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## **Farming within limits; the new reality. Concluding remarks**

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In 2002, Fish and Game New Zealand launched arguably one of the most successful environmental campaigns since the anti-nuclear movement which began in the 1950s. The 'Dirty Dairying Campaign' set the agricultural sector on a path to addressing its impact on the environment in a much more public and open forum than had been seen before. Within a generation, farmers have gone from receiving government funded incentives to increased stocking rates, cleared bush and scrub, and applied what we now know to be excessive amounts of fertiliser. They are now faced with the prospect of farming within limits imposed either naturally or by regulation.

Over the coming years, farming within environmental limits will be the new 'normal'. Communities will be working together in collaborative processes to determine what fresh water values or objectives they hold, and to set limits to ensure those values are upheld. Farmers will need to be involved and will need to adapt. Some farmers will need to adapt on a large scale. The science that underpins the decisions communities make will need to be comprehensive and robust. It will also need to link back to the profitability of farming systems. There will not be a 'one-size-fits-all' solution to addressing this complex issue.

The papers in this session have each addressed different components of the associated problem to highlight the complexity around the science, policy and implementation of both the desirable values and the potential limits.

As a starting point Beukes et al. explored system fundamentals. They highlighted the importance of the topsoil as a living nutrient trap and challenged farmers to consider the soil as a 'productive ecosystem', suggesting a healthy topsoil with plenty of organic matter can reduce nitrogen (N) losses. They went on to talk about the importance of the rumen and diet of animals in nutrient losses at the other end of the cycle. To link back to the profitability of the system, they discussed the importance of buffers and the ability of farmers to recover from challenging times associated with climate, product volatility and management issues. Based on these key fundamentals, Beukes et al. proposed five on-farm mitigations to reduce greenhouse gases and N leaching on New Zealand dairy farms.

Scarsbrook outlined the dairy industry engagement in the process of setting water quality limits and suggested it brings challenges for the dairy industry to remain competitive. The dairy industry have a range of initiatives to address this challenge and have a four-step model for engagement. The steps are to set the limits to

address water quality issues, to define the regulatory and non-regulatory methods to achieve these limits, to manage to limits on farm, and to assess progress towards the desired outcomes.

Abercrombie then presented menus of practices to improve water quality as an example of multiple industries and interests working together in collaboration to achieve a shared goal. The developed menus provide a practical resource for farmers and their advisors to reduce agriculture's impact on water quality. By engaging with individuals from a range of different organisations with a range of different skills, the outcome has become a 'nationally based' relevant resource that will help farmers meet future sustainability challenges.

As a farmer farming on the shore of Lake Taupo Barton presented a 'first hand' illustration of the practical constraints associated with farming in the Lake Taupo Catchment. He presented a clear outline of the lessons learned from the science, and how the consumer of products produced on the farm has an important part to play in enabling the established limits to be achieved in a sustainable manner. Barton challenged the current agricultural business model highlighting the need to move away from the production of commodity products to value added products, if limits are to be attained. The role of scientists in redefining the model to ensure farmers remain viable in a constrained environment is vital.

There are some common themes in the four papers presented. Understanding the system, and then how it can be altered, utilised and optimised to achieve long-term viability. There are multiple approaches, preferences, and ideas in addressing the water quality challenge. Collaboration is the most appropriate way to collectively consider the information. There has to be change but it will not be easy to retain viable profitability.

Ultimately, as a nation, a community, a family, a farmer, a scientist, or a consumer, we have some answers. As a nation famous for its 'Number 8 wire' mentality, the possibilities are endless and provide a unique opportunity to extract value from maintaining a 'clean, green image' that will remain competitive and protect our natural resources. The New Zealand Society of Animal Production should be engaged in the discussion to assess and present data to objectively assess the possibilities from the point of view of issues related to animal production.

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