Accelerating new greenhouse gas mitigations

Progress report – October 2025

AgriZero NZ

Ministry for Primary Industries
Manatū Ahu Matua

AG EMISSIONS CENTRE
New Zealand Agricultural Greenhouse Gas Research Centre

Introduction

The rapid development and commercialisation of emissions mitigation solutions for pasture-based farming is key to supporting efforts to double the value of New Zealand's exports by 2034 while reducing agricultural emissions.

The application of these tools and technologies into our farming practices is a key focus of the Government and industry to keep New Zealand globally competitive, efficient, and sustainable.

To achieve this tech-led approach, we are working together as part of a long term, co-ordinated investment programme with a focus on:

- driving progress of mitigation tools along the research and development pipeline;
- ensuring fit-for-purpose regulation for solutions that are safe and market ready;
- driving uptake on-farm and measuring emission reductions at the farm and national level.

Alongside the Ministry for Primary Industries (MPI), the key delivery partners in this programme of work are:

- **AgriZero^{NZ}** – a joint venture between the Government and industry;
- **Ag Emissions Centre** – an independent unit within the Bioeconomy Science Institute, dedicated to scalable, science-led solutions that reduce agricultural emissions and build farm resilience. Formerly known as the New Zealand Agricultural Greenhouse Gas Research Centre (NZAGRC).

This report is the first of our six-monthly updates showing how we're tracking with tools to reduce emissions, and the wider work going on to help get those tools into farmers' hands quicker.

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Investment in technology pipeline

Government and industry are investing heavily to scale up tools and technologies that reduce agricultural emissions on-farm. This spans fundamental research, product development, commercialisation, communication, engagement, adoption support, and targeted investments to address capability and infrastructure needs.

Innovative technology is key to ensuring efforts to cut agricultural emissions do not undermine our agricultural production and profitability.

AgriZero[NZ] is focused on making high-impact investments to drive product development and commercialisation of mitigation tools. Funding of $191 million has been committed by Government and industry partners between 2022 and 2026. Those sector partners include a2 Milk Company, ANZCO, ANZ, ASB, BNZ, Rabobank, Fonterra, Ravensdown, Silver Fern Farms, and Synlait.

The Ag Emissions Centre is geared towards fuelling the innovation pipeline. From foundational science to enabling on-farm adoption, the Centre leverages scientific expertise with global and national partnerships, to develop tools and technologies that reduce agricultural emissions, strengthen farming resilience, and safeguard market access. The Government has committed $143 million towards the Centre between 2024-29.

Key performance indicators

1. Increasing the number of mitigation tools available.
2. Tools are suitable for a range of sectors and farm types.

Highlights from last six months

- **EcoPond** – Targeted investment by MPI to support innovation in EcoPond. The technology is effective in reducing methane emissions from dairy farm effluent ponds by over 90 percent. The system is being piloted on 200 Fonterra dairy farms and 50 Synlait farms in 2025/26.
- **Ruminant Biotech** – Trials show a single bolus can cut enteric methane by 70 percent over three months. Its methane inhibitor bolus for beef cattle is undergoing assessment by New Zealand Food Safety for registration under the Agricultural Compounds and Veterinary Medicines Act. Currently at assessment stage, a New Zealand roll-out could commence in late 2025 or early 2026.
- **Cool Sheep** – continued roll out of low methane sheep genetics including methane measurement of rams, farmer engagement and developing a tool to track low methane genetics in flocks. Low methane sheep genetics has potential to achieve 1 percent reduction per year while not impacting productivity.
- **ArkeaBio:** United States startup developing a methane vaccine with AgriZero[NZ] investment. It's undertaken trials in cattle at Texas A&M University and is now looking to undertake animal trials in New Zealand in 2026.
- **Lucidome Bio**: Launched in September 2024 with funding from AgriZero[NZ] and the Ag Emissions Centre. It has advanced its technology, expanded its team, and run New Zealand cattle trials. It's now raising seed funding to progress to the next stage.
- **Ruminaut** is developing a robotic rumen to monitor real-time enteric methane, enabling rapid screening of new mitigation technologies like feeds or inhibitors. Recent trials show its outputs closely match those from live animal tests.
- **AgriZero[NZ]** has now invested in 14 ventures and research projects, with recent investments in:
  - Agteria Biotech (NEW): Swedish startup developing a small molecule inhibitor which could be added to feed, water, or in a bolus.
  - Bovotica (NEW): Australian company developing a probiotic.
  - BiomEdit (NEW): United States company developing a probiotic-based feed additive.
  - Hoofprint Biome Inc (Follow-on): United States startup developing natural enzymes and probiotics.
- **AgriZero[NZ] and the Ag Emissions Centre** partnered in an annual innovation investment funding round to identify and support innovative ideas to tackle emissions reductions and accelerate progress.
- **The Ag Emissions Centre** is continuing significant programmes of research work in methane and nitrous oxide inhibitors, the methane vaccine, breeding low methane emitting animals, and supporting infrastructure. Highlights include:
  - A project conducted by LIC and CRV showed low methane dairy bulls pass this trait onto their daughters. The project is now moving forward to assess lactating animals.
  - Lease rates for the methane measurement GreenFeed systems used in research have been halved under the new Ag Emissions Centre funding model, increasing demand from researchers and developers.
  - Funding has been confirmed to expand Pāmu's feed conversion efficiency and methane testing facility near Taupō, boosting capacity for large-scale trials that test emissions reduction alongside productivity.

Next six months

- AgriZero[NZ] will:
  - Continue to investigate global solutions that could work on New Zealand farms. It has 77 potential investments on its radar.
  - Work with stakeholders to accelerate the adoption of tools.
  - Continue engagement with the AgriZero[NZ] Farmer Focus Group to ensure mitigation tools are fit-for-purpose.
  - Work collectively on a way to support the uptake of low methane sheep genetics.
- Ag Emissions Centre will:
  - Initiate a long-term research trial to investigate the potential for the rumen to adapt to methane inhibitors. Understanding adaptation at a microbiology level will minimise the risk of a mitigation becoming less effective over time.
  - Continue the low methane dairy genetics programme, with methane emissions being measured from the daughters of low/high emitting sires during lactation. Understanding what is happening with an animal's emissions during lactation is the last key step in this programme before a low emissions breeding value can be made available to dairy farmers.
  - Initiate a programme, in partnership with Beef + Lamb New Zealand, to progress the development of low methane beef genetics, so that beef farmers also have access to low methane genetics.
  - Continue work to develop alternative, lower cost measurement tools to identify low methane animals for breeding (e.g. saliva swabs, milk test).
  - Complete a national capability plan to identify greenhouse gas research capability gaps and actions to address them.
  - Initiate work to identify new options for reducing nitrous oxide emissions from agriculture.

3 mitigation tools
available now (Urease inhibitors, low methane sheep genetics, EcoPond).

7 mitigation tools
expected to be available by 2027.

11 mitigation tools
anticipated to be available by 2030.

9 AgriZero[NZ] supported companies
have or are planning to undertake trials in New Zealand.

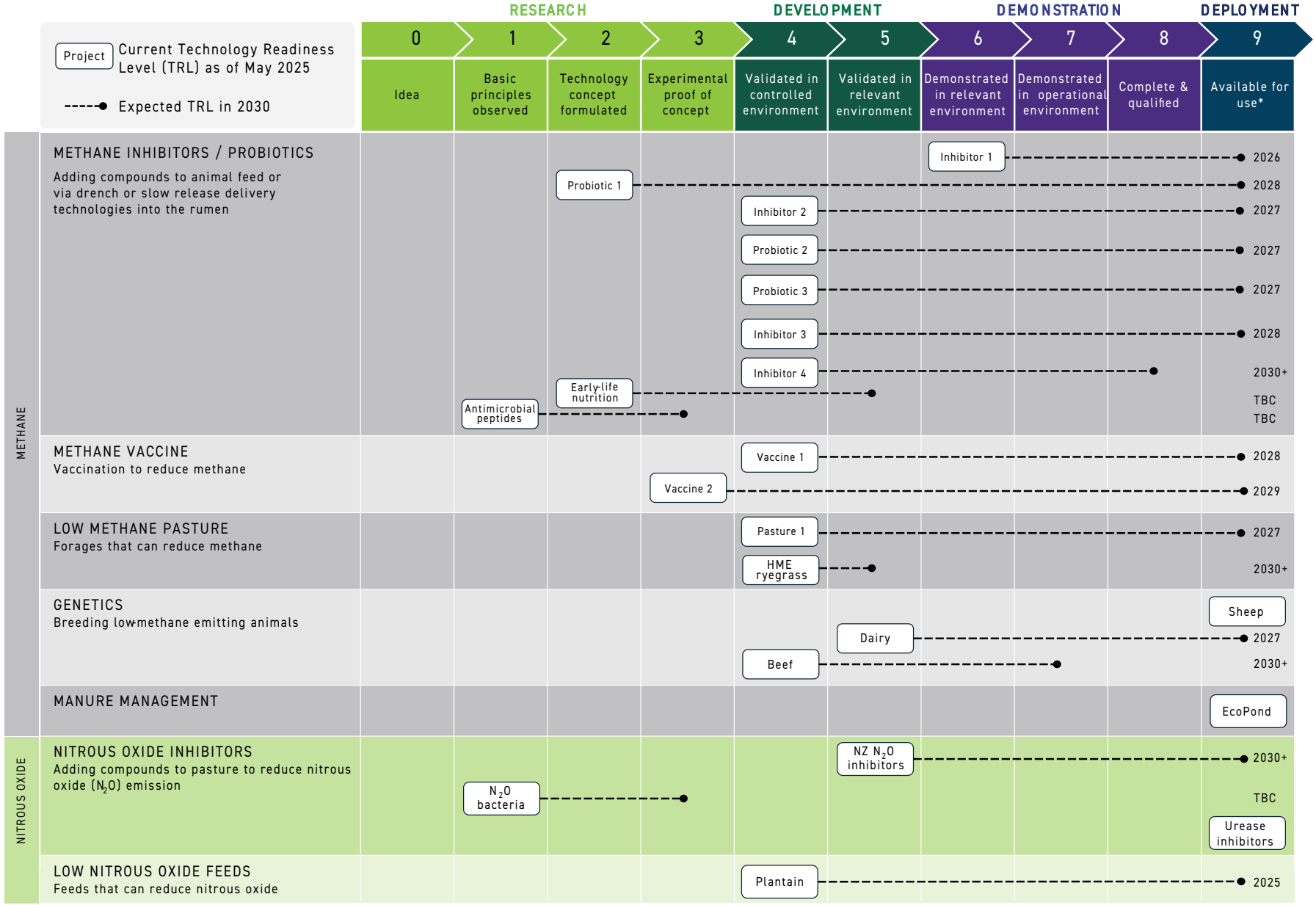
14 emission reduction ventures
and research projects invested in by AgriZero[NZ].

12 emissions reduction tools
or technology research and development (R&D) projects currently funded by Ag Emissions Centre.

7 targeted investments
including facility upgrades and purchase of additional assets, that support emissions reduction R&D and remove barriers to research acceleration.

New Zealand agricultural emissions research and development portfolio: technology pipeline

We are investing in a portfolio of high-impact emissions reduction technologies suitable for a range of pasture-based farming systems, including long-lasting inhibitors and probiotics, genetics, pasture, and manure management activities. This will give farmers choices and success won't be reliant on a single technology.

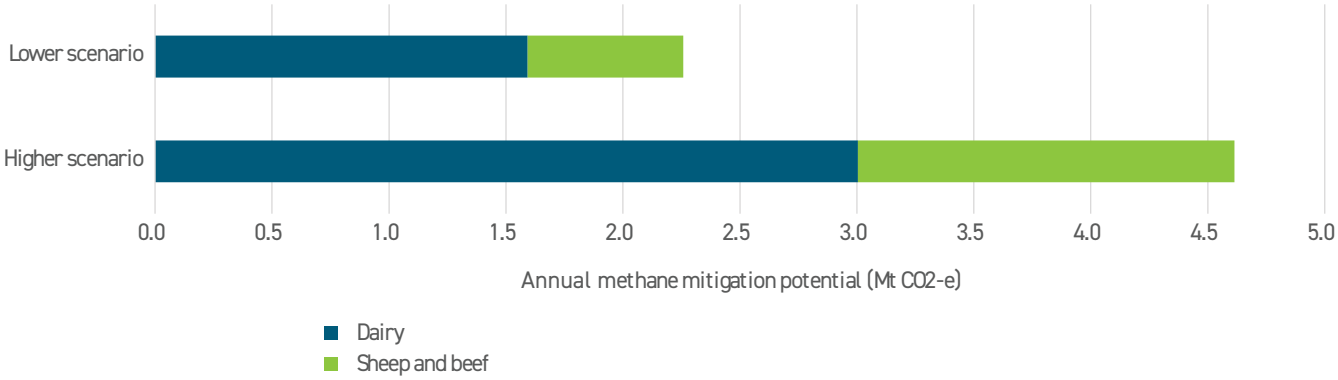


Disclaimer: This table indicates current estimates as at May 2025. In most cases these estimates have been provided by companies developing the tools. The dates and details are subject to change as projects progress through the pipeline, and noting these are early stage technologies. There is also ongoing scanning of new technologies and research. This diagram does not include work underway on soil carbon and farm systems management, and other supporting research. Some technologies will be stackable, whilst others are either/or as they have similar modes of action. *The earliest possible year for market availability is shown. This is dependent on regulatory and approval timeframes and pricing structures. 'TBC' = early stage, cannot predict time to availability yet.

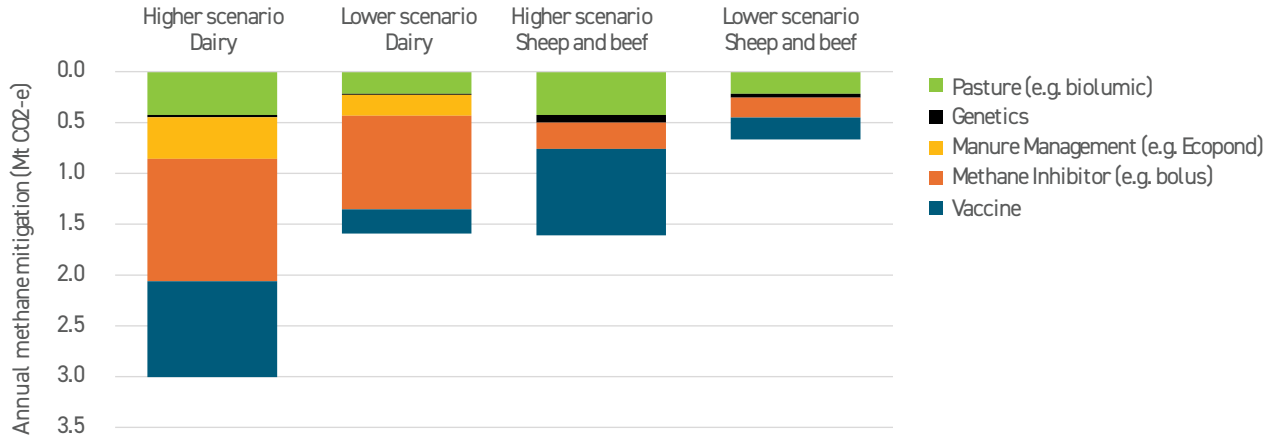
New technologies can deliver emission reductions to meet international and market expectations while enabling the sector to grow.

- If 15-30 percent of farmers take up each of the technologies that are expected to be available before 2030, total agricultural emissions could reduce by between 7-14 percent over the next decade.
- This is in addition to any reduction in emissions that may come from efficiency gains on-farm, or changes to land-use and farm systems.
- Some technologies will suit some farm systems better than others.
- Work is underway to understand opportunities for using combinations of different technologies to achieve greater reductions and affordability to maximise uptake.

Total annual mitigation potential from technologies in 10 years*



Annual mitigation technology abatement potential in 10 years*



*Based on assumption of:

- current estimates of the effectiveness of technologies within each category (as shown on page 3, Technology Readiness Level diagram), including the potential for the effectiveness of any methane vaccine to increase from delivering a 10 percent reduction in enteric methane to a 30 percent reduction.
- the impact of different technologies being additive – i.e. adoption of different technologies is either on different farms, or the impact of technologies used on the same farms are biologically additive.
- future emissions based on the level of production forecast in the *Situation and Outlook for Primary Industries June 2025* extrapolated out to 2035.
- an illustrative lower scenario with an adoption rate of 15 percent of farmers using each mitigation technology estimated to be available by 2030 and a vaccine delivering a 10 percent reduction in enteric methane.
- an illustrative higher scenario with an adoption rate of 20 percent of farmers using a vaccine, 20 percent using a methane inhibitor, and 30 percent using all other technologies estimated to be available by 2030 and a vaccine delivering a 30 percent reduction in enteric methane.

Note: scenarios are illustrative only and estimates of abatement potential are expected to change over time.

Effective regulation and market acceptance

We're improving New Zealand's regulatory systems to make them more effective and efficient. We're also working closely with key export markets and international organisations to make sure new mitigation tools are accepted globally. This means New Zealand farmers will have faster access to tools, while continuing to meet the high safety and quality standards that make our agricultural exports trusted worldwide.

MPI's New Zealand Food Safety Agricultural Compounds and Veterinary Medicines (ACVM) team is responsible for administering the ACVM Act.

It ensures all agricultural compounds and veterinary medicines meet the requirements of the ACVM Act to protect public health, food safety, support trade, safeguard animals and maintain consumer confidence.

Currently, some environmental inhibitors are required to be authorised under the Act. When the Regulatory Systems (Primary Industries) Bill is enacted, all environmental inhibitors will be required to be authorised under the ACVM Act.

Key performance indicators

1. Farmers, markets, and consumers have confidence in the safety of products where new mitigation tools have been used.
2. Increased efficiency and effectiveness of New Zealand's regulatory processes required to register new mitigation tools.

Highlights from last six months

- ACVM has registered a further two urease inhibitors, taking the total number of products registered to three.
- ACVM received an application from Ruminant BioTech for the bromoform bolus product Emitless.
- ACVM has hosted two Inhibitor Operational Forum meetings, to discuss relevant regulatory matters with industry and researchers.
- The Ministry for Regulation completed its review of approval pathways for new agricultural and horticultural products under the ACVM and Hazardous Substances and New Organisms (HSNO) Acts. Implementation of review recommendations is underway including reducing efficacy data requirements, exempting low-risk technologies from ACVM registration, and leveraging international regulator assessments.
- ACVM has reviewed and consulted on the methane inhibitor efficacy guideline to better accommodate qualitative claims for registration while complementing the requirements for the Farm Emissions Method and Agricultural Greenhouse Gas Inventory recognition of impact.
- Public consultation closed on proposed amendments to the ACVM Exemptions and Prohibited Substances regulations, including a proposal to exempt certain low risk inhibitor products from registration on 11 August.
- Engagement with global bodies and key export markets to facilitate approval and use of new mitigation tools – including Codex (the global food safety standard setter) and the Strategic Food Safety Dialogue (EU, UK, US, Canada, Australia, New Zealand), and Food and Agriculture Organization (FAO).
- Assessment of Bromoform compound as methane inhibitor prioritised for assessment at Codex.
- Industry regulatory workshop focused on efficacy trial design, hosted by AgriZero^{NZ} (supported by MPI).

Next six months

- Anticipated completion of the appraisal and registration decision on the Ruminant BioTech product Emitless.
- Implementing Ministry for Regulation recommendation on strengthening external data assessor framework and maximising use of overseas approvals.
- Publishing of updated efficacy guidance for both methane and nitrogen/urease inhibitors.

64 trial approvals
to date (2022-2025)

25 currently active trials

19 organisations
have engaged with ACVM on registering their mitigation products.

47 organisations
are members of the Inhibitor Operational Forum (42 industry, 5 research organisations).

Measuring emissions and supporting uptake on farms

We are doing the groundwork to support farmers to use new mitigation tools as they become available. This includes raising awareness of tools in the pipeline, how they fit into a farm system, and tackling barriers such as cost.

We are also creating a standard way to measure on-farm greenhouse gas emissions at the farm level and the impact of new mitigation tools. This will ensure they are reflected in emissions calculators and New Zealand's Agricultural Greenhouse Gas Inventory.

Key performance indicators

1. Increasing the number of farms that have adopted or are willing to adopt new mitigation tools.
2. Increasing the number of mitigations included in the national inventory and Farm Emissions Method.

Highlights from last six months

- AgriZero^{NZ} Farmer Focus Group and Ag Emissions Centre End-User Advisory Group established. Both groups provide input into programmes, investments, communications, and factors affecting adoption, to ensure mitigation tools are fit-for-purpose.
- Ag Emissions Centre and AgriZero^{NZ} involvement in the MPI Science for Farmers site at regional and national Fieldays. The site had a focus on engaging with farmers about work underway to deliver new tools and technologies and why reducing emissions matters.
- Broader engagement and communication with farmers and the public via processor-led fieldays and media on the progress of tools. This included AgriZero^{NZ} content profiling farmers in support of reducing emissions on social media.
- Pre-release version of the new On-Farm Emissions Calculator demonstrated to hundreds of farmers at national Fieldays.

Next six months

- Increase communications on the availability, safety, and efficacy of new mitigation technologies.
- On-Farm Emissions Calculator will be released on the AgMatters.nz website.
- Upskill New Zealand rural professionals via training sessions on climate change and agricultural greenhouse gas emissions.
- New mitigations incorporated into the Farm Emissions Method.
- AgriZero^{NZ} continue to raise awareness about the global drivers for emissions reduction, to farmers and broader agriculture sector audience, and highlight farmer voices.

250 dairy farms
piloting Ecopond in 25/26 season.

22 ram breeder flocks
tested for low methane genetics out of 92 flocks (that produce more than 1,000 lambs each year).

1 mitigation technology
(urease inhibitor coated fertiliser) included in Agricultural Greenhouse Gas Inventory and Farm Emissions Method).

3 more technologies
targeted for inclusion in the Farm Emissions Method by early 2026 (Low methane sheep genetics, EcoPond, and Ruminant BioTech for beef, subject to approval).

Science for farmers site at Mystery Creek Fieldays, June 2025