

Consumers' willingness to pay for sustainability and other attributes

WHO IS THIS RESEARCH BRIEF FOR?



Food exporters
Food processors
Marketing professionals
Central government
Farmers and growers
Rural lenders

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RESEARCH TIMELINE

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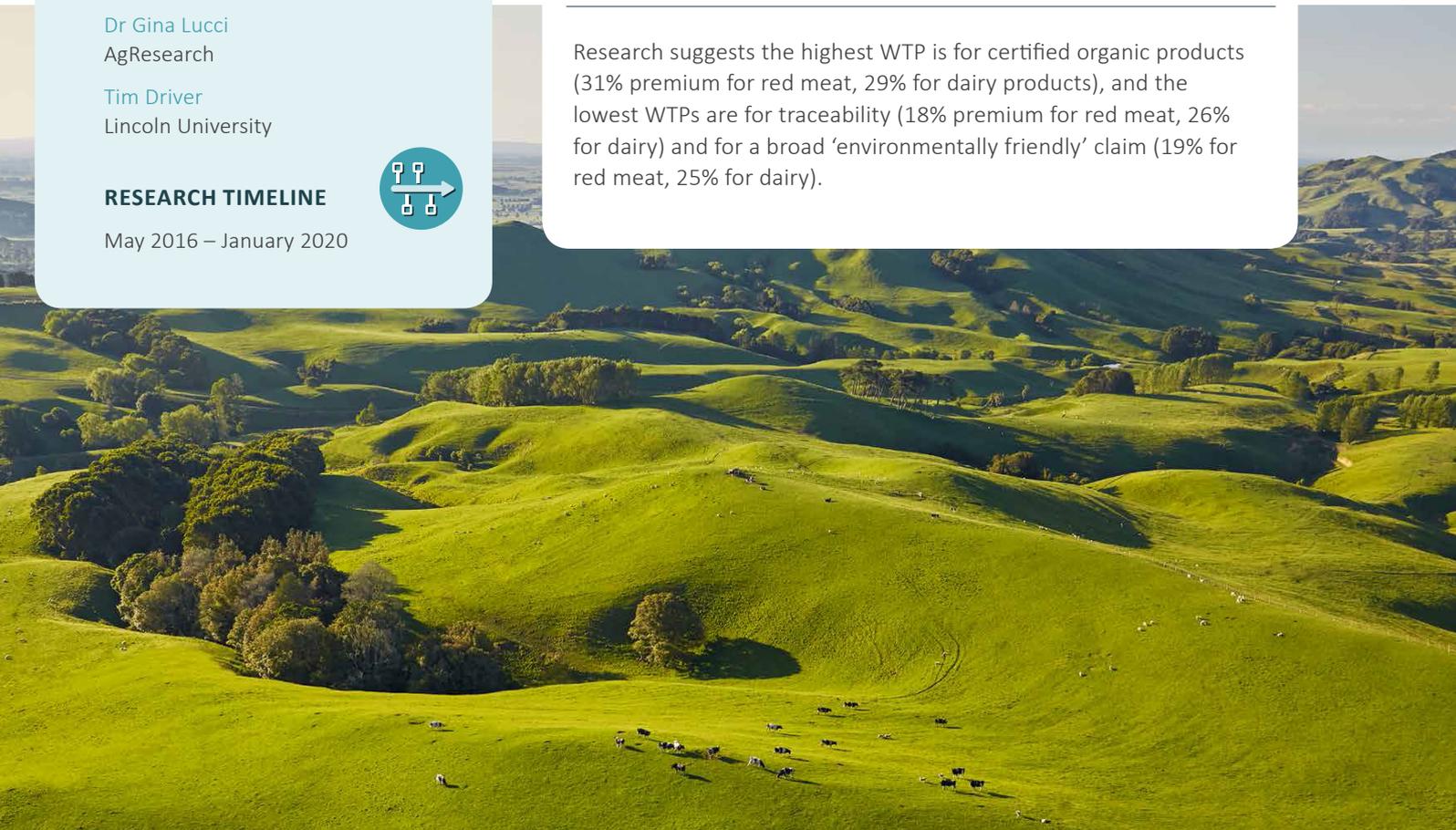
Key points

Changing practices on farms to meet new water and climate regulations can be turned into a marketing advantage in New Zealand's food export markets, and has the potential to significantly increase farm profitability.

Consumer willingness to pay (WTP) research provides evidence that consumers of New Zealand food exports will pay a price premium for sustainability and other attributes (credence attributes). This can increase returns to domestic producers and offset the costs of providing these attributes.

Credence attributes – product attributes such as environmental sustainability, animal welfare and cultural authenticity – are not directly observable by consumers at the point of sale, and are strongly related to on-farm production.

Research suggests the highest WTP is for certified organic products (31% premium for red meat, 29% for dairy products), and the lowest WTPs are for traceability (18% premium for red meat, 26% for dairy) and for a broad 'environmentally friendly' claim (19% for red meat, 25% for dairy).



How can this research be used?

Marketing strategies: The research identifies export market segments willing to pay a premium for an attribute, and can inform product development, tailoring of livestock industry credence attributes for market segments, branding and labelling (see 'Targeting conscious foodies').

Policy development: The research can inform design and implementation of policy to help consumers, such as regulations around environmental footprint labels on product packaging.

On-farm change to gain price premiums: Confirming the existence of price premiums, and providing information on adjusting farm systems in response to market signals, could motivate and assist farmers to gain premiums by making changes to their farming systems or adopting new practices and technologies.

Targeting 'conscious foodies'

Research on what consumers in US and Chinese target markets will pay for credence attributes of New Zealand beef helped Beef + Lamb NZ identify a premium market segment it labelled 'conscious foodies' and launch the Taste Pure Nature country-of-origin brand. The brand reached at least 640 million people in the US and China in 2019–20, with potential to earn New Zealand hundreds of millions of dollars per year.



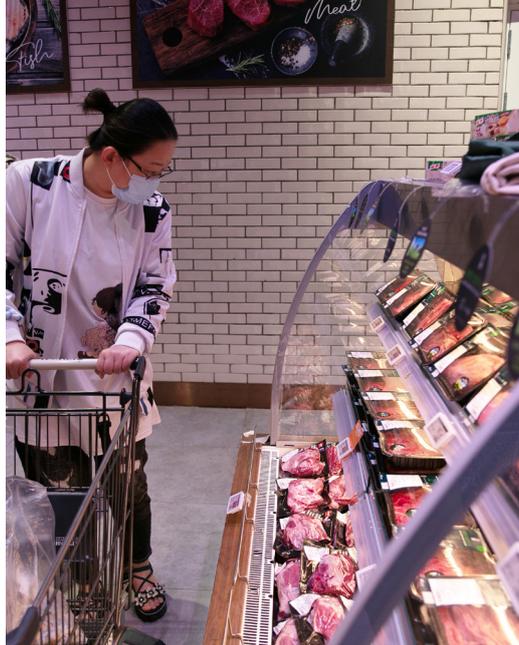
Why is this research needed?

Industry leaders such as Te Hono and the Primary Sector Council are urging New Zealand producers of food and fibre to move from volume to value. Some of the increased value that producers provide consumers in terms of product attributes should come back to producers as increased income.

Most of New Zealand's agri-food produce is exported. Domestic producers can increase profitability if environmental compliance is used as a marketing advantage in international markets, targeting consumers who value sustainable production practices.

It is often difficult for farmers and industry to have a clear picture of monetarised WTP. While many observational studies have estimated consumers' WTP for food products, the estimated values of WTP vary across different studies, and are hard to generalise due to variations in methodology.

Increased returns can help New Zealand agri-food producers offset the costs of environmental compliance. For producers to obtain higher returns, research is needed to identify the market segments willing to pay price premiums, the attributes they want and how much they are willing to pay for them.



What did we do?

We completed four research projects:

Integrating Value Chains: This project produced a series of eight reports detailing focused primary data of consumer behaviours and preferences for New Zealand's key export markets and products (for example, New Zealand wine in the Californian market). The project produced WTP estimates for a wide range of attributes relevant to New Zealand's primary producers, such as pasture-raised and grass-fed beef.

Credence Attributes on Farm: Stage 1 was a meta-analysis (analysis of analyses) of 94 existing WTP studies from around the world. Results from the studies were gathered into a model and analysed to identify a WTP number for each key NZ livestock product. The model took into account variables such as country and method to try to identify WTP for different attributes. Stage 2 investigated the on-farm environmental and economic impacts of changing farming systems to deliver credence attributes.

Eutrophication Product Footprinting: Scientists worked with international researchers to develop eutrophication impact assessment models that can be applied in every country. These will allow the full environmental footprint of agricultural products to be calculated and compared, using methods set by the European Product Environmental Footprinting initiative. This project focused on the producer end in the Taupō region.

Matrix of Drivers 2019: This included an updated literature review of consumer WTP for credence attributes for primary products, as drivers of land-use and management practice change.

What did we find?

Evidence suggests that consumers of agri-food products in New Zealand's key export markets value attributes produced by responsible innovation. This has the potential to increase returns to producers.

Beef and dairy products have significantly higher WTP than lamb, according to data from existing studies.

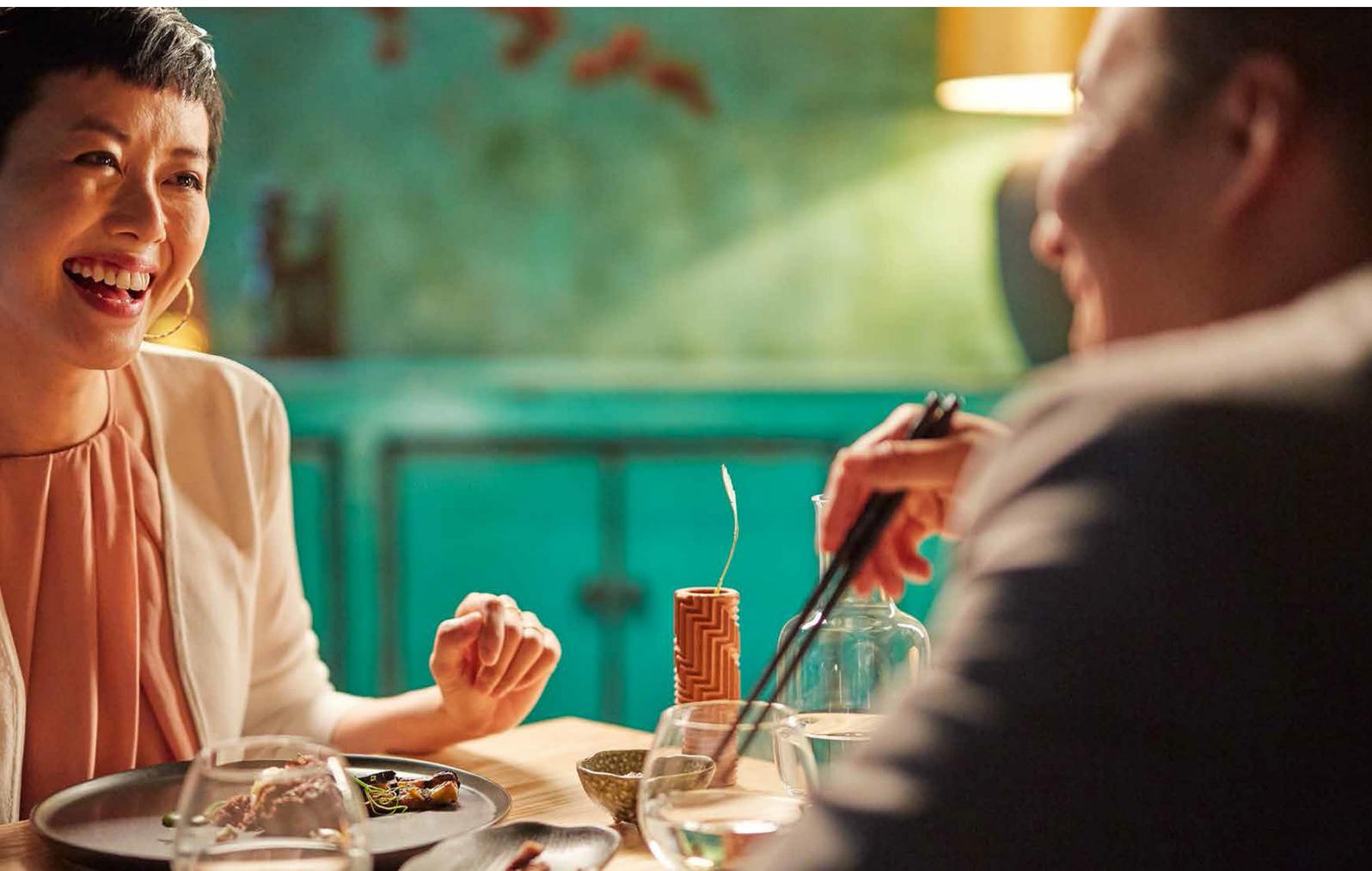
The research suggested there is potential to add a 20% premium to New Zealand beef and lamb in the US market, generating an additional \$238 million in export returns.

Modelling of the farm system changes required to deliver carbon-neutral dairy, using data for the average Waikato dairy farm, showed economic and environmental outcomes varied over the predicted WTP range (a price premium of 5.3–47.5%) and for different farm system scenarios. Carbon-neutrality comes with a cost, but the price premium obtained from the market may cover the cost and is likely to create a profitable outcome.

European consumers' willingness to pay a 32% price premium for beef products with low environmental impacts could offset the cost to farmers of reducing of nitrogen emissions. Combining an environmental life cycle assessment with an economic analysis revealed that the consumer WTP could compensate for the environmental cost of protecting Lake Taupō, which is currently being borne by farmers.

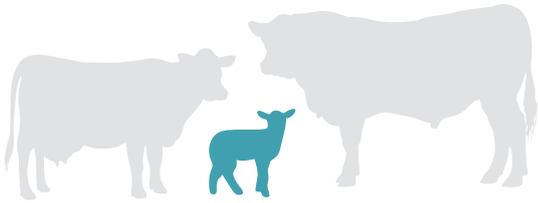
Evidence indicates the farms with the highest profit potential were those with no nitrogen fertiliser input. Modelling of farm systems in the Waikato also suggests this.

Overall, social responsibility is an important consideration for consumers, but it varies between countries, and also on the level of standard, according to 2015 surveys conducted in the UK, Japan, India and Indonesia.



Consumer willingness-to-pay is variable

Consumer WTP for credence attributes varies across:



Livestock Products

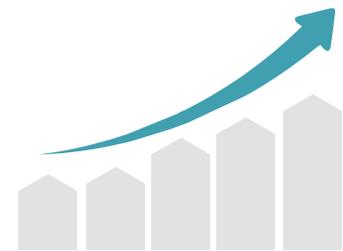
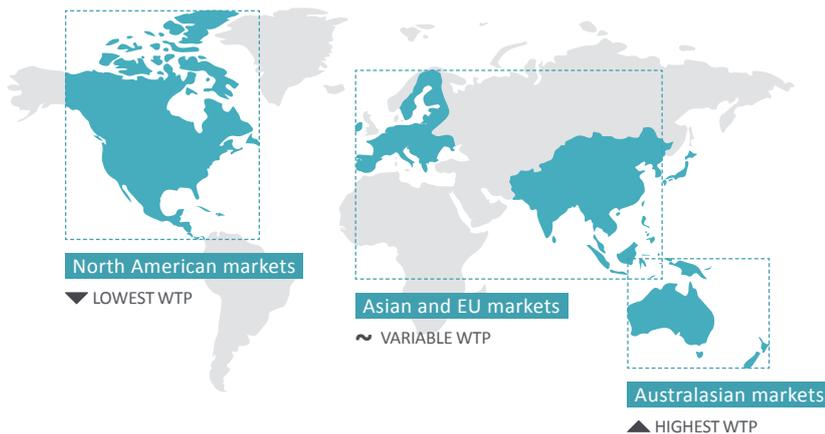
Beef and dairy have significantly higher WTP than lamb.



Credence Attributes

'Organic' attracts the highest price premium (31% for red meat; see Table 1).

Regions



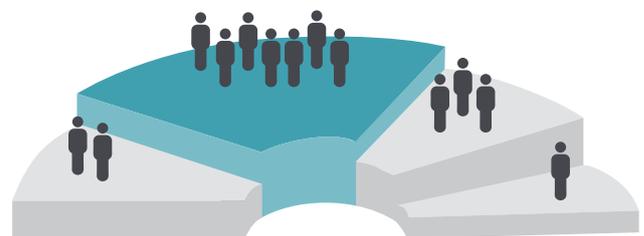
Time

WTP for credence attributes for livestock products is increasing over time.



Situations

Supermarket data confirms consumers are willing to pay price premiums, although less than consumers' intentions might indicate.



Market Segments

The 'conscious foodies' segment has a higher WTP for credence attributes, for example.

Table 1: Predicted WTP price premium for red meat and dairy products

Source: Yang & Renwick, 2019

Overall price premium	Credence attribute	Red meat price premium %	Dairy price premium %
	Organic	31	29
	Hormone/Antibiotic-free	24	34
	Animal welfare	19	31
	Food safety	23	39
	Country/Region of origin ¹	23	30
	Protected designation of origin/Protected geographical Indication ²	22	26
	Environmentally friendly	19	25
	Grass-based	22	25
	Traceability	18	26

1. e.g. made in New Zealand
 2. e.g. champagne can only be made with grapes from the Champagne region in France

Table 2: Summary of potential impacts of delivering credence attributes on dairy farms

Source: Lucci et al, 2020

	Profit	Nitrogen leaching	Carbon footprint
Organic	+ 42–67%	– 17–24%	– 11–20%
Carbon-neutral	+ 11–25%	– 41–42%	– 11–17%
Pasture-fed	+ 36–49%	– 5%	– 7%

Does consumer WTP research reflect reality?

Asking consumers outright how much they would pay for credence attributes is unreliable. Instead, most consumer WTP research uses the choice experiment method, which is more reliable as it emulates a real-world market scenario.

In the choice experiment method, consumers choose from a range of products with different attributes and price. From these choices, researchers can deduce which attributes are most important, and determine the associated price premiums. Such experiments are particularly useful for testing products not yet available on the market, such as carbon-neutral meat.

Choice experiment results can also be validated by investigating if the preferences stated are consistent with other truer measure of preferences. This is done by eliciting consumers’ preferences for the same or very similar goods in both hypothetical and actual payment settings. The real-payment-based estimates provide a reference point for validity verification.

Observed market behaviour does provide more reliable data, and the number of studies using market data has increased since research on price premiums for credence attributes started in the mid-1990s. Still, choice experiments have been shown to accurately predict consumer behaviour in a range of contexts such as food and healthcare product choices and transport modes.

According to the meta-analysis of existing WTP studies, even though consumers are willing to pay a higher price premium in hypothetical situations than in the real world, a real-world premium still exists.

Queries around actual versus reported behaviour are not unique to WTP research and exist across surveys in the social sciences, such as estimating unemployment rates and political polling.

Next steps

Most meat and dairy product credence attributes are strongly related to on-farm decisions, and this relationship could be further explored. Research in this area has not yet considered the costs of changing farming systems, for example from traditional to organic.

The farm system modelling that estimated on-farm impacts of delivering environmentally friendly dairy products was based on Waikato data (see Table 2). It could be worthwhile to explore these impacts in other regions of New Zealand, and to explore the on-farm impacts of providing other credence attributes.

Further research is underway to understand product innovation to deliver credence attributes, using UK data on new product launches and associated packaging, food labelling and price.

The research has led to two other research programmes, currently in progress:

- **Unlocking Export Prosperity:** researching international market segments where New Zealand land-based exports can earn premiums (funded by the MBIE Endeavour Fund)
 - **Rewarding Sustainable Practices:** researching how New Zealand enterprises can create and sustain global agri-food value chains that create value for consumers in distant markets and bring some of that extra value back to reward sustainable on-farm practices (funded by the Our Land and Water National Science Challenge)
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New Zealand WTP research is far behind that of international competitors. This research is a series of snapshots into markets at one point in time. As consumer preferences change over time, long-term consumer research is required to provide clear, reliable knowledge to producers.

Communicating a product's certifications and standards via label design is crucial in connecting consumers to credence attributes. Labels must balance simplicity and complexity so that consumers can recognise a product's potentially multiple attributes. This area could be further researched to ensure labelling supports producers receiving price premiums for attributes.

Key publications

Consumer Willingness to Pay Price Premiums for Credence Attributes of Livestock Products– A Meta-Analysis. Wei Yang, Alan Renwick. *Journal of Agricultural Economics* 2019; 70 (3): 618–639. doi.org/10.1111/1477-9552.12323

Impact of delivering 'green' dairy products on farm in New Zealand. Wei Yang, Grant Rennie, Stewart Ledgard, Geoff Mercer, Gina Lucci. *Agricultural Systems* 2020; 178. doi.org/10.1016/j.agsy.2019.102747

Eutrophication and climate change impacts of a case study of New Zealand beef to the European market. Sandra Payen, Shelley Falconer, Bill Carlson, Wei Yang, Stewart Ledgard. *Science of the Total Environment* 2020; 710. doi.org/10.1016/j.scitotenv.2019.136120

Appendix A: Review of international consumer preferences studies – choice experience (CE) and willingness-to-pay (WTP) case studies in **The Matrix of Drivers: 2019 Update.** Tim Driver, Caroline Saunders, Simon Duff, John Saunders. ourlandandwater.nz/matrix2019

Rewarding Responsible Innovation when Consumers are Distant from Producers: evidence from New Zealand. Paul Dalziel, Caroline Saunders, Peter Tait, John Saunders, Sini Miller, Meike Guenther, Paul Rutherford, Tim Driver. *International Food and Agribusiness Management Review* 2017; 20 (4). doi.org/10.22434/IFAMR2017.0012

Estimation of consumer willingness-to-pay for social responsibility in fruit and vegetable products: A cross-country comparison using a choice experiment. Sini Miller, Peter Tait, Caroline Saunders, Paul Dalziel, Paul Rutherford, Walter Abell. *Journal of Consumer Behaviour* 2017; 16 (6): 1-13. doi.org/10.1002/cb.1650

The added value of value-add. Brief synopsis of findings, 3p. Gina Lucci, Wei Yang, Stewart Ledgard, Grant Rennie, Geoff Mercer and Michael Wang. 2020. ourlandandwater.nz/credence-attributes-synopsis

Our Land and Water (Toitū te Whenua, Toiora te Wai) is working towards an agri-food and fibre system that enhances the vitality of te Taiao with a diverse mosaic of land uses that improve the health of land, water and people.

Our Land and Water is one of 11 National Science Challenges that focus on defined issues of national importance identified by the New Zealand public.

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