NFR: ENVIRONMENT

RESEARCH RACE

Clock ticking on greenhouse gas solutions

We've spent millions of dollars trying to find ways to reduce agricultural greenhouse gas emissions, and there have been breakthroughs. But we're racing time to meet international commitments New Zealand made at the 2016 Paris Agreement on climate change. By SIMON EDWARDS

Dr Harry Clark: If scientists could find a vaccine that inhibited methane production, "it offers the tantalising prospect of giving an animal one shot that lasts its lifetime".

DR HARRY CLARK'S educated estimate is that around $20 million a year is being spent by the New Zealand Government and agricultural industry bodies to find ways to cut the methane burped by sheep and cattle, and nitrous oxide emitted when animal urine interacts with microbes in soil.

My dumbest question of the interview: "Is that enough?"

Bemusement radiates down the phone line from the director of the NZ Agricultural Greenhouse Gas Research Centre (NZAGRC) in Palmerston North. Never ask a researcher that question.

"Always people would want more. But I think it's an investment that recognises the size of the problem," Dr Clark says diplomatically.

Hard decisions on ongoing funding are on the horizon. Research funding commitments for the three biggest players — $4.5m pa for the NZAGRC; around $5m from the 50/50 government/industry funded Pastoral Greenhouse Gas Research Consortium (PGgRc); and $65m over nine years as NZ's contribution to the Global Research Alliance (GRA) — "all have an end date" in two or three years.

"Whatever government comes into play (in September), decisions will have to be made. We know our Paris Agreement commitments are not going to be easy to achieve," Dr Clark says.

Quick refresher — We've pledged to reduce emissions in 2030 by 30 per cent below 2005 emissions (11 per cent below 1990). One of our dilemmas is that 49 per cent of our emission profile is from farming activities, but agricultural exports remain a backbone of the economy.

The good news is that efficiency gains (better productivity from fewer stock, smarter fertiliser application, etc) have kept the sector's emission increases to 15 per cent relative to 1990 when they might otherwise have been 40 per cent higher. In the same period carbon dioxide emissions from transport went up 71 per cent.

But we need not just more efficiency gains, but also new mitigation solutions. And we need them soon.

METHANE INHIBITORS

Dr Clark says work identifying compounds that inhibit the activity of microorganisms ('methanogens') that produce methane have made rapid steps.

"The task now is to refine them so that they work at low concentrations and you can deliver them into animals that are kept in New Zealand conditions."

There are regulatory requirements to meet, not least the rigorous assurances that will be needed that animal health isn't compromised, and harmful substances don't end up in products consumed by humans. "It's a complex, and probably quite a lengthy, road," he says.

"Even if you have a very good idea a compound is safe, you have to get the data to prove it."

Laboratory trials to prove a compound works are one thing. "Then you have to do larger trials in field situations over longer periods of time; you need to know longer term effects as well as short term."

It would be "foolish" to try and put a date on when an inhibitor would be available for NZ farmers to use.

A Dutch company, DFM, has worked for years go get a methane inhibitor to the point where it hopes to have a product on the market by 2020. They'd started animal trails back in 2013, "so that gives you an idea of the time frames involved". Also, this product is designed for cows on a diet of controlled daily supplement feed, not our pasture-raised animals.

BREEDING PROGRESS

The PGgRc and NZAGRC have made strong progress on breeding sheep and cows which emit lesser amounts of methane when fed the same things/amounts as a control flock. Within two years, reliable information on low-emitting stock will be there for the industry to take up, Dr Clark says.

"The difference between the high and low emitting flocks is in the region of 10 per cent, which means the difference between the average animal and low emitting animal is roughly half that.

"We're not talking about massive gains but with animal breeding you're always selecting [the best] and those gains keep going. The estimate is you could up to a difference of about 20 per cent."

More refinement is needed to ensure there isn't unwanted side effects — that you've altered one or more other traits that you need. The work does seem to suggest that doesn't happen, he says. "If you're selecting for live weight gain, for profligacy, certain wool characteristics, and then you also want low methane along with those, you put pressure on the other selection traits. Now you want all four, and the other three deliver you profit. Now if something like methane had a price . . . it all depends what incentives are available."

If that sounds like a pitch for including agriculture in the Emissions Trading Scheme (ETS), Dr Clark says it wasn't meant to be. "That's just one mechanism by which you can encourage uptake of technologies. It's not the only one."

Improving efficiency in general is good for greenhouse gases. NZ used to have 70 million

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