IMPROVING ACCESS TO SOIL DATA FOR IMPROVED DECISION MAKING

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AUSTRALIA

APEC Workshop on Addressing Food Security Challenges by Promoting Data Driven Policymaking
Trujillo, Peru, 17 August 2024

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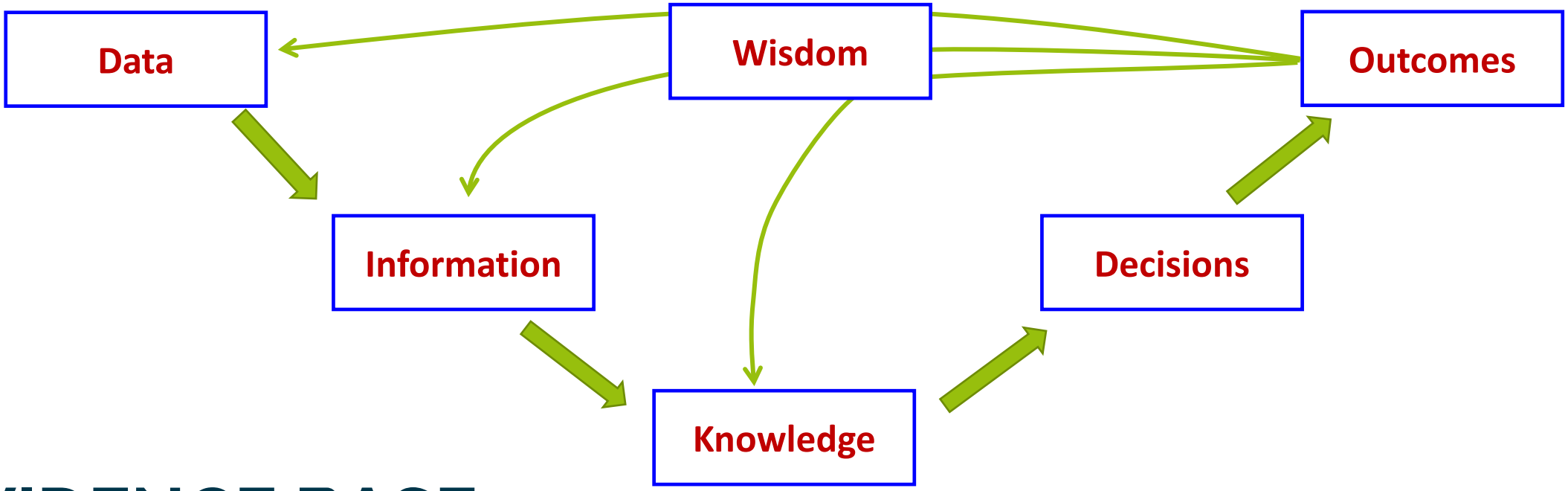
SOIL CRC

- Collaboration of farmers, industry and scientists – 39 partners
  - 8 universities
  - 4 government agencies
  - 7 industry partners
  - **20 grower groups**
- Deliver research that helps farmers improve their soil performance and increase their productivity and profitability
- 10 years funding 2017-2027

The largest collaborative soil research effort in Australia's history

BETTER DATA = BETTER DECISIONS



EVIDENCE BASE

- ✓ Proof of soil stewardship, carbon neutrality, minimising off-site affects, nature positive, etc.
- ✓ Proof of compliance with standards: environmental/consumer/welfare/health/food security

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A SOIL DATA APPROACH TO IMPROVED DECISION MAKING

1. Australian Soil Information Framework

2. Visualising Australasia's Soils

3. Farmer Practice Benchmarking

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SOIL DATA

- Soil is a poorly understood, underutilised, and undervalued resource. It is not readily visible so can be easily dismissed or forgotten
- Australia's soil data is currently
  - Inconsistent
  - Incomplete
  - Inaccessible
- Soil data and information can be applied by stakeholders in a range of contexts at domestic, regional, and farm levels
- Used effectively, soil data and information will play a key role in Australia's ability to address current and future challenges

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1. AUSTRALIAN SOIL INFORMATION FRAMEWORK

- ANSIS – Australian National Soil Information System
  - ansis.net
  - ANSIS provides access to domestically consistent soil data and information to support the sustainable management of Australia's soil.
  - ANSIS brings together soil data from across Australia, connecting multiple data sources.

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1. AUSTRALIAN SOIL INFORMATION FRAMEWORK

- ASMP - Australian Soil Monitoring Program
  - The ASMP will monitor agreed domestic soil health indicators to understand soil condition and trends, and to better inform domestic priorities.
  - Data collected will be consistent and made publicly available through the Australian National Soil Information System.
  - 3643 sites

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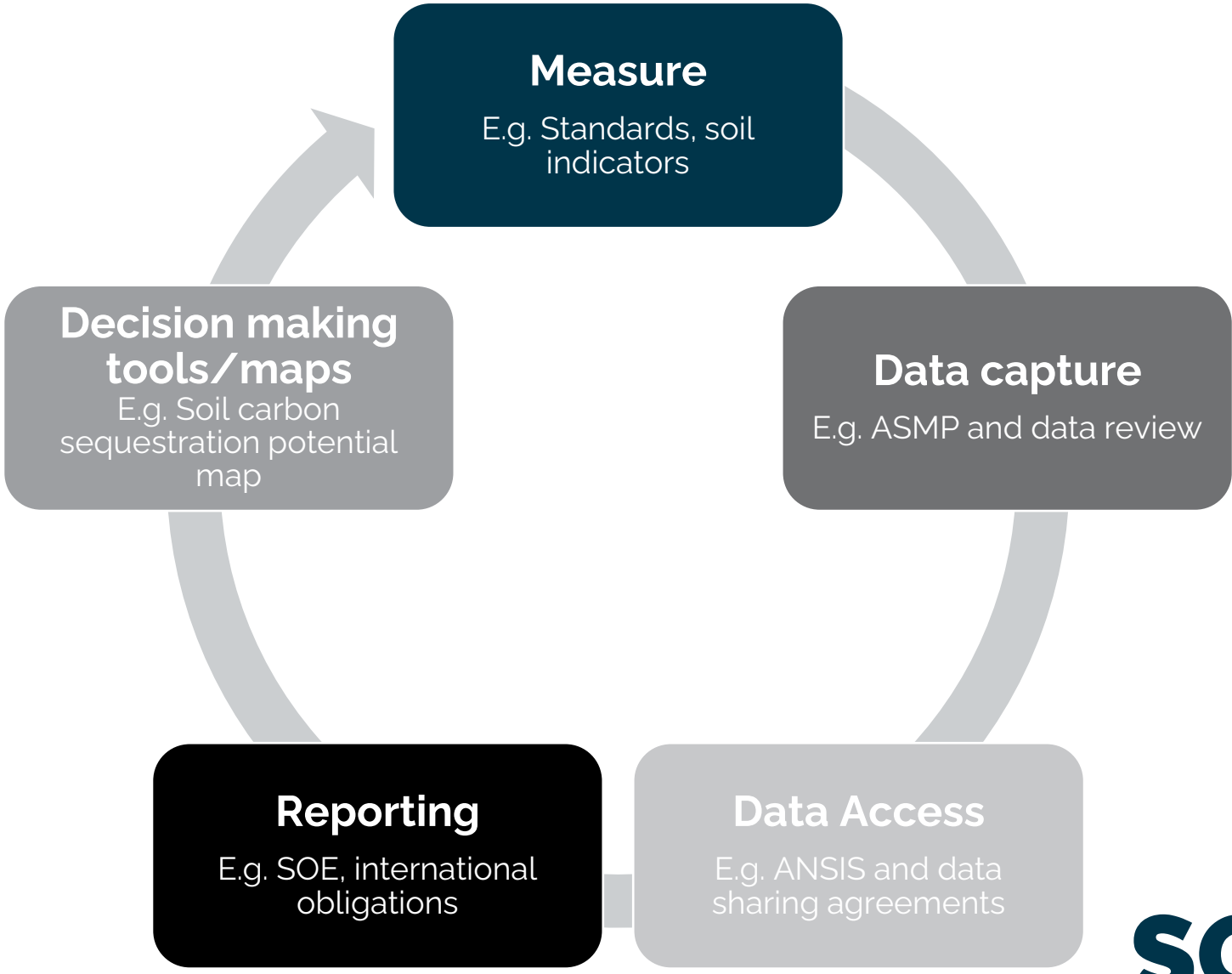
Australian Soil Information Framework



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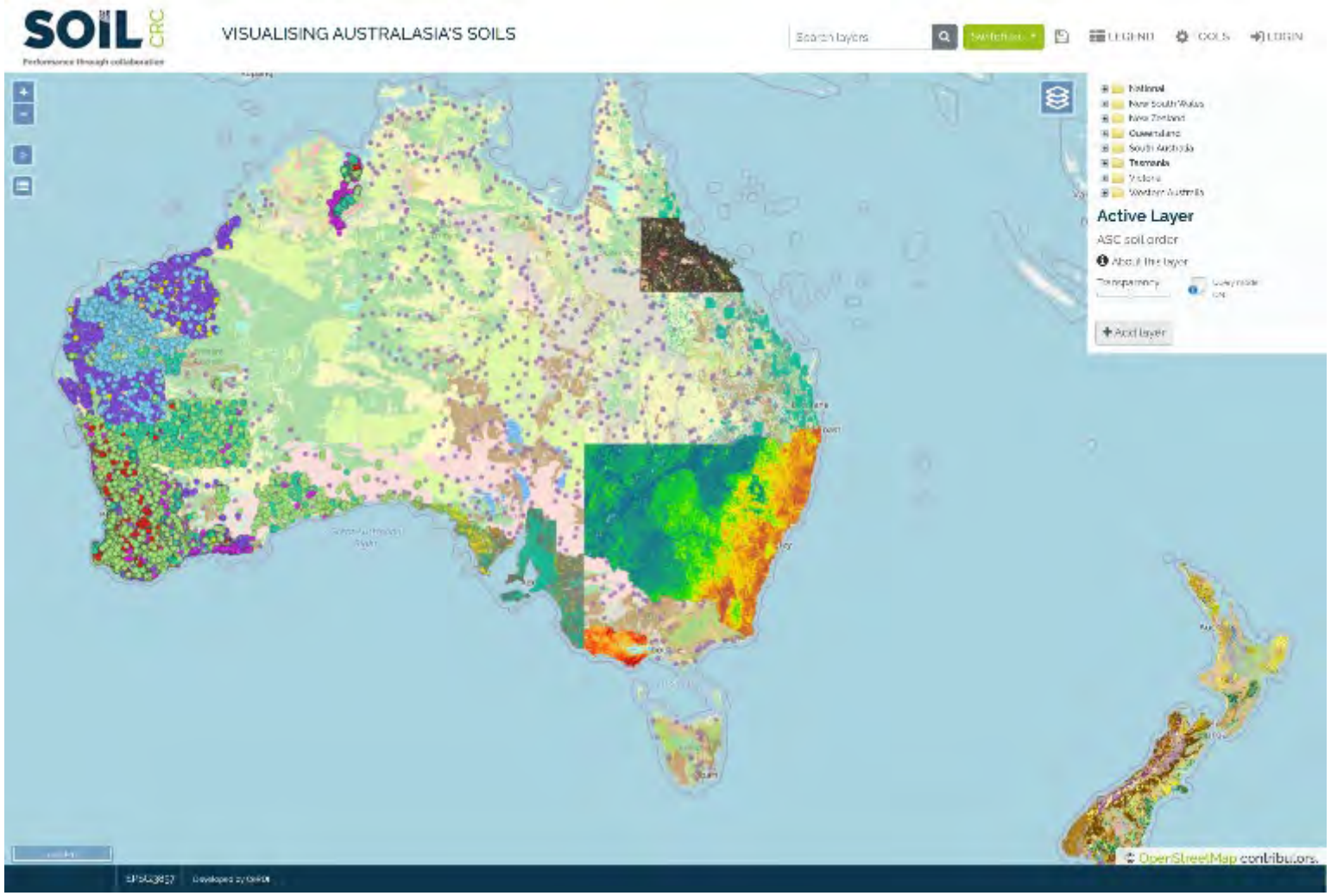
2. VISUALISING AUSTRALASIA'S SOILS

A soil data federation, based on agreed data stewardship and governance frameworks, that allows Australasian soils data from the private and public sectors to be discoverable to participants through an intuitive-to-use internet portal.



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VAS OBJECTIVES

- **Motivate Australian soils data custodians to make their data** Findable, Accessible, Interoperable and Reusable (**FAIR**), by providing a range of benefits for research, on-farm decision making and policy development.

- **Align with other soil data initiatives** to maximise soil data discovery and re-use through the FAIR framework
  - local (e.g. farming data co-operatives)
  - domestic (e.g. ANSIS)
  - international (e.g. ESIP soil data information cluster)

- **Co-develop and implement an enduring Australasian soils knowledge system** that is based on principles of data democracy, self-sustaining and inherently useful for research and education

Federation University

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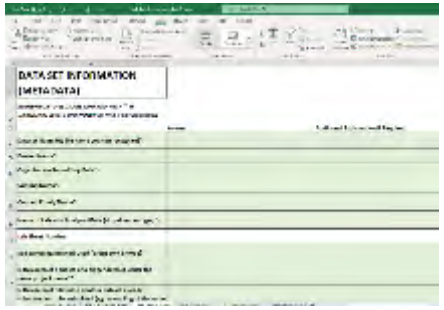
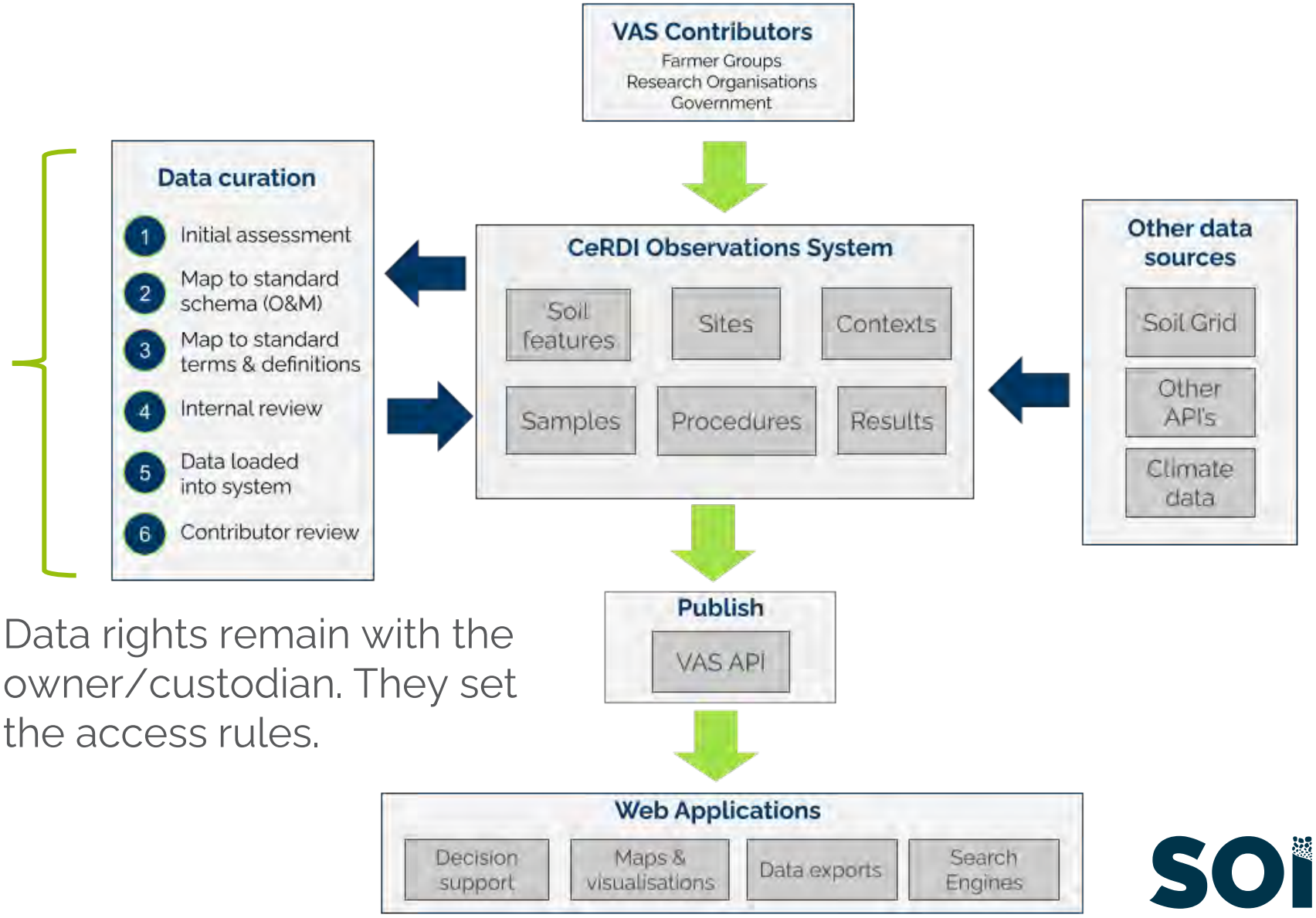
VAS SYSTEM OVERVIEW

Self-serve system

(meta) data templates



“how-to” videos



Data rights remain with the owner/custodian. They set the access rules.

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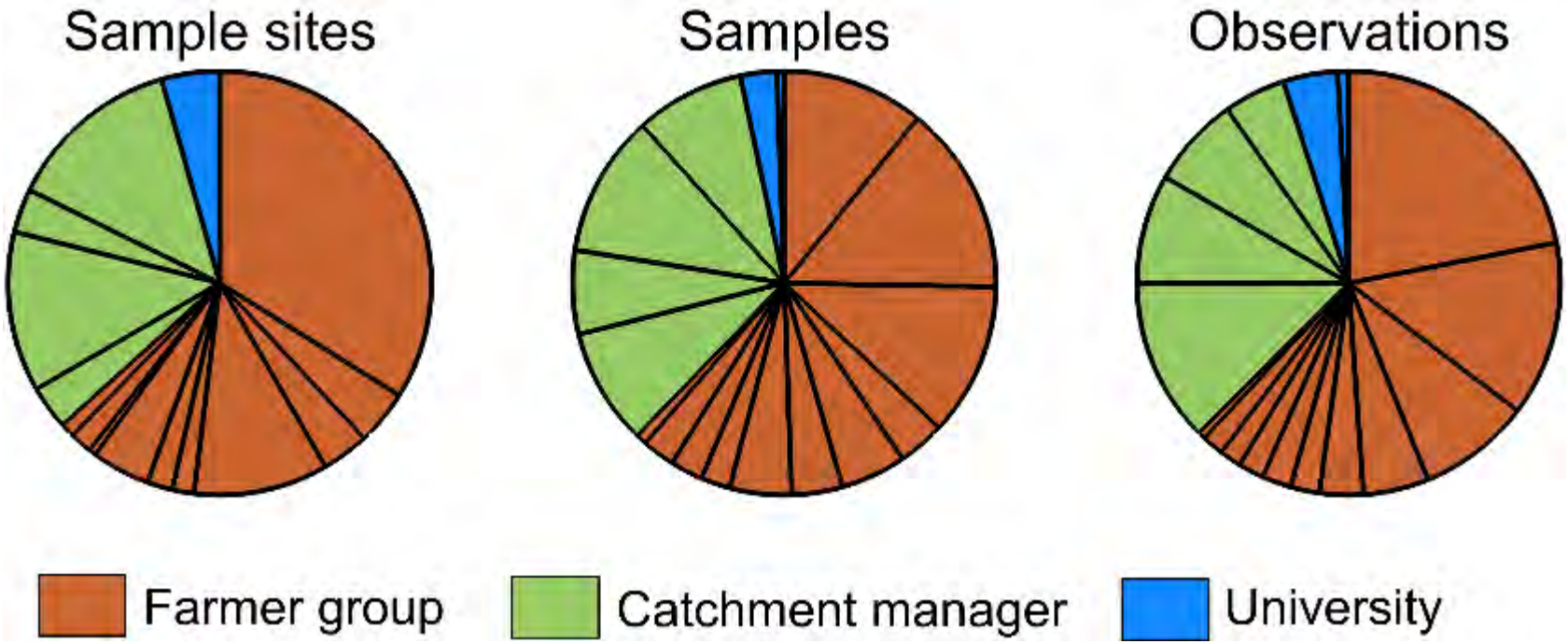
SYSTEM CONTENT (on 18 July 2024)

Contributions from:

- **11 Farmer groups**
- **4 Catchment managers**
- **2 Universities**

Resulting in:

- **55 datasets**
- **3,043 sites**
- **10,919 samples**
- **218,375 observations**
- **from 1988 to 2024**



9,634 soil carbon observations using 13 different procedures

5,639 using Walkley & Black (6A1)
Others include Dumas, MIR, SOC, SOM, LOI, PPOC, KJE, Leco, etc.,

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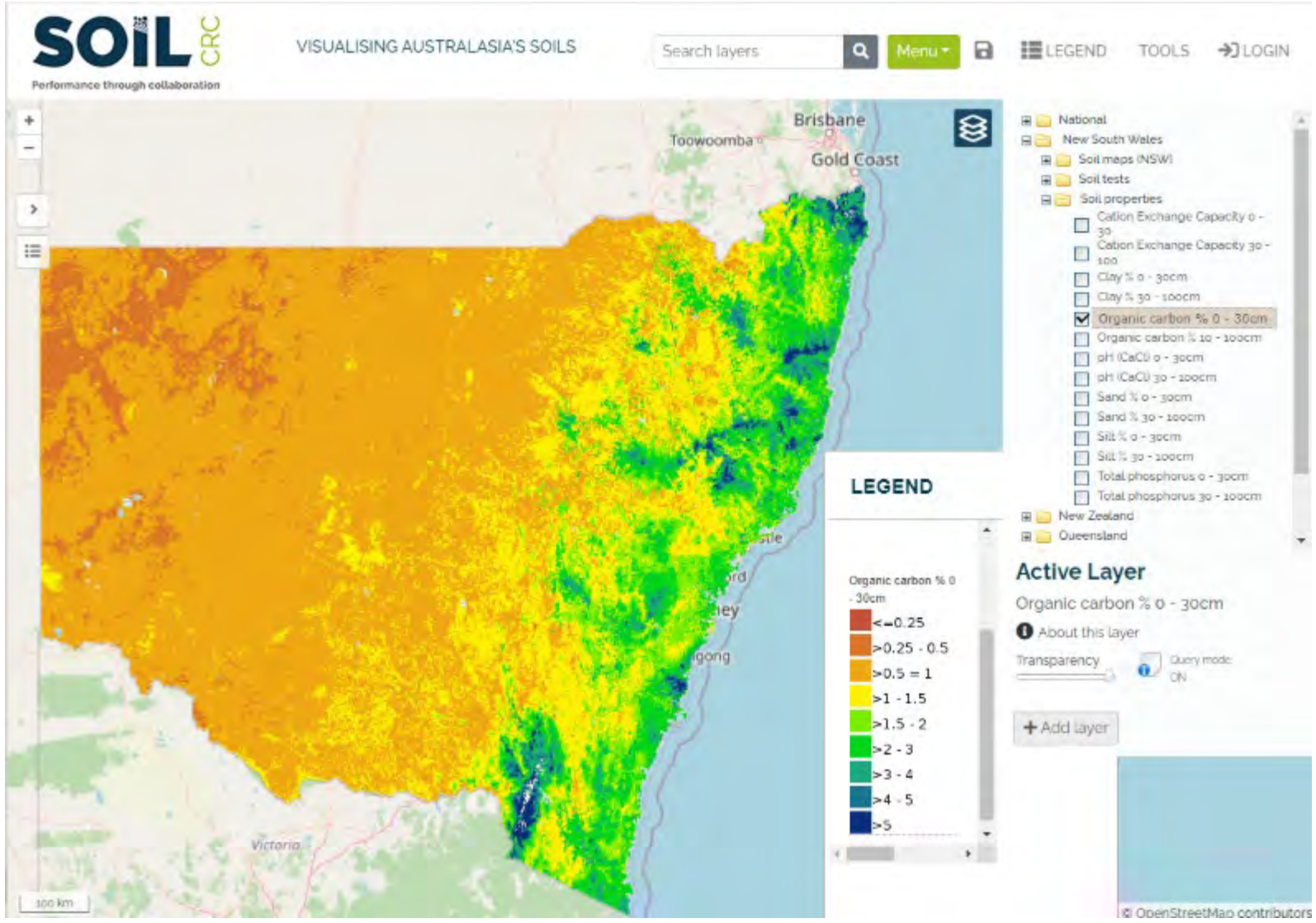
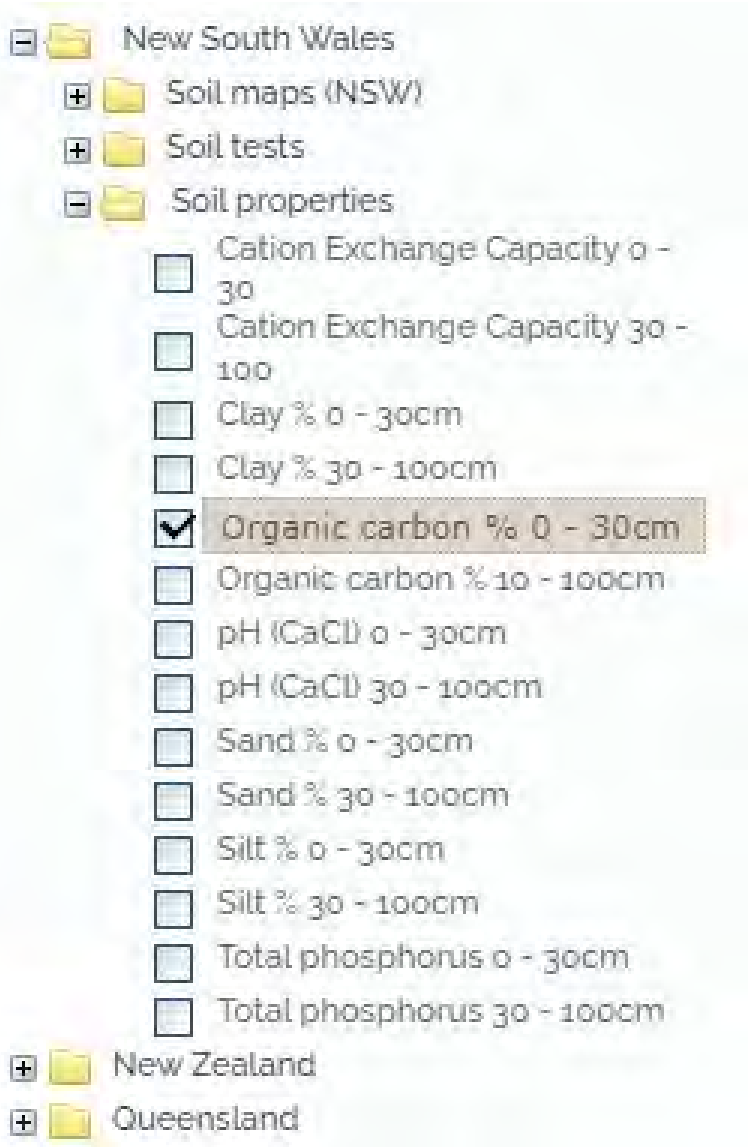
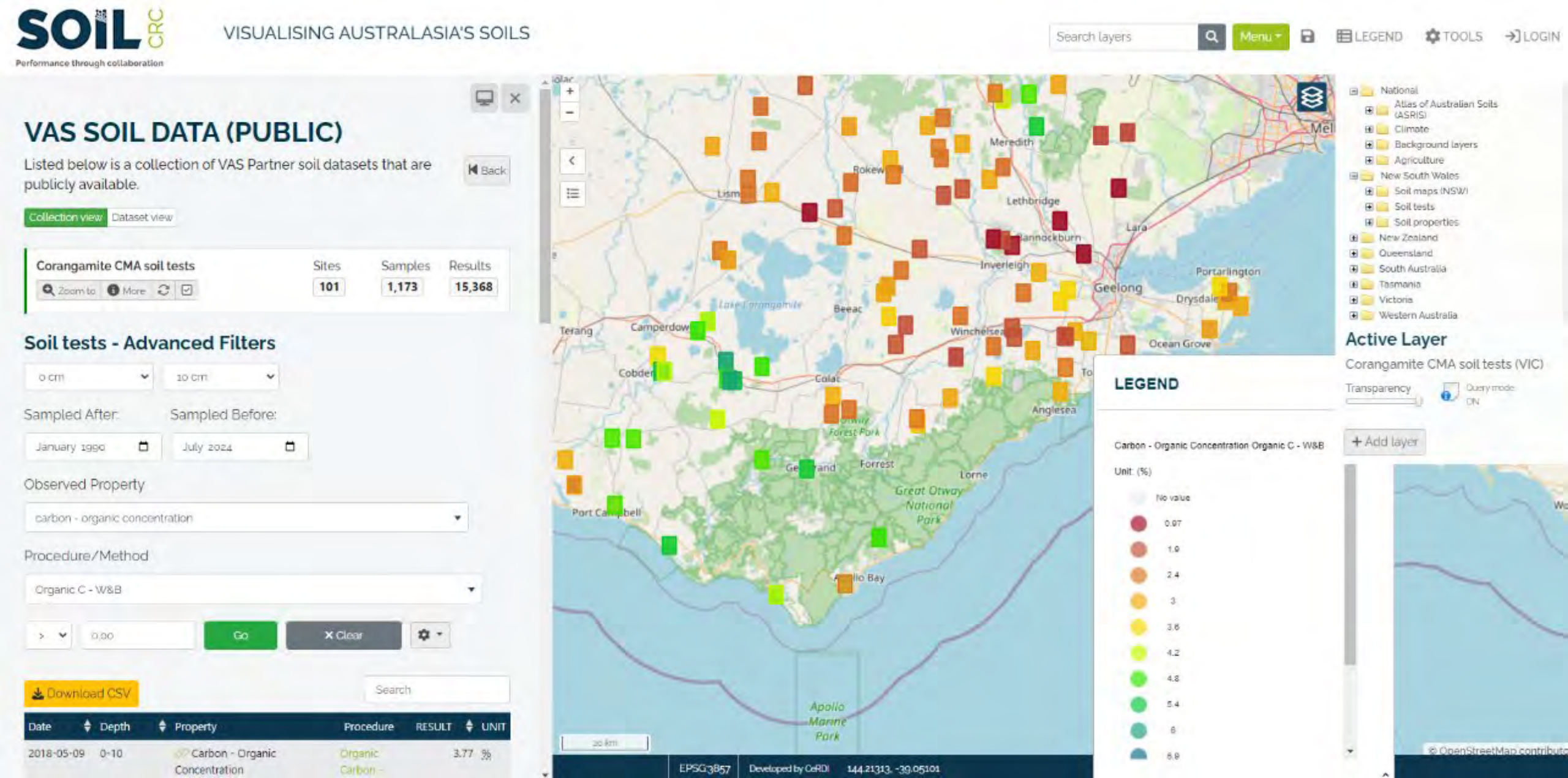
SOIL PROPERTIES (DIGITAL SOIL MAPS)





SHARED DATA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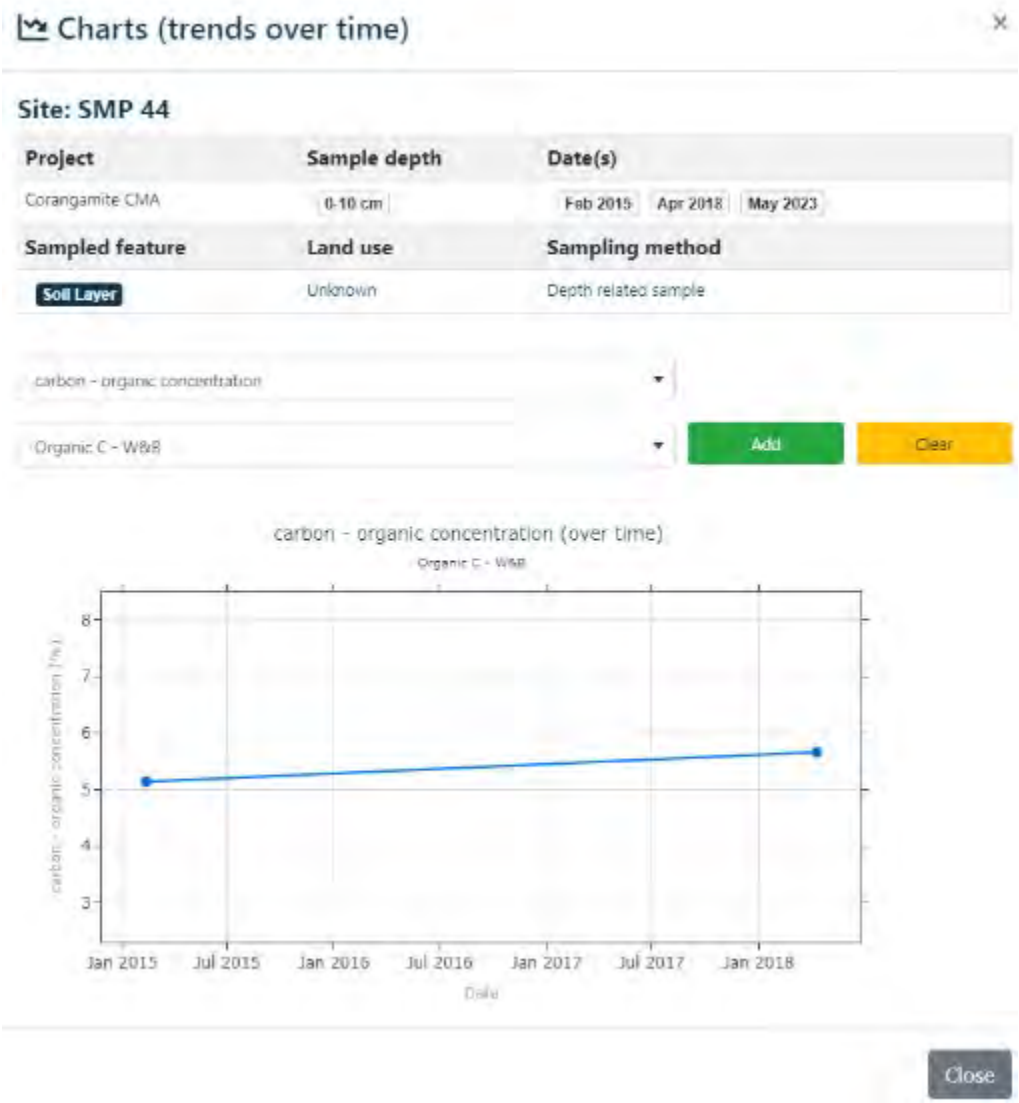
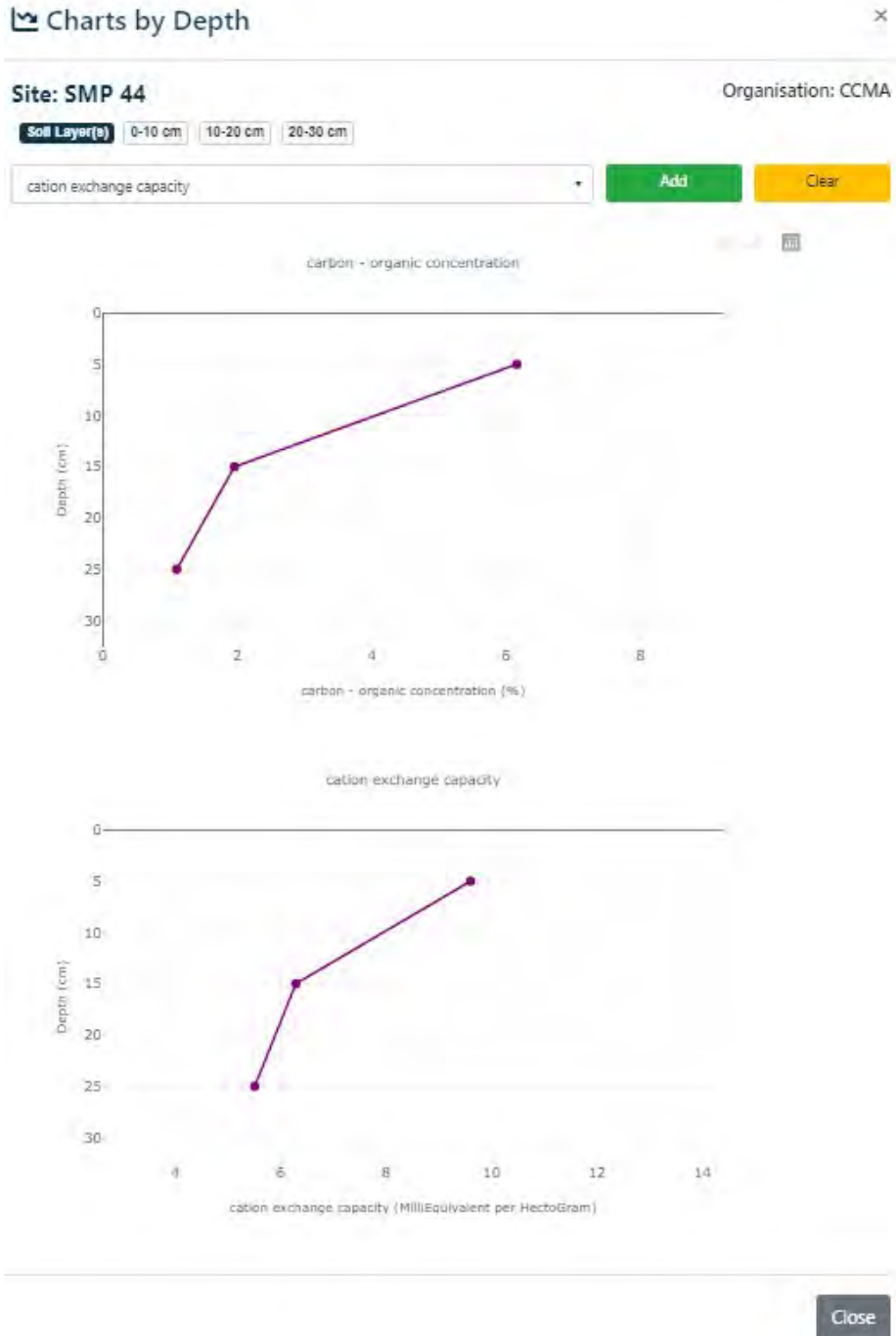
VISUALISING AUSTRALASIA'S SOILS
Search layers
Menu
LEGEND
TOOLS
LOGIN
VAS SOIL DATA (PUBLIC)
Listed below is a collection of VAS Partner soil datasets that are publicly available.
Back
Collection view
Dataset view
Corangamite CMA soil tests
Sites
Samples
Results
Zoom to
More
101
1,173
15,368
Soil tests - Advanced Filters
0 cm
10 cm
Sampled After:
Sampled Before:
January 1990
July 2024
Observed Property
carbon - organic concentration
Procedure/Method
Organic C - W&B
>
0.00
Go
Clear
Download CSV
Search
Date
Depth
Property
Procedure
RESULT
UNIT
2018-05-09
0-10
Carbon - Organic Concentration
Organic Carbon -
3.77
%
Meredith
Lethbridge
Lara
Inverleigh
Geelong
Portarlington
Drysdale
Ocean Grove
Anglesea
Lorne
Forrest
Beeac
Terang
Camperdown
Cobden
Colac
Winchelsea
Great Otway National Park
Apollo Marine Park
Port Campbell
LEGEND
Carbon - Organic Concentration Organic C - W&B
Unit: (%)
No value
0.07
1.9
2.4
3
3.6
4.2
4.8
5.4
6
6.9
National
Atlas of Australian Soils (ASRIS)
Climate
Background layers
Agriculture
New South Wales
Soil maps (NSW)
Soil tests
Soil properties
New Zealand
Queensland
South Australia
Tasmania
Victoria
Western Australia
Active Layer
Corangamite CMA soil tests (VIC)
Transparency
Query mode
Off
+ Add layer
EPSG:3857
Developed by CeRDI
144.21313, -39.05101

TRENDS





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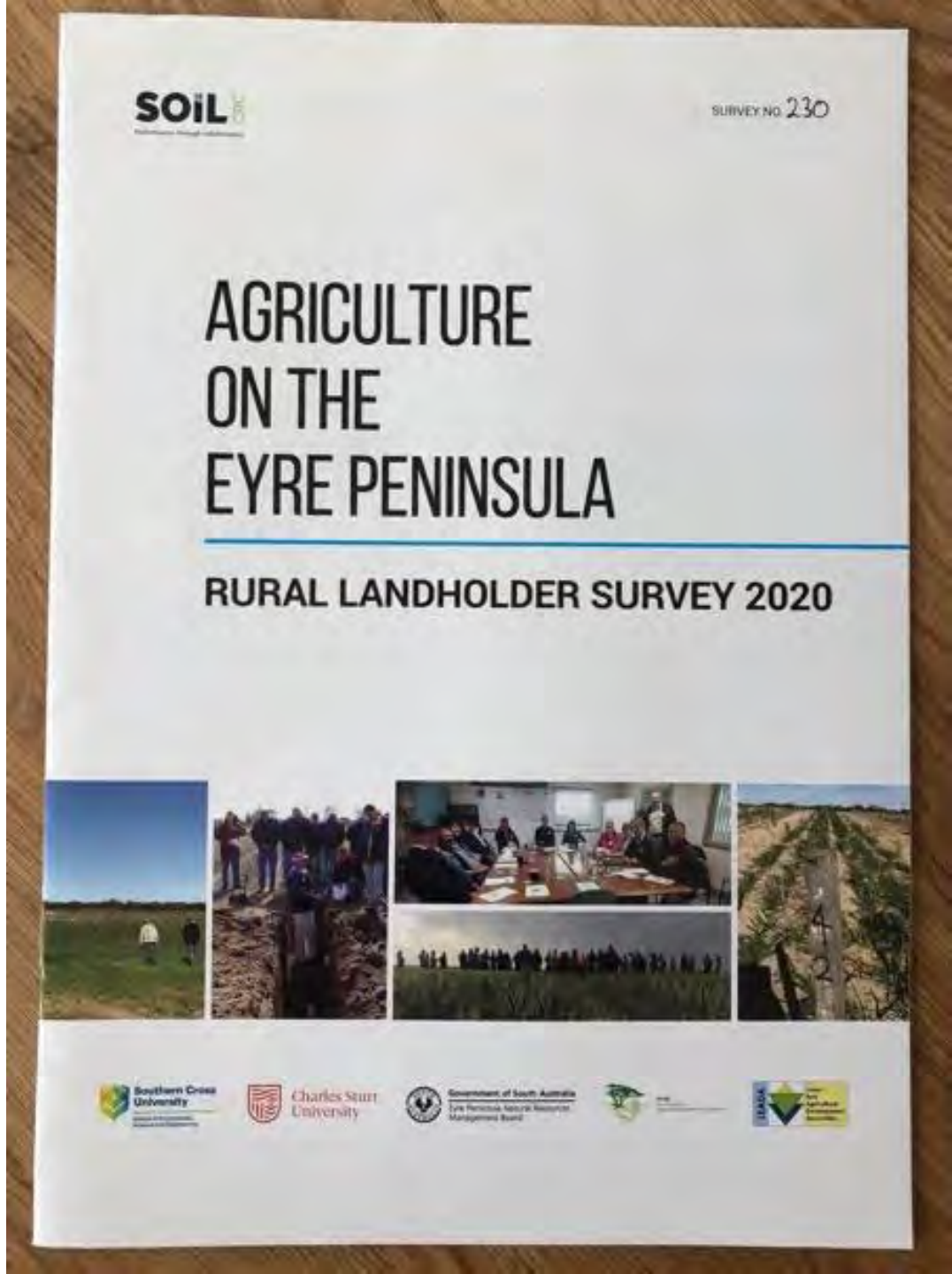
3. FARMER PRACTICE BENCHMARKING

Farmer decisions are central to soil health and productivity

- Understanding farmer on-farm practices, priorities & challenges
- Established methodology
- Data is spatially referenced
- Input into strategic planning



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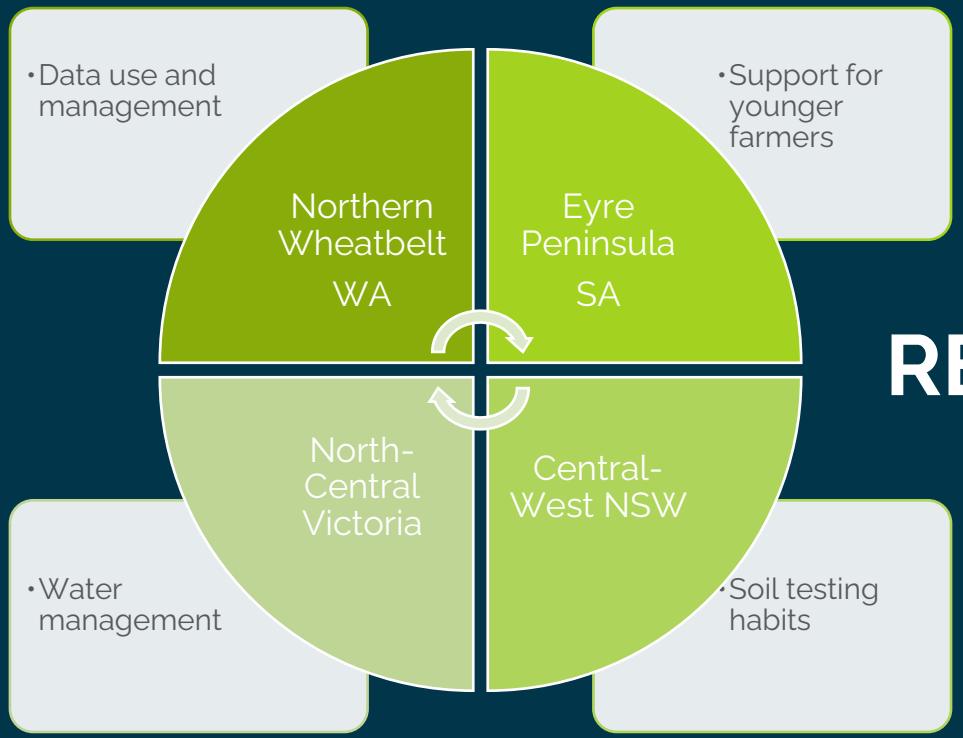
CORE QUESTIONS

REGIONAL PRIORITIES



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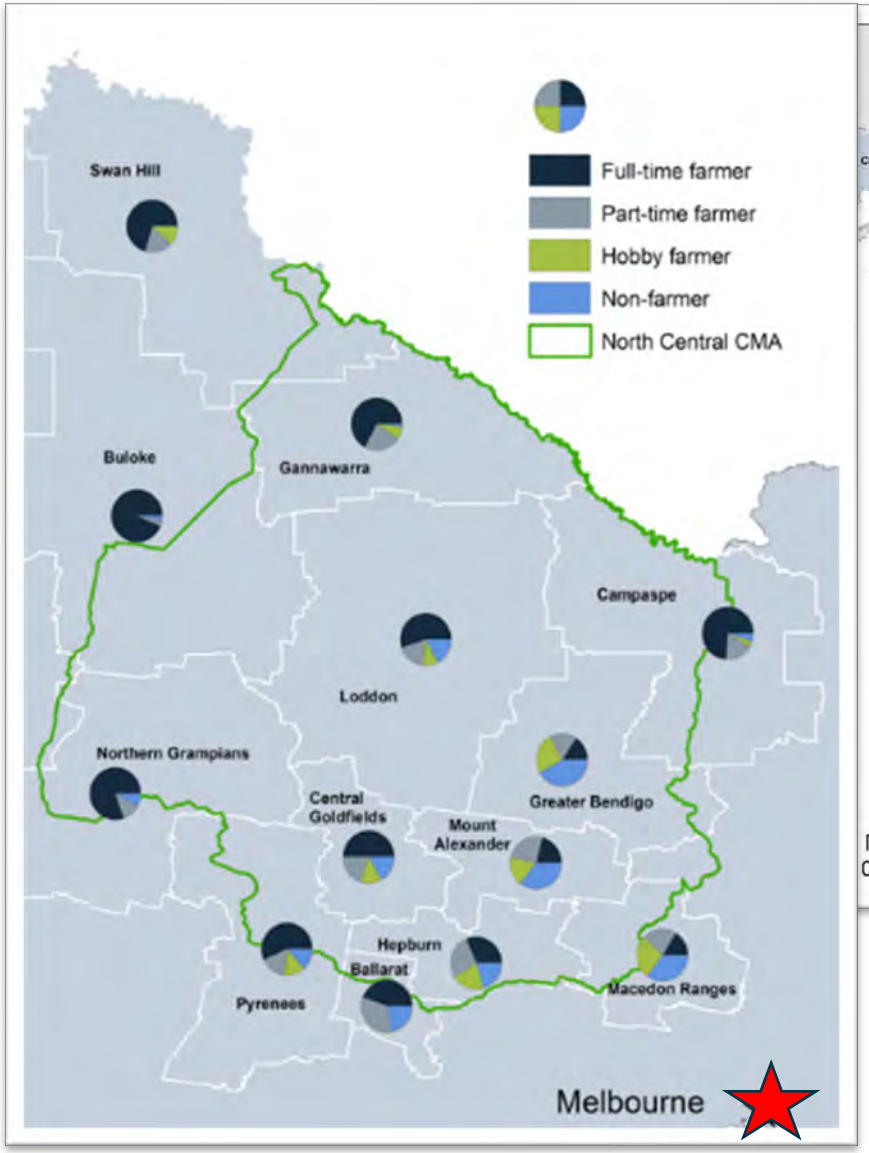
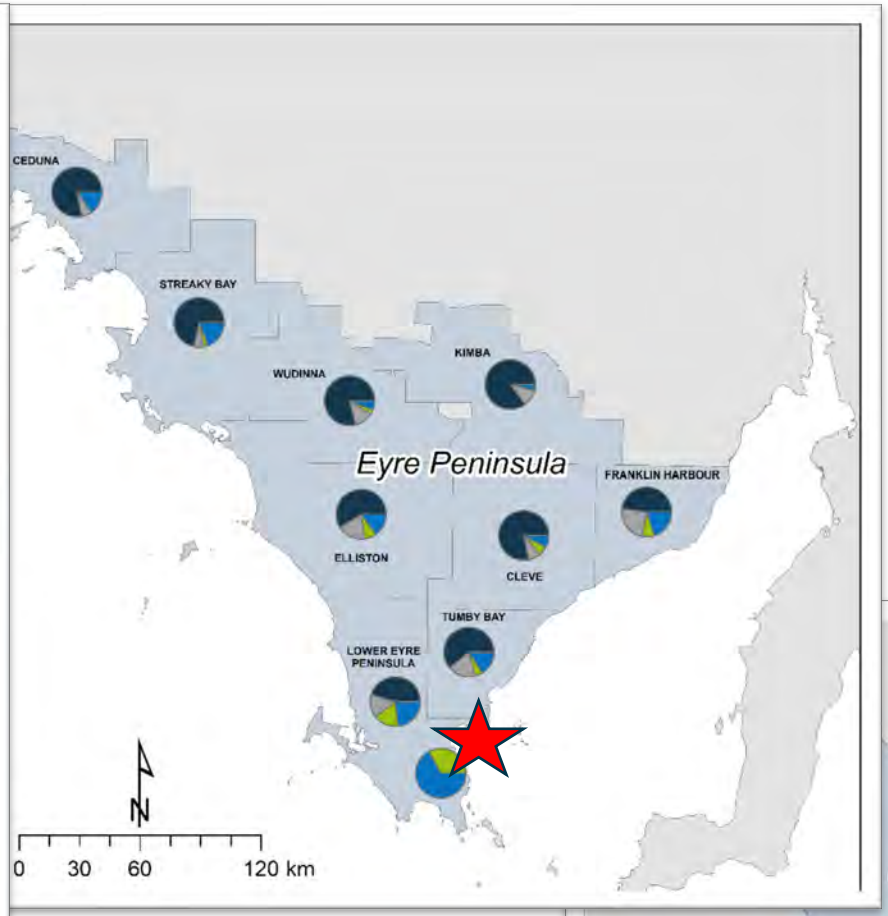
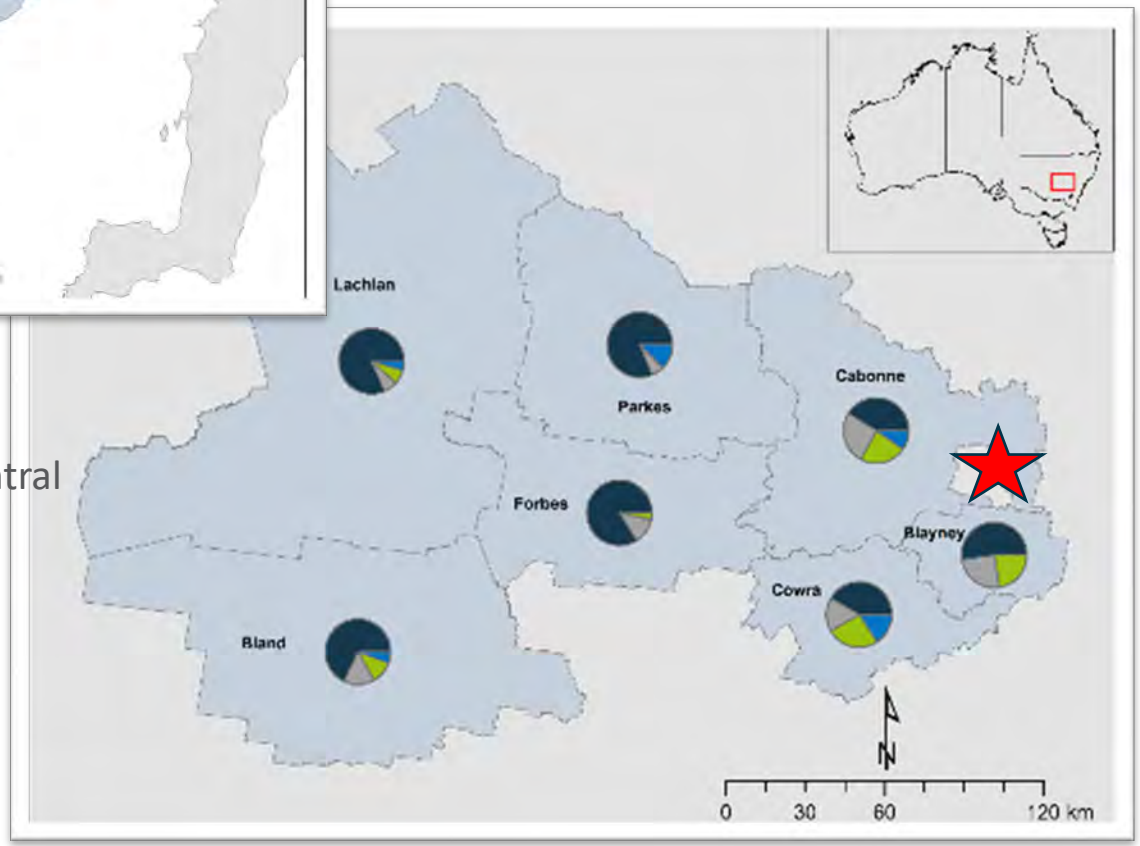


Full-time, part-time hobby farmers & non farmers-in Central West Victoria by LGA
Source: Curtis & Luke, 2020



Full-time, part-time hobby farmers & non-farmers in Central West NSW by LGA

Source: Luke et al. 2022



Full-time, part-time hobby farmers & non-farmers on the Eyre Peninsula by LGA

Source: Luke et al. 2021

ISSUES ACROSS REGIONS

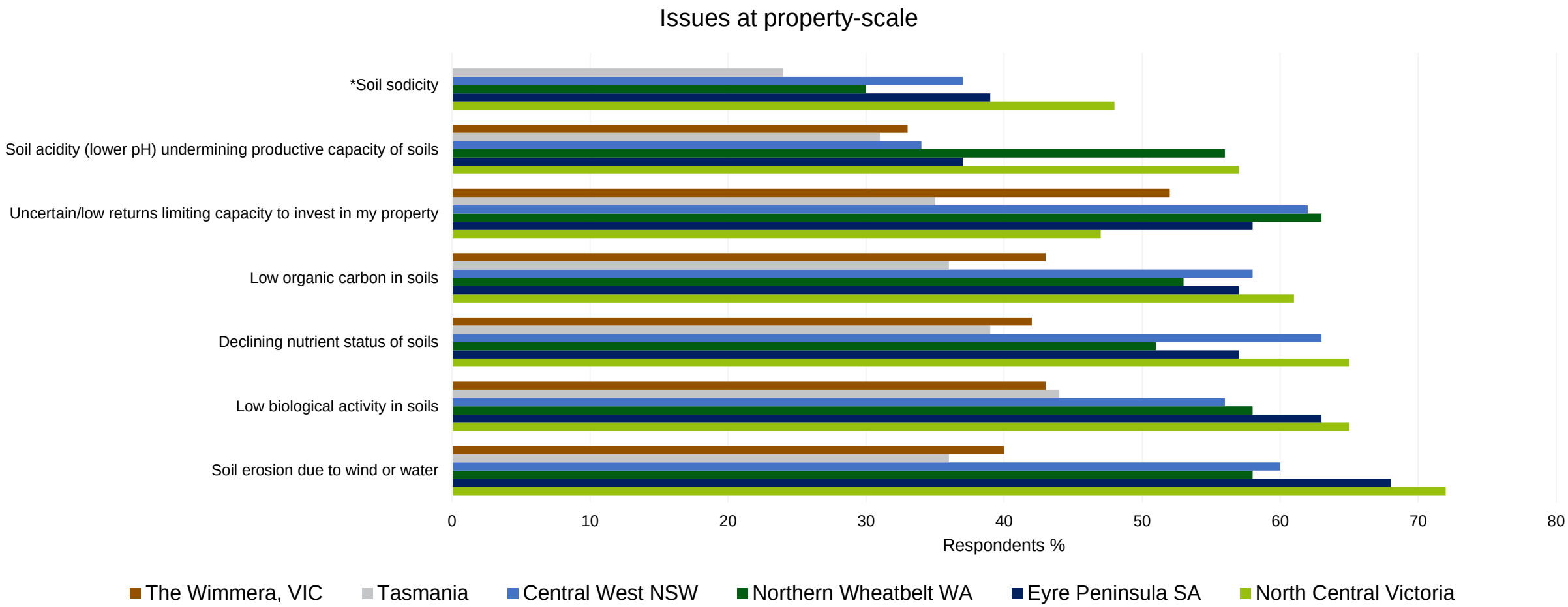
Survey items explore issues at property and regional scale

The most important regional-scale issues were:

- **Changes in weather patterns** (North Central Victoria and WA, both 85%)
- **Water security** (SA, 81%; WA, 78% and 66% (dams-focussed) for NC. Vic).
- **Absence of important services and infrastructure** was a big issue for around 70% of farmers across regions, especially on the Eyre Peninsula (79%)
- **Declining soil health and water holding capacity** was a key issue for around 60% of farmers across regions (76% in NSW)
- **Herbicide resistance** was an issue for around 60% of farmers
- **Impact of pest species on native species** was an issue for around 55% of farmers nationally

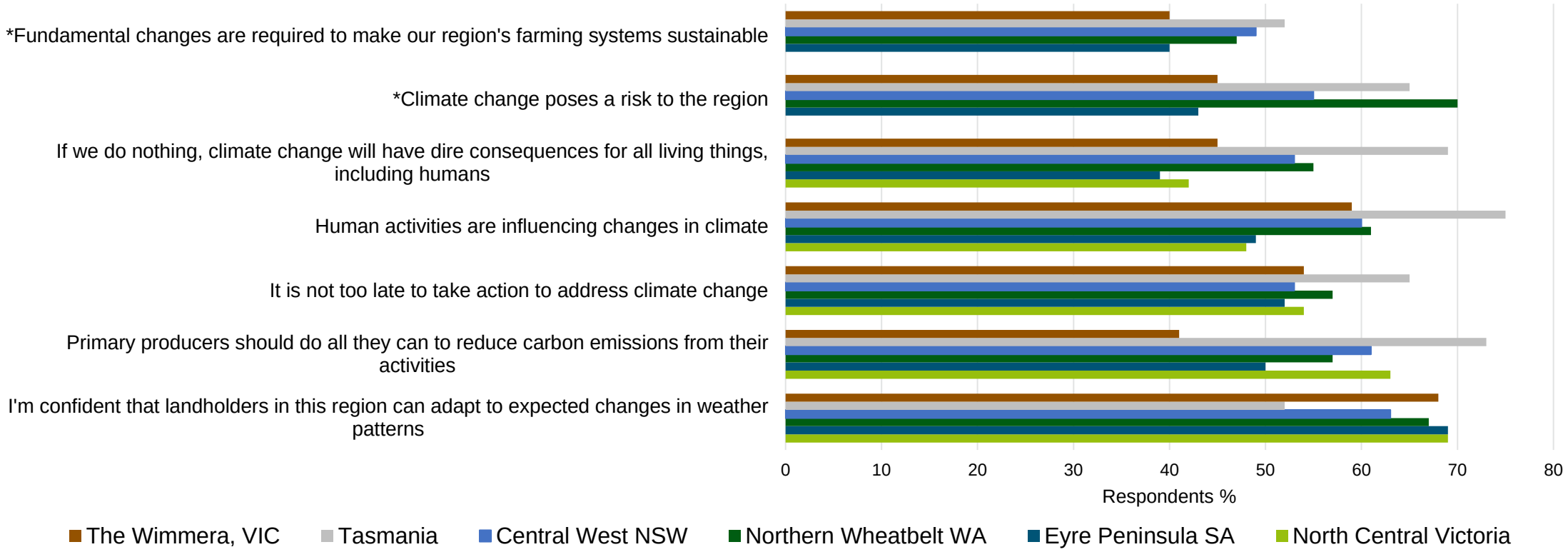
ISSUES ACROSS REGIONS

Survey items explore issues at property and regional scale



CLIMATE BELIEFS ACROSS REGIONS

Landholder beliefs related to climate change across regions



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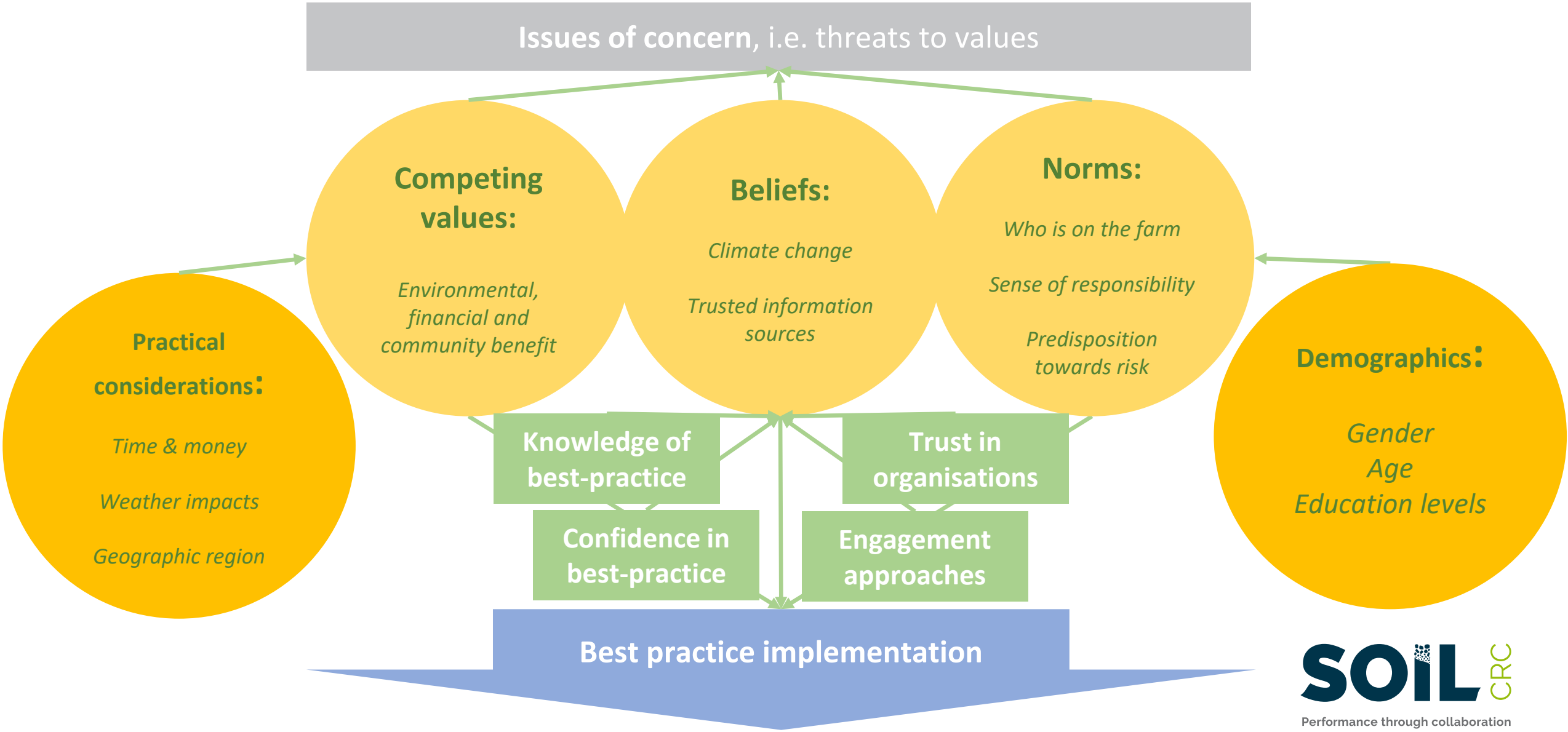
Drivers of Landholder Decision-Making



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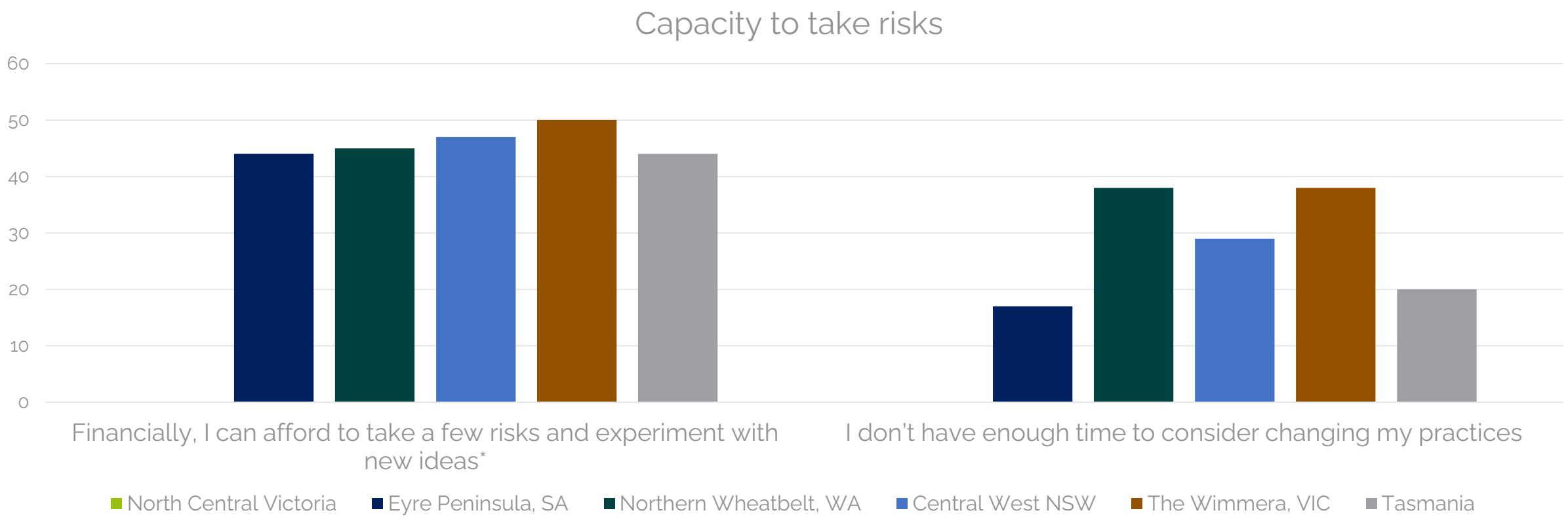
RISK ACROSS REGIONS

Core survey items explore landholder capacity to take risks (per cent farmers)



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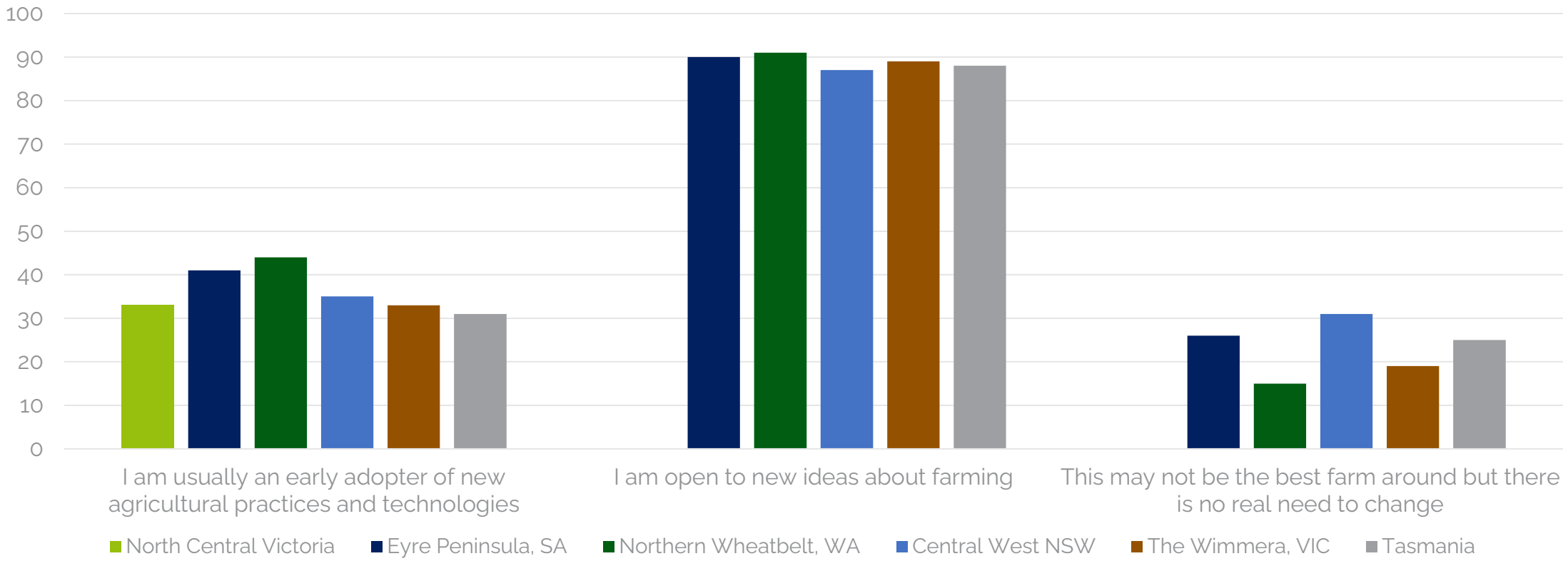
OPENNESS TO CHANGE

How landholders see themselves in relation to new investments and innovations (per cent farmers)



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SUMMARY

Key elements driving farmer decision-making are:

Farmer characteristics:

- Demographics
- Underlying values and priorities
- Attitudes
- Time
- Money

And for resilience-focussed practices:

- Capacity and actions to undertake whole-farm planning
- 'Belief' in climate change is an important driver
- Decision-making team
- Succession-planning

Southern Cross University

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Australian Government
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