

CONNECT

Updating shareholders about their co-operative



Smarter farming at the heart of why we're here

The here and now

As the end of an eventful year approaches, your co-operative is in a strong position to assist you in 2018.

Spring has been wet overall but orders and activity have been solid. This can mean that the spreading team is put under a bit of pressure as farmers catch up on their nutrient needs. Thanks for your business and patience as any backlog is worked through.

We're seeing a lot of interest in our coated urea product N-Protect which keeps more nitrogen available to the plant - especially important in hotter weather and where rain is hard to count on.

There's plenty of activity on the investment front: from the new store in New Plymouth opening in February, asbestos removal in Nelson, a store upgrade in Seadown and countless smaller projects.

As usual, autumn will be a crucial season for us. But for now, the company is well positioned thanks to shareholder support, a hardworking team and a proven strategy.

The why and how

Speaking of strategy, we have a clear idea of why Ravensdown exists - to enable smarter farming for a better New Zealand. How do we try and achieve that? By providing products expertise and technology to help farmers reduce environmental impact and optimise value from the land.

There are important, tough questions confronting all of us. How do we feed more people with less land? How do we provide proof to back up our food's excellent "back story"? How do we manage the trade-off between environmental impacts and economic prosperity?

The answer to all these questions is smarter farming. Smarter farming is about acknowledging there are always improvements to be made and anticipating how food for humans and animals is going to be transformed.

Value to count on

Three trends driving smarter farming:

1. More (older) people

New Zealand has the potential to feed 40 million. So the question is, which 1% of the world's population are we going to feed and how?

The growing ranks of the over 65s will demand smaller pack sizes (more older people living alone) and added benefits,



Finishing touches for the blending and despatch area at new New Plymouth store

like lamb with extra Omega 3 for healthy joints.

2. More people in cities

More people living in cities means less space for storing food, cooking, inviting others over and perhaps more eating out. A lettuce from a vertical city garden or a 3D printed lunch at your desk or in your self-driving car may provide the nutrients you need in a day, but perhaps it's New Zealand cheese on the pizza in the restaurant, milk in the latte or fruit in the hotel for the special moments.

3. More alternatives to animal products

As a small country a long way from so many ageing mouths, NZ will never be able to be the cheapest provider of commodity animal protein and fat. Insect flour is already popular in Asia, factory farmed animals, plant-based 'meat', lab-grown meat and synthetic food will pump out the basic protein that a growing population needs.

How does New Zealand battle against that? The answer is we don't. We work with it, and help New Zealand tell its authentic pasture-based, real food story. Our primary industry could possibly end up creating less, but able to charge more through value add.

But to command a premium, you need the proof. And that's where technology can help: maps that show exactly how much fertiliser was placed where, robots that measure grass growth, laboratories that diagnose soil needs, algorithms that predict how much feed a farm will grow, special aerial cameras that can assess soil nutrients remotely and software that maps areas that are at

risk of phosphate run-off and models potential for nitrate leaching.

Ravensdown is working on these tools today and helping farmers reduce their environmental impact. There's still much more to do as smarter farming allows us all to adapt to looming disruption.



Greg Campbell, Chief Executive

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Drive for greater nutrient efficiency will pay environmental dividends

N-Protect as the smart choice

Ravensdown is seeing a switch away from uncoated urea to its stabilised nitrogen fertiliser product N-Protect as farmers take advantage of the three key benefits:

Growth: potential increased N for the plant.

Certainty: no need to count on rain.

Less emissions: ultimately lower nitrous oxide (greenhouse gas) emission.

The smart technology of the Urease Inhibitor coating applied to each urea granule means N-Protect reduces nitrogen lost to the atmosphere as ammonia. "Some of this ammonia is redeposited on the soil where a small amount can be lost as nitrous oxide emissions. Although small, nitrous oxide is 310 times more potent than carbon dioxide as a greenhouse gas (GHG), and so farmers using N-Protect are also helping reduce New Zealand's GHG emissions," said Mike Manning, General Manager Innovation and Strategy.

"The great thing about this environmental gain is that on average it doesn't cost farmers any extra. This is because more nitrogen remains available to the plant than would be the case if uncoated urea was used." Losses of ammonia to the atmosphere from using uncoated urea amount to an average 18% in spring, summer and autumn. "This may be worse in hot conditions with unpredictable rainfall," adds Mike.

The higher per-tonne price compared with uncoated urea is cancelled out by the greater availability of nitrogen that remains available to the plant when using N-Protect. "If the product "washes its face" when it comes to cost-benefit over



the three seasons, the question is 'why wouldn't you use N-Protect when there is an important ultimate benefit like reducing nitrous oxide?'"

The Nutrient Efficiency toolbox

Greater nutrient efficiency at the soil-to-plant level is an important part of smarter farming.

Increasing the availability of the paid-for nutrient to the plant whilst minimising potential losses to air, soil and water makes financial and environmental sense.

With greater efficiency and depending on each farm's circumstances, the farm operator then has three choices:

- 1. Redeploy the same amount of nutrients where they're needed most and will cause less environmental impact.**
- 2. Reduce the total amount of nutrients applied in the appropriate locations.**
- 3. Raise the total amount of nutrients applied more accurately if soil fertility, farm conditions and environmental parameters allow.**

These choices become even more important when farming under regulatory-applied limits or caps.

"While we pay attention to sales, as a farmer-owned co-operative, it is not our policy to sell farmers more fertiliser than they need," explains Mike Manning. "Ravensdown is focused on the science and solutions that will improve nutrient efficiency both now and into the future."

Ravensdown product or service	Potential outcome
Next generation fertilisers such as N-Protect	Improve nutrient availability to plant and reduce N losses
Whole-farm soil testing and variable rate ground / aerial spreading	Develop fertility strategies to optimise productivity and reduce the risk of potential over / under-application
Aerial soil diagnostics and exclusion mapping	Develop fertility strategies to optimise productivity and avoid non-productive, culturally sensitive or environmentally vulnerable areas
Fertmark-certified products, proof of placement maps and measurement tools	Quality assurance plus better nutrient decisions from economic and environmental perspective
Exclusive software that maps areas at risk of phosphate loss (from 2018)	Reduce potential risk of phosphate run-off
Certified nutrient management advisors and specialist environmental consultants	Confidence in latest science and holistic view to achieve farm goals

HawkEye is a clearer way to see nutrient decisions

Collaboration in action

LIC and Fonterra's benchmarking tool called Agrigate is placing important benchmarking information for farmers all in one place.

Since signing an agreement to co-operate with Agrigate, Ravensdown's technical team is working on supplying a window into nutrient performance to display alongside weather updates, financial news and milk solids volumes.

"One of the key advantages of the new HawkEye platform compared to the former Smart Maps tool is the ability to collaborate with others and readily give tools like Agrigate a way to 'see into' the farm data held on the HawkEye system," said HawkEye Product Manager Phil Barlow.

According to Phil, the vision is that each farm's planned-versus-purchased



nutrient status will display on the Agrigate dashboard. Eventually a feed wedge will display alongside other benchmarking information.

Phil added "we're not trying to become an IT company or try and build a rival portal which houses all farm information. Our niche is in nutrient management and,

because of how HawkEye is built, it can be part of a 'system of systems'."

If they haven't already been migrated to HawkEye from Smart Maps, shareholders will be hearing about their own transition throughout 2018.

Three new features for HawkEye

Planned vs Applied Map Contrast

Agronomy plans are a valuable tool. If a Ravensdown-owned or joint venture spreading operation is used or you self-spread with details uploaded to HawkEye, you can compare maps of the actual spreading and that outlined in the agronomy plan across the whole farm or a selected block.



HawkEye Product Manager, Phil Barlow

Now on one screen, you can see the proposed applications for the coming farming year contrasted with how the spreading is actually going and where each product has been applied. This is useful to demonstrate environmental compliance and track what's gone where.

Feed Analysis

Knowing where your best growth is helps guide stock movements to make the best of what you have. When pasture measurement is recorded consistently you will have a very clear picture of where your performing paddocks are and how your stock rotation might look. A strategic feed budget will help with estimating if or when you may need to supplement crop feed for your stock over the year.

You will be able to view current and past feed wedges. For a future view, the predictive feed wedge using the Farmax pasture growth forecaster will predict up to a fortnight out from the last date of measurement. If records are regularly captured, growth rates will also be available to view.

In the future, you will be able to benchmark paddock and annualised comparisons within your own farm as well as the rest of the region or country. We will also eventually be converting the feed wedge graph into a map so you can see your paddock growth performance visually. This will be a first for farmers.

Sharing Access

In HawkEye, there is only ever one view of everything that happens on the farm but different permission levels ensure only the right level of users can create, edit or view information.

The current permission levels are set by role and include: Owner, Manager and Worker. Future releases will enable flexibility in how the permissions can be set up. If you are a corporate farm, you may want to share data access with the person running your farm with Owner or Manager level as they will likely want full access to what HawkEye can do. For example, a Worker role cannot edit farm boundaries by default, but can view Activities and other data within HawkEye.

Dedicated team helps with smoother projects across company

Since it was set up in 2016, the Project Support Office (PSO) has overseen \$44 million worth of investment in infrastructure projects that have improved efficiency, safety or service to customers.

The reason

As work is completed on Ravensdown's largest-ever project and the new New Plymouth store prepares for a February opening, David Blatchford National Engineering Manager, reflects on all the projects being overseen by a group of four Ravensdown specialists.

At \$30 million and 120m long, the scale of the New Plymouth project means the smallest thing can blow out the costs and timeline. If the type of wall sealant changes or number of light bulbs is adjusted, this can lead to a six-figure variance in the whole budget according to David Blatchford who leads Ravensdown's Project Support Office.

"This was why we set up a Project Support Office in the first place – to scope, select and implement projects so they were on time, on spec and on budget," said David. "We also knew that we could apply the learning across each project so we got better each time."

The value

Ravensdown's assets and physical infrastructure like its loaders, trucks, aircraft, stores, blending plants, manufacturing facilities or laboratories are worth hundreds of millions of dollars.



National Engineering Manager, David Blatchford, leads the Project Support Office.

To keep performing safely and reliably, this network of assets needs to be renewed. Improving service levels is also a key aspect of the company's strategy. For good governance, every improvement project over \$500,000 has to be approved by the Board. For these projects, the PSO supervises all stages from start to finish.

"Actually much of the work the PSO does is before the start. There's a 150-page process to go through and half of these are to be sorted before there's even a peg in the ground!" said David.

Kevin Gettins, General Manager Operations, believes that "consistently doing that thinking upfront is probably the biggest change compared to before the PSO started. Getting smarter on some of the contracts has also added up to savings of millions of dollars."

The partner

The PSO is supported by project management specialists BECA which is an employee-owned company with 3,000 staff; many of them engineers. "This gives us the horsepower we need at certain times for certain projects," said David Blatchford. "The partnership also brings a fair degree of negotiating clout when dealing with other contractors and good project management discipline because this is their bread and butter."

It's all about reducing risk and so far it's been working well according to David. "The projects we've partnered on have gone according to plan which is important because multi-million dollar projects have the potential to go very wrong indeed. We're investing shareholders' funds in projects that ultimately improve the service provided by their co-operative and the PSO is one example of how we take that responsibility very seriously."

Among the PSO successes are a new furnace in Napier, new high voltage switching in Napier and Christchurch and an upgrade to the new Seadown store. "Along the way we've saved millions of dollars just in having centralised contract negotiations," says Dave.

Napier make the switch

When you're handling enough electricity to power a small town, you can't just change a fuse when the circuit needs replacing. The 11.6kV high voltage switchgear at the Napier manufacturing plant hadn't been replaced since 1974 which impacted safety and reliability. "Scheduling the changes so they didn't impact on despatch or manufacturing was just

The old switchgear in Christchurch has now been replaced with this new machinery.

one part of a massive undertaking," said Andrew Torrens, Works Manager. "The PSO framework made this challenge more manageable and the

Christchurch plant benefitted from our experience when they upgraded." Dunedin is next to upgrade their switchgear in the winter of 2018.



Quality at the heart of what we do

Robot arm speeds through testing

The team at Analytical Research Laboratories welcomed its newest two team members, but they won't be joining the social club any time soon.

The pair are new robots nicknamed R2 and D2 that are testing customers' soil samples for pH and a component of cation exchange capacity (CEC).

ARL's manager Will Bodeker believes the robots will deliver more accurate results captured more quickly and efficiently.

"With no more manual entry, the digital process is better for traceability and trend analysis. They back each other up in case there's a fault with one. Using a local automation engineer also means we are ready for contingencies."

The automated arms place a digital probe into pottles of 120 samples on each tray. The pH results are important as they underpin recommendations about aglime. The CEC indicates how good or bad the soil is at holding on to phosphate ions which helps determine superphosphate application rates.

Dunedin loader

Rob Hunter from Dunedin Despatch was excited to take possession of the latest mobile plant acquisition - a new Volvo 180H which arrived on site in September.

This loader complements the Volvo 150G also used in Despatch. This is the third new loader Rob has had the pleasure of enjoying in the 25 years he has been with the company. Manoeuvred by a Comfort Drive Controller (CDC) and with a larger loader, this mobile plant will ensure more efficient loading times, reduced repair bills and less fuel burn compared to the old



Liebherr model. Pictured with the new loader, from left, Rob Hunter and Dunedin Works Manager, Tony Gray.

Animal health product registration

All Ravensdown animal health products with claims for animal treatment are registered for use in New Zealand under the Agricultural Compounds and Veterinary Medicines (ACVM) Act 1997.

These have also been approved by the Environmental Protection Agency under the HSNO Act 1996 for import, manufacture and use in New Zealand. The effectiveness and safety of all these animal health products have been tested which acts as a quality assurance for buyers who are seeking the right combination of value and performance.

Glen Bradbury, Manager ACVM Programmes and Appraisals ACVM Group Ministry for Primary Industries, confirms that "all products registered for use in New Zealand have undergone a thorough risk assessment under the ACVM Act." Each application for approval must provide information on the efficacy (effectiveness), chemistry and manufacturing processes and be compliant with Good Manufacturing Practice standards. Information establishing target animal safety and residue/trade risk profiles is also required. Each application is assessed in relation to the risks presented balanced

against the benefits of registration.

Animal Health Product Manager and veterinarian Dr Julie Wagner believes any scare tactics about the use of generic active ingredients should be taken with a pinch of salt. "The fact is ACVM would not register a product if it did not have confidence in its quality and effectiveness. Users of the product should share that confidence." The information requirements, risk assessment processes, and other information about what the ACVM does is all readily available on its website. Members of the public can contact them with questions about that process and what it entails by contacting the Approvals team if they want to find out more.



Ravensdown dips and drenches offer ACVM-certified performance at a competitive price point.

Environmental mitigations the focus as shareholders seek support

Consultancy keeps growing
Ravensdown's environmental consultancy is the fastest growing part of the co-operative as customers turn to the team for help with mitigations, compliance issues and scenario planning.

According to Mark Fitzpatrick who is the business manager, the appeal is the integrated nature of the service, the knowledge of the specialists and the access they have to the co-operative's technology and farm data.

"There's a growing realisation that farm environment planning is here to stay," says Mark. "Many farmers are charging ahead and embrace the new reality with open arms. Others are grappling with the implications of emerging regulations. In either case, our environmental consultants are able to assist."

"For every complex environmental management issue, there's an answer that's quick, simple and wrong. The truth is that there are few, if any, shortcuts. Investing in getting it right is worthwhile because failing to put the right measures in place now could have long-term consequences for your farm."

A poor piece of technical work linked to a resource consent can result in legally binding conditions with the council that



"Farm environment planning is here to stay" reckons Mark Fitzpatrick, Ravensdown's Business Manager Environmental.



Turi Macfarlane started in Ravensdown's environmental consultancy service in November and also became one of the five 2018 Nuffield Scholarship winners.

put your farm's value at risk according to Mark.

"The ultimate test of any consultant's confidence in their data, analysis and recommendations is to consider the worst case scenario of an Environment Court hearing. If a consultant wouldn't defend their work in a legal setting, then their advice was a very false economy."

All Ravensdown Farm Environment Plans are produced by well qualified staff and involve face-to-face contact with farmers. All work is peer-reviewed as part of a robust process which means Ravensdown is prepared to defend its work as and when legal requirements demand.

Staying abreast of the latest rule change, version of modelling software, scientific breakthroughs and examples of good practice are the bread and butter of the team's job. The added value is in the knowledge of how these will all impact a particular farm and the ability to play out scenarios for the best outcome.

Ravensdown Environmental consultants use soil test data and documents such as application records, proof of placement maps and past nutrient budgets that can already exist on the co-operative's systems.

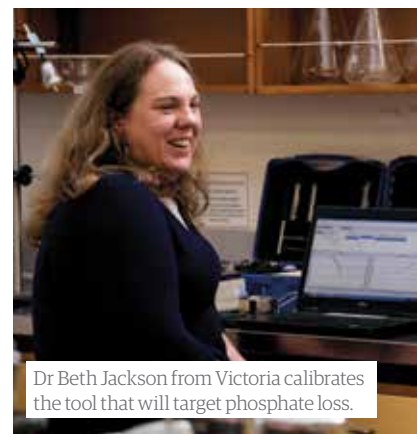
P-loss tool a boon
Ravensdown has worked with Victoria University to develop a tool that will help customers better manage areas of potential nutrient loss into waterways.

Victoria's Dr Bethanna Jackson worked with Ravensdown on the Land Utilisation and Capability Indicator (LUCI). In 2018, it is planned that the co-operative's environmental consultants will be using the exclusive decision support tool for on-farm expert advice.

"Managing phosphate losses on farms is obviously a hot topic," says Dr Jackson. "Central government, iwi, regional councils and the entire agri-sector are all grappling with this challenge and working to find effective solutions."

"It's not just about reducing the volume of fertiliser or the number of animals—there are also options to intercept nutrients before they get into waterways. Ravensdown's use of the LUCI tool means farmers can target certain areas for mitigations, and then map the effectiveness of those mitigations in reducing farm nutrient losses and improving freshwater quality."

While Overseer models how much P is anticipated to be lost, LUCI shows where the at-risk areas are and models the biggest gains or mitigations to be made. Above the farm level, catchment-level views can also be used by groups that are collaborating on improving water quality.



Dr Beth Jackson from Victoria calibrates the tool that will target phosphate loss.

In brief: Items from around the traps

1 Relief milking fund returns

The scheme that helped dairy farmers to take time out to celebrate success at the New Zealand Dairy Industry Awards is back. Ravensdown gives regional winners \$1000 towards relief milkers to ensure the milk keeps flowing when the farmers head to the national award dinners.



4 Nelson store asbestos

The Nelson store has completed phase 1 of its asbestos replacement programme. The intake, urea store and DAP store are finished - the first two very visible from the main road travelling east into Richmond.



7 Brushweeds begone

Bad news for brushweeds. Ravensdown is offering a bonus 20L of Eliminate Brushkiller for every 200L ordered and a bonus 1kg of Eradicate for every 10kg ordered.



2 Dr Roberts recognised

Chief Scientific Officer, Ants Roberts was awarded the Ray Brougham Trophy for his outstanding contribution to the pastoral farming industry at the 2017 Grasslands Conference. Here he is on a November fact-finding trip to Chile.



5 Team pools efforts

The Dunedin team painted the pool at Ravensbourne school as part of the co-operative's Lend-a-Hand day. As part of the scheme to celebrate Ravensdown's 40th anniversary, all staff were given a day to volunteer at a cause that was important to them.



8 Positive Vibe

Cropmark Seeds NZ Sales Manager Callum Davidson in a trial plot of Vibe Italian ryegrass, which the company will be commercialising in 2018. Orders of the high-yield high-persistence variety will be available through the agri managers or Customer Centre.



3 Bags recycled into plastic

The single use bags that were introduced for safety reasons have been collected from across the country ready for recycling in Christchurch. Peter Hay (left), Christchurch Works Manager inspected the specialist plant which shreds and melts the bags and turns the raw material into plastic used for twine and piping.



6 Precision conference

Mike White Technical Development Manager explains the latest in soil scanning from the skies and the new IntelliSpread precision aerial application service to an international audience at a Limestone Downs farm. The event was part of the Precision Ag Association of New Zealand conference.



9 Screen test

After a successful trial of a loader-mounted rotating screen at Napier port, Nelson store is the next to place to try a screen for urea and all other high analysis products. It's proven to be a fast way to filter out any lumps or obstructions - ultimately improving quality.



Ravensdown-sponsored causes support smarter farming

New partnership builds capability

Ravensdown has joined forces with the Agri-Women's Development Trust (AWDT) to promote change across the primary sector.

Lindy Nelson, Executive Director of the AWDT, says "The key benefit for us in working with such a progressive company as Ravensdown is that we share the same aspirations and values.

Our purpose is to equip women with the skills and confidence to establish change in the primary sector, on the global stage. Our focus is on the planet, profit, people and progress. We see Ravensdown as a vital partner in this."

Tracey Paterson, Ravensdown's General Manager of Organisational Development added "Effective leadership is about diversity in decision-making and an important part of that is empowering women in the sector and improving their professional skills."

One of AWDT's flagship programmes is a leadership and governance programme called Escalator. Each year 14 women are selected for the programme which begins in February and ends in November.

Lindy adds that the Trust's vision is to remove the need for AWDT. "In 30 years' time, we may not need to exist if we can achieve 100 percent capability



Senior Agri Manager Julie Roberts is on the Escalator programme 2018

and empowerment in the sector. This is only possible with our strategic partners at our side – empowering kiwi women to lead on the world stage in making meaningful change to economic, social and environmental progress."

For details of the programmes available from the Agri Women's Development Trust, visit their website awdt.org.nz



Class of 2017! Graduates of AWDT's prestigious Escalator programme

Upcoming conferences

This year's Ravensdown-sponsored conference at the Fertiliser Lime and Research Centre's is focusing on the science, policy and practice of farm environmental planning. Practical mitigations, smart technologies and soil conservation are all on the agenda.

Mike Manning, General Manager Innovation and Strategy explains "The ways in which farmers can reduce their environmental impact are increasing every week. But we believe change should be led by the science and conferences like this February event, with their peer-reviewed papers represent the scientific process in action."

Young Farmer Contest hits 50

District Finals are in full swing in the 50th contest season of the FMG Young Farmer of the Year. Ravensdown is a sponsor of the AgriSkills Challenge and, as part of the support, supplies prize packages and expertise to help set and judge tasks. Regional finals begin in February with the national finals being held in Invercargill.

Gordon McCormick Training Manager says "Achievement and improvement at an individual level is what smarter farming is all about. In addition to the big picture reason to support the contest, we have 'skin in the game' because we recruit more than our fair share of young, talented professionals."

