DairyNZ Submission on

Action on agricultural emissions:

A discussion document on proposals to address greenhouse gas emissions for agriculture

13 August 2019

DairyNZ

Tim Mackle
Chief Executive
DairyNZ
tim.mackle@ceo.dairynz.co.nz

For more information visit dairynz.co.nz or phone 0800 4 DairyNZ (0800 4 324 7969)

DairyNZ
Corner Ruakura and Morrinsville Roads
Private Bag 3221
Hamilton 3240

About DairyNZ

DairyNZ is the industry good organisation representing New Zealand's dairy farmers. Funded by a levy on milksolids and through Government investment, our purpose is to secure and enhance the profitability, sustainability, and competitiveness of New Zealand dairy farming.

We deliver value to farmers through leadership, influencing, investing, partnering with other organisations and through our own strategic capability. Our work includes research and development to create practical on-farm tools, leading on-farm adoption of best practice farming, promoting careers in dairying and advocating for farmers with central and regional government. For more information visit **dairynz.co.nz.**

Table of Contents

Executive Summary

DairyNZ is committed to responding to the challenge posed by climate change and contributing to global efforts to limit additional warming while maintaining food production. We agree that our industry needs to stabilise absolute net emissions at a reduced level, in addition to promoting emissions efficiency. New Zealand is the first country to come up with a meaningful approach to reduce agricultural emissions. It is an incredibly complicated issue and it's important we get it right the first time.

We acknowledge that the Government has taken into consideration recommendations of the Interim Climate Change Committee, as well as conversations with leaders in the agriculture sector, to put together several proposals on how best to manage reducing emissions from agriculture.

DairyNZ supports:

- A priced-based mechanism to be introduced at the farm-level from 2025, and the Interim Climate Change Committee's (ICCC) analysis which suggests a levy/rebate scheme would be a better option than the New Zealand Emissions Trading Scheme (NZ ETS).
- A solid 5-year interim work programme with clear actions, outcomes, targets and timeframes, including the implementation of the following dairy industry commitments outlined in the Dairy Tomorrow Strategy and the *Primary Sector Climate Change Commitment: He Waka Eke Noa*:
    - All dairy farmers will know their farm emissions profile and associated emission numbers by 2022;
    - All dairy farms will develop and implement integrated Farm Environment Plans by 2025. The plans will assist farms in becoming more environmentally sustainable, incorporating measurable actions to reduce greenhouse gas emissions and deliver improved water quality, biodiversity and biosecurity outcomes;
    - The completion of an extensive pilot programme on emissions reporting and benchmarking by 2025; and
    - The implementation of a farm-level agricultural emissions accounting and reporting system by 2025.

DairyNZ does not support:

- A price-based mechanism in the interim period over the next 5 years. Implementing a processor levy or NZ ETS could lead to revenue recycling of money that would be better invested on-farm to prepare for and start the process of managing emissions.
- Farmers or processors facing surrender obligations under the NZ ETS.

In addition, DairyNZ proposes:

- Farmers are not precluded from an ability to offset a portion of their total emissions at the farm level.
- Continued co-investment in the development of both incremental and breakthrough technologies to support the agricultural sector to remain competitive, profitable, and sustainable as it goes through these changes, not just on climate change, but for other regulations such as water quality and biodiversity.
- The Government continues to work with the dairy sector and other stakeholders on the science surrounding methane and its impact on global warming, through national and international frameworks.
- The Government acknowledges the continued importance of approaching carbon pricing as part of a broader suite of policy measures that address both price and non-price barriers to mitigation. The point is that carbon pricing will not, on its own, induce a significant uptake of abatement opportunities, nor will it generate mitigation options.

1. Introduction

1.1 DairyNZ welcomes the opportunity to submit on the *Action on agricultural emissions* discussion document. We recognise the dairy sector's responsibility to play its part in contributing to New Zealand's greenhouse gas reduction targets and welcome the development of a robust, transparent, and equitable framework for agriculture alongside the rest of the New Zealand economy.

1.2 Safeguarding the environment and maintaining a sustainable and competitive dairy sector is very important to our farmers, customers, and consumers. Dairy farmers care about the environment as stewards of the land and are continuously refining their farm systems to improve water quality, biodiversity outcomes, and to reduce their emissions while maintaining profitable farm businesses, as signalled through our Dairy Tomorrow sector strategy.[1]

1.3 The Organisation for Economic Co-operation and Development notes there are significant environmental and economic risks and costs associated with inaction on climate change and that these are likely to be higher than taking action to reduce global greenhouse gas emissions.[2] This is why DairyNZ believes it is essential all countries take action to reduce their national greenhouse gas emissions.

1.4 We are therefore supportive of the Government developing and implementing clear and stable climate change policies, which align with global efforts under the Paris Agreement and support New Zealand's transition to a low emissions economy. Providing policy certainty will enable the dairy sector to incorporate addressing emissions and adapting to a changing climate into future business decisions, alongside the other key areas such as improving water quality, biosecurity, workforce capability, animal care, and on-farm biodiversity.

1.5 While we support ambitious climate change action, we want to ensure New Zealand's position as already being a world leader of sustainable food production is recognised. We also need to balance this goal with the agricultural industry's competitive position of producing high quality, safe food at a reasonably low cost. The biggest impact New Zealand can have in tackling global emissions will be through its contribution to efforts to reduce global livestock emissions which account for around 14 percent of all global emissions.[3] As a world leading emissions-efficient producer of milk, our dairy sector can share our farm systems expertise and research findings to contribute to global efforts to reduce livestock emissions.

1.6 There is a large capability development programme that needs to be initiated. Most farmers do want to do the right thing, but practical tools and tips are in their nascency. This is what a 5-year joint programme of action must develop. For example, during the Interim Climate Change Committee's regional rural meetings, one farmer reflected that "*The [government] think we can just get a farm consultant to help us - there is one in Taranaki*".

1.7 As a final point, we wish to note that the timeframes for this consultation have been extremely short given the strategic importance of this issue and coming so quickly off the back of the consultation on the Climate Change Response (Zero Carbon) Amendment Bill 2019. We appreciate that officials from the Ministry for the

[1] https://www.dairytomorrow.co.nz/
[2] https://www.oecd.org/fr/environnement/climate-change-consequences-of-inaction.htm
[3] http://www.fao.org/news/story/en/item/197623/icode/

Environment and the Ministry for Primary Industries have done roadshows around the country to gather questions and explain the options. DairyNZ has assisted by encouraging our Climate Change Ambassadors and Dairy Environment Leaders to attend and support other farmers. But a four-week consultation window during the busiest part of the farming year (calving) has inevitably prevented the vast majority of farmers from engaging with a process that is of fundamental importance to the sustainability of their farm businesses. We think this emphasises the need for continued and deep engagement with the dairy sector during the next phases of the policy development process.

2. Context

2.1 New Zealand has a unique emissions profile for a developed country which reflects the productive importance of our agricultural sector to the New Zealand economy and the role we play in providing nutritional food to many other countries. Under the current emissions accounting framework, 48 percent of New Zealand's emissions come from agriculture, this is approximately six times higher than the average (7.5 percent) for developed countries.[4] The only developed country with a similar emission profile to New Zealand is Ireland, where around 33.3 percent of emissions come from agriculture.[5]

2.2 The three largest emitting sub-sectors in New Zealand are dairy accounting for 22.5 percent, sheep and beef accounting for 20.8 percent, and transport accounting for 19.7 percent of New Zealand's emissions.

New Zealand's dairy and wider agricultural sector is highly emissions-efficient

2.3 Compared to the energy and industrial processes sectors which have increased emissions by 38 and 39 percent respectively since 1990, the agricultural sector's emissions have increased by only 13 percent since 1990, and have largely stabilised since 2005. This is due to farmers becoming more efficient, reducing emissions intensity – or greenhouse gas emissions per unit of product – by one percent each year over the last 25 years. If these improvements had not occurred the agricultural sector's emissions would have been 40 percent higher from 1990 than they are now.

2.4 As a result, New Zealand is already world leading in producing emissions-efficient milk. While the average global emissions from milk production, processing, and transport is estimated to be 2.4 CO_2-eq. per kg of fat-and-protein-corrected milk at farm gate[6], our dairy farmers are over 60 percent more emissions-efficient (about 0.80-0.90 CO_2-eq. per kg of fat-and-protein-corrected milk at farm gate[7]).

2.5 New Zealand's dairy farmers continue to refine and adapt their farm systems to improve the environmental, social, and economic sustainability of their businesses.

New Zealand's agricultural knowledge can make a global impact

2.6 When examining how New Zealand compares internationally, it can be difficult to determine how our national circumstances stack up against other developed countries due to our unique emissions profile. While this does present some challenges in our ability to adopt and meet ambitious emission reduction targets, it also presents New Zealand with an opportunity to take a leadership role in aiding the reduction of global livestock emissions through farm system expertise, research, and technology transfer.

2.7 The Government and the agricultural sector industry bodies such as DairyNZ, Fonterra, Beef+Lamb New Zealand, and Deer Industry New Zealand continue to invest (via the New Zealand Greenhouse Gas Research

[4] https://www.niwa.co.nz/atmosphere/research-projects/agricultural-emissions-of-greenhouse-gases
[5] https://www.epa.ie/climate/communicatingclimatescience/whatisclimatechange/whatareirelandsgreenhousegasemissionslike/
[6] http://www.fao.org/3/k7930e/k7930e00.pdf
[7] Life cycle environmental impacts of high and low intensification pasture-based milk production systems: A case study of the Waikato region, New Zealand, Chobtang et al. (2017).

Centre (NZAGRC) and the Pastoral Greenhouse Gas Research Consortium) into the research and development of breakthrough technologies to reduce biological methane and nitrous oxide emissions (such as promising inhibitors and vaccines). This research is showing promising results. For example, last year DairyNZ launched a ground-breaking methane research facility at our Lye Farm research facility, which was funded by the Global Research Alliance and the NZAGRC.

2.8 New Zealand's global agricultural emissions footprint is small[8] but our ability to accelerate the reduction of global livestock emissions through farm system expertise and technology transfer is significant.

DairyNZ's engagement with the Interim Climate Change Committee (ICCC)

2.9 DairyNZ have primarily engaged with the ICCC members and their Secretariat at the policy level through the Agriculture Challenge and Review Group (AG CHARG), which met a total of nine times. During this process we have helped the ICCC compare various policy options by providing input and feedback on criteria such as the ability to reduce emissions, suitability for a split-gas approach, implementation costs and practicality, timing, and other considerations (such as limitations, trade-offs, or perverse outcomes).

2.10 DairyNZ also attended several ICCC-organised cross-sector Chief Executive and Technical Forums, and regional rural meetings, in order to participate in robust discussions with other industry and business leaders, and rural communities, on the ICCC's draft proposals and agriculture's role in addressing emissions in general.

2.11 In addition, the DairyNZ Economics Group undertook some distributional analysis of dairy farm biological greenhouse gas (GHG) emissions using our Baseline farm data for the ICCC. The aim of the analysis was to compare estimation methods for calculating biological greenhouse gas emissions on New Zealand dairy farms with those from Overseer and to assess the impact of various allocations at a range of carbon prices using the various estimation methods. We provided distributional graphs and tables required to describe the outcomes of the analysis to assist the ICCC with their recommendations for allocation and methodology.

2.12 The ICCC also met with our Climate Change Ambassadors at the end of 2018, for a workshop and site visit at Owl Farm. This meeting was well received by the farmers, many of who found the session valuable and were impressed by the depth of thinking and analysis that had been done to date. They were also able to provide some integral feedback to the ICCC on their early thinking around pricing options and companion policies.

3. Comment on 'Incentivising farmers to reduce emissions'

What is the best way to incentivise farmers to reduce on-farm emissions?

3.1 In order to best incentivise farmers, a policy framework needs to be easy to understand and use, cost-effective, and set at the farm level where they can make changes on-the-ground. Introduction of pricing will not achieve the required behaviour change, or could have unintended effects, if not supported by robust analysis and broader context. Overall, it must be designed in a way which is:

- Outcome focused (New Zealand actions lead to global emissions reductions);
- Science-based;
- Transparent;

[8] Global Livestock Environmental Assessment Model -- http://www.fao.org/gleam/en/.

- Not imposing costs that compromise the competitiveness of New Zealand's primary sector; and
- Accompanied by robust impact assessment which takes into account environmental, social, economic, and cultural considerations.

3.2 Farmers view effective environmental management as a core part of farming. Many see themselves as kaitiaki of their property with a long-term vision for its environmental sustainability. But as with every decision they make on their farm, environmental management is weighed up on a cost/benefit basis – with a balance needing to be struck between financial and environmental sustainability, as well as time constraints to make the best short-term and long-tern decisions.

3.3 Sustainable Land Management and Climate Change research showed that 92 percent of farmers surveyed in 2018 were focussed on making their farms more environmentally sustainable. Specific actions mentioned show an increase, notably riparian/shelter planting, waterway control, improved fertiliser management, and more efficient irrigation systems (up from 78 percent in 2009); but that only 23 percent of farmers anticipated an increased focus on reducing their greenhouse gas emissions in the next five years. In addition, five percent said financial assistance, incentives, or subsidies are most likely to encourage action to make their farms more environmentally sustainable. Seeing initiatives work on other farms/businesses similar to theirs increases farmer confidence that actions will be effective[9].

3.4 We know that there is relatively low awareness of, or engagement in, the issue of greenhouse gas emissions in dairying. There is some awareness of the broader macro-economic focus on emissions reduction; but the connection between the climate change impacts of greenhouse gases, New Zealand's international commitments, Government's policy objectives to move to a low emission economy, and what that all means for the dairy industry and individual is not widely understood or accepted.

3.5 For dairy farmers to be willing to take action to reduce their on-farm GHGs, they need to understand where the emissions are coming from on their farm, what their number is and how this compares to others, what mitigation options are available and how to decide between them, who they can trust to help them.

3.6 Setting a price on emissions won't alone be enough to drive reductions. Significant co-investment is needed on mitigation innovation, skills development, and infrastructure. This is why DairyNZ supports a policy package approach which incorporates complementary measures to address non-price barriers to mitigation. This could include investment to increase the scope and scale of farmer and rural professional extension services, as well as the range of decision-support, emissions reporting, and benchmarking tools. The implementation of Farm Environment Plans (FEPs), that integrate actions on GHGs with those on water, biodiversity, biosecurity, animal welfare, and consider farm financials, will be another critical part of this package.

Should livestock emissions be priced at the farm level?

3.7 Livestock emissions should be priced at the farm level on the basis that farmers have the most direct influence over the management decisions that affect emissions and offsets within their farm systems. A price on emissions at the processor level would be ineffective at sending any price signal to incentivise on-farm

[9] https://www.beehive.govt.nz/release/farmers-focused-climate-change.

emissions reductions or sequestration because the signal would be too diffuse, and all farmers would be taxed the same regardless of their emissions efficiency.

3.8 The ICCC recommends a levy/rebate scheme as the most effective and cost-effective way to manage agricultural emissions and support New Zealand's ability to manage the transition toward long-term targets. Depending on how any free allocation is distributed, some farmers would pay for their emissions while others would receive a rebate. Relative prices could be adjusted over time to ensure they reflect the New Zealand Emissions Trading Scheme (NZ ETS) price and different targets for different gases.

3.9 DairyNZ agrees with the analysis of the ICCC which concludes that the implementation of a farm-level emissions levy and rebate scheme, including the use of FEPs, would be less complex and less costly for farmers to comply with than if they faced surrender obligations under the NZ ETS. Revenue collected on emissions above allocation (or carbon removals) could be recycled into an Agricultural Emissions Fund.

3.10 This was also the favoured priced-based option of attendees (many of which were farmers) to the ICCC regional rural meetings, as it is simple and effective, enables individuality, is a good mix of incentives and penalties, avoids grandparenting, allows new entrants, supports a split-gas approach, and re-invests in the sector.

3.11 Because a farmer-level system would require three to five years to set up, this policy likely could not be implemented until 2025. Farmers may also just choose to pay the levy if the cost of compliance is higher, a levy in general has negative connotations, and adding an unnecessary bureaucratic layer to revenue recycling should also be avoided.

3.12 DairyNZ supports a price signal at the farm level being implemented in 2025 as part of a wider behaviour change framework. We want to work with the Government to determine the best way to price biological emissions in a way which drives behaviour change and rewards actions undertaken by farmers.

Should fertiliser emissions be priced at the processor level?

3.13 DairyNZ believes that nitrous oxide emissions from the on-farm use of fertilisers should also be priced at the farm-level from 2025, as the best way to incentivise emissions reductions across the sector.

3.14 Farmers are able to manage nitrous oxide emissions from fertiliser by adjusting fertiliser quantity and type, and incorporating the use of urease and nitrification inhibitors. In addition, managing nitrous oxide emissions from livestock and other practices include making decisions about liming, imported feeds, stocking rates, stand-off platforms, effluent, and manure management. Applying a single priced-based mechanism at the farm level will avoid misalignment and confusion, and enable costs to be more directly factored into a suite of these management options to reduce emissions overall for an efficient production system. This approach requires transparency in prices and flexibility for options at farm level.

3.15 Pricing fertiliser emissions at the processor level based on a national average, as proposed, risks missing out on regional and climatic differences, does not affect farmer choice, and therefore does not incentivise increased GHG-efficient production on-farm. Rather, it will simply result in farmers paying a levy to ultimately produce milk and/or meat. As an analogy, the impacts may be similar to a levy on petrol. An additional levy

embedded in the price of petrol has limited transparency, there are limited options, and thus limited effect on behaviour.

3.16 Over 9,250 farmers are currently in OverseerFM. They have already been calculating their water footprints but most are unaware that similar functionality exists for generating GHG footprints. Most available mitigations for nitrous oxide are already incorporated into OverseerFM's methodology (see table 1), and there is an existing work programme to further develop OverseerFM and to incorporate additional science and mitigation measures.

Table 1: GHG emissions mitigation technologies and whether or not each can be implemented using OverseerFM and New Zealand's Greenhouse Gas Inventory methodology.

Mitigation technology	OVERSEER®	Inventory
Reduce N fertiliser applied to soils	Yes	Yes
Apply N fertiliser with urease inhibitor	Yes	Yes
Apply nitirifcation inhibitor	Yes	Yes
Apply N fertiliser when N losses lowest	Yes	No
Replace some pasture with lower N feed	Yes	No
Use stand-off pad when N losses highest	Yes	No
Apply effluent when N losses lowest	No	No
Reduce animal stocking	Yes	Yes
Reduce dairy cow replacement rate	Yes	Yes
Reduce enteric CH_4 EF using inhibitor, vaccine, alternative feed (e.g., brassica) or animal selection	Yes	Yes

Source: Amended from NZAGRC [10] (OverseerFM now includes urease inhibitor).

3.17 DairyNZ believes that an integrated approach should be adopted for managing emissions on-farm. The primary sector has identified a 5-year programme of action that includes a workstream for agreeing methodology and systems for calculating and reporting animal emissions. The administrative costs to implement a priced-based mechanism for on-farm emissions from fertiliser use can be minimised by ensuring that these tools can also accurately estimate fertiliser emissions.

4. Comment on 'Setting legislative milestones for farm level'

4.1 DairyNZ acknowledges the importance of holding the agricultural sector to account in making good on our commitments. This includes by setting time-bound milestones ahead of 2025, to track progress and maintain momentum. It is important that these milestones are realistic and aligned with legislative processes already in train.

[10] https://www.nzagrc.org.nz/policy,listing,229,report-desk-top-review-of-ghg-components-of-overseer.html

4.2 As such, DairyNZ along with ten other farming sector organisations, identified potential time-bound milestones needed for delivering a farm-level pricing mechanism by 2025 through the *Primary Sector Climate Change Commitment: He Waka Eke Noa*. These milestones require commitment to act not only from the agricultural sector but from Government also:

- By 2020,
  - Roll out of methane genetic selection to a pilot group of breeders, followed by release to sheep breeders and industry.
  - Incorporate mitigation of Brassica Rape into the New Zealand's Greenhouse Gas Inventory.
- By 2021,
  - The proportion of farmers who understand the actions they can take to reduce farm GHGs will have increased from 50 to 90 percent.
- By 2022,
  - All farmers will know their farm emissions numbers.
  - The proportion of farmers who expect to place a moderate or major focus on reducing their GHGs will have increased from 23 to 70 percent.
  - Programmes to assist farmers to establish and maintain newly planted areas will be established.
- By 2023,
  - All farms will have access to region and sector specific climate change adaptation information and resources.
- By 2024,
  - Piloting of an emissions reporting and benchmarking system will be completed.
- By 2025,
  - A system for farm-level accounting and reporting of agricultural emissions will be in place at farm level.
  - All farms will have FEPs in place.
  - Progressive targets for uptake of FEPs over the period to 2025 will be developed and agreed with the Government.
  - At least 70 percent of farmers will agree they are managing their GHGs in accordance with their FEPs.
  - Accelerate the advancement of inhibitor and vaccine methane reduction technologies for use in grass-fed systems and confirm their impacts on productivity.
  - All farmers will have planting opportunities identified in FEPs, including recognition of small-scale sequestration.
  - All farmers are prepared for the effects of climate change through identifying strategies and planning for adverse weather events in their FEPs.
  - There are appropriate pricing frameworks that can be practically implemented at farm-level.

5. Comment on 'Interim options to get started now'

What are the key building blocks for a workable and effective scheme that prices emissions at farm level?

5.1 The emphasis needs to be on developing a policy framework for pricing emissions at the farm level in a way which:

- cost-effectively reduces emissions;
- is easy for participants to understand;
- minimises administrative and transaction costs;

- allows for innovation;
- rewards positive actions;
- copes with uncertainty of emissions reduction targets and prices; and
- adequately accounts for on-farm sequestration.

5.2 DairyNZ believes that based on the above criteria, the levy/rebate scheme is more favourable compared to the NZ ETS.

5.3 In addition, it will be important to further design a system which:

- can be verified;
- recycles revenue back to the sector efficiently and fairly;
- sees farmers' efforts recognised;
- applies a netting-off approach;
- supports collaboration;
- is transparent and predictable;
- retains flexibility; and
- supports efficiency but also incentives a decrease in absolute emissions.

What should the Government be taking into consideration when choosing between options?

5.4 When considering between options, the Government should select the one that has the greatest potential to:

- Deliver clear, multiple benefits for climate change mitigation and adaptation, as well as its broader social and economic goals;
- Incentivise the adoption of low-carbon farming practices in the most efficient and effective manner, noting that these approaches will need to be specifically tailored to New Zealand's distinct regional characteristics and farmer needs;
- Build climate resilience;
- Encourage collaboration, as it is important for the agriculture industry to work hand-in-hand with the Government to ensure the most efficient approach and system to reducing emissions is created; and
- Secure rural community and farmer buy-in.

As an interim measure, which option would be best?

5.5 DairyNZ strongly considers Option 2 -- a formal sector-government agreement, as the preferable interim measure to achieve action on agricultural emissions. We, along with ten other farming sector organisations, drafted the *Primary Sector Climate Change Commitment: He Waka Eke Noa*, which seeks to work in good faith with government and iwi/Māori to design a practical and cost-effective system for reducing emissions at farm level by 2025. It outlines a proposed 5-year programme of action aimed at ensuring farmers and growers are equipped with the knowledge and tools they need to deliver emissions reductions while maintaining profitability; and contains concrete milestones and investment by the sector to ensure it is delivered on.

5.6 The key workstream areas of the *Primary Sector Climate Change Commitment: He Waka Eke Noa* are:

- Developing emissions reporting systems;

- Integrating climate change, including emissions reductions and climate adaptation, into FEPs for all farms;
- Building the farmer and rural professional climate change related knowledge base through enhanced extension and engagement;
- Increased investment in research and development to expand the toolbox available to farmers;
- Engaging with the One Billion Trees Programme to enhance on-farm carbon sinks to offset farm emissions; and
- Developing strategies for farm climate change adaptation.

5.7 Before pricing is appropriate to be applied, we must create the platforms for our farmers to act from. We support the ICCC's recommendation that a permanent price-based mechanism should be implemented at the farm level and be accompanied by FEPs, an extensive extension network to support farmers, and on-farm greenhouse gas recording and benchmarking so farmers can reduce their emissions. However, we do not consider pricing livestock and fertiliser emissions at the processor level in the NZ ETS over the next five years (Option 1), to collect funds from the industry only to distributes it back again, is the right approach for a number of reasons:

i. Two-thirds of attendees to regional rural meetings held by the ICCC did not support Option 1, with the remaining one-third of attendees conditionally supporting this option, only if:
   - there is an ability for processors to differentiate between farmers in pay-out;
   - the levy is small (eg. $25/tonne);
   - its effectively used by industry to educate farmers; and
   - it has a sunset clause.

ii. Although we support an interim measure in general to give direction, gain momentum, and allow farmers to demonstrate they are contributing, we are concerned that Option 1 will get locked in as policy, inefficiently recycle revenue, cause confusion among farmers, could deter industry from investing into Research & Development, and have a dampening effect on any action plan progress towards achieving farm-level pricing sooner.

iii. Pricing at the processor level does not differentiate between low and high emitters, thereby reducing the strength of the signal.

iv. Fails to reward early adopters who have made adjustments to their systems already.

v. It lacks an educational component, and places pressure on processors to police the system.

vi. It forces farmers to face a price on emissions before the tools and systems have been consistently developed and tested to allow them to make adequate choices for their farm system.

5.8 DairyNZ considers that Option 2 sets out a pathway that ensures the industry will be ready for a farm-level approach by 2025, better supports farmers to achieve emissions reductions now, represents a significant opportunity for industry and Government, and iwi and Māori, to constructively and collaboratively work together on genuine policy objectives, and is more likely to gain widespread support from farmers. DairyNZ's position is that we must first determine the programme of action and associated function requirements from industry and the Government, before a pricing instrument can be implemented.

5.9 Farmers are already investing in efforts for environmental benefit. They do this through the choices they make on farm, levies to industry-good bodies such as DairyNZ and Beef+Lamb New Zealand, and also through their dairy companies. Over the next five years, we consider it is better to keep the money in the hands of farmers so they can continue to invest in the work on their farm (such as infrastructure, irrigation, stock exclusion, and planting) that will make the most difference.

DairyNZ's proven track record for delivery on climate change

5.10 DairyNZ is leading efforts on agriculture's contribution to meeting New Zealand's climate change goals by identifying and implementing strategies to reduce or offset greenhouse gas emissions from dairy farming. Reducing greenhouse gases is part of the Dairy Tomorrow Strategy as a key commitment for dairy.

5.11 Through the Dairy Tomorrow Strategy, the dairy sector supports action to address agricultural emissions being driven and recognised at the farm level. To this end, we have publicly committed to ensuring all farms will prepare certified farm plans and report on progress implementation by 2025. We are working with Government, rural professionals, and others to gear up for that, so we are all continuing to keep New Zealand world-leading as a low-carbon dairy nation, and internationally competitive.

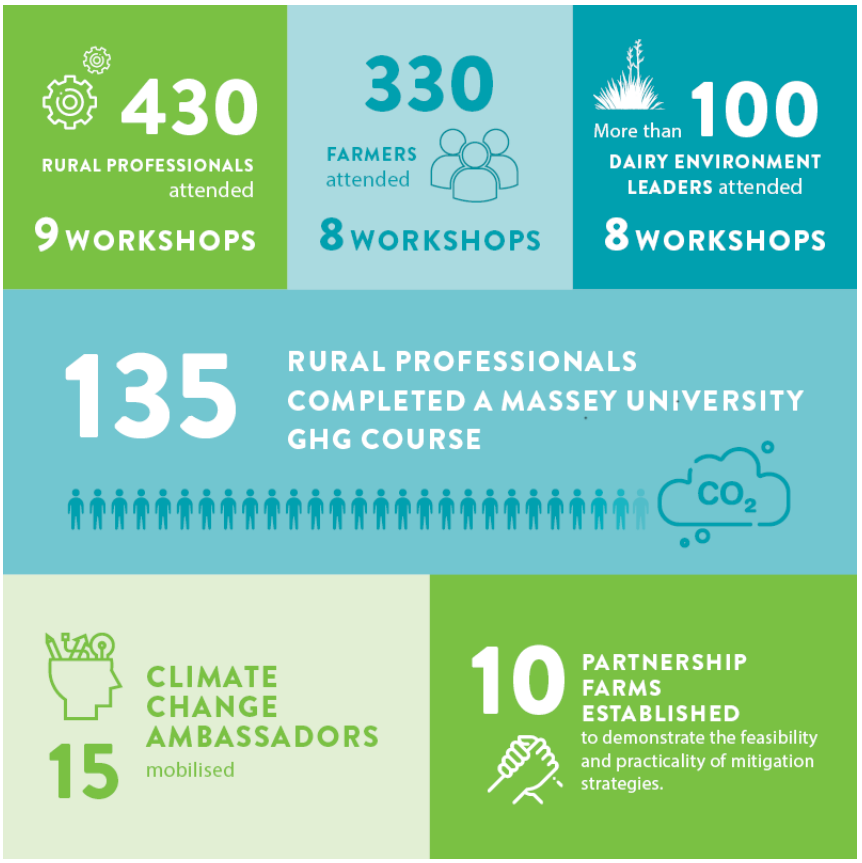
5.12 In 2016, we helped establish and co-chair the Biological Emissions Reference Group (BERG) in order to proactively identify the opportunities to reduce biological greenhouse gas emissions from New Zealand agriculture and the costs and benefits of these opportunities, and any barriers to their use. This initiative helped progress conversations between industry and government and resulted in the publication of an extensive summary report[11] of research which helped inform proposed emissions reduction targets in the Climate Change Response (Zero Carbon) Amendment Bill 2019 (ZCB).

5.13 At the end of 2018, we completed stage 1 of the Dairy Action for Climate Change (DACC), an 18-month work programme launched in June 2017 in partnership with Fonterra and with support from government agencies. This initiative included commitments to build capability of rural professionals through professional training courses, raise the awareness of farmers, trial on-farm emissions reports, and undertake dairy farm greenhouse gas pilot case studies.

5.14 As a result, DairyNZ has delivered 25 farmer and rural professional climate change workshops and additional farmer discussion groups, funded 135 rural professionals to be trained in greenhouse gas emissions, mobilised 12 farmers as leading Climate Change Ambassadors, and established 10 Partnership Farms (see Appendix 1) to show farmers the mitigation options available (see figure 1).

Figure 1: Summary of outcomes achieved to date through Dairy Action for Climate Change.

[11] https://www.mpi.govt.nz/dmsdocument/32125-berg-report-final-for-release-6-dec



Source: DairyNZ

5.15 We have a proven track record for delivering climate change-related work programmes and commitments and integrating the key learnings with our world-leading water research programme to develop evidence-based adaptation pathways for our farmers.

What additional steps should we be taking to protect relevant iwi/Māori interest, in line with the Treaty of Waitangi?

5.16 The critical importance of unlocking the potential of Māori land to help improve social, economic and environmental outcomes for iwi, hapū, and whānau is well-understood. A broad range of strategies, programmes and investment funds have been launched in recent years to improve the utilisation and productivity of Māori land. Key initiatives include:

- He Kai Kei Aku Ringa (the Crown – Māori economic growth partnership) which aims to lift Māori land performance and productivity, and strengthen links between innovation and Māori enterprises and collectives; and
- Whenua Māori Programme, jointly launched by Te Puni Kōkiri and the Ministry of Justice at the beginning of 2019, to provide on-the-ground support for Māori landowners in key regions, amending Te Tue Whenua Māori Act 1993 to provide a more effective regulatory framework for land-based assets, modernising Māori Land Court information systems, and creating a Knowledge Hub (including the launch of the WhenuaViz website) to provide landowners with a new suite of digital tools and maps to support them in developing and implementing their land management strategies.

5.17 These initiatives indicate that our collective understanding of the unique characteristics and growth potential of Māori land is still developing. Recent research undertaken by the Federation of Māori Authorities and

Business and Economic Research Limited[12] (for submission to the Interim Climate Change Committee) also highlighted the importance of incorporating GHG management components in the education, training and extension services provided to Māori land owners to build management capability, and ensure that Māori engagement in these programmes is measured in a more systematic way. The research also identified a number of systemic "pipeline" issues relating to the engagement of Māori youth in science (including agriculture and horticulture) at both secondary and tertiary levels.

5.18 It is essential that the Government's final policy decisions on agricultural emissions maintains momentum and creates a regulatory environment that supports the continued development of Māori agribusiness opportunities. It is also important to ensure that future regulatory approaches retain the flexibility to combine Western scientific and indigenous land management practices.

6. Comment on 'Opening up opportunities'

What barriers or opportunities are there across the broader agriculture sector for reducing emissions? What could the Government investigate further?

6.1 New Zealand has a good understanding of the barriers to achieving emissions reductions across the broader Agricultural sector, namely:

- Lack of farmer trust in the science, combined with limited capability to identify, acquire, and implement feasible, cost-effective mitigation technologies and land management practices;
- Perceived complexity of emissions monitoring, reporting and enforcement systems;
- Low levels of business confidence due to:
    - Perceived investment risk (i.e. that the pay-offs from investment in mitigation technologies and/or farm-system change won't be enough to meet emissions targets and safeguard the viability of their farms);
    - Deep-rooted concern that intensifying regulatory requirements (for both water and carbon management) will compromise their viability and accelerate the decline of their local communities; and
    - Inability to access the high-quality (ie. first tier lenders) and affordable debt financing and capital investment that will be necessary to fund the on-farm change process; and
- Low levels of awareness of new market opportunities for low-carbon foods (and how to exploit them), both now and into the future.

6.2 These barriers are not insurmountable and there are some potentially important lessons to be learned from international experience. For example, the United Kingdom Government is re-engineering its approach to agricultural policy to take into account:

- The often-hidden additional benefits that improved environment outcomes on farm deliver in terms of promoting national wellbeing, health, and economic prosperity[13]; and

[12] Education, training, and extension services for Māori land owners. 2019. https://www.iccc.mfe.govt.nz/assets/PDF_Library/f12a9f85fb/FINAL-BERL_FOMA-Education-training-and-extension-services-for-Maori-land-owners-BERL_FOMA.pdf

[13] A Green Future: Our 25 Year Plan to Improve the Environment. https://www.gov.uk/government/publications/25-year-environment-plan

- The need to start awarding public money for the enhancement and protection of the environment as a pre-eminent public good, over and above any actions set out in the regulatory baseline[14].

Policy Integration and Alignment

6.3 The ZCB will be the latest addition to an already complex and highly fragmented policy landscape. Over the last few weeks in addition to the ZCB, the Government has launched a comprehensive review of the Resource Management Act. It will commence public consultation on the Essential Freshwater Package, which is expected to contain far-reaching changes to the National Policy Statement for Freshwater Management, before the end of August. The Reserve Bank is also contemplating changes to its capital adequacy framework which is likely to increase the cost and availability of capital.

6.4 Work on policy processes that have the potential to deliver a step-change in the primary sector's innovation potential and management capacity (e.g. regulation of gene editing, use of agricultural compounds, and mechanisms to improve workforce capability) are unlikely to deliver the level of transformative change that is required to transition to a low-carbon economy in the near-term. Thus, there is an urgent need for the Government to deepen its understanding of the primary sector's regulatory environment, and work at speed to align and integrate its policy processes.

6.5 There is also a need to mobilise community action. Across the country regional councils, to meet the requirements of the National Policy Statement for Freshwater Management (NPS-FM), are working with their communities to identify freshwater management units, set objectives for the state of fresh water bodies, and set limits on resource use to meet those objectives. Given the co-benefits associated with effective freshwater management practices and GHG emissions outcomes, the Government should be supporting regional councils to use these NPS-FM processes as an opportunity to develop low-carbon visions for their communities.

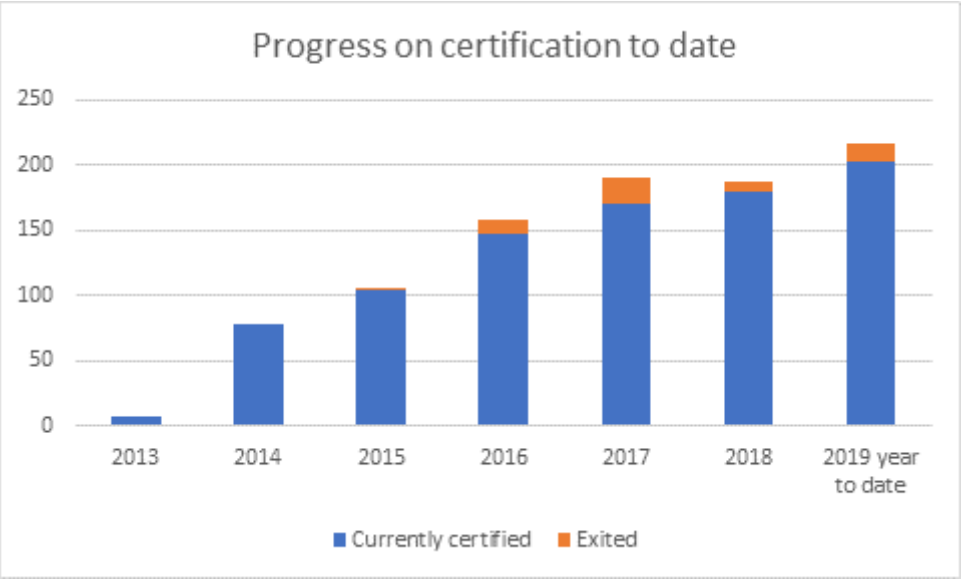
Capacity and capability of rural advisors

6.6 To be credible and competent, rural professionals and farm advisors need to be able to provide accurate and consistent advice and they need to be armed with the right tools and resources to help farmers make the right decisions in the context of their particular farm system.

6.7 The Nutrient Management Advisor Certification Programme (NZMACP) is industry-wide and targeted at those who provide nutrient management advice to New Zealand farmers, with the intention of ensuring this advice of the highest standard. There are currently 202 certified nutrient management advisors (see figure 2).

Figure 2: Progress on the levels of NMACP-certified nutrient advisors over time.

[14] Health and Harmony: the future for food, farming and the environment in a Green Brexit – policy statement (which provided the basis for the Agriculture Bill 2018). https://www.gov.uk/government/publications/the-future-for-food-farming-and-the-environment-policy-statement-2018/health-and-harmony-the-future-for-food-farming-and-the-environment-in-a-green-brexit-policy-statement



Source: Fertiliser Association of New Zealand.

6.8 The NMACP endorsement for GHGs requires that advisers have completed the Massey University course *An Introduction to New Zealand's Agricultural Greenhouse Gas Emissions and Management* and that they are already certified nutrient management advisers. Over 40 advisors are currently endorsed for greenhouse gases, and it is expected that this number should rise to 60 by the end of 2019. Although a total of 122 have completed the Massey University GHG course to date and another 25 are scheduled for September, most of these advisors are not NMACP certified.

6.9 Certification takes time and has an associated cost, so numbers certified reflect demand (such as when regional councils put in requirements). Even in a situation of growing demand based on the requirement for the inclusion of GHG components in FEPs, there would be a limitation on the rate at which certification or endorsement can occur, which may result in a deficit situation – with programmes struggling to keep up with demand. In addition, it is often only the principal advisor in a consultancy who is certified, who is then both supervising and signing off FEPs delivered on behalf of junior staff. This makes it difficult to consider how may certified advisers are required to generate a specific number of FEPs within a set timeframe. Turnover is also an issue to be considered.

6.10 However, there is a large potential pool of pre-certified advisors that could proceed to certification if demand rises. Undertaking the Massey University *Advanced Sustainable Nutrient Management in NZ Agriculture* course is a pre-requisite for NMACP certification. By April this year 809 had met the advanced course requirements with a further 71 advisers undertaking the advanced course this year. It is possible the numbers of certified advisers could double reasonably quickly if needed.

6.11 There is currently under capacity in the agricultural sector to deliver FEPs for all farmers in the timeframes desired. DairyNZ recommends that industry and government need to better align efforts and approach on the acceleration of rural professional training and certification programmes in order to:

- Increase efficiency of investment;
- Ensure the consistency, quality, and credibility of the advice farmers can access;
- Signal an expectation that there will be an increasing need for qualified advisors to undertake farm reports; and

- Ensure GHG reduction is mainstreamed into dairy system management.

Ability for farmers to mitigate their emissions now

6.12 DairyNZ's Science and Economic Groups estimate it is possible for the dairy industry to achieve up to 10 percent emissions reduction over a 10-year period (i.e. by 2030) but that this could result in an average decrease in operating profit per hectare of four to seven percent, depending on cost of mitigation. This recognises the availability of existing options to achieve the level of mitigation required to achieve the 2030 target, the length of transition time, the high assumed level of initial free allocation (95 percent) and the slow rate at which it is predicted to be reduced per year (one percent).

6.13 For the dairy industry, these mitigation options include reducing total feed and overall nitrogen input through a combination of: reducing supplementary feed and adjusting stocking rate appropriately, using low-protein supplementary feeds in place of higher protein feed types, reducing use of nitrogen fertiliser, improving pasture and crop management to maximise dry matter yield and quality, increasing the genetic merit of cows, and/or improving animal health, longevity and reproductive performance.

6.14 However, the success of current farm mitigation options to reduce on-farm emissions while maintaining or improving profitability will depend on a range of factors, including current farm system and management, farmer skill levels, how mitigation options are implemented, and other economic indicators.

6.15 Through the DairyNZ Partnership Farm project (see Appendix 1), involving modelling on 12 farms across the country, we have also learned that there is not a 'one-size-fits-all' package of changes that every farmer can use. Mitigation will need to be farm-specific, as not all options are relevant to all farms. Opportunities to improve both profit and reduce emissions through good management practices will be more challenging for those farms that are already implementing efficient systems, and some mitigations could result in conflicting environmental outcomes.

6.16 A greater than 10 percent reduction in absolute biological emissions by 2030 will lead to greatly increased costs to farmers over the next decade, with the flow-on effects to farm solvency and regional economies. Technically, a greater target would likely require a combination of on-farm mitigation, land-use change, and potential alternative solutions (e.g. feed additives, genetics, vaccines) which are currently under development.

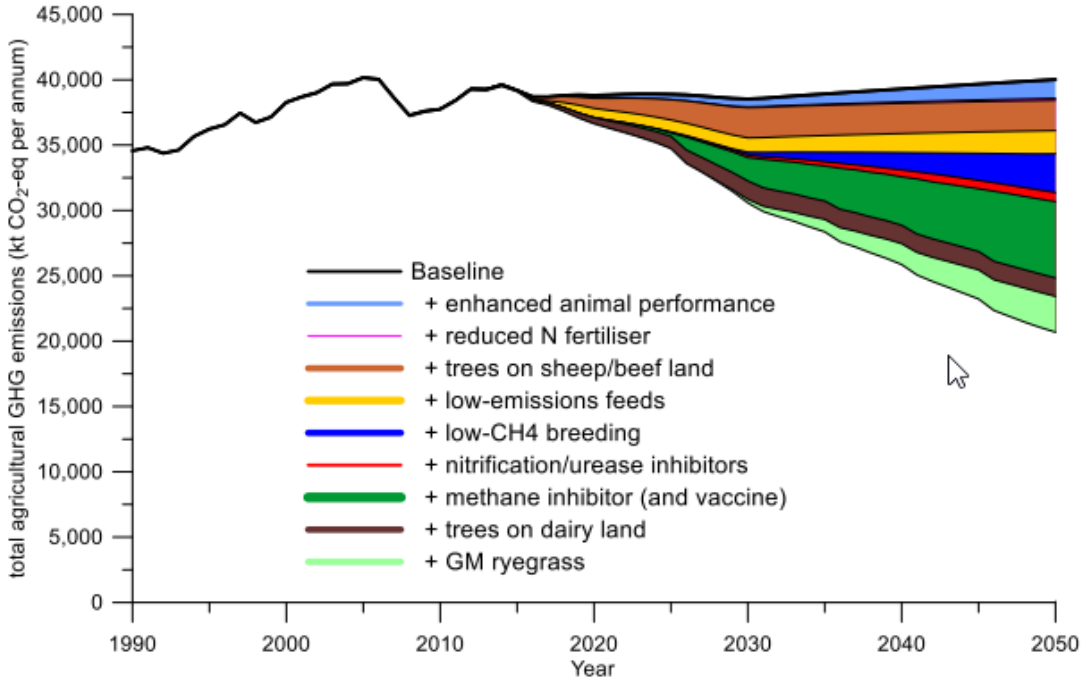
Ability for farmers to mitigate their emissions in the future

6.17 There is a very strong relationship between feed intake and methane emissions; thus, technological mitigation options are aimed at uncoupling this relationship. These mitigation options include feed additives, vaccines, genetically selected cows, selected plants (e.g. plantain, forage rape) and genetically modified plants. There is current, and future, investment in these solutions; however, they are not yet commercially available and are unlikely to be implementable on typical New Zealand farm systems for another five to 20 years.

6.18 The sheep industry has developed a low methane line of sheep that produce about nine percent less methane per kilogram of dry matter intake with no detrimental effects on productivity traits. This research has now been initiated in dairy cows, with identification of low and high methane emitting bulls and validation of emissions from progeny. If successful, it has the potential to lower emissions by one to two percent per year.

6.19 It is unlikely that a large shift in overall emissions can be achieved with a single mitigation option. Qualitative assessments and quantitative modelling by the BERG indicated that when various future mitigation options are combined into packages (assuming various rates of adoption by farmers), overall biological emissions could potentially be reduced between 10 to 21 percent by 2030, and by 22 to 48 percent in 2050, relative to MPI baselines. These ranges are based on assumptions of technology becoming available (see figure 3).

Figure 3: Cumulative effect of a comprehensive package of mitigation options for dairy, beef and sheep, for maximum assumptions about efficacy and adoption rates for each mitigation option.



Source: BERG 2018.

6.20 Achieving any package in-full would have considerable consequences for the intensity of farm management as well as potentially for infrastructure and would require targeted support and training programmes to turn it into a feasible scenario. The impact of such a package of mitigations on farm profitability or the distributional effects on different farms are not currently known. It is also worth noting the key contribution of an inhibitor and vaccine to meeting ambitious future targets in the graph above.

6.21 At present, there is low confidence that a methane vaccine with the potential to deliver 30 percent reduction in biogenic methane will be available by 2030, and medium-high confidence that one will be available by 2050. As for a methane inhibitor, there is medium-high confidence of one for grazing systems that can deliver a 30 percent reduction in biogenic methane will be available by 2030, and high confidence that one can deliver between a 30 to 50 percent reduction by 2050. However, there is no guarantee that these technologies will be implementable in our systems, affordable, nor consistently achieve this expected level of emissions reductions.

6.22 It will not be possible to meet an ambitious 2050 target without very large financial costs to dairy farms and the dairy sector unless the breakthrough technologies under development coming to fruition. Some of the barriers are regulatory, some are scientific or economic. DairyNZ is therefore supportive of Government and Industry:

- Continuing co-investment in the development of the breakthrough technologies to support the agricultural sector to remain competitive, profitable, and sustainable as it goes through these changes, not just on climate change, but for other regulations such as water quality;
- Creating a framework and protocol within the Hazardous Substances and New Organisms Act and the Agricultural Compounds and Veterinary Medicines regulations for new compounds and technologies to be imported, tested, manufactured and applied on-farm;
- Ensuring the processes in place through the CODEX Alimentarius system for new compounds and technologies are up-to-date to ensure that they will be accepted by New Zealand's key trading partners and within the domestic market;
- Undertaking case studies of different farms looking at the mitigations undertaken to meet the catchments nutrient limits and the effect on nitrous oxide and methane emission; and
- Implementing processes to ensure the National Greenhouse Gas Inventory can account for new mitigation options and technologies as they emerge.

Ability for farmers to offset their emissions

6.23 Previous work by AgResearch, Motu and Maanaki Whenua[15], suggests that changes already implemented by some councils to meet existing policy requirements for freshwater management could reduce agricultural emissions by up to four percent through changes in farming practices, such as reduced fertiliser use and optimised stocking rates. In addition, up to 800,000 hectares of trees could be planted on agricultural land as a result of the National Policy Statement for Freshwater Management, which would sequester up to 14 percent of agricultural emissions.

6.24 Many farmers also carry out significant planting and management of vegetation on farm including in small woodlots, shelterbelts, riparian strips, and areas of native bush. These planted areas contribute to carbon sequestration as well as improving water quality, supporting biodiversity, and erosion control. They can also provide shade, shelter and dietary diversification for animals; or in some cases (e.g. farm forestry) may be harvested for productive use. Most of this work is carried out voluntarily and at cost to the farmer, for the purpose of protecting the environment. Farmers like to see their efforts and the benefits of this work recognised and accounted for.

6.25 Three case studies looked at by the BERG indicate that on-farm planting our farmers either currently have and are carrying out (such as small woodlots, shelter belts, riparian strips and pole plantings), offsets up to 2.5 percent of current gross livestock emissions on intensive lowland sheep and dairy farms, and about five to 20 percent on hill country sheep and beef farms. However, on-farm planting which does not meet the current criteria of a forest as defined in the NZ ETS is not eligible for credits.

6.26 The sector believes farmers need an appropriate policy framework which recognises and accounts for the sequestration already happening on farms (both regenerating native forest and plantation forestry) and is supported by appropriate incentives to encourage further planting. We want to ensure that farmers are not precluded from an ability to offset a portion of their total emissions at the farm-gate, but rather, are recognised for and incentivised to continue planting, alongside mitigation efforts.

[15] Shepherd M, Daigneault A, Clothier B, Devantier B, Elliott S, Greenhalgh S, Harrison D, Hock B, Kerr S, Lou E, Lucci G, Mackay A, Monaghan R, Müller K, Murphy L, Payn T, Timar L, Vibart R, Wadhwa S, Wakelin S. 2016. New Zealand's freshwater reforms: what are the potential impacts on Greenhouse Gas emissions? A synthesis of results from two independent studies. MPI Technical Paper No: 2017/21

6.27 DairyNZ continues to support the recognition of non-ETS planting such as small woodlots, riparian strips, wetlands, and shelter belts, where there is scientific evidence demonstrating carbon is being sequestered over the longer-term. We propose that through the development of the on-farm pricing mechanism, that this planting is counted via a "netting-off" approach. Farmers would face a cost on a portion of the emissions remaining once the on-farm planting and mitigations undertaken have been subtracted.

6.28 We note that sequestration that is not recognised in New Zealand's Greenhouse Gas Inventory would have to be dealt with separately from national targets and emissions budgets via subsidiary mechanisms, such as the FEPs. One possible avenue would be to apply discount factors for specific thresholds of action (eg. # hectares of riparian planting) when calculating emissions at the farm gate. Striving for absolute accuracy, although important, should not act as a barrier to giving farms recognition for behaviours we know have multi-beneficial effects on the environment.

Metrics

6.29 DairyNZ notes there are different metrics which can be used to account for the greenhouse gas emissions, such as GWP100 and GWP*. While we accept GWP100 is the metric that has been agreed to internationally and is currently being used domestically, we want to ensure the New Zealand Government continues to engage in the international negotiations regarding what the most appropriate metric is to account for the warming effect of different global greenhouse gas emissions as more science emerges about their warming impacts.

7. Comment on the impacts of the proposals

What impacts do you foresee as a result of the Government's proposals in the short and the long term?

7.1 The discussion document outlines a low cost associated with a price on emissions from dairy farms. Table 1 on page 22 of discussion document highlights an estimated cost of $0.01 per kilogram of milk solids, while Table 2 therein highlights a cost of $14 per hectare or $1,937 per farm. These costs are in line with our expectations but are highly dependent on a carbon price of $25 per tonne of greenhouse-gas emissions and a level of free allocation of 95 percent.

7.2 The carbon price is predicted to increase substantially in future years within New Zealand, as goals for emissions become more stringent. Vivid Economics[16] and Productivity Commission[17] present several potential trajectories for the carbon price. The median estimate predicts carbon prices of around $25, $50, $75, and $150 per tonne for 2020, 2030, 2040, and 2050, respectively. In contrast, NZIER[18] estimate carbon prices of up to $9; $495; $1,273; and $2,459 per tonne in 2020, 2030, 2040, and 2050, respectively. These greatly exceed those estimates generated for the BERG[19]. The highest price set generated therein was $80, $100, $120, and $150 per tonne in 2020, 2030, 2040, and 2050, respectively. Accordingly, we support the

[16] Vivid Economics (2018). Modelling the transition to a lower net emissions New Zealand: interim results, Report in conjunction with Concept Consulting and Motu Economic and Public Policy Research. Ministry for the Environment, Wellington.
[17] Productivity Commission (2018). Low-emissions economy, Productivity Commission, Wellington.
[18] New Zealand Institute of Economic Research (NZIER) (2019). Economic impact analysis of 2050 emissions targets: Stage 2 modelling, NZIER, Wellington.
[19] Dorner, Z., Djanibekov, U., Soliman, T., Stroombergen, A., Kerr, S., Fleming, D.A., Cortes-Acosta, S., and Greenhalgh, S. (2018). Land-use change as a mitigation option for climate change, BERG report 18398, Wellington.

discussion document action to more fully assess the impacts of different design options between now and 2025 (p. 20). Here, we encourage strong engagement with sectoral bodies who have access to data and expertise relating to the farm-level costs associated with mitigation and pricing emissions.

7.3 These estimates provided by the discussion document are also predicated on a high level of free allocation. The level of free allocation is important to help maintain the competitiveness of the New Zealand dairy sector, especially in the short term if the rest of the world does not follow New Zealand's example and price carbon[16]. This negative economic effect is so great that it will likely require the free allocation of all or most emissions to offset it [20] [21] consistent with international evidence[22]. Thus, we agree with the discussion document (p. 31) with regards to the need to subject decisions around free allocation to robust, objective analysis.

7.4 Emissions leakage remains a risk in the context of New Zealand dairy production. Pricing emissions has the potential to increase compliance costs, particularly if the carbon price increases or the level of free allocation is reduced. Together with the actions that will be motivated by the ZCB, the cost of milk production within the New Zealand dairy sector will likely rise, reducing market share to other countries where they can produce milk more cost-effectively[23] [24]. It is highly probable that requiring a marked reduction in methane emissions within the New Zealand dairy sector will lead to lower production levels, even with improvements in feed-use efficiency and the broad-scale adoption of a methane vaccine[14] [16] [18] [25]. It is likely, though not guaranteed, that this production will be substituted by more emissions-intensive production because of the high export exposure of the New Zealand dairy sector[26]. Indeed, Sense Partners (2018, p. 1-2) state that:

> *It is likely that… emissions intensive and trade exposed firms [such as NZ dairy farms] will face declining competitiveness. This conclusion is based on an expectation that climate policies will continue to be applied unevenly around the world…. This unevenness is embedded in socio-economic differences between countries and in the Paris Agreement on climate change.*

This risk is particularly significant in the case of the New Zealand dairy sector, as it is a major source of biological emissions and around 95% of its production is exported[15]. See section 8 for further thoughts on how this risk can be addressed.

7.5 It is prudent to consider the administrative costs of the regulatory scheme. Table 3 on page 23 of the discussion document highlights costs between $80 and $500 for a dairy farm. It is likely that the costs would

[20] New Zealand Institute of Economic Research (NZIER) (2018). Economic impact analysis of 2050 emissions targets: A dynamic computable general equilibrium analysis, NZIER, Wellington.
[21] Interim Climate Change Committee (2019). Action on Agricultural Emissions.
[22] Naegele, H., and Zaklan, A. (2019). Does the EU ETS cause carbon leakage in European manufacturing? Journal of Environmental Economics and Management 93, 125-147.
[23] Levinson, A., and Taylor, M. S. (2008). Unmasking the pollution haven effect, International Economic Review 49, 223-254.
[24] International Farm Comparison Network (IFCN) (2019). Dairy report 2018: for a better understanding of the dairy world, IFCN, Kiel.
[25] DairyNZ Economics Group (2017). Mitigation options to reduce GHG emissions on New Zealand dairy farms, DairyNZ, Hamilton.
[26] Sense Partners (2018). Countervailing forces: Climate targets and implications for competitiveness, leakage and innovation, Sense Partners, Wellington.

fall at or above the higher estimate of the range, for an individual dairy farmer. The assessment of emissions for a farm is a necessary step. But, administration costs for a farmer are borne more widely than this. The efficient reduction of emissions by individual farmers requires understanding how a range of alternative mitigation actions will affect emissions, production, and profit[27]. This requires an iterative evaluation of different options through emissions modelling (using a tool such as OverseerFM) and farm-profit calculations (using a tool such as FARMAX). This process can be time-consuming and expensive—typically imposing costs of much greater than $500 per farm, particularly if consultants are used.

8. Free allocation of emissions units

8.1 The Government has committed to providing 95 percent free allocation of emissions units if agricultural emissions were included in the NZ ETS. DairyNZ believes that free allocation of emissions units should be granted to the agricultural sector via any price-based mechanism, irrespective of whether this is a levy/rebate scheme or the NZ ETS, at a farm or processor point-of-obligation.

8.2 Free allocation of emissions units should also be divided proportionally across the agriculture sector so that each industry (eg. dairy, sheep, beef, deer, etc.) receives an initial 95 percent free allocation of their emissions. This will incentivise farmers across the sector to implement mitigation strategies specific to their farm systems. In addition, how the 2017 baseline will be set and applied, and how rolling averages could work needs to be clarified.

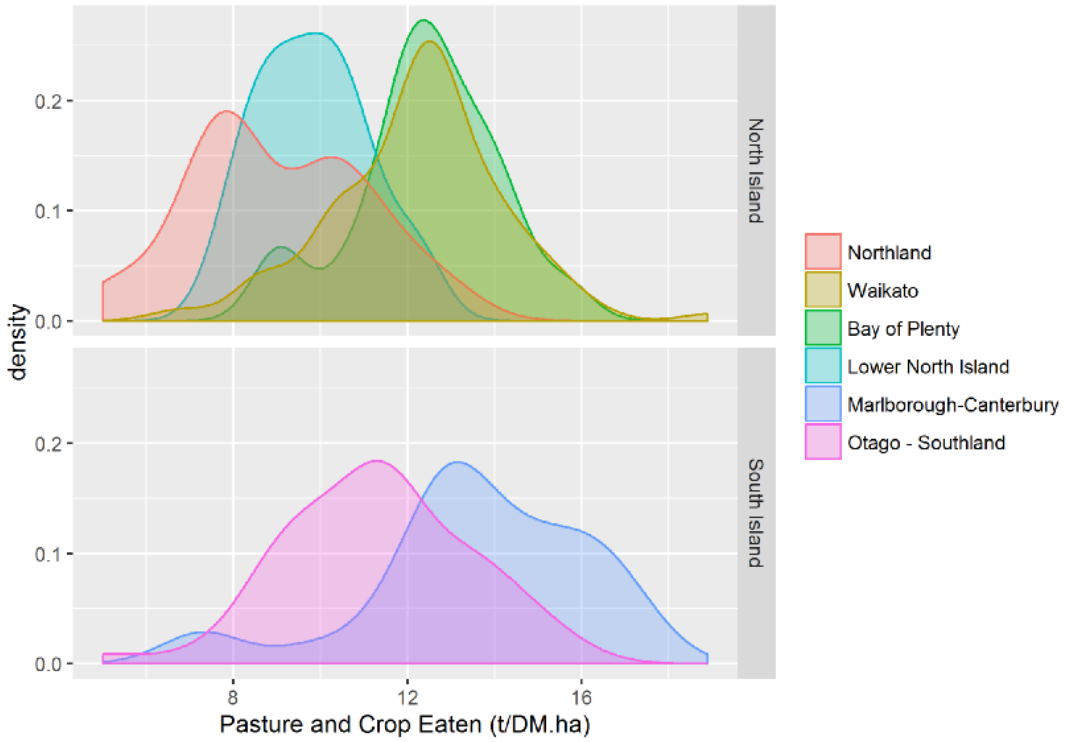
8.3 It is important when considering the allocation methodology that dairy farmers do not end up paying twice for a portion of their emissions. A recent example of this was required for the Biosecurity levy to recover costs from the *Mycoplasma bovis* response by allowing different rates to be set for different stock classes, so that dairy cattle could be exempt from a 'beef cattle' levy. One particular area to consider will be winter cows and young stock grazing to ensure an emissions price will only be charged once for the activities of these animals. It is vital that NZ ETS emissions factors are aligned with allocation factors, should Option 1 be chosen in the interim, to avoid milk and meat processors potentially over-charging farmers. All risks and causes need to be identified and resolved before a free allocation methodology is decided.

Methods for free allocation of emissions units at farm-level

8.4 An appropriately framed land-based allocation method has advantages in terms of reflecting the productive capacity of land used for dairy. It can, with estimation of emissions at a hectare level, provide strong marginal incentives (as outlined in ICCC Technical Appendix 5, Table 7). Different dairy regions have a different ability to grow pasture (see figure 4), which is inherently linked to the emissions volume per hectare. The need to consider these differences is recognised in the ICCC's Technical Appendix 5 (4.2.2), and we support further work on an appropriate method for land-based allocation for the dairy sector's share of emissions. It should be feasible to determine an allocation based on land quality – eg. pasture potential (independent of management), at least for dairy land, and apply at some appropriate spatial resolution (which may be more localised than a region).

Figure 4: Pasture and crop eaten (2012/13) by region, showing variation between and within regions.

[27] Doole, G.J. (2014). Least cost greenhouse gas mitigation on New Zealand dairy farms, Nutrient Cycling in Agroecosystems 98, 235-251.



Source: DairyNZ.

8.5 The ICCC's analysis showed that the land-based and output-based methods both have strong incentives to reduce GHG production. However, the output-based method has lower incentives to reduce emissions intensity, and so in principle could be less preferred (ICCC Appendix 5, figures 42 and 44). We note the concerns raised in the ICCC report, that an output-based approach may encourage some farmers to increase their output. While this is a valid theoretical concern, in practice, it is unlikely that dairy farmers will be able to significantly increase their output and/or convert additional land into dairy because of other national regulatory frameworks (such as the Essential Freshwater Package and the National Policy Statement on Indigenous Biodiversity), tightening regional planning consent requirements, and financial constraints.

8.6 A hybrid approach was recommended by the ICCC, partly because of less extreme outcomes on farm incomes as suggested by modelling (ICCC Technical Appendix 5, figure 20). However, these extremes were based on the very loose proxy for allocation of a flat rate per hectare, nationally, within each sector (ICCC Technical Appendix 5, page 6). We support further investigation of the land-based approach, and whether it could be suitable for the dairy sector by itself, or as part of a hybrid allocation system. As we support a free allocation to each sector separately, we note that other sectors need not choose the same allocation system as the dairy sector.

8.7 DairyNZ wants to continue working with the government on designing the details of a free allocation methodology at farm-level ahead of 2025.

Should the method for free allocation of emissions units at processor level be output-based?

8.8 DairyNZ considers the *Primary Sector Climate Change Commitment: He Waka Eke Noa* as the preferred option, compared to pricing livestock and fertiliser emissions at the processor level via the NZ ETS.

8.9 Free allocation of emissions units at the farm-level would be more effective at driving change than at the processor-level because there are significant regional and system-level differences between farms in both emissions efficiency and absolute emissions. There are some actions that processors could encourage farmers to adopt to reduce emissions, but this would require implementing a system that could monitor and audit these on an individual farm level.

8.10 If an interim price-based mechanism is introduced at the processor level, both output-based and proportional free allocation methodologies would similarly act as blunt instruments with a limited effect on behaviour. In the time available ahead of 2025, proportional allocation would be a more transparent and rational choice. Developing and implementing unique emissions factors under an output-based system as a temporary solution would not be worth the effort and could unfairly disadvantage certain processors without any notable change in agricultural emissions nationally.

8.11 More effective still, would be to accelerate the design and development of the monitoring and auditing system for farmer mitigation action, and to allow processors the ability to voluntarily move to farm-level before 2025.

Should free allocation of emissions units be provided at the same time emissions obligations are due?

8.12 Yes, we agree free allocation of emissions units at the processor-level should be provided at the same time as emissions obligations are due in order to limit market fluctuations and large-scale trading of units which could cause greater price volatility.

Should allocation factors be updated in line with business-as-usual improvements in emissions intensity?

8.13 No, allocation factors should be not be updated regularly (if output-based or land-based methodology is chosen) in line with improvements in emissions intensity and uptake of new technologies and practices. This is because the benefits of these are not known instantaneously, but rather, are revealed as a trend over time. A more appropriate way to take these potential improvements into consideration would be through the free allocation phase-out setting process.

8.14 The allocation factors, should however, be updated to align with the data and emissions factors used within the New Zealand's Greenhouse Gas Inventory. This should be kept to a minimum, as frequently changing the allocation factors would be confusing for farmers. These adjustments should also be considered together with reductions in the free allocation of emissions units because both have a similar impact on the costs faced by processors or farmers.

Should the process for making decisions on any phase down of free allocation of emissions units be set in legislation and informed by the Climate Change Commission?

8.15 Yes, DairyNZ agrees that the process for making decisions on the level and any phase down of free allocation of emissions units, as well as the allocation factor and any adjustments to it, should be set in legislation and informed by a Climate Change Commission that is independent and has appropriate expertise. The agricultural sector must also be consulted with and have the ability to submit on any adjustment-setting decisions.

8.16 Phasing out free allocation of emissions units should be gradual, well signalled, and informed by robust analysis (taking into consideration scientific advice, the availability of mitigation technologies, international competitiveness, and overall progress towards emissions reduction targets by all sectors of the economy) in order to provide business and investment certainty, avoid economic and social shocks, and prevent potential emissions leakage offshore.

9. Conclusion

9.1 As noted in the sections above, DairyNZ is supportive of a price-based mechanism at the farm-level from 2025 forming part of the policy package needed to incentivise farmers to reduce their emissions. This would be in addition to complementary measures which address non-price barriers to mitigation and significant co-investment in mitigation innovation, skills development, and infrastructure. Ahead of 2025, DairyNZ supports a formal 5-year interim work programme with clear actions, outcomes, targets, and timeframes, as outlined in the *Primary Sector Climate Change Commitment: He Waka Eke Noa,* to achieve action on agricultural emissions.

9.2 We note that this is still the start of a very complex and involved process, especially for determining the allocation and methodology for applying any price and free allocation for agricultural emissions. DairyNZ has done a significant amount of work in assessing different options and would want to continue to work with the Government in the development of appropriate mechanisms.

9.3 As kaitiaki of our environment, farmers recognise the importance of protecting the land for future generations. This is why we are committed to helping our levy payers reduce and offset their emissions.

9.4 DairyNZ looks forward to contributing our farm systems, economics, extension, and policy expertise to the design and development of the policy package to address agricultural emissions. A just and fair transition is vital to enable a sustainable, competitive, and profitable dairy industry for New Zealand.

APPENDIX 1 – DairyNZ Partnership Farm Project

The Partnership Farm Project, (an initiative of the DACC plan) established 10 partnership farms across NZ and modelled 44 different farm systems to understand how on-farm mitigation options impact on GHG emissions, Nitrogen (N) leaching and profitability. Mitigations modelled fell into three categories: farm management changes, infrastructure investment, and retiring or planting land. The best options for each farm vary depending on the current farm system and region. Many of the mitigation options are existing good management practice principles promoted through existing projects – such as Pastoral 21 and Forages for Reduced N-Leaching.

For methane, focusing on efficiency of total dry matter is the key to reduction. For instance, by:

- reducing the amount of dry matter eaten per hectare (ha) by:
    - Removing supplementary feed and lowering stocking rate; and
    - Lowering replacement rates (improving the genetic potential, health, longevity and reproduction of the animals).

To reduce nitrous oxide and N-loss:

- minimising nitrogen surplus by:
    - Smarter fertiliser/effluent application;
    - Planting low-nitrogen forages or crops to reduce nitrogen excretion (e.g. fodder beet and plantain);
    - Use of low nitrogen feeds; and
    - Improving pasture quality.

Other management changes that reduce feed eaten, or N surplus, per ha included the timing of culling cows, irrigation practices, wintering practices, and using off-paddock facilities to lower nitrogen loss and nitrous oxide emissions during autumn and winter, and how planting trees on retired or low-productivity areas could reduce and offset emissions.

High-level Findings

- **Packages of mitigations need to be farm-specific.** Opportunities are currently available on many farms to improve both profit and reduce emissions through good management practices, however there isn't a 'one-size-fits-all' package of changes that every farmer can use. Packages of mitigations need to be farm-specific as not all mitigations were relevant to all farms.
- For some farms, reducing N-loss and GHG can maintain or even increase profitability; however, for some farms, particularly those that already implement efficient systems, it may be challenging to achieve moderate or large reductions in GHG and N leaching without a loss in profit.
- Some mitigations resulted in conflicting environmental outcomes. This was mainly around infrastructure where reduced N-loss could lead to increased GHG emissions.
- There is high correlation between reducing N-loss and reducing GHG emissions, this mainly focuses on reducing N-surplus.

dairynz.co.nz