



agri-nutrients
Ballance

Together,
Creating the Best
Soil and Feed on Earth

Grow

**Environmental policies
special edition**

South Island
Autumn 2021



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Ballance Agri-Nutrients is one of New Zealand's leading fertiliser manufacturers. A 100 percent farmer-owned co-operative, the company has approximately 18,000 shareholders and sells around 1.5 million tonnes of product each year, representing a turnover close to \$900 million. Its products include imported and locally manufactured fertilisers, the majority of which attract a rebate for shareholders.

ballance.co.nz
0800 222 090

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Since its inception in the 1980s, Super Air has evolved into one of New Zealand's leading agricultural aviation companies. In addition to aerial fertiliser application, Super Air has developed a world-class reputation for aircraft engineering and innovation. Wholly owned by Ballance, Super Air services most of the North Island, and from February 2021 is also servicing the South Island.

superair.co.nz
0800 787 372

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SealesWinslow is a recognised leader in the production of high-performance compound feeds and feed additives. A fully owned subsidiary of Ballance, SealesWinslow has manufacturing sites located in Morrinsville, Ashburton and Wanganui, and supplies custom-blended pelletised feed to farmers throughout New Zealand. It also provides molasses feed blocks, feed supplements and additives.

sealeswinslow.co.nz
0800 287 325

Message from the CEO

In the Chinese calendar, 2021 is the year of the Ox. That's a good sign for our primary industry, with the Ox representing balance and strength.

These are the same characteristics that will be needed as we adapt to new environmental policies this year. Most farmers and growers across New Zealand are actively making changes to comply with two major new environmental policies which have come in quick succession, with a third on the horizon.

This special edition of Grow is about supporting farmers and growers adjust to this largely unfamiliar policy landscape.

The Zero Carbon Act, the Essential Freshwater package, and the upcoming National Policy Statement for Indigenous Biodiversity (due for release in April 2021) are a significant shift in environmental regulation.

Ballance's focus on sustainable farming means we support the intent of these policies, but in our submissions, we provided constructive feedback on some of the detail. It is vital that the policies are backed by science, easy to understand, and consistently interpreted for them to be effectively and efficiently implemented.

Ballance understands the challenges farmers and growers face juggling many priorities including food production, maintaining animal welfare and

protecting the environment. We are well-placed, with many options to support our customers to successfully farm and thrive within the parameters of the new regulations.

Over 10 years ago, in anticipation of these policies, we started developing tools, services and products designed to reduce the primary sector's environmental footprint. These include MitAgator and SurePhos, both of which have much to offer in the freshwater space. For more information see pages 20-21.

Our development of science-based innovation to support the sector is ongoing. As part of the Future Ready Farms programme, we look forward to offering an even greater range of products, tools and technologies. This Ballance-led programme, announced in late 2020, features 12 projects that will significantly reduce the primary sector's environmental footprint and benefit multiple sectors, from forestry to livestock production. For more on Future Ready Farms see page 4.

Regulatory change, like any change programme, may initially seem quite daunting, but I remain highly optimistic about the future. In 2020 the primary sector demonstrated yet again its

resilience and importance globally, and New Zealand's reputation as an environmentally friendly producer of food was highlighted.

Working together remains the key. Ballance, as your cooperative, is here to provide any guidance and assistance you might need. Together, creating the best soil and food on earth.



A handwritten signature in black ink, appearing to read 'Mark Wynne', written in a cursive style.

Mark Wynne
Chief Executive Officer
Ballance Agri-Nutrients





*Ballance CEO
Mark Wynne and
Agriculture Minister
Damien O'Connor*

Future ready farming

A major programme led by Ballance will minimise the primary sector's impact on the environment and benefit New Zealand.

Ballance is leading a five year programme to significantly reduce the food and fibre sector's environmental footprint, while boosting economic growth and sustainability.

The \$25.2 million Future Ready Farms programme, announced in December 2020, will develop new solutions to meet national environmental targets for reducing greenhouse gas emissions, agricultural chemical use, and nutrient loss to waterways.

The Ministry for Primary Industries' Sustainable Food & Fibre Futures (SFF Futures) fund has co-invested more than \$10 million into the programme.

Agriculture Minister Damien O'Connor says: "Our farmers and growers are among the most progressive in the world and have been working hard for years to increase productivity while minimising their environmental footprint. This programme will contribute to these efforts across the country to further lower our emissions.

"It aims to trial and develop farm nutrient technologies that offer significant environmental benefits, while being economically viable for our farmers."

Ballance CEO Mark Wynne says Ballance is extremely grateful to the Government for its significant show of support towards the programme.

"We know New Zealand's food and fibres sector takes its responsibility to reduce its environmental impact seriously, and this programme represents our ongoing commitment to partnering with farmers and growers on that journey."

The new programme features 12 projects to develop products, tools, and technologies that will help farmers and growers to continue to build on their sustainable agricultural practices.

The outputs of the Future Ready Farms programme will address multiple sectors within the food and fibres sector including fertiliser manufacture, livestock production, forestry, horticulture, and arable, with projected benefits of \$1.063b to New Zealand farmers by 2030.

One of the 12 projects is a forestry project in partnership with Scion Research.

"The forestry project aims to develop a product concept to support radiata pine growth," says Mr Wynne.

"This product concept has the potential to reduce the environmental impact while meeting the nutritional requirements of the pine. In addition, the product concept has the potential to reduce the requirement for agricultural chemical application."

Mr O'Connor says another project will develop a nitrate inhibitor and technology to use with Spikey, a world-leading technology developed by Pastoral Robotics Limited. Spikey is towed behind a tractor and detects urine patches in the paddock, the main source of the nitrogen losses. The project will enable Spikey to apply the nitrate inhibitor, once developed, which will hold the nitrogen in a more stable form, to reduce nitrate losses into waterways.

Ballance Chairman Duncan Coull says: "Our 12 projects will make a meaningful and positive difference in New Zealand's collective efforts to move towards a lower emissions economy. We're delighted to have the opportunity to lead their delivery over the coming years."

Mr O'Connor says SFF Futures was established to support initiatives that make a positive and lasting difference. "Our key focus is sustainability. Anything we can do to farm smarter, with less impact on the environment will deliver wider benefits to New Zealand."

i FOR MORE INFORMATION

www.sff-futures.mpi.govt.nz

Ministry for Primary Industries
Manatū Ahu Matua





Essential Freshwater

The Essential Freshwater Policy Package contains new rules which will particularly impact high input, intensively grazed livestock systems such as dairy and sheep and beef.



Key rules affecting livestock farmers

Synthetic nitrogen fertiliser cap for grazed areas of pastoral farms

The new rules for synthetic nitrogen (N) fertiliser are a significant change in legislation for livestock farms. This is the first time in New Zealand a cap has been placed on farm inputs such as fertiliser, rather than placing limits on outputs, such as N leaching rates.

The new synthetic N rules will impact approximately 10 per cent of New Zealand's pastoral farms (those applying more than 190 kg N/ha/year).

What

Pastoral farms can only use up to 190 kg N/ha/year of synthetic N on any grazed hectare of pasture (excludes forage crops) AND averaged over the total grazed area (includes forage crops). If this amount is to be exceeded, a resource consent is needed before the rule is in force.

'Synthetic nitrogen (N)' is any manufactured fertiliser product (solid or liquid) containing more than 5 per cent N by weight. The 190 kg cap applies to the amount of N, not the amount of product.

Where

The rules apply to grazed areas of pastoral farms, not to crops or pasture not grazed by livestock. For paddocks used for both pastoral (grazed) and arable crops (ungrazed) in a year, the cap only applies to N applied to the pasture, not to the crop.

When

In force from 1 July 2021, for the 2021/22 season. By 31 July each year, dairy farms must report N use for the previous 12 months ending 30 June.

See page 8 for more.

Intensive winter grazing restrictions

What

Areas used for intensive winter grazing must comply with a Certified Freshwater Farm Plan. If no plan exists, the cropped area must meet the following conditions:

- no greater than 50 ha or 10 per cent of the property (whichever is greater)
- paddock has a mean slope $\leq 10^\circ$
- pugging covers ≤ 50 per cent of the area (>5 cm depth), and is no deeper than 20 cm (excluding around fixed structures)
- all livestock kept ≥ 5 m away from rivers, lakes, wetlands and drains at all times
- replanted as soon as practical, and by

1 October (or 1 November for Otago and Southland) the same year

- the area of winter grazing is no greater than the maximum extent used for winter grazing between 1 July 2014 and 30 June 2019.

A resource consent is required for areas that do not meet these conditions. In Southland, if the scale, scope and intensity of winter grazing do not change from previous years (2014-2019), consent may not be required for the winter of 2021; contact Environment Southland to discuss.

Where

Applies to any annual forage crop grazed by livestock at any time between 1 May and 30 September in any one year.

When

In force from 1 May 2021.

See pages 10 and 12-13 for more.

Annual forage crops exclude pasture, and are grazed on for one winter. Examples include fodder beet, kale and swedes.

Stock exclusion

What

All new fencing must have a 3 m setback from the edge of a lake or river more than 1 m wide.

Where and when

Applies to:

- dairy cattle, pigs, intensive beef and deer on all slopes from 1 July 2023
- beef cattle and deer on low slope land ($\leq 10^\circ$), and dairy support from 1 July 2025
- cattle, deer and pigs excluded from currently mapped wetlands from 1 July 2023, and all other wetlands from 1 July 2025.



For new pastoral systems, the rules apply from 3 September 2020.

A fence already in place on 3 September 2020 with a setback under 3 m can remain in place if it meets the minimum standards and excludes animals from a waterway.

See page 11 for more.

Can't meet the rules?

If the synthetic N fertiliser cap or intensive winter grazing rules cannot be met, a consent from the local regional council is needed.

Any increase in the area used for intensive winter grazing will need a consent, specifically if the area is going to be more than the largest area in hectares of winter forage crop grown between 1 July 2014 and 30 June 2019. This temporary provision is in place until your council's regional plan change gives effect to the new rules, or by 1 January 2025, whichever comes first.

In deciding whether to grant consent, regional councils will consider a number of things including how the intensive winter grazing affects the environment, and the recreational and cultural impacts.

Consent won't be granted if the increased area for intensive winter grazing would increase contaminant

loads in the catchment, or concentrations of contaminants in fresh water or other receiving environments compared to levels at 2 September 2020.

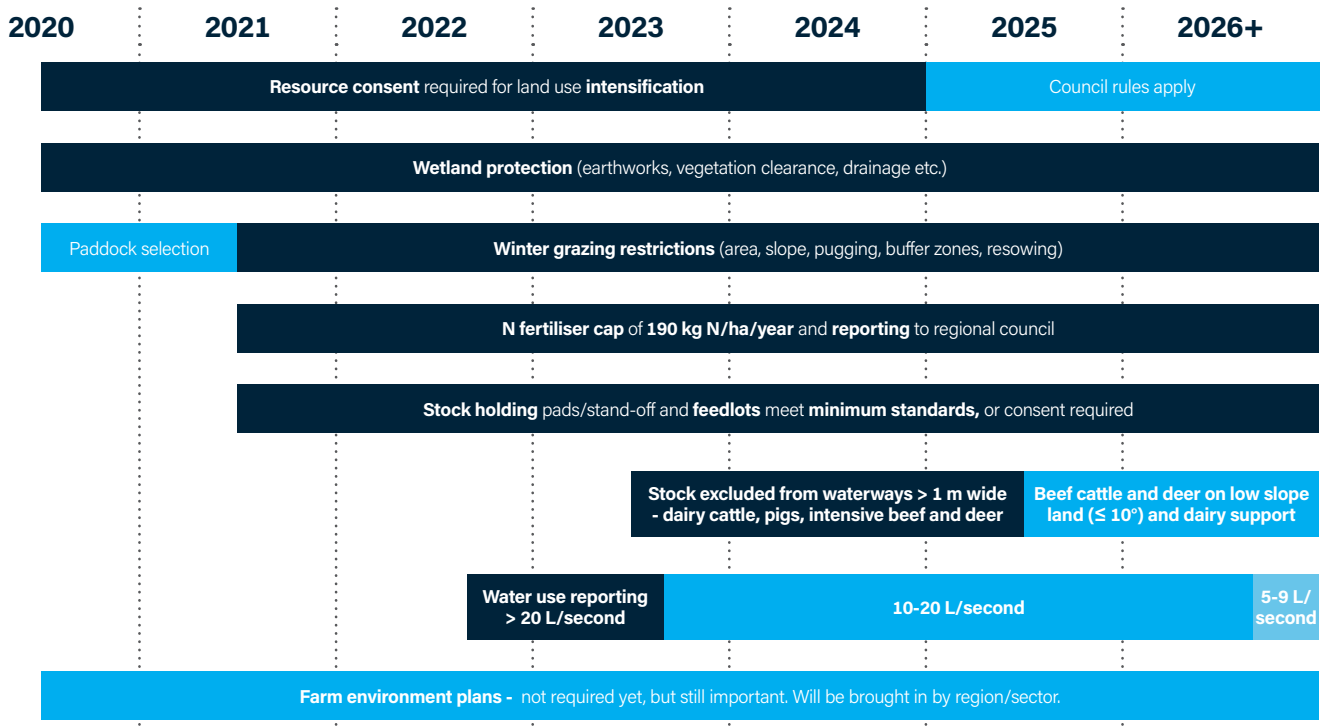
For more information, contact your local regional council.

Ballance's position

Feedback from Ballance and others has helped to shape the Essential Freshwater package. For example:

- the national bottom lines for dissolved inorganic nitrogen and dissolved reactive phosphorus have been put on hold
- the requirement for an average riparian setback of 5 m has been reduced to a 3 m minimum, and existing fences not meeting this requirement do not need to be moved
- the requirements and timeframes for farm environment plans are being developed over the coming year, following concerns over a shortage of qualified rural professionals for preparing and certifying farm environment plans within the specified timeframes.

Essential Freshwater timeline



We can help

Ballance has a range of products and tools to help you adapt to the new rules and remain viable. For more information see pages 20-21.

i FOR MORE INFORMATION

ballance.co.nz/essential-freshwater-policy

This is an interpretation/summary of the rules. To gain a better understanding visit mfe.govt.nz. Always get professional advice before investing any money into remedial actions and/or management changes.



A regional council perspective

“ Environment Southland is working with industry and other regional councils to ensure there is consistent interpretation and implementation of the new regulations. It's a large and complex package of regulations, and it's taken time for us to interpret and understand how it fits with our proposed Southland Water and Land Plan. In addition, in Southland we established an advisory group which was tasked with reviewing and recommending some changes to the intensive winter grazing rules. Our aim was to ensure any changes considered by Ministers would lead to better environmental outcomes and more practical implementation for farmers.”

LUCY HICKS, Policy and Planning Manager, Environment Southland

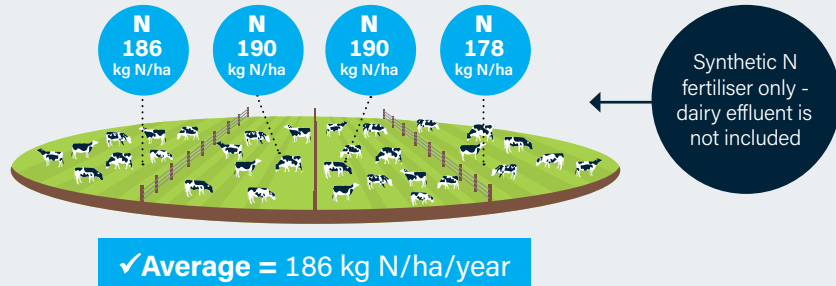
Meeting the synthetic N fertiliser cap rules

A maximum of 190 kg N/ha/year is:

- applied to each grazed paddock in pasture
- the average applied across all grazed paddocks (pasture and forage crops).

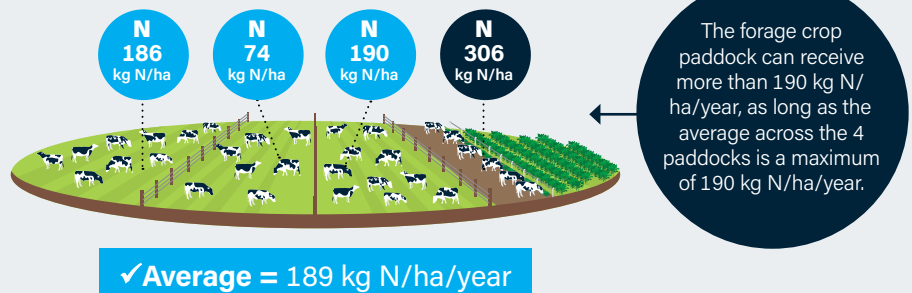
Dairy system with pasture only

4 x 1 ha paddocks in permanent pasture



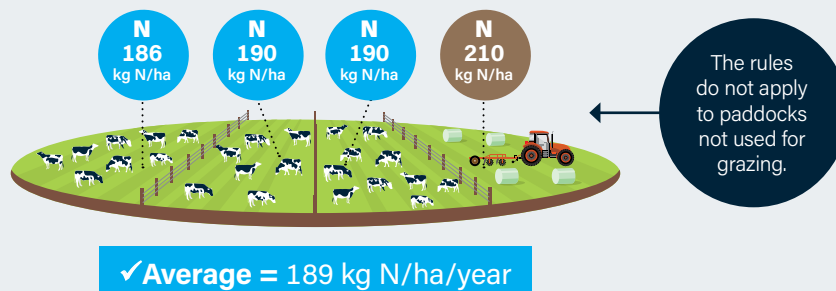
Dairy system with forage crop

3 x 1 ha paddocks in permanent pasture, 1 x 1 ha paddock of forage crop, all paddocks grazed



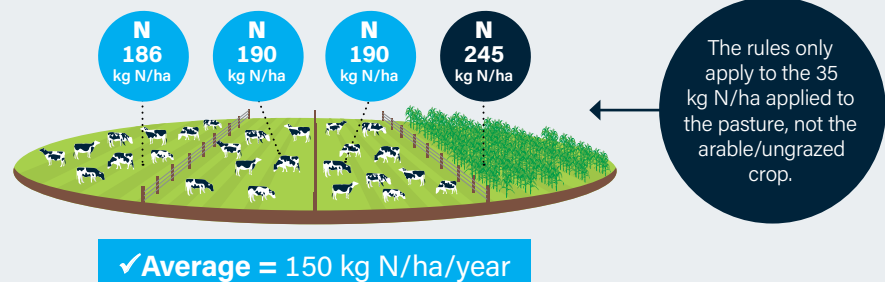
Dairy system with cut and carry

4 x 1 ha paddocks in permanent pasture, but 1 not grazed and only used for cutting supplement



Dairy system with arable crop

3 x 1 ha paddocks permanent pasture, and 1 x 1 ha paddock used for grazed pasture and summer maize silage crop (ungrazed). The fourth paddock has 210 kg N/ha/year applied to the maize, and 35 kg N/ha/year to the pasture (a total of 245 kg N/ha/year).



Using less N fertiliser

Tips, tools and untruths to help make the most of every kilogram of nitrogen (N) applied and avoid the pitfalls of reducing N fertiliser use.

Keep other nutrients optimal

Soil and herbage testing to ensure levels of other macronutrients, such as sulphur, potassium and phosphorus, are optimal can help to minimise the impact of using less N. A shortage of sulphate-sulphur, for example, limits pasture's ability to take up N.

Maximise response from applied N

Ballance has a range of products and services to help make the most of N used on farms. For more information see My Pasture Planner, SustainN, PhaSedN and PhaSedN Quick Start on pages 20-21.

Liquid N no better

While liquid N products are convenient, research shows they do not result in greater pasture responses.

One study, conducted on a dairy farm in central Canterbury, showed that pasture responses to liquid and solid urea, applied at 20 or 40 kg N/ha, were the same¹.

Non-synthetic N not as plant available

Dairy effluent, compost and plant or animal waste such as chicken manure are excluded from the synthetic N cap, so can be used freely.

But keep in mind they only contain a small percentage of plant available N, so these substances would have to be applied in huge amounts to boost growth (in the short term) to the same extent as specially manufactured fertiliser.

Grow more clover

See opposite page.

Similar response from fine particle N

Nitrogen applied in fine particle form does not significantly increase pasture production compared to granular N application, according to research².

The research compared applying varying rates via either fine particle or granular N form on a Southland dairy farm. Pasture was harvested at four and eight weeks post N application and wet weight and dry matter (DM) were measured to determine pasture production and N response rates.

Gibberellic acid just brings feed forward

The plant growth hormone gibberellic acid, applied with or without N fertiliser, brings feed supply forward, but does not increase overall pasture yield.

Extensive trials in New Zealand and Ireland showed gibberellic acid, used

both with and without N fertiliser, increases pasture yield within the first 21-25 days of application, but at the expense of reduced yield in subsequent weeks^{3,4,5}.

¹ McCloy BL 2009. Liquid urea on pasture – Burnham, NZ Arable Trial Code Pa0819, Confidential report prepared for Ballance Agri-Nutrients

² Risk JT, Dawson AE 2019. Comparing fine particle and granular nitrogen response on Southland pastures. In Nutrient loss mitigations for compliance in agriculture. (Eds. L.D. Currie and C.L. Christensen). <http://flrc.massey.ac.nz/publications.html> Occasional Report No. 32. Fertiliser and Lime Research Centre, Massey University, Palmerston North, New Zealand.

³ Guinto D, Stafford A 2016. Product X report: trial results 2015-16, Ballance Agri-Nutrients internal report

⁴ Higgins S 2016. Comparison of the relative agronomic performance of several different plant growth promoting formulations in ryegrass-based pasture, under non-moisture limited late winter/early spring conditions, Agri-Food and Biosciences Institute, Northern Ireland

⁵ Ledgard SF 2016. Review of research on effects of application of gibberellic acid alone or in combination with fertiliser nitrogen on pastures, AgResearch report for Ballance Agri-Nutrients



Over to clover

Higher clover content in pastures can help to compensate for reduced N fertiliser use.

Clovers' conversion of N from the air into a plant available form for pasture can reduce the need for N fertiliser.

Many New Zealand pastures are around 10-15 per cent clover, but 30 per cent is ideal. Increasing content to this amount would fix around 150 kg N/ha/year (dependent on overall pasture production) and deliver feed quality, dry matter yield and animal productivity benefits.

Nutrients and pH

New Zealand's climate is ideal for clovers, but they are more sensitive to nutrient deficiencies than ryegrass and other pasture species, and need good soil fertility to grow well. Clovers are also sensitive to soil pH, growing best at 5.8-6.0.

Soil testing prior to establishment is important, as is a soil and herbage testing programme to monitor soil fertility and plant nutrition over time. This helps to prevent nutrient availability limiting clover growth and pasture production.

Clovers are poorer foragers for nutrients than grasses, so show signs of nutrient deficiencies sooner. A clover-only herbage test during the spring flush when moisture levels and temperatures are not limiting growth helps to fine-tune a fertiliser programme.

White clover thrives on soils with adequate phosphorus (P), potassium (K) and sulphur (S), and molybdenum is essential for N fixation.

Clover requires more P than grasses, and higher available P levels will ensure P is not limiting clover growth. Maintenance P can be applied any time throughout the growing season, but not in wetter months and winter when P loss can occur. If soil test levels are low, P application will provide an immediate boost.

Adequate K helps improve clover content. In most maintenance situations where K levels are adequate, a single application of K can be made at a suitable time during the growing season. In high loss situations where K can leach, the application can be split to ensure the plant has access to sufficient K throughout the season.

Sulphur is often deficient for clover growth. On free draining ash soils, application timing and the form of S used (sulphate or elemental) are not important, but on other soil types the form of S used is guided by rainfall and application timing.

Managing grazing

Growing close to the ground, clovers are easily shaded by grasses, particularly in mid to late spring when competing with ryegrass's high growth rate.

Grazing management can prevent shading. White clover does best under rotational grazing with grass kept quite short, and ryegrass kept under the three-leaf stage.

Clover is preferentially grazed, so set-stocking can reduce clover levels, despite it being more resistant to overgrazing than ryegrass.

Establishing clover

Cultivars should be suitable for the farm system – for example more tolerant of close grazing for sheep, or for rotational grazing for dairy.

Clovers take up to 18 months to establish in new pasture, but can establish faster without herbicide residues from previous crops, and by allowing at least three months in crop with no clover to control nematodes.

When establishing clover-only crops, a spell without clover will manage pests. A clover-only sward is very attractive to brown beetle/grass grub, which could cause problems on light soil in subsequent pasture

Grazing new pastures early on keeps the sward open, letting sunlight in and encouraging clovers.

i FOR MORE INFORMATION
Contact your Ballance Nutrient Specialist.

Preventing pugging

How can you minimise pugging on winter grazed forage crops?

Pugging reduces soil's capacity to absorb water, so the risk of nutrient and sediment loss in runoff increases. Aside from its potential impacts on water quality, pugging also impacts pasture production.

Depending on severity, dairy pasture production can fall by 20 to 80 per cent over several months to a year. Even two years on, total dry matter production on heavily pugged areas can be down 15 to 20 per cent. Affected areas are vulnerable to weeds and less desirable grasses, and prone to future pugging if soil structure remains damaged.

Ballance Forage Specialist Murray Lane shares his tips on minimising pugging on winter grazed forage crops.

The new Government rules on intensive winter grazing on forage crops coming into force on 1 May 2021 state that pugging (stock hooves penetrating the soil to 5 cm or more) must not cover more than 50 per cent of the grazed area, or be more than 20 cm deep at any one point (except within 10 m of entrance gates and fixed water troughs).

Tip 1 Use no-tillage

As the first defence against pugging, instead of cultivating, use no-tillage techniques which don't damage the soil structure and increase the risk of pugging during forage crop grazing.

No-tillage techniques, which involve no-till drills or broadcasting, have been successfully used for 30 to 40 years. Another bonus is that predators of grass grubs aren't affected, as happens when soil is cultivated. AgResearch data published 40 years ago made it clear that cultivation affects grass grub predators leading to an explosion of grass grub three to four years after cultivation.

Tip 2 Sow a companion cover crop

Some farmers have been including Agritonic plantain in the seed mix with swedes and rape, in order to have a cover crop after grazing (see pages 12-13). It works well with lighter animals such as sheep, but requires some management with cattle, particularly older cattle (see Tip 4).

Tip 3 Grow more than needed

Growing more feed than planned means less damaging block grazing can be used (see Tip 4).

It's difficult to grow the right amount of forage crop for the winter. We know how many and what type of animal we plan to graze, but don't know how extreme the weather will be.

If very cold and wet more feed will be required. Growing a great crop also depends on the summer seasonal weather conditions. The 15 T dry matter/ha goal may end up in reality being 12 T/ha, resulting in a large hole in the feed budget.

To minimise wastage of grazed forage crops, strip grazing is often used, but this can lead to more soil damage due to hoof concentration, and is made worse if stock have to walk back over the area already grazed to access water.

Tip 4 Block grazing

Multi-day block grazing is an increasingly common way of reducing pressure on the soil.

It involves controlling the number of hooves in a blocked, back fenced area, using a mobile water trough, and focuses on preventing soil damage rather than optimising crop yield. The efficiency of crop utilisation will decline, so it requires more crop than essential to be grown (see Tip 3).

It might be that the farmer offers the stock four days grazing, being prepared to move them at three days with inclement weather. Observations are that though stock initially gorge, they quickly settle down to the new regime, move less and are more settled, plus it frees up farmer time for other activities.

i FOR MORE INFORMATION

Limiting pugging and compaction damage - bit.ly/36eo5w5

Winter forage crops: management after grazing - bit.ly/3pebWi2

Top tips for winter crop paddock selection - bit.ly/39h9TEz

Agritonic plantain, sown as a companion crop, providing a cover crop after swedes are grazed

Exclusion explainer

What do the stock exclusion rules mean, and what do you have to do to meet the deadlines in the next few years? Ballance Environmental Management Specialist Ian Power answers the big questions.

What (and who) do the new rules apply to?

The new stock exclusion rules include all pastoral farm systems – pigs, dairy cattle, dairy support cattle, deer and beef – but not sheep or feral animals. Any person who owns or controls stock must comply.

For land being newly converted to pastoral land use (such as forestry being converted to dairy), the rules applied from 3 September 2020. Compliance deadlines for land already in pastoral use range from 1 July 2023 to 1 July 2025 (see page 6).

What are the benefits?

Finding benefits in seemingly restrictive rules can feel hard. But besides improving water quality, excluding stock can help to reduce stock losses, and troughs can provide stock with an improved water supply. In addition, new fencing can help to improve subdivision and pasture utilisation and quality.

What about existing fences with a setback under 3 m?

Existing fences with a setback under 3 m already in place on 3 September 2020 can remain if they meet the minimum standards (post and batten with driven/dug fence posts, electric with at least two electrified wires and driven/dug fence posts or deer fence) and exclude animals from a waterway.

When these fences need major repairs or replacement, they must be moved to 3 m (or more) away from the edge of the waterway.

What about stock in wetlands?

All stock on low slope land ($\leq 10^\circ$) must be excluded from any natural wetland that is 0.05 ha or more.

How can stock cross waterways?

Stock crossings – bridges and culverts – may be needed to keep cattle and pigs out of waterways (there are no restrictions for deer). However, these crossings must be safe for stock, and channel any runoff away from the waterway.

For rivers where highly mobile beds make it too difficult to install a bridge or culvert, cattle and pigs can cross if supervised and actively driven across, and do not cross the same lake or wide river more than twice in any month.

How will stock access water?

To supply water to stock, many farms may have to invest in significant water infrastructure. This will pose a significant cost, especially in hill country where water sources are limited and terrain makes it difficult to install water reticulation.

What about different regional rules on stock exclusion?

In situations where regional council and national rules differ on any matter, the most stringent rules always apply. So if you are in a region with stricter stock exclusion rules, you must comply with those instead of the national rules.



FOR MORE INFORMATION

This is an interpretation/summary of the rules. To gain a better understanding visit mfe.govt.nz. Always get professional advice before investing any money into remedial actions and/or management changes.

Catch nutrients and soil

Catch crops can reduce nutrient and soil loss from bare ground in winter.

According to new Government rules, areas used for intensive winter grazing (where stock graze an annual forage crop such as swedes or kale any time between 1 May and 30 September) must be replanted by 1 October, or, for Otago and Southland by 1 November (see page 5).

“The goal is to, as far as practical, always have plants growing to prevent soil and nutrient loss. This is where catch crops (also known as cover crops) can help,” says Ballance Forage Specialist Murray Lane.

After winter forage crops are grazed, short term catch crops can reduce nutrient loss and soil erosion on land that would otherwise be bare until the next main crop or new pasture is established in spring. Catch crops can be established before, during or after a winter crop is grazed off.

In winter, bare land is prone to nitrogen (N) leaching due to greater rainfall and minimal plant uptake of N. This is particularly so after livestock have grazed winter forage crops and deposited large quantities of urine N onto soil. In addition, bare sloping land is vulnerable to soil erosion, resulting in both soil and phosphate (P) loss.

“Catch crops are a worthwhile tool to consider, given their proven ability to help prevent soil and nutrient losses from the farm, as well as provide spring grazing,” says Murray.

“To date catch/cover crops have really only been used for multi-year maize silage, when winter ryegrasses are sown after harvest. But there’s tremendous opportunity for them to be put to use after winter forage crop grazing.”

The following Ministry for Primary Industries Sustainable Farming Fund projects are investigating effective use of catch crops:

- Helicropping, protecting our soils project - a Ballance-led project in partnership with Beef + Lamb New Zealand, Agricom, PGG Wrightson Seeds, Nufarm NZ and Environment Bay of Plenty

- Catch crops project - run by Lincoln Agritech in partnership with Plant & Food Research, co-funded by Ballance
- Catch crop sediment mitigation project - led by AgFirst and involving Beef + Lamb New Zealand and DairyNZ

These and prior research projects have proven the effectiveness of catch crops post-winter cropping. More recent work has focused on how to best establish catch crops at scale for particular situations.

Sowing into wet winter soils

A major challenge to overcome is sowing catch crops in very wet soil during winter, when heavy equipment, especially cultivators, could damage soil. Aerial oversowing of seed may provide the solution.

The Lincoln Agritech catch crop project trials have, for accuracy’s sake, used seed drills and tractors, but have also evaluated a spader drill which pushes the tractor. However, soil damage due

to smearing and compaction of wet soil may be a problem.

The Helicropping, protecting our soils project is investigating aerial oversowing of seed (where seed is broadcast onto the soil surface) after winter grazing of kale or swede. Helicropping, essentially aerial no-tillage, does not require machinery access and leaves the soil undisturbed. Depending on the scale of the sowing, a helicopter or a drone could be used.

Protecting seed from birds

Hungry birds are another challenge when seed is surface sown in winter, and ways of preventing birds from eating seeds have been investigated.

Smaller seeds such as plantain are less likely to be eaten than larger seeds such as oats. Bird repellent seed treatments such as Avipel look promising on ryegrasses, but more work is needed for large seeded species. The colour of treated seed – dyed green or blue – can also help to camouflage the seed.



An annual ryegrass cover crop surface sown in July after grazing swedes (right) compared to no cover crop (left)



Annual ryegrass seed treated with bird repellent (right) compared to no bird repellent (left)

Suitable species

For catch cropping, species need to be fast establishing and winter active. Options most commonly used are annual ryegrass, ryecorn or oats.

The Helicropping, protecting our soils project has focussed on annual ryegrass as a catch/cover crop, and future work will look at various combinations of annual rye, oats and ryecorn.

In trials looking into the use of catch crops in winter to early spring to reduce N loss, the Catch crops project found using oats in both Canterbury and Southland resulted in significant reduction (30-50 per cent) in N leaching loss compared to leaving the soil fallow, as well as enhanced oat crop production.

The Catch crop sediment mitigation project is evaluating a range of catch/cover crop species, initially ryegrass and oats, followed by plantain and clover, with a focus on establishment techniques and barriers to uptake. Improvements in sediment losses will be measured across different soil types, and the economic benefits of a range of catch crops will be evaluated.

In the Helicropping, protecting our soils project, farmer observations led to plantain being evaluated as a companion crop (sown with the winter forage). Plantain is a suitable companion crop because it is low growing, with shallow roots, even flowering under the canopy over

summer, and tolerant to low rates of a common herbicide.

The plantain can provide two purposes if sown with a main crop such as swede. Firstly the plantain provides an understorey during grazing to hold the soil together. Secondly, if the main crop

is grazed well, the plantain regrows to become a ready-made catch/cover crop.

i FOR MORE INFORMATION
Contact your Ballance Nutrient Specialist or your rural supplies store.

Catch or cover?

Catch crops are already used extensively in cropping, and are commonly referred to as cover crops. They are traditionally sown in autumn to conserve nutrients over winter, reduce weeds and stabilize soil.

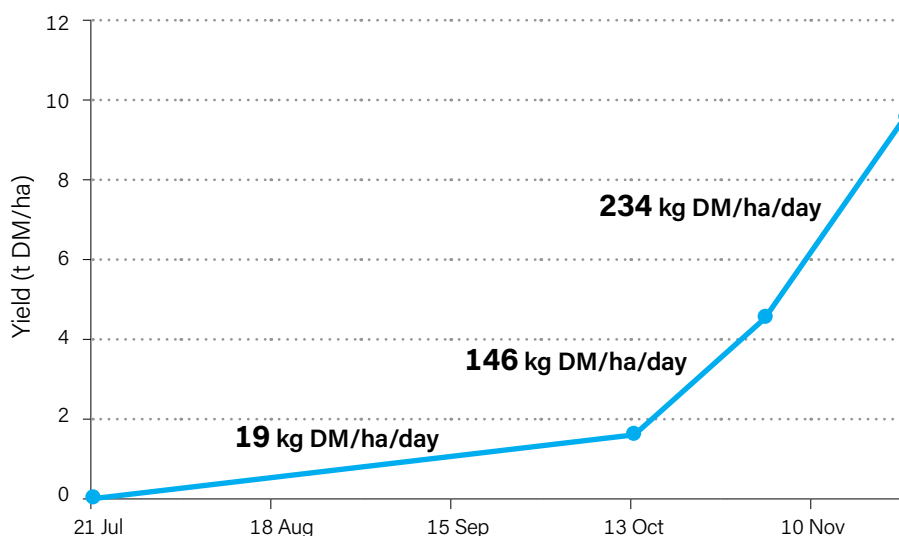


Figure 1 **Daily growth rates of winter sown plants after grazed kale. They are slow to get going, but are still effective at mopping up nitrogen.**

Source: Brendon Malcolm, Plant & Food Research



Zero Carbon

Livestock farmers will be most impacted by the Zero Carbon Act.



The Zero Carbon Act is likely to positively impact forestry, as more trees are planted to offset national emissions. It will also have a major effect on livestock farms. More intensive farms, and those with limited flexibility to adapt their system or offset their emissions, may be more significantly impacted.

The Climate Change Response (Zero Carbon) Amendment Act sets a framework for developing climate change policies to help New Zealand prepare for and adapt to climate change, and play its part in global efforts to limit warming.

Under the 2016 Paris Agreement, New Zealand is one of nearly 200 countries working to limit the global average temperature increase to within 1.5° C of pre-industrial levels.

The Zero Carbon Act came into force in late 2019 and is expected to take effect from 2021.

Climate change's impacts on agriculture

Significant changes in New Zealand's climate and weather are already being observed. These include higher land and sea temperatures, sea level rise and decreasing glacier volumes. Some locations are experiencing drier soils, altered precipitation patterns, fewer frost days, and more warm days.

For agriculture, these changes contribute to challenges around water security, management of extreme weather events such as droughts and floods, increased pest

pressure and changes in seasonality for horticulture and arable crops.

Key greenhouse gases

The Zero Carbon Act focuses on the most abundant greenhouse gases (aside from water vapour) in the atmosphere. The gases differ in how long they last and how effective they are at 'trapping' heat energy in the atmosphere (see Figure 1).

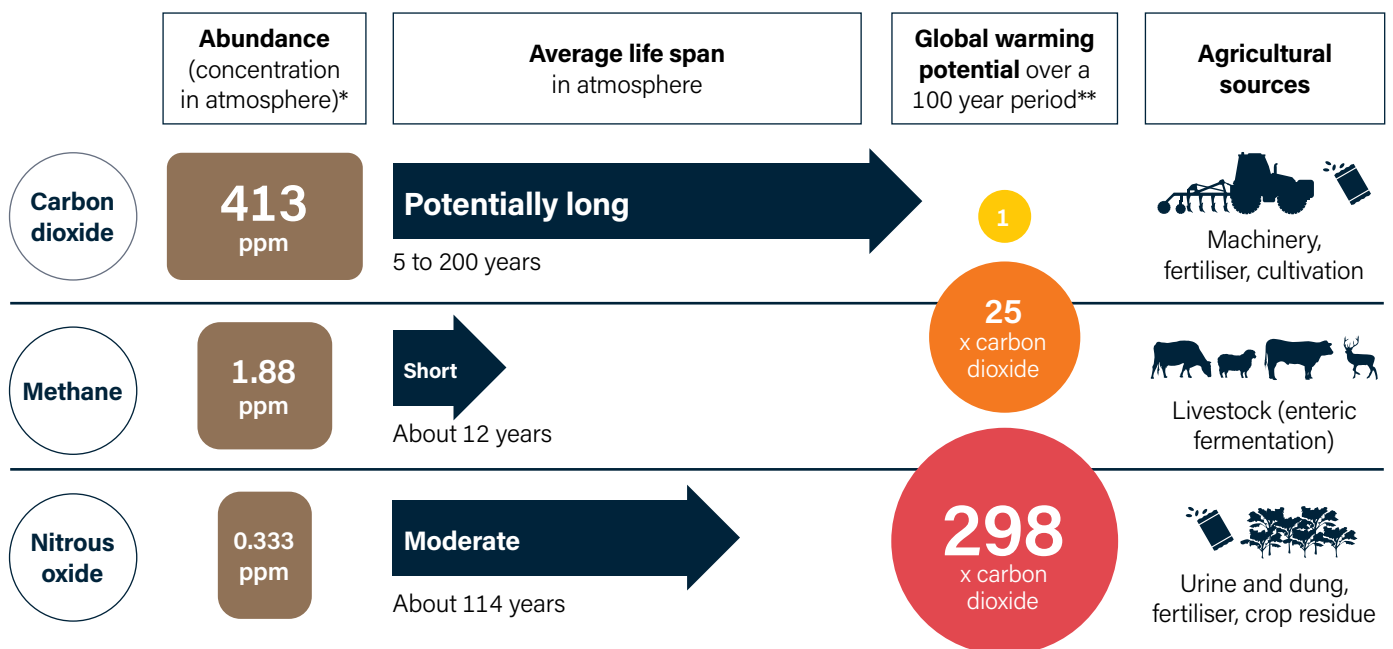


Figure 1 The Zero Carbon Act focuses on the most abundant greenhouse gases (besides water vapour)

* Besides water vapour. Based on NOAA Global Monitoring Laboratory figures for 2020.

** Carbon dioxide is used as a reference gas, so has a global warming potential of 1.

In 2018, 48 per cent of New Zealand's greenhouse gas emissions were from agriculture, and 74 per cent of those were biogenic methane from ruminant livestock (sheep and cow burps).

What's new?

The Zero Carbon Act introduces several key changes.

A separate reduction target for biogenic methane

The Act sets new greenhouse gas emissions targets, aiming to reduce emissions of:

- biogenic methane to 10 per cent below 2017 levels by 2030, as part of reducing levels to 24-47 per cent below 2017 levels by 2050
- all other greenhouse gases to net zero by 2050 (no new greenhouse gases can be added to the atmosphere without being offset).

Why a separate target?

Biogenic methane is recently derived from carbon dioxide in the atmosphere, so does not add to what is already there.

Fossil methane, on the other hand, releases carbon that has typically been stored underground for millions of years, so adds to carbon dioxide to the atmosphere.

Biogenic methane still has some warming effect during its relatively short life, before decaying back to carbon dioxide.

Climate Change Commission

An independent Climate Change Commission has been set up to focus on the emissions reduction targets. Its task is to provide the Government with 'emissions budgets' every five years (starting 1 February 2021) to monitor progress towards meeting emissions reduction targets ahead of achieving the final 2050 targets.

The Government will review the emissions reduction targets every five years, taking into account equity of contribution across sectors and across countries, emerging technologies and mitigations, and other factors.

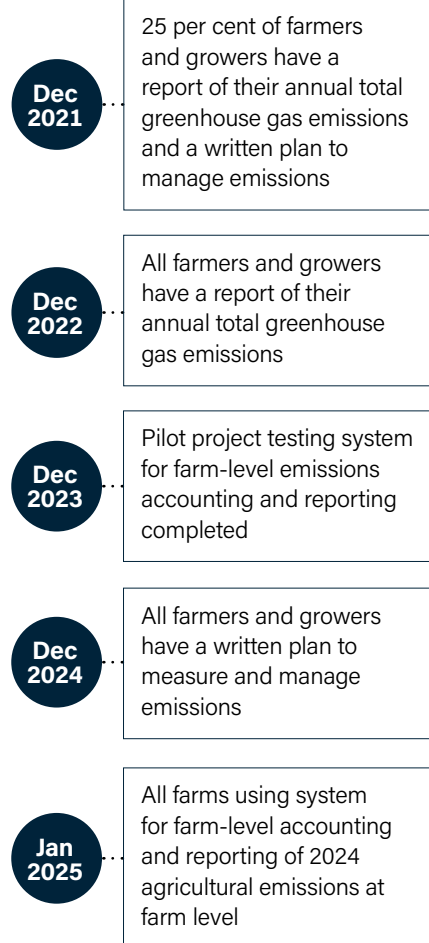
The Commission will also develop a risk and adaptation plan, and provide advice and guidance to the Government.

He Waka Eke Noa: Primary Sector Climate Action Partnership

Established in March 2020, He Waka Eke Noa is a Government-industry partnership to reduce primary sector emissions. It is working to equip farmers to measure, manage and reduce agricultural greenhouse gas emissions and adapt to climate change. It will provide the information, tools and support needed for all farms to have an annual report of emissions as part of their farm environment plan, and a plan in place to reduce emissions.

The programme includes collaboration on the design of an appropriate farm level pricing mechanism as an alternative to pricing agricultural emissions through the Emissions Trading Scheme. A price on emissions is one part of a broader framework to equip farmers and growers to reduce on-farm agricultural greenhouse gas emissions and build resilience to climate change.

Key milestones of He Waka Eke Noa are:



See page 17 for more.

Ballance's position

While Ballance supports New Zealand playing its part in international climate change mitigation, we recognise its unique emissions footprint, and the key role our agriculture sector plays in its economy and communities.

Our submission on the Zero Carbon Bill in July 2019 highlighted the support businesses involved in the agriculture sector would need so as to build a stable, practical foundation for action and investment in climate change mitigation and adaptation.

We supported formation of a Climate Change Commission, but asked for it to include expertise from business, trade and the primary sector, and were pleased with the final outcome.

We also supported an industry-led approach to achieving reduction targets such as He Waka Eke Noa, but had questions about the resources required to generate budgets and plans for all farms.

We did not support the large range for required methane reduction by 2050, as it does not provide certainty for farmers and growers, and instead asked for a single science-based target. The methane reduction range may be refined by the Climate Change Commission over time.

i FOR MORE INFORMATION

Contact your local Ballance Nutrient Specialist or one of our specialist Farm Sustainability Services team. For an in-depth discussion on the policy contact your industry group, such as DairyNZ, Beef + Lamb New Zealand, Horticulture New Zealand or the Foundation for Arable Research.

By 2025 all farms need an annual report of emissions and a plan to reduce these.



Tackling farm emissions

What options are currently available for curbing on-farm greenhouse gas emissions?

With farm-level greenhouse gas measurement and pricing expected to be implemented by 2025, farmers and growers may already be thinking about reducing emissions.

An important first step is to estimate baseline emissions (using tools such as Lincoln University's carbon calculator or OverseerFM), so the effect of actions can be assessed.

When it comes to actions, there's no one-size-fits-all, and factors such as the farm system and location should be considered. A selection of currently available, science-based tactics for reducing on-farm greenhouse gas emissions are covered below.

Continue to improve efficiency

While total emissions have gradually increased, improved pasture management (including improved use of fertiliser and irrigation), optimised stocking rates and improved animal genetics have all contributed to reductions in New Zealand's agricultural emissions intensity (emissions per unit of product). Between 1990 and 2014, dairy's emissions intensity reduced 19 per cent, sheep by 33 per cent and beef by 23 per cent (see Figure 1).

Improve animal performance and reduce stocking rate

Methane and nitrous oxide emissions are closely related to the quantity of feed consumed. Lowering the quantity of dry matter ingested on farm means less methane belched from animals, and less nitrogen from urine and dung converted into nitrous oxide.

Reducing the replacement rate in dairy systems by improving animal health and longevity, better genetics, and re-evaluating supplementary feeding and fertiliser practices are all possible actions to support this tactic¹.

Farm system modelling shows reducing the replacement rate (and therefore the number of non-productive animals) on dairy farms from 21 to 16 per cent can reduce greenhouse gas emissions by up to 6 per cent. When combined with other mitigations such as improved genetics and reduced nitrogen fertiliser, total emissions were reduced by 15-20 per cent².

Reducing milking

Once-a-day milking can reduce daily feed demand, and therefore methane emissions, by lowering the daily milk yield per cow. Reduced labour and other input costs may help to compensate for a drop in production.

Maximise nitrogen use efficiency

Soon after application, most nitrogen fertilisers can be lost as the greenhouse gas ammonia, which when re-deposited onto land is turned into more problematic nitrous oxide.

Optimising nitrogen fertiliser applications helps to reduce emissions of ammonia and resultant nitrous oxide, by maximising plant uptake of nitrogen.

Ballance's My Pasture Planner tool optimises the timing, rate and placement of nitrogen applications on farm, while fertilisers with a urease inhibitor, such as SustaiN, also help to reduce the production of ammonia.

See pages 20-21 for more information on SustaiN and My Pasture Planner.

Low emission feeds

Brassica crop trials show promise in reducing biogenic methane emissions. Compared to pasture, diets of 100 per cent rape, the most rigorously tested crop to date, consistently reduce

emissions by an average of 44 per cent for cattle and 37 per cent for sheep, with emissions reductions proportional to the proportion of rape in the diet³.

Plantain has been found to be helpful in reducing nitrous oxide emissions. A study found that nitrous oxide emissions in autumn and winter were 39 to 74 per cent less where plantain was planted compared to perennial ryegrass⁴.

FOR MORE INFORMATION

For more on actions to reduce on-farm greenhouse gas emissions visit www.AgMatters.nz

¹ van der Weerden T, Beukes P, de Klein C, Hutchinson K, Farrell L, Stormink T, Romera A, Dalley D, Monaghan R, Chapman D, Macdonald K, Dynes R 2019. The Effects of System Changes in Grazed Dairy Farmlet Trials on Greenhouse Gas Emissions. *Animals (Basel)*. 2018 Dec 7;8(12):234

² Beukes P, Gregorini P, Romera A 2011. Estimating greenhouse gas emissions from New Zealand dairy systems using a mechanistic whole farm model and inventory methodology. *Animal Feed Science and Technology* 166-167: 708-720

³ Sun X, Pacheco D, Luo D 2016. Forage brassica: A feed to mitigate enteric methane emission. *Animal Production Science*. 56. 451. 10.1071/AN15516

⁴ Plantain shows potential for reducing greenhouse gas emissions [accessed January 2021] <https://www.agresearch.co.nz/news/plantain-shows-potential-for-reducing-greenhouse-gas-emissions/>

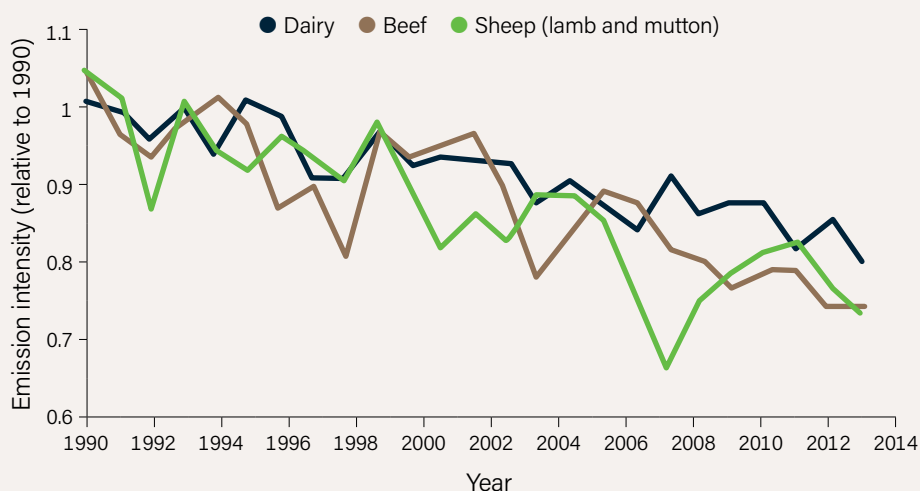


Figure 1 New Zealand's agricultural greenhouse gases emissions intensity by agricultural sub-sector including nitrogen fertiliser use (1990-2014)

Source: New Zealand's Greenhouse Gas Inventory 1990-2014

Gases into farm plans

He Waka Eke Noa is on track to achieve a major milestone by the end of the year.

Primary sector bodies are working on including greenhouse gas emissions in farm plans templates, using He Waka Eke Noa guidance.

In December 2020 He Waka Eke Noa released guidance on managing agricultural greenhouse gas emissions.

This represents an important step towards meeting the major milestone of 25 per cent of farmers knowing their farm's greenhouse gas emissions numbers, and having greenhouse gas emissions incorporated into their farm plans by the end of 2021.

Farmers will not need multiple farm plans, as integrated farm environment plans will build on the plans currently being developed under Essential Freshwater, according to DairyNZ.

DairyNZ's Step Change project (dairynz.co.nz/step-change) is helping farmers with ways they can reduce greenhouse gases, improve water quality, and improve profitability. Their 'Know your numbers' campaign includes calculating methane emissions and purchased nitrogen surplus per hectare.

In March, Beef + Lamb New Zealand is launching a new farm planning resource to replace and build on its existing Land and Environment Plans.

The new farm plan will also help farmers meet their business objectives and get ahead of their consumer and social licence obligations.

A key priority for this work is to help farmers tackle emerging environmental requirements on their farms (climate change, freshwater, biodiversity and soils) in an integrated and holistic way.

He Waka Eke Noa guidance and requirements will be integrated into B+LNZ's farm plans over time. B+LNZ is also developing a free calculator for beef and sheep farmers to measure emissions and sequestration. This is due for completion in April/May and once ready will be incorporated into B+LNZ farm plans.

B+LNZ has also been working with processors on aligning its farm plans with the New Zealand Farm Assurance Programme, to try to extract a consumer premium for climate change work.

Horticulture New Zealand, horticulture industry product groups, Foundation for Arable Research (FAR) and grower reference groups are also participating in the He Waka Eke Noa programme.

Horticulture New Zealand and product groups are developing a simple solution for fruit and vegetable growers to meet

the requirements through integrated and certified Good Agriculture Practice (GAP) farm environment plans. For most growers, this will mean documenting annual emissions from fertiliser use.

FOR MORE INFORMATION

hewakaekenoa.nz

Refer to your relevant industry body. Growers can contact Horticulture New Zealand, their product group, or FAR for a mixed farming system.

Integrating a Māori perspective

Drawing on its vast network, the Federation of Māori Authorities (FOMA): Me Uru Kahikatea has convened Te Aukaha to connect and bring together Māori agribusiness experts at a governance, technical and farming level. This ensures a Māori perspective is integrated throughout all the work that progresses across He Waka Eke Noa.

He Waka Eke Noa partners have appointed a steering group to provide oversight and ensure delivery of the milestones and objectives (left to right): Tanira Kingi - Federation of Māori Authorities, Bruce Thorrold - DairyNZ, Martin Workman - Ministry for the Environment, Ruth Fairhall - Ministry for Primary Industries, Vaughan Payne - iwi/Māori, Karen Williams - Federated Farmers of New Zealand, Michelle Sands - Horticulture New Zealand, Jeremy Baker - Beef + Lamb New Zealand, Michael Ahie - Independent Chair, Charlotte Rutherford - Agrifood Processors. Also pictured is Programme Director Kelly Forster.





Upcoming biodiversity policy

The National Policy Statement for Indigenous Biodiversity (NPSIB), set for release in April 2021, is likely to have an impact on forestry and all farming sectors.

Biodiversity's importance for primary production

Protecting and enhancing biodiversity on farm is not just critical for indigenous biodiversity, which is at a crisis point, it also provides ecosystem services such as clean water, nutrient cycling and pollination, which are critical for the long term sustainability of New Zealand's farms and orchards.

Our country's unspoilt nature is already used to promote exports, and greater returns are possible by meeting the increasing demands for environmentally sustainable production from some markets.

Key proposals

The following policies appeared in the proposed NPSIB, and are likely to feature in some form in the final policy statement. The policies only cover terrestrial (land-based) biodiversity.

Significant Natural Areas (SNAs)

What

Regional councils will be asked to identify:

- all SNAs in their region, using new standardised criteria, and work with landowners to create management plans to protect these SNAs
- priority SNAs to restore and enhance.

Where

SNAs are areas of significant indigenous vegetation, such as native forests and shrubland, as well as habitats of significant fauna, such as threatened kiwi. They could be a native bush block or wetland, or something less obvious, such as a rock outcrop

providing habitat for native skinks, or the presence of a particular plant or invertebrate. They represent the most iconic and highly valued indigenous biodiversity.

In some regions, such as Waikato, SNAs have already been mapped.

When

Regional councils must map SNAs within five years of the release of the NPSIB.

Celebrating good work

Ballance supports the significant efforts that go into promoting indigenous biodiversity on farms. One way we do this is through the Ballance Farm Environment Awards, which recognise and celebrate good farm practices, including protection of indigenous biodiversity, that promote sustainable land management.

In 2020, the awards recognised Mark and Felicity Brough by naming them Regional Supreme Winners for the Waikato. Since taking over their Waitomo farm Paerua 20 years ago, their commitment to biodiversity has seen native birds returning and water quality improving.

The judges said Paerua is an excellent example of farming within the capabilities of the land and that the Broughs are role models both in terms of their farming systems and their commitment to biodiversity.

Indigenous Vegetation Targets

What and where

Regional councils will be asked to assess the total percentage of indigenous vegetation cover in the region (both rural and urban), and set targets to increase this cover to:

- at least 10 per cent in urban areas (as this is where ecosystems are particularly depleted)
- a council-set target in rural areas, if the region's total indigenous vegetation cover is under 10 per cent.

When

Timelines have not been set.

How it could affect you

The NPSIB's impact will depend on the individual property.

Properties with SNAs are likely to be most impacted. Given the proposed criteria for identifying SNAs, it's possible (although unlikely) that in some areas SNAs could cover most, if not all, of entire farms.

If an SNA is identified on a property, a range of measures in the statement could then severely restrict existing and new activities a farmer could undertake within or adjacent to the SNA.

The farmer would have to ensure disruption or damage to a species, habitat or ecosystem from existing activities does not increase.

While most existing farming activities could continue, new or changed activities that could negatively impact an SNA (such as increasing stocking rate, stock access, machinery, or the use of pesticide and herbicide around or

within the SNA) may be restricted.

If a new activity is allowed, its negative impacts on an SNA must be avoided, remedied, mitigated, offset or compensated. This could in effect limit the ability to carry out new activities.

The legal requirement to maintain or restore an SNA may also include improving fencing and controlling pests and weeds, so could pose a significant cost.

Ballance's position

Ballance supports the core intent of the policy to 'halt further loss and degradation of indigenous species, habitats and ecosystems' throughout New Zealand, and understands the importance of tackling this issue nationally, with farmers and landowners playing their part.

Below are the main points Ballance raised in its submission on the NPSIB.

Managing immediate threats to biodiversity

Ballance was concerned that the policy's goal of increasing indigenous vegetation cover and improving degraded SNAs could be undermined if widely present, rapidly increasing pest species are not first reduced or eradicated.

We suggested regional councils take a prioritised approach to supporting improved indigenous biodiversity in their region (see Figure 1), and ensure that farmers are supported in managing threats such as wallaby.

Resourcing and expertise

Ballance highlighted the lack of specialist knowledge available to accurately assess every SNA in the country in five years.

Ballance suggested creating a national ecological steering group of experts and relevant stakeholders to advise on priorities, programmes and assessment criteria.

The steering group would ensure that resources could be prioritised towards the most nationally critical areas (in line with Figure 1), and that responsibilities for resourcing and funding restoration and enhancement of SNAs are fair and clearly defined.

SNAs on farms

Farmers who have protected or

restored indigenous biodiversity could be impacted the most by measures restricting activities in and around SNAs. The measures could leave them with the greatest costs and potential limitations to the ongoing use of their land, while farmers who have done little in the way of biodiversity would be effectively rewarded.

To overcome this, Ballance suggested setting 1990 as a land use and restoration baseline, to reward those who have protected areas since then. A council rates charge (based on habitat loss) or relief (based on enhancement) would also reward those who have done good work.

Indigenous vegetation cover

National targets for afforestation do not consider regional variation in landscape or land use intensity.

Ballance suggested calculating requirements for percentage cover by region based on national priorities and targets for specific vegetation types or habitats, and considering regional variations in economic impacts on farmers if they have to retire land.

We can help

Ballance has a range of products and services to support you to adapt to the

new rules and remain viable. For more information see page 20-21.

FOR MORE INFORMATION

Contact your local Balance Nutrient Specialist or for more detailed information, one of our specialist Farm Sustainability Services team or your regional council.

Environment Southland's submission

In its submission on the proposed NPSIB, Environment Southland noted the proposal significantly shifts the requirements for managing indigenous biodiversity in Southland, and would impact the council and the wider Southland community.

The council noted that many of the requirements in the NPSIB exceed its capability, and asked for work to be prioritised to reduce the strain.

It was also concerned that linking SNAs to Resource Management Act regulations could hinder development of non-regulatory methods, partnerships and meaningful change.

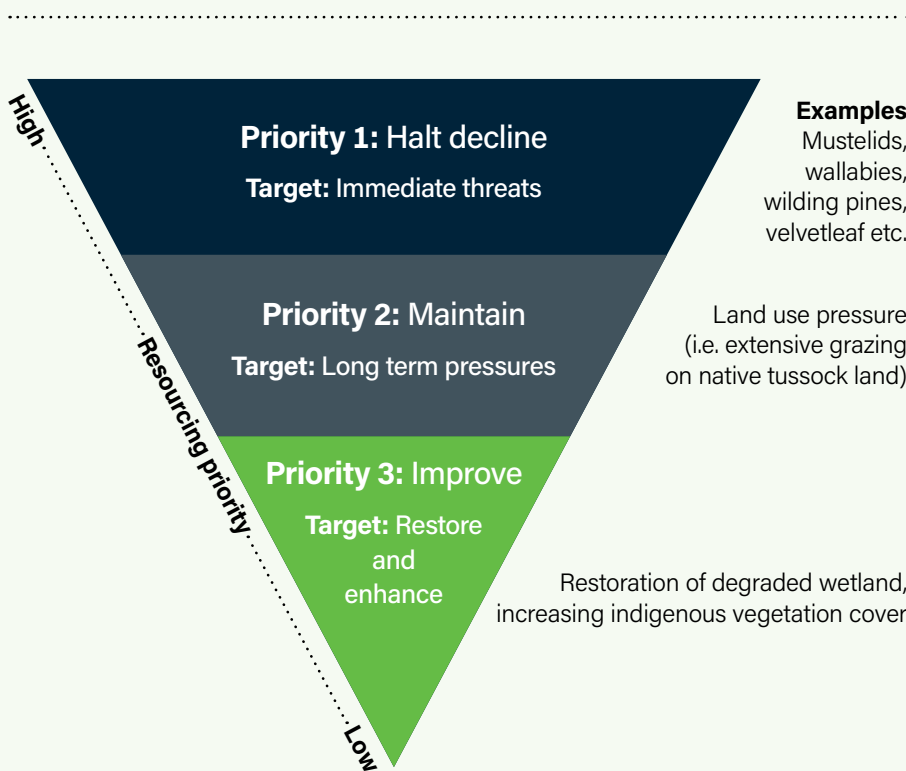


Figure 1 Ballance's suggested prioritised approach for supporting improved indigenous biodiversity

Sustainable and viable

Ballance's products, tools and services can help you maintain profitability and comply with the new rules.

Over 10 years ago, anticipating what was on the horizon, Ballance began developing a suite of products and tools to help you reduce nutrient losses and greenhouse gas emissions, so you can farm in a more measurable and sustainable way.



Our fertilisers containing Sustain (urea coated with the urease inhibitor AGROTAIN®) are designed to minimise nitrogen (N) losses as the greenhouse gas ammonia (volatilisation) and keep N in the ground for plant use and increased pasture production.

Sustain:

- cuts N volatilisation losses by around 50 per cent (compared to standard urea)¹
- increases N efficiency, with research showing over a wide range of conditions the average increase in pasture yield is 5 per cent (compared to standard urea)²
- provides greater flexibility of use, and can be applied at any time of year, when a crop or pasture needs N, without the need for sufficient rainfall within 8 hours to reduce volatilisation losses.

Costing about 10 per cent more than standard urea, Sustain is a cost-effective and environmentally responsible way of protecting investment in N fertiliser, in a regulatory environment where making every kilo of N count is essential.

If sulphur (S) is also required, it is combined with Sustain in:

- PhaSedN - a blend of Sustain, fine elemental S and fine lime to support rapid pasture growth. Sustain provides N for an immediate autumn boost, while the fine elemental S remains in the soil over winter and releases in early spring to support that key growth phase.
- PhaSedN Quick Start - contains sulphate S for a quick boost, and elemental S for slow-release and two types of N (urea from Sustain, and ammonium from sulphate of ammonia) which are both immediately available for plant uptake.
- Sustain Ammo - a blend of Sustain and sulphate of ammonia. Contains sulphate S that is readily available for plant uptake. Ideal for use in spring on pastures that might otherwise be limited by S.

i MORE INFORMATION
ballance.co.nz/Sustain



SurePhos* is an effective and sustainable phosphate that reduces phosphate loss by up to 75 per cent (relative to superphosphate products)³. A slow release phosphorus fertiliser, it

gradually releases into the soil so more phosphorus is retained in the soil and less lost to the environment.

SurePhos is currently only available at limited stores in the North Island. For more information, availability in your region and to place your order, contact your local Ballance Nutrient Specialist.

i MORE INFORMATION
ballance.co.nz/surephos



Farm Sustainability Services

Our Farm Sustainability Services team work together with you to identify environmental risks and opportunities – providing practical advice and solutions that work for you, on your farm.

Our Farm Sustainability Services team work with key industry partners, including regional councils, irrigation schemes, industry good bodies and dairy companies to ensure your nutrient management solutions are effective and fit for purpose.

Year end nutrient budgets

Generated in Overseer®, a nutrient budget provides a picture of nutrient inputs, outputs and losses for a

particular year. When the farm reaches a near steady state, it is a reasonable estimate of the farm's nutrient flows.

Scenario nutrient budgets

Model how potential farm system changes, such as stock numbers, fertiliser changes, effluent or feed usage, changes in irrigation, or adding a feed pad, herd home or wintering barn will impact nutrient flows.

Farm environment plans

A farm environment plan is for sustainably managing the soil, water and nutrient resources on farm. The property-specific plan is developed to reflect the environmental risks and opportunities associated with a farm and how these can be best managed.



Our MitAgator* service uses cutting-edge software to spatially identify critical source areas of contaminant losses and find the best mitigations for your farm.

Developed by Ballance and AgResearch and incorporating around 30 years of independent research, MitAgator is the first tool that singlehandedly deals with nitrogen, phosphorus, sediment, and *E. coli* losses.

MitAgator produces detailed risk maps for your farm, showing where losses occur spatially, and identifying critical source areas across your farm. It then compares the cost and effect of different mitigation strategies so you can weigh up the alternatives and confidently

choose an option that suits your situation.

MORE INFORMATION

ballance.co.nz/Farm-Sustainability-Services

ballance.co.nz/mitAgator

Contact farm.sustainability@ballance.co.nz or 0800 222 090



This software tool* incorporates AgResearch's scientific expertise to help you optimise the timing, rate and placement of N applications. When the situation suits, our nutrient specialists are able to utilise this decision support tool to guide N fertiliser plans.

MORE INFORMATION

ballance.co.nz/my-pasture-planner

Contact your **Balance Nutrient Specialist** or 0800 222 090



Super Air are leaders in agricultural aviation, specialising in the fixed-wing aerial application of solid fertiliser, lime, as well as spray work. Our modern fleet of aircraft use the latest state-of-the-art automated aerial application and GPS technology.



Super Air's Spreadsart* system makes aerial topdressing more precise. It combines GPS, hydraulic gate control and digital farm mapping to apply fertiliser where required, taking into account slope, aspect and soil fertility status on your farm.

The system automates the aircraft's gate control to take the guesswork out of topdressing and allows for smaller exclusion zones down to 30 m, eliminating application on unproductive and/or environmentally sensitive areas.

MORE INFORMATION

ballance.co.nz/Super-Air

ballance.co.nz/About-Super-Air/SpreadSmart

Contact 0800 SUPER AIR (0800 787 372)

¹ Zaman M, Saggar S, Stafford AD 2013. Mitigation of ammonia losses from urea applied to a pastoral system: The effect of nBTPT and timing and amount of irrigation. Proceedings of the New Zealand Grassland Association 75: 209-214

² Stafford A, Catto W, Morton JD 2008. Ballance Agri-Nutrients approach to sustainable fertiliser use. Fertiliser and Lime Research Centre, Massey University, Occasional Report No. 21: 197-205

³ McDowell RW, Smith C, Balvert S 2011. The environmental impact and agronomic effectiveness of four phosphorus fertilisers: Report for Balance Agri-Nutrients, October 2011

* Developed with Primary Growth Partnership funding

Ministry for Primary Industries
Manatū Ahu Matua





Water rules for growers

What do the Essential Freshwater regulations mean for horticultural and arable growers?

Only growers with livestock grazing pasture or forage crops during the year will be affected by the synthetic nitrogen fertiliser cap (see page 5). But a number of other key rules in the Essential Freshwater package could affect growers.

Protect wetlands and streams

Rules around the permitted clearance or modification of wetlands and streams have been tightened. Resource consent is now required for a range of activities, such as clearing vegetation, earthworks, damming or diverting water in and around wetlands. To make sure you comply, contact your local regional council before undertaking activities in wetlands or streams.

Land use change

Changing to a more intensive land use (such as from arable to dairy, but not from sheep and beef to arable) on an area over 10 ha will need resource consent. Consent will only be granted if catchment level contaminant loads are not increased as a result. These rules last until 2025, when individual council rules will supersede them.

Intensive winter grazing restrictions

See page 10.

Stock exclusion

See page 11.

Electronic reporting on water use

Existing resource consents taking more than 5 L/second must measure use every 15 minutes and provide electronic records to the regional council by the end of the following day.

The compliance deadline for a consent taking:

- over 20 L/second is September 2022
- 10-20 L/second is September 2023
- 5-9 L/second is September 2026.

Farm environment plans (FEPs)

While FEPs are not included in the new freshwater policy, it is likely that all farms and orchards will require one in the next five years through the Resource Management Act (RMA). The Government is working with stakeholders to set out the exact requirements of FEPs over the next 12 months.

It is likely the freshwater module of the FEP will need to include:

- a farm map identifying features (e.g. waterways), critical source areas (e.g. discharge outlets), erosion prone areas and so on

- risk assessment across specific activities including irrigation, application of nutrients and effluent, winter grazing, stockholding areas, stock exclusion, offal pits and farm rubbish pits
- schedule of actions to manage identified features and address identified risks.

Many growers already have FEPs as part of complying with regional council rules or through New Zealand Good Agriculture Practice (NZGAP), and these will just need to be adapted to fit the new rules.

Ballance's specialist Farm Sustainability team can complete a FEP for your farm or orchard, or provide support and guidance on how to make a start. See pages 20-21.

Alternatively, for arable farms, FAR has a FEP template which covers most of the new requirements.

FOR MORE INFORMATION

Refer to your relevant industry body. This is an interpretation/summary of the rules. To gain a better understanding please visit mfe.govt.nz. Always get professional advice before investing any money into remedial actions and/or management changes.

A connected catchment

A collective approach can sustain water, and people.

A sobering 2014 report on water quality in a Southland estuary ended up bringing people together to achieve a shared vision.

After the report, disconnections amongst different groups arose, says David Diprose, who runs a dairy farm in the Pourakino valley catchment near Riverton. The catchment is about 50 per cent native vegetation, as well as forestry, deer, sheep, beef and dairy farming.

"Farmers were upset for not getting recognised for what they were doing on their farms, and the disconnect between urban-rural and different land uses in the valley meant assumptions were getting in the way of meaningful dialogue," he says.

In response, David started the Pourakino Catchment Group in 2014, initially to bring people together to do something about the water quality of Riverton's estuary.

But he says forming a catchment group has brought other benefits.

"As part of a group, the individuals found they had a clearer, unified voice in bigger conversations with Environment Southland and other parties."

The catchment group has also connected and strengthened the community. It has brought together people connected to and through the land and the water, including Te Rūnanga o Ōraka Aparima, fishers, white baiters, jet boaters, local schools and community groups. The local town of Riverton, connected to the estuary's health due its importance for mahinga kai and recreation, is also involved.

"At our last Christmas do, we just enjoyed being together and eating the cockles from the local estuary. It feels like a whanau now.

"It's very much about relationships – that's what sustains us when we get into

tougher conversations. There've been tensions, but we respect each other's differences and return to the common thread."

Time has been instrumental in bringing the group to their current resilient position. David says in the early days they would worry about numbers at events, but that has long passed, and while some people turn up to everything, others dip in and out.

"Supporting other catchment groups is our measure of success at the moment," says David. The group deliberately paused in 2016 to ensure other newly forming groups could establish themselves and learn from Pourakino experience.

The biggest challenge along the way for the group has been funding, but they have been self-running since 2016 and are "doing what they can with what they've got." As a charitable trust, subscriptions from local farmers keep the group going.

Farmers in the catchment group have used Ballance's MitAgator service. "Ballance field reps Selina (Copland) and Kate (Eddington) also gave their time and skills as group secretary for a good period. It was helpful to draw

David Diprose, initiator of the Pourakino Catchment Group

on their strengths of organising and recording the conversations, and in turn allowed them to see the challenges we face as landowners," says David.

David chaired the catchment group until 2019, and says a collective approach is important for getting results in the water.

"Being informed and part of a catchment group enables mana – a pride in being part of a team. The water sustains us, like a catchment group can sustain and support us with the collective decisions we'll need to make when we consider Te Mana o te Wai."

i FOR MORE INFORMATION

www.landcare.org.nz/completed-project-item/catchment-groups

Catchment groups are people from a geographical area (usually a river or lake catchment) working together towards a common long term vision based on a healthy environment and a thriving community.






Correction to Grow Spring 2020

In the article 'Nutrients for animal health' on pages 12-13, the units for the product rate of NutriMax Cobalt 10% were incorrect. Correct units, for both capital and maintenance, are g/ha.

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