WHAT RESOURCES AND RESEARCH ON CLIMATE CHANGE IMPACTS AND ADAPTATION ARE AVAILABLE FOR THE PRIMARY SECTOR?

This resource brings together the research from Deep South Challenge: Changing with our Climate, Our Land and Water, and Resilience to Nature's Challenges that may interest you as a participant of Adapting Aotearoa: Towards a climate resilient land and food system.

LEGEND:

Our Land and Water

Resilience to Nature's Challenges

Deep South Challenge

WHAT IS LIKELY TO CHANGE LAND USE IN NEW ZEALAND?

Primary sector leaders agree climate change is the key challenge most likely to change land use in Aotearoa New Zealand, found the 2022 'Matrix of Drivers' report by Our Land and Water. This places it significantly higher in importance than all other factors, including the ongoing impacts of the Covid-19 pandemic. The 2023 edition of the report will be released by end of 2023.

RURAL COMMUNITIES AND ECONOMIES

WORKFORCE IMPLICATIONS OF LAND-USE CHANGE

Investigates how regional workforce capacity will affect the suitability of different land-use types. It also covers strategies and interventions that could mitigate workforce constraints, such as counter-seasonal production. This is relevant to new land-use opportunities that could be created under climate change – as they can't be taken up if the workforce isn't available.

CLIMATE CHANGE AND DROUGHT: THE FUTURE OF FARMS AND RURAL COMMUNITIES

Draws on 70,000 tax returns and temperature and soil moisture data to understand the historical relationship between local weather and farm profits. The research found a strong relationship between more intense future drought and reductions in farm profit, for both dairy and sheep+beef farms.

SUPPORTING LAND USE ADAPTATION TO CLIMATE CHANGE

Uses farmer workshops and interviews, to identify barriers, gaps and constraints that limit Canterbury farmers from exploring land use options suitable for a changing climate. The research suggests the convergence of water use consent renewals and dairy shed renewals may be a catalyst for land-use change in mid-Canterbury around the early 2040s.

DISASTER RESILIENT OUTCOMES FOR RURAL AOTEAROA

Breaking out of 'non-decisions' for primary industries

Current policies guiding the recovery of primary industries after natural hazard events may have unintended long-term consequences, by preserving the status quo and locking in undesirable pathways. This workstream uses three case studies; Southland (drought), Marlborough (drought and earthquake) and Bay of Plenty (flood), to gain insight into recovery in rural settings and identify opportunities to enable more resilient responses.

Protection and recovery from localised natural hazard events

This case study is investigating the recovery path of farmers and rural households affected by adverse events in the Hawkes' Bay region. The aim is to identify potential tools that could increase preparedness, reduce risk and aid recovery for farmers, industry groups and relevant agencies.

CLIMATE RESILIENT FORESTRY AND HORTICULTURE

To help landowners in Te Tairāwhiti reduce the risks of increased erosion under climate change and to maximise their revenue, this project used kaupapa Māori, bio-physical and economic assessment tools to understand and evaluate different land-use decisions within a range of potential climate change scenarios. The team worked alongside landowners to identify multiple land-use opportunities with a range of social, economic, environmental and cultural benefits. These included alternative forestry options, horticultural options and other medicinal and cosmetic business options derived from mātauranga Māori.

Climate resilient forestry and horticulture cont.

This research found that re-foresting the land – particularly with indigenous species – would result in a significant reduction of soil erosion for the Waiapu catchment, as well as helping realise the core values and aspirations of Māori landowners.

HIGHER CARBON PRICES: IMPACTS ON FARMING AND FORESTRY WHĀNAU

Higher carbon prices are likely to lead to permanent carbon forests and a reduction of mahi on farms and in production forests. This will almost certainly impact whānau working in farming and forestry. This project was designed to ensure that our hapori in Te Tairāwhiti understand and are prepared for the risks and opportunities posed by permanent forests. This research focused on whānau engagement around our level of understanding about and responses to likely forestry scenarios. It aims to ensure that the perspectives and priorities of affected whānau and hapū shape public policy at the local, national and international levels. Various engagement resources are available from this project.

ENHANCING RESILIENCE AND WELLBEING

The speed and extent of recovery from natural hazard events often vary significantly across communities depending on factors such as socio-economic status, the level of external support and aid, past experience of disasters and the nature and severity of the disaster.

We aim to obtain a deeper understanding of the contextual nature of vulnerability and provide additional insight into effective pathways for addressing the underlying causes of risk, to enhance wellbeing and resilience in the face of disruptions and shocks.

Case studies on topics including regional food security are providing new insight into the factors that enhance wellbeing and contribute to resilient communities, focusing on the social connectivity, networks and relationships that bind individuals and communities together. Our overall goal is to increase the capacity for communities to bounce back from immediate shocks and help them proactively respond to slow-building changes.

SECTOR-BASED IMPACTS AND ADAPTATION

PRIMARY SECTOR PREPAREDNESS FOR CLIMATE CHANGE

Collaborating with Dairy NZ and working with farmers from Otago, Southland and the Waikato, this multi-disciplinary project incorporates hydrological, biophysical and economic modelling, risk analysis and qualitative social science to develop a picture of the impacts of climate change and the options for and implications of adaptation. The analysis spans the farm scale through to regional, national and global scales, and provides a comparison of the implications of climate change for the upper North and the lower South Islands.

CLIMATE, WATER AND WINE: ENABLING ADAPTATION TO INTERACTING STRESSORS

Focusing on the Marlborough Region, this project is assessing the combined effects of climate change and changing water availability, and what's required to secure future sustainability. Working with land managers and others, the team is developing a sector-specific pathway to ensure emerging risks and opportunities are managed effectively. The research employs viticultural and soil-water modelling, geospatial analysis and integrated scenarios of change, combined with in-depth, qualitative research. The aim is to document the decision context, identify strategies and sequence adaptation options over time.

WHITIWHIT ORA: LAND USE OPPORTUNITIES

This project aims to help land stewards assess diverse land use opportunities and make decisions with confidence so that both the whenua and its people will prosper.

The climate change aspect of this project aims to give land stewards a greater understanding of the most suitable crop options for their land, by modelling the impacts of climate change on key land uses and agricultural concerns. It follows on from the Deep South Challenge project Climate change and its effect on our agricultural land.

The team used biophysical modelling to understand the critical climate attributes of various fruit and vegetable crops. It also developed national maps of the climate impact on:

- Crop suitability and phenological stage of various fruit and vegetable crops,
- Risks of several animal health issues such as facial eczema and Barber's pole worm; and,
- physical implications of climate change relevant to the primary sector, such as sediment load in rivers, erosion and annual potential evapotranspiration deficit (drought).

The national maps and data produced by this joint work are being uploaded to the "Data Supermarket" as they become available:

CROP DISEASE UNDER CLIMATE CHANGE

Projects change in crop disease risk by integrating the latest climate change scenarios with disease risk and plant phenology models. An economics team will investigate the potential impacts on our global agricultural markets, and on producer and consumer prices in Aotearoa New Zealand. This project will create an interactive tool via HortPlus's Metwatch that will provide farm-scale climate information.

LAND USE FOR NUTRITIOUS DIETS

Tested future scenarios for land-use change to see whether it's possible to design a 'win-win-win' plan for future food production. Could we produce the right crops, in the right places, to feed all New Zealanders a healthy diet, while reducing greenhouse gas emissions or freshwater contamination, and minimising the financial impact on families and farmers? The short answer is yes.

ADDITIONAL RESEARCH PROGRAMMES

There is much research outside of the National Science Challenges also, for example:

THE MINISTRY FOR PRIMARY INDUSTRIES' SUSTAINABLE LAND MANAGEMENT AND CLIMATE CHANGE FUND (SLMACC)

This fund aims to support research that helps the agriculture and forestry sectors with challenges arising from climate change.

EXTREME WEATHER RESEARCH PLATFORM

In February 2023, as part of the ongoing response to extreme weather events in the North Island, the Ministry of Business, Innovation and Employment (MBIE) reallocated $10.8 million for urgent scientific research and data collection. The funding was distributed across several different projects and is being coordinated by Climate Sigma and the Resilience to Nature's Challenges National Science Challenge.

To find out more about these projects, please follow the QR codes to explore their project pages. For specific queries contact each National Science Challenge:

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