Achieving a lower Carbon bioeconomy

Our Land and Water New Ideas Workshop

4th&5th April 2018

Wellington

NIWA Taihoro Nukurangi

SCION

Manaaki Whenua Landcare Research

AERU Agribusiness and Economics Research Unit

A Lincoln University Research Centre.
New Zealand's specialist land-based university.

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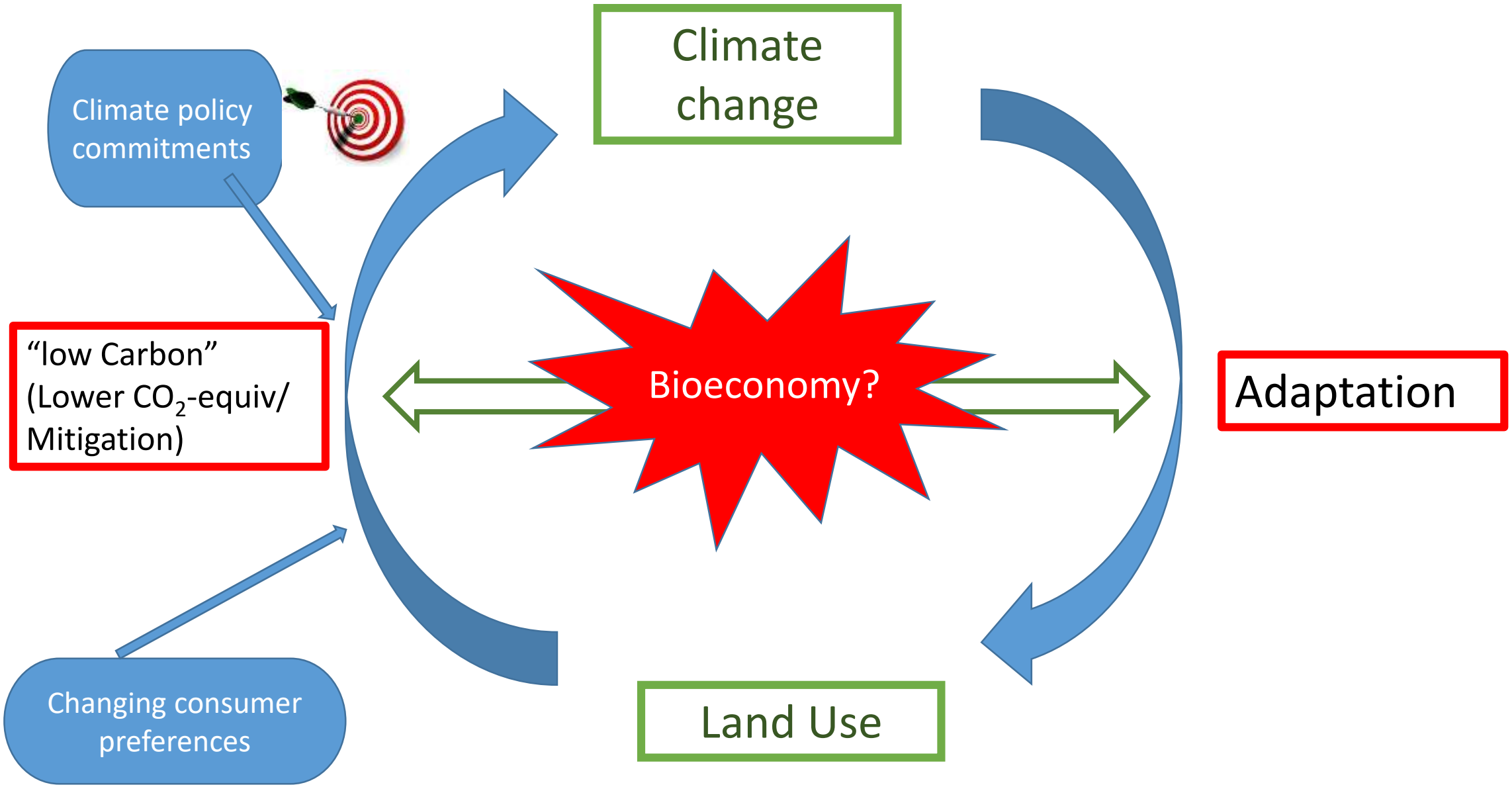
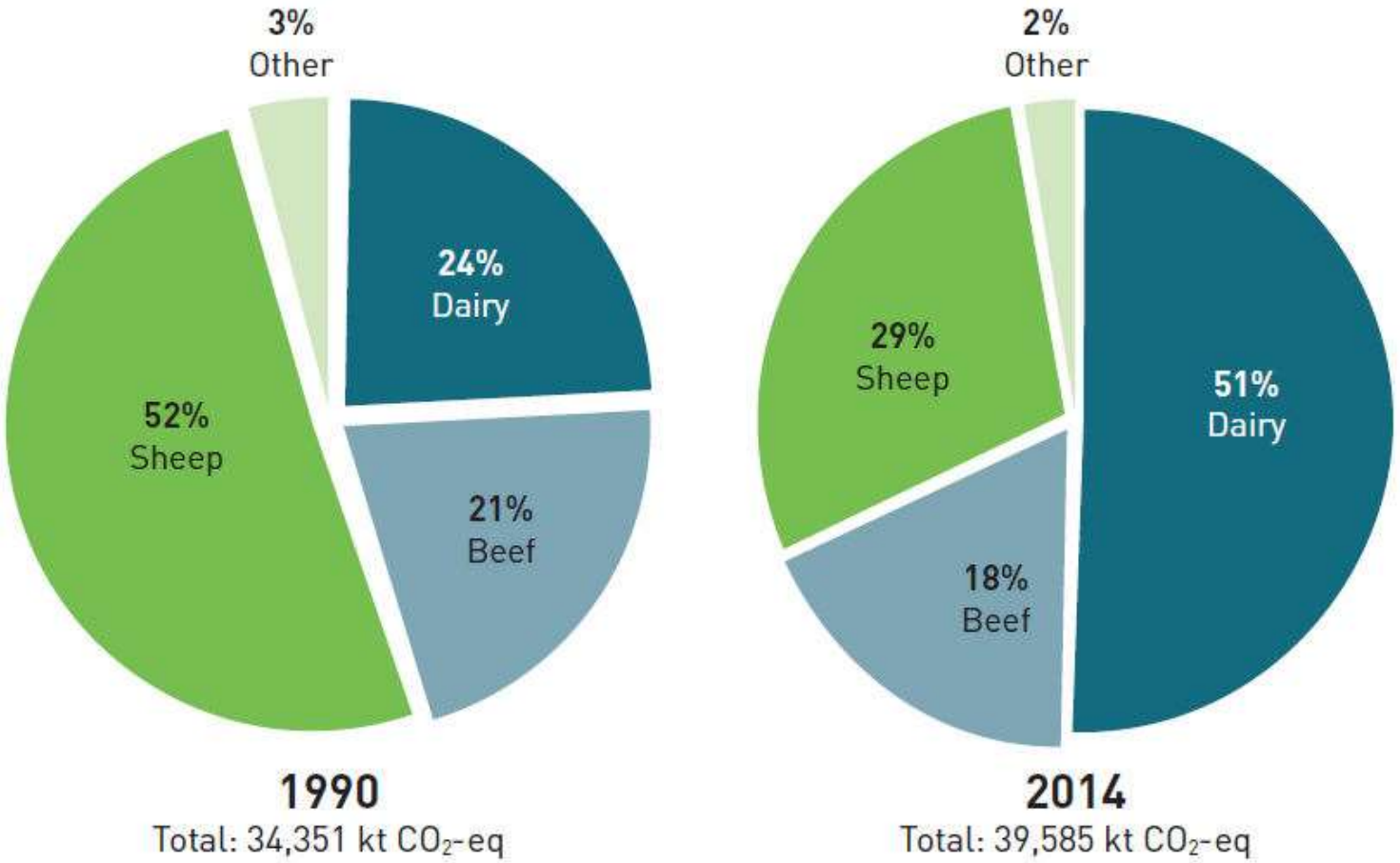

Climate policy commitments
Climate change
"low Carbon" (Lower CO_2-equiv/ Mitigation)
Bioeconomy?
Adaptation
Changing consumer preferences
Land Use

New Zealand

- Growth model has started to show its environmental limits
- Urgent need to address GHG emissions, water quality, also biodiversity loss, soil erosion; while
- Realising greater value-add from primary sector
- Promoting regional rural development

- ***"A long-term vision for the transition towards a low-carbon, greener economy is necessary" (OECD 2017)***

Agricultural sources of GHG



Relative contributions of key agricultural sectors to total agricultural emissions from 1990 to 2014[5].

Source: New Zealand's Greenhouse Gas Inventory 1990-2014.

Early action on climate change would save New Zealand $30b, report finds

CHARLIE MITCHELL
Last updated 06:00, April 4 2018

ROSS GIBLIN/STUFF

Agriculture will take an economic hit if the transition to a low-carbon economy is delayed.

We need to adapt to a changing climate

What then is a lower carbon bioeconomy?

- Bioeconomy:

comprises “those parts of the economy that use renewable biological resources from land and sea – such as crops, forests, fish, animals and micro-organisms – to produce food, materials and energy“”

EU Commission

- Lower Carbon Bioeconomy:

An economy where the use of biological resources results in economic benefits, ***as well as*** reducing the carbon footprint

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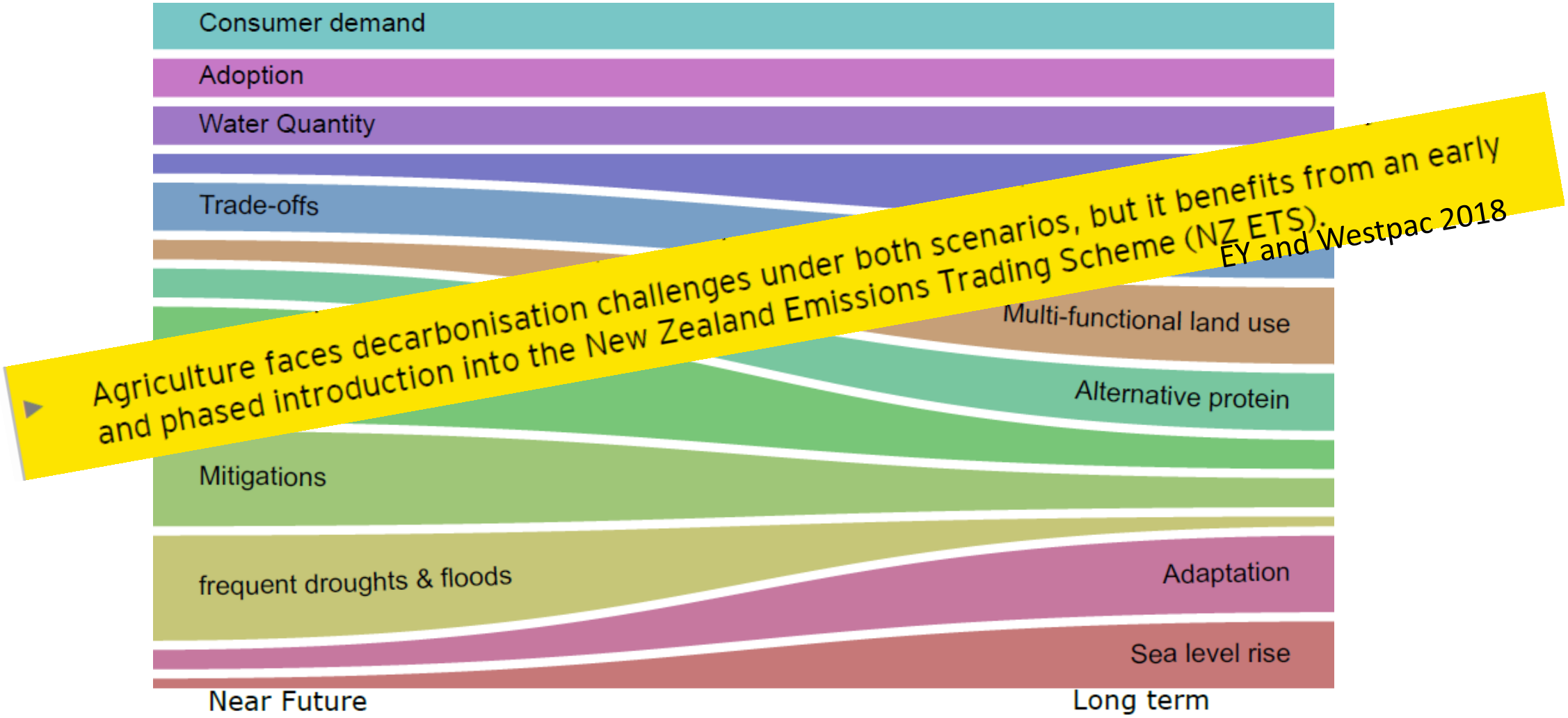
Short and long-term decision making

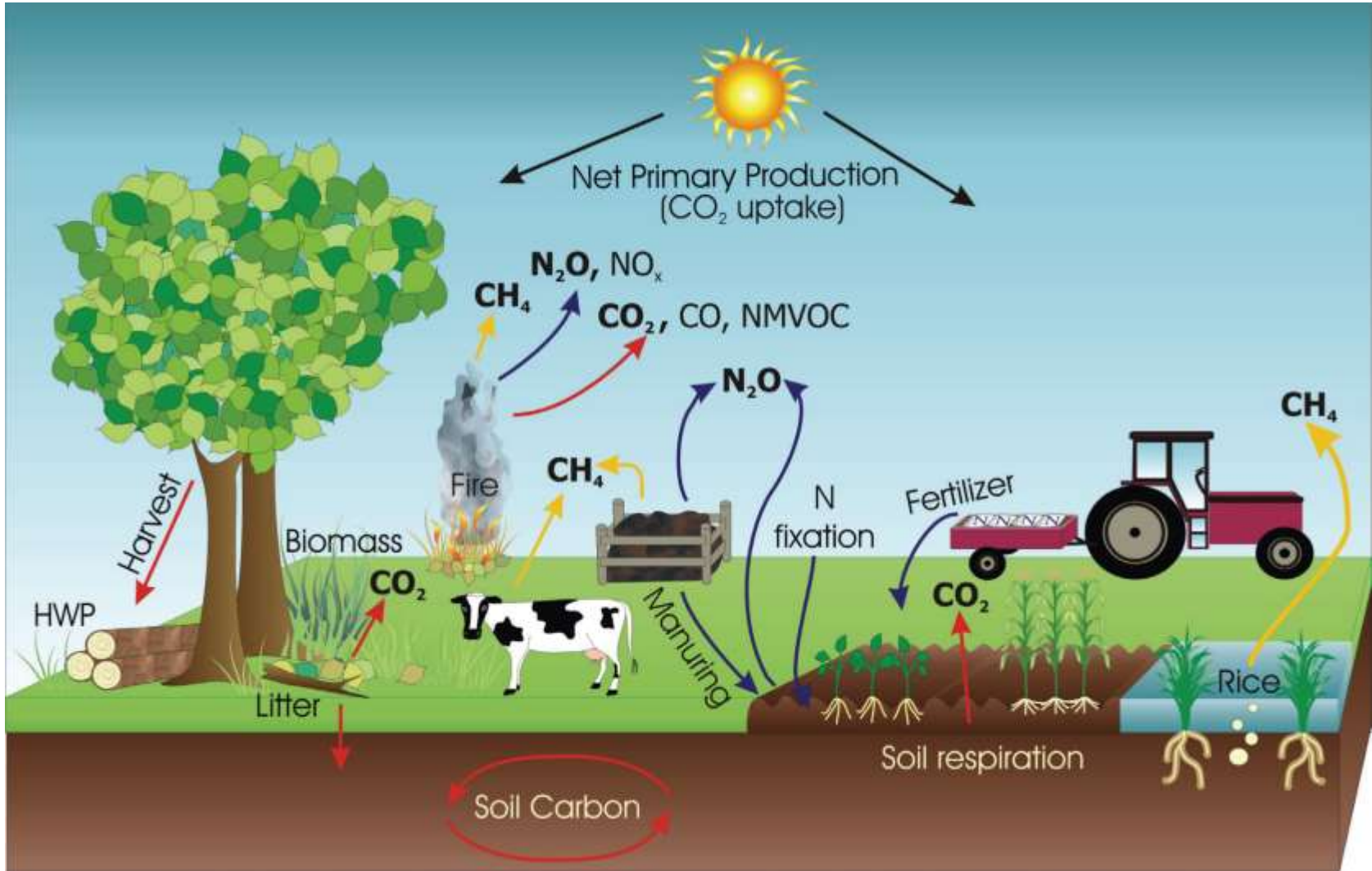


What are the consequences of moving toward a low carbon bioeconomy?

Everything is connected

Risks:

- Nutrient swapping or
- Co-reduction



Project aims and objectives

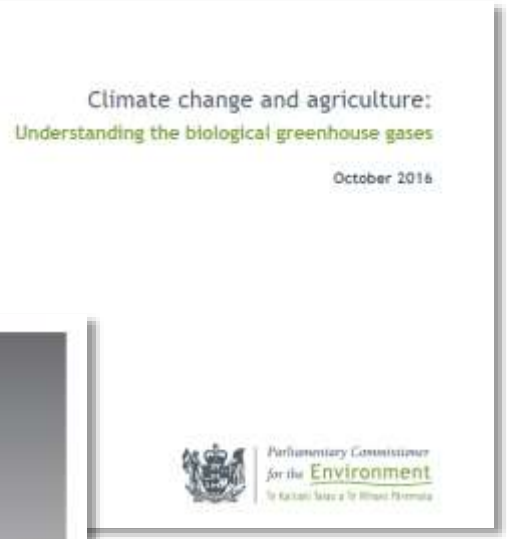
OVERALL: Assess the short- and long-term opportunities and consequences of transforming to a low carbon bioeconomy for land and water quality in the face of a changing climate.

Include effects of:

- Policy imperatives
- Changing markets and preferences
- Disruptive technologies
- Uncertainty and variability

How can NZ best adapt to maximize the benefits and minimise negative impacts?

We have a lot to build on…



Suggested research areas

- Exploring scenarios and adaptation pathways for land use change, including land and water impacts from a move to lower C systems
- Carbon forests & forestry integration
- Future production systems in a low C bioeconomy
- New methods to support short and long-term decision making
  - Identifying and quantifying synergies and trade-offs
  - Certification schemes
  - Indicators

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Achieving a low C bioeconomy

OLW Impacts:

- This will deliver to the “new innovative land use options… that achieve primary production growth targets…”

Other Impacts:

- Reduce the environmental footprint of production
- Identify new technologies and areas for innovation
- Enable the production of products that are acceptable and potentially of greater value, to consumers at home and abroad.

What might farm systems look like under a lower C bioeconomic model?

1 billion trees on our hillsides

New emerging sectors– tall timber buildings.

Synthetic meats

Livestock impacts

Impacts on land use and value; Impacts on water flows; quality; sedimentation; across the value chain

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What might farm systems look like under a lower C bioeconomic model?

Baby doll sheep as ovine lawnmowers

Sustainable land use – Yealand's vineyards

Solar powered production

Grape Marc compost

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What might farm systems look like under a lower C bioeconomic model?

Regenerative agriculture

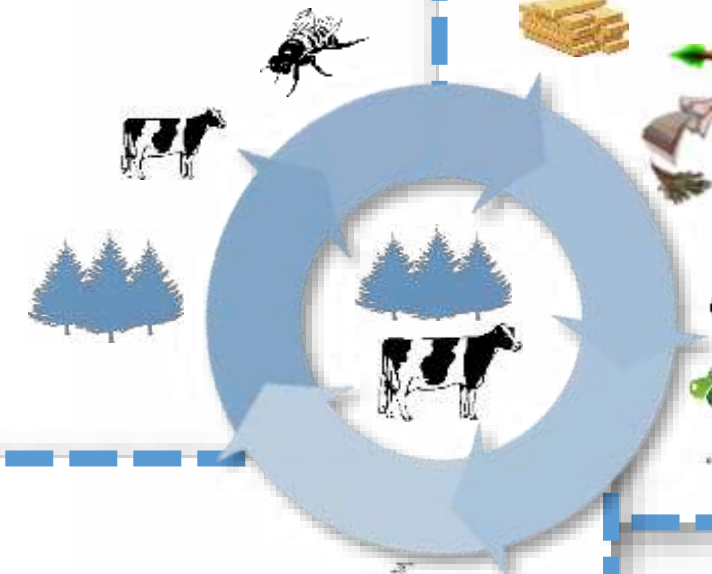
Biomaterial products replacing synthetics

Optimal Products from Optimal Land Use

Environmental Health + Economic profitability + Social & Economic health

THE LAND

- Mixed Land Use
- New Tree Systems
- Different Species
- Under cropping for health
- Animal Welfare
- Diversification – Resilience
- New Incomes



THE PRODUCTS

- New NZ products - Chemical, Energy, Fibre, Wood
- New NZ exports
- New Processing opportunities
- Scaled Processing – land area to plant capacity
- New Incomes
- New Regional opportunities

THE ENVIRONMENT

- Water Quality
- Public & customer expectations
- Enhanced natural environments
- New Employment opportunities
- Social Licence to operate
- Greater diversity
- Carbon Capture
- Nutrient Management

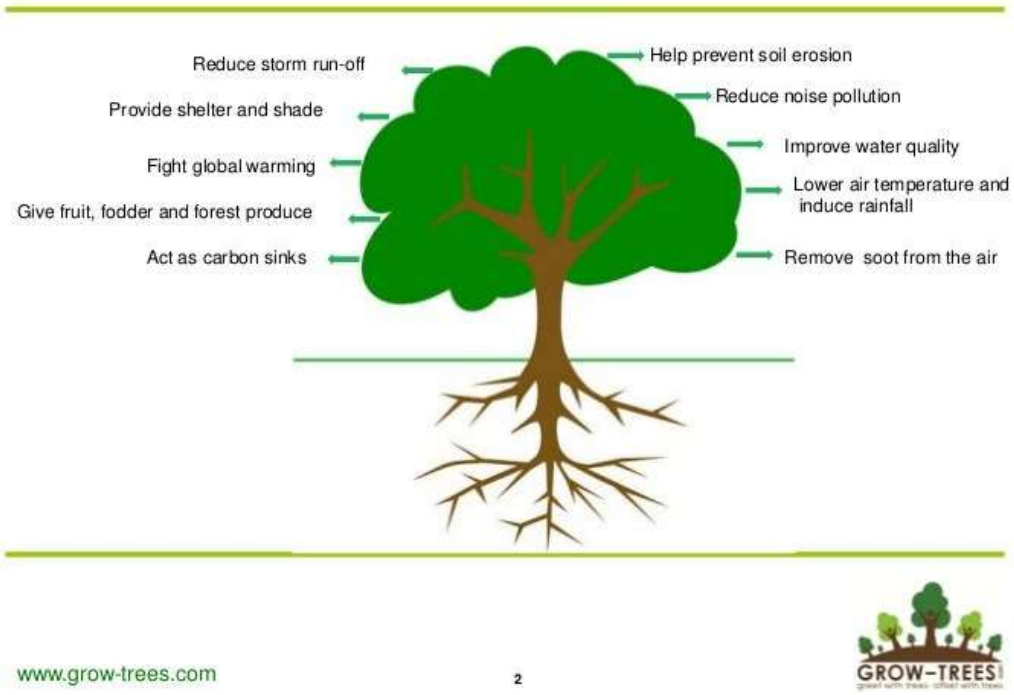
SUSTAINABLE DEVELOPMENT GOALS
17 GOALS TO TRANSFORM OUR WORLD

Food and Agriculture Organization of the United Nations

KEY GOVERNMENT MESSAGES

- **Environment,**
- **Water Quality**
- **Climate change**
- **Regional growth**
- **Billion trees**
- **Equality**
- **UN Sustainable Development Goals**

Catchment scale approach to lower bio-economy



Role of Forest

Large scale tree planting and impacts on hydrology and carbon sequestration provide an **opportunity** to improve land water quality and develop sustainable outcomes for New Zealand

Climate change is an opportunity to redesign future landscape ecosystem function

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Catchment scale opportunity

- Mitigate impact of primary production on **catchment scale water quality** (strategic placing on the landscape- dynamic land use optimization)
- Mitigate positive or negative downstream **impact of climate change** on water resource and water quality (dynamic land use suitability)
- Fostering biodiversity hotspot and passage
- Mitigate GFC emission (Carbon credit and associated economical benefit- carbon neutral or sink certification at regional/catchment scale)
- Improve **social and market value of agricultural production** at catchment scale (diversification of social makeshift at catchment scale to mitigate impact of extreme events- diversification of income…)
- ……

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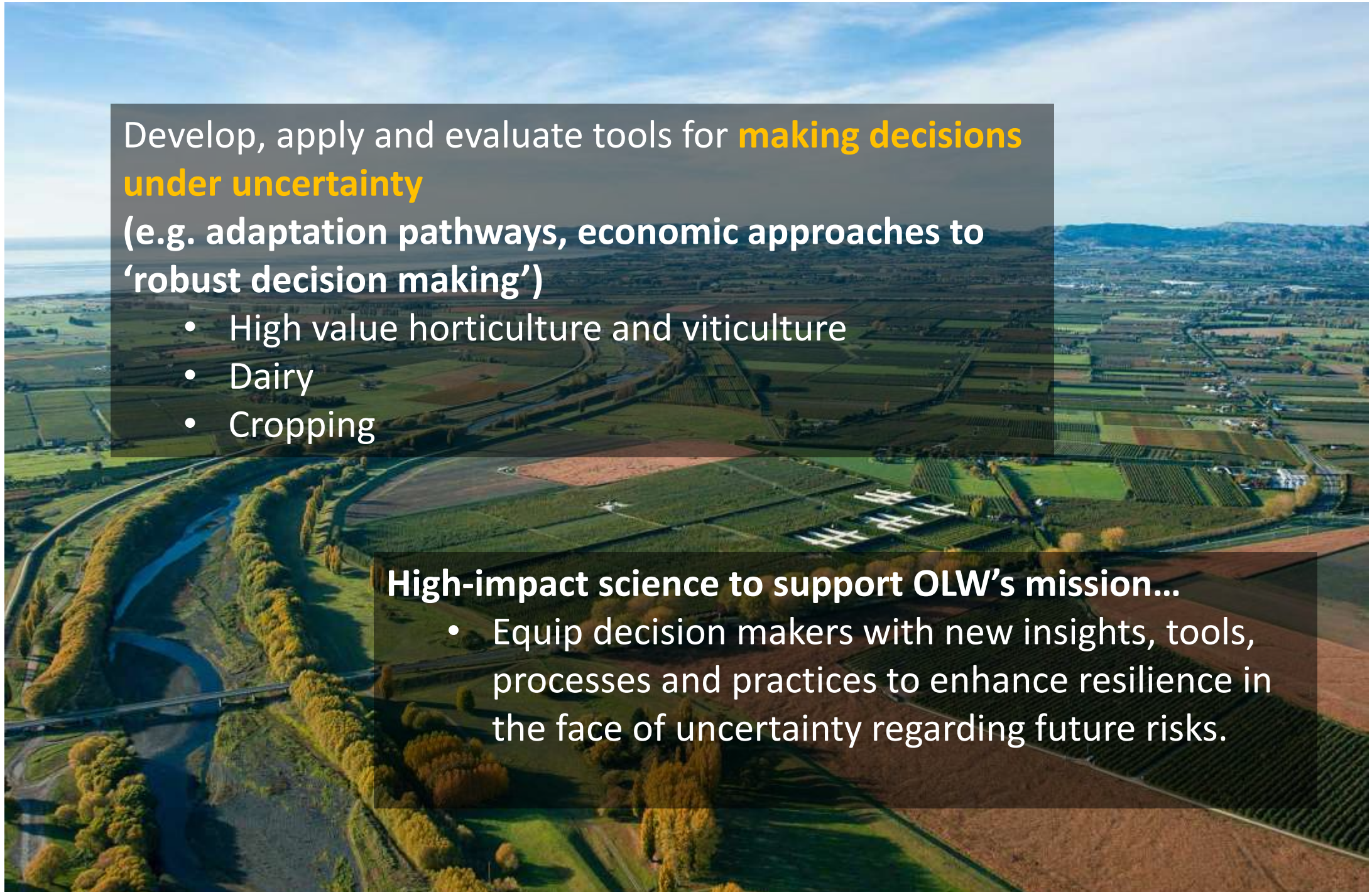

Develop, apply and evaluate tools for **making decisions under uncertainty**
(e.g. adaptation pathways, economic approaches to 'robust decision making')

- High value horticulture and viticulture
- Dairy
- Cropping

High-impact science to support OLW's mission…

- Equip decision makers with new insights, tools, processes and practices to enhance resilience in the face of uncertainty regarding future risks.

Co-develop with partners

- Established links and identified interest with Wine and Kiwifruit industries, Pāmu, DairyNZ, Farm Forestry Association, Forest Owners, Māori Trust, Iwi Forestry Trusts, MPI, MfE

Co-develop with partners, ….come and talk!

Climate Change Forestry Reference Group

Biological Emissions Reference Group