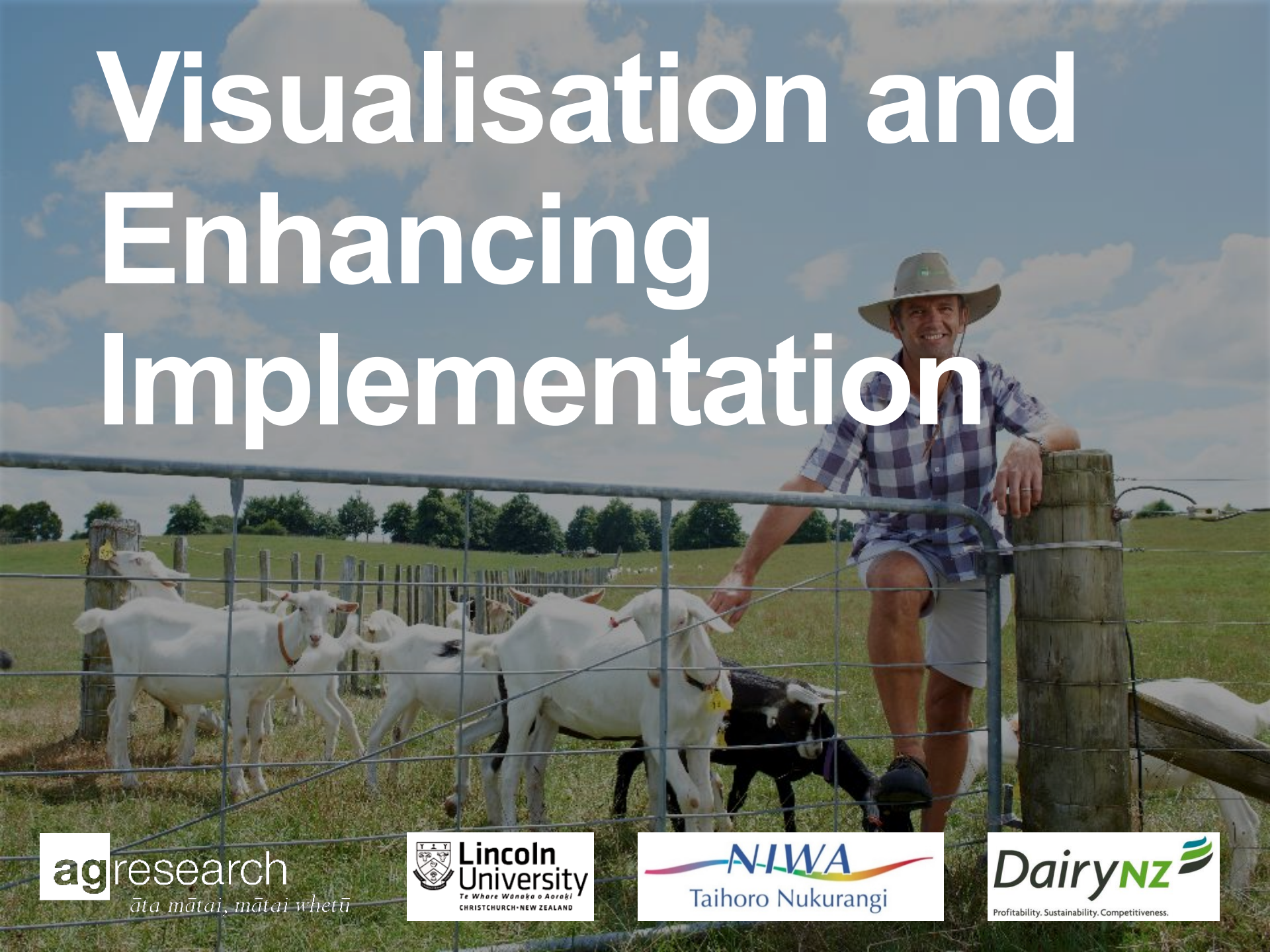
Visualisation and Enhancing Implementation



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Lincoln University
Te Whare Wānaka o Aoraki
CHRISTCHURCH•NEW ZEALAND

NIWA
Taihoro Nukurangi

DairyNZ
Profitability. Sustainability. Competitiveness.

… developing visualisation tools in which scenarios of current and future land use can be tested.

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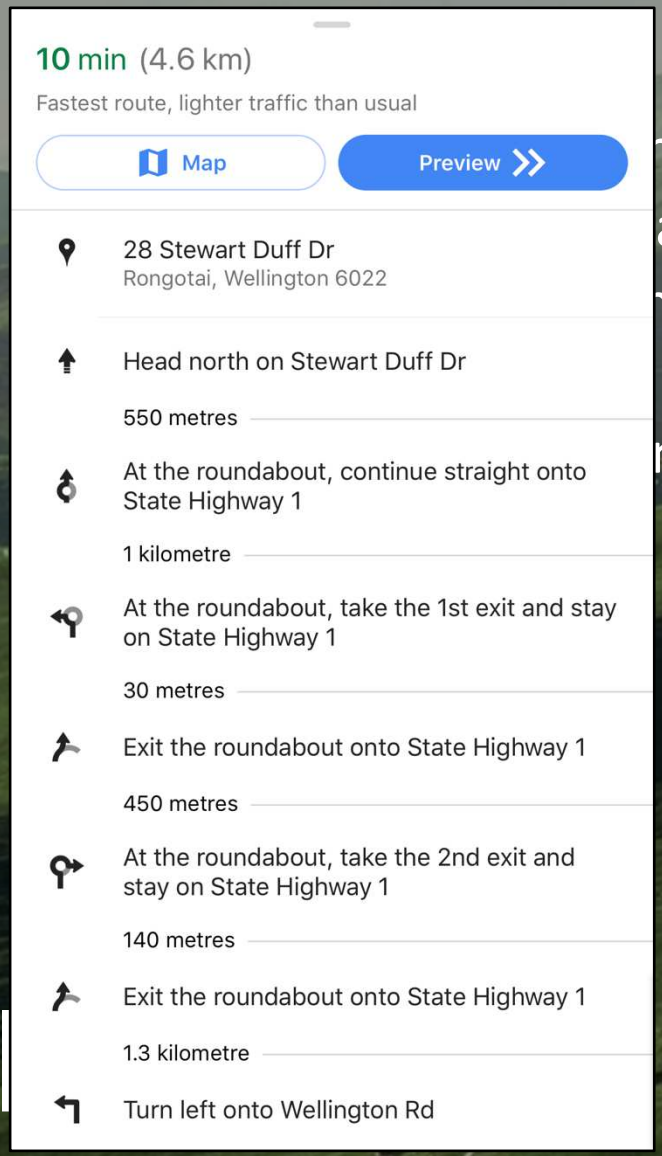
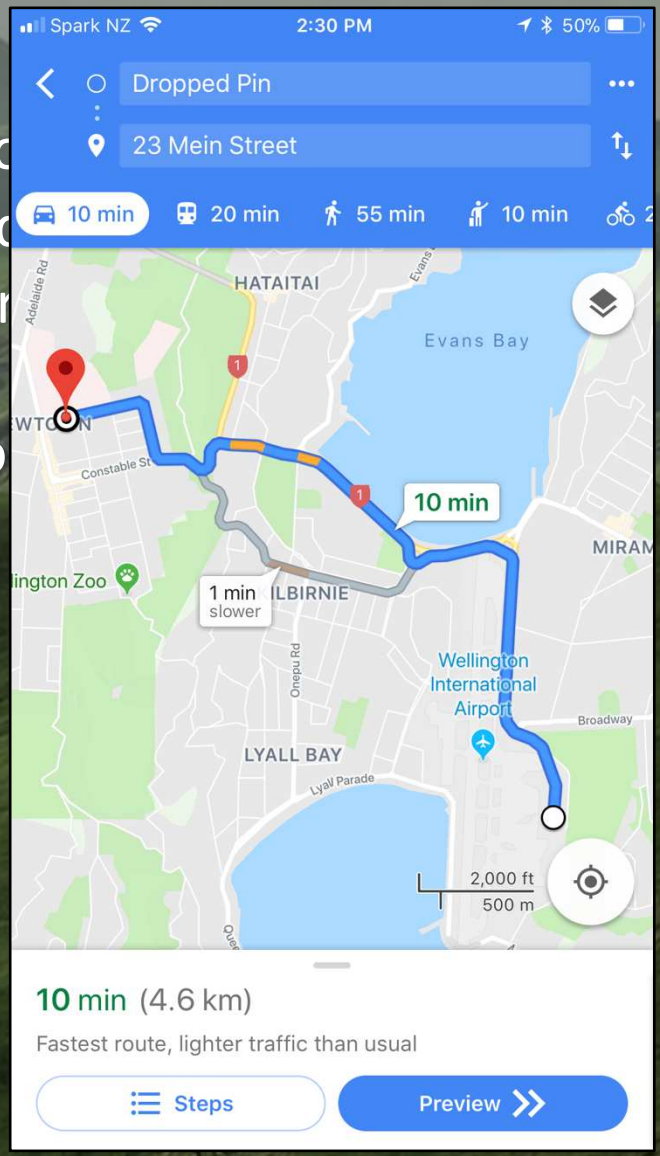




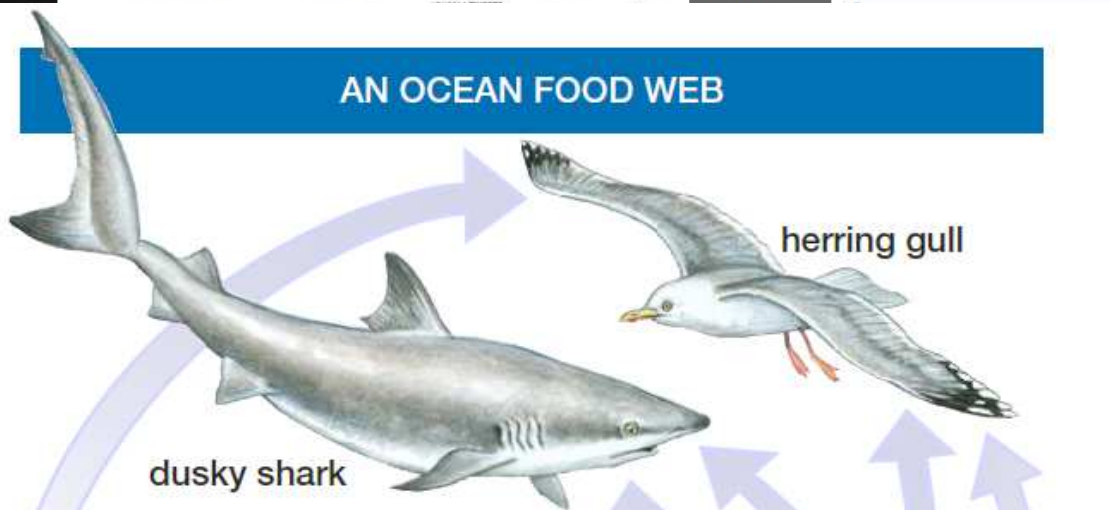
Why Visualisation?

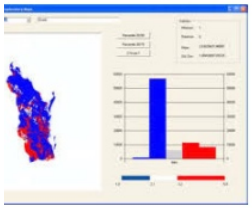
- Conversion of data into decision-relevant information
- Rapid understanding of complexity and multiple trade offs

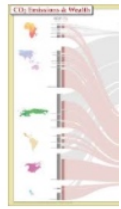
- Learning by exploration and experimentation
- Improved clarity of communication within a group
- Common basis (language and/or tool) for communication within a group

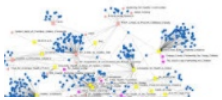
Enhancing Implementation

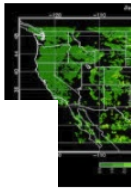
- Addresses the key focus / purpose
- Context, opportunities
- Must understand and address the drivers and barriers



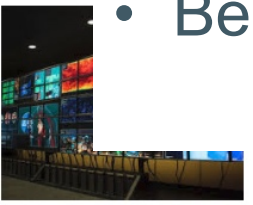


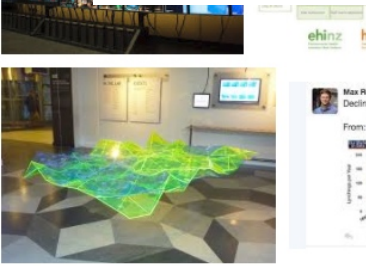


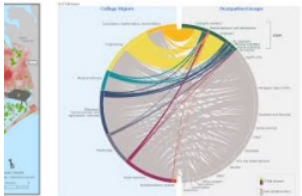




- Must be appropriate for context and problem scale
- Best designed with decision-makers using Agile principles







What are the barriers and how can we help support the decision-making (implementation) process?

How is information best presented for informed, confident decision-making?

What decisions are made? By whom? How? (Or why not?)

Issues of equity in resources or understanding between stakeholders

Interoperable Models - a common platform for data, models, approaches, discussions

Multi-enterprise	Tourism	Value-chains	Bio-diversity	Cultural values

EMULATOR

Visualisation platform

A visual image provides rapid understanding of complexity & multiple trade offs

Decision-making

How is information best presented for informed, confident decision-making?

Applied across scales

Catchment group

- 10+ individuals
- “Our Land, Our Possibilities”
- Coarser-level information
- Rapid scenario exploration for higher-level outcomes

e.g. scarcity of good water/diff landuse

Single farm

- ~ single participant
- “My Farm, My Possibilities”
- Specific farm information
- Detailed scenario exploration

e.g. reclaim a social licence to farm

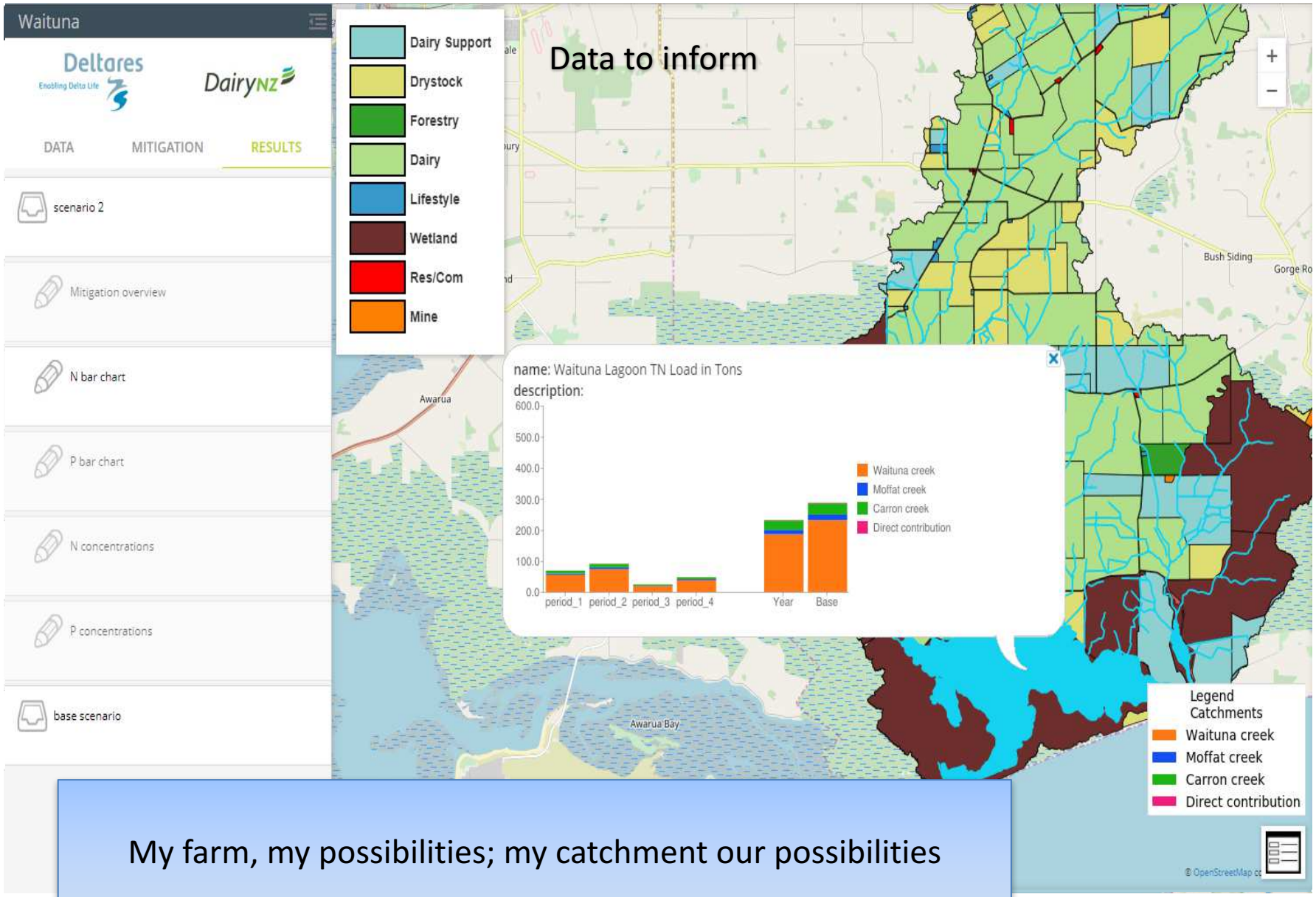
Sub-farm block

- Precision management
- Highly detailed in space & time
- Potential solutions sit here

e.g. accurate agriculture

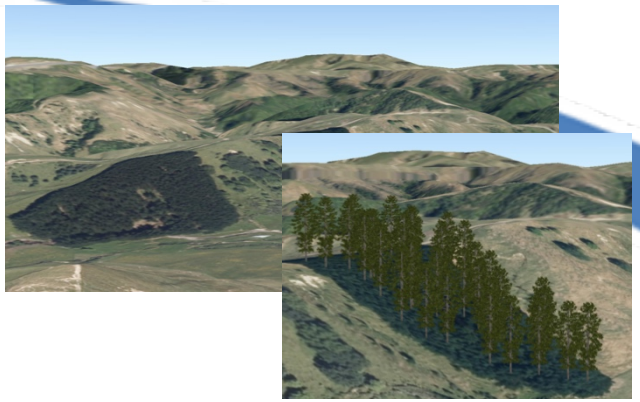
e.g. product provenance- proof of sustainability

Catchment scale



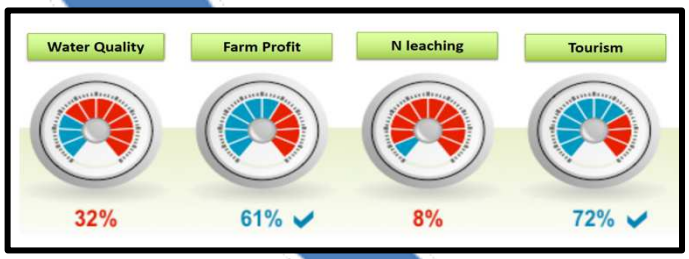
My farm, my possibilities; my catchment our possibilities

Farm scale

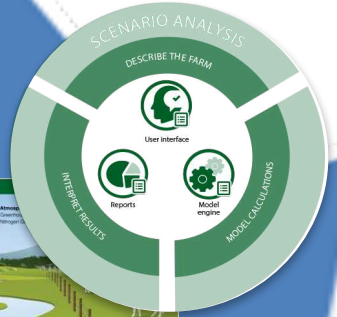


FARMAX
YOUR ADVANTAGE

			Plan	Actual	Difference
Revenue	Sheep	Sales - Purchases	176942	176942	
		Wool	28875	28875	
		Capital Value Change	852	852	
		Total Sheep	**206669**	**206669**	**0**
	Beef	Sales - Purchases	92158	81746	-10411
		Capital Value Change	-20221	-21655	-1433
		Total Beef	**71937**	**60092**	**-11845**
	Total Revenue		**278605**	**266760**	**-11845**
Expenditure	Crop & Feed	Hay & Silage	14100	14100	
		Feed Crops	13000	13000	
		Nitrogen	17600	17600	
		Total Crop & Feed	**44700**	**44700**	**0**
	Stock Costs	Animal Health	10016	10016	
		Shearing	19054	19054	
		Total Stock Costs	**29070**	**29070**	**0**
	Interest on Capital		37957	37596	-360
	Total Expenditure		**111726**	**111366**	**-360**
Gross Margin			**166879**	**155394**	**-11484**



OVERSEER®



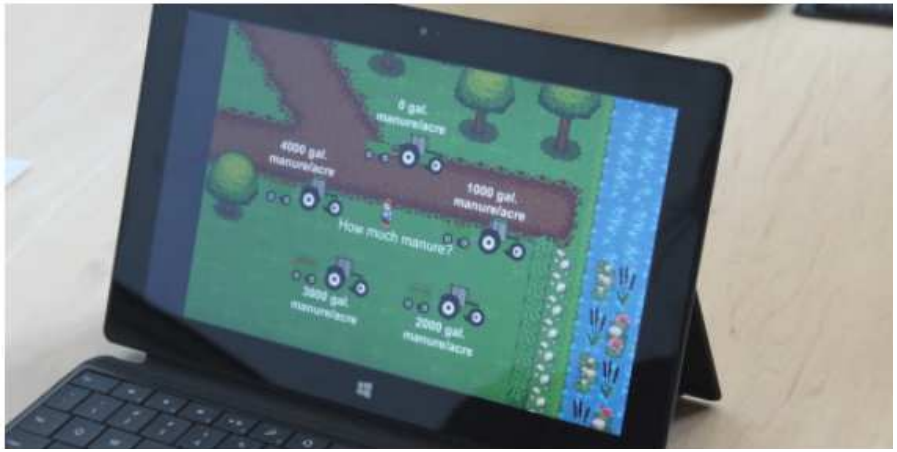
Scenario testing new possibilities

Serious gaming -experiment with possibilities

SEGS Lab

social ecological gaming and simulation

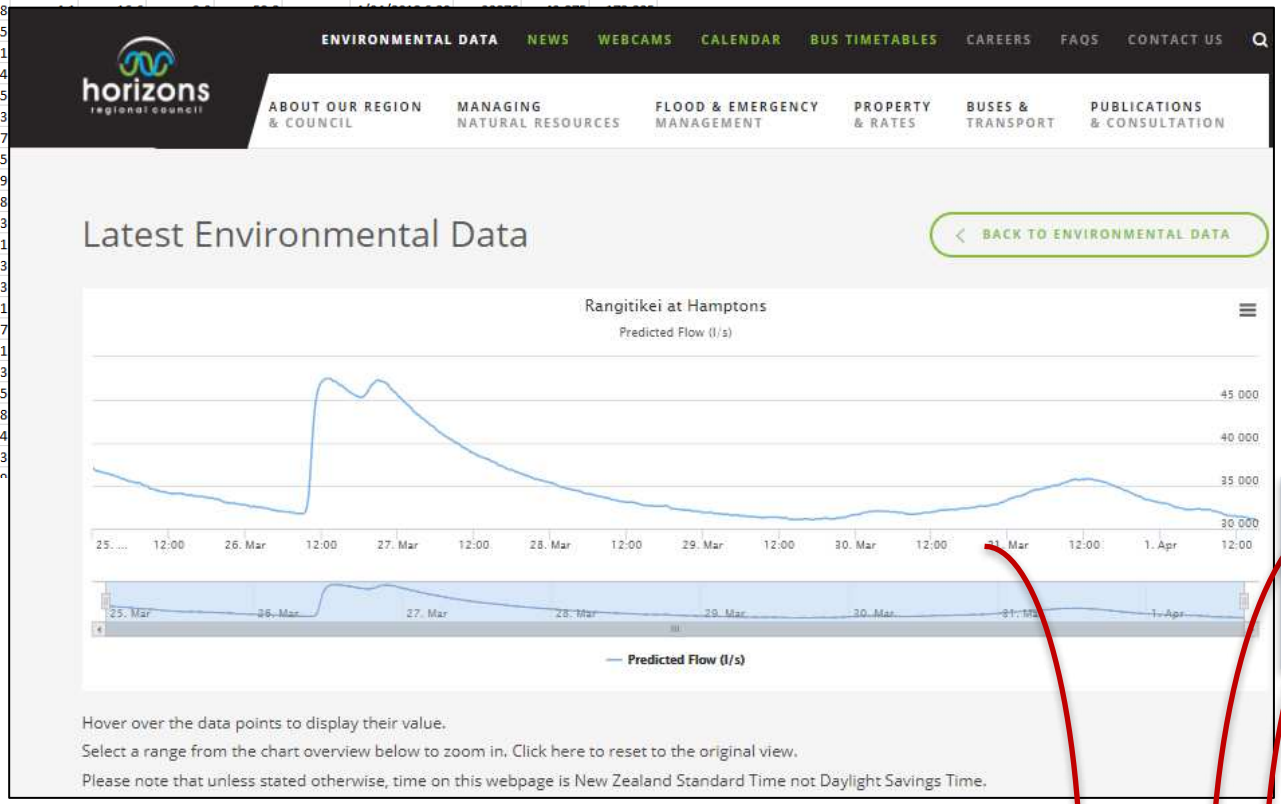
Harnessing complexity to solve problems.



Visualising real-time data

Q12 | RID Weather

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	tmax	tmin	rain	tsoil	pet	rad	vp	rh	wind	date	Days since	grid latitu	grid longituc
2	17.9	10.5	0	16.6	6.5	19.1	12.3	84.1		4/04/2018 6:00	32872	-43.875	172.225
3	23.7	10.1	0	15.8	3.4	23.2	14.1	80.9		4/04/2018 6:05	32873	-43.875	172.225
4	22.6	8.2	0	16.2	5.9	28.4	13.8	75.7		4/04/2018 6:10	32874	-43.875	172.225
5	24.7	14.4	0	17	5.2	13.5	11	53.2		4/04/2018 6:15	32875	-43.875	172.225
6	21.7	11.2	2	15.8									
7	18.5	11.8	0	15									
8	20.8	11.6	0	17.1									
9	23	13.3	5.7	17.4									
10	15.7	11.6	0	16.5									
11	21.3	6.8	0	14.3									
12	26.1	10.6	0	16.7									
13	27.9	11	0	17.5									
14	28.8	14.3	0	19.9									
15	28.3	9.8	0	17.8									
16	28.5	10.5	0	18.3									
17	27.4	10.3	0	16.1									
18	29.2	10	5	18.3									
19	18.3	11.4	0	17.3									
20	24.2	10	0	17.1									
21	28.5	9.3	0	17.7									
22	30.1	13.3	0	19.1									
23	14.9	12.9	1.7	19.3									
24	22.7	7.7	3.3	15.5									
25	21.8	10.6	0	16.8									
26	33.5	13.7	0	17.4									
27	19.2	14.8	0	19.3									



Other information

Decision on if to irrigation & where to irrigate

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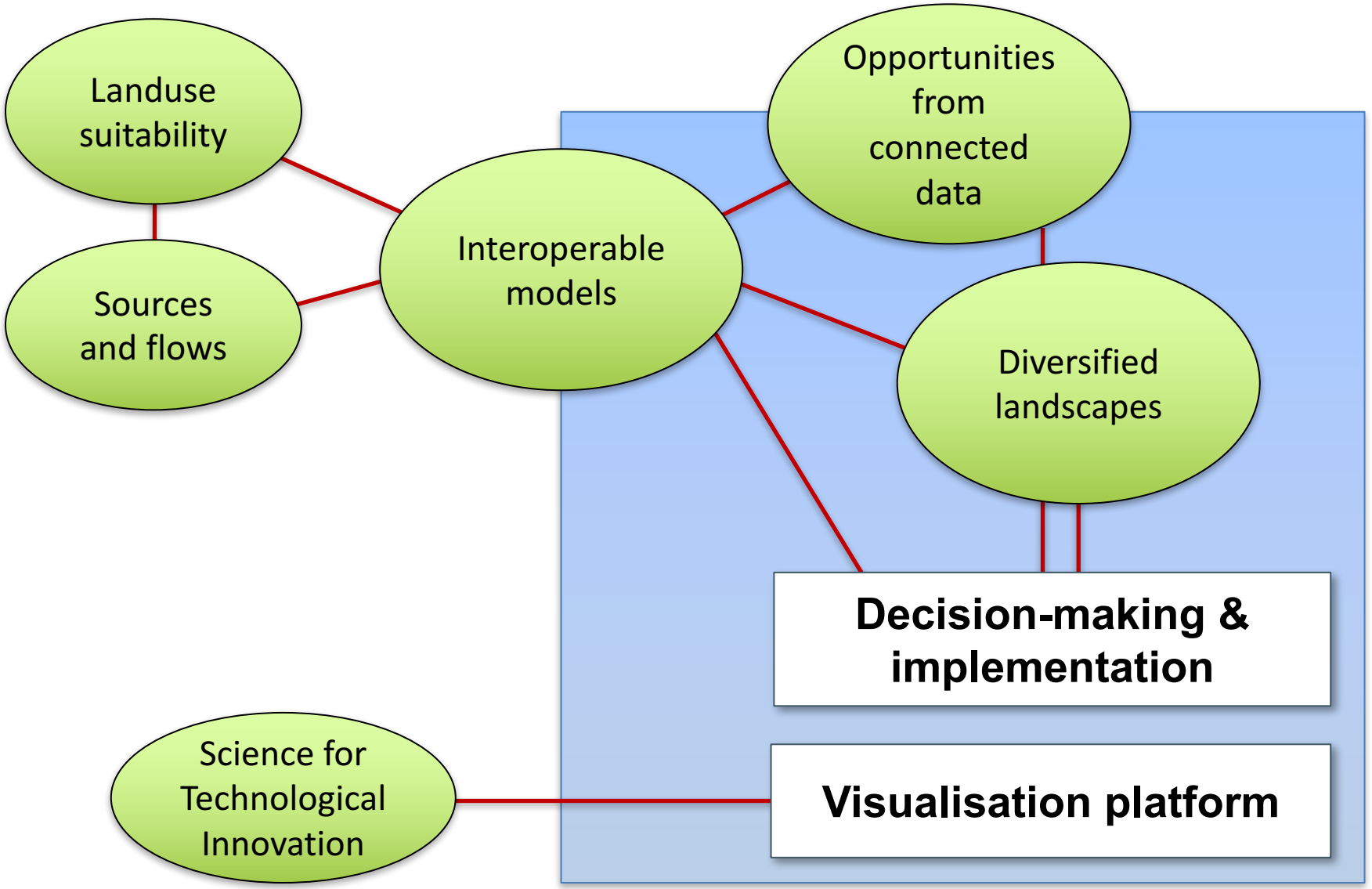
Approach

- Review current efforts and emerging technologies
- Work closely with “Diversified Landscapes” and “Opportunities from connected data” to target opportunities for a diversity of visualisation types/methods
  - Collectively refine the problem or decision to work on.
  - Co-design (decision-makers, modellers, social sciences, software developers, data science, …) visualisation platforms to support the objectives of the group
  - Evaluate performance of the tools
    - Learning (acquisition of new knowledge); ■ Decision–making (new choices) ; ■ Measured by pre and post event/intervention interviews, surveys and reflections
  - Will be an iterative design
  - Need a diversity of groups / problems / issues

Key linkages to other research ideas (OLW)



Delivering impact to the challenge

- Enabling technology within diversified landscapes and other activities where complex data exists
    - Data → information → decision
- Enhanced engagement
    - Web-platforms to bring in those beyond primary group
- Enhanced equity of information / resources available to diverse stakeholders

Diverse (and evolving) co-innovation partners and research providers

- Catchment groups, land owners, other stakeholders
- OLW researchers (Diverse Landscapes, Connected Data, Interoperable Models, etc.)
- Other challenges (Technology for Tech. Innov.; Deep South, Resilience)
- Commercial entities (rural agribusinesses, software developers, etc.)
- Opportunities to link with tertiary education courses

Research team

- Many to investigate, e.g. from Science for Technological Innovation and other proposed research ideas

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