

# Time for farmers to measure gases

In the last in a series of four articles about climate change and agriculture in New Zealand **Dr Harry Clark** of the Agricultural Greenhouse Gas Research Centre considers some of the ways farmers can measure and assess their greenhouse gas emissions-reduction performance in the future.

**R**IGHT now New Zealand farmers compare very well with their counterparts in other developed countries in terms of greenhouse gases emitted per unit of production.

But best practice is a moving target and overseas farmers are working hard to improve their performance.

Many overseas farmers are advantaged because they operate housed production systems.

They make it easier to adopt some of the new greenhouse gas mitigation technologies such as administering methane inhibitors through feed or capturing methane for energy.

New Zealand's pasture systems make adoption of such initiatives very challenging.

Whatever reduction strategies farmers adopt, knowing how well the strategies are working is critical to ongoing success.

A crucial starting point for farmers is to quantify the level of greenhouse gas emissions on their farm.

Only a few NZ farmers have done this so far but it's likely more will follow suit soon, driven in part by the requirements of regional councils and processors.

An example is the way Fonterra benchmarks nitrogen loss and milk production at the farm level.

It lets individual farmers compare their performance against regional and national averages. And by tracking performance year on year they can create a picture of improvements in their production systems.

Calculators for estimating agricultural greenhouse gas emissions, developed here for NZ farming systems, are readily available.

Overseer calculates greenhouse gas emissions and rural



**GET CRACKING:** Greenhouse gas emissions reduction targets will become increasingly ambitious and all farmers could be asked to do more, Dr Harry Clark says.

professionals are schooling up so they can operate and interpret that component of the tool in tandem with its nitrate-leaching calculations. Overseer's greenhouse gas calculation routines are supported by scientific understanding and consistent with the national greenhouse gas inventory.

The calculator can be used for different farming systems and management practices.

Lincoln University has also developed a simple calculator that can provide initial greenhouse gas emissions for beef, sheep and dairy farms.

More and more data are available to compare emissions from different farm types and regions.

To enable these comparisons

the different greenhouse gases are converted into a common currency for accounting purposes. Carbon dioxide has a value of 1, methane a value of 25 and nitrous oxide a value of 298. The currency is known as CO<sub>2</sub> equivalent or CO<sub>2</sub>e.

The national average for dairy farms is 9.6t per hectare CO<sub>2</sub>e.

In Waikato, the average is 12.3t per hectare CO<sub>2</sub>e with a range from about 11t/ha CO<sub>2</sub>e for low-input farms to 18t/ha CO<sub>2</sub>e for high-input farms.

Farmax estimates the national average for sheep and beef farms is 3.1t/ha CO<sub>2</sub>e.

Emissions can also be expressed on a per-unit-of-product basis.

The average for dairy is 8.8kg CO<sub>2</sub>e/kg of milk solids, with a range of 4.3-17.2kg, while for

sheep and beef it's 16kg CO<sub>2</sub>e/kg of meat, with a range of 3.8-33.7kg. These are considered good by international standards, reflecting the efficiency of NZ's farmers and farming systems.

The wide ranges indicate there's an opportunity to improve.

Specific targets and policies to encourage emissions reductions in the agricultural sector are under active development.

While details and time frames are unknown because the Zero Carbon Bill legislation is unlikely to be agreed until later this year, we can be quite sure targets for reducing emissions won't remain static.

The Paris Agreement, to which NZ is a signatory, explicitly calls for increasingly ambitious reduction targets to be adopted.

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All farmers could therefore be asked to do more in future. Some efficient and early-adopter farmers have raised concerns about this, believing they'll be penalised by being asked to do even more.

While there have been some examples of that in the past, early adopters have recently been rewarded as an encouragement for others to follow suit.

Anything that we can do to reduce greenhouse gas emissions helps the climate.

By adopting reduction practices and technologies as they become available, NZ farmers will be at the forefront of sustainable food production.

It's true that NZ, on its own, will have little impact on reducing global greenhouse gas emissions. We contribute less than 0.2% of the global total.

But by developing productions systems that both lower emissions and make us more resilient to the impacts of a changing climate, NZ farmers will maintain their enviable reputation for producing high-quality products in an economically sustainable way.

The sooner we act, the sooner the beneficial effects will be felt.

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