversive) rather than in mud. The changes in behaviour seem to be largely driven by the moisture content of the surface.
The negative effects of reduced lying times may be more evident in cold weather due to thermoregulatory challenges associated with cold, wet surfaces, which in turn will increase metabolic requirements. Exposure to poor hygiene conditions is likely to increase the risk of infections, and hygiene scores are commonly used internationally in on-farm welfare assessments as an indicator of cleanliness of the lying surface. A shelter with a dry, soft bedding area for all cows to use simultaneously can enable good welfare and health and mitigate the negative effects of inclement weather and wet and muddy underfoot conditions.

A documented winter management plan should include a “Plan B” to provide dairy cattle with a comfortable drier lying surface. In general, the provision of continuous drier lying areas can be achieved by minimising pugging. This can be achieved throughout winter by fencing off wetter areas of the paddock and grazing them only during drier periods and regularly moving the back fence. Some farmers have had success with the provision of longer feed faces while others advocate for a short but deep feed face to take “larger chunks” of the paddock resulting in access to drier paddock areas.

The reality is that rain events or regular bouts of rain lead to reduced lying times on most soil types so removing cows from the crop paddocks might be the only Plan B to achieve a drier lying area. Plan B alternative areas may include a grass area left under the most robust shelter belt on farm, a drier paddock elsewhere on farm or a paddock that contains a drained slope for cows to access.

Forty percent of farmers nationally now have some sort of off paddock facility with around twenty two percent of facilities having a roof. This indicates a strategy beyond a Plan B, with the provision of a covered facility that provides a dry lying area.

Several minimum standards defined in the Dairy Cattle Code of Welfare around feed, water, behaviour and adverse weather apply in a wintering context. The increased number of calls to MPI from concerned public around cows in mud has led to a refresh of on-farm observations MPI will make following a complaint. These include the provision of a suitable lying surface and the behaviour of the cattle, particularly their ability to easily walk on surfaces, in this case the wintering paddock.

The complexities of cattle ownership and daily or even seasonal care should not inhibit the responsibilities required by the Animal Welfare Act 1999. Owners of stock must stay active and involved in their care irrespective of where the animals are located. Care obligations still apply even when the animals are not in the direct control of the owner i.e. wintering at a grazer. Having clarity of animal care requirements between the parties involved in the business structure e.g. a contract milker, the farm and cattle owner and a grazer is essential for good wintering outcomes.

Documenting a well thought out Plan B and considering all aspects of dairy cattle management over winter is part of a documented winter management plan. DairyNZ has resources that can help with this approach involving the whole team so excellent care standards can be provided whatever the weather.

**What does Good Management Practice wintering look like?**

The factors (GMP’s) that need to be implemented to ensure good animal welfare and environmental management during wintering are:

1) **Paddock Selection and Set Up**
   a) Cow shelter
      i) Look at options when selecting paddocks to provide protection from the prevailing winter wind direction. The shelter will need to be long enough to protect all the cows
   b) Water trough access
      i) Cows must always have access to water. Water can be provided by either permanent or portable water troughs.
c) Soil type
   i) If possible, select paddocks with soils less susceptible to pugging or compaction. This will reduce soil structure damage and the potential for overland flow.

d) Sediment run-off/CSA identification
   i) Understand where water flows or collects during wet periods. Avoid cultivation of these areas to minimise potential soil loss.
   ii) Paddocks with many CSA’s may be unsuitable for winter cropping.

e) Waterways
   i) Paddocks that are a greater distance from waterways reduce the risk of contaminants reaching a waterway.
   ii) Identify drainage networks and plan grazing activities to minimise nutrient losses.
   iii) If the paddock you select is near a waterway you can reduce the contaminant risk by using buffer zones, CSA management and strategic grazing management strategies.

f) Slope
   i) The greater the slope in a paddock, the greater the risk of surface runoff. Paddocks with steep slopes require larger buffer zones than flat paddocks.
   ii) If paddocks are too steep to cultivate across the slope they should not be cropped.

g) Nutrient management
   i) Soil test the paddocks that are selected for winter cropping 6-12 months before planting and ensure that appropriate nutrients are applied to grow the crop.

2) Establishment of The Winter Crop

a) Planning
   i) Establish an individual paddock grazing plan when paddocks are selected for winter cropping. This includes a contingency plan – ‘Plan B’ for adverse weather events.
   ii) Use the plan to identify areas you do not want cultivated and communicate this to the person/contractor establishing the crop.
   iii) Ensure that this plan is well communicated with the farm team.

b) Cultivation
   i) Cultivate across slopes rather than up and down where possible to minimise overland flow.
   ii) Leave grass strips across slopes of cultivated paddocks to trap sediment running off cultivated areas.
   iii) Leave appropriate buffers zones to water bodies to act as a filter for overland flow.
   iv) Flat paddocks should have a buffer zone of at least 5 metres wide between the crop and any waterways.
   v) As the slope of the paddock increases so should the buffer zone. Investigate your regional council rules for details about the buffer zone requirements in your area.
   vi) Consider direct drilling when establishing a crop to minimise soil disturbance and potential nutrient and sediment losses.
   vii) Leaving CSAs uncultivated and not planted in crop will make it easier to fence them off. This will reduce the amount of soil disturbance by machinery and stock. The pasture will also provide an additional filter for any runoff that occurs.

c) Paddock access
   i) If a paddock is renowned for getting particularly muddy therefore difficult to walk through, fence off an access strip along the length of the paddock to allow staff to easily access gateways, the animals, and break fences.

d) Selecting grazing direction
   i) Use strategic directional grazing to protect CSA’s or water bodies from overland flow i.e. graze from top to bottom of slope. If this is not possible leave a wider buffer strip on the downhill side to minimise the risk of any overland flow entering the waterway.
ii) Protecting the gullies and CSAs will reduce overland flow by maintaining soil structure and allowing surplus water to soak into the soil rather than running off.

e) Setting out baleage

i) Place bales away from waterways, critical source areas and swales

ii) To reduce the need to drive heavy equipment on wet soils, place bales strategically throughout the paddock prior to winter, and use ring feeders when feeding the baleage

3) Grazing Management of The Crop

a) Transitioning

i) Ensure that cows are transitioned onto crop effectively to minimise digestive upsets.

ii) Transitioning requires a gradual introduction of the crop so that the rumen can adapt to the new feed type; 7-10 days for brassicas, 14-21 days for fodder beet

iii) Ensure that enough supplement/pasture is offered during this transition period to meet cow energy requirements as the crop allocation is increased.

b) Feed allocation and utilisation

i) Ensure that stock are offered sufficient feed to achieve body condition score targets over the winter period

ii) Be realistic with utilisation levels of crop and supplement when working out allocations

c) Cow condition

i) Planning for achieving BCS targets should start in autumn to utilise milking frequency and dry off date, therefore minimising the amount of body condition gain required during winter

ii) Cows in good body condition are better able to withstand cold as the fat layer beneath the skin acts as an insulating layer therefore plan to gain condition early.

iii) Establish initial wintering mobs based on BCS and priority feed those with the biggest BCS gain requirement

iv) Monitor cow condition regularly through winter and adjust feed allowances and mob makeup if targets are not being achieved

d) Cow lying time

i) Ensure cows have access to drier areas so they achieve eight hours lying time per day.

ii) Keep cows close to the feeding face where the soil is often drier

iii) Have a ‘Plan B’ for prolonged periods of extreme wet

e) Cold Stress

i) In cold and wet weather allow for decreased utilisation of crop and increased cow demand for energy.

   1) Offer more supplement or

   2) Increase the crop allocation or

   3) Increase the frequency of moving the break

ii) Watch the weather predictions and be proactive in implementing your ‘Plan B’ to reduce cold stress

f) Utilisation and back fencing

i) Reduce crop wastage by moving the fence once or twice a day rather than offering a few days feed at a time

ii) Offer long feeding faces rather than blocks. All cows should be able to access fresh feed at the same time

iii) Back fence to reduce excessive movement of animals and damage to soils

g) Managing CSA’s

i) Fence off CSAs and leave ungrazed or graze quickly in dry conditions at the end of the paddock grazing.

h) Water access and portable troughs
i) Ensure animals always have access to water troughs

ii) Portable troughs are a good way to minimise unnecessary movements and should be kept close to the feeding face to limit cows walking.

i) Calving cows on crop

i) Cows should not calve on the crop paddock. Ensure that cows are drafted off the crop paddock at least two weeks prior to their expected calving date.

ii) Ensure that cows calve on a suitable surface and have enough area and that their pre-calving mineral requirements are met.

4) Post Grazing Management of The Crop Paddock

a) Catch crops

i) Where possible investigate options to use catch crops, such as oats, triticale and rye corn to minimise soil/nutrient losses following grazing by minimising the fallow period.

References


Resources

www.dairynz.co.nz

https://www.dairynz.co.nz/publications/seasonal/reviewing-your-wintering-system/


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The Smart Dairy Farm of The Future

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Introduction

The fourth industrial revolution is upon us (Schwab & Forum 2016). This revolution is marked by technology breakthroughs in robotics, artificial intelligence (AI), quantum computing, the Internet of Things (IoT), and autonomous vehicles. In our everyday lives, AI is all around us, from Netflix to predictive web searches to road and flight navigation. Technologies are generating more data everyday but only a small fraction of these technologies and data is utilised to improve dairy farming systems.

Big data combined with AI can provide predictive insights (e.g. yield, growth rates, etc.), facilitate real-time operational decisions, and reinvent processes for farm businesses (Lokers et al. 2016; Wolfert et al. 2017). Factors that push and pull the development and use of “smart farming” technologies include interpretation of unstructured data (e.g. images), advanced data analytics e.g. AI techniques, increased connectivity, advanced remote sensing and image capture, increased efficiency and improved management, food safety and compliance. Smart farming is important for tackling the challenges of agricultural production in terms of productivity, environmental impact and sustainability (Kamilaris et al. 2017).

Some of these smart technologies have become heavily embedded in crop and fruit production systems, e.g. use of robots for fruit picking and sorting, AI for weed and pest identification and precision spraying, and IoT connected devices for sensing (for example, soil moisture, humidity). But, they are yet to become commonplace for NZ dairy production systems.

Why are NZ dairy farmers not fully grasping new smart farming technologies?

1. Data rich but information poor

Only recently have technologies such as sensors started to provide true insights rather than scree of uninterpretable data. In addition, AI enabled devices are now programmed to process the data into something meaningful rather than outputting or sending massive amounts of raw data to data centres for processing. This avoids data overload by generating insights from the data not just generating data. It is highly probable that some of the key opportunities to utilise and link data, and to generate insights have yet to be discovered.

2. Connectivity

Fine scale connectivity and data transfer is still a real issue on many dairy farms. Smart IoT devices need broader connectivity to pass on their insights collectively and integrate with other data sources. Sensor data needs to be delivered real time to harness the true benefits of artificial intelligence and cloud-based services. New approaches such as 5G could provide huge opportunities to overcome current connectivity constraint.
3. **Cost of data and technologies**
   It is undoubtedly that cost of data and smart technologies is still an issue hindering the adoption of new technologies. Technologies need to be cheaper to overcome the capital investment hurdle, but the cost of technologies and their data is decreasing all the time. For instance, it took more than 10 years, at a cost of $2.7 billion, to complete the Human Genome Project. Today, a whole genome can be sequenced in a few hours and for less than a thousand dollars. So, the cost of collecting data will get cheaper.

4. **Data interoperability**
   Data interoperability is a real challenge. By this we mean different service providers may provide data in different forms so that data cannot easily be combined. The real power of data for decision support is when multiple sources can be combined. For example, one data or information service provider may represent a paddock and measure related to that paddock in one way and another provider in a completely different way. Following the FAIR principle (that data should be Findable, Accessible, Interoperable and Re-usable), will lead to reduced costs for producing and managing data, improvement of data quality and integrity, greater availability of reliable data in real-time, a reduction in the time between monitoring and action, more use of data in new combinations, and expanding people’s ability to use data (Rychlik et al. 2018). Many are now suggesting open standards be adopted and agreed for data integration (Lokers et al. 2016).

5. **Data access**
   Many technology companies impose terms and conditions that state that data can only be used and accessed via their systems for agreed purposes, and not retrieved or reused if the farmer changes service providers. The ‘Ownership Principle’ of the Big Data Coalition (agdatacoalition.org/) states that “We believe farmers own information generated on their farming operations. However, it is the responsibility of the farmer to agree upon data use and sharing with the other stakeholders (Wolfert et al. 2017). This ownership principle would free up innovation by allowing farmers to share and utilise more data. Big data concentrated in the hands of big agri-businesses limits the potential of any technology (Kamilaris et al. 2017).

6. **Proven value proposition**
   Perceived barriers to uptake of technologies are common: high investment costs, complexity of use, lack of fit with the farming context, and – critically - unclear benefits to the business compared with current practice. It is therefore essential ag-tech industry provides evidence of the value of adoption, and that the farmer can fast see that value in their own eyes.

**The Five V’s**

When commencing any smart farming initiative (Kamilaris et al. 2017), we need to consider what is often termed the five V’s:

- **Volume (V1):** The size of data collected for analysis. Do you need to store all data in its raw form or its most useful forms?
• Velocity (V2): The time window in which data is useful and relevant. When does data not become useful or relevant to make tactical or strategic decisions?
• Variety (V3): Multi-source (e.g. images, videos, remote and field-based sensing data), multi-temporal (e.g. collected on different dates/times), and multi-resolution (e.g. different spatial resolution images) as well as data having different formats, from various sources and disciplines, and from several application domains. How can we best link or transform that variety to obtain the best insights?
• Veracity (V4): The quality, reliability and potential of the data, as well as its accuracy, reliability and overall confidence. How can we increase the veracity of the data?
• Valorization (V5): The ability to fully realise the value of data to generate knowledge, appreciation and innovation. How can we enhance this aspect to drive the most value from data?

Example use cases

AgResearch has recently launched a research programme “NZ Bio-economy in the Digital Age”. This programme includes a series of use-cases that range from individual animal to national impact to transform NZ’s primary industries. Dealing with the Five V’s is central to this research programme. For instance:

In Simulation and Visualisation Tools to Accelerate Adoption Change use case, we want to use data, simulation and visualisation to enable users to understand complexity, gain new insights and have more informed perspectives contributing to decision-making for complex, multiple land uses.

In AI (Farmax), we want to explore how knowledge of a farming system and its component parts, current conditions, risk, uncertainty and past insights can be used to determine the best management options for proactive management.

In Facial Recognition, we want to explore if we can use artificial intelligence techniques to identify micro-expressions that quantify an animals’ emotional state.

Conclusions

Dairy farming operations are increasingly becoming complex and data rich but often information poor. The development of smart technologies is likely to change that but first we need to overcome connectivity challenges and ensure more open data access combined with greater data and model interoperability. Only then will the true benefits of smart technologies and innovation occur at a scale to transform the dairy farming sector in New Zealand.

References


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Who’s the boss?
Ben and Nicky Allomes, Nick Bailey

Our Business

What drives us

1. **Vision**: The strength of the vision we have set for our family
2. **People**: Empowering the people in our team grow and succeed
3. **Business**: Driving our business for continuous improvement
4. **Environment**: Being able to try and get that balance right

Farm Statistics

- 290 ha + 50 support block
- 35% flat 65% hills
- 700 cows (Kiwi Cross)
- 280,000 kg/MS
- Spring calving
- 95% pasture based
- 60 bale rotary cowshed
- Milk meters
Why? The birth of the customer centric model

Increased competition for labour
A more discerning workforce
Key person risk
Changes in dairy career paths
Attracting residents v migrants / immigration changes
Skilling up fast, specialization v generalisation
Long hours of work, perceived flexibility
Demographic change
Isolation, social interactions
Different expectations of new generation?

WAS - “Our workers/FTE’s milk our cows”

What if our people were our customers?
Connect with values and culture
Dairy meets our needs, why can’t it meet theirs?

NOW - “We empower our team to achieve, and by the way, we milk cows”

Where the industry is now

- 49 hour week on average, busiest weeks of the year 84 hours/week
- Average days can be 12hrs
- 60% of people new to a dairy farm job last no more than 1 year
- Dairy farming jobs are not seen as desirable
- Historical impact of tanker pick up times on milking
- 59% of people on farms work 50hrs or more on average
- 30% work 70+ hrs August to October
Long milking times

Challenges approaching the industry

Demographic shift
• Another million people by 2030
• Rural depopulation
• Aging workforce
  • 360k over 65 (from 170k)
• Competition for staff
• 20% Maori, 22% Asian, 18% Pacific Islander
• Access under-employed in the workforce
• How to utilise diversity?

Expectation of future employees-Gen Z
Flexible working/hours
Less full time work, more short term project work
Expect technology in the workplace
Short tenure, often looking for their next role (43% likely to leave ~ 2yrs)
Expect inclusive workplace
Expect training opportunities
Desire for work life balance

Talent Mobility
• Tenure in jobs will change
• People prefer variety and changes in jobs
• Demand for workers may see skilled people move across borders easily

Future of work-Critical factors
Technological change
  Steady or accelerated
Learning evolution
  Greater retraining, updated and agile curricula
Talent mobility
  Ability to move to where economic activity is
What we did

Moved from FTE’s to hours/year for working out labour requirement
Re-defined our values and purpose
Understood the needs of our people and community
Redesigned our reporting and responsibility structure
Did a time and motion study
Split out essential work from non-essential work
Changed to paying hourly rates
Everyone sets their own hours

We created…

The “flexible modular staffing structure”

How this can work

We worked out how many hours does it take to run the farm doing the essentials throughout the year.
For example: Spring 38 hours/day, Winter 10 hours/day.

We then fit the people we have available to us, to the essential work; core farm team and wider farm team
The non-essential work is put into “packages”
I.e. Fencing, Spraying, Maintenance, Breeding, Calf rearing, Effluent/irrigation

**How this works for us**

- Having flexible rosters
- Made labour costs a variable cost rather than a fixed cost by paying hourly
- Basing our essential jobs on-farm around our team
- Use technology to benefit our team
- Rotating the team round the jobs on the farm to allow them to grow in all areas and to keep them interested
- Training sprints - 5/10 mins training, observation and feedback, keep it informal
- The team always has a say in decisions - Freedom within a framework

**Get to know your team!!**

- What do you want to do/don’t want to do?
- What are your interests (both on and off farm)?
- What do you know?
- What do you want to know?
- How do you want to get there/how can we help them achieve it?

**Benefits for the team**

- Having packages of work which they can be responsible for
- Allowing them to pick the hours they work per week
- Giving them the opportunity to do their off farm interests
- Enabling them to upskill and achieve their goals
- Having a fun workplace

**Benefits for us**

- It’s simple!!
  - Minimises the risk to the business-ability to bring new people into the team through the packages
  - Allows for us to see where efficiencies can be made
Future Farms – What it could look like in 2030

Employees
Youth and people live in the world of real-time
Digital interactions
Virtual communications
Less patience in jobs, short term career horizons
Ethics and values of farm important

Technology
Automate drudgery
Better information
Enhanced learning methods
Upskilling/reskilling

Workplace
Flexibility in hours, and tasks
Engagement and people-focus (EQ)
Innovativeness
Technology for automation
Connection to consumers, or the reason for farming
Different ways of learning
Pride in dairy farming
More time for management
Minimising the drudgery
Providing career paths
Outdoors and the farming lifestyle
Where people can learn and grow
A community - socially connected and nurturing

Co-designing the future
Alternative milkings
Breeding better leaders
Transferrable potential
Tech for training
Removing job titles
Operation choice

Current major industry initiatives

Farmers learning from farmers
Dairy Connect
Efficiency
Milk Smart
Relief milker service

Training and careers
Roster Builder
Wellness
Fed Farmers
FarmTune
Good Yarn
Apprenticeships
Farm Strong
Primary ITO
Rural
Anti-microbials under the microscope

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Introduction

Both farmers and vets depend on antimicrobials (AMs) for the management of animal health and welfare. Although they’ve been around less than 100 years, they have improved animal health and welfare immeasurably in that time. They’ve also improved efficiencies in production and helped with the leaps in food production that we have seen.

AMs are regulated in New Zealand, for both human and animal use, as they are in most countries around the world. Although this can be frustrating for farmers (and vets), there are very good reasons for this.

In 2015, a growing awareness of the risks of antimicrobial resistance (AMR) was developing globally. AMR has always been with us, but it has steadily increased to the point where currently in the US, 2 million people are infected with AMR bacteria every year, and 23,000 of these die.

A report published in 2016 suggested that by 2050, 10 million people globally would die from AMR-related diseases. Things that we take for granted now such as childbirth, hip replacements, a simple cut or injury, or even a chest infection are the sorts of things that would be untreatable in such a scenario.

80% of all AMs used globally are used in agriculture. The more often we used AMs the greater the risk of developing AMR. Agriculture globally was quickly seen as the single greatest threat to increased AMR. Social media began to clamour.

Front-footing the clamour

In mid-2015, the NZ Vet Association (NZVA) developed and released the aspirational statement that ‘By 2030, NZ Inc will no longer need antimicrobials for the maintenance of animal health and welfare.’

We did this to front foot the increasing call from the public (and regulators) that ‘something must be done’ to control AM use (AMU) in agriculture. Although there was little evidence to support that view, the specialist AMR group within the NZVA felt that there was an opportunity to develop a leadership position for the profession and for agriculture.

The core of this statement was the belief that working towards preventive animal health and mitigation of infection was something that was of critical importance to the continuing development of animal health and welfare. Similarly, the flipside of this statement was that, as veterinarians, we would always hope to have access to a broad and effective range of antimicrobials (AMs) to treat disease if needed.

Both the risk of AMR and the risk of political intervention around the continued role of AMs in animal treatment at that time put our continued access to effective AMs under threat. We certainly didn’t want a knee-jerk regulatory action to ban or remove key AMs from our armoury, either through human health fears, or trade, or both.
Demonstrating NZ Ag’s low AMU

Globally, a far greater proportion of all AMs used are used in agriculture than in human medicine- approximately 85% of all AMs by weight are used in agricultural production (O’Neill, 2015). The belief that agricultural use may be impacting AMR has been raised as a concern (Anon, 2015). Of all the risk factors for the development of AMR within a bacterial population, the use of AMs is the single constant risk: exposing bacterial populations to antimicrobials will favour the survival of resistant bacteria. Typically, the biological cost to resistance leads to the reversion to a non-resistant population once the antimicrobial is removed. However, this is not always the case (Andersson & Levin, 1999; Andersson 2006).

To determine our current state we researched agricultural AMU globally, to assess the relative impact from New Zealand’s agriculture. We used country- level production animal census data (where available) and matched that with animal liveweight data. We then gathered available AM sales data at a country level, and converted this to weight of active. We were then able to assess AMU by calculating use as Population Correction Unit (PCU), which best allows for analysis across large datasets.

Using these data, we were able to show that New Zealand was the 3rd lowest user of AMs for agriculture across all the countries we were able to measure, just after Norway and Iceland (Hillerton et al, 2017). As a country, our AMU in 2012 (the last available data) was 9.4mg active/kg liveweight (or PCU). That compared with the US (266.2 PCU) and the UK (66.3 PCU). The countries that sat below New Zealand in terms of use were Norway (3.8 PCU) and Iceland (5.9 PCU).

Moving towards even lower AMU

In terms of the main contributors to New Zealand’s AMU, Zinc Bacitracin (ZB) comprised 40% of the total weight of AMs. However, its use is almost exclusively in poultry, which comprises 0.4% of the total biomass of the country. The dairy industry contributed the next largest amount of AM to the total country use, and amongst this industry, the penicillin group represented the highest contributor in terms of weight. With regards to route, parenteral treatment represented the largest category, followed by intramammary. In terms of disease application, AMU for mastitis prevention and treatment is the largest contributor (Bryan et al, 2017).

Within the area of mastitis therapy, prevention of mastitis using dry cow antimicrobial therapy (DCAT) is the area of greatest concern and also the area of greatest opportunity. Blanket DCAT has frequently been recommended to prevent infections over the dry period (McDougall, 2010; Bryan et al, 2011). However, the majority of cows in a typical New Zealand dairy herd at dry off are uninfected, and the rationale for using DCAT to prevent infection seems questionable, particularly now that effective teat sealants based on Bismuth Subnitrate are available. Overseas work has shown that selective DCAT can be effective from a both a disease outcome and an economic outcome (Scherpenceel et al, 2018), with a reduction in AMU of up to 85% where DCAT is not used (Schepenceel et al, 2014).

The level of awareness of both vets and farmers around AMU has increased markedly since the launch of the 2030 aspirational statement. By focussing on the reduction of ZB use in poultry and DCAT reduction in dairy cows, large steps can be made towards a significant reduction in PCU in New Zealand. Regional analysis of dairy cattle use indicated that use varied from a low of 5.28 PCU (Taranaki) to a high of 9.97 PCU (Southland/Otago), indicating that disease and management patterns may influence use (Bryan et al, 2017).

Using country level data, our current estimation is that, by reducing both ZB and DCAT use, in tandem with more responsible use generally, by 2025 our country- level use could reduce to around 4 PCU. A goal of 2 PCU by 2030 would most closely approximate ‘zero’ without compromising animal welfare, and would place us as the lowest user of antimicrobials globally.
A novel, farmer-led project

One of the innovations in this space has been the development of a 3-year project in Southland and Otago funded by the Sustainable Farming Fund (SFF). Currently, we are at the end of the second year of this project, which aims to develop effective strategies on-farm to reduce AMU.

The project is coordinated by VetSouth, and involves a number of farmers, veterinarians and focus groups around the region. Farmer focus groups spent a year developing and discussing options around practical reduction strategies for AMU. These 12 strategies were then communicated to other farmers and their effectiveness measured.

Effectiveness is not simply around reduction in AMU, but includes practicalities, simplicity of design, economic benefit (or impact), and any negative consequences. The goal is then to determine the most effective of these 12 strategies and encourage other farmers to pick them up in the 2019/20 season. We have a lofty goal of reducing AMU by 20% by the end of the 2020 season on involved farms, utilising effective strategies that have been designed by farmers themselves.

In terms of outcomes, the first thing we recognised was that farmers were able to develop some really novel programmes which were outside of typical veterinary or consultant thinking. The second noticeable outcome was that some of the strategies were simpler and easier to apply in a practical setting than others. Finally, the farmer groups have been effective at communicating these ideas to their colleagues in a way that vets and farm advisors would struggle.

The goal will be to identify the impact of the most effective strategies, smooth off some of the less effective areas, and communicate these strategies to farmers across the country.

Discussion

The development of the 2030 aspirational statement demonstrated industry leadership from the veterinary profession. It shifted the focus from a negative perspective of agricultural AMU in New Zealand and our role in that, and allowed us to highlight that firstly, we were a relatively low user of antimicrobials; and secondly, we would work hard to do even better.

Our data was compared with equivalent data from the human medicine field which demonstrated that New Zealand was amongst the highest users of AMs with regard to human community use, when compared to other similar countries (Thomas et al, 2014). This in turn shifted the debate towards a focus on responsible AMU within the human population first.

The veterinary community in New Zealand has thus contributed strongly to the leadership and stewardship debate around AMU and AMR globally. The link between AMU in agriculture and AMR in people is tenuous at best, and requires far greater surveillance and research (Holllis et al, 2013). However, our approach echoes comments from the NCCID in Canada who stated, in reference to agricultural use of AMs: ‘Whilst it is true that gaps in evidence remain, decreasing the use of significant quantities of antimicrobials in contexts that do not provide a corresponding health benefit seems to be the reasonable place to start.’ (Anon, 2016).

There is much work to do as we strive to continue to lead in this space, but New Zealand veterinarians have demonstrated that taking a bold leadership stance on a critical and potentially socially polarising issue is a positive position to work from.

Critical further steps revolve around greater stewardship; removal of distance prescribing of AMs; greater monitoring and recording of AMU; better diagnostics for farmers and vets; and a behavioural change towards preventive animal health.

Both farmers and veterinarians want and need ongoing, reliable access to AMs to mitigate animal disease and improve welfare outcomes, and it is largely in our hands to ensure this. The support of our leading farmers in this is acknowledged and further encouraged.
Summary

Over 80% of all AMU globally is used in agriculture. However, NZ is the 3rd lowest user of AMs for agriculture worldwide.

Despite this, we are at risk of regulation to curtail AMU, and demonstrating continued reduction and responsibility around use is key. Leading farmers have demonstrated their appetite for novel and innovative approaches to animal health and welfare management.

Our SFF-funded project is leveraging off farmers’ innovation and practicality, to develop critical and effective AMU reduction strategies.

We’ve been heartened by the positive response and leadership shown by dairy farmers in the Southland/Otago communities around striving for lower and responsible AMU. We’re optimistic that the strategies developed here and currently being implemented will improve farm efficiencies, increase sustainability, and prove to be practical in reducing AMU and allowing our agriculture sector to continue to thrive in a challenging global environment.

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Let’s talk about gas!

Nick Tait, Mo Topham, Robyn Dynes

Executive Summary

The problem of climate change is a global one; every country in the world is contributing to it and every country needs to be part of efforts to limit further climate change. New Zealand (NZ) has signed up to international agreements that commit us to doing our bit to reduce greenhouse gas (GHG) emissions, with reduction targets we must meet by certain points in the future.

Dairy biological emissions (methane and nitrous oxide) make up a ¼ of NZ’s GHG emission. The key driver for methane emissions is feed intake, while N surplus (N input on farm less N output) is relevant to both nitrous oxide & methane emissions. New Zealand is investing in the development of solutions to uncouple methane emissions from feed intake and these include genetic, pharmaceutical and plant solutions. However, these are some time away from being implementable on farm, so it is important to consider on-farm mitigations to reduce GHG gasses towards targets in a profitable and sustainable manner.

These include reducing feed eaten on farm by:

- reducing imported feed and matching stocking rate appropriately,
- reducing replacement rate and rearing of young stock,

and reducing N surplus on farm by:

- reducing N inputs (e.g. N fertiliser and supplements)
- manage N surplus more appropriately (e.g. increase effluent area, best practice use of N fertiliser).

With the future targets in mind, farmers need to know their current GHG emissions number. Then they can consider mitigation strategies available for their farm and determine the impact of these strategies on GHG emissions, N leaching and profitability. To decide on the most appropriate mitigation strategy farmers also need to know the total feed intake (kg Dry Matter) per ha, and N surplus per ha for their farm.

To help farmers with these decisions, several partnership (case study) farms from around NZ have undergone modelling to determine the effect of different mitigation strategies on GHG emissions, N leaching and profitability. These case study farms have shown that it is possible to achieve modest reductions in GHG emissions and N leaching, with a positive impact on profitability.

Why is this important?

Climate Science

Greenhouse gasses (GHGs) such as carbon dioxide (CO₂), methane (CH₄) and nitrous oxide (N₂O) are naturally occurring compounds that have formed part of the Earth’s atmosphere for millions of years. They trap heat, acting like an insulation blanket or a ‘greenhouse’, hence their name. Their presence is responsible for maintaining a relatively constant global temperature of around 15°C, and without them, Earth would be a frozen planet.

For thousands of years, the concentration of these GHGs, and in particular CO₂, (the most significant GHG) has remained within a constant range, cycling naturally every 150 thousand years. But since the industrial revolution (160 years ago), CO₂ has been rising at an unprecedented rate, about 100 times faster than ‘normal’.
Records from 2013 showed that CO\textsubscript{2}, CH\textsubscript{4} and N\textsubscript{2}O had all increased by more than 100% in the last 150 years, resulting in modelled surface temperature changes from current levels. Current datasets indicate that if CO\textsubscript{2} continues to increase, surface temperatures will be on average 2°C above pre-industrial levels.

**International Politics**

As the scientific evidence for human-caused climate change increased, so did international concern. In 1990, the Intergovernmental Panel on Climate Change (IPCC) stated ‘emissions resulting from human activities are substantially increasing the atmospheric concentrations of GHGs’. By 1992 it was agreed that this required global action, and the United Nations Framework Convention on Climate Change (UNFCCC) was formed.

The first international climate change agreement, the Kyoto Protocol, was formed in 1997. It has a commitment period from 2008-2020 and is predominantly focused on reducing CO\textsubscript{2} emissions to zero. As 2020 approached, there was a need to establish another international climate change agreement. This resulted in the 2015 Paris Agreement, which covers the reporting period from 2021-2030 and was eventually signed by all UNFCCC members. Like the Kyoto Protocol, the Paris Agreement still focuses on decreasing CO\textsubscript{2}, but now acknowledges the role of other GHGs, mainly CH\textsubscript{4} and N\textsubscript{2}O.

Under both Paris and Kyoto agreements, countries must take on National GHG reduction targets, which inform each country’s domestic response. Each country must also track progress against its targets and report this internationally.

**Domestic Politics**

The Climate Change Response (Zero Carbon) Amendment Bill (Zero Carbon Amendment Bill) will set the framework for NZ’s transition to a low emissions and climate resilient economy.

The original proposal was for a separate piece of legislation called the Zero Carbon Bill. The Government has now decided to introduce it as an amendment to the current Climate Change Response Act 2002. This will ensure that all key climate legislation is within one Act. The Bill’s objective is to provide a framework by which NZ can develop and implement clear and stable climate change policies that contribute to the global effort under the Paris Agreement to limit the global average temperature increase to 1.5 degrees above pre-industrial levels.

It takes a modular approach:

**Setting the Goal** - The 2050 Target which consists of:
- an interim 2030 target to reduce gross emissions of CH\textsubscript{4} to 10% below 2017 levels;
- a provisional 2050 target to reduce gross emissions of CH\textsubscript{4} within the range of 24% to 47% below 2017 levels; and
- to reduce net emissions of N\textsubscript{2}O and CO\textsubscript{2} to zero by 2050.

**Setting the Pathway** - Five-year Emission Budgets which set out the stepping stones for how NZ will meet the target.

**Creating the Toolkit** - Implementing and developing policies to meet the targets and adapt to a changing climate, this includes the Emissions Trading Scheme (ETS) and developing a National Adaptation Plan.

**Creating a Monitoring Framework** - Establishing an Independent Climate Change Commission in an advisory capacity to develop the budgets, monitor progress against the target, and review the target.
All decisions relating to the Bill will be made by the Government via the Cabinet process.

The Interim Climate Change Committee (ICCC) was established to provide independent evidence and analyses on two key questions with outputs passed to the proposed Climate Change Commission to inform its recommendations. The two questions are:

1. How can GHG emissions be accounted for if agricultural CH\textsubscript{4} and N\textsubscript{2}O emissions enter the NZ emission trading scheme (NZ ETS) in which emissions are either surrendered or received.

2. How to plan for the transition to 100% renewal electricity by 2035.

A report was completed 30th April and delivered to the Government and at the time of writing has not yet been released to the public. We understand the Committee has recommended that the Government puts:

1. A farm level levy as the permanent policy commencing in 2025

2. A processor levy with a rebate system where funds go back into the sector to fund the establishment of a system for a farm point of obligation as the interim measure. This system would consist of on farm GHG accounting and benchmarking, Farm Environment Plans, and a comprehensive extension and communications network.

The Government is scheduled to consult on the interim and final policy mechanism for agriculture in June 2019. This will include the ICCC recommended option and a wider suite of options.

Comparing gases: Why methane is being treated differently?

Not all GHGs have the same warming effect, some gases are more effective at trapping heat than others, and each has a different lifetime in the atmosphere. International scientists developed the Global Warming Potential (GWP) metric to give emissions of each gas a simple weighting factor that allows them to be compared across different periods of time.

GWP\textsubscript{100} has been adopted by the UNFCCC as the universal metric for reporting GHG emissions and for measuring the success of mitigation, and it is used in both International Agreements to date. GWP\textsubscript{100} is calculated by multiplying the heat absorption capacity of the gas by the lifetime of the gas in the atmosphere. This is then calculated with a timeline of 100 years and reported as CO\textsubscript{2}-equivalents (CO\textsubscript{2}e). Currently GWP\textsubscript{100} calculates CH\textsubscript{4} at 25 times more potent than CO\textsubscript{2}, and N\textsubscript{2}O at 298 times more potent than CO\textsubscript{2}.

There is discussion as to whether this is the correct metric to use, and a new metric: GWP\textsuperscript{*}, has been proposed (Allen et al 2018).
Inventory

The National inventory is compiled by the Ministry for Environment (MfE) each year and reported internationally to the IPCC as part of NZ’s obligations. For agriculture’s emissions this is done by MPI. The 2017 emissions results were released in April of this year [GHG Inventory](#).

The key points from the inventory were:

- Total NZ GHG emissions rose by 2.2% from 2016 to 80.9 million tonne (mt) CO₂e (up 1.72 mt CO₂e)
- Agriculture’s emissions dropped slightly by 0.1% from 2016 to 38.9 mt CO₂e (down 0.39 mt CO₂e)
- Agriculture made up 48.1% of NZ’s emissions (down from 49.2% in 2016)
- Dairy farming made up 22.5% of NZ’s total emissions (down from 22.9% in 2016)
- Land Use/Land Use Change and Forestry (LULUCF) dropped from 24.8 mt to 23.9 mt CO₂e, which means that the amount sequestered from trees was reduced.

What can we do about it?

Sources of Methane (CH₄) and Nitrous Oxide (N₂O)

Agriculture primarily emits two GHGs known as biological emissions. These are:

- Methane (CH₄) which is produced during fermentation of feed in the rumen
- Nitrous oxide (N₂O) which is emitted from soils, mainly from the breakdown (denitrification) of urinary nitrogen (N) in the soil and N fertiliser application.

Methane contributes approximately 80% of the biological emissions, mostly from eructation (burping) during feed digestion. Therefore, CH₄ emissions are largely a reflection of total feed consumed (Hammond et al 2009). Methane from dung, urine and effluent ponds only contributes about 5% of total CH₄ produced.

About 20% of biological emission are from N₂O, from urine patches. Nitrous oxide production tends to be higher at higher temperatures, and when soils are wet, compacted and where anaerobic conditions occur.

Animals are key drivers of biological emissions through their digestion and excretion, so changes in animal performance (intake and production), and animal number, will alter emissions of both CH₄ and N₂O. Since 1990, CH₄ and N₂O emissions have increased by 130% and 51% respectively, primarily due to an increase (89%) in the size of the National dairy herd and an increase (>600%) in application of synthetic N fertiliser (MfE, 2017). Therefore, reducing farm feed intake and N surplus will have a positive impact on GHG emissions in the long term.

New Zealand Agricultural GHG Research Centre (NZAGRC) & Pastoral GHG Research Consortium (PGgRC)

The NZAGRC (established 2010) is a partnership between NZ research providers and the Pastoral Greenhouse Gas Research Consortium (PGgRc) [https://www.nzagrc.org.nz/](https://www.nzagrc.org.nz/)

The PGgRC (established 2003) is a partnership between industry (including DairyNZ + Fonterra) and Government (MBIE) [https://www.pggrc.co.nz/](https://www.pggrc.co.nz/)
The NZAGRC was created to build on existing research, working with existing organisations to create an effective, trusted partnership to bring cost-effective, simple solutions to NZ farms, and contribute world leading results to the International science community. Its mission is to provide knowledge, technologies and practices which grow agriculture’s ability to create wealth for NZ in a carbon-constrained world.

**Research**

The NZAGRC has 5 key areas of research: (source [www.nzagrc.org.nz/research.html](http://www.nzagrc.org.nz/research.html))

1. Mitigating GHG emissions (joint programme with PGgRC); vaccines and inhibitors
   - Low CH₄ animals e.g. 4-6% reduction in grazing sheep
   - CH₄ inhibitors; e.g. 30% reduction in controlled sheep/cattle studies,
   - CH₄ vaccine; targeting a 30% reduction

2. Plants and GHG; Plant traits, mitigation practices for soil carbon and less N₂O emissions, and defining achievable soil carbon stabilisation capacity of grassland soils.
   - Low CH₄ feeds e.g. 25% reduction when forage rape was fed to sheep and
   - Low N₂O feeds e.g. N₂O emissions reduced with fodder beet compared with kale, and plantain compared with ryegrass.

3. Integrated farm systems to promote profitable, practical and low GHG emitting systems. These systems use the following principles:
   - To reduce total CH₄ emissions, need to reduce feed inputs per ha and adjust stocking rate accordingly. There are 21.6 g of CH₄ produced for every kg DM of feed consumed.
     
     Options to lower feed inputs/ha include reducing N fertiliser and/or bought in supplements and matching stocking rate (Dalley et al 2018; van der Weerden et al 2019), and reducing replacement rates.
   - To reduce N₂O emissions, need to reduce farm N surplus (N inputs less N outputs). Farm N surplus also impacts on CH₄, and nitrate leaking (Dalley et al 2018).
     
     Options to lower N surplus include avoiding urine deposition when conditions are ‘risky’ e.g. dry cows off, cull cows early in Autumn or use stand-off facilities. However, standoff facilities have a risk of pollution swapping. (e.g. reduce N leached, but increase N₂O production) and require capital investment (Dalley et al 2018)

4. Maori-focused research; assisting pastoral sector to increase resource efficiency and productivity with lower GHG emissions.

5. Policy support; research and analysis for current and validated science available for policy.
What does this look like on a real farm?

Every farm has a unique set of resources, ambitions and challenges. Deciding on which mitigation options will be appropriate for your business will depend on these factors.

The Partnership Farm Project was set up as part of the Dairy Action for Climate Change, an industry partnership between DairyNZ and Fonterra, supported by MfE and MPI.

The aim was to partner with commercial dairy farms to discover, demonstrate and communicate the feasibility and practicality of applying principles and practices developed through research to meet future environmental challenges. There was a key focus on nitrate leaching, GHG emissions and farm profitability.

This 18-month project established 12 partnership farms across NZ and modelled 44 different farm systems. The farms were located in the Waikato, Bay of Plenty, Southland, Canterbury and the Manawatu and the mitigations modelled fell into three categories: farm management changes, infrastructure investment, and retiring or planting land. The mitigations chosen for each farm depended on the farm system and region, but were based on the key principles behind lowering GHG emissions and N leaching which are applicable across many farms. These are to reduce whole farm N surplus through best practice management of N fertiliser and imported feed, and reduce total feed eaten per ha.

Modelling outputs included the impact of the different mitigations on GHG emissions, N leaching and farm profitability, and more detail of each case study can be viewed on the DairyNZ website as they are completed.

https://www.dairynz.co.nz/environment/climate-change/partnership-farm-project/

References


Shaping Your Future

Bruce Thorrold, DairyNZ.

Right now, it's easy to see why dairy farmers are feeling that there's a lot of work for little reward. After two decades of un-constrained growth and increases in land and cow prices that turbo-charged optimism and business expansion, it's all got a lot trickier.

Eight reasons to worry

1. While milk price is solid now for the fourth year in a row, it's only around the long-run average. The increased costs farmers are facing (and in some cases have built into their systems), along with capital re-payments mean tight cash-flows.
2. The prospect of interest rate rises due to bank capital restructuring is a threat given the debt levels many farmers carry.
3. Constraints on farming from environmental limits for water quality and greenhouse gases are challenging our farm systems and thinking. There's a lot of uncertainty about what we're going to be asked to achieve.
4. Land and cow values are dropping, and so are sales – so it's hard to exit if you want to.
5. Everywhere you look, an expert is pointing out that animal foods are a thing of the past, and all the protein we need will (and should) come from a lab, some GE yeast or a soybean.
6. The on-going problems with M. bovis are causing loss and stress for people and businesses. Farmers are facing uncertainty about the status of individual farms and the prospect of eradication.
7. It's hard to attract and retain the caliber of people we need to make farms hum.
8. And while the public's view of dairy farming isn't overly negative (or that different from their view of other industries), it feels as though there is little affection or respect for dairy farming people.

You will have other concerns of your own.

The good news is that we've been here before. Sixty years ago dairy farmers were the poor cousins of the farming community. When Britain joined the EEC in the 1970's we faced disaster. Government restructuring of the economy and high interest rates in the 1980's caused businesses to fail. The 1990's were mostly a long grind of low prices. We've had volatility of milk price in the last decade. But through all this we have a long history of adapting to new challenges.

Today we are still the most profitable land use at any scale in New Zealand. We've got there by innovation in science and on-farm, clear thinking, sharing of problems and knowledge and sheer hard work. We still have all these admirable traits – I would argue that today's dairy farmers are better armed than ever to face the challenges. You're smarter, with better technology, better connected to consumers and freer to worry out loud than the previous generation.

That's just as well, because there are real challenges. But if you're sitting in the room for this session, you've probably already in the mindset to build your way to the future.

Eleven reasons to be positive.

1. We know how to be profitable at world market milk prices. We don't need premium pricing to make money. The fundamental biology and cost structures of our pasture-first dairy systems are internationally competitive.
2. Profits service debts and allow time for repayment or restructuring.
3. We're producing a nutritious food that people love. Science is building a strong case for dairy – there are high levels of essential amino acids in dairy foods that can’t be matched in the plant based alternatives, and now that dairy fat is back in favour people are remembering how great it tastes!

4. World demand for dairy products continues to grow – and even the much-hyped Lancet report actually recommends an increase in global dairy consumption. It’s meat consumption that gets the negative attention.

5. Turns out the alternatives aren’t that easy. Perfect Day (the milk from yeast people) have ‘pivoted’ from producing whole dairy foods to producing milk proteins for the ingredients business. There’s an irony in that given the flak we get for being a commodity business.

6. We’re getting some certainty on environmental targets. The government is proposing a split gas approach which is a vital (and fair) policy win for us. A 10% methane target by 2030 is doable, it simply means we have to eat 10% less feed – we’ve got ten years to make sure we can do it at low or no cost.

7. While longer term greenhouse gas targets and tree-planting for off-setting are less certain, we’ve got research in the pipeline with feed additives, GE ryegrass and vaccines aimed at providing options. We’re world leaders in low greenhouse gas intensity dairying – but we’re going to need these technologies to stay that way as the feedlot dairy systems get the feed additive technologies.

8. We’ve got well researched techniques to address water quality issues now – winter cropping guidelines, N input management, off-pasture systems. And we’ve got more options in the pipeline with plantain, catch crops and better infrastructure all being researched.

9. We already have a high standard of animal care by global standards, and we’re committed to be world leading and give our consumers confidence in what we do.

10. As land values re-adjust and owners re-think their exit plans, there will be new opportunities to attract and keep great people in dairy farming.

11. Farmers continue to be endlessly innovative in getting the best out of the technology and finding new ways to improve performance – and sharing this knowledge is still a big part of the dairy farming culture.

In the session we’re going to hear from farmers who will share their concerns and the actions they’ve taken to build a bridge to the future. Everyone has their own situation, concerns and mental blocks. In the Shape Your Future session we aim to help you build confidence in the future and get started on the bridge.