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International Case Studies for Scotland's Climate Plan

Emissions accounting in New Zealand agriculture

Facts & Figures

48% of New Zealand's greenhouse gas emissions come from agriculture. The sector accounts for two thirds of all the country's exports, playing a crucial role in the New Zealand economy.

\$150 million has been allocated by the New Zealand government to support agricultural research and development through AgResearch.

Chemical nitrogen fertiliser use in New Zealand has increased by 617% since 1990.

Reducing dairy stock numbers by 1/3 and implementing biological farming practices can result in greater profits, increased productivity and reductions in nitrous oxide of up to 30%.

Overview

Agriculture is a vital component of the economy in New Zealand, forming the single largest sector of the tradeable economy and accounting for two thirds of exports. However, agriculture also makes up almost half (48%) of New Zealand's greenhouse gas emissions.

Two-thirds of agricultural emissions come from methane, a greenhouse gas 25 times more potent than carbon dioxide, with most of the remainder of the sector's emissions coming from nitrous oxide which is 300 times more potent than CO₂. In addition, changing practices in agriculture such as the intensification of livestock farming, the shift from sheep farming to dairy and beef and the increasing use of chemical fertilisers have seen a rapid rise in emissions, deforestation and pollution of land and waterways.

To combat the high levels of emissions from agriculture in New Zealand, the government has introduced legislation and is supporting research and development in climate adaptation and mitigation.

Legislation

Since it was voted on in 2009, the main mechanism for reducing emissions in New Zealand has been the Emissions Trading Scheme (NZ ETS). Based on the principles in the Kyoto Agreement, the NZ ETS requires entities from all sectors of New Zealand's economy to report on emissions, including the agricultural sector.

Specific regulations introduced by the government require agricultural processors to report to the Environmental Protection Agency on the emissions associated with the agricultural produce they process. The regulations also set out how emissions from different agricultural activities should be calculated. Activities that are required to be reported on include the import or manufacture of synthetic fertilizers containing nitrogen; slaughtering of cattle, deer, goats, pigs, poultry, or sheep; dairy processing; and the export from New Zealand of live cattle, pigs, or sheep.

Currently the agricultural sector is required only to report on their emissions, but there have been proposals for the sector in future to be required to join trading within the full NZ ETS scheme. The current government's position is that agricultural emissions should eventually become part of the NZ ETS but only when the sector has the capacity to reduce their emissions and manage the costs associated with the NZ ETS.

However, others have suggested that there is already sufficient basis on which to provide the sector with a timescale for entry to the traded element of the NZ ETS. For example, a recent report by New Zealand's Parliamentary Commissioner for the Environment stated that; *"Making a smooth transition to producing lower emission food is very important. Continuing delay just makes an abrupt transition more likely. In the past, for this reason, I have recommended that the biological gases should be included in the Emissions Trading Scheme."*

The most recent independent review of the system also recommended that agriculture be part of the traded element of the NZ ETS, and highlighted many of the emission reduction options available to the sector.

In the meantime the New Zealand Government has been investing significantly in research and development, and increasing the capacity of the agricultural sector to achieve emissions reductions.

Research and development

Research and development is having an impact on emissions, pollution, yields and lowering costs for farmers.

- AgResearch, with funding from Government, supports innovation through funding \$150m of research throughout New Zealand, with a particular focus on climate change adaptation and mitigation. For example, the body funded research into a more strategic method of winter grazing for cattle with the aim of reducing the pollution of waterways and increasing the retention of crucial nutrients in the ground. The trials, run over several years, reduced sediment and phosphorus loss by 80-90%
- Carbon Farming NZ connects and supports farmers to take up "biological" or "ecological farming" which does not have the same stringent rules as organic farming but which requires much lower inputs of chemical fertilizer, generally smaller livestock numbers and an element of reforestation. Farmers who have taken part in the scheme have reported healthier herds, radically reduced risks of flooding and better yields.
- Pastoral21 was a five year programme funded by DairyNZ which supported dairy farmers to increase profitability while lowering emissions. In one example, a dairy farmer has reduced her farm operating expenses by 9% in a year and aims to reduce them even further, to at least 40% less than neighbouring farms.

Each of these bodies, sometimes working together, has had significant successes in proving that lower-input, more ecologically focused farming can result in lower emissions and often at a lower cost than more intensive farming methods.

How it works

Biological farming makes the most of natural processes, which promote good soil, healthy crops, and healthy animals. These natural processes include; better use of manure; reducing compaction from overstocking of livestock; promoting soil life; using rotational grazing and balancing the soil's minerals through the use of soil conditioners.

Typical changes to farming practices might include;

- methane digesters to turn manure into energy
- fewer chemical fertilisers, cutting down on water and land pollution
- native reforestation
- fewer cattle per hectare
- clover planted for nitrogen levels
- renewable farm energy



"I wanted to see if there was a different way of farming the island and whether that could add to both productivity and economic value. We've been farming under that system [biological farming] over six years and the result of that is very positive. We're seeing our pasture growth rate, our soil moisture content, our livestock health all advance. The livestock are happy, even though we're in the worst drought period this island has seen for a long long time."

Rick Braddock, dairy farmer, Motutapu Island, NZ

Further information:

- Context on New Zealand agriculture: <http://www.greenpeace.org/new-zealand/Global/new-zealand/report/2008/10/new-zealand-farming-and-climat-2.pdf>
- Research into low intensity dairy farming: <https://ideas.repec.org/a/eee/ecolec/v68y2009i6p1615-1625.html>
- DairyNZ response to agriculture's inclusion in the NZ ETS: <http://www.dairynz.co.nz/media/1612478/dairynz-submission-on-the-nz-ets-agriculture-regulations.pdf>
- The Parliamentary Commissioner for the Environment's recent report: <http://www.pce.parliament.nz/media/1678/climate-change-and-agriculture-web.pdf>
- DairyNZ's case studies: <http://www.dairynz.co.nz/about-us/research/key-projects/pastoral-21/p21-principles-case-studies/>
- Carbon Farming NZ film on biological farming on Motutapu Island: https://www.youtube.com/watch?v=VxrP2Dmsn_8
- Climate Change (Agriculture Sector) Regulations 2010 <http://www.legislation.govt.nz/regulation/public/2010/0335/latest/whole.html#DLM3253004>
- Doing New Zealand's Fair Share: Emissions Trading Scheme Review 2011 Final Report: <http://www.mfe.govt.nz/sites/default/files/media/review-report.pdf>

