

Russ Tillman.

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Imagine yourself in 25 years time – it's 2042 and water quality is better than in 2017 and improving, dairy farming is a profitable business and still a major part of the New Zealand economy.

Russ Tillman was the closing speaker at the Fertiliser and Lime Research Centre annual conference at Massey University and took delegates on a flight of fancy – or could it have been a peek into a totally plausible and attractive future?

The future looks very different to the present, Massey emeritus professor Tillman postulated – saying most of the world's proteins are manufactured in biotechnology facilities and no animals are required.

In 2042, dairy farmers receive strong financial incentives to minimise the impact on their farm environment – not subsidies, but premiums around NZ's quality brand from the market segment that pays extra for their products – maybe because they are grass-based proteins, because of their animal welfare record or because of their minimal greenhouse gas footprint.

So that's the future – how did the industry get there?

Change came in a gradual evolution, Tillman theorised – starting with the introduction of a carbon tax in 2018 to encourage low greenhouse gas (GHG) emitters. Tillman touched on how the tax

would work, saying all dairy farmers paid a carbon tax to the government depending on the amount of gas emitted, then were awarded a tax refund paid back as an amount per kilogram of milksolids (MS).

"The scheme rewards farmers who produce milk with a low C footprint, at the expense of those with a larger C footprint – and sets up a competition between the farmers with the difference in tax liability encouraging farmers to reduce emissions of carbon where this can be done easily and at little cost," Tillman said.

Importantly, Tillman said the price is set low so that low GHG producers were likely to receive a tax refund of \$10,000 and the highest emitters might have a net liability of \$30,000. Enough of a differential to encourage behaviour change however, Tillman said. The success of the carbon tax initiative in enhancing NZ's reputation abroad encouraged the Government to develop a wider "environmental brand".

But Tillman warned, for the brand to have marketplace credibility it had to be backed by real action.

"We had to be world leading and have more than just lip service paid to it like the current 'clean, green' image."

**FIVE-STAR FARMERS**

The way forward was to pair the carbon tax framework with a star rating system that rates farmers with stars relating to separate components of the farming system and farmers are paid based on how many stars they have.

**Star rating components:**

- GHG footprint (measured per kg MS)
- Nitrate leaching footprint (per kg MS)
- Environmental infrastructure and management
- Animal welfare
- Milk safety and quality

"Farmers might be awarded half a star or a whole star for each component – or no star – and their star rating will directly affect their payout. Below two star status over the five categories and farmers will struggle to get a contract to have their milk picked up.

"Losing half a star might cut their payout by 45cents/kg MS and in the same way as the carbon tax, farmers will be competing with each other for star rating – so the bar is always being lifted," he said.

Tillman said the system would be closely controlled and audited and because there is a strong financial incentive, farmers will see it as an investment rather than a cost.

"Expenditure on environmental performance is an investment in the brand rather than a compliance cost," Tillman explained.

**REGULATION AND COMPLIANCE**

Using a carrot rather than a stick greatly reduced the need to regulate dairy farms to ensure good environmental performance, Tillman said.

In 2017 the regulation from regional councils was becoming increasingly contested.

The approach taken by many regulatory bodies of imposing limits for example on the leaching of nitrate meant limits tended to become targets.

"Farms that were originally leaching less nitrate than the limit imposed by the regional councils regarded this as an opportunity to intensify production until the limit (or target) was reached, and there was no incentive for farmers already complying with the limit to slow down by further reducing N leaching."

Tillman said the unconstructive atmosphere of regional councils trying to regulate farmers into limiting N leaching and environmentalists becoming increasingly strident about advocating limiting cow numbers as the only way of halting the decline in water quality has been overcome by 2042.

"By 2042, environmental advocates accept that a profitable dairying sector benefits the country as a whole and there are no dairy farmers who think poor water quality is a good thing."

In Tillman's scenario, central and local governments realised that a limits-based approach was hurting rather than helping environmental outcomes, once they saw the positive effects of the carbon tax and star rating system on farmers behaviour, so they abandoned the idea of applying arbitrary minimum standards on water quality and replaced it with striving to return water quality "as close as practicably possible to the original pristine state".

While he said regional councils were at first reluctant to move away from regulating nutrient losses on a per-hectare basis, thinking they would lose control of increased discharges into waterways, their concerns proved groundless.

"Farmers found it difficult to increase production without increasing production costs and their nitrate leaching footprint – which resulted in a reduction in the payout price."



## Summary: 2017 to 2042

- Astute environmental branding increases financial returns, passed on to farmers meeting environmental standards.
- Less need to trade-off environmental performance and profit.
- Continual improvement of forages, cow performance, development of hybrid grazing systems bring improved environmental performance and profitability.
- Competition between farmers the best way to bring ongoing small improvements.
- Simplified environmental regulation.
- Central and local government moved to "set directions, not targets".
- Government and industry leaders moved forward together to bring about change.

"The financial pressure has meant that N leaching from dairy farms in 2042 is now less than half of what it was in 2017 – a much better result than could have been achieved by trying to enforce regulatory nitrate leaching limits."

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### DAIRY FUNDAMENTALS

The fundamentals of dairying have not changed between 2017 and 2042 but Tillman said change has come in the increased use of technologies to enhance the quality brand.

"The financial incentives have encouraged farmers to reduce costs and concentrate on environmental efficiency,

putting the emphasis on profit and not production."

By 2042, with changes to the tax system and the overseas investment rule, returns from dairying come from the farming operation – not capital gains."

A focus on continual improvement will help farmers maintain their competitive edge in the marketplace, Tillman said.

He saw a hybrid grazing system, featuring cows getting 80% of their nutrition from pasture in the paddock and the remainder a supplementary feed eaten in a covered yard. Supplementary feeds will be chosen to reduce the overall GHG footprint and improve the farm's star rating – and very few supplements might come from overseas. Methane emitted from covered yards and manure storage areas will be collected and used.

"The ratio of time in the paddock to time in the covered yard will vary between seasons and different regions in the country."

Cows would be milked by robotic milkers and cow production, health and welfare closely monitored by sensors and data-collection units.

Pasture would also change, Tillman predicted.

Advances in precision drilling and fertiliser application would allow the use of a wide range of forages, capable of reducing both methane emissions and nitrogen excretion, yet still producing and persisting well.

Cows would be bred to be more efficient – emitting less methane and excreting less nitrogen as well.

Small gains across many fronts would add up, Tillman concluded.

"Each of these initiatives increasing by a few percentage points can add up to big differences in environmental gains."

"Plus providing financial incentives for environmentally efficient production has compressed the traditional normal distribution in farmer performance – the laggards have upped their performance to reap added rewards, and the one and two-star farmers have simply gone out of business."

While Tillman foresaw teething problems with both the carbon tax and star rating system implementation, he praised government and industry leaders for having the tenacity to proceed.