Department of Primary Industries and Regional Development
GOVERNMENT OF WESTERN AUSTRALIA

GRDC
GRAINS RESEARCH & DEVELOPMENT CORPORATION

Protect
Grow
Innovate

Researcher and the farmer – from small plot research to farm scale adoption - increasing yields, profitability and positive environmental outcomes

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Global Sandy Soil Conference I 21-24 July 2025

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Projects: DAW00252, DAW1902_003RTX

-5th generation family farm. 300mm annual rainfall.

-Cropping wheat, barley, canola, lupins and chickpeas

-No livestock with flexible cropping system and strategic fallow.

-Soils characterised by acidic Wodjil sands and heavy sodic and saline soil

Our priority - Maximise production on lighter, more forgiving soils types.

Have grown the business with a focus on sandy soils to manage our seasonal risk

Ameliorating sands with poor lime history. Original farm commenced liming 1994.

Our sandy soils-

- Deep yellow sand
- Naturally very acidic pH 4 to 4.3. Remnant veg legume
- Associated Al toxicity
- Highly compacted
- 10 to 13% clay
- **Recharge zones causing down stream salinity**

2017: Same day, same growing season rainfall (GSR).

Our story… On farm Lime

Turned poorest pad on farm into an asset.

Found on morrell soil type.

- Perfect local ingredient for reengineering
- 40-50% NV
- 14% Ca
- 4% Mg

- Spread at 4 T/ha
- Piles don't blow and very even spread.
- Slakes, very fine wet sieve test.

- Previously spreading 4000t limesand year.
- Have spread 100,000t

We can fix the surface ... but ?

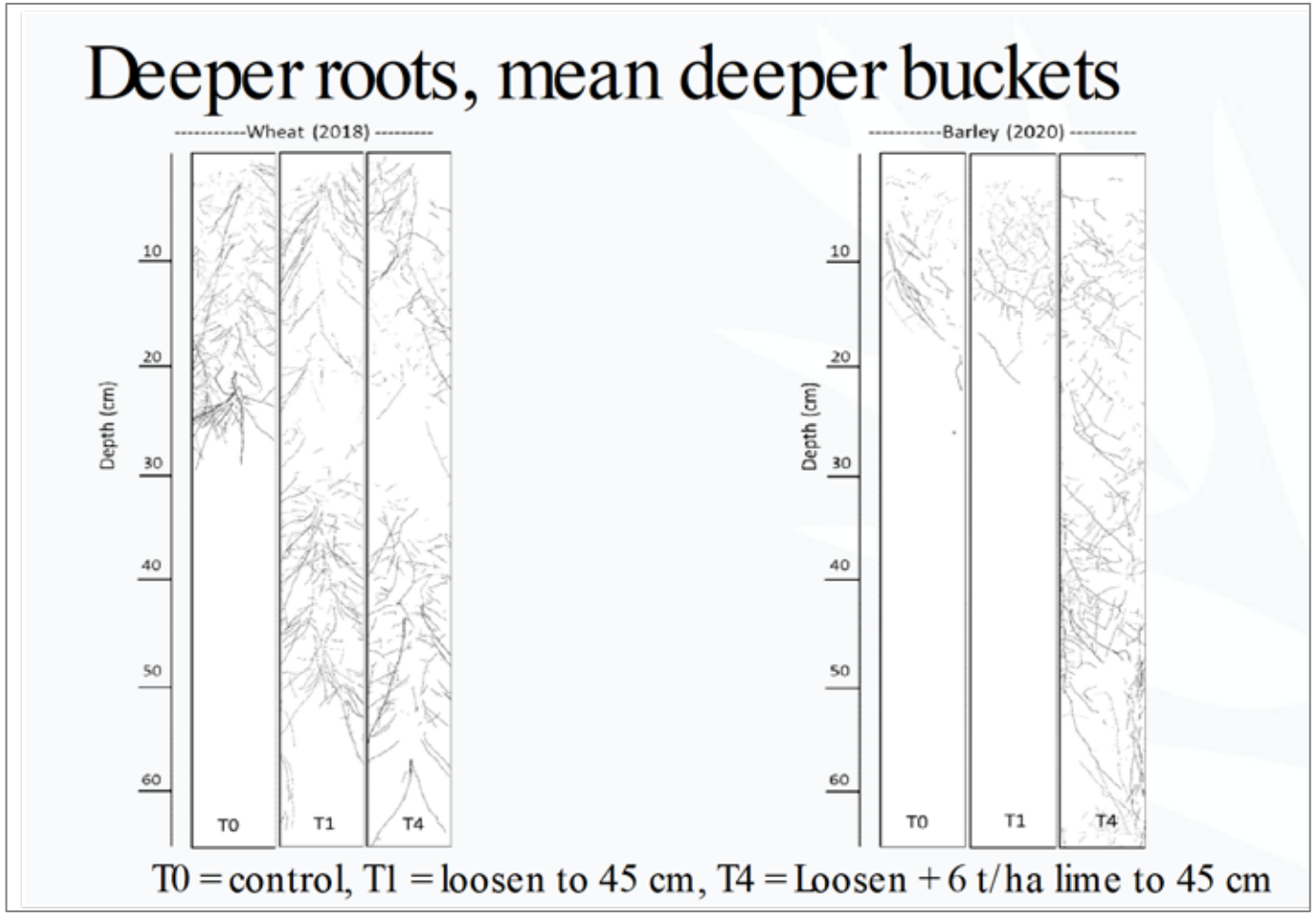
pH results CaCl2

Paddock	Site	Soil Type	Top pH	Mid pH	Sub pH	10yr Rec
K1	1	Sandy Loam	6.4	4.8	4.6	6t
K1	2	Sandy Loam	6.1	4.3	4.1	6t
K1	3	Sandy Loam	6.1	4.4	4.3	6t
K1	4	Sandy Loam	6.2	4.1	4.6	6t
K1	5	Sandy Loam	6.1	4.4	4.4	6t
K1	6	Sandy Loam	6.2	4.2	4.1	6t
K1	7	Sandy Loam	6.2	4.2	4.0	6t
K1	8	Sandy Loam	6.4	4.5	4.4	6t
K1	9	Sandy Loam	6.2	4.6	4.1	6t
K1	10	Sandy Loam	6.3	5.4	5.3	1t
K1	11	Sandy Loam	6.4	4.5	4.2	6t
K1	12	Sandy Loam	6.3	4.8	5.0	4t
K1	13	Sandy Loam	6.3	4.4	4.3	6t

Taken 5 years to get top 10cm from low 4's to above 6 pH.
DPIRD/GRDC industry investment showing often no further lime needed just mixing.

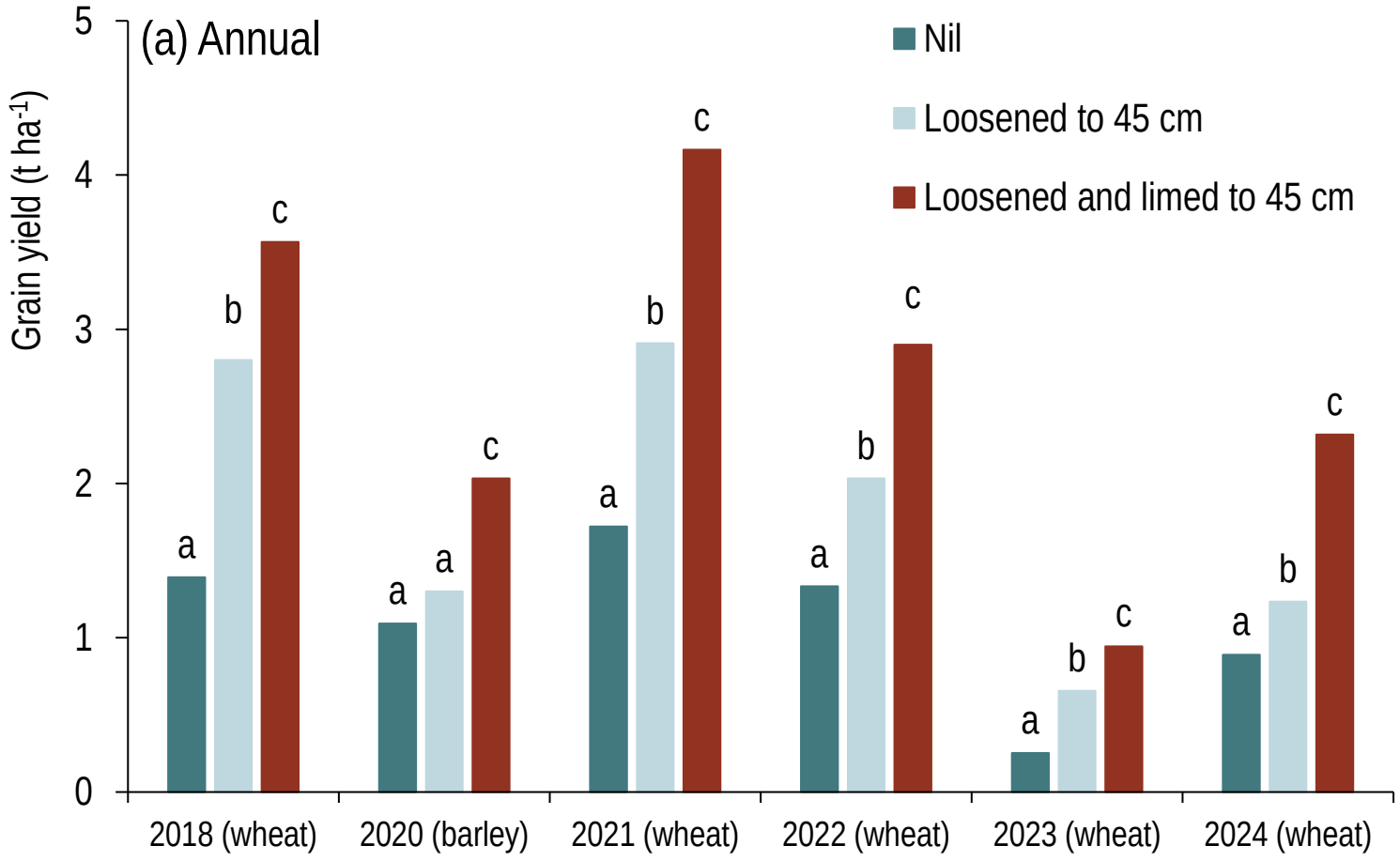
Then Gaus came along! Confidence to invest in high cost farm scale approach

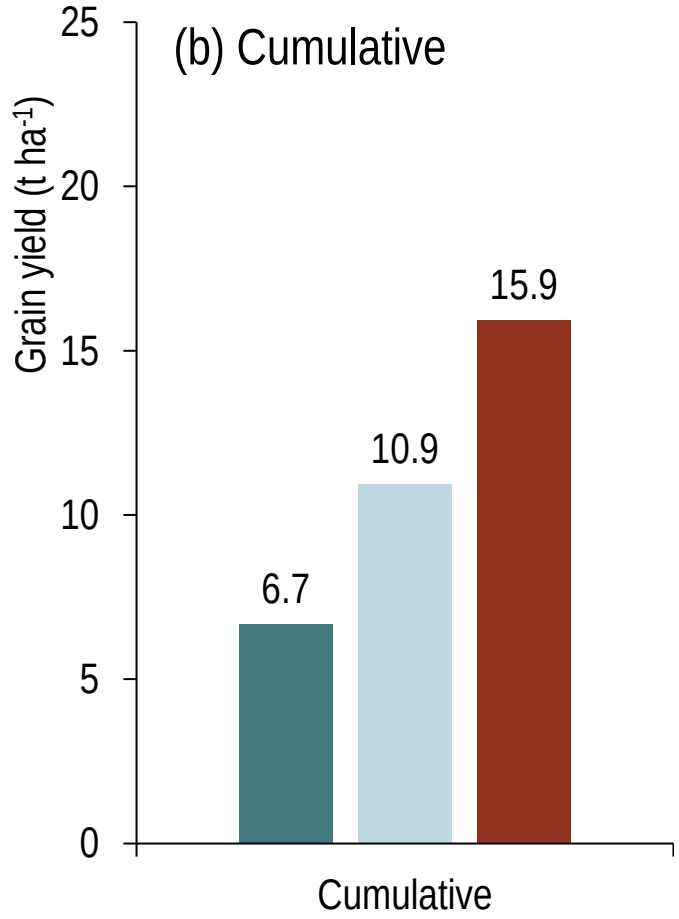
Graveyard trial, Kalannie.



30cm depth: soil remains wet after poor seasons.

Grain yield in graveyard trial over six years at Kalannie, WA





DPIRD research allowed the confidence to adopt at scale in low rainfall, low land value area

- The Economics have changed with increasing land prices.
- Better return on investing in current land asset than expansion.
  Eg spading, reefinator
- Used contract spading. High cost ($200/Ha) specialised pass by comparison, quick payback.
  Thankyou Nathan Evans and team.
- Merredin spading trial 2021-

  Control 2.5 t/ha

  Spaded 4.1 t/ha

Crop establishment after soil amelioration can be challenging…

What changes:

- It ends up bloody soft! Have to get CTF system sorted! Our headers not matched yet.
- Nutrition distribution and requirements change
- Rapid increase in soil pH after lime mixed in, Rhizoctonia an issue 2 to 3 years post.
- Stimulates weed germination, pre-emergent herbicide behavior changes
- Have managed wind erosion risk by only ameliorating when soil wet. Easier when clay content above 10%.

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2024 wheat on spaded. Country that was planned for reveg.

Now business as usual-

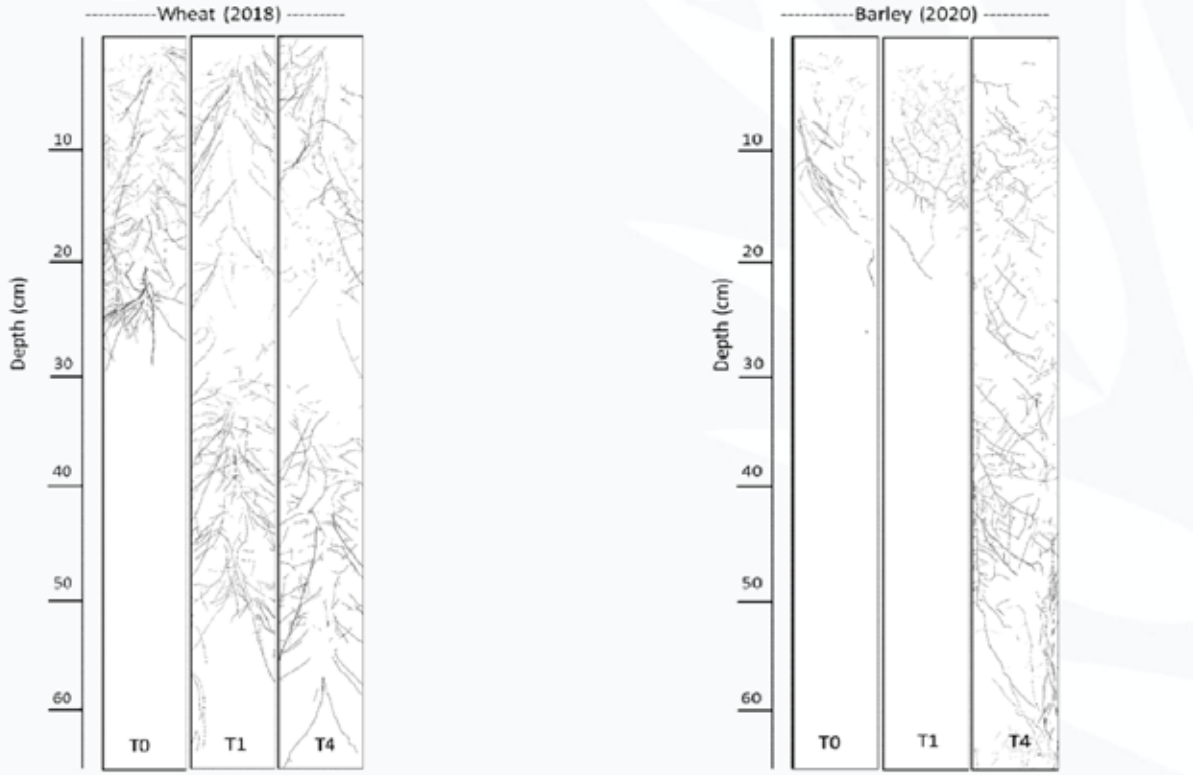
- Continue to lime, getting top 40cm to 6pH in CaCl2
- 12m Grizzly offsets
- 12m Ausplow ripper- rip 300mm
- 6m Gessner ripper – rip to 500mm
- Protect the investment and soil health - CTF, cut stubble high and inter row sowing

Positive environmental outcomes

Same bucket, different focus-

- Whole of landscape management
- Reducing sandy soil zone recharge and downstream salinity
- Doubling root biomass and increasing C storage potential.

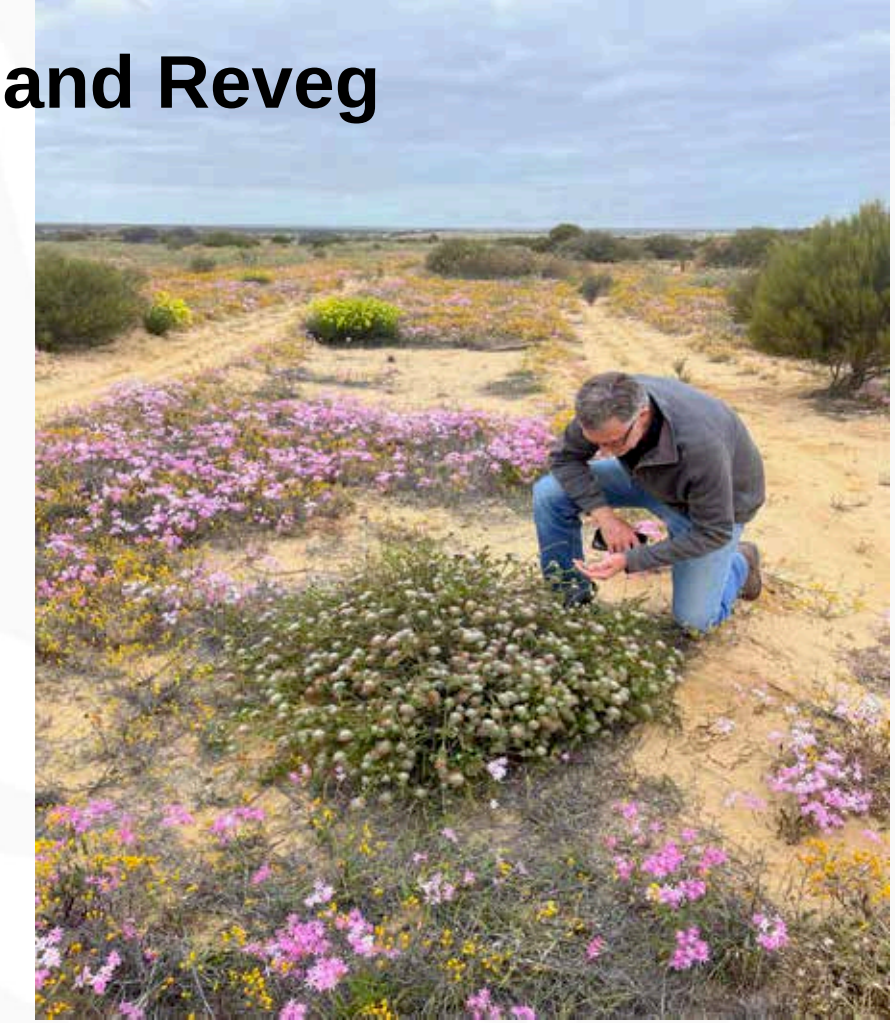
Deeper roots, mean deeper buckets



T0 = control, T1 = loosen to 45 cm, T4 = Loosen + 6 t/ha lime to 45 cm

Whole of landscape management- Cropping and Reveg

- **Cropping**- Reengineered soils with deeper crop rooting and higher biomass reduce recharge, increase NUE and build soil health lowering emissions. Win Win!
- As an industry need to improve measuring broader impact and telling the complete story.



- **Reveg-** Take poor performing (plain sand) zones out of production.
- Have registered our own 550 ha ACCU project.
- Natural regeneration in reveg project, our sandy soils a biodiversity hotspot.

  Bush pea- Urodon dasyphyllus, Banksia benthamiama

Thanks, Questions?

Lupins inter row sown on magic sand and chickpeas on that hideous horrendous red clay stuff.