

ravensdown 

INSIGHT AND ACTION FOR AGRICULTURAL SUCCESS

ground

EFFECT

AUTUMN 2018
EDITION 6

"It's really satisfying to know I've done this on my own."

Kate Macgregor,
Ravensdown Shareholder
and Senior Agri Manager



Clover

The fuel to ignite your farm engine

Water

In search of a rational water debate



WELCOME TO THE SIXTH EDITION OF GROUND EFFECT® FROM RAVENSDOWN

This edition of *Ground Effect*® is packed with doctorates delivering their perspectives. As we look back on the previous five editions of *Ground Effect*, it's clear that the publication has been doing its bit to enable smarter farming. Looking ahead, the country will need smarter farming more than ever, so it's clear that magazines like this have a role to play.

In *Ground Effect* #6, Ravensdown has assembled the viewpoints of some leading agri-science minds.

Professor Keith Woodford, Dr Gwyneth Verkerk, Dr John Roche and our very own Dr Hendrik Venter and Dr Ants Roberts outline their perspectives on issues as diverse as water, animal welfare, the power of pasture, the benefits of potash and the process of soil testing.

In the agri-sciences, it's all about applying the discipline and being accessible; not just about waxing lyrical about the latest theory or preaching from a pulpit. All these leaders have devoted countless days to this academic engagement and their passion to communicate is inspiring.

This academic "grunt" is important as New Zealand seeks to have an informed debate about allocation/protection of natural resources, national prosperity and thriving rural communities.

Of course farmers learn from farmers so it's interesting to read about the co-operative's shareholders: Ali and Dion from Wairarapa, the Averys of Marlborough, the Wilkins of Southland and Reporoa dairy and beef farmer Hamish Lee.

Many of Ravensdown's agri managers are not just Certified Nutrient Management Advisors; they either have been, or are, practicing farmers. Kate Macgregor is now a part-time Senior Agri Manager as she takes over a 124ha sheep and beef farm. On page 28 Kate explains how the learning never stops.

On page 36 Senior Agri Manager Jane Mayo outlines how clover, which fixes nitrogen from the air as it grows, can be applied by aircraft or truck.

Guest writer Mike Peterson discusses the importance of trade deals for the New Zealand economy on page 34. Mike is a sheep



and beef farmer in the Hawke's Bay and special agricultural trade envoy to boot. Meanwhile Tina Porou outlines a framework called "Te Mana o te Wai" on page 38, which sets out a hierarchy of responsibilities when it comes to a cultural approach to managing our freshwater.

The environment is a recurring theme with cadmium, effluent management and water quality all featured. Page 9 covers mitigating nutrient loss, page 14 looks at cutting nitrous oxide emissions and on page 41 you can read about how to choose an environmental consultant.

As a farmer-owned co-operative, our commitment as nutrient efficiency specialists is to supply the necessary amount of nutrients – no more, no less – and help minimise losses for the benefit of the farm and the environment.

Thanks for dropping by and, as ever, I'd love to get your feedback on the email address below.

Best Regards
Greg Campbell
Ravensdown Chief Executive

CEO@RAVENSDOWN.CO.NZ

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BEHIND THE SCENES

Ravensdown is enabling smarter farming for a better New Zealand

Agri-Women's Development Trust Escalator graduates of 2017

Congratulations to the 2017 Escalator graduates - we're proud to be behind this programme, and AWDT, in developing our industry's female leaders.

Escalator is an established leadership and governance programme for women involved in the primary industries and rural communities. It equips them with the tools, confidence and support they need to successfully lead and govern in their chosen fields.

Enquiries open for 2019 now at <http://www.awdt.org.nz/programmes/escalator/>



BACK ROW FROM LEFT: PARMINDAR SINGH, KAREN DAVIDSON, JENNY MCDONALD, KATHRYN DE BRUIN, ANNE-MARIE WELLS, TRACEY COLLIS, SHARON SHANNON, NICOLA SORENSEN, JUSTINE FITZMAURICE
FRONT ROW FROM LEFT: OLIVA BUCKLEY, JANE DAVIDSON, SANDRA MATTHEWS, MIHIRANGI HOLLINGS AND LAURA KATELEY-CULLEN.

Dr Ants Roberts honoured

Congratulations to our Chief Scientific Officer Dr Roberts who was honoured in November for his life's contribution to the pastoral farming sector.

Awarded the Ray Brougham Trophy for his excellence in more than 40 years of agricultural soil science and service to the industry, Ants says he is deeply humbled to be recognised amongst his peers for effectively doing something he loves and is passionate about.



Ag Awards Massey

Congratulations to Sam Pike, BAgriScience, awarded the most proficient 3rd year Massey student award for 2017.

These awards are sponsored by Ravensdown, with the top three students receiving a share of \$1500 in prize money.



Lending a hand in our communities

A total of 947 hours was spent lending a hand across New Zealand by Ravensdown staff last year. Staff were given a day to give back as part of Ravensdown's 40th anniversary celebration, with many communities and charities receiving some much-needed help.



IN SEARCH OF A RATIONAL WATER DEBATE

By Keith Woodford, Honorary Professor of Agri-Food Systems, Lincoln University

In recent years, the debates about water rights and water pollution have become increasingly torrid. Most New Zealanders have fixed views on the topic and are confident their views are correct. Human nature then leads to so-called "facts" being organised to buttress those fixed views.



KEITH WOODFORD, HONORARY PROFESSOR OF AGRI-FOOD SYSTEMS, LINCOLN UNIVERSITY

There is a term for this phenomenon called 'noble cause corruption'. The problem is that 'we' have the 'noble cause' and 'they' have the 'corruption'. And so, within this framework, the water debate has been characterised by huge superficiality, rhetoric and shouting. The opportunities for shared learning and accommodation have been minimal.

How did we get to this state and is there a way forward? Well, to a large extent the situation has crept up on us all. The nutrient responses are lagged, often by decades, and we did not see it coming until it was far too late. By then, everyone was in their tribal corner.

In finding a way forward, there has to be recognition that science, economics, environment and human values are all part of the equation. Also, some solutions can be found at the local level while other elements have to be set in place from above.

A starting point that most can probably agree with is that the rivers have to be clean and clear, rather than green or brown. The societal majority is saying that the rivers have to be swimmable without fear of infection, and they must provide a habitat for a diverse set of living creatures. However, there is further debate to be had about measures and timelines.

There is a need for science communicators who can explain the science in terms of catchment contexts and devoid of their own belief systems. This is not going to be easy. This needs to start at upper primary school level, and continue through the high school system and then into the universities at increasing levels of sophistication. Most people learn best within a contextual framework.

"A lot of the problems relate to the media, which is superficial in its reporting and hard-wired to create controversy."

In a democracy, it is not only scientists who need to understand basic science but every voting citizen who has a responsibility to understand those basic principles. It requires systems thinking within a dynamic framework. We have to be honest about what we know and what we don't know.

Currently, there is great confusion between issues of water quantity and water quality. 'Dirty dairying' has become the catch phrase. At a public level, distinguishing between nitrogen leaching, phosphorus run-off, bacterial loadings and sediment does not occur. There is also very poor understanding as to the constraints to cash crops and horticulture production in the absence of irrigation.

The rural community also has to accept that change is necessary. In relation to dairying, the science is clear that most of the nitrogen leaching occurs from cow urine deposited in late autumn and winter. We will not find solutions without recognition that cows must spend the majority of winter off-paddock. They can still graze for the required hours per day, but then they have to go to an off-paddock environment.

There are dairy solutions such as in situ composting barns, which can tick all the environmental, animal welfare and economic criteria. But finding the finance will be an issue. These technologies are well established overseas, but very much in the pioneering stage in New Zealand, with just a handful of operational setups.

A lot of the problems relate to the media, which is superficial in its reporting and hard-wired to create controversy. Perhaps we get the media that we deserve? However, for those of us trying to use the media as an informational tool, it is a huge issue.

It is remarkable how huge swathes of the big-city populations have lost sight of the dependence New Zealand has on its natural resource-based industries. They do not appreciate that destruction of agriculture is incompatible with poverty elimination.

The journey ahead in relation to water is going to be long and difficult, but education has to be the key. It will require a lot of resilience from those who take on the educational responsibilities. ■

"In finding a way forward, there has to be recognition that science, economics, environment and human values are all part of the equation."



EFFLUENT TECHNOLOGY SET TO IMPROVE DAIRY WATER EFFICIENCY

By Jamie Thompson, Ravensdown Effluent Technology Manager



JAMIE THOMPSON, RAVENSDOWN EFFLUENT TECHNOLOGY MANAGER

Nutrient efficiency is vital to Ravensdown as an important component of smarter farming. It's good for the environment and the bottom line. Water efficiency has become an important topic and there are demands for the dairy sector to lessen its "water footprint".

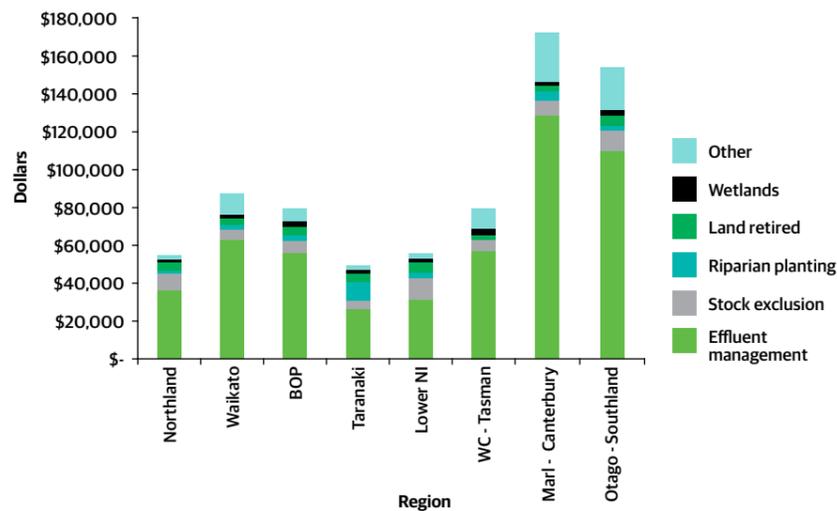
At the heart of this challenge is how effluent is managed. Recycling and reusing the nutrients in dairy shed effluent is good practice and is just one way dairy farmers are showing they are doing the right thing.

This commitment comes with a price tag with 70 percent of dairy farmers' environmental expenditure going on effluent management*.

70 percent of dairy farmers' environmental expenditure goes on effluent management*.

(* see Source Code on page 42)

Figure 1: Average farm spend on environmental components by region over 5 years*



Challenges of the status quo

When managed well, effluent forms a significant part of the nutrient cycle on-farm. However, in spring when cows are calving and spring rains continue to fall, effluent ponds can fill and the traditional and viable method of irrigating or spreading of effluent can become a real headache.

This is where problems with accidental breaches of discharge can occur, resulting in potential leaching or run-off of nutrients into surface water, reputational damage and the risk of a hefty fine.

In a cold wet winter, spreading effluent nutrients to keep ponds under control can also increase the potential for nitrate leaching.

If farmers are also looking to use feed pads more in the winter, to avoid pugging,

as a way to mitigate potential phosphate run-off, then the effluent capture, treatment and reuse becomes even more important.

Recycling and reusing water

There are a few reasons why the ponds are at risk of filling up too fast - reaching the danger zone. Without tackling the root cause, the temptation can be to simply build a bigger pond with all the costs and risks that entails.

A new generation of effluent treatment is on its way. When combined with reporting, management and decision support technology, a farm would be able to easily track, demonstrate and improve its nutrient efficiency and water efficiency, which would be a win-win for everyone. ■

A LOSS MAP WHICH HELPS YOU GAIN!

By Michael White, Ravensdown Technical Development Manager



MICHAEL WHITE, RAVENSDOWN TECHNICAL DEVELOPMENT MANAGER

They say a picture paints a thousand words so what about a farm map that pinpoints Critical Source Areas (CSA) for nutrient loss across a farm, evaluating their influence?

For this exact reason, Ravensdown partnered with Victoria University three years ago to improve an existing hydrological model (LUCI) to better identify and estimate nitrogen (N) and phosphorus (P) losses from CSAs at the farm scale.

While the OVERSEER® nutrient budgets model is widely regarded as the best tool available for predicting long-term N loss in particular, as well as P, from pastoral farming systems, it is not a spatially explicit model; that is it doesn't provide a map of where these losses are happening. This means while the risk profile of farm blocks in terms of N and P loss can be determined. It may be that areas, "hot spots or CSAs", within these blocks that contribute significantly to the overall nutrient loss cannot be so easily identified. Arguably, this is more important for P but will still be very useful for N.

Once these areas have been identified through LUCI (Land Utilisation &

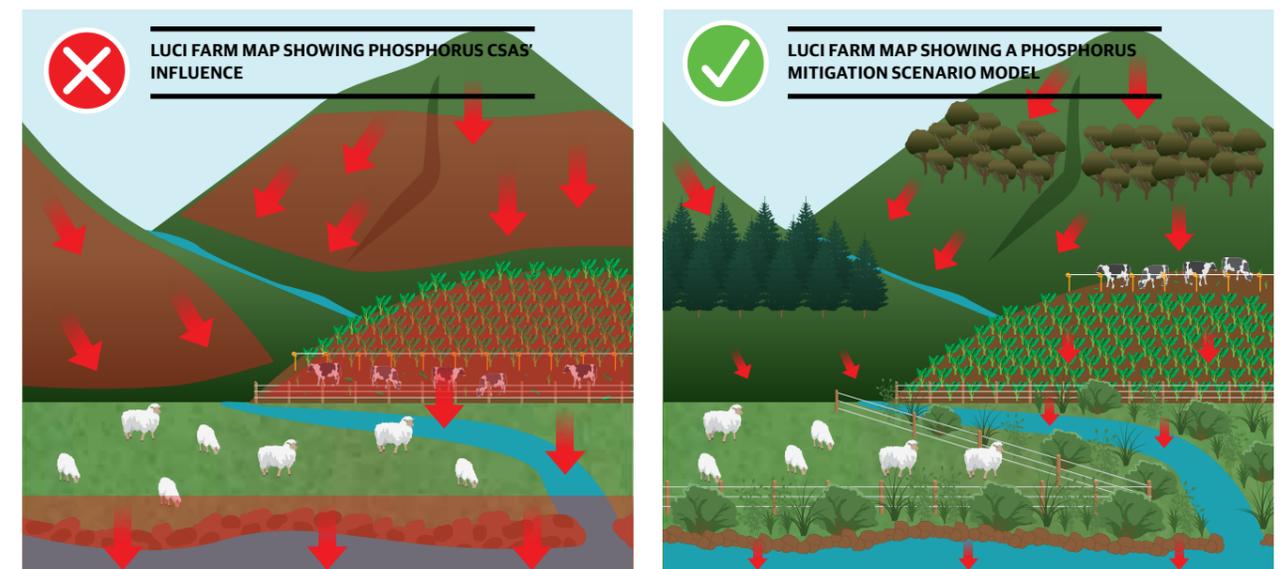
Capability Indicator), appropriate mitigations such as timing of fertiliser application, adjusting soil fertility targets or riparian plantings can also be evaluated in terms of effectiveness in reducing a farm's nutrient losses. With some further streamlining, this capability is also being extended to catchment level so specific farms can be modelled in respect to their current management and any changes can also be evaluated at a catchment scale impact if appropriate. ■

Note: It is planned that LUCI farm nutrient modelling will be used in conjunction with OVERSEER® by Ravensdown environmental consultants in 2018.

3 key benefits of LUCI

1. Works spatially to allow identification of CSAs for nutrient loss
2. Enables scenario modelling to determine which mitigation areas are the most suitable for reducing risk from CSAs
3. Has the ability to work at a farm and catchment scale so mitigations can be analysed to give both a farm and catchment view

Figure 1. LUCI accounts for landscape organisation, and spatially targets intervention opportunities



KNOW YOUR FARMER KNOW YOUR FOOD - FROM PASTURE TO PLATE

Wairarapa farming couple Ali Scott and Dion Kilmister stepped into the world of marketing and selling their meat direct from the farm gate in January 2017.

With three farms in the Wellington and Wairarapa region a sheep stud (Charollais) and the Homegrown Farm Fresh Meats business, these guys have a lot going on. The couple met four and half years ago in a Wellington pub - Ali was working as a general manager in print and marketing at the time - and have been together, on Dion's farm, ever since.

Ali says going from talking to 150 people a day to none was interesting. "Good but interesting. I really didn't know anybody, so I joined a women's discussion group to meet people. With the Homegrown Farm Fresh Meats business, I'm really enjoying being back in front of people again, but still love being on the farm and having that balance."

Dion, who has been farming all his life, quips, "It works well because she can use her 10,000 words a day on someone else rather than me!"

The couple didn't take the business of selling meat from the farm on lightly. They discussed it and assessed the risks, knowing the worst case scenario would be the product just going back on the commodity line. So they created a logo, website and Facebook page themselves and got stuck in.

"We believed it was something people wanted - they love the lamb, the story and the people behind it," Ali says. "We did the

Auckland food show and had seven to eight people queued up at a time for the whole four days. Auckland is now about 50 percent of our market as a result."

"Ali's phrase is 'Know your farmer, know your food' and people were really interested in us once they knew we were the farmers," says Dion. "They really wanted to know what they were eating. It's personalising the eating experience. They feel like they know us so when they buy from us they know where their food is coming from."

Ali is proactive on Facebook and Instagram, posting daily so people can keep up to date with what they're doing. After nine months they have 8000 followers on Facebook and after just six weeks 200 followers on Instagram.

Originally just selling their lambs, they've recently put their

"They really wanted to know what they were eating. It's personalising the eating experience."

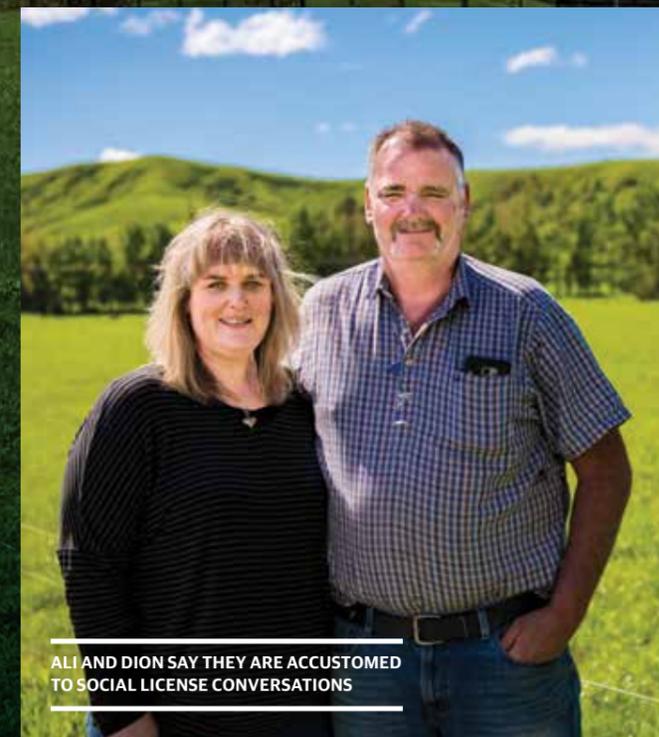
Angus beef on the menu. The lambs are hand-picked and guaranteed at a minimum of 18kg so the product is consistent throughout the year.

"This week we've had 20 orders for half and whole lamb boxes, which we deliver to Taylor Preston," says Dion. "It takes about a week and half from ordering to it arriving on your door step - we'll pick the lambs on the Monday, deliver and process Tuesday then deliver to the customer the following Wednesday."

"The biggest question we get from our customers is why it is so different to the supermarket meat," Ali says. "It's because its breed and gender specific - we only sell female lambs. Some people ask for organic and we say we're as close as you can get, explaining that we don't just throw fertiliser on for the hell of it and the animal welfare side of needing to treat sick animals. 'Naturally farmed and ethically raised' is our catch phrase, which our customers relate to and is quite unique from a marketing perspective."

Dion explains that they're accustomed to social licence conversations with the public.

"With the Belmont farm in Wellington we're farming in a fish bowl, with 150,000 people walking through the farm a year. A lot of people don't understand what fertiliser is and have misconceptions about it, so when we apply Ag-lime we put up big core-flute posters about what we're doing and why."



ALI AND DION SAY THEY ARE ACCUSTOMED TO SOCIAL LICENCE CONVERSATIONS



Growing pains

Dion and Ali's three farms are spread over 300km, with Belmont farm (1100ha) in Wellington, Canoga Park (1100ha) in Masterton where they live, and Puketai Station (530ha) as well as other lease blocks in Masterton and Dannevirke.

When Ali came on board, Dion was leasing Canoga Park and owned Puketai station, plus a 140ha lease block. He says it's been a rapid growth since then to purchase Canoga Park and take on additional leases at Belmont in Wellington and Ardale in Dannevirke.

"We had to tender for the Belmont lease off the Greater Wellington Regional Council, which was quite a lengthy process. We think they liked the story of what we were doing and appreciated our environmental management style - which is to treat the land as our own and leave it in better shape than when we took it on.

"Setting out I wanted 20,000 stock units by the time I was 45 and I've managed to get 25,000 at 46. I'm absolutely rapt with it but it's taken a lot of sweat, it hasn't been easy."

The couple breed a base block of Romney Texel sheep with Charollais terminal sires, which are relatively new in New Zealand. They breed Angus Hereford cows with Speckle Park terminal sires and a baseline of Angus in all the maternals with Speckle Park going over 50 percent of those.

"The reason for Speckle Park and Charollais sires is that they have a high yielding meat-to-bone ratio, good intramuscular fat (marbling) and are fast growing," says Dion.

For feed, they run Italian grasses and use chicory and clover in the summer dry to keep the feed quality up.

"It's really hard to finish lambs in the summer in the Wairarapa, but chicory and clover see you through. We don't run winter crops, just chicory and a bit of rape and silage when required. In a really dry year we use barley to supplement the ewes," Dion says.

They meet with their Senior Agri Manager Greig McLeod from Ravensdown every six months to talk about their cropping rotation. All the farms are Whole Farm Soil Tested bi-annually with the fertiliser varying from year to year as a result with sulphur super as a base.

"Greig's really efficient and tells you how it is," says Dion. "He's definitely not a yes man and gives us really good information.

"We're currently running a lime programme to get our pH levels right, as we haven't done lime in a long time. As soon as we bought Puketai we did a lime programme and the response was amazing. The local fencer couldn't believe the number of worms when he was digging the post holes (two years after spreading the lime). When we first bought it we got 200 lambs off mum at 14.5kg and the rest had to go to store. Last year we got 1800 lambs at 19kg so there's virtually no store lambs coming off that farm now. That's why we're doing lime on the rest of our farms - we won't let lime lapse again."

At pre-lambing, a blend of Sulphur Super 15 and FlexiN will be applied to all the farms, which has had a good track record.

Environmental initiative

Ali and Dion have just started their Farm Environment Management Plan ahead of council requirements, working with Ravensdown and say as soon as Ravensdown's aerial variable rate spreading technology IntelliSpread is available in their area they will be taking up the precision tool. They've fenced off all their major waterways at Canoga (anything over one metre wide) and planted a minimum of 300 poplar and willow poles a year over the past five years for erosion.

It's a work in progress Ali says. "The poles have been going well but in the drought some haven't been surviving. After eight droughts we're getting smarter and only planting on the south side where it's less exposed to the nor'west. On average we're getting about 65-70 percent survival rates, hence the numbers we're planting. We pay for 40 percent of the costs and the rest is subsidised by the council."

The couple are retiring land at Canoga and Belmont to meet Transmission Gully's mitigation requirements, but what really sets them apart is the water quality group that Ali has set up to measure and monitor the Taueru Catchment's health.

Ali, the driver behind the group, says after Dion attended a discussion group about what has happened in other regions she wanted to get ahead of the rules and be proactive.

"The idea is to get a baseline that we can then monitor," she says. "I'm working on getting the 23 farms in the wider Biddiford Valley on board, which all come under the Taueru Catchment. We're going



to test once a month through ARL for the next two years at four different spots - monitoring our N, P, E.coli and sediment levels.

As someone said, 'the train is coming, you may as well get on board rather than be hit by it'. It's all about getting as much information as possible so you can get ahead."

The group is still in conception stages - with their first tests in the pipeline, with all the neighbouring farmers excited and on board, the costs for the testing will be spread across their farms at \$200 per year due to missing out on the council citizen science fund.

"I'm definitely not a greenie or into organics," Dion says. "But I am about using the tools and science around us to look after the land and get better results. Being more efficient today allows us to leave the land in better condition than how we found it." ■

STABILISED UREA - THE SMART CHOICE

Urease inhibitors, such as Ravensdown's N-Protect®, provide farmers with an additional tool to keep applied nitrogen (N) in the root zone, which can have economic, agronomic and environmental benefits.

While urea is the most widely used form of N fertiliser in New Zealand, and usually the most cost effective, its disadvantage is the losses of ammonia gas through the volatilisation process if not incorporated into soil soon after application. Some of the ammonia volatilised can be redeposited back to the soil surface by rainfall, entering the soil nitrogen cycle. The ammonia can then be evolved as nitrous oxide, a greenhouse gas (GHG), which contributes to New Zealand's GHG emissions. New technologies are being introduced that reduce those losses and enhance efficiencies.

How volatilisation works

The loss of ammonia by volatilisation can be variable depending on a range of factors, especially a lack of moisture after application. When urea is dissolved in water in the soil it is converted (hydrolysed) by the naturally occurring enzyme urease to form ammonium bicarbonate, with much of the resulting ammonium being held on soil cation exchange sites*. Urease is produced by many soil microorganisms and plants, and is present in nearly all soils. During the conversion, the pH temporarily rises and ammonia gas is produced.

In winter, average volatilisation losses are about eight percent, and in spring through to autumn, losses average 18 percent of the nitrogen applied.

The factors conducive to N loss as ammonia are:

- less than 10mm of rainfall and/or irrigation in the first eight hours after application
- high rates of N applied in a single application
- presence of crop residues
- open crop canopies
- high temperatures
- high soil pH and low cation exchange capacity soils
- dry soil conditions

If there is sufficient moisture, as either rain or irrigation immediately after application, then volatilisation will be reduced to near zero.

Reducing volatilisation/urease activity

Using a urease inhibitor on urea fertiliser reduces the activity of the urease enzyme in the hydrolysis of N to ammonium bicarbonate, and to ammonia gas. The most

widely-used urease inhibitor is N-(n-Butyl) thiophosphoric triamide (NBPT) due to its effectiveness, low-toxicity and ability to be coated on urea. Ravensdown's stabilised urea N-Protect uses NBPT and was trialled to ensure efficacy and no residue effects.

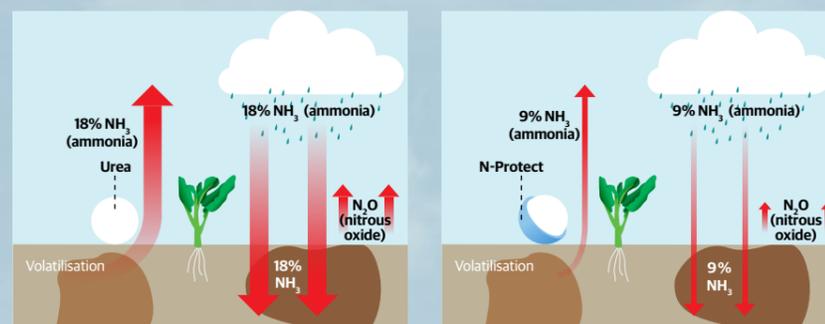
Because the magnitude of ammonia loss varies with soil type, climate and crop cover, the reduction can also be variable. However, working on a 50 percent reduction of ammonia for budgeting purposes is prudent.

The potential boost in crop yield from the preserved N will depend on the nutrient demand of the crop, the existing soil N supply, and other management practices.

Basis for use

N-Protect is a technology that enables smarter farming for a better New Zealand, lowering farmers' environmental impact (a small contribution to GHG emissions) and optimising value from the land. Modelling shows it is cost effective to use during spring/summer/autumn when N losses are greater than 18 percent. ■

RAVENSDOWN HAS DONE EXTENSIVE RESEARCH ON N-PROTECT® WHICH HAS RESULTED IN THE FOLLOWING FINDINGS.



"Working on a 50 percent reduction of ammonia for budgeting purposes is prudent."

(*) See Source Code page 42

TOOLS TO FEED A GROWING POPULATION

By Blair Cotching, Ravensdown Project Manager - Precision Blending



BLAIR COTCHING, RAVENSDOWN PROJECT MANAGER - PRECISION BLENDING

As the world population grows so too does the demand for more food. Farmers across the world are set with the challenge to increase production sustainably, which means more precise technologies and better science to feed the world without harming it.

Unique to Australasia, New Zealand's first two Precision Blending Plants, one in Christchurch and the other to open shortly in New Plymouth, are setting the standard for precise blends and coatings of fertiliser. The technology is designed to efficiently deliver complex and precise blends of nutrients that are increasingly required for the high calibre of farm production today.

Globally, there are more than 200 precision blending plants in commercial use with the key drivers for investing in the technology similar across the board.

Precise input of all ingredients

+ Efficient mixing and coating

= High quality fertiliser output

Like Ravensdown, a large USA co-operative CHS wanted to combine its two dry fertiliser facilities in Minnesota into a blend system that would produce an accurate mix fast, using both macro and micronutrients. The Sackett-Waconia High Intensity Mixer, which is a key part of the Precision Blending Plant, has enabled CHS to blend 250t/hr compared to its previous capacity of 30t/hr. Its reliability when adding micronutrients and liquids to fertilisers, such as nitrogen stabilisers, has seen CHS produce common blends of up to 4-5 macro nutrients, 1-2 micro-nutrients and nitrogen stabilisers.

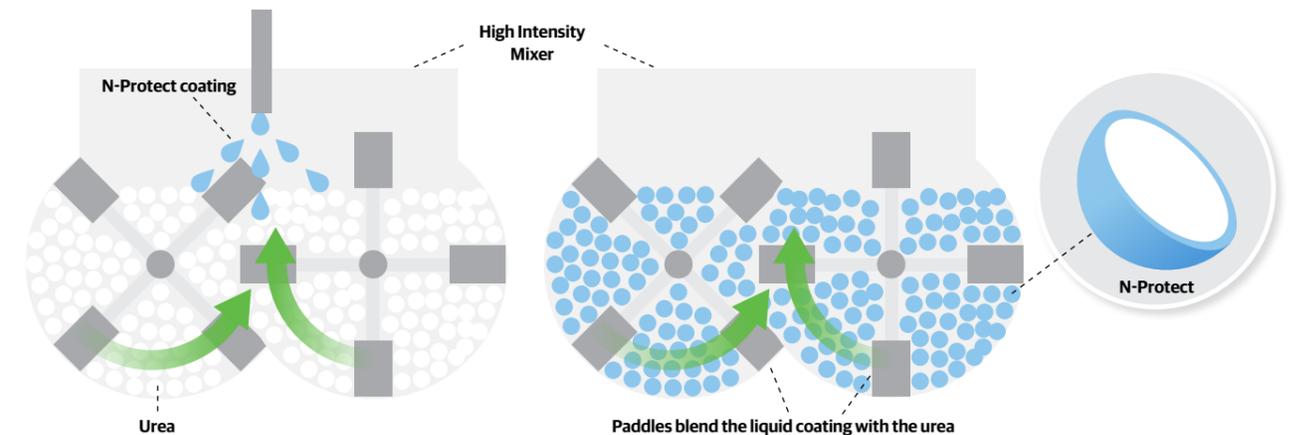
"A big advantage we found was the speed of the liquid impregnation system," says Jason Frinack, Plant Manager for CHS. "Our



customers are more specific about the planting time of their crops, so when they want to plant they don't want to wait. The Sackett system was able to blend accurately with uniform coverage of coated fertiliser at speed."

CHS says farmers use the plant's precision blends primarily for row crops, such as maize and beans because of the ability to blend precise fertiliser mixes along with coating the mix with nitrogen stabilisers. In addition, there is a large vegetable market that requires increased precision to ensure extremely accurate inputs and complete mixing of fertilisers using a number of inputs.

Ravensdown has been doing a lot of background work on coatings to understand the range of options we have for coating a large number of fertiliser products. As a result Ravensdown is now releasing Superphosphate based products with either Molybdenum, Copper or Cobalt coatings with the benefits of every single granule having an even amount of the trace element for increased distribution across the paddock - increasing the chance of every plant taking up the required trace element. ■





UTILISE YOUR PASTURE WISELY – YOU'VE ALREADY PAID FOR IT!

By Dr John Roche, DairyNZ Principal Scientist

Dry summer

The hot, dry start to summer following a very wet spring changed how pastures performed in many regions this season. Farmers should always factor variable weather into their seasonal plans, particularly monitoring their feed supply, and the condition of their cows.

Decades of research in New Zealand confirm that cows consuming the same amount of metabolisable energy (ME) from pasture, or pasture plus a supplement (eg sugars, grains, or silages) produce the same amount of milk solids.

In fact, at a system level, the amount of milk solids produced from 100 megajoules

(MJ) pasture, maize grain or maize silage is the same. This is because, in a grazing system, intake of metabolisable energy is the factor that limits milk production. So it stands to reason that 100MJ from any feed would result in the same production response.

However, many people believe that because we've intensively selected dairy cows to produce more milk, they require more than just pasture: they must be supplemented with an additional feed to ensure that:

- they 'meet their genetic potential'
- they don't lose too much body condition, or they get in calf

Critics of pasture have been saying this for at least 70 years, when McMeekan* first

reported that people believed cows needed a higher quality feed than pasture.

For more than 80 years, research has proven that temperate pastures, like those grown in New Zealand, are very high quality and can sustain reasonably high milk production per cow. In fact, decades of research have shown that intake of metabolisable energy is what drives production in grazing cows and not the type of feed supplied.

This does not mean that cows not receiving a supplement will produce the same amount of milk as cows eating 3kg DM of supplement. Generally, supplements increase the intake of metabolisable energy, so you would expect the cows to produce more milk. However, the greater milk production may not be associated with an increase in profitability.

"For every \$1 spent on supplement, total costs increase about \$1.50."

Cost-benefit ratio of supplement feed

Financial analysis from many different countries and from different regions in New Zealand has identified a very simple rule of thumb: for every \$1 spent on supplement, total costs increase about \$1.50. This means that it is important to achieve high biological responses to supplements to ensure using supplements increases profitability.

To achieve high responses to supplements, cows must be in a situation where they would be 'hungry' if they weren't fed the supplement. Measuring post-grazing residual offers us a chance to judge whether a cow is hungry or not. If residuals are less than 1400kg DM (3cm residual), responses to supplements can be greater than 10g MS/MJ ME. If residuals are greater than 1500kg DM (3.5cm residual), responses to supplement tend to be less than 7g MS/MJ ME.

If you leave pasture behind, it is not available to be grazed the following

rotation: use it or lose it! In fact, the real situation is worse. Not only is the pasture wasted and the money spent to grow it lost, subsequent pasture quality and the milk production from pasture is less.

So, use supplements wisely and only when there isn't enough pasture. Use post-grazing residuals to guide your supplementary feeding strategy.

Remember, temperate pasture is a very high-quality feed. Replacing it with another feed will increase cost of production and reduce profitability. ■

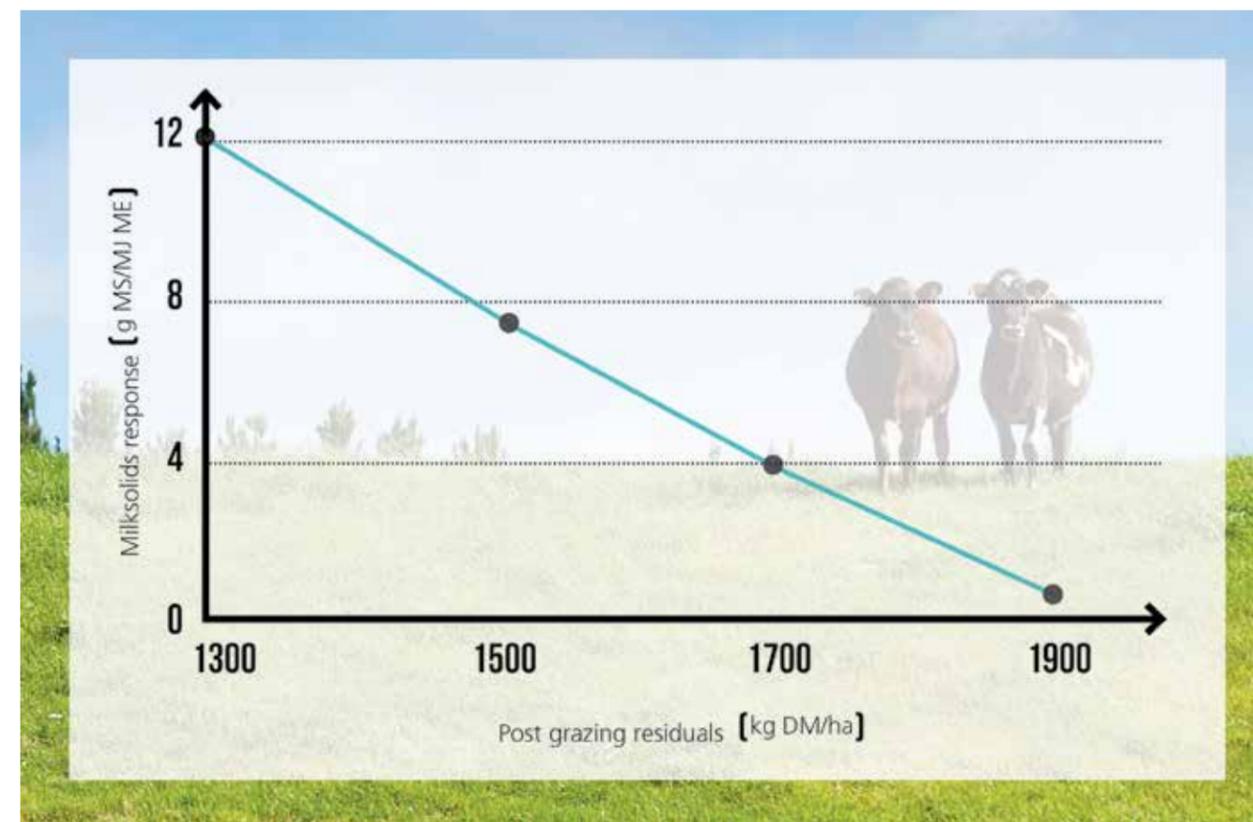
"If you leave pasture behind, it is not available to be grazed the following rotation: use it or lose it!"

Pasture first

If residuals are less than 1400kg DM, milk production responses to supplements can be high; if residuals are greater than 1500kg DM, responses to supplements tend to be very low.

Factor in all costs before you purchase supplementary feed.

Response to supplements



(*) See Source Code on page 42

POTASH - YOUR FRIEND OR FOE?



DR ANTS ROBERTS, CHIEF SCIENTIFIC OFFICER

Late winter to early spring in the major farming areas of Godzone - when you're up to your eyeballs in mud and rain. It's cold, and if you were honest you'd rather be inside warm and dry, but calves and lambs are hitting the deck all over the show, the pasture's not growing fast enough and there are hungry animals to be fed.

This is a time when metabolic disorders, specifically milk fever (hypocalcaemia) and grass staggers (hypomagnesaemia), can be prevalent but what has this to do with potash - is it your friend or foe?

Friend...?

We all know that to develop and maintain good grass/clover pasture on most farms we need to apply potash (potassium chloride or potassium sulphate) or, more exactly, potassium (K) fertiliser.

There are some soils eg some sedimentary soils and recent soils that can supply K from soil minerals for plant uptake. Understandably, these farms often require little or no K fertiliser application. But for most others, K fertiliser is as necessary as milk on your Weet-Bix, or mint sauce on your lamb roast.

As with most of the fertiliser nutrients you use on-farm, you apply K principally to encourage white clover growth and function. More white clover means better quality feed for livestock and more nitrogen

fixation giving you more pasture production. If K is for clover growth, it follows that it should be applied when clover grows - or is just about to.

In many areas, clover starts really moving in late spring/early summer so K fertiliser should be applied from around mid-September onwards. The amount you require will depend on your farm's soil, its K levels, annual rainfall and animal production (see Table 1).

However, on some free draining soils in high rainfall areas, and on peats, it is almost impossible to reach the target soil test levels. If you apply K fertiliser to do this on these soils you end up using far too much. This is where pasture analysis comes into its own, although it is also a very good monitoring tool on all farms.

Table 1: Generalised 'target' ranges for soil, herbage and fertiliser K*

Soil	Soil test K (QTK)	Herbage K (%)	Fertiliser K (kg/ha)
Volcanic	7-10	2.5-3.5 (2-3)	20-90 ²
Sedimentary	5-8	2.5-3.5 (2-3)	20-70 ²

*Sheep and beef ²Get specific advice for your situation

"K fertiliser is as necessary as milk on your Weet-Bix, or mint sauce on your lamb roast."

...or foe?

Too much K affects animal health by reducing magnesium (Mg) uptake by pastures and in your livestock. Even low amounts of K addition eg 30kg K/ha** will suppress Mg uptake. However, the more K fertiliser you use, the more the pasture will take up - this is called luxury uptake.

The K content of pasture is one of the most important factors affecting your stock's ability to adsorb dietary Mg***. The higher the K in your pasture, the harder it is for your stock to get the Mg they need,

whether it's from the pasture they are eating or any dietary Mg supplement you are giving them, including drench, paste or dusting.

But, I hear you say, isn't milk fever caused by a lack of calcium (Ca)? Well...yes, but Ca adsorption by the animal is influenced by parathyroid hormone (PTH), calcitonin and vitamin D. These factors control the mobilisation of Ca from bone reserves in response to the high Ca demands of late pregnancy and lactation. Magnesium is essential for PTH activity, which is produced when blood Ca levels are low in the animal. PTH increases vitamin D production, which, in turn promotes the ability of the gut to adsorb Ca and release it from the bones - increasing blood Ca levels.

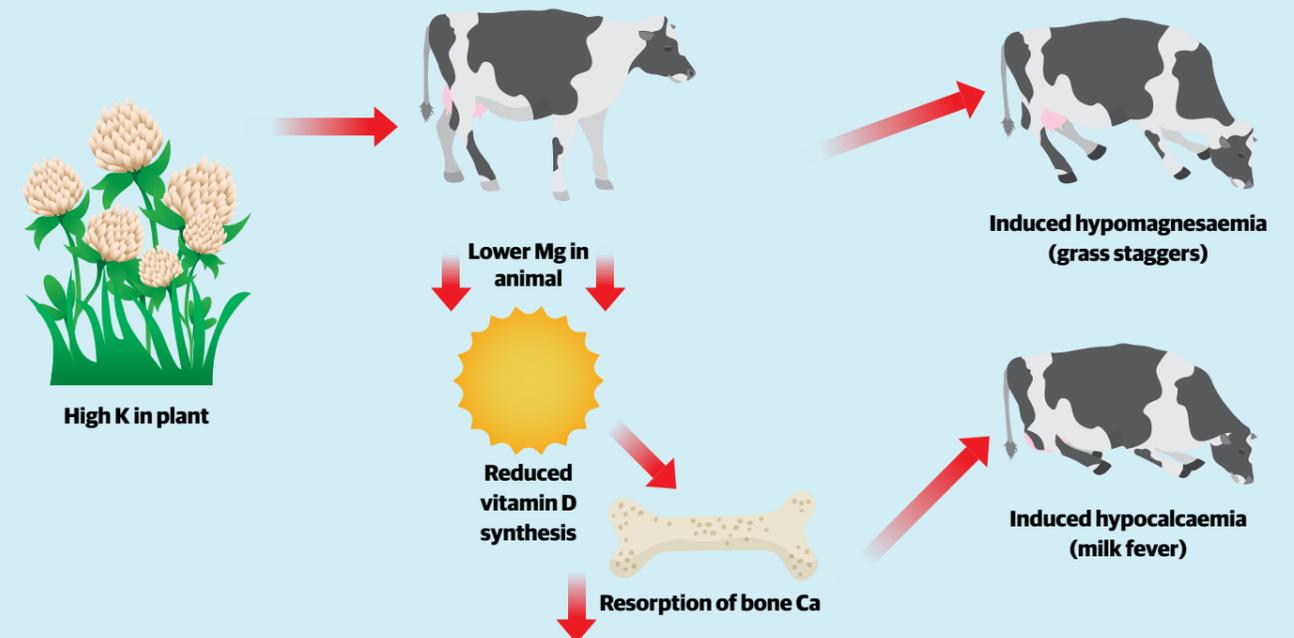
If you followed all that, you could be a veterinarian when you give up farming! Basically, excess K in your cows' or ewes' diets, around parturition, affects their ability to get enough Mg out of the feed, and this may help increase the number of grass staggers and/or milk fever cases you get each season.

So what can you do about all this?

- Maintain soil and pasture K levels at the levels in Table 1
- Monitor regularly
- Avoid applying K fertiliser before and after the start of calving/lambing (being conservative probably 6-8 weeks either side)
- Supplement the herd/flock with Mg at least three weeks before calving/lambing and then for as long as required afterwards. ■

"If K is for clover growth, it follows that it should be applied when clover grows - or is just about to."

How too much K affects animal health



(*, **, ***) See Source Code on page 42

HOW SENTIENCE APPLIES TO ANIMAL WELFARE



DR GWYNETH VERKERK, CHAIRPERSON OF THE NATIONAL ANIMAL WELFARE ADVISORY COMMITTEE

What is the sentience amendment and what does it mean?

Well it can sound a bit scary when it's dressed up, but we've had an Animal Welfare Act since 1999. In 2015 a preliminary amendment that recognised animal sentience and would build on the five freedoms (see below) was introduced.

NAWAC is now required to consider the implications of the amendment. Some views are that it's not a lot different to what we already do while others see it as an opportunity to change.

The sentience amendment will shift the bar in terms of how we think about things in terms of best practice. It's a similar situation to how the environmental mindset shifted following societal pressure - some farmers were already meeting expectations while others had some catching up to do.

What will this mean to farmers?

There will be further regulations coming through this year (46) - a number of them relate to transport of livestock. In 2019 it is intended that when people take the horn

The Animal Welfare Amendment, which passed its final reading in 2015, states that animals, like humans, are "sentient" beings. The sentience concept is not new and was introduced into European law 20 years ago. Now New Zealand has caught up, the need to understand what this could mean for farm systems is important. Dr Gwyneth Verkerk, Chairperson of the National Animal Welfare Advisory Committee (NAWAC) explains what the amendment is likely to mean to farmers.

buds off cattle they will require local anaesthetic - but a lot of farmers already do this; it's about enforcing best practice to the others.

Future implications may be around providing shade and shelter for stock eg, is it fair that animals have to stand in deep mud enduring the elements, or can we provide them with a more positive experience with a drier more sheltered area for them to lie down in? In the regulatory sense, there are allowances for extreme weather events, but it's part of rethinking elements of farm design to suit conditions and creating a positive environment for the animals. It's like doing a Farm Environment Management Plan.

What can farmers do now to prepare themselves?

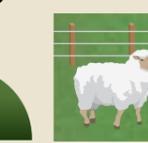
Farmers already understand what gives animals positive feelings and know the benefits to their business by treating their animals well. They shouldn't be concerned - but they can be thinking about their farming systems and where they can improve their animals' experience. Longer term, shelter and deep mud will become a focus - if farmers can start planning and budgeting for improvements around that, they'll be in a good position.

How will this help the NZ Inc?

If we look at the changes coming through in marketing by supermarkets, particularly in the US with the Whole Foods group, consumers prefer products coming from animals that have had a good life. We should be acknowledging the positive emotional experiences of animals and make that part of our marketing strategies.

Changes will come through in terms of supermarkets' requirements of product - driven by consumer views and conscience eg demand for free-range products. That concept is quite central to a lot of consumer thinking and becoming more mainstream, which will see higher priced premium products on supermarket shelves. ■

Five freedoms for sentient beings

1.  Freedom from hunger and thirst (food and water)
2.  Freedom from discomfort (shelter)
3.  Freedom from pain, injury and disease (medical care)
4.  Freedom to express normal behaviour (exercise)
5.  Freedom from fear and distress (love and understanding)

AT THE TOP OF THE GENE POOL - A DEER STORY

Mike Wilkins is a deer farmer in Southland.

The family business, Wilkins Farming Company Ltd, was established by Mike's parents in 1974 and runs a full commercial mob of breeding hinds and stags for venison and velvet production, alongside other various enterprises.



Forty years on from when the deer industry was established in New Zealand - it has diversified from venison and velvet to now include commercialised trophy hunting. The deer portion of the Wilkins' family business was started by Mike's parents, Ray & Pam, in 1981 and utilises all aspects of the industry, selling trophy deer, venison, velvet and genetics, the latter being Mike's main focus.

"Deer is my passion," Mike says. "Our farm business is diverse beyond deer but deer is what I did the most with Dad growing up and is why I chose to focus on that aspect of our business. I love seeing the progress in the livestock and the improvements that can be made in live weights."

Mike says his feed policy is regular new grassing, which has seen his hinds and fawns grow up to 600g a day versus the 250-350g on older grasses.

"Over 30 days that's a lot of venison! There are a number of parts to make the full recipe. I believe it's all connected, to be well fed means you need good fertiliser programmes, which in turn need to be more sustainable."

Genetics

A big part of the recipe for Mike, and the success of the deer stud, is the genetics aspect. Breeding a different mix of deer genetics is a constant in the pursuit of perfection for their venison, velvet and trophy.



"Our core deer business is venison genetics. We've had a lot of success with the 12-month growth rate Breeding Values (BV). One of our sale stag sires (Churchill) has been number one in New Zealand for five years running. The deer industry is right up there when it comes to genetics because of its recognition of breed values when selecting sires for venison and velvet. When a farmer velvets their animal they are able to see their annual harvest in one cut so you can benchmark year on year," Mike says.

"We keep pure bloodlines as well as composites so we can balance the breed when we want to. When our animals are getting too big we put more of the English genetics in, or if we're getting too small we bring the European genetics back in. The English genetics are hardier, which has

become more important as deer farmers are pushed back into the hill country with dairy expansion on easier flat land."

Mike's breeding base for mating selections is 1500 stud hinds, which are all DNA profiled and registered on DEERSelect (national bureau for monitoring deer genetics). They sell 100 breeding stags a year, but Mike says while they're seeing good returns in the market it is not encouraging a lot of new entry to the industry.

"While it's a niche market - people don't go out and convert to deer like they did 15 years ago. This season the farm gate prices are looking good but it's the same as the dairy industry you don't count your chickens until the money is in the bank. You can't bank a forecast."

"I love seeing the progress in the livestock and the improvements that can be made in live weights."

RAVENSDOWN AERIAL SPREADING MIKE'S HILL COUNTRY.

Passion2Profit - PGP

To keep the industry progressing and capitalising on its value, the Passion2Profit (P2P) group was set up under the Primary Growth Partnership scheme and is in the third year of its seven-year programme. Indicated in its title, P2P aims to improve the deer industry's competitiveness in profitability and land use, and is something that Mike is actively involved in through its Advance Parties.

The Advance Party members are made up of motivated deer farmers who work together to identify opportunities to improve profits on-farm and demonstrate improvements they make to their wider community to encourage wider adoption of farming practices that improve profitability.

"We have been set the task to make recommendations back to the industry about what the key performance indicators should be as well as how we should measure them and how often. We run it like any farm discussion group, also learning from each other's businesses," Mike says.

"It's been a game changer, focusing in on production by benchmarking and peer review. Farmers traditionally aren't good at sharing information so it's opened those opportunities up through the collaborative industry-good format."

Innovation and technology

Mike recently went to Europe with Mt Hutt Station owner Bruce Hood to buy new genetics into New Zealand. The new strain of Eastern European genetics will add a new dimension to not only their farms but the rest of the industry too - vital to keeping the genetic strains within New Zealand progressing.

"Diversifying your genetics increases options for breeding and continuing pure lines of deer. It also keeps all markets happy as the genetics that are good for venison

aren't necessarily good for trophy or velvet," Mike says.

To help him make genetic gains, Mike uses a selection of tools including CT and ultrasound scanning, Artificial Insemination and Embryo Transfer programmes.

To keep track of their genetics and stud's performance Mike is using the Gallagher TSi2 technology.

"We can record the pedigrees of the deer and see the sire lines straight away. It helps us manage and analyse our data better." ■



"Diversifying your genetics increases options for breeding and continuing pure lines of deer."



THE CADMIUM CONUNDRUM - PART 2



By Mike Manning, Ravensdown General Manager of Innovation and Strategy

Cadmium in soils

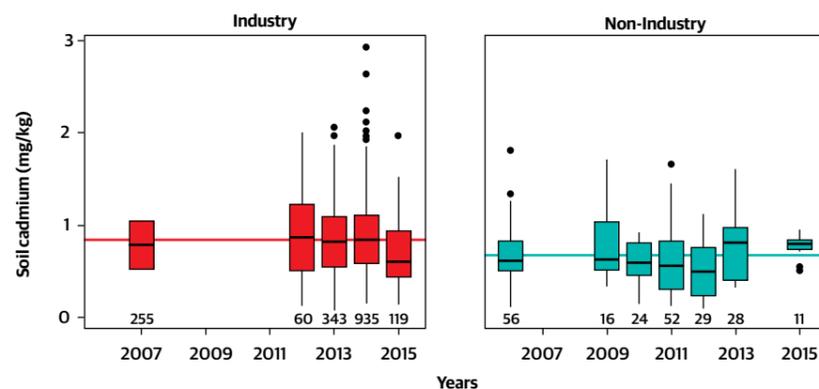
Cadmium concentrations in New Zealand agricultural soils are measured by the fertiliser industry as part of the on-farm nutrient sampling. Some regional councils and research organisations have also collected soil cadmium data.

Of the 8835 soil samples taken between 2006 and 2015, the mean soil concentration was 0.43mg Cd/Kg soil. Across all samples 95 percent had a soil cadmium concentration less than 1.16mg Cd/kg soil. The data also showed that for many territorial authorities (32 out of the 62 sampled) there were no farm results with soil cadmium

concentrations beyond the range that naturally occurs in New Zealand.

The primary source of anthropomorphic cadmium in agricultural soils is from phosphate fertiliser. Many of the productive dairy farms in Taranaki* and Waikato** were developed with a long history of superphosphate use, which prior to the mid 1990s was predominately made from Nauru phosphate rock (high in cadmium). These two regions showed more elevated soil cadmium levels relative to the other regions in New Zealand (Figure 1).

Figure 1: Sample soil cadmium values from the Waikato region



Sample soil cadmium values from the Waikato region show the median and interquartile ranges with points indicating sample values over 1.5 times the interquartile range of the median. Numbers below each box plot indicate the number of samples. Horizontal lines indicate the mean cadmium concentration of samples from each source**.

"There is no evidence of risk to the health of New Zealanders from dietary cadmium."

A pan sector group formed the Cadmium Working Group in 2011 that approved, implemented and now manages a Cadmium Management Strategy that manages cadmium in our soils - one component of which is the Tiered Fertiliser Management System (TMFS). This is a voluntary system administered by the fertiliser industry to actively manage phosphate fertilisers applied to soils that have been found to have elevated levels of cadmium in the soils.

Cadmium in food

Foods that contribute most to the average cadmium dietary intake of New Zealanders are oysters, potatoes and bread (Figure 2) - with oysters accounting for 21-28 percent for both adult women and men respectively.

Data on the concentration of cadmium in food is collected by the Ministry for Primary Industries as part of the New Zealand Total

Diet Study. With an intended five year frequency of retesting, the programme samples foods following a simulated New Zealand diet. These foods are analysed for selected agricultural residues, contaminants and nutrient elements. The foods are bought at supermarkets and prepared as they would be by consumers. The study includes analyses of cadmium concentrations in a typical diet.

There have been seven New Zealand Total Diet Studies to date, including the first in 1974 to the most recent in 2009. A further study is currently under way. The 2009 study found that cadmium intake by different age and gender groups of New Zealanders was 50 percent or less of the provisional monthly tolerable intake recommended by the World Health Organisation. The conclusion from the number of studies so far is that, subject to the assumptions of the diet study, there is

no evidence of risk to the health of New Zealanders from dietary cadmium.

The connections between cadmium inputs, soil cadmium and cadmium concentrations in crops and produce are complex. Managing soil pH, soil organic matter and zinc levels are known to help reduce uptake by plants, however, other factors also have an influence.

Recent New Zealand research*** is consistent with earlier international studies on the uptake of cadmium by vegetables and forage plants and found marked differences between species and cultivars and only weak relationships between plant tissue concentrations and soil cadmium. Better understanding of the conundrum is the subject of further New Zealand-specific research, under the Cadmium Management Strategy. Cadmium in the New Zealand environment continues to be the subject of active research and management. ■

Figure 2: Comparative cadmium concentrations in key foods

Food	Mean ^a cadmium concentrations (mg/kg)						Overseas reference
	1990/91 NZTDS	1997/98 NZTDS	2000 NZ ^b	2003/04 NZTDS ^b	2009 NZTDS ^b	Overseas Conc.	
Bread, white	0.012	0.018	0.018	0.015	0.015	0.010	FSANZ, 2003
Bread,wheatmeal	0.017	0.025	0.022	0.018	0.018	0.015	FSANZ, 2003
Milk, whole	0.00033	0.0015	<0.001	0.0002	0.0001	0.0004	Dabeka <i>et al</i> , 1992
Liver lambs fry	0.255	0.113	NA	0.101	0.103	0.084	Rose <i>et al</i> , 2010
Oysters, raw	0.39	4.48	NA	2.92	1.33	0.35	FAO/UNEP/WHO, 1988
Potatoes, peeled	0.009	0.028	0.016	0.023	0.027	0.022	Millour <i>et al</i> , 2011

a Vannoort, 2001; number of samples analysed n = 30 per food. b n = 8 per food
c Mean based on assigning ND = 2002



(*, **, ***) see Source Code on page 42

QUALITY CONTROL - SOIL TESTING EXPLAINED

By Dr Hendrik Venter, Technical Director ARL



DR HENDRIK VENTER, TECHNICAL DIRECTOR ARL

Measurement of soil pH dates back to 1934 and the Olsen P test was introduced in 1954. Changes to instrumentation since inception of these tests has been significant but the chemical principles have stayed the same.

How we analyse soil

Extraction solutions, containing chemical salts to aid in the extraction of specific nutrients, are added to dried and ground

soil samples and shaken for a fixed time at room temperature before being filtered. The target nutrient is then measured in the extract.

It may not be apparent but this is a heavily loaded sentence - considering the following aspects of soil nutrient measuring:

- The chemical used needs to be consistent eg pure, supplied by the same company, brand, batch and validated to ensure correct results
- The balances for weighing chemicals and soils need to be calibrated
- The concentration of the extraction solution and the volumetric glassware needs to be correct and accurate
- The water needs to be of desired purity
- Soil needs to be air dry and screened through a standard 2mm screen
- The shaker needs to be oscillating at the correct speed
- Stopwatches calibrated for measuring the extraction time
- Laboratory temperature within the allowable range of around 20°C
- Different filter papers need to be used for different tests. Validation of filter papers is important due to variability

in measurement that can be introduced

- Specialised "dishwashers" incorporating an acid wash cycle to ensure glassware is clean

How accurate are your results?

Calibration solutions are analysed for the different nutrient concentrations, measured to derive a calibration curve, and validated by an independent calibration check solution.

Because of the high sensitivity of some of the instruments, which can detect at a level equal to 15g of an element per hectare, samples analysed include quality control samples, duplicate samples and blank samples. Blanks have the purpose of measuring the accumulated background noise caused by the factors listed above that can affect results.

Quality control samples, with known nutrient content and variation in range, are used to monitor consistency of the instrument and its extraction process. Random duplicate samples chosen from customer samples are analysed to establish uncertainty of measurement for the test as a whole, based on the differences between duplicate samples. Besides all these checks, regular external calibration and maintenance are undertaken to ensure instruments are working correctly.

ARL also participates in numerous inter-laboratory comparison programmes involving analysing unknown samples on a regular basis, comparing results with those from other local and international laboratories. Only when results align consistently with other laboratories can we be satisfied that we are getting the measure right. ■

BEING WORMWISE SMART TOOLS FOR MANAGING INTERNAL PARASITES

One of the top sheep farmers in New Zealand's driest climates (Marlborough) has discovered a side benefit of his lucerne grazing system in how it combats worms.

Fraser and Shelley Avery transitioned their eastern Marlborough farms from traditional ryegrass/clover to a predominant lucerne platform, which has dramatically improved livestock performance with significantly less reliance on drenching.

Fraser says with a lucerne platform they aim to wean their ewes at 160 percent or better, with at least 90 percent of lambs going to the works off the mother.

With the lambs able to leave the property undrenched, the 'pasture contaminators' are removed from the system.

"We have previously drenched tail-end lambs at 28-day intervals until they reached target weights," says Fraser Avery. "This year we'll be making that decision off Faecal Egg Count (FEC) testing to assess both worm challenge and drench efficacy, thanks to advice from Graham Payne (Ravensdown Animal Health Technical Advisor). This data should help us make decisions about whether we could apply more targeted treatments in future and focus simply on supplying quality feed so our animals can reach their genetic potential."

Other benefits to the Avery's forage system are a high (50/50) cattle/sheep grazing ratio, as well as adult cattle following young sheep mobs and vice versa.

"We believe the sheep/cattle ratio is an integral part of managing both parasites and feed quality. They take care of each other's burden as they both naturally remove the other's troublesome parasites."

Fraser emphasises that the whole process of removing parasites from the production system initially starts with summer following of up to 25 percent of intensive areas.

"The mating platform is mostly on first-year lucerne where some of the paddocks, sown in spring, will not have been grazed by animals at all since the previous winter."

The benefits of good feeding and nutrition, balanced stock ratios, providing 'clean' forage, and above all, smart management, of all of the above, are obvious in the results being achieved here. ■

GRAHAM PAYNE, RAVENSDOWN ANIMAL HEALTH TECHNICAL ADVISOR AND FRASER AVERY DISCUSS THE BENEFITS OF LUCERNE.



"We believe the sheep/cattle ratio is an integral part of managing both parasites and feed quality."

Note: For more information on the Wormwise National Worm Management Strategy head to their website www.wormwise.co.nz

A FOOT IN BOTH CAMPS - AGRI MANAGER TURNS FARMER

“It’s really satisfying to know I’ve done this on my own. Even when you have a bad day it’s not that bad.”



In March 2016, Kate Macgregor, Ravensdown Senior Agri Manager, stepped into the big leagues, officially becoming a farmer and part-time agri manager. Buying the stock and plant off her dad, Kate took over the family farm - leasing the land. She shares with us her new insights from both sides of the fence.

“The big benefit of being an agri manager and now farmer is I’ve gained empathy from my experience in understanding how much is involved in my customers’ farm business and the pressures they are under. I now ask slightly different questions and have got a lot more specific in how I help them reach their end goal,” says Kate.

“I’m a strong believer in doing what you’re passionate about. I’m really lucky that Ravensdown has been really flexible and allowed me

to go part time so I can do this. They’ve been really supportive.”

Kate now works four days a week with flexible hours and farms the remaining three. With help from her dad, she runs 124ha of easy hill country (54ha flat Kline irrigated and 70ha hill country). The farm supports 43 Friesian Hereford steers and 1070 Romney ewes and Hoggets (Wairere).

“My farm goal is to aim to be the best not the biggest. I’m not ruling anything out, I’m open to all ideas and opportunities, even if this means a change in land use. Our farm is small and without scale so I’ll always have to be looking at the best return on investment.”

Kate says her agri manager skills have been really helpful in starting out farming and as she gets up to speed on the rest of the business.

“I probably take for granted that I don’t need to stop and think about fertiliser and the agronomy side of things. It’s given me time to focus on other areas I don’t know, such as tractors and irrigation, which are really foreign to me. I knew the theory of it but now I am learning the practical as well. Don’t get me wrong, I was brought up and worked on a farm but it’s so different when it’s under your management and you’re responsible for the bigger picture. I’ve found it extremely intimidating but also exciting.”

The biggest benefit when out on customers’ farms, Kate says, is the general farm info and advice she picks up, but also her ability to help the farmer.

“I’m listening to them on a whole other level now. It’s my 13th year at Ravensdown and I have noticed now I’m a farmer too it’s opened up a more in-depth level of dialogue with customers. They

like that I run the same fert programme that I recommend to them.”

Learning from her peers has been a major focus for Kate who recently joined a Farm Business Group.

“Shared learning is daunting for me as some of the group are my customers. Everything’s on the table including financials so you’re pretty vulnerable, but the aim is to help and learn from each other.

“I also did the Agri Women’s Development Trust course - Understanding Your Farm Business - which was amazing. It gave me more confidence to make decisions on my own rather than asking Dad all the time. It also gave me my ‘why’ and once I got clear on that, everything else fell into place.”

Ironically, the course gave Kate the confidence to talk to farm advisors. The biggest gain she has made from external advice was using Ravensdown Animal Health Technical Adviser George



“I’m a strong believer in doing what you’re passionate about. I’m really lucky that Ravensdown have been really flexible and allowed me to go part time so I can do this.”

KATE'S ROMNEY EWES AND LAMBS ARE FATTENED ON THE FLAT COUNTRY

Williams (now Ravensdown Regional Manager for the Eastern North Island) who changed her lamb drench programme - using a combo plus tape for the first two drenches then switching to a triple combination, as well as insisting on Faecal Egg Counts before drenching the ewe hoggets.

“It made a huge difference. The egg counts told me whether I actually needed to drench, which saved me money because I was able to switch from drenching every month to just doing it as required, but the biggest gain is avoiding the drench resistance problem.”

Kate soil tests annually, Whole Farm Soil Testing the flat paddocks, and does a predictive nutrient budget for her fertiliser. She recently trialled half a paddock of a new rape seed from Cropmark on advice from Ravensdown Agronomist Huw Murray, which went really well. The rape produced thinner stems, more leaf and a higher yield.

Her strategic plan is how to grow her father’s legacy.

“My dad’s goal was to leave a farm for his four kids and I want to be able to pass it on to the next generation with it being improved

and viable. I’m a big supporter of farm succession working. We spent a lot of time going over scenarios to make it work and I’ve been really lucky that none of my other siblings wanted to farm this property so I’ve been able to take the opportunity.”

Kate says the biggest challenge for her has been juggling the workload.

“There is so much going on at once and you have to be able to make snap judgement calls - it’s a lot of pressure. When I visit a farmer on behalf of Ravensdown, I’m giving advice on just one element of their business - now I have a huge appreciation of just how much farmers are dealing with.”

The juggle is real for Kate who wears two hats with Ravensdown and her farm Glengyle, but she says the rewards are worth it.

“It’s really satisfying to know I’ve done this on my own. Even when you have a bad day it’s not that bad. I love being outside and seeing the stock in the yards in great condition or a lamb ready for sale - it’s that visual feedback that you’re doing well.” ■



A LOVE AFFAIR WITH CROPPING

Third generation Reporoa farmer, Hamish Lee, likes to take risks. In his third year of equity partnership with his younger brother Sam, he says farming is “bloody boring” if you’re not trying new stuff.

Hamish oversees two farms, the home dairy farm with 700 Friesian cows and the two beef farms in the Wairarapa raising 500 Friesian bulls and 400 Angus x Friesian fattening cattle. With a recent new purchase across the road from their family dairy farm, Hamish has been putting his cropping skills, gained from his three and a half years in Scotland, to good use.

“It’s a bloody expensive hobby (farming) but it’s a hobby I love.”

The significant new development has involved a full cropping programme trialling oats, peas, triticale and sunflowers.

“Cropping allows you to develop land more quickly because you turn the land over more regularly, which allows you to get rid of the brown top and weeds and get into sowing new pastures more quickly,” Hamish says. “I’m finding the new pastures are producing four tonnes more than the older pastures.

We’ve turned over 50 percent of the new farm in two years, spraying out in autumn and under sowing with annual ryegrass or oats in spring, with another spray-out and full cultivation of brassica or fodder beet or cereal. Unfortunately, I couldn’t get the oats dry enough to harvest so I switched to triticale and sunflower, which I harvested into silage.”

The triticale and sunflower crop’s quick growth (100 days) allowed Hamish to turn the new property around quickly into new pasture whilst producing 14 tonnes to the hectare in feed, which has held them well over winter.

“The ME was at 10 and the starch about 20 percent, which I was impressed with, but

the real measure was in how much the cows loved it compared to other silages we’ve made. It’s been great in the wet weather when we needed something substantial to feed them, especially now we’ve started winter milking this year to get the better premium.”

Winter milking, at 500kgMS per cow, has meant the farm could afford to build an underpass connecting the two dairy farms.

“It’s a bloody expensive hobby (farming) but it’s a hobby I love. I actually started out studying music and have a degree in sound engineering. I did a few tours with some bands but there were no jobs to sustain a full-time income, which is how I ended up back home farming.”

Hamish says he got his passion for cropping and trying new things from his grandfather, who also wanted to be a cropping farmer, and he’s been doing rather well at it.

“I won the kale crop comp with Ravensdown last year, at 16 tonne costing 4.8c a kilo of dry matter to grow. These comps are great to benchmark yourself and hopefully have your hard work validated.

However, it takes a certain attention to

detail to grow crops well. I’m quite an impatient person, which makes it hard because I’m ‘watching grass grow’ and wishing it would hurry up.”

This year Hamish says he’s getting away from brassicas and is going to try out fodder beet to give the farm more options with its new winter milking system.

“Now I’m happy with where the farm is I want to look at solutions during our dry period. Fodder beet, instead of summer crops, will get me twice the amount of feed on the same ground and also allows me to milk cows on it.”

Having never grown fodder beet before, Hamish is seeking as much advice as he can.

“I’m working quite closely with my agri manager, Lachlan Paine, on the new fodder beet. We did soil tests back in autumn and put four tonnes of lime on to bring the pH up to 6.2. Lachy has had quite a bit of experience with fodder beet and suggested I use N-Control on it.

“He (Lachy) has been great in challenging me - I used to just pick paddocks I thought were rubbish and put them in crops. Lachy questioned whether I was wasting my money and insisted I find out what my pH

was, which was lucky because it turned out I didn’t need to put lime on at all. I’ve now got a more tailored approach to nutrients rather than chucking it on.”

This approach suits Hamish’s environmental motivations. He has always run a low stocking rate (2.5 cows per ha) and been keen on technology to help him

be more environmentally friendly.

“We all know we’ve got to change, it’s just that people don’t like to. I’m really keen to get into precision Ag but I find our market is really slow. New Zealand is putting policy in place before the capability is there - it’s a tail wagging the dog scenario.” ■



“It takes a certain attention to detail to grow crops well.”



MIKE PETERSON, NEW ZEALAND SPECIAL AGRICULTURAL TRADE ENVOY AND HAWKE'S BAY SHEEP AND BEEF FARMER

KEEP CALM AND CARRY ON ...

It is becoming increasingly difficult for farmers and New Zealand exporters to understand the international landscape and politics of trade. Recent elections of nationalist politicians certainly give the impression that the world is becoming a much more protectionist place. For now, the rhetoric from world leaders has not been converted into action, and the best message for New Zealand is to Keep Calm and Carry On.

New Zealand is a small country and in global terms is a very small producer of food. Although we produce enough food for about 40 million people, with a domestic population about the size of Sydney, we export about 90 percent of everything we produce. Even in dairy farming, New Zealand is only about three percent of world dairy production with Europe producing about eight times more milk than our farmers here at home.

Securing access to markets and reducing the barriers to trade matters more to us than any other country on Earth. Barriers to

markets are barriers to our economic success and social wellbeing. New Zealand works hard to be at the centre of talks where trade is the focus of the conversation. The well-used saying in trade is that if you are not at the table you will be on the table.

The good news is that New Zealand has the necessary leadership, skills and expertise to navigate our way through the international politics of trade. Importantly, when it comes to agri-food and fibre, New Zealand is seen as the thought leader in this space. Most of the forums discussing trade seek to have New Zealand at the table and recognise our reputation for constructive and influential leadership in trade.

There is no doubt that we have some major challenges to overcome to continue to grow and improve our access to international markets. When we look at New Zealand's top five goods markets in the world, we only have trade agreements with two of these - Australia and China. This is why the Trans-Pacific Partnership was seen as being a big prize with its ability to secure deals with the US and Japan. The fifth leg of the top five is Europe,

"Securing access to markets and reducing the barriers to trade matters more to us than any other country on Earth."

and talks are well progressed for negotiations to start later this year on a free trade agreement with EU27 and the UK, following the completion of Brexit in a few years' time.

Other challenges are more domestically focused but have an international perspective. New Zealand has now reached the point where increasing production for production's sake is not the solution to growing our economy. The need to reduce our environmental footprint is now top of the agenda in discussions about our future. Importantly, the move to higher value products is increasing at a rapid pace, and New Zealand exporters recognise

the need for value over volume as a core principle for our sector.

The newly agreed 'Trade Agenda 2030' outlines our plans to improve market access to ensure 90 percent of our exports are covered by trade agreements. This document also reinforces the importance of ensuring non-tariff trade barriers are reduced, alongside the headline tariff and quota market access, as part of our ongoing efforts to improve the economic and social wellbeing of New Zealand.

In a world where the political rhetoric appears to be eating away at our country's future, New Zealand must continue to be the constructive and reasoned voice for trade. There are certainly challenges on the horizon for an exporting country like ours, but we have the necessary expertise and influence to be at the heart of the discussions that matter. As we move further up the chain with higher value products, our negotiators are working hard to ensure we have access to as many of the world's affluent, discerning consumers as possible.

Our small country in the bottom of the South Pacific Ocean has faced many challenges before and will face many challenges again. We are well equipped to lead and respond to these challenges and secure the opportunities for our sector for the next generation. ■

New Zealand's Trade Agenda 2030*

Figure 1: Tariff rates on selected products faced by New Zealand exporters in target FTA markets: India and the EU

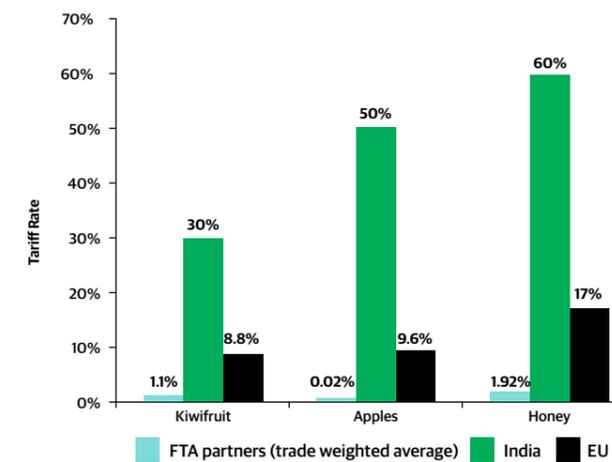
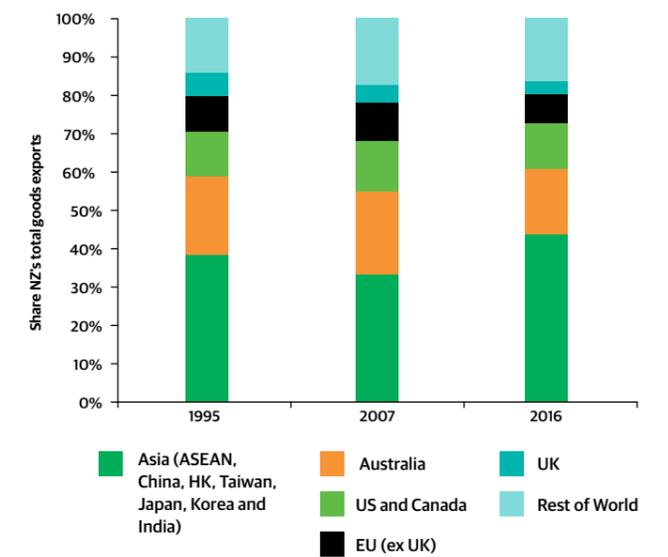


Figure 2: Export destinations for New Zealand's good exports in 1995, 2007 and 2016 *(Source: Statistics NZ)



While Australia is a relatively more significant market for services than goods (in 2015 comprising 22 percent and 17 percent of the respective totals), the profile is broadly similar when exports of goods and services are combined.

(*) See Source Code on page 42

CLOVER – THE FUEL TO IGNITE YOUR FARM ENGINE

By Jane Mayo, Ravensdown Senior Agri Manager

Lifting average pasture quality from 10MJ ME/kg DM to 10.5MJ with increased clover content can lift lamb live-weight gain from 100g LWT/day to 150g LWT/day for a 30kg lamb*** (see figure 1).

In sheep, beef and deer systems a small to medium-leafed white clover is recommended. In dairy systems a medium to large clover. Cropmark offer some great varieties including Demand and Mantra clover.

Annual clovers

A hot topic right now is the use of annual clovers, being utilised as a spring crop to maximise ewe milk production and growth rates of lambs in summer dry areas.

Growth rates in excess of 350g/day have been recorded on mixed swards containing annual and subterranean clovers****.

The beauty of subterranean clover is that it drags quality feed forward in spring, as the plant kicks into gear at lower temperatures than perennial clovers. They are a hardy species, germinating in autumn, setting seed in spring, with seeds capable of surviving a dry summer, and naturally increasing the clover population the following year.

Higher sowing rates for annual clover compared to perennial clover are recommended, due to the large seed. Rates will depend on whether it is a pure or mixed sward.

Some useful tips on growing a successful subterranean clover sward are:

- Allow seedlings to establish properly in autumn and develop a good root system - avoid temptation to graze too early
- Keep grass species covers low in winter to allow clover to dominate early spring
- De-stock at flowering to allow clover to set seed and proliferate the following year****.

Whether it's a clover crop, or adding to existing pastures, clover can be the fuel to ignite your farm engine. ■



JANE MAYO, RAVENSDOWN SENIOR AGRI MANAGER

Typical hill country rates of nitrogen fixation by legumes sit between 80-100kg N/ha/yr, with more intensive meat or dairy systems upward of 250kg N/ha/yr*. Soil fertility status has a major bearing on this difference.

Things to consider

- Climate stresses on clover such as summer dry areas may benefit from a more targeted clover cultivar such as an annual, red or subterranean clover.
- Grazing management will play a part in clover success, so make sure you seek the correct management advice to match your cultivar.
- Herbicide use can take a toll on clover, with many of the broadleaf pasture herbicides being injurious to clover, as well as herbicide residues in soil from cropping rotations.
- When sowing new pastures white and red clover should be sown at 10mm depth, with care taken to prepare a fine, firm, seedbed to provide the best platform for germination**.

- Effective weed control in new pastures will maximise yield; best completed pre-graze to allow more clover-friendly herbicide options when weeds are smaller.
- Take the time to think about what could be limiting clover on your property; do you need some lime, or more potassium in your system?

Clover top-ups

If you think you need a top-up of clover in your established pastures, a convenient way to do this is to apply white, or, red clover with your fertiliser mix - 2-3kg/ha is typically recommended, but any addition of clover can make an appreciable difference to the quality of the sward. Seed is best added in autumn for summer dry areas, or spring sown for summer safe areas.

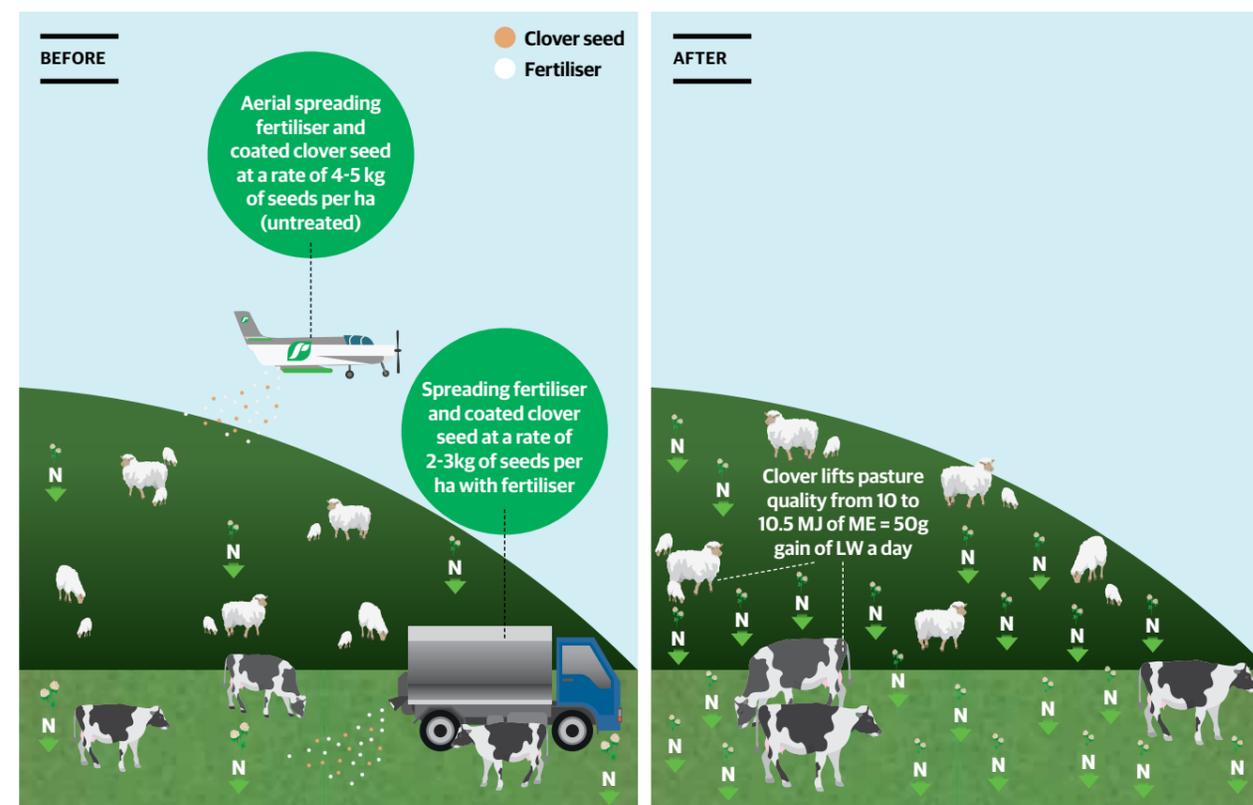
For hill country over-sowing of new pastures, a rate of 4-5kg/ha of clover (untreated) in a fertiliser mix is recommended. Remember to adjust the rates depending on seed treatment, as some of these can double the weight, therefore reducing seeds applied per hectare.

Everyone loves something for free, and that's just what clover provides; free nitrogen. It's a high-nutritive value feed that can aid in maximising animal production. So how can we maximise this?

Get the platform right

The biological soil fertility optimum targets for New Zealand soils are set at optimal conditions for clover with a pH of 5.8-6.0. The root system of clover is less robust than its grass counterparts, so better soil fertility helps it compete for nutrients.

Figure 1. Returning N to soil via clover



(* , ** , *** , ****) see Source Code on page 42

TE MANA O TE WAI - A CULTURAL APPROACH TO HEALTHY WATERWAYS



TINA POROU, POIPOIA FOUNDER

"The first right of water quality and quantity goes to water and its natural ecosystems - the insects and fish."

describe our rights and responsibilities when it comes to freshwater.

Te Mana o te Wai is, at its heart, a hierarchy of responsibilities to water. The first right of water quality and quantity goes to water and its natural ecosystems - the insects and fish. Once these levels have been enforced, the second part is to share the rest of the water with users who understand the concept of Te Mana o te Wai, the importance of first rights to water. The last part of Te Mana o te Wai is to fix the waters we have broken and to conserve the gains we have made.

It is a simple view that Maori have lived by for over 1000 years. We see this framework as an opportunity to guide water users such as Ravensdown advisors and shareholders, water policy makers and our decisions as a community. The devil will be in the detail; however, these are universal principles we believe we all share. Tangata whenua are looking forward to sharing in the solutions to our water challenges. I as a Ngati Porou, Ngati Tuwharetoa kaitiaki know that only by sharing common values together with the private sector will we all achieve our common goals for water. ■

Water in all its forms is considered a taonga (treasured entity) to tangata whenua. It has an important place in our whakapapa (our genealogy). It is a core part of our language base, it is used as a conduit to our spiritual ancestors and it is the giver and sustainer of life. It is summed up best in the Whanganui whakatauki, "Ko au te awa, ko te awa ko au - I am the river and the river is me".

Many tangata whenua have seen the ongoing degradation of the waterways in New Zealand as a personal attack on our fundamental rights and interests as the indigenous peoples of this land who hold the responsibility as kaitiaki, to protect, connect with and sustainably use our waters.

With the nation's growing focus on water, the Iwi Chairs Forum saw the need to clearly articulate our aspirations around our waters, which led to the confirmation of 'Te Mana o te Wai' as a way to

Te Mana o te Wai: is all encompassing



Protection

Te Mana o te Wai ensures that the first right to the water goes to the water.



Enabling

The Wai is also nurturing and provides us with a koha to enable sustainable use.



Sustains

Te Mana o te Wai is the framework to rehabilitate and maintain gains in our waterways.



USING BIG DATA

By Phil Barlow, Ravensdown Product Manager HawkEye

"Big data" is a common term bandied around when the conversation of farming for the future turns to technology.

It is true that a number of the ideas, improvements and significant changes we can introduce to the farm system through technology are reliant on data. This idea of being able to achieve insight and action means something needs to go into the system first. That is, of course, data.

But when it comes to the data we need, the reality is something quite different to what we may have been led to believe. Big isn't necessarily better.

Actionable data

Rather than big data - what we need to shift our focus to is actionable data, and actionable data is something quite different. Actionable data starts with asking the right questions.

The whole point of data is to draw conclusions. Sure it's nice to have a record of activity, and indeed the requirements

for record keeping continue to grow with regulatory compliance. But the real value, the insight-to-action part, the stuff of accurate and actionable data - is data you can actually do something with.

That's where Agrigate and HawkEye's collaboration comes in. It is about creating an environment through HawkEye where the right data can be collected, where it is able to help you take action on-farm, based on what you want to achieve, and then collaborate with Agrigate to 'ask the right questions' to gain valuable insights.

So why don't we just use systems that enable us to collect data? Because these systems don't collect the right data in the right way, which is Collection - Insight - Action.

"The real value is the insight-to-action"

What is Agrigate?

Agrigate, from Fonterra and LIC, is a digital tool that brings farm information together in one place, allowing farmers to make faster decisions more easily. Combining datasets means new insights are able to be created.

What is HawkEye®?

HawkEye® from Ravensdown has a software application for the recording of farm data spatially that is then turned into decision support tools, and end-to-end spreading solutions. HawkEye® is currently collaborating on research projects such as remote sensing, on-farm robotics and sensors. ■

HEALTHY RIVERS WAIKATO

By Adrian Brocksopp, Ravensdown Principal Environmental Consultant



ADRIAN BROCKSOOPP, RAVENSDOWN PRINCIPAL ENVIRONMENTAL CONSULTANT

The next 10 years for Waikato farmers will require a step-change in how they farm.

The changes to the Waikato Regional Council's regional plan is the first step towards meeting the Healthy Rivers Vision and Strategy for the Waikato River over the next 80 years.

Even in the current hearings phase of the process, farmers still need to be preparing for the changes that the notified plan will bring.

How it impacts you

For most farmers, there will be a requirement to complete and implement a Farm Environment Plan (FEP) and submit a nitrogen reference point (NRP) for your property or enterprise. It is less than 18 months before registrations are required for all properties over 2ha and all NRPs for impacted landowners over 20ha, (plus commercial vegetable operations) need to be submitted to the regional council.

This affects more than 5000 properties (required to register) with 5000 properties requiring nutrient budgets for both the 2014/15 and 2015/16 seasons.

Put your best foot forward

What you should be doing right now, if not already:

1. Check your property on the Waikato Regional Council's website to confirm your obligations
2. Initiate the completion of your 2014/15 and 2015/16 NRP with a CNMA qualified advisor as soon as possible
3. Keep good management records that will make NRP calculations easier and more accurate ■

What's a nitrogen reference point?

'Nitrogen Reference Point' (NRP) refers to information on a property's nitrogen leaching losses, calculated using OVERSEER® or another approved model. Under the proposed plan change, people undertaking farming activities on all properties over 20ha, and all commercial vegetable operations, must calculate an NRP.

Nutrient budgets explained

Nutrient budgets can be produced for many different purposes. The nutrient budget required for regional council regulations will differ from the 'predictive' nutrient budget that your fertiliser representative may produce, or the 'year-end' nutrient report required by your milk company, where the level of accuracy varies according to its purpose.

It is important to ensure you're using a nutrient budget that meets Waikato Regional Council's regulations for your NRP calculation for the 2014/15 and 2015/16 seasons, which is the reference period for the plan.

Waikato Regional Council nutrient budget requirements for compliance are

- Complete nutrient budget in the latest version of Overseer
- Data supplied is verified
- Nutrient budgets are done by a CNMA qualified adviser using the Best Practice Data Input Standards
- NRP data must be provided to Council within the registration period

Note: Ravensdown's internal database and technologies ensure that the data used for the nutrient budgets is accurate and verifiable.

HOW QUALIFIED IS YOUR ENVIRONMENTAL CONSULTANT?

By Nicole Wheadon, Ravensdown Farm Environmental Consultant



NICOLE WHEADON, RAVENSDOWN FARM ENVIRONMENTAL CONSULTANT

The next steps are as follows:

1. Intermediate Sustainable Nutrient Management course (ISNM)

To enter the ISNM course, participants must have completed a tertiary-level qualification in a relevant scientific field, or have significant equivalent experience. An existing understanding of farm systems and nutrient cycling is required, including experience with Overseer. The course involves an expected time commitment of up to 40 hours including independent learning, an assignment, contact course and examination.

2. Advanced Sustainable Nutrient Management course (ASNM)

To enter the ASNM course, completion of the ISNM is required, or direct entry into the course if significant existing expertise in the area can be demonstrated through qualifications and/or experience. The course is expected to advance nutrient cycling and management knowledge in a range of farm systems and participants are also expected to be confident with Overseer. The course involves up to 170 hours, comprising four assignments, a contact course, presentation, independent learning and a two-hour examination.

3. Nutrient Management Adviser Certification Programme (NMACP)

This is the most recognised formal qualification for an environmental consultant. It was developed for the accreditation of advisors responsible for safe

and effective nutrient management and to define the standard for people to meet to provide this advice.

The last step to certification

As well as passing the sustainable nutrient management courses, to become certified an adviser must supply evidence of other relevant qualifications and existing training in an extensive list of topics. The evidence of capability also includes verification from farmers and a peer review of previous work. If sufficient, a further set of assessments is required before becoming certified.

Once certified, the names of advisers are listed on the Nutrient Management Adviser Certification Programme (NMACP) website. In order to keep the certification current, a minimum of 15 hours of professional development must be completed annually to ensure up to date learning. This can include compulsory training, farm field days, workshops, etc.

Without the NMACP, New Zealand would not be able to build and uphold a transparent set of industry standards for nutrient management advisers to meet and provide farmers with nationally consistent advice of the highest standard. ■

Working in the farm environmental sector is a challenging field, particularly as the advice given may have significant implications on a future farming system. With that in mind, it is essential that as environmental consultants we are highly trained and competent. It takes about two years to get certified. Here is what is involved.

What are the different levels of certification?

The Fertiliser & Lime Research Centre at Massey University has developed two courses in conjunction with the Fertiliser Association of New Zealand (FANZ), which are required as the first steps towards certification. The courses have proved popular as a wide range of professionals aim to improve their skills in the assessment of nutrient requirements over a range of farm systems and learn the mitigations required going forward with increasing demands on the environment.





MICHAEL WOODWARD, SHAREHOLDER AND NZDIA SHARE FARMER OF THE YEAR 2016 GETTING HIS 'FAB' ON TO HELP US PROMOTE OUR NZDIA RAVENSDOWN RELIEF MILKING FUND.

In case you would like to learn more, we have collated this list of sources cited in our articles. Most of these are available online. If you'd like more information, or you'd like to discuss an article written in Ground Effect by any Ravensdown specialist, give the Customer Centre a call on 0800 100 123 to arrange a chat.

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The Last Word

We hope you enjoyed the sixth edition of Ravensdown's Ground Effect. Let us know what you think by filling out our quick survey at this link <https://www.surveymonkey.com/r/GroundEffect> If you'd like to contribute to the next edition please contact us on the details below.

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On behalf of Ravensdown, we'd like to thank you for your valuable contribution to our primary industries. We continue to invest in developing our agri-science, technology and innovations to capture insights for the good of your business and the country. Keep up the good work of smarter farming for a better New Zealand.

Contributors

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Penny Clark-Hall
Editor

Ground Effect

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