

Rural Workshop



BACKGROUND MATERIAL



Interim
Climate
Change
Committee

The Interim Climate Change Committee

Who we are and what we've been asked to do

The Interim Climate Change Committee (ICCC) is an INDEPENDENT Ministerial Advisory Committee. We were established in May 2018 as a precursor to the proposed Climate Change Commission.

We have been asked to provide evidence and analysis to Government on two key questions:

- 1** *How surrender obligations could best be arranged if agricultural methane and nitrous oxide emissions enter into the NZ ETS.*
- 2** *How to plan for the transition to 100% renewable electricity by 2035.*

To answer the agriculture question we are looking more broadly at what is a good policy package to get us started on reducing our agricultural emissions.

On 30 April we will hand over our recommendations to Government. From there Government will decide how to respond before getting any policy package underway.



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What we'll discuss at the workshop

We have identified that any policy package to reduce agricultural emissions must include:

- **Enabling policies** to support farmers with the knowledge and skills needed to reduce emissions. These include use of Farm Environment Plans, extension and training.
- **Motivating policies** to encourage farmers to act and make decisions to reduce emissions – this could be rules e.g. standards or limits or a price on emissions.

We want to discuss and get your feedback on what we see as promising options within these categories.

Your feedback from this workshop will be used to inform our final recommendations.

What we've heard so far

A solution that works for farmers

Farmers need to know what they can do to reduce emissions.

Solutions need to reduce emissions and contribute to a successful sector.

Farmers are thinking about emissions, water quality, biodiversity, and production decisions together.

Acknowledge progress to date

We need to acknowledge and reward farmers' good work to date.

Methane is different

Methane is shorter lived and should be treated differently to carbon dioxide and nitrous oxide.

Agriculture needs to play its part

Agriculture contributes to climate change and needs to play a role in reducing emissions.

Global stage

We need to consider opportunities and risks for NZ Inc., including risks around competitiveness and emissions leakage.

Rural communities

We need to understand the impacts on rural communities and support them.

Trees and soil carbon

Farmers want credit for the carbon removed by their trees and any carbon that is taken up by their soils.

Agriculture and climate change

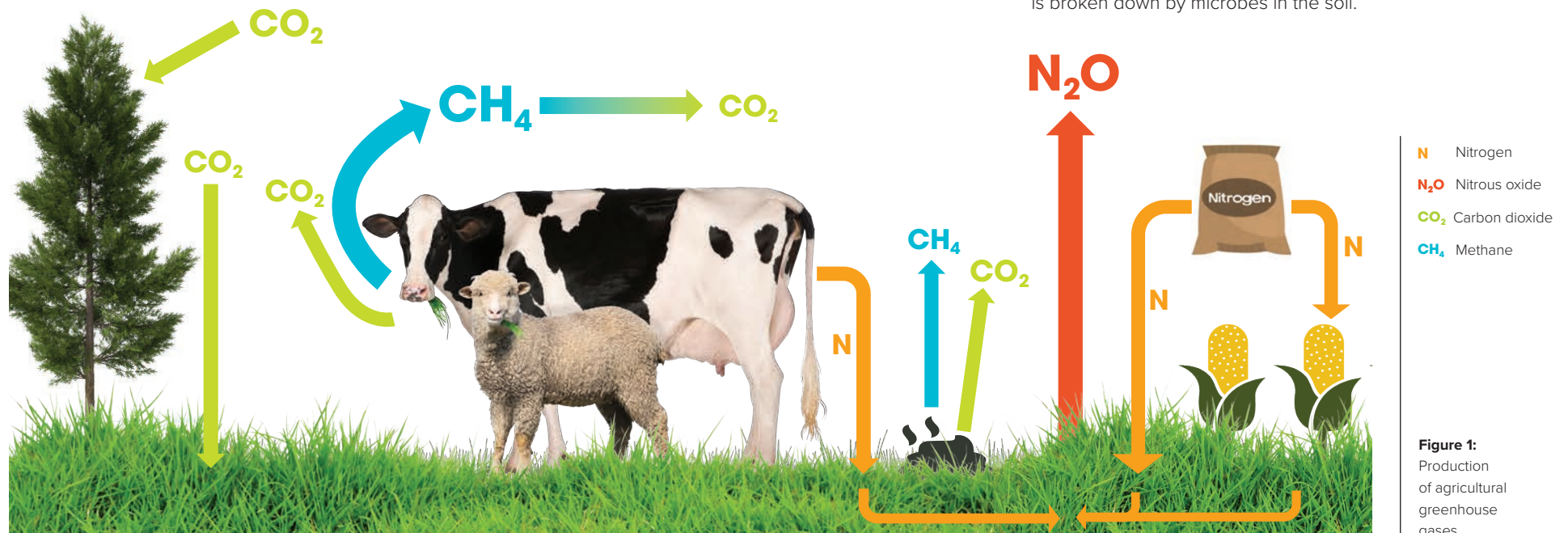
*Greenhouse gases in the atmosphere act as a blanket and trap heat as it leaves the Earth.
The more greenhouse gases there are in the atmosphere, the thicker the blanket, and more heat trapped.*

Human activities are causing the amount of greenhouse gases in the atmosphere to increase above what would be there naturally. This is thickening the blanket of gases in the atmosphere and causing our climate to change.


There are three main greenhouse gases – carbon dioxide, methane and nitrous oxide. Globally, carbon dioxide is the main driver of climate change. It comes from burning fossil fuels for electricity, transport, or industrial processes. Methane is the second most important gas globally.

Methane is formed in the rumen of cows, sheep and other ruminant animals, and emitted from the mouth. Smaller amounts of methane come from animal wastes.

Nitrous oxide is emitted when animal urine, and to a lesser extent nitrogen fertiliser and animal dung, is broken down by microbes in the soil.



How do methane and nitrous oxide contribute to climate change?



Methane is a potent greenhouse gas – every tonne of methane emitted has a large warming effect on the climate – almost 28 times the warming effect compared to one tonne of carbon dioxide over 100 years.

However, methane is a shorter-lived gas – once it has been emitted it stays in the atmosphere on average for about 12 years. So every unit of methane emitted today is to some extent replacing a unit of methane emitted a few decades earlier. It doesn't accumulate in the same way as nitrous oxide and carbon dioxide does. So methane does not have to go to zero to prevent further climate change but on-going methane emissions keep the atmosphere warmer than it would be otherwise.

Reductions in methane will help slow climate change and are critical if we want to keep warming to well below 2 degrees.

Nitrous oxide is a very potent greenhouse gas – every tonne of nitrous oxide emitted has a very large warming effect on the climate – 298 times the warming effect of a tonne of carbon dioxide over 100 years.

Nitrous oxide is similar to carbon dioxide in that it is a long-lived gas – once it has been emitted it stays in the atmosphere on average for about 114 years, and some of it remains for several centuries. That means every unit of nitrous oxide emitted accumulates in the atmosphere. So only net zero emissions of nitrous oxide will prevent further climate change.

We can offset some of our emissions by planting trees – that is what is meant by net zero emissions – but as trees reach maturity they no longer soak up as much carbon. So trees will only get us so far for so long.

Where do New Zealand's emissions come from?

Methane and nitrous oxide from agriculture make up 49% of New Zealand's emissions. A further 43% of our emissions are from carbon dioxide from the energy sector (this includes emissions from transport).

The proportion of our emissions coming from methane and nitrous oxide is much higher in New Zealand than in many other developed countries. This is because of the significant

role that agriculture plays in our country and, unlike many other countries, our main sources of electricity are already low emission sources (e.g. hydro, wind, gas).

SINCE 1990,
NEW ZEALAND'S
EMISSIONS HAVE
INCREASED BY

19.6%

The five emissions sources that contributed the most to this increase were:

- dairy cattle (methane)
- road transport (carbon dioxide)
- chemical industry and food processing (carbon dioxide)
- agricultural soils (nitrous oxide)
- industrial and household refrigeration and air-conditioning systems (fluorinated gases).

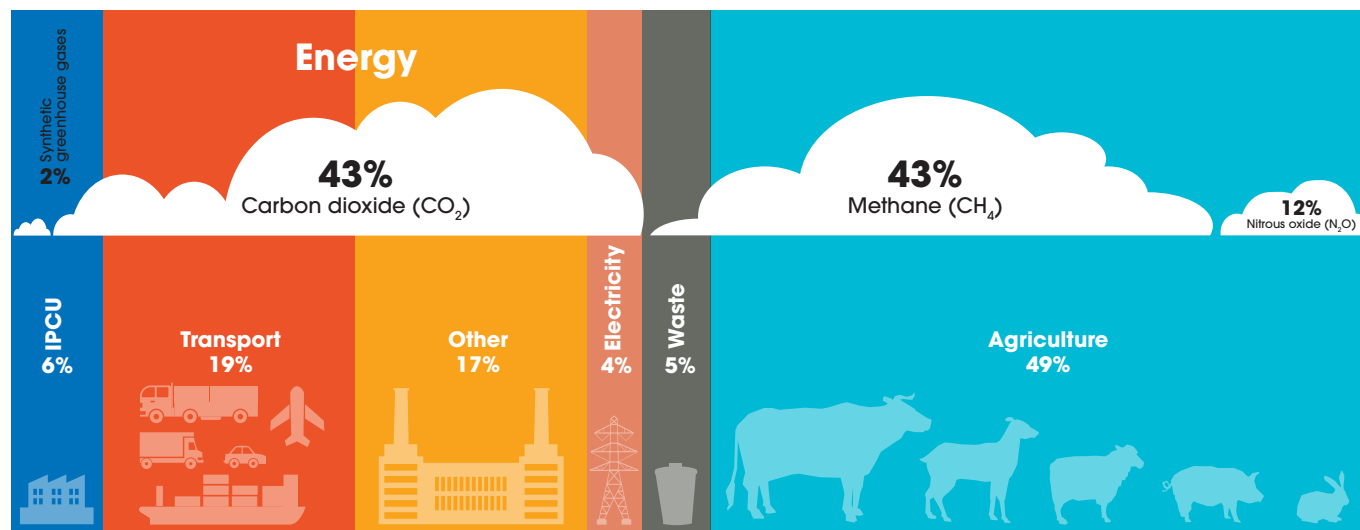


Figure 2:
Breakdown
of New Zealand's
emissions in 2016
in carbon dioxide
equivalents

How are New Zealand's agricultural emissions tracking?

Between 1990 and 2017, farmers have made significant improvements in efficiency through improved practices such as feed and nutrition, animal genetics, reproduction rates and pasture management. These gains have reduced greenhouse gas emissions per unit of product (this is also called emissions intensity).

But these gains in efficiency have been more than offset by increased milk production and increased fertiliser use. So even though emissions intensity declined, total emissions from agriculture increased by 16% between 1990 and 2017. These increases have tapered off in recent years – this is largely attributed to a consistent decline in sheep numbers and less favourable dairy conditions that constrained overall production. Without efficiency improvements, agricultural emissions would have risen by almost 40% to produce the same amount of food.

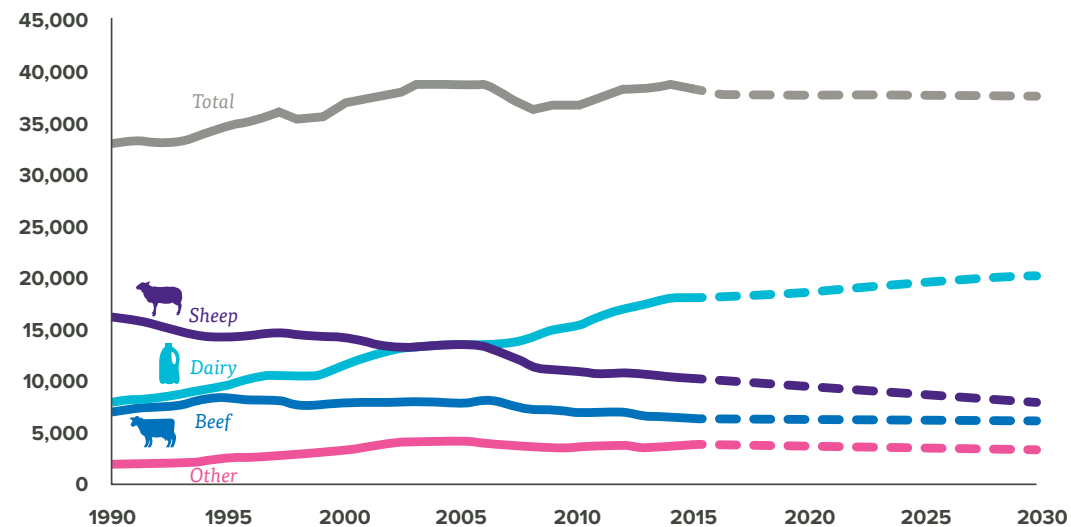


Figure 3: New Zealand's actual and projected agricultural emissions (1990–2030)

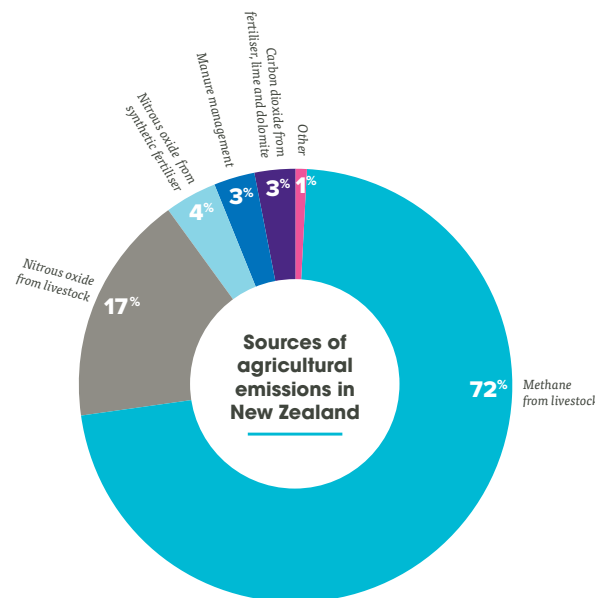


Figure 4: Breakdown of New Zealand's Agricultural Emissions 2016

Source: Ministry for the Environment

Note: National Inventory figures are published two years behind the current calendar year (for example, the 2018 inventory has figures up to 2016)

Why does New Zealand need to address agricultural emissions?

Risks from climate change include weather extremes (floods, droughts), sea level rise, and pest incursions. These affect New Zealand too.

A recent report from the Intergovernmental Panel on Climate Change (IPCC) confirmed the need for urgent action and transformation in all sectors, from transport to industry to agriculture, if we want to limit warming to 1.5°C (which is what countries agreed to in the Paris Agreement).

“All options need to be exercised in order to achieve 1.5°C... We can make choices about which options, and trade off a bit between them, but the idea you can leave anything out is not possible.”

PROFESSOR JIM SKEA, IPCC

In 2015, New Zealand joined many other countries in signing up to the Paris Agreement. As part of this, New Zealand adopted a national target to reduce our overall greenhouse gas emissions by 30% by 2030, relative to 2005 levels, and agreed to set increasingly ambitious targets over time.

More recently, the Government has been consulting on a target for 2050 as part of the Zero Carbon Bill. Regardless of what New Zealand's 2050 target will be,

we know we need to get started on bending the curve of all New Zealand's emissions downwards, including methane and nitrous oxide from agriculture.

We are not alone – 185 countries have made commitments under the Paris agreement and over 100 countries have included agriculture within their commitments.

“Our competitors in our market from Ireland to New Zealand have laid down the gauntlet. And I am here to pick it up today. I believe we can match and beat their lead – our aim must be ambitious, to get our industry to net zero across all greenhouse gas inventories by 2040 or before.”

UK NATIONAL FARMERS' UNION PRESIDENT
MINETTE BATTERS SPEAKING AT THE OXFORD
FARMING CONFERENCE. JAN 2019

How much does a farm emit and what more can farmers do to reduce emissions?

The following table shows average emissions per animal and average emissions per kg of product in New Zealand:

Animal type	Total emissions per animal (kg CO ₂ e/head/year) ¹	Total emissions per kg of product (kg CO ₂ e/product)
Sheep	379	23 (CO ₂ e/kg meat)
Deer	686	29 (CO ₂ e/kg meat)
Beef cow	1812	10 (CO ₂ e/kg meat)
Dairy cow	2755	10 (CO ₂ e/kg milk solids)

On average, a dairy farm emits 10-11 tonnes CO₂e per hectare. On average a sheep and beef farm emits 3-5 tonnes CO₂e per hectare. However, these averages mask that there is a wide range in the emission intensity of farms of the same type across New Zealand.

Opportunities for farmers to reduce their greenhouse gas emissions exist now through action in five broad areas:

- 1 Increasing individual animal performance while reducing stocking rates, relying on improved pasture management, breeding worth, animal health, and reproduction – allowing farms to maintain total production from fewer animals.
- 2 Using feeds with lower crude protein content (e.g. maize, plantain), or higher metabolisable energy (e.g. fodder beet, grains), or those which produce less methane (e.g. forage rape).
- 3 Shifting to a less intensive system – leading to decreased production but also lower input costs and maintained profitability.
- 4 Improving the efficiency of fertiliser use.
- 5 Diversifying farm operations with alternative lower emission land uses (e.g. cropping, horticulture, trees).

These options are being pursued by farmers already. The challenge is to accelerate uptake of these actions across an even wider spread of farmers.

More options are on the way

New Zealand currently invests in research and development to discover more options to reduce agricultural emissions. This means more options are likely to become available in the future including low methane-emitting sheep and methane and nitrification inhibitors.

More information on current and future mitigation options can be found here:

www.dairynz.co.nz/environment/climate-change/mitigation-options

www.beeflambnz.com/news-views/topics/Greenhouse-Gas

www.nzagrc.org.nz/fact-sheets.html

¹ CO₂e=Carbon Dioxide equivalent. The amount of carbon dioxide that would need to be emitted to cause the same amount of warming over 100 years as the methane and nitrous oxide emissions of the animal.

What about trees?

- Trees can help meet near-term climate goals while transitioning to a low emissions economy.
- Recognising the role trees play in soaking up carbon dioxide is important to farmers.
- Currently the rules we have adopted for accounting for our national emission targets exclude some types of trees and vegetation.
- The ICCC is looking into whether there are ways to acknowledge the role those trees play, that...
 - are consistent with international rules and expectations; and
 - can be administered without undue costs to farmers and government.



What we want to discuss

We want to know what tools and advice would support you to reduce emissions on farm? And who you want that advice from? There will be time during the workshop to discuss this, or you can email us your thoughts on **feedback@iccc.mfe.govt.nz**

We will also discuss different ways to motivate farmers to act and make decisions to reduce emissions. Again, there will be time at the workshop to get your feedback on this, but please feel free to email us your thoughts on this as well.

Frequently asked questions

What are we doing to reduce carbon dioxide emissions from the other sectors of New Zealand e.g. transport?

All greenhouse gases emitted in New Zealand, with the exception of methane and nitrous oxide from agriculture, are subject to a charge through the New Zealand Emissions Trading Scheme. There is also a range of other policies aimed at reducing carbon dioxide. Examples include minimum energy performance rules, compulsory energy efficiency labelling, schemes to incentivise uptake of electric cars and public transport use.

Aren't we already world leaders in agriculture in terms of emissions per product? Why do we need to do more? And if we produce less won't global emissions increase?

We do perform well globally in terms of emission intensity per unit of product – but most of our competitors are also highly efficient².

The vast majority of our direct competitors have also taken on ambitious climate goals through economy-wide commitments.

Consumers are increasingly concerned about the authenticity of their food, where and how their food is produced – including environmental impacts.

There is more New Zealand farmers can do to stay ahead in the market place.

What about emissions from the production of other foods?

The emissions per unit of product, calorie or protein vary across different food types. While there is enormous diversity across different countries, and even within countries, there are reasonably consistent patterns (shown below, the results from a large set of individual studies across a number of different countries).

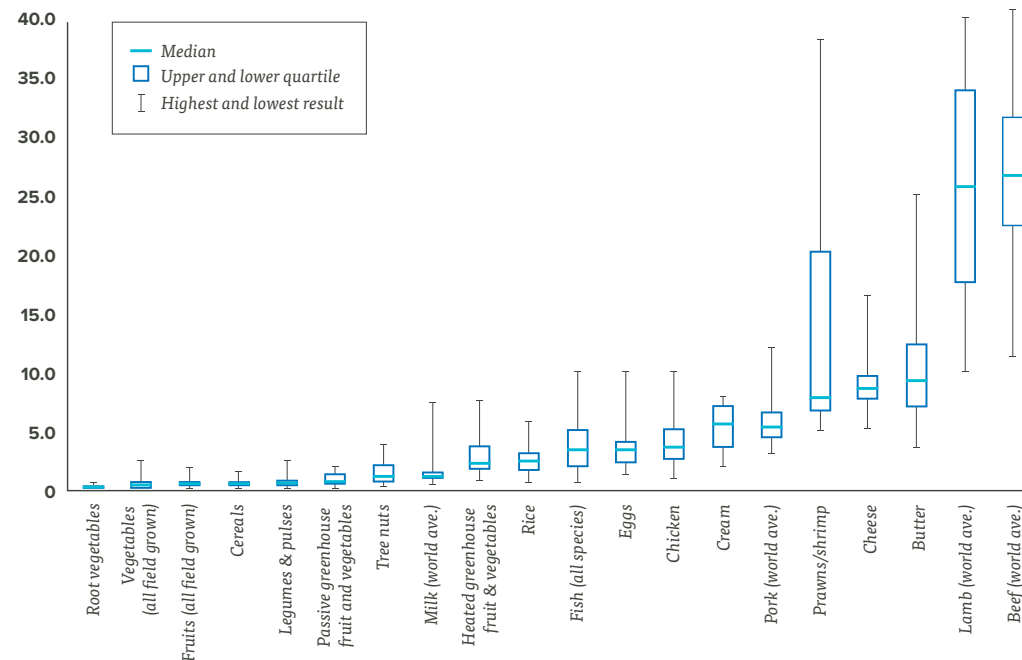


Figure 5: Summary of global warning potential values (kg CO₂-eq/kg produce or bone free meat) across broad food categories

² Clune, Crossin and Verghese, 2016, Systematic review of greenhouse gas emissions for different fresh food categories www.sciencedirect.com/science/article/pii/S0959652616303584

Frequently asked questions continued



What about soil carbon?

New Zealand soils tend to be higher in carbon than in many other countries. In some areas of New Zealand soil carbon content is stable or declining, increasing in others.

Some farm practices have been advocated as ways to change soil carbon stocks but there is currently no robust long term evidence of their effectiveness in New Zealand.

Circumstances outside of farmer control (such as drought) can lead to large soil carbon losses. So...

Soil carbon has potential as a mitigation option, but a lot more research is needed to understand the role of farm practice and climate in changing soil carbon stocks.

What about wetlands?

Wetlands can also be important carbon sinks. They do emit methane and nitrous oxide – but if well managed (e.g. stock are excluded, water table is maintained) they are a net sink, not source, of emissions.

However, if wetlands are not well managed, or are drained and converted to another land use, they will be a net source of emissions.

Wetlands are important for more reasons than being a carbon store – they provide multiple ecosystem services that currently benefit people and nature on farms and in catchments.

Ninety percent of New Zealand's original wetland area has been lost to farming, urban, and horticulture development, and continues to be lost.