Next Generation Systems

Emissions to air

Breaking the production ceiling

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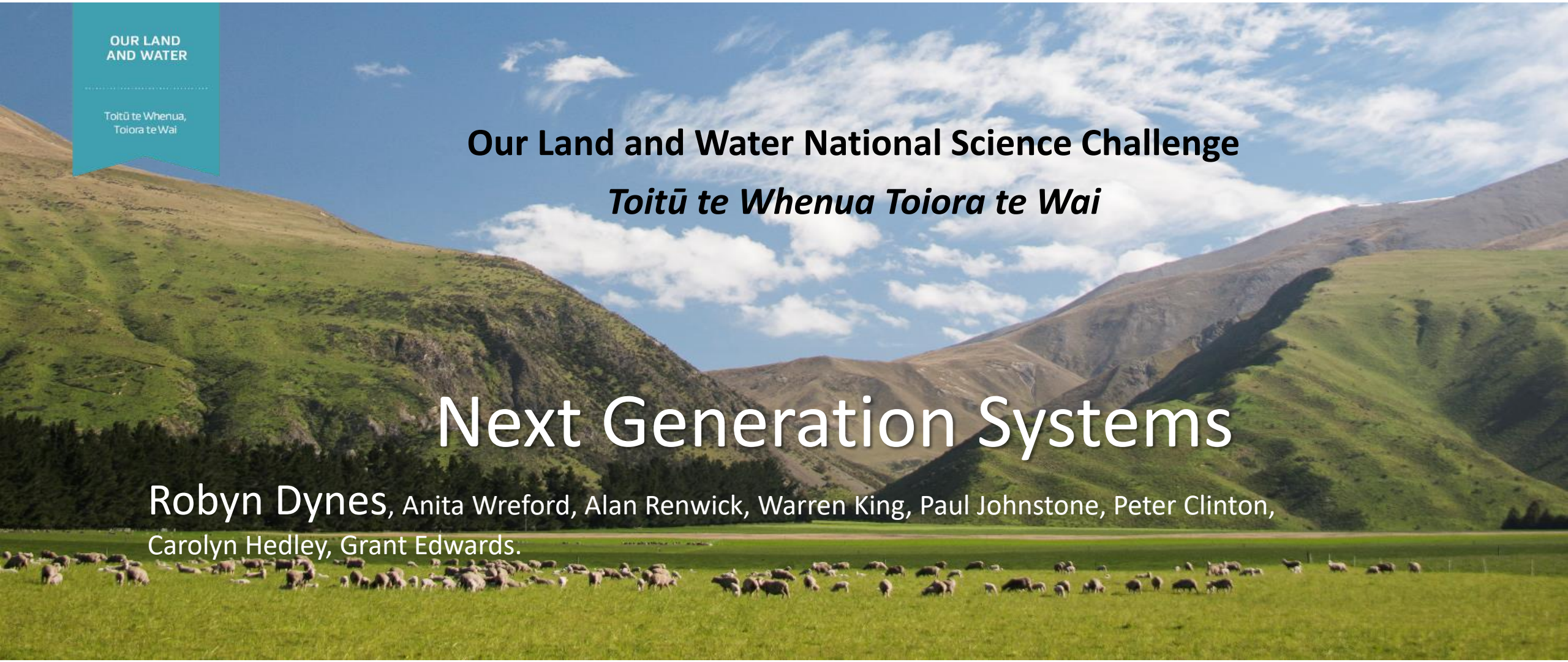
Adopting AgResearch-recommended grazing management strategies reduces overland flow and sediment losses during winter

National SCIENCE Challenges

OUR LAND AND WATER

Toitū te Whenua, Toiora te Wai



Our Land and Water National Science Challenge

Toitū te Whenua Toiora te Wai

Next Generation Systems

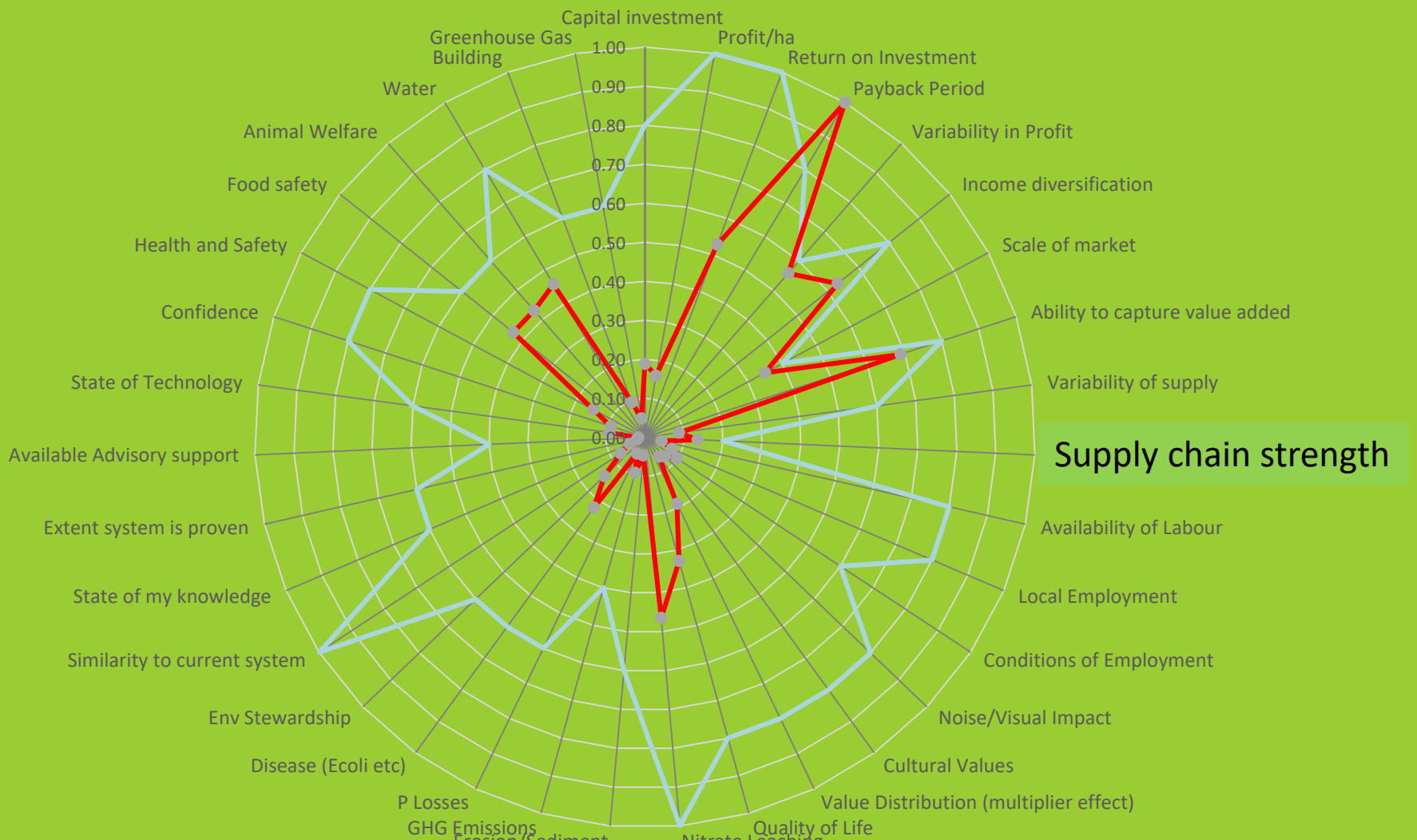
Robyn Dynes, Anita Wreford, Alan Renwick, Warren King, Paul Johnstone, Peter Clinton, Carolyn Hedley, Grant Edwards.

Why science in NGS

- Development, redesign, New technologies

- Science supporting innovation
- Business decision
- Which solutions have comparative advantage??

Weighting of each alternative under each criteria – sheep dairy example



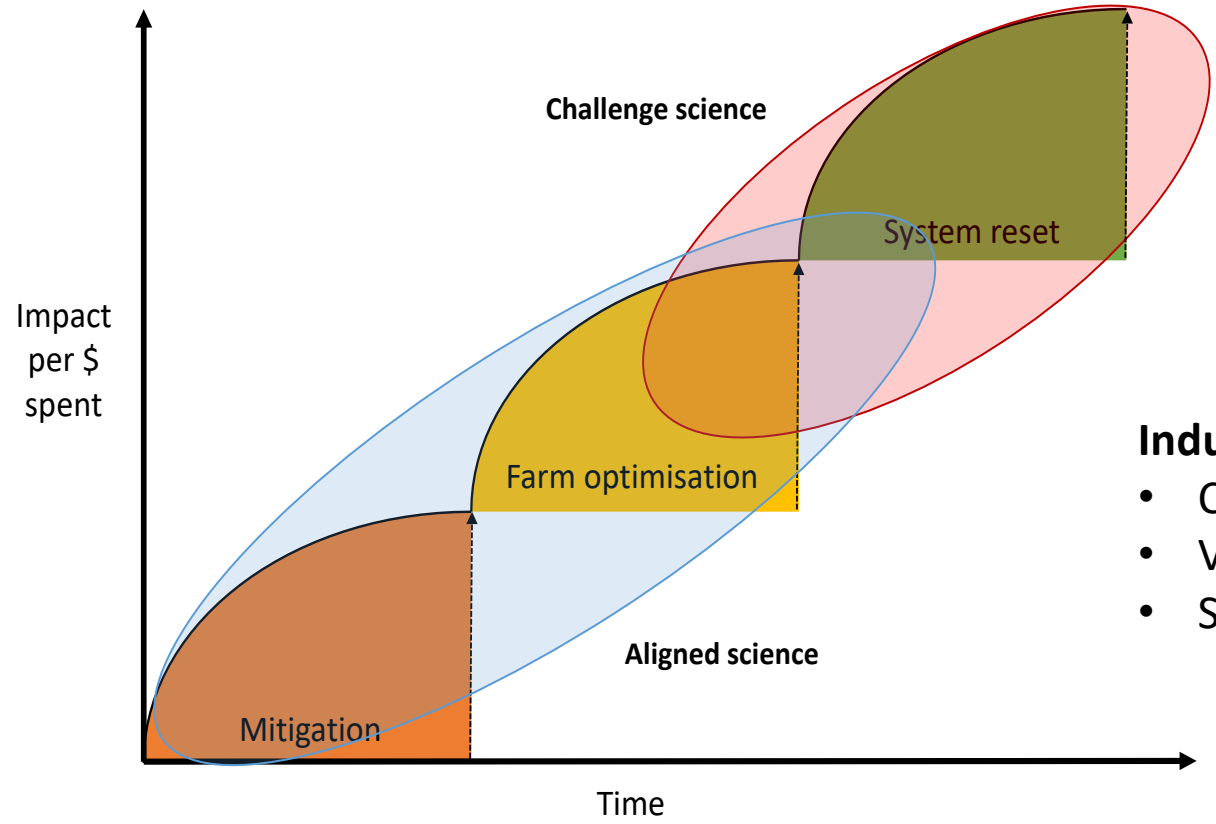
What are the benefits from partnering with NGS?

Business

- Certainty of investment
- Less risk

Science

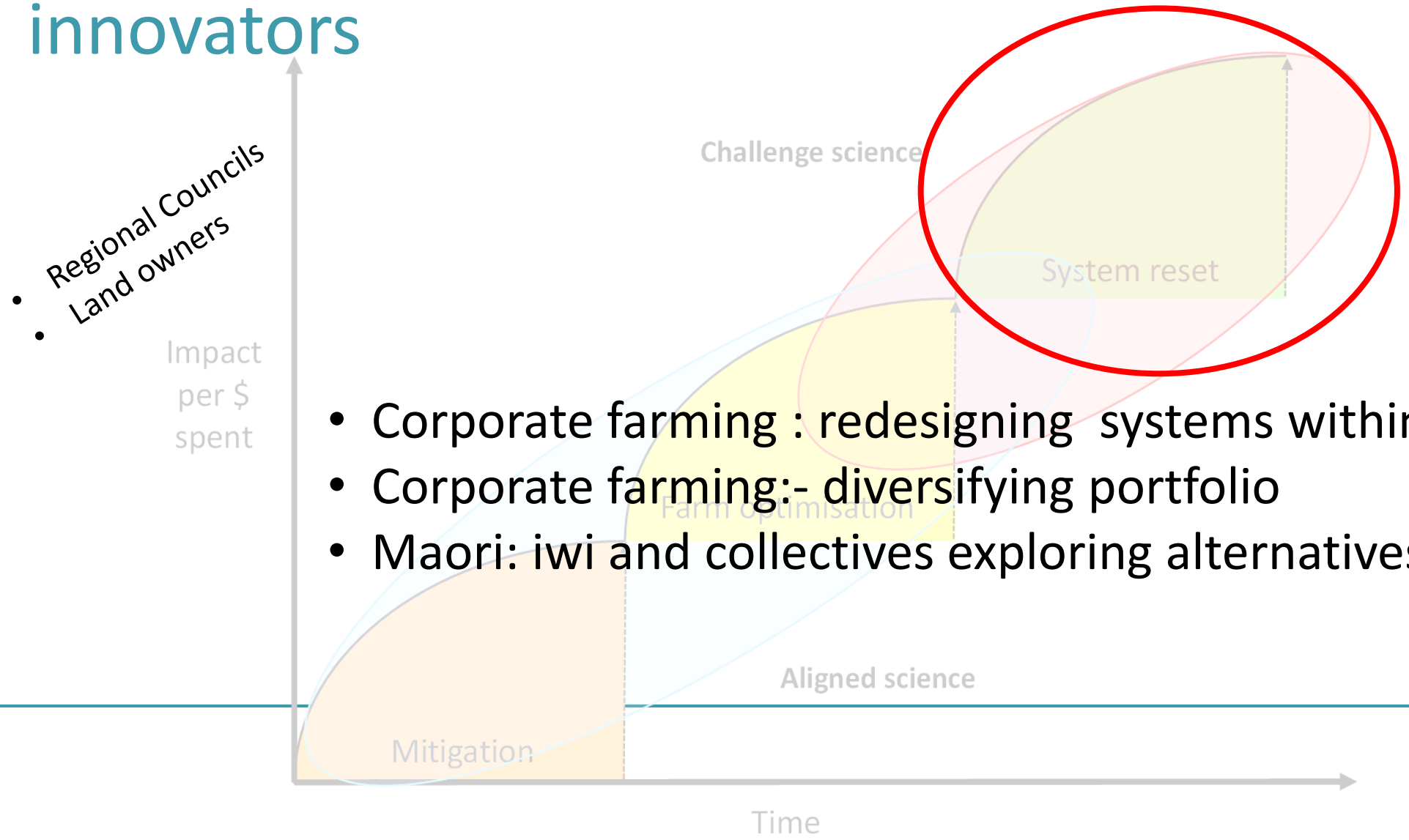
- Investment priorities



Industry

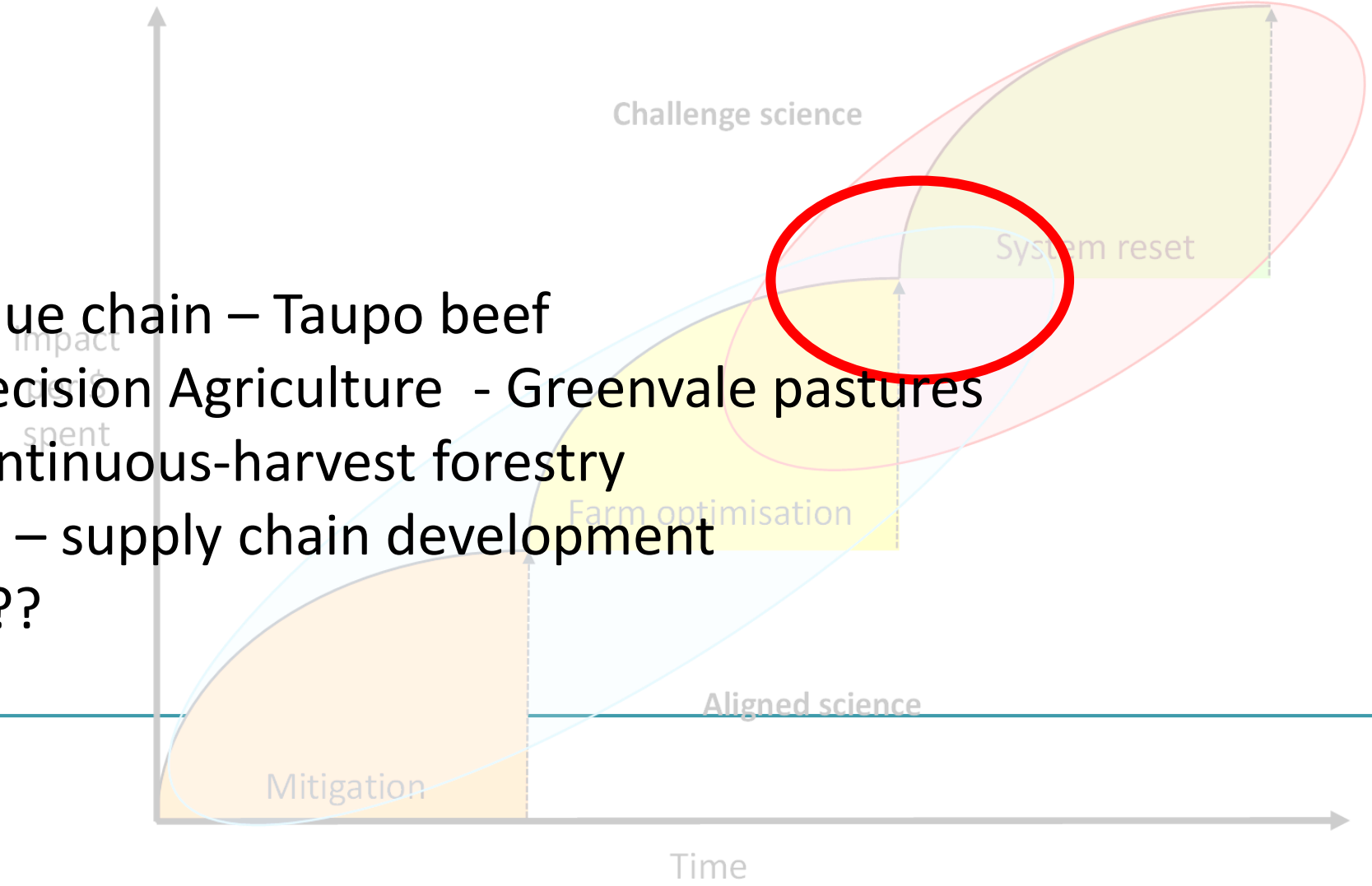
- Consistency of desired product
- Valued NZ brand
- Shifting culture and performance

Next Generation Systems: partnerships with innovators



- Corporate farming : redesigning systems within nutrient limits
- Corporate farming:- diversifying portfolio
- Maori: iwi and collectives exploring alternatives

Next Generation Systems: case studies of optimised systems



- Value chain – Taupo beef
- Precision Agriculture - Greenvale pastures
- Continuous-harvest forestry
- Iwi – supply chain development
- ????

Background to dairy system studies

Previous Modelling

More efficient systems based on 5-point plan:

1. High BW lower SR
2. NI + reduced N fert
3. Reduce replacements
4. High energy/low N
5. Stand-off/housing

P21 Phase II

Dairy systems trials incorporating (parts of) this 5-point plan:

a) Waikato (1, 2, 3, 4, 5)
b) Canterbury (1, 2, 3, 4)
c) South Otago (2, 3, 4, 5)

Evaluate and demonstrate feasibility, practicality, financial returns, and other environmental impacts of a range of pastoral systems

NZAGRC Integrated Farm Systems – Dairy

Evaluate and demonstrate GHG emissions intensity

Improved efficiency systems

5-point plan	Waikato	Canterbury	South Otago OPT	South Otago RES
1. Higher breeding worth lower SR	✓	✓		
2. Reduced N fertiliser	✓	✓	✓	✓
3. Reduced replacement rates	✓	✓	✓	✓
4. High energy/low N	✓ Grain	✓ Diverse pasture Fodder beet	✓ Cereal	
5. Stand-off/housing	✓			✓

Approach

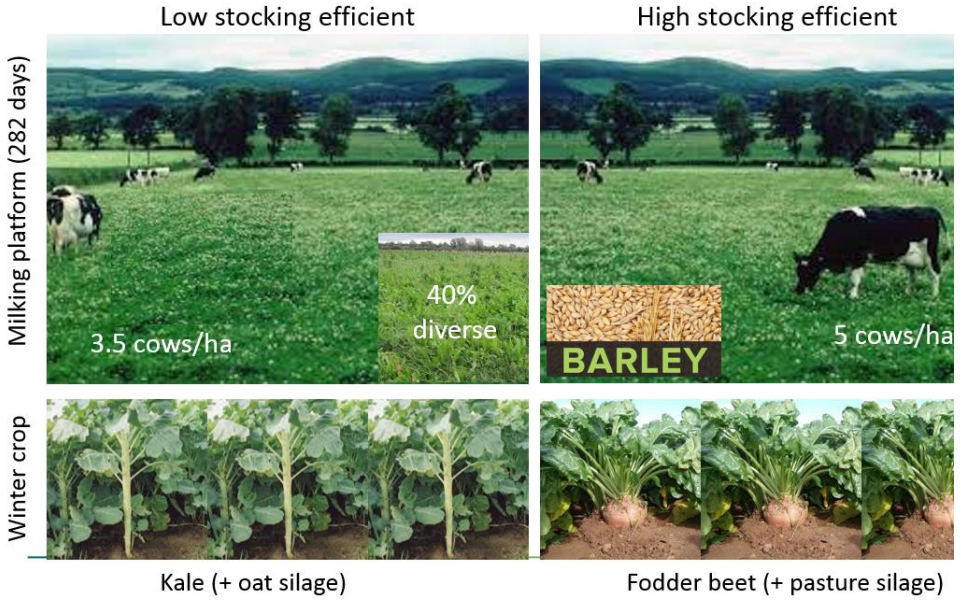
To apply the models in practice: a farm systems evaluation of practices that reduced GHG emissions intensity in modelling studies.

Can't measure GHG losses from entire system!

Instead:

1. Use 'Inventory' type calculations
2. Combined with targeted CH_4 and N_2O measurements
3. 'Source' detailed systems data from P21 partners

P21 Canterbury

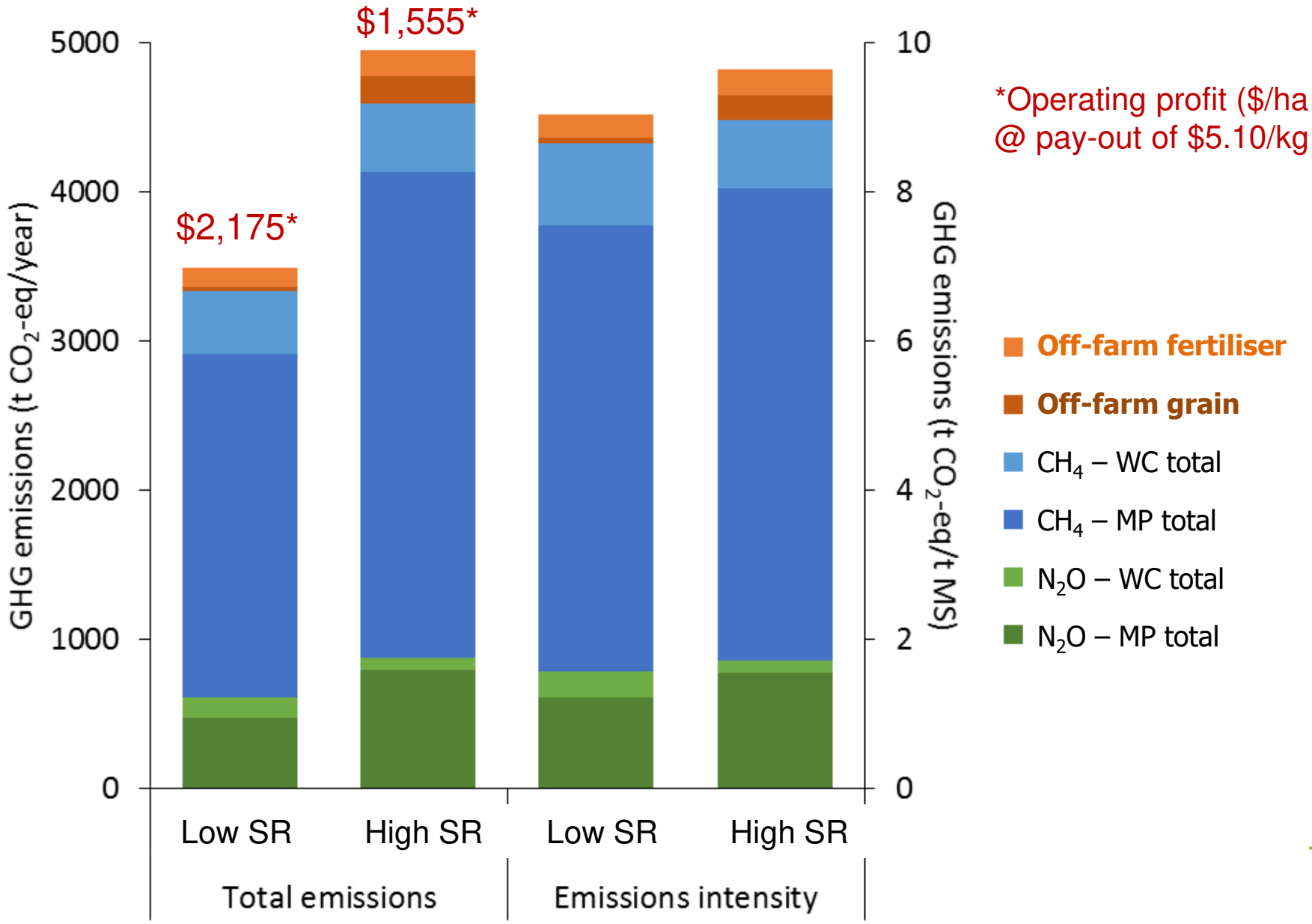


Achievements

1. Targeted measurements to obtain systems specific emission factors for combinations of farm practices within practical systems
2. Calculated relevant GHG footprint for systems comparisons
   - Provided a wider systems analysis added GHG to $$, environmental losses to water.

Key message: to demonstrate impact of changed practices must have accurate and relevant GHG emissions data

Canterbury (232 ha): including off-farm emissions



*Operating profit ($/ha MP)
@ pay-out of $5.10/kg MS

Future Farm Systems: partnership model

Farmers: Farmer, Industry, Rural professionals and Researchers
Co-development towards a shared problem - shared solutions

ravensdown

- Key client value
- Project management role
- Relationships with science and sector

agresearch

- New farm systems analysis tool developed
- Farm Systems research 'grounded' on commercial farms
- Demonstrating 'value' of component research
- Greater impact from science

Joint benefits:
- Publications
- Exposure
- Value/Impact

Future Farming Systems - Dairy

The Goal: Additional 2 t DM/ha more (considered very difficult)

Where: Rakaia Island Dairy

Who: AgResearch science expertise in farm systems, pastures, pests, disease, soils and Ravensdown staff

Farming system – analysis using yield mapping as a tool

Identified potential leverage points – pasture variability

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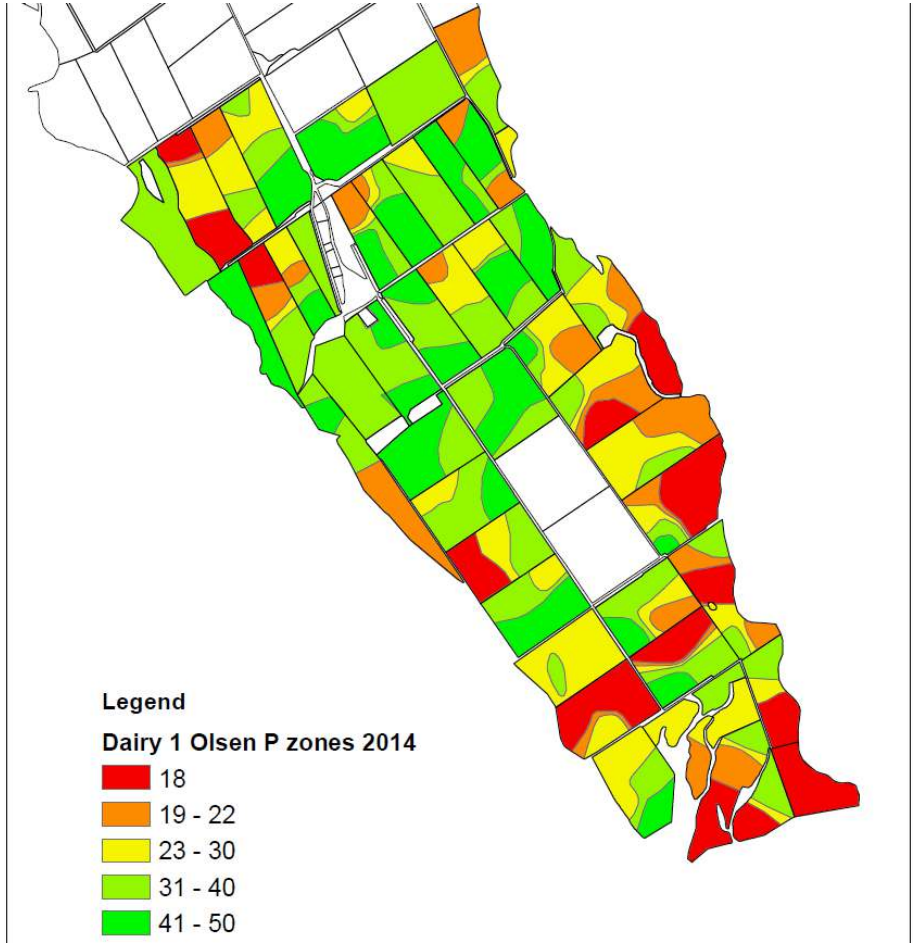
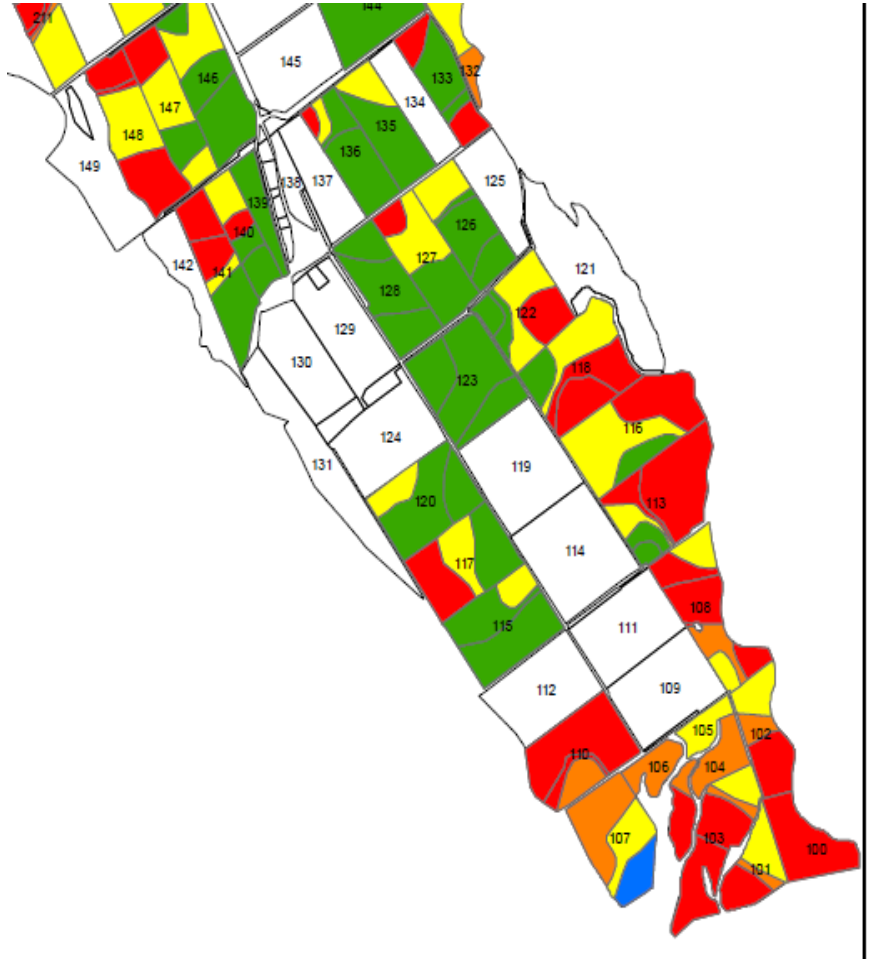
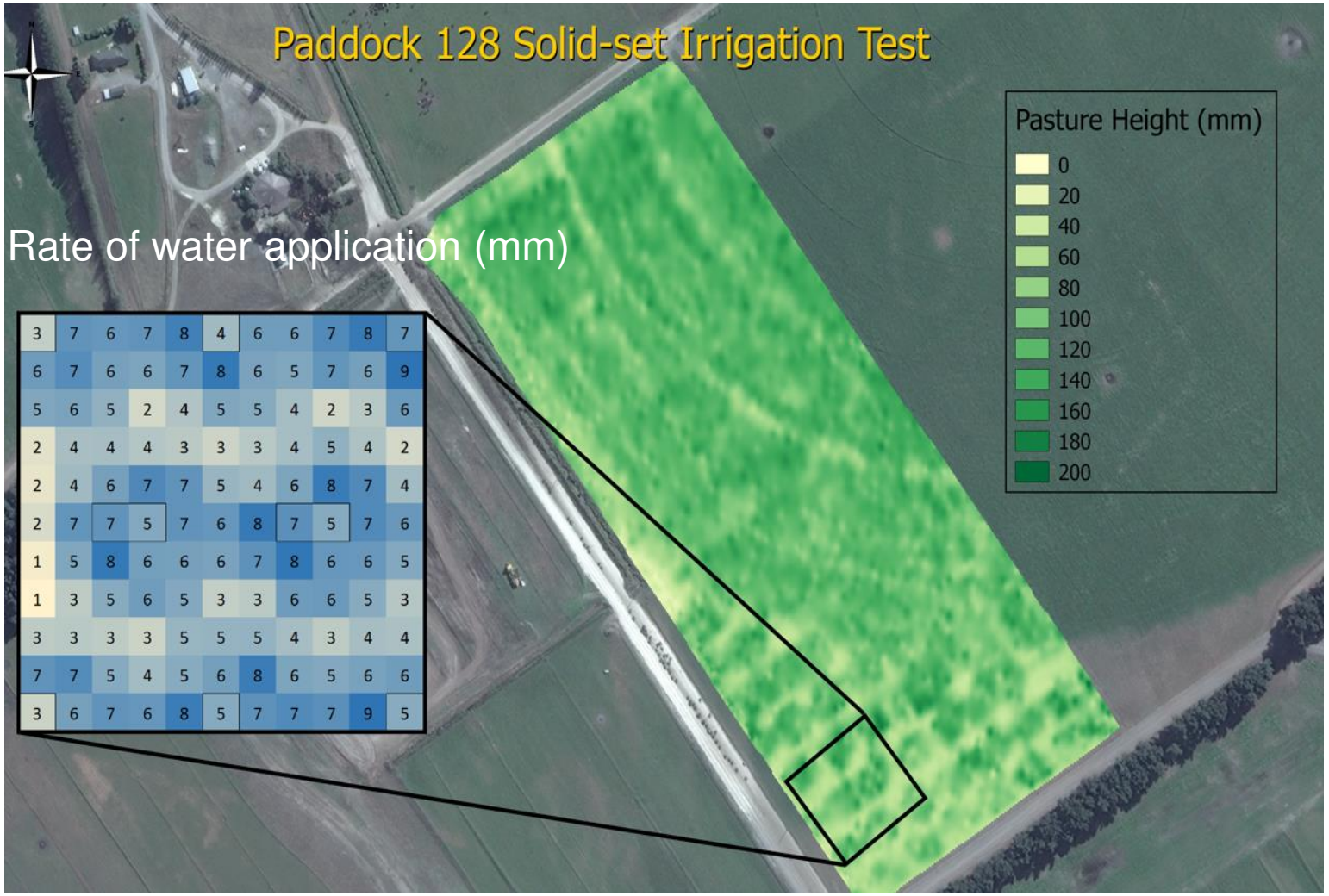
Differential P applications within paddocks





Leverage Point: irrigation



Component research and AgResearch Science to assess key leverage points

Leverage Point: grass grub