HEALTHY LAND AND WATER

Soil Health Forum

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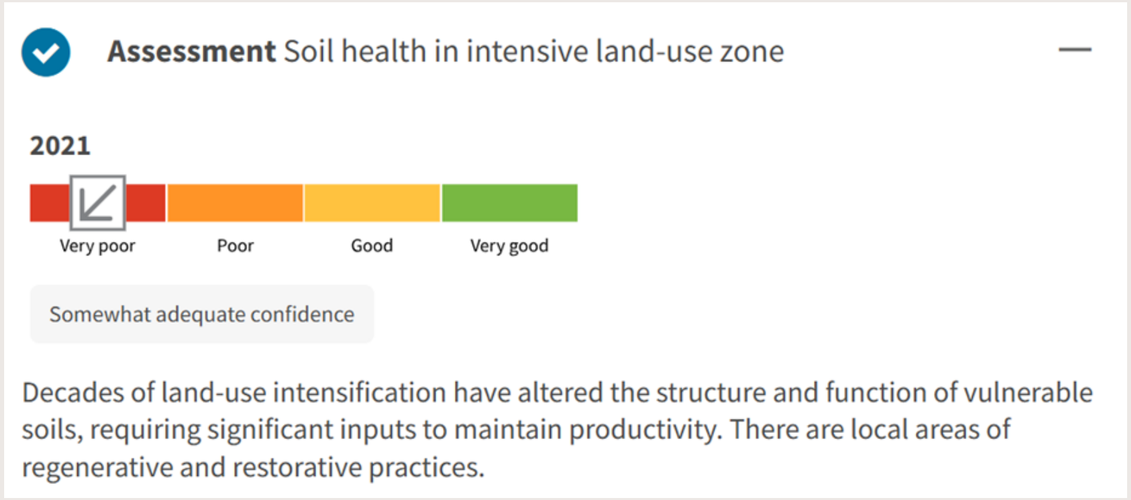
BMRG Ecosystem Resilience

Australian Government

University of Southern Queensland

SQNNSW Innovation Hub



IFDC

'The next fertilizer crisis is inevitable'

Whether it becomes a food crisis depends on what we invest in now'

International Fertilizer Development Center

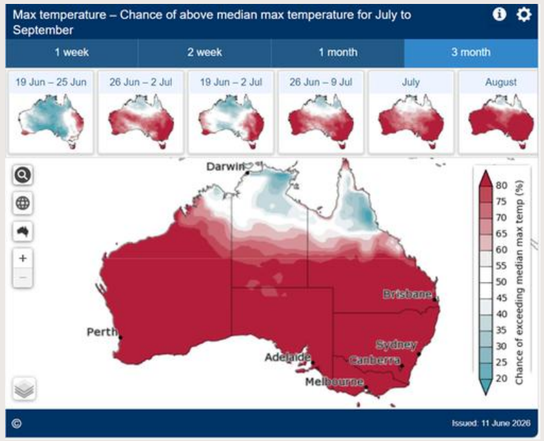
(June 2026)

AUSVEG

'Two in five vegetable growers currently considering leaving the industry in the next 12 months'

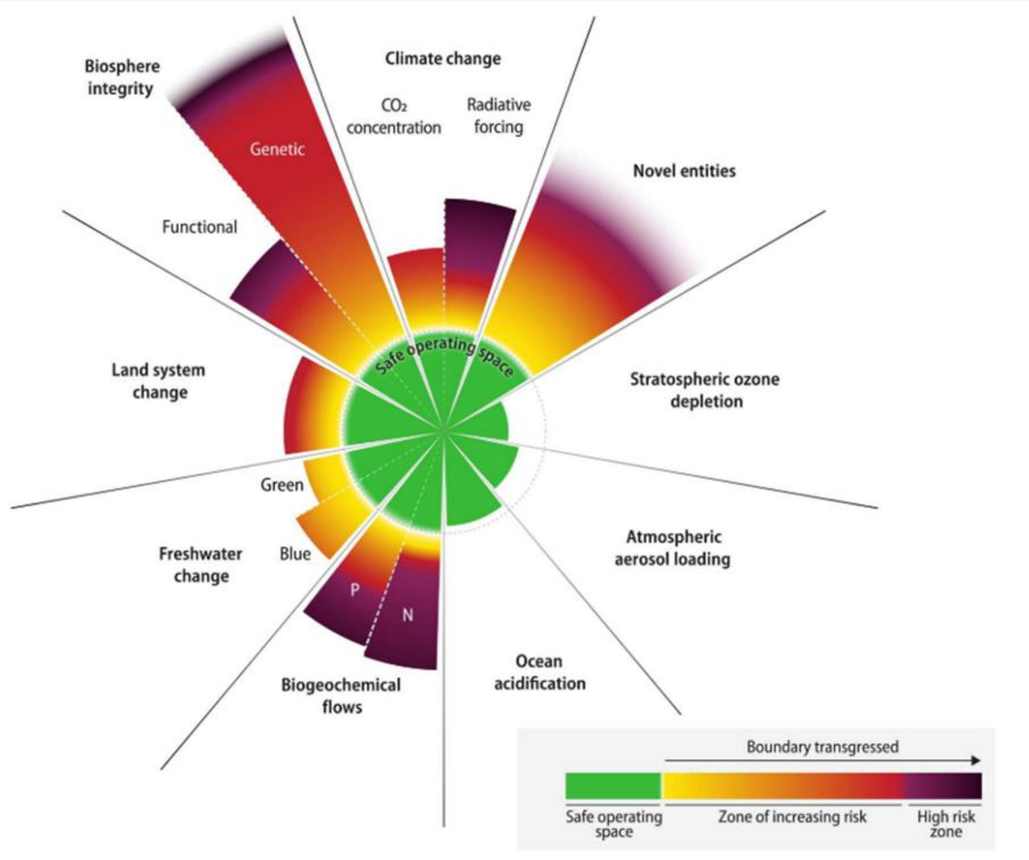
Vegetable Industry Sentiment Report

(September 2025)

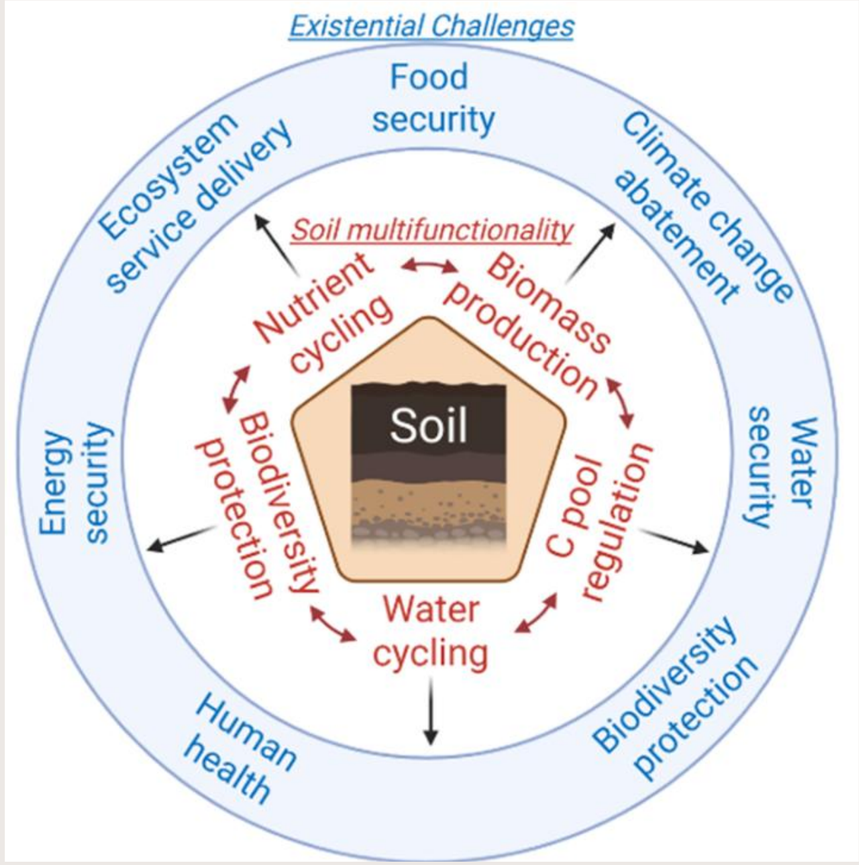


BMRG Ecosystem Resilience

Soil: *More important than ever!*



(Richardson, Steffen et al. 2023)



(Kopittke, Harper et al. 2025)

BMRG Ecosystem Resilience

What Can We *Do?*

- Know Your Soil
- Keep Your Soil

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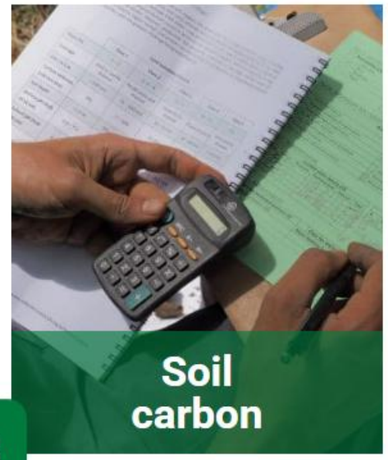
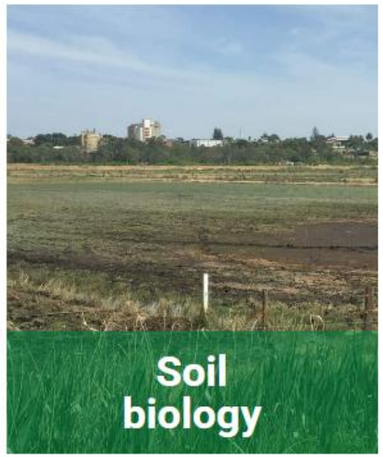
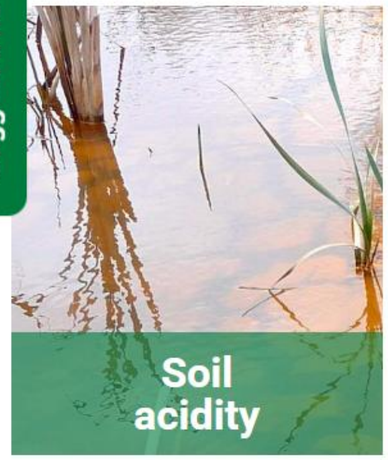
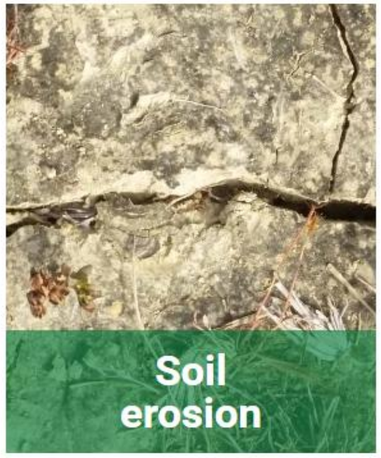
Soil Resource *Library*





Suggest a Resource





SOIL SCIENCE AUSTRALIA

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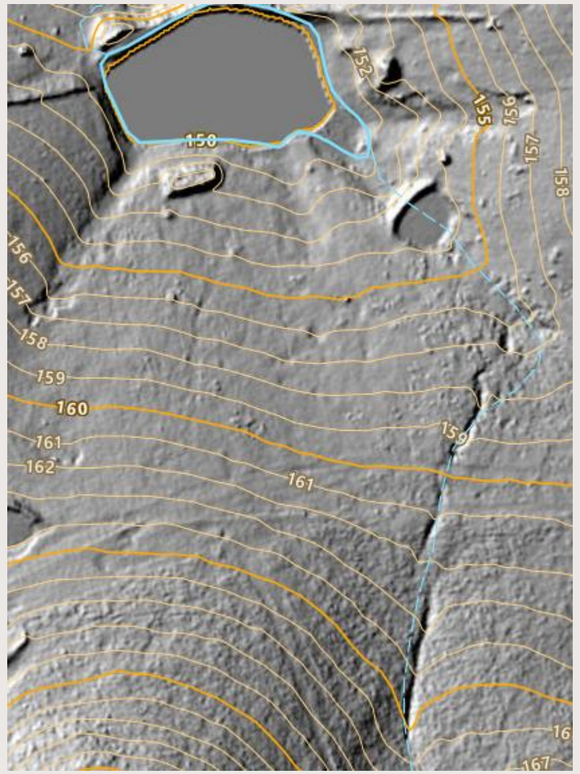
Queensland Globe

Queensland Globe

- Topics – Natural Resources – Soil Resource
- Geoscientific information
  - Geology – Detailed 1:100K (Parent Material)
  - Soils
    - Soil Mapping Sites
    - Best Available Soil and Landscape Resource Info
- Farming
  - Agricultural Land Classification
  - Grazing Land Management
  - Soil Conservation Plans
- Elevation
  - Contours (including LiDAR)
  - Hillshade
- Inland Waters
- Planning Cadastre



FutureBeef

Brigalow softwood scrub

Landform	Undulating low hills and steep hills (3–10% slopes).
Woody vegetation	Mostly cleared; brigalow softwood scrub, occasionally with belah.

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Training & Accreditation

Soil Management Training

- Aimed at people who collect soil samples and interpret soil data
- Field Training - Warwick (2-3 September 2026)

Accreditation

- Registered Soil Practitioner
- Certified Professional Soil Scientists
- Fertcare Accredited Adviser

RSP
REGISTERED SOIL PRACTITIONER
SOIL MANAGEMENT

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Visual Soil Assessment

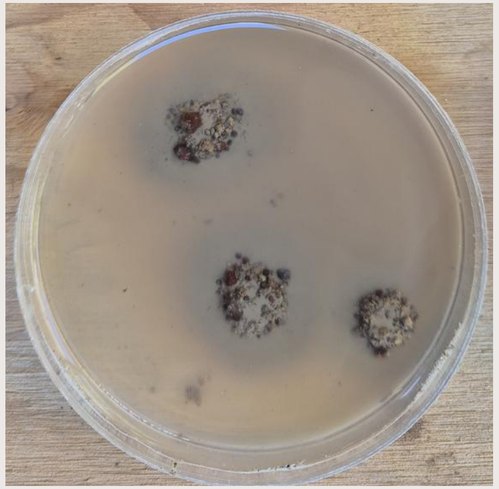
Simple assessments

- Soil depth/rooting depth
- Texture
- Structure
- Colour
- pH

Lead to conclusions on

- Fertility potential
- Condition
- Soil water
- Land use

That inform management



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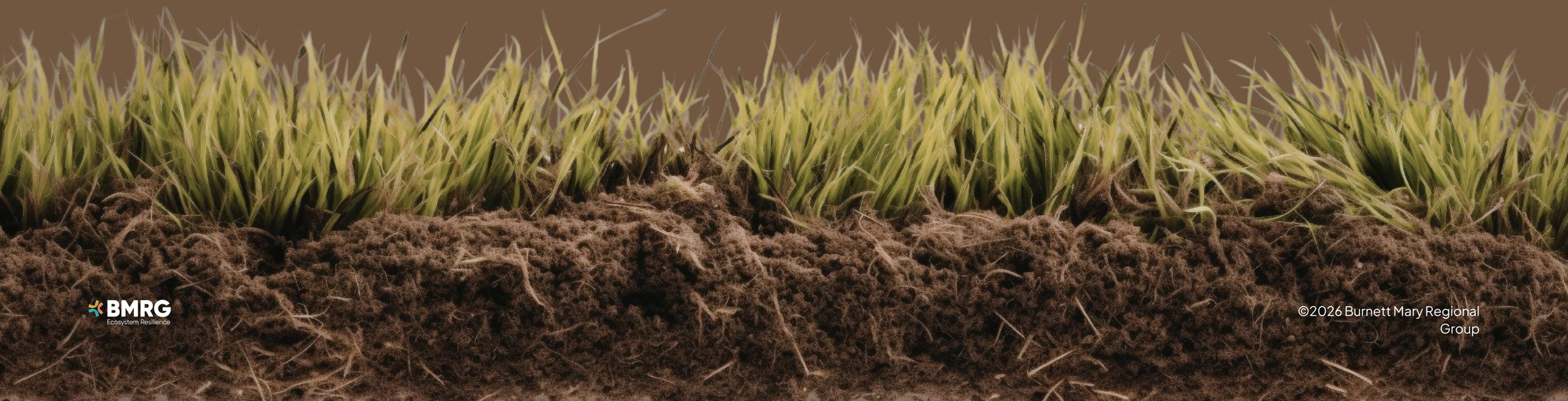
What makes *soil stable and healthy?*

- SOIL AGGREGATES = CRUMBS
- HELD BY BIOLOGY + ORGANIC MATTER
- HEALTH = RESILIENCE
- PLANT ROOTS = ROOT EXUDATES
- FUNGAL HYPHAE



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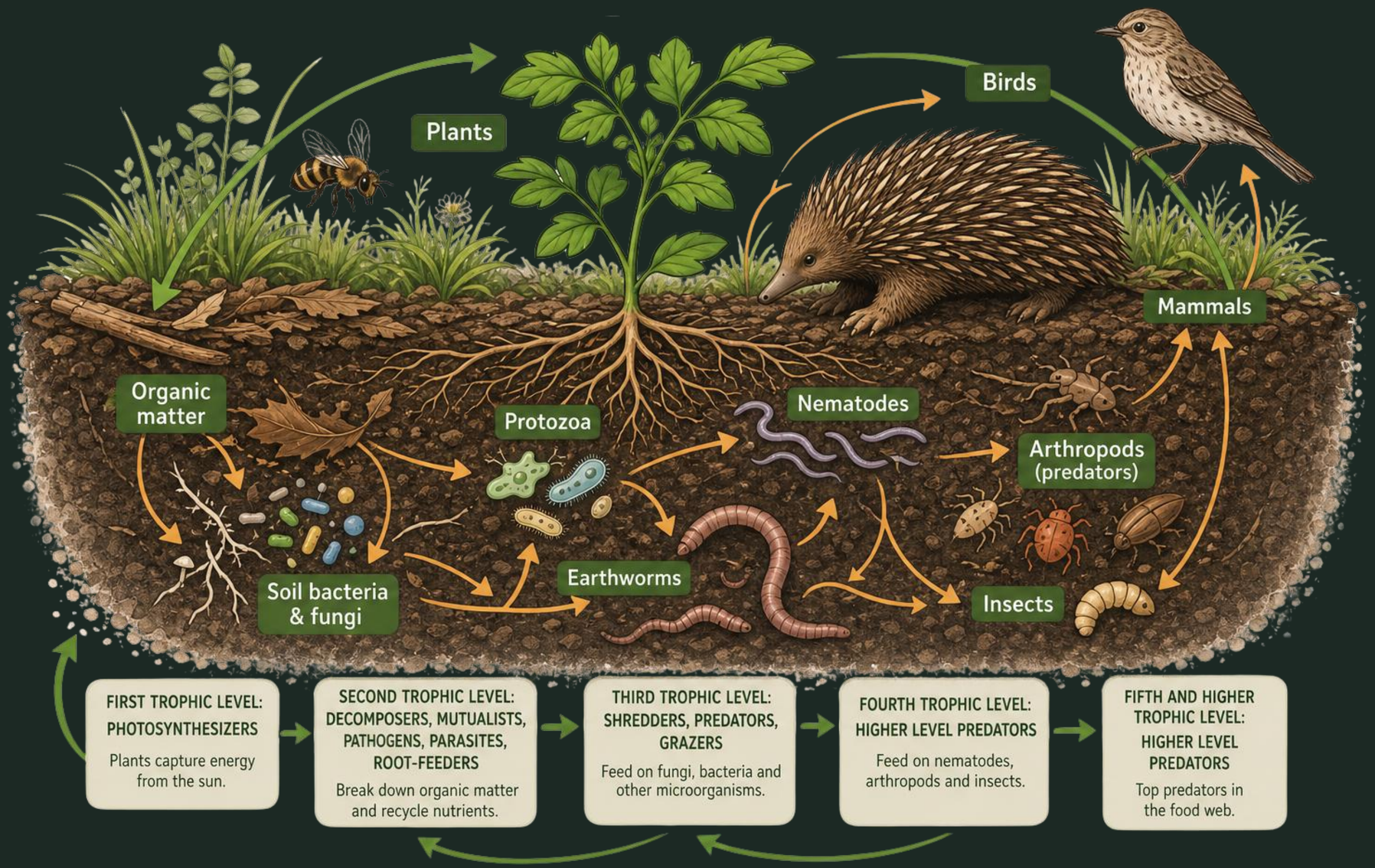

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Soil Biology House

- Think of soil as a living house
- Different parts of the soil ecosystem all have roles
- Each keeping it functional, comfortable and productive

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The *Foundation*

- Mineral component of soil
- How stable the house is
- How much “space” is available for life

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The *Plumbing*

- Water in the pores
- Delivers nutrients around the “house”
- Supports all living occupants
- Can cause problems if there’s too much (waterlogging) or too little (drought)

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The *Kitchen* and *Pantry*

- The organic matter
- Stores carbon and energy
- Feeds soil organisms
- Breaks down into nutrients plants can use

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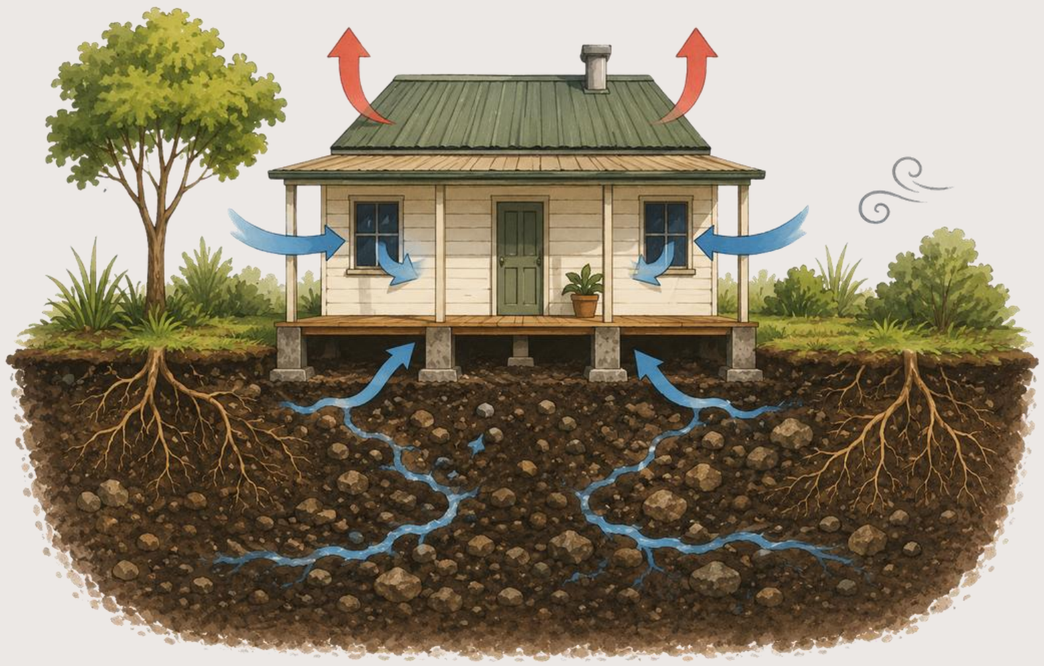

The *Ventilation System*

- Oxygen in the soil
- Keeps roots and microbes breathing
- Supports decomposition and nutrient cycling
- Prevents the house from becoming anaerobic
- Without airflow, the house becomes unhealthy very quickly

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The *Residents*

- The soil microbes
- Bacteria = fast-working chefs and recyclers
- Fungi = long-distance transport and structural builders
- Earthworms & fauna = builders, mixers and engineers
- They keep everything moving, cycling and functioning.

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The *Doors* and *Windows*

- The pore spaces
- Allow water, air, and organisms to move through
- Connect plants to deeper soil resources
- Regulate exchange between surface and subsoil

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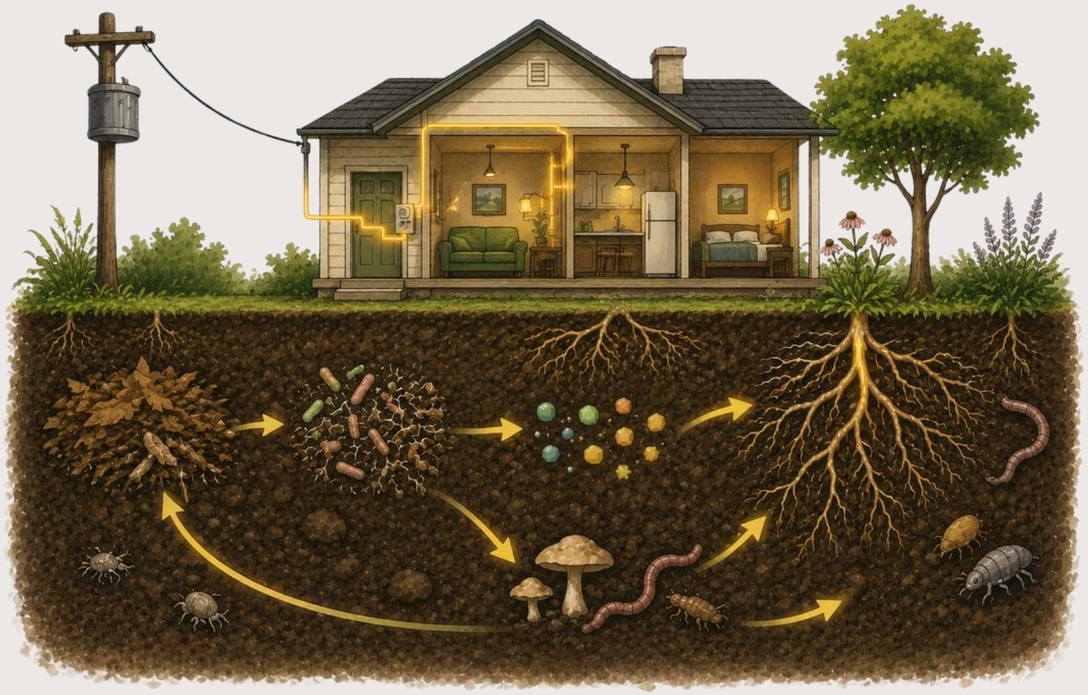

The *Power Supply*

- The plant available forms of nutrients
- Microbes convert nutrients into plant-available forms
- Decomposition “powers” plant growth
- Energy flows through the food web
- Without this, the house has structure but no function.

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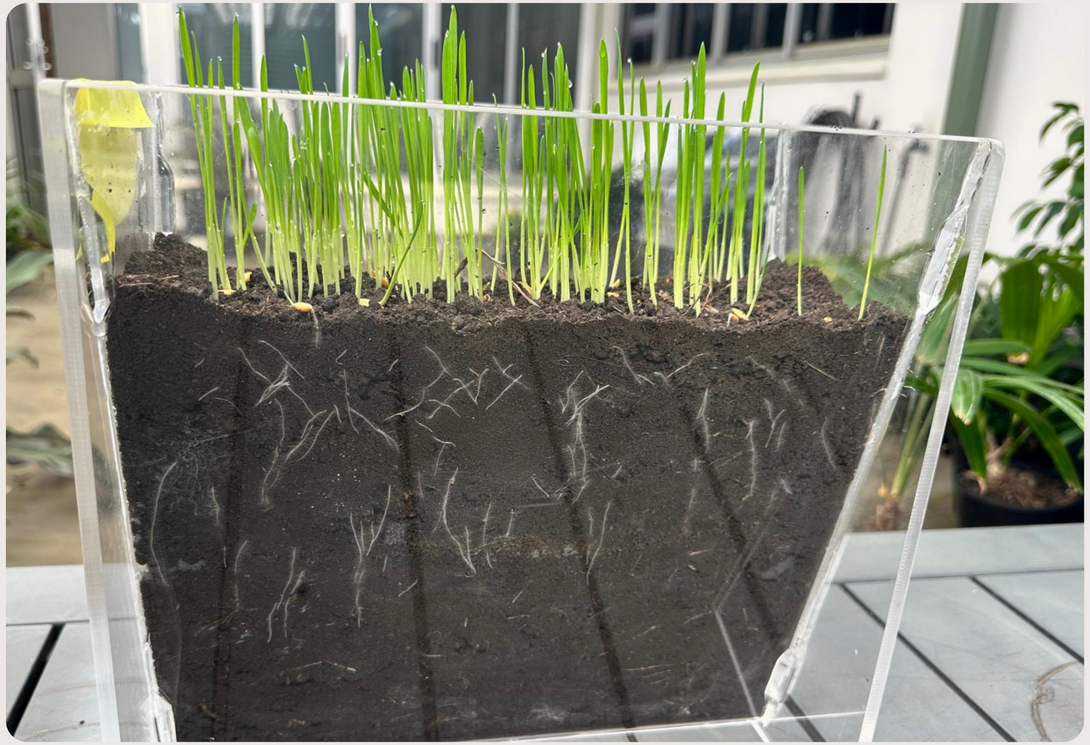

Control

- $0/ha

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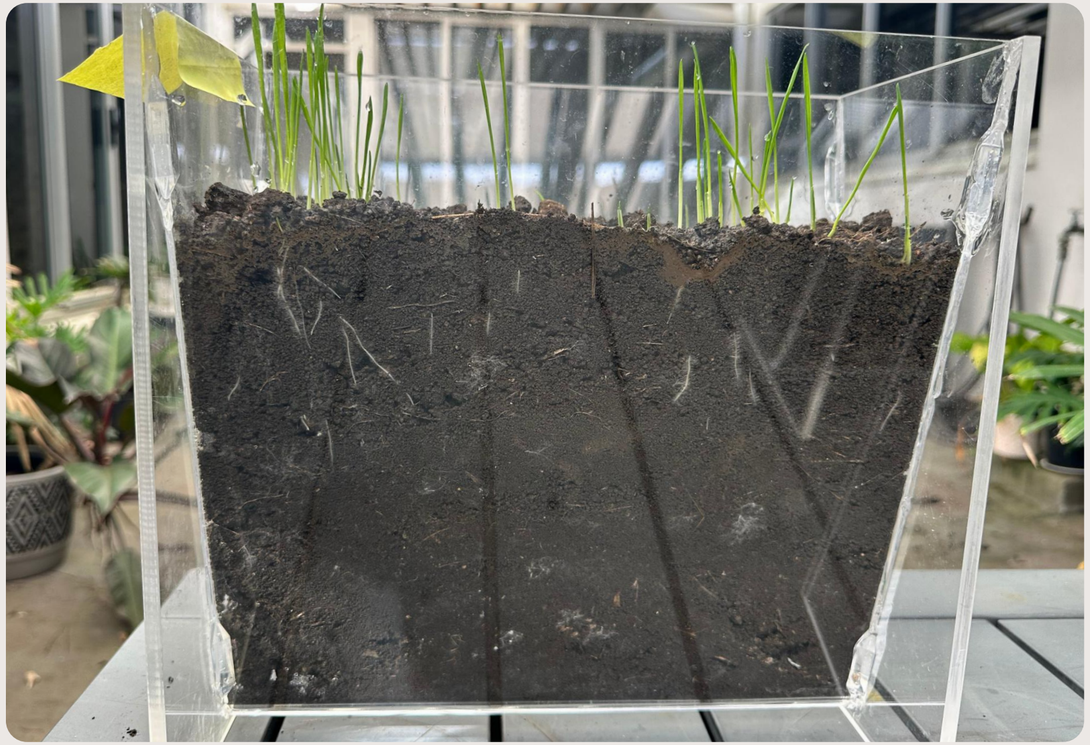

Urea

- $220/ha
- 100kg/ha

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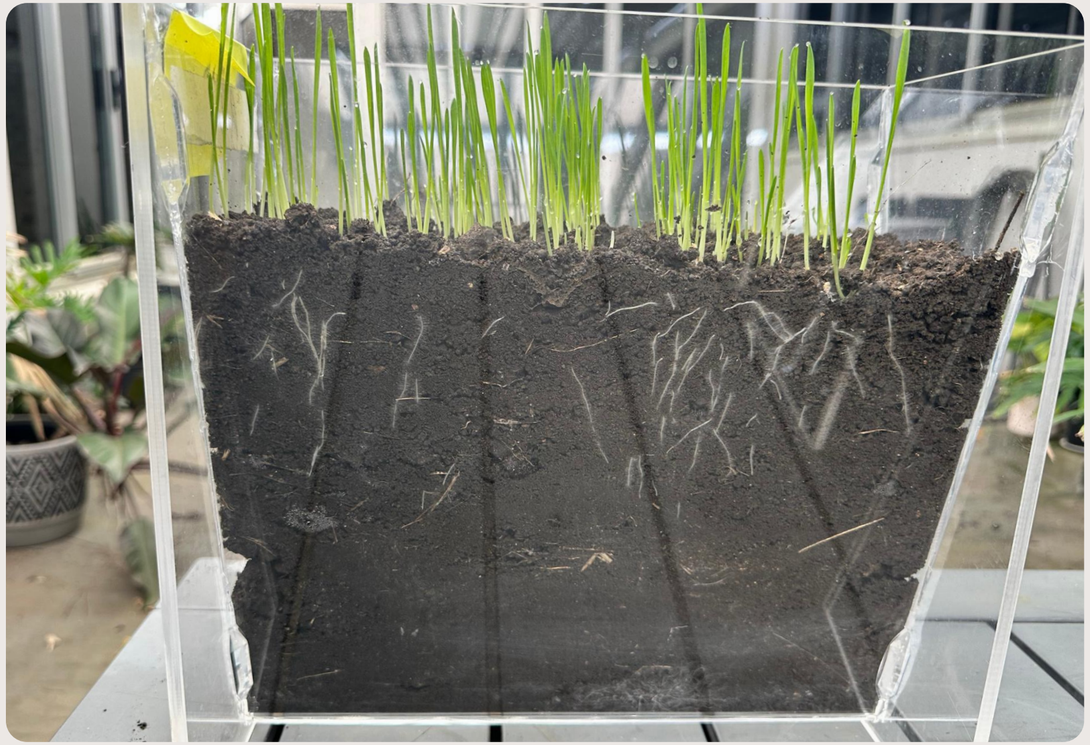

DAP

- $210/ha
- 100kg/ha

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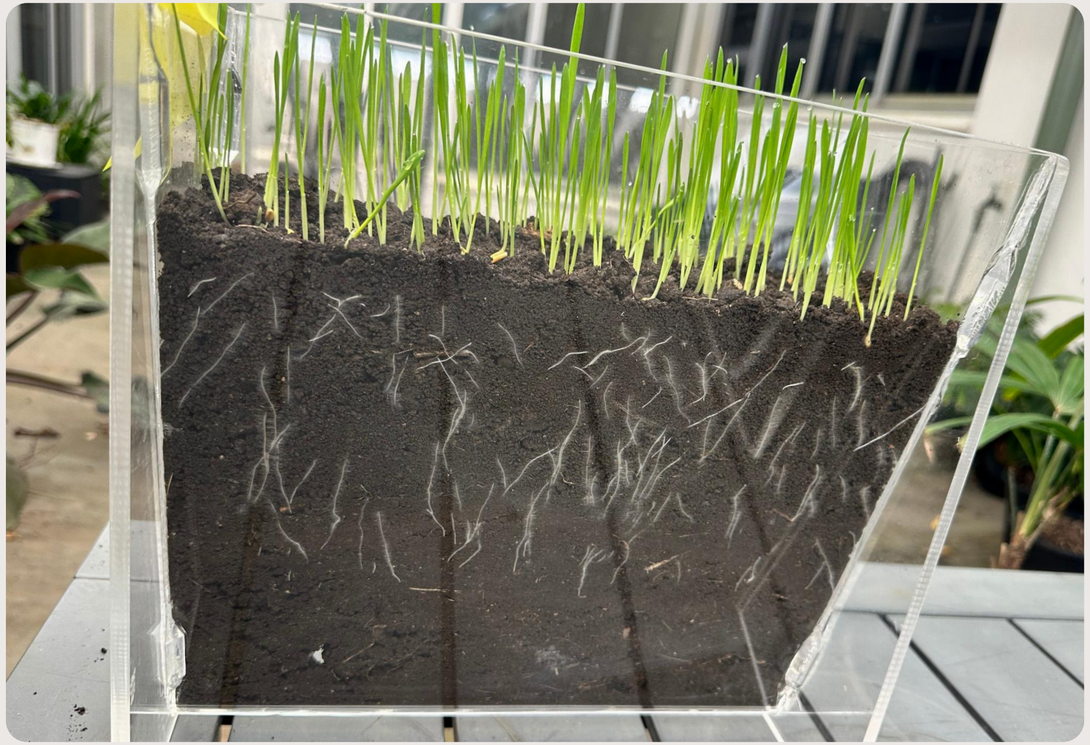

Fish Hydrolysate

- $6.20/ha
- 2L/ha

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Liquid Seaweed

- $6.20/ha
- 2L/ha

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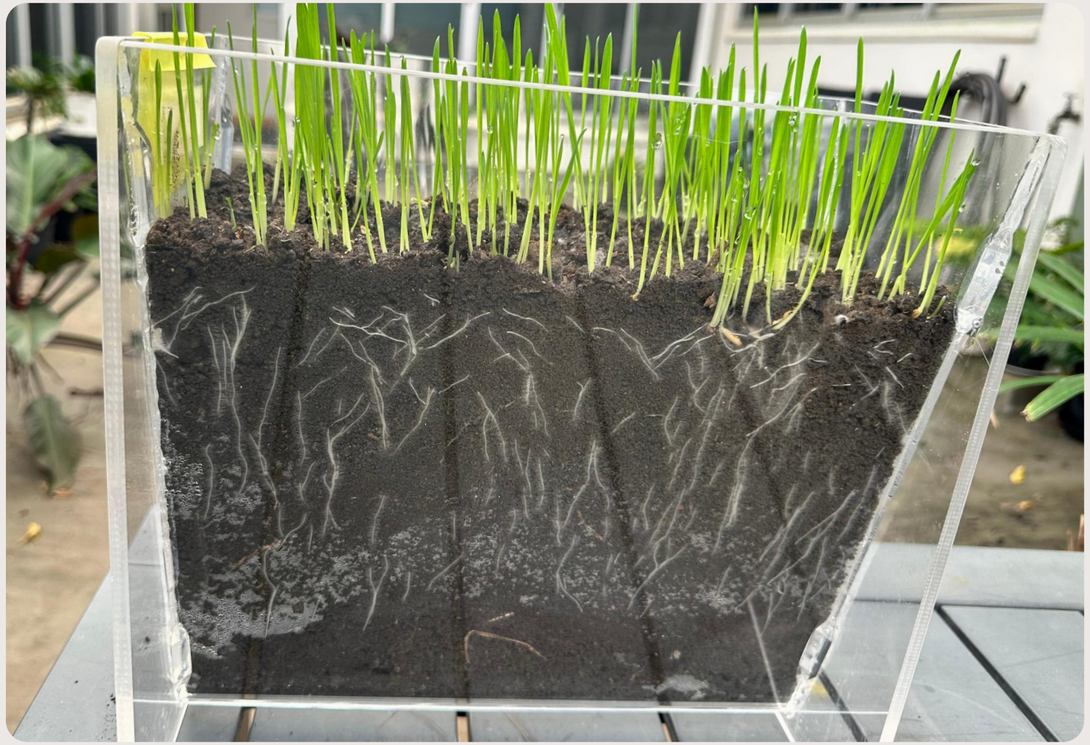

Chicken Manure Pellets

- $218.35/ha
- 500kg/ha

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Keep Your Soil - *Soil Conservation*

Revised Universal Soil Loss Equation

$Average\ annual\ soil\ loss = R \times K \times LS \times C \times$

Term	Can we control it?	Comment
R = Rainfall erosivity	No	↑ (Bulovic, Mcintyre et al. 2024)
K = Soil Erodibility	Yes	Δ Soil Organic Matter
LS = Slope length and steepness	Slope length = Yes Steepness = No*	
C = Cover & Management	Yes	
P = Soil conservation practices	Yes	

Ground cover is *king*

Energy ∝ Velocity Squared

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Questions?

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