



## New Zealand's Sustainability Dashboard: future-proofing agriculture for all New Zealanders

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## Tonight's talk

- Why NZ needs a Sustainability Dashboard
- How we are building the Dashboard
- Sustainability & resilience frameworks
- Progress so far
- Challenges and opportunities
- What would success look like?



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## Sustainability is a group 'social contract'

- We share land, futures and values
- We feed and nurture each other
- We teach and learn from each other
- We identify with our place, our nation
- ... so we must collaborate to reach a shared vision

**The NZ Sustainability Dashboard for  
People, Profit and the Planet!**

## People collaborate if they ...

- are respected
- are listened to
- have their values accepted
- are trusted with responsible and meaningful roles to set and achieve the goals
- feel proud to belong or are members of the community/club/group

**... willing participation is the key  
indicator of long term success**

## What is the NZ Sustainability Dashboard?

- Online tool and network
- Mainly self-assessed KPIs reported annually
- Instant benchmarking
- Trend analysis, Targets, Trigger points
- Upscaling
- Automated reporting
- Cultural authenticity and sustainability credentials

## NZSD Research Team Transdisciplinarity rules!



## New Zealand agriculture

- Primary production exports: \$24 billion in 2013/14
- Biological Industries 'Sector Investment Plan' aligns to government's Business Growth goal
  - 30% becomes 40% GDP by 2025
  - Doubling exports by 2025
  - 5.5 – 7.1 % growth p.a.
- 60% land cover dedicated to agriculture
- 87% voters live in urban areas



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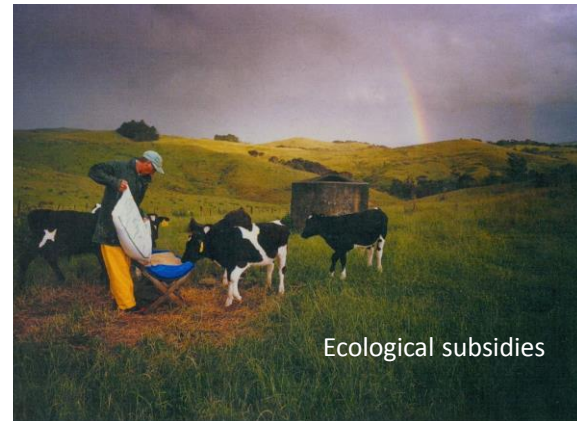


## Agriculture, Horticulture & Forestry Domain Plan (MAF & Statistics NZ 2009)

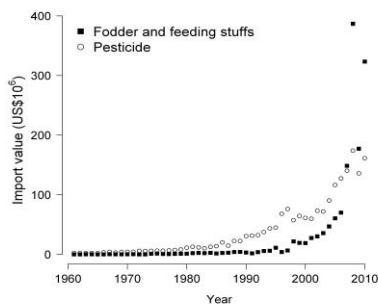
Challenge & opportunity	Complexity	Information Gap severity	Dashboard
Market access & global competitiveness	High	Fully met	✓✓✓
Market-led research & development	Medium	Mostly met	✓
Production	High	Fully met	✓✓✓
Innovation, growth, productivity improvement, labour & supply-chain efficiency	Extreme	Mostly met	✓✓
Food safety, biosecurity & consumer concerns	Medium	Barely met	✓✓
Land use, changes & demands	Medium	Mostly met	✓✓
Environmental sustainability, biodiversity & integrity	Extreme	Barely met	✓✓✓
Rural social capital	High	Barely met	✓✓



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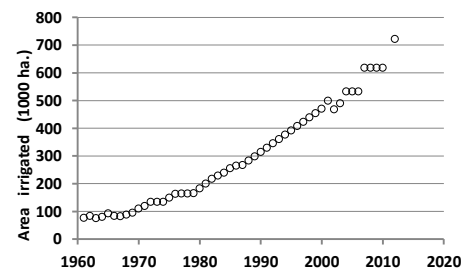


## Increased reliance on chemicals and nutritional subsidies (MacLeod & Tompkins unpubl.)



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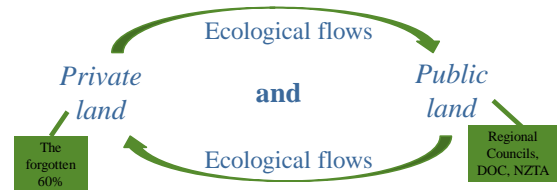
## Irrigation driving intensification (MacLeod & Tompkins unpubl.)



Dairy conversion: 113,739 extra cows per season since 2000/01

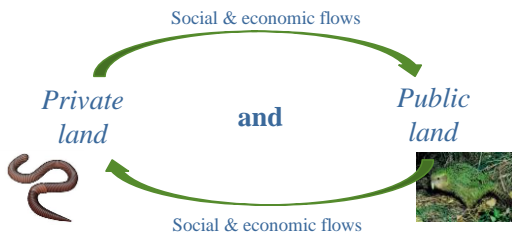


Think holistically: Ecological  
landscapes matter



*Ki uta , ki tai ... from the mountains to the sea*

Think holistically: Social-ecological  
systems matter



*Kia ora farmers, Take a bow!*

Can markets incentivise sustainability?

'Willingness to pay' for attribute as % of product price  
(Dairy products)

	China	India	UK
Safety	74%	73%	16%
Animal Welfare	26%	42%	17%
Water	16%	19%	3%
GHG	25%	38%	7%
Biodiversity	22%	27%	6%
NZ Origin	49%	10%	3%



## The Tower of Eco-babble?

... too many eco-labels?  
... what do they mean?  
... do people trust them?



Design & Construction: Challenges  
& opportunities

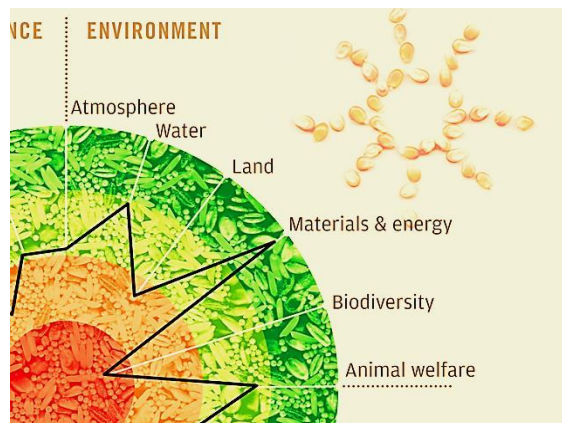
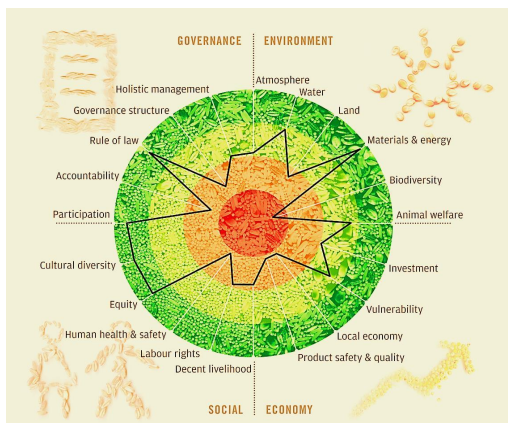
## NZSD Main Industry Partners



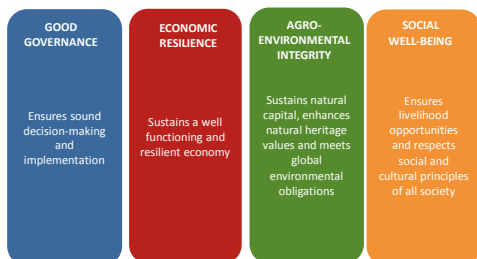
## SAFA: Sustainability Assessment of Food and Agriculture systems



Food and Agriculture Organization  
of the United Nations



## Four Pillars of the Sustainability Dashboard



## Agro-environmental integrity

National outcome for NZ production lands



'The state which sustains the full potential of land and its natural capital, ecosystem processes and services to efficiently and indefinitely produce healthy, high quality food and fibre, while enhancing natural heritage values and meeting global environmental change obligations.'

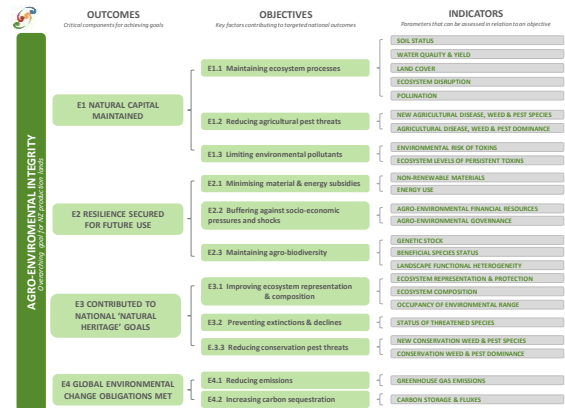
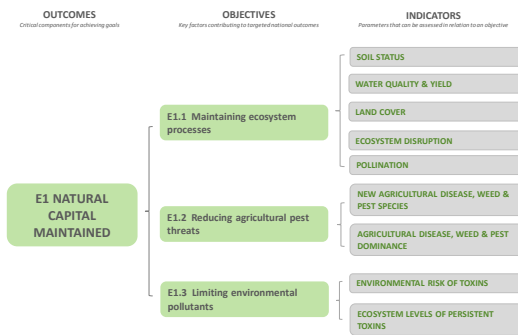
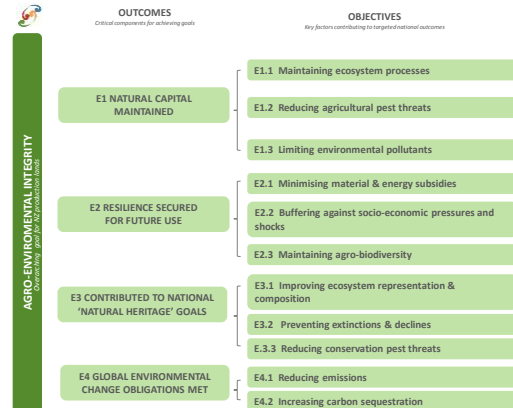


## Agro-environmental integrity

National outcome for NZ production lands

Four critical components for achieving the national outcome:

- Natural capital of production landscapes is maintained
- Resilience of New Zealand agriculture is secured for future use
- Production landscapes contribute to national 'natural heritage' goals
- New Zealand meets global environmental change obligations



Launch mid June

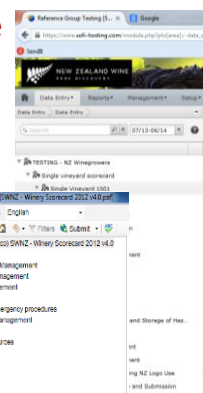


## Sustainable Wine New Zealand Scorecard

2012

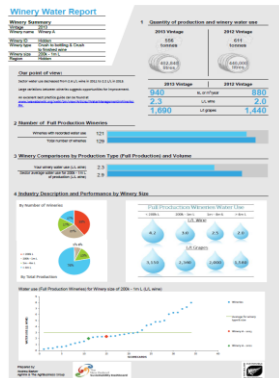
- 1,196 vineyards
- 169 wineries
- 94% of production

.... a statistician's dream



## Individualised Winery and Vineyard reports

eg. Winery water  
Use Reports



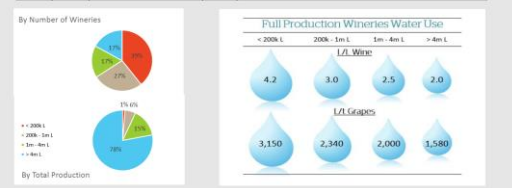
## Winery Water Report



- 🔗 Key winery information tracking up front
- 🔗 Key messages and links to learning resources

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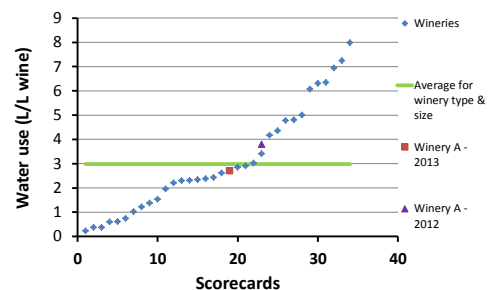
#### 4 Industry Description and Performance by Winery Size



- Industry description
- Water use across the industry by size

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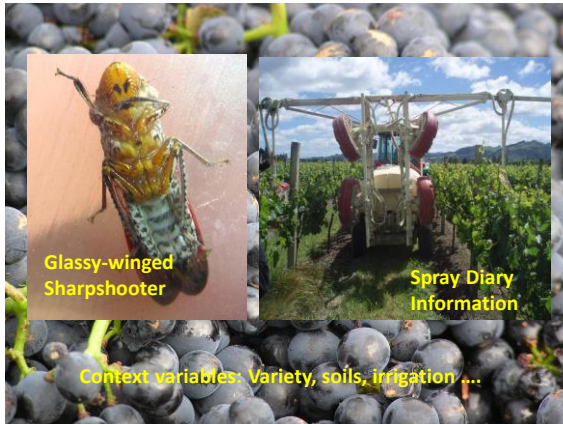
Benchmarking: incentivising performance improvement and learning



## Roll out of WiSE beyond the SWNZ scorecards

- Go wider and deeper
- Rotors ... give some themes a rest after a while
- Statistical power analysis to understand when we have enough information for risk management
- Escalation of monitoring when and where warning flags are raised





## Ngāi Tahu's Dashboard



- Whānau scaled businesses lack resources for marketing, distribution, manage finances
- Online virtual market *Ahikā Kai*; 'food from the home fires.'
- Producers need to follow iwi sustainable production principles to sell through the site
- Embedding indigenous notions of sustainability into products and indicators ... starting with values!



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## Taramea

- Ngāi Tahu has a perfume making tradition using the plant taramea.





## Individual sustainability indicators

(Moller & MacLeod 2013)

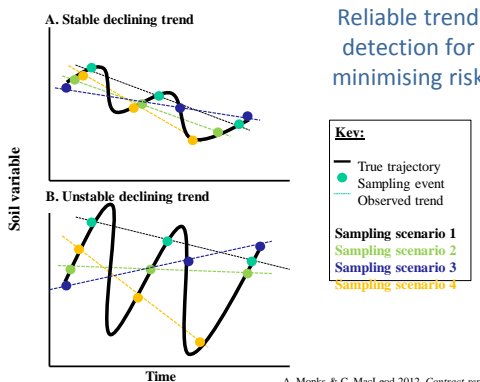
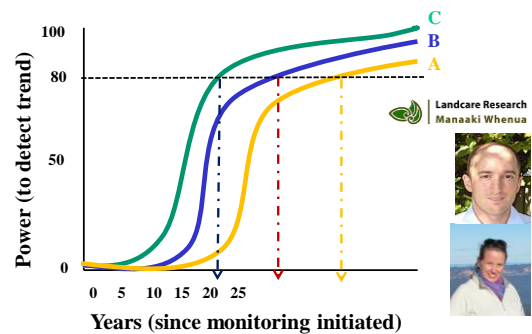
1. Policy relevant and meaningful
2. By preference performance based rather than practice based
3. By preference, quantified
4. Clearly defined and repeatable
5. Low number of indicators

## Balance simplicity and complexity

*'Perfection is attained not when there is no longer anything to add, but when there is no longer anything to take away'.* (Antoine de Saint-Exupéry)

*'Seek simplicity . . . and then distrust it.'* (Alfred North Whitehead)

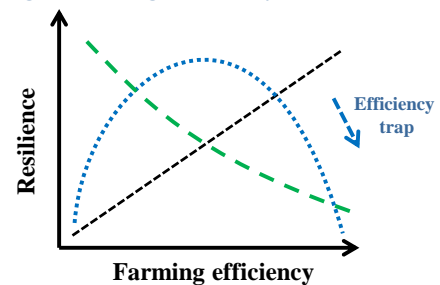
**Balancing cost with scientific reliability:**  
e.g. Optimising investments by efficient monitoring



Reliable trend detection for minimising risk

A. Monks & C. MacLeod 2012. Contract report for ZESPRI

**Building systems understanding:**  
e.g. Balancing Efficiency vs Resilience





**DECISIONS**  
Priorities, Rank, Choose. [See solutions](#)

**Building systems understanding:  
e.g. what matters most to the 'layers and players'?**

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**1000Minds in the news**  
Eve efficiency aim of online project  
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Implementations of gen-engineering schemes for New Zealand  
[Read more](#)

## An online 'Choice Experiment'

- Measure relative weightings for different dimensions of sustainability assigned by different

- Sectors
- Stakeholders
- Actors

.... to understand what the various layers & players value most

- Create a few aggregated 'composite' scores to simplify and provide summary overview



**Smart decisions going forwards:  
e.g. What-if tools for growers**

## Smart decisions going forwards: e.g. What-if tools for growers

- Linear programming to optimise profit in Kiwifruit production

- Fruit quantity and quality
- Profit
- Labour costs
- Fertiliser and agricultural inp
- Environmental constraints

$$\begin{aligned} \max \quad & \sum_{j=1}^n p_j x_j - \sum_{i=1}^m c_i y_i = \Pi \quad (1) \\ \text{s.t.} \quad & \sum_{j=1}^n a_{ij} x_j + G_i \geq b_i \quad \forall i = 1, \dots, m \quad (2) \\ & \sum_{j=1}^n L_{ij} x_j \leq L_{ij} \quad \forall i \quad (3) \\ & x_j^{min} \leq x_j \leq x_j^{max} \quad \forall j = 1, \dots, n \quad (4) \\ & G_i = \sum_{j=1}^n A_{ij} b_j \quad (5) \end{aligned}$$

- Trading-off different indicators of sustainability .. Understanding the interactions between the indicators



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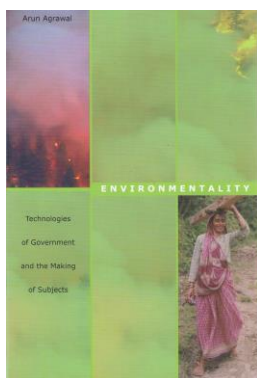


## What would success look like?



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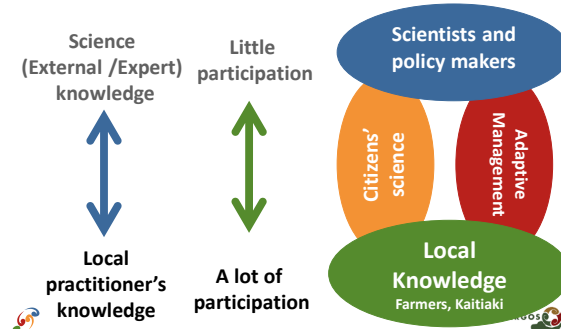


## Transformation through real participation

- Slow to achieve, lasting benefits
- Key part of social capital for sustainability

## Complementary paradigms

for co-discovery of how, where and when to intervene



## Kā ora te whenua, kā ora te tangata

*If the land is healthy, the people are healthy*

**and**

*If the people are healthy, the land will be healthy*

## Thanks!

- NZ's Ministry of Business, Innovation and Employment (principle funder of NZ Sustainability dashboard project)
- NZ Wine, Zespri & kiwifruit Packhouses, BioGro, Ngāi Tahu

## Follow-up information and participation

- Research Summaries hand out at the back table
- [www.nzdashboard.org.nz](http://www.nzdashboard.org.nz) for PowerPoint hand out
- Podcast of the Wellington presentation: [www.otago.ac.nz/winter-lectures](http://www.otago.ac.nz/winter-lectures)
- 30 minutes of your time to participate in the Choice Experiment online ... please sign-up your interest at the back of the table

## Questions and Discussion

- Andrew Barber – The Agribusiness Group and leader of the WiSE project for SWNZ



- Cerasela Stancu – Landcare Research – Sustainable Business Researcher



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