



# Australian Wheat Sustainability Framework: A Bottom-Up Model

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The University of Queensland



**Slide 1**

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**BRDAMO** [@Sudhir Yadav] Provide your feedback on this.  
Bruno Rafael De Almeida Moreira, 2024-10-22T07:54:05.244

# Acknowledgment of **Country**

The University of Queensland (UQ) acknowledges the Traditional Owners and their custodianship of the lands on which we meet.

We pay our respects to their Ancestors and their descendants, who continue cultural and spiritual connections to Country.

We recognise their valuable contributions to Australian and global society.

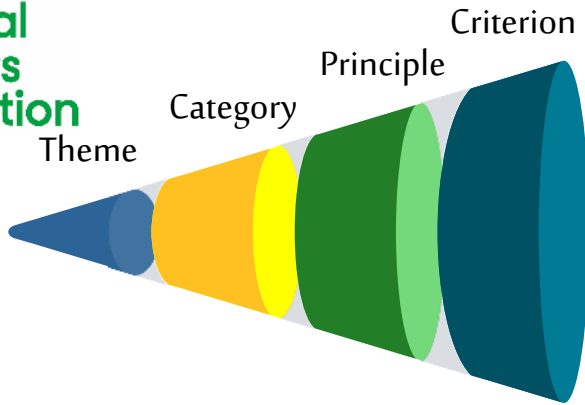


# Macro-level Frameworks

## Australian Agricultural Sustainability Framework



National Farmers Federation

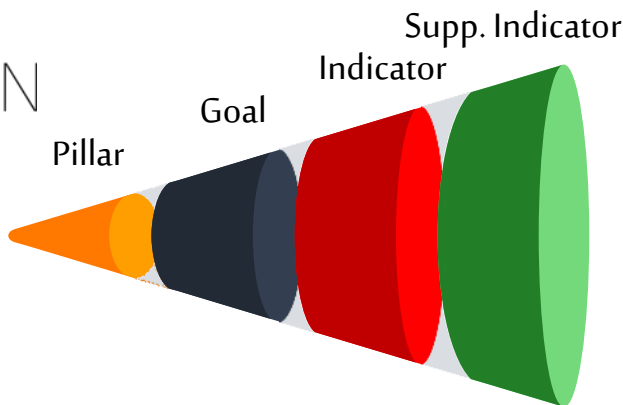


Agri Landscape

Sust. Ag. System

**Downscaling to commodity level for adding value**

## Australian Grain Industry Sustainability Framework



Grain Landscape

Sust. Grain System

Academia



Gov



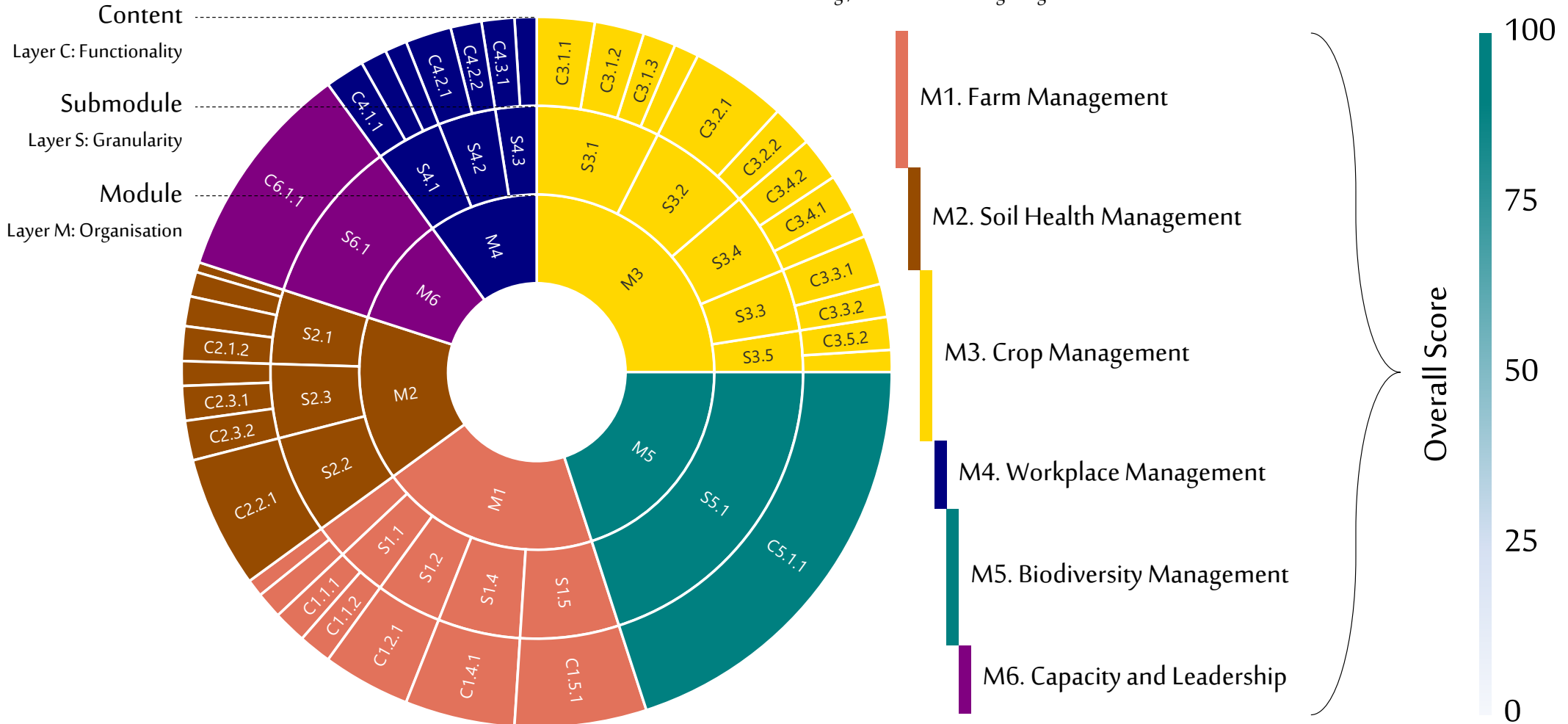
Grower & Industry



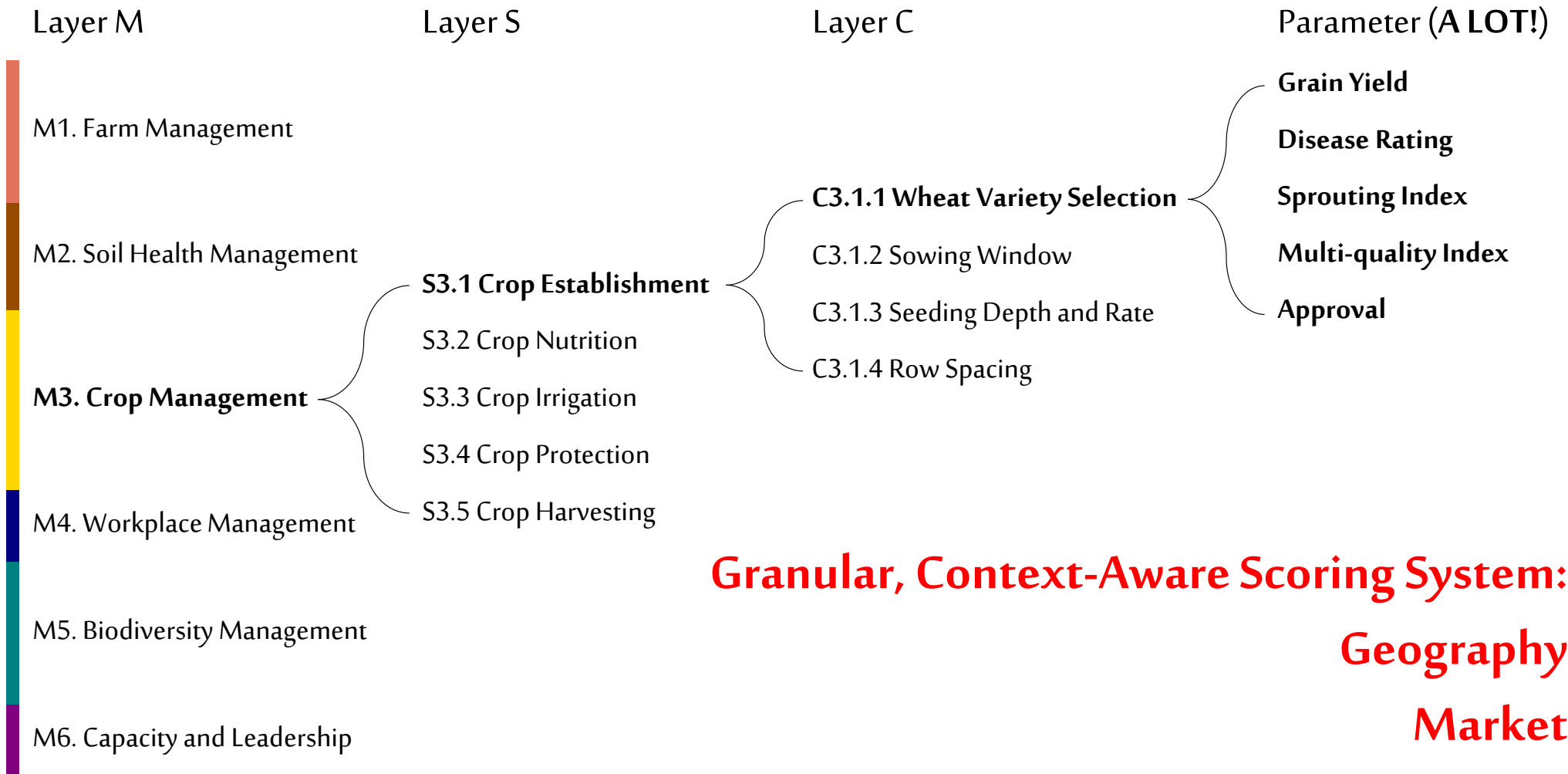
# ML-enhanced Bottom-up Model: Downscaling to address the actual “pain points” at crop/farm level

E.g., Module-level Weighting

Hierarchical Weighting



The approach can integrate specific data from Australian growers at the **SUBREGION LEVEL**



**Granular, Context-Aware Scoring System:  
Geography  
Market**

**1. MODULE**

- Farm Management
- Soil Health Management
- Crop Management
- Workplace Management
- Biodiversity Management
- Capacity and Leadership

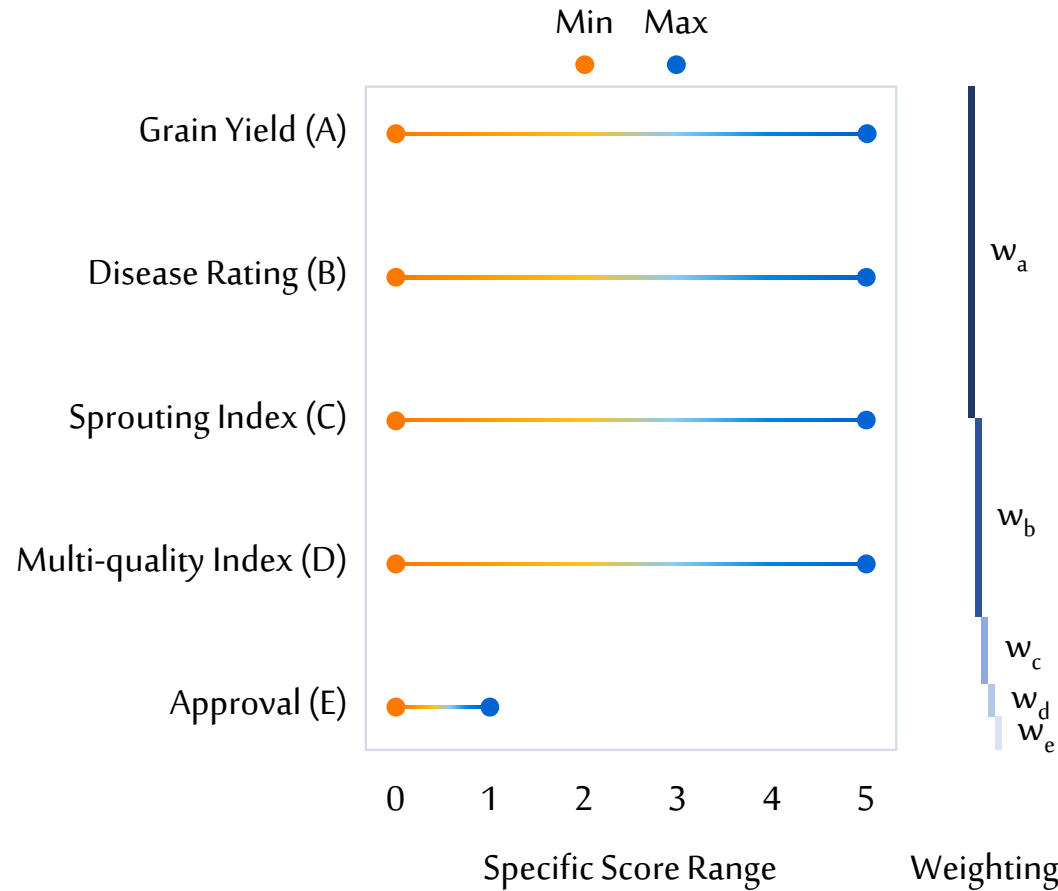
**2. SUBMODULE**

- Crop Establishment
- Crop Nutrition
- Crop Irrigation
- Crop Protection
- Crop Harvesting

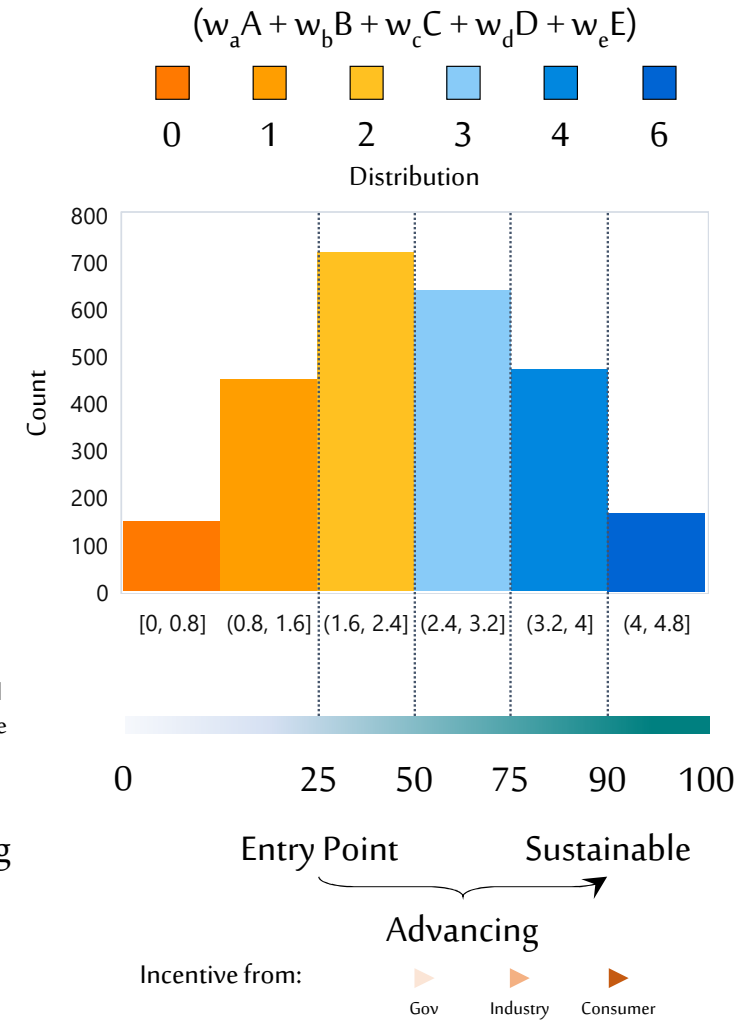
**3. CONTENT**

- Wheat Variety Selection
- Sowing Window
- Seeding Depth and Rate
- Row Spacing

Parameter



Multi-criterion Equation



**1. MODULE**

- Farm Management
- Soil Health Management
- Crop Management
- Workplace Management
- Biodiversity Management
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**2. SUBMODULE**

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- Crop Nutrition
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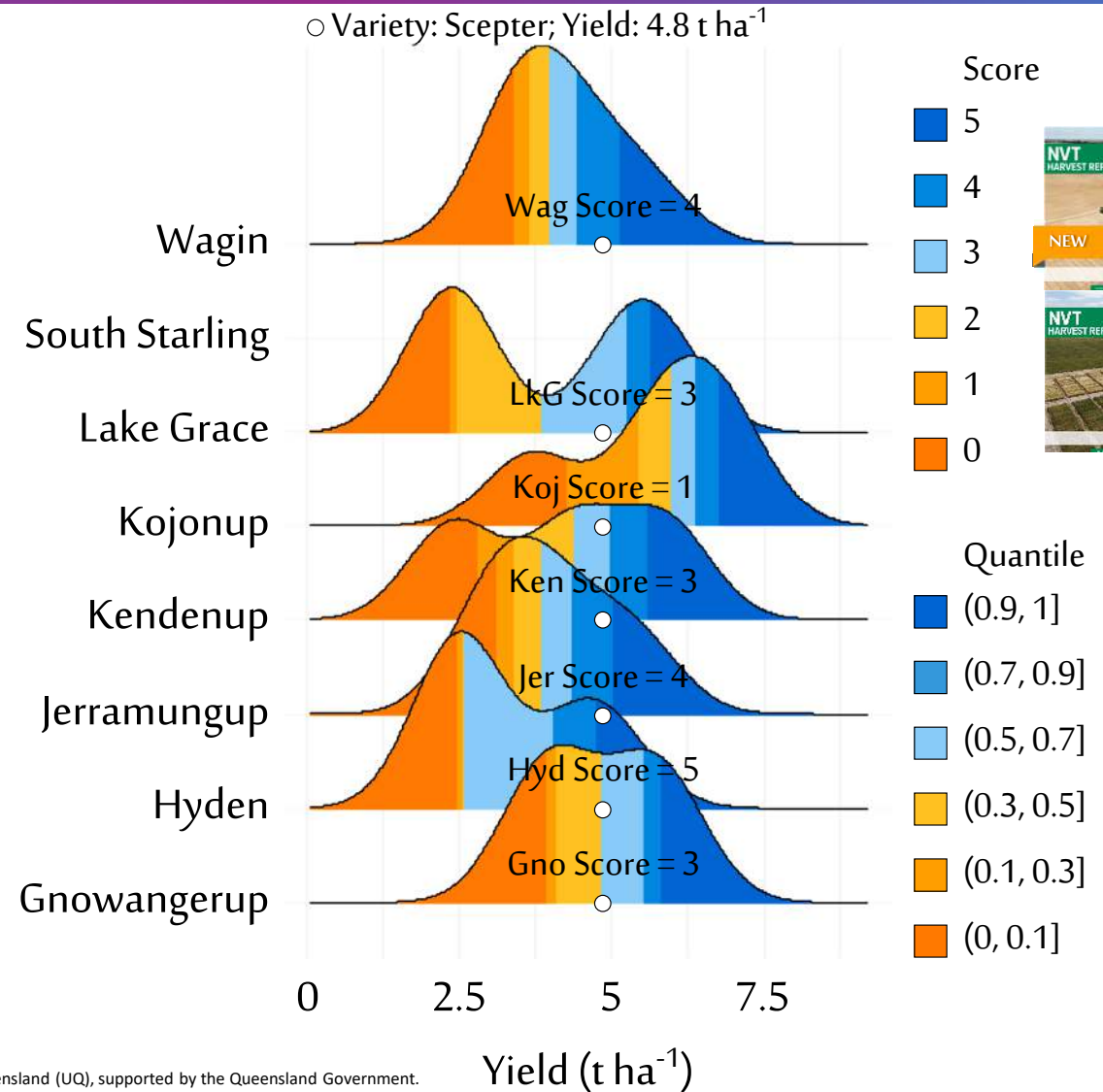
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- Sowing Window
- Seeding Depth and Rate
- Row Spacing

**4. PARAMETERS**

- Grain Yield
- Disease Rating
- Sprouting Index
- Multi-quality Index

**5. LEVEL**

- State
  - WA
  - VIC
  - QLD
  - NSW
- Region
  - Albany
  - Esperance
  - Geraldton
  - Kwinana West
  - Kwinana East



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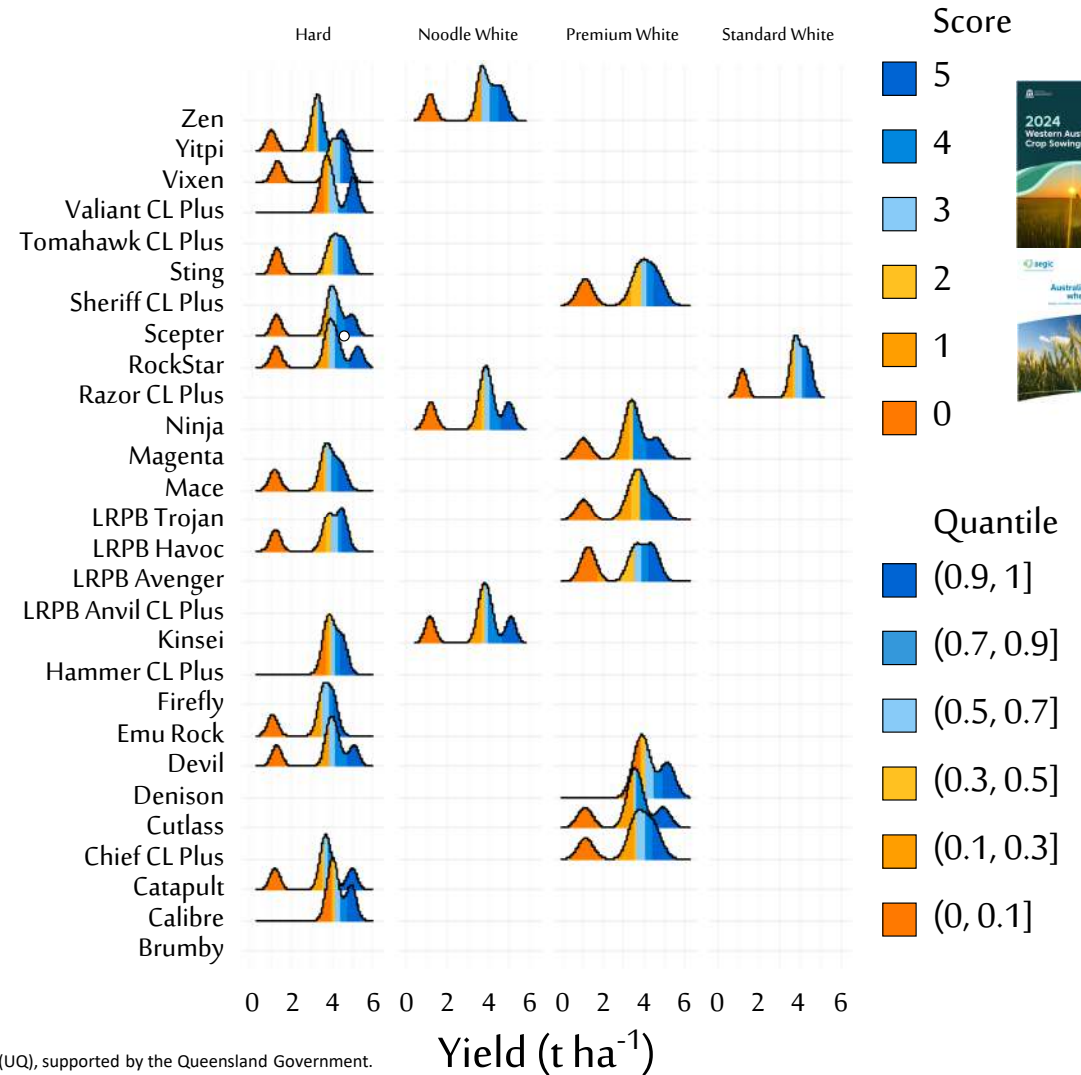
**4. PARAMETERS**

- Grain Yield
- Disease Rating
- Sprouting Index
- Multi-quality Index

**5. LEVEL**

- State
- Region
  - WA
  - AgZ 1
- Subregion
  - VIC
  - AgZ 2
- Market
  - SA
  - AgZ 3
  - QLD
  - AgZ 4
  - NSW
  - AgZ 5
  - AU
  - AgZ 6

○ Variety: Scepter; Yield: 4.8 t ha<sup>-1</sup>



# Each layer in the approach carries specific weight, contributing to the overall score (0–100)

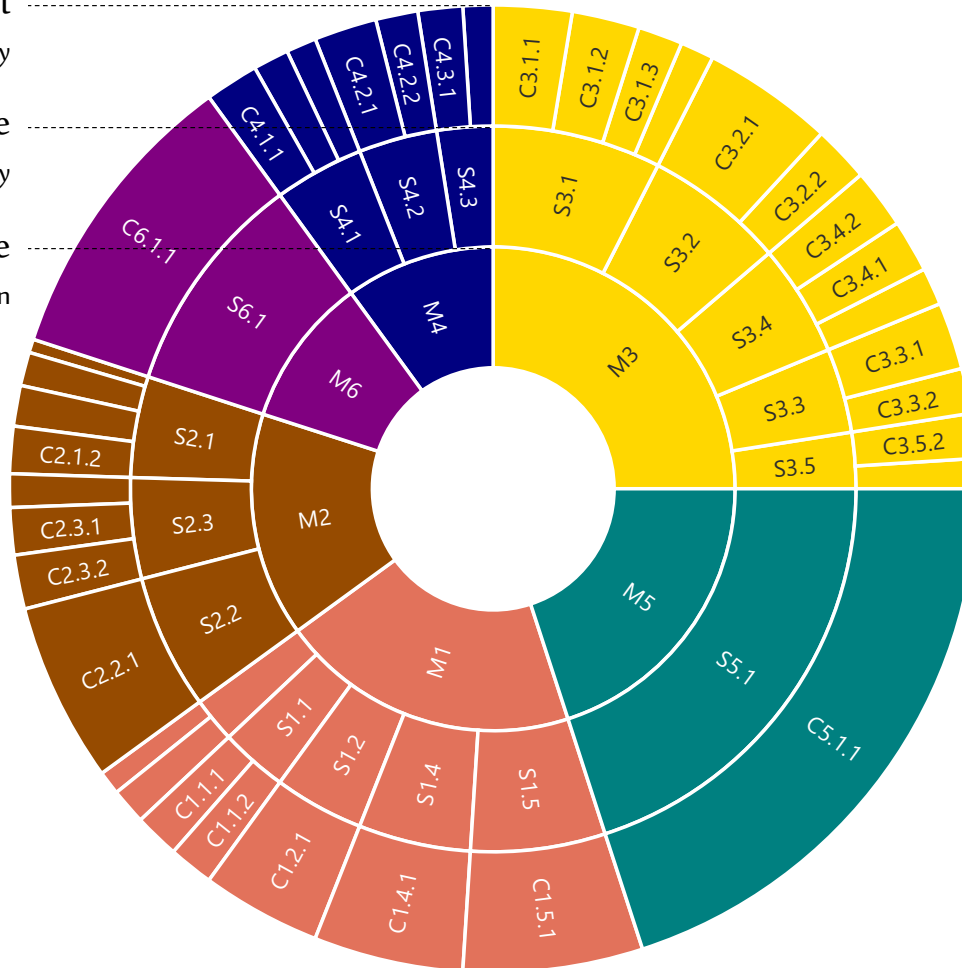
E.g., Module-level Weighting

Hierarchical Weighting

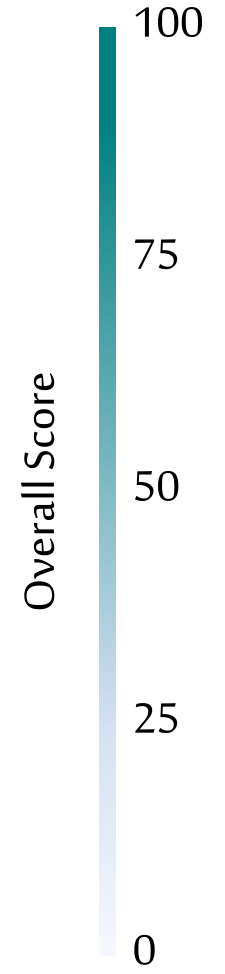
Content  
Layer C: Functionality

Submodule  
Layer S: Granularity

Module  
Layer M: Organisation



- M1. Farm Management
- M2. Soil Health Management
- M3. Crop Management
- M4. Workplace Management
- M5. Biodiversity Management
- M6. Capacity and Leadership



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## Thank you!

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