How do we cut on-farm emissions?

In the third article of four about climate change and agriculture in New Zealand Dr Harry Clark of the New Zealand Agricultural Greenhouse Gas Research Centre explores options for reducing on-farm greenhouse gas emissions. It's a daunting challenge but every small step counts.

MANY farmers ask what more they can do to reduce greenhouse gas emissions on their farms.

I'd love to be able to tell them there's a tried-and-true formula but, unfortunately, there isn't.

Reducing emissions without reducing profitability and thereby compromising the viability of individual farms and the national economy is extremely challenging.

In recognition of that, successive governments have invested in research to identify cost-effective options.

The Biological Emissions Reference Group (BERG), a collaboration between government and industry, reported in 2018 New Zealand agriculture might be able to reduce emissions by 4% – 24% relative to 2005 levels by 2030.

It reckoned up to 10% should be achievable without adversely affecting many farm businesses – but it acknowledged success hinges on the specific operations and skills available on individual farms.

A good place to start is to calculate the emissions produced by your farm. A recent Ministry for Primary Industries survey found only 2% of farmers have taken that step.

Once you have a benchmark it's possible to quantify how changes to your operation might affect emissions.

Eventually, it's likely these numbers will need to be included in your farm environment plans, which are required by an increasing number of regional councils and processors.

A number of online tools is available to help.

Dairy farmers using Overseer already have emissions calculated for them.

There's a range of other simple calculators, such as Lincoln University's Farm Carbon Footprint Calculator, that need minimal data to produce a quick emissions estimate.

While there's no one-size-fits-all solution or silver bullets, an examination of every aspect of your operation might reveal where small improvements can be made.

And every small step is a step in the right direction.

Here are some options you might like to consider.

Is it possible to get more production from grass and reduce the use of imported feeds?

Are alternative forage crops an option?

Fodder beet has high energy and low protein, which can result in improved animal performance and lower nitrogen excretion, offering greenhouse gas and water quality benefits.

Plantain shows promise for reducing nitrous oxide emissions and nitrogen leaching.

Is it possible to reduce animal numbers but increase productivity per animal? That can maintain output while reducing emissions.

Try using high-genetic merit animals, which have higher performance.

Can you achieve greater longevity in the breeding herd or flock? That might let you maintain overall output and profitability while reducing stocking rates.

BERG estimates on some dairy farms once-a-day milking could reduce production and emissions by 6% – 7% while maintaining profitability. However, for that to work, reduced labour costs need to balance the reduction in total milk production and milk income.

Applying nitrogen fertiliser only when required, using precision technologies, reduces nitrous oxide emissions.

On dairy farms it might be possible to reduce emissions by improving effluent management. Will the installation of dairy sheds, shelters and/or stand-off pads reduce emissions to both air and water?

Not all farms have the same potential to reduce emissions.

Some farmers have already done what they can.

Others are limited by their unique climate, topography, markets and infrastructure.

Rest assured, you're not alone in your efforts. Consulting officers, environment specialists, extension staff and other rural professionals are gearing up to help through an MPI-funded programme.

Research into technologies that might help in the future is under way on several fronts:

Some animals emit less methane per unit of feed eaten than others thanks to a smaller rumen with a distinctive population of micro-organisms.

Breeding for this trait could result in a potential emissions reduction nationally of 3% – 8% over 20 years.

That research is well advanced in sheep and it's likely the trait will be included in the selection process in the next few years. Work in cattle is just starting.

Methanogen vaccines and inhibitors are also under development.

Vaccines are being tested in the laboratory with the goal of reducing methane emissions by 30%.

An inhibitor has already been developed in the Netherlands that demonstrably reduces emissions by at least 30%.

However, in its current formulation it must be included in every mouthful of feed – less than ideal for NZ's grazing livestock.

Work continues and new formulations or alternative products could be on the market in the next five to 10 years.

Products that inhibit nitrous oxide emissions from urine patches are also under development.

In the next issue, I'll wrap up this series of articles with a look at how our efforts to reduce on-farm emissions of greenhouse gases can be consistently measured and assessed.