

## OUR LAND AND WATER

Toitū te Whenua,  
Toiora te Wai

## *What is Our Land and Water?*

Our Land and Water is a National Science Challenge. National Science Challenges are dedicated and designed to break new ground in areas of science that are crucial to New Zealand's future. In our case, this means, tackling the biggest science-based issues and opportunities facing our country in the area of primary production, and the complex relationship it has with our precious land and water resources.

Enhancing New Zealand's primary sector production and productivity while maintaining or improving land and water quality is our aim. The vision for Our Land and Water is that New Zealand is world-renowned for integrated and successful land based primary production systems, supported by healthy land and water and capable people. We already have research programmes underway including **Next Generation Systems (NGS)** that specifically target our aim and are working towards our future vision.

## Research Timeline

**April 2016:** Next Generation Systems funding approved

**July 2016:** Next Generation Systems research underway

**June 2019:** Next Generation Systems research complete

## *Why do we need research about Next Generation Systems?*

Primary production industries are constantly changing in response to external factors like new market opportunities, consumer demands, changing community expectations of the social and environmental outcomes associated with the primary sector and technological innovation. These external forces for change will likely intensify over the next 10 years. Next generation land-based primary production systems will be critical to enable primary producers to double the value of New Zealand export returns while improving environmental performance. These systems may consist of one or more different land uses within a business enterprise or catchment. Land managers will need new land use options and new ways to select and configure their enterprise mix to simultaneously meet their business goals, those of the catchment and international markets.

## *What research has taken place so far?*

First a framework using multi criteria decision making (MCDM) was developed because it provides the ability to simultaneously consider multiple domains where selection of best alternatives is highly complex. The approach here recognises that for land owners and managers, this assessment is primarily a business decision but is, influenced by other factors. The aim is to use the framework with land owners and managers to both explore opportunities for next generation systems for their business and to identify gaps in knowledge concerning the systems that require research investment.

## How will the research be implemented?

The Next Generations Systems team will form partnerships with businesses in land based sectors who have:

1. Identified land holdings within their businesses where transformation innovation is considered essential due to nutrient limits
2. Already begun the process of transforming part or all of the business and are recognised as at the leading edge of their sector in terms of optimised systems.

We will work with our partners in businesses to test the MCDM framework for their farm enterprise. This provides a platform to:

1. Further road test and refine the framework across a wide range of primary sectors
2. Use it to explore the potential NGS that would be suitable for each enterprises individual biophysical resources and important decision making criteria they select in the framework

Many of the partners have already been identified in the earlier stages of the project, covering enterprises investing in evaluating transformative options as well as those already leading in systems optimisation.

During this stage we will identify knowledge gaps and barriers to adoption that would affect further investment by the partner and/or NGS programme.

We will work with our partners to critically review the knowledge gaps and barriers to adoption identified in the first instance.

Specifically, we will collate and share existing information to identify mitigations and/or adaptations that can de-risk the decision making process for these enterprises.

Where information is not readily available nationally or internationally, priority research will be commissioned to inform the decision-making process. As our partners move to implementation phase, we will form technical teams to support this process.

*The programme will partner closely to achieve science-informed innovation with businesses across the land based sectors. To achieve this, the programme will draw on expertise from across the research*

