



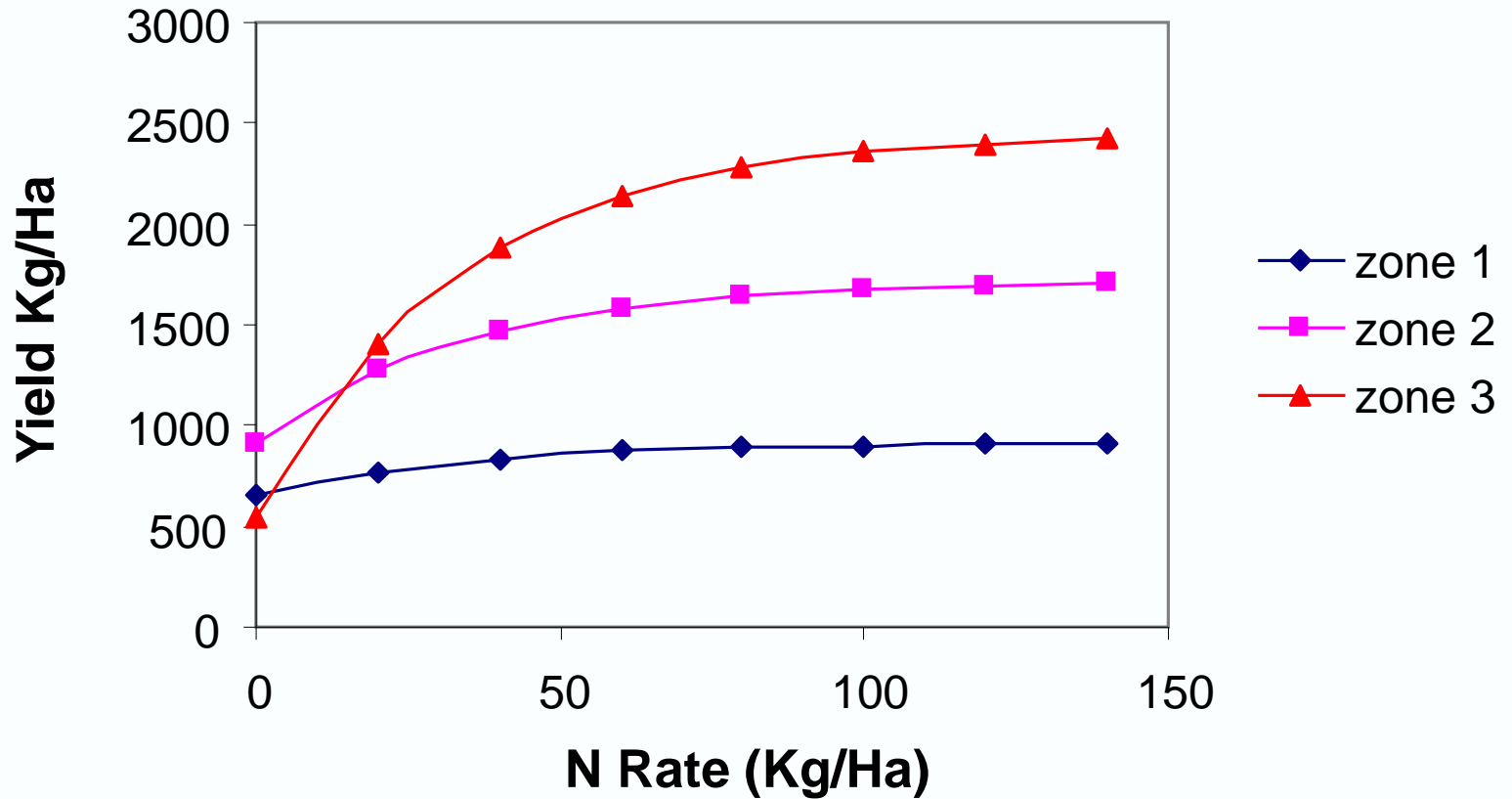
# How will digital technologies assist with Nitrogen Management?

Roger Lawes

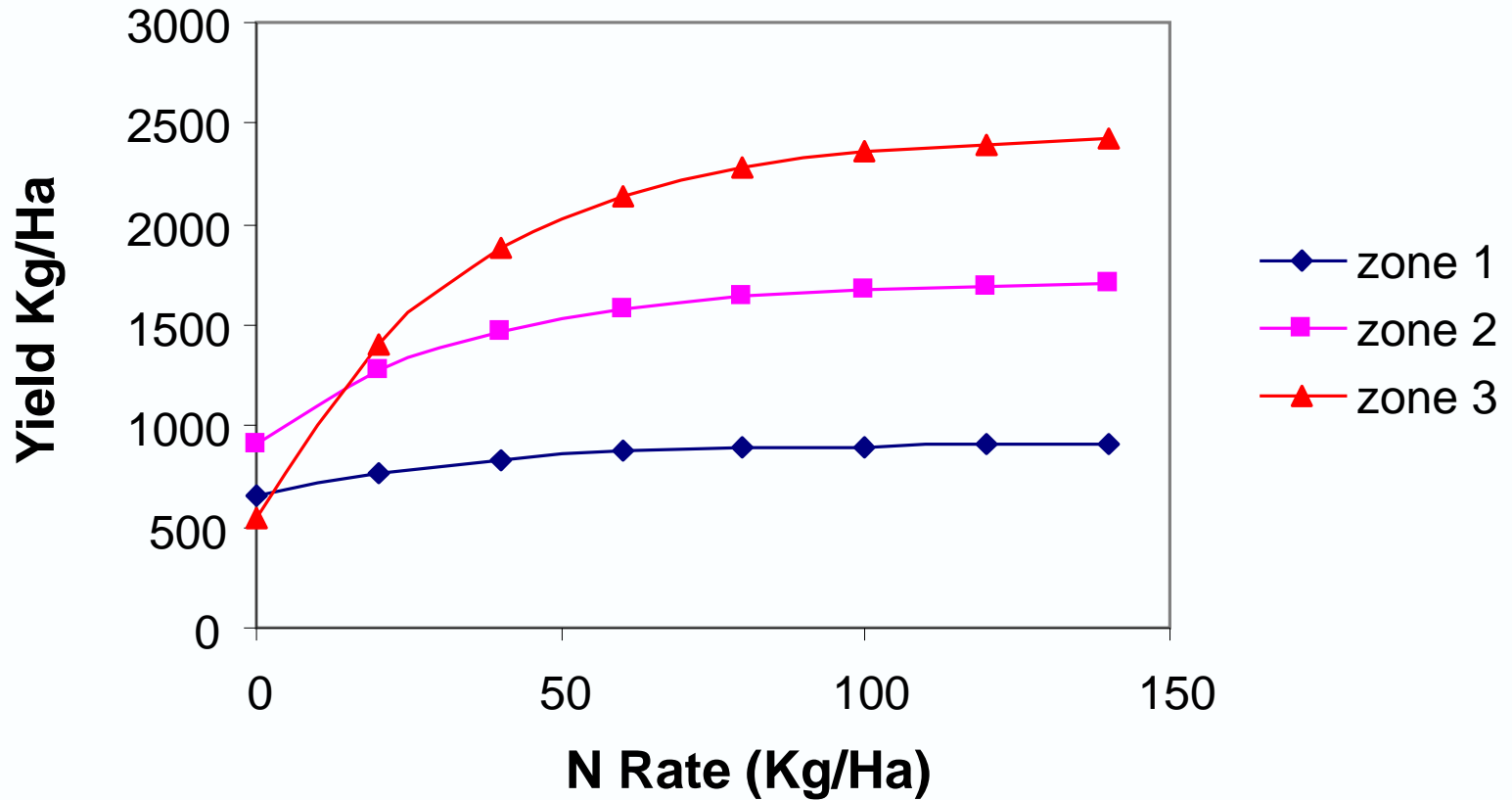
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# Supply and Demand drive the N decision



# Supply and Demand drive the N decision



Is this your paddock?

# Can we bring new tools to solve an old problem?

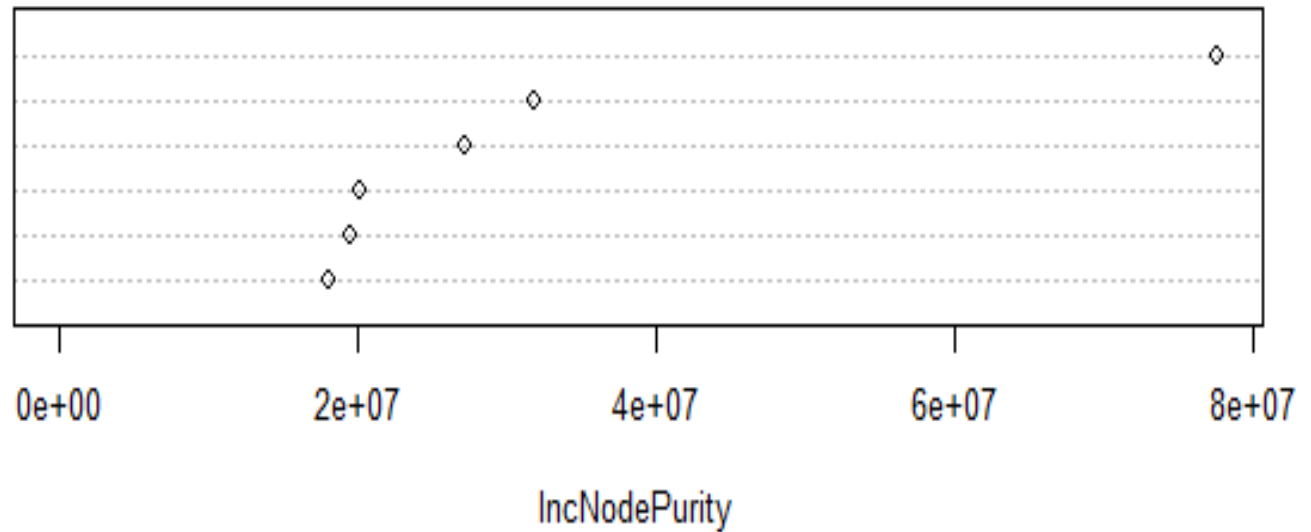
# An early warning system for N management

- Use an on farm experiment to find out if your paddock is normal
- Sense information from the paddock to make an N decision
- Use multiple sources of data from your paddock to drive a better N decision



# Generate variation through on-farm experimentation to inform an N decision

MeanYield  
N0ESW150cm  
N0Wheat.Leaf.Live.NConc  
Wheat.Leaf.Live.NConc  
N0ESW120cm  
StartN



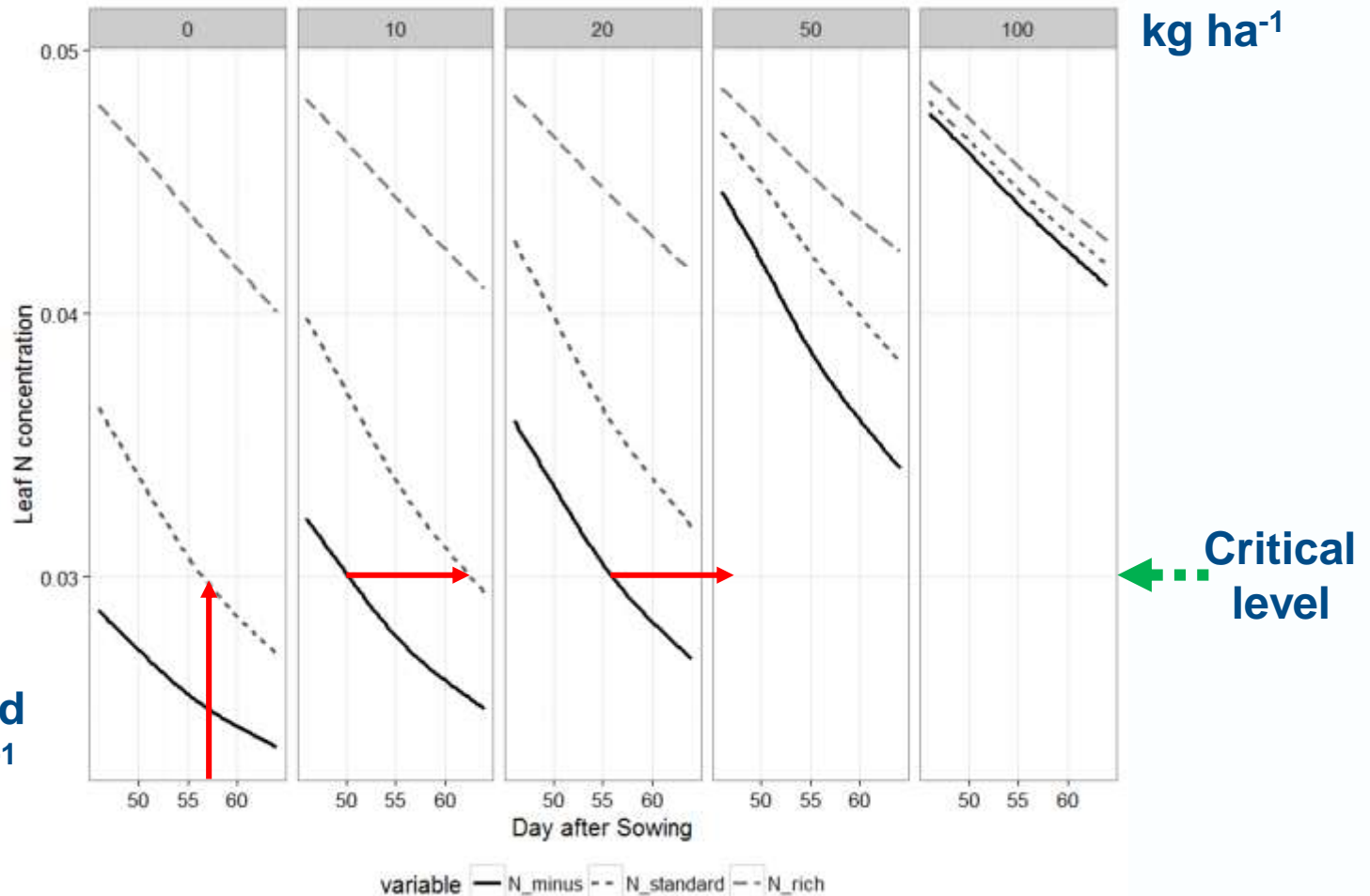
# 1. Conduct an On Farm Experiment

- 0 kg/N/ha, 20 kg N/Ha, 80 kg/N/ha
- Calibrate the N decision, given what is observed in the paddock
- Assess historical yield, leaf N status, soil water
- Can improve an N estimate based on historical yield alone by 30 kg/ha



# 'N-minus' strip gives advanced warning of N stress

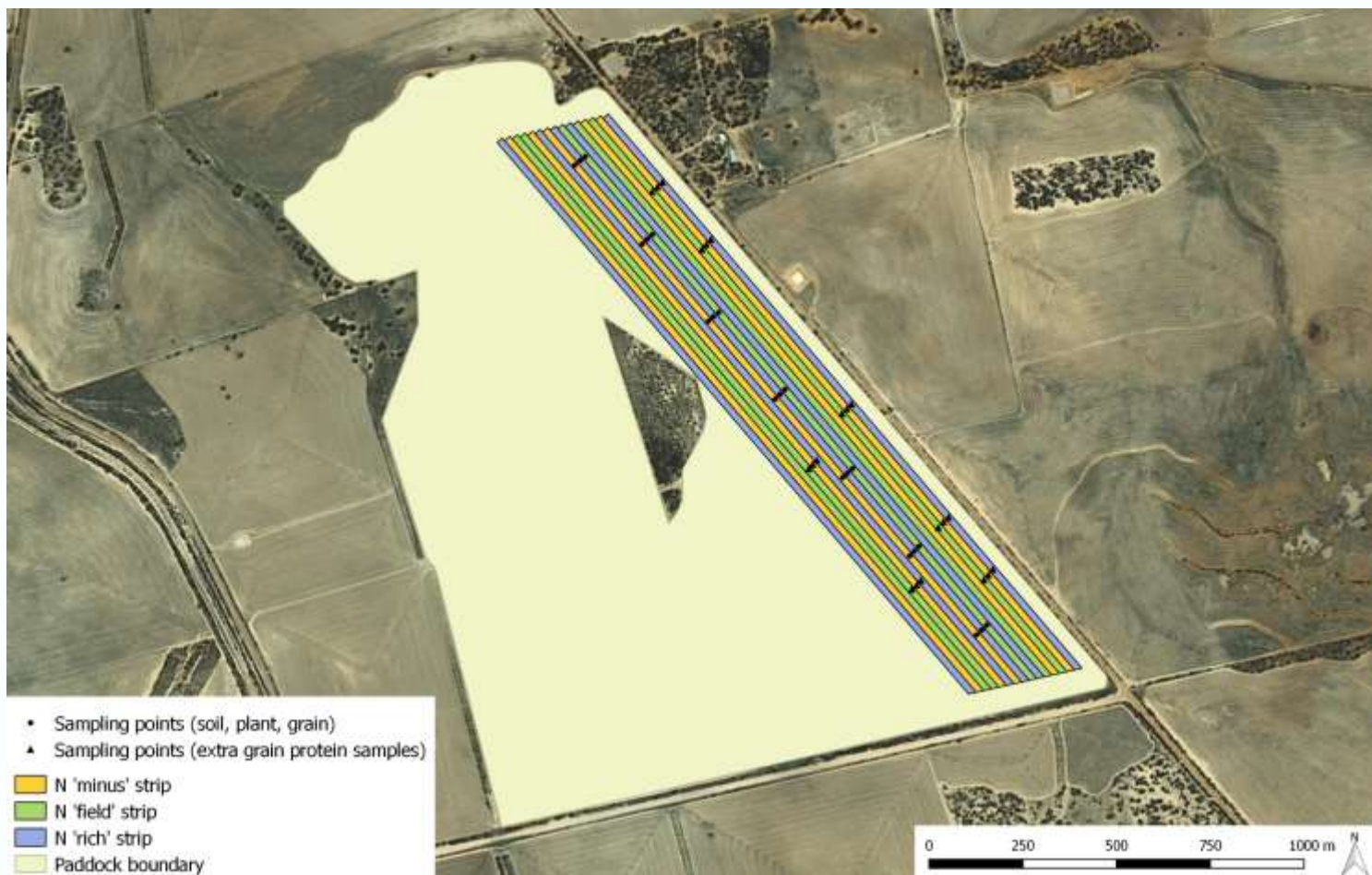
Starting  $N_{fert}$  :



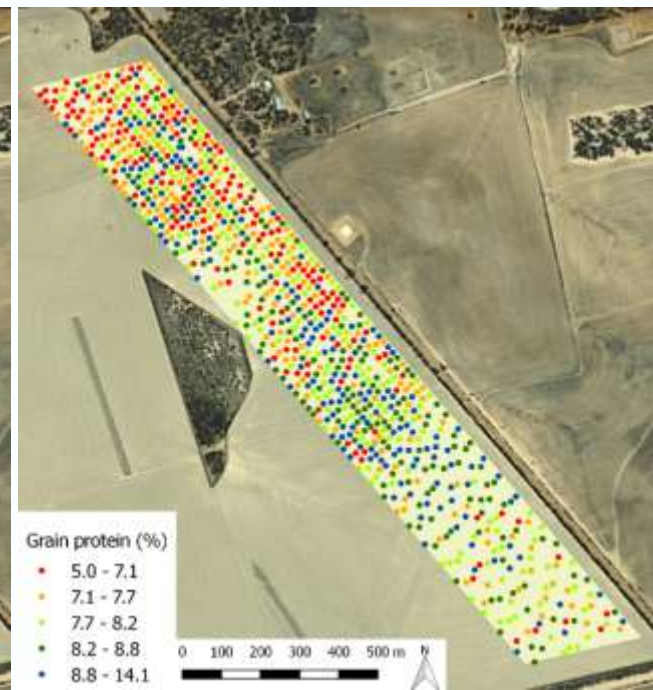
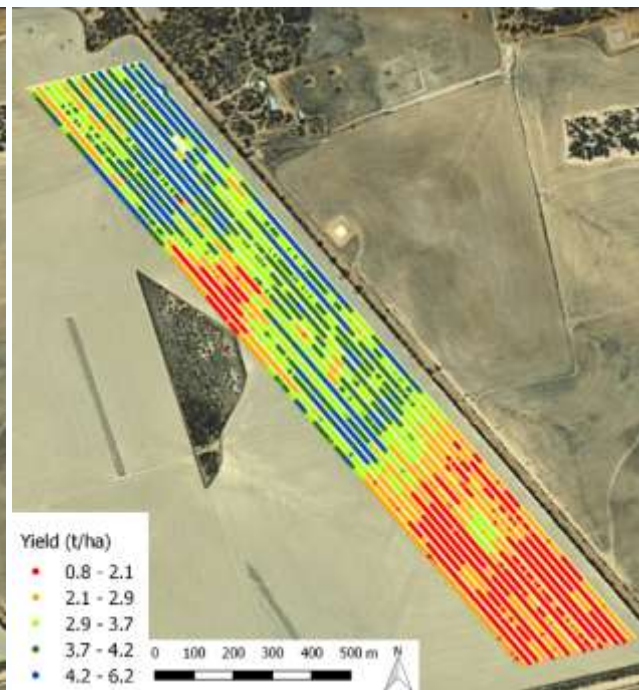
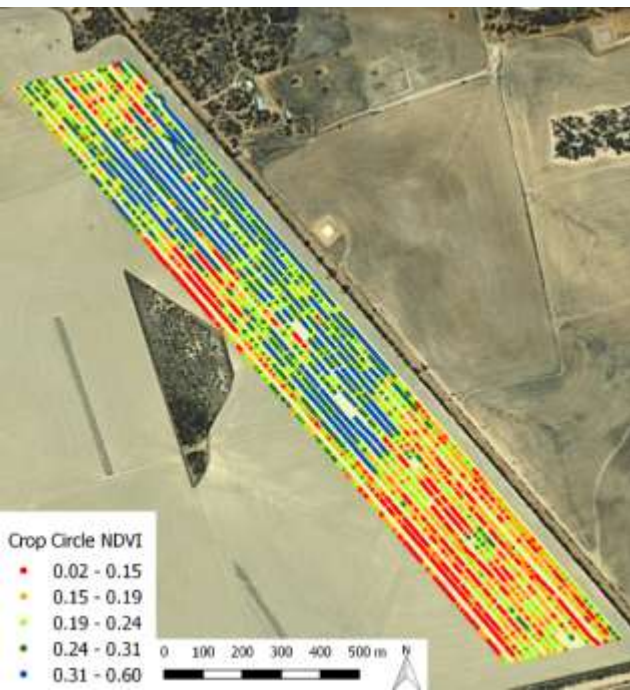
Soil N assumed to be 20 kg ha<sup>-1</sup>

**N-minus = 0 N at sowing; Standard = 20 kg ha<sup>-1</sup>; N-rich = 80 kg ha<sup>-1</sup>**

## 'Core' site in WA



# Crop Circle, yield and protein data at 'core' site in WA



# 2. Sense the field!

## Sensor scanning WA



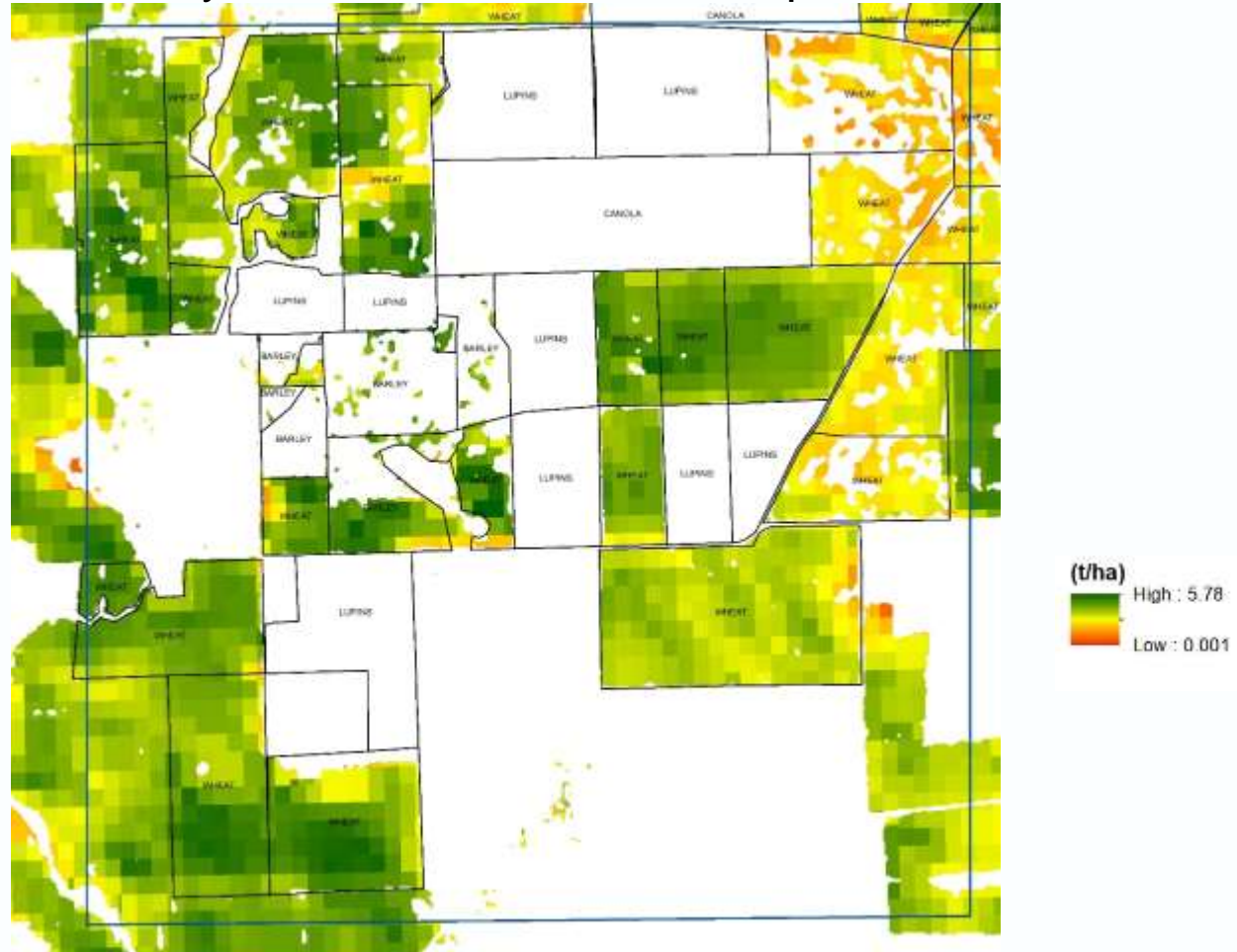
# Future Farm – Phase 2 – Supporting field trials - WA

## Soil and plant sampling

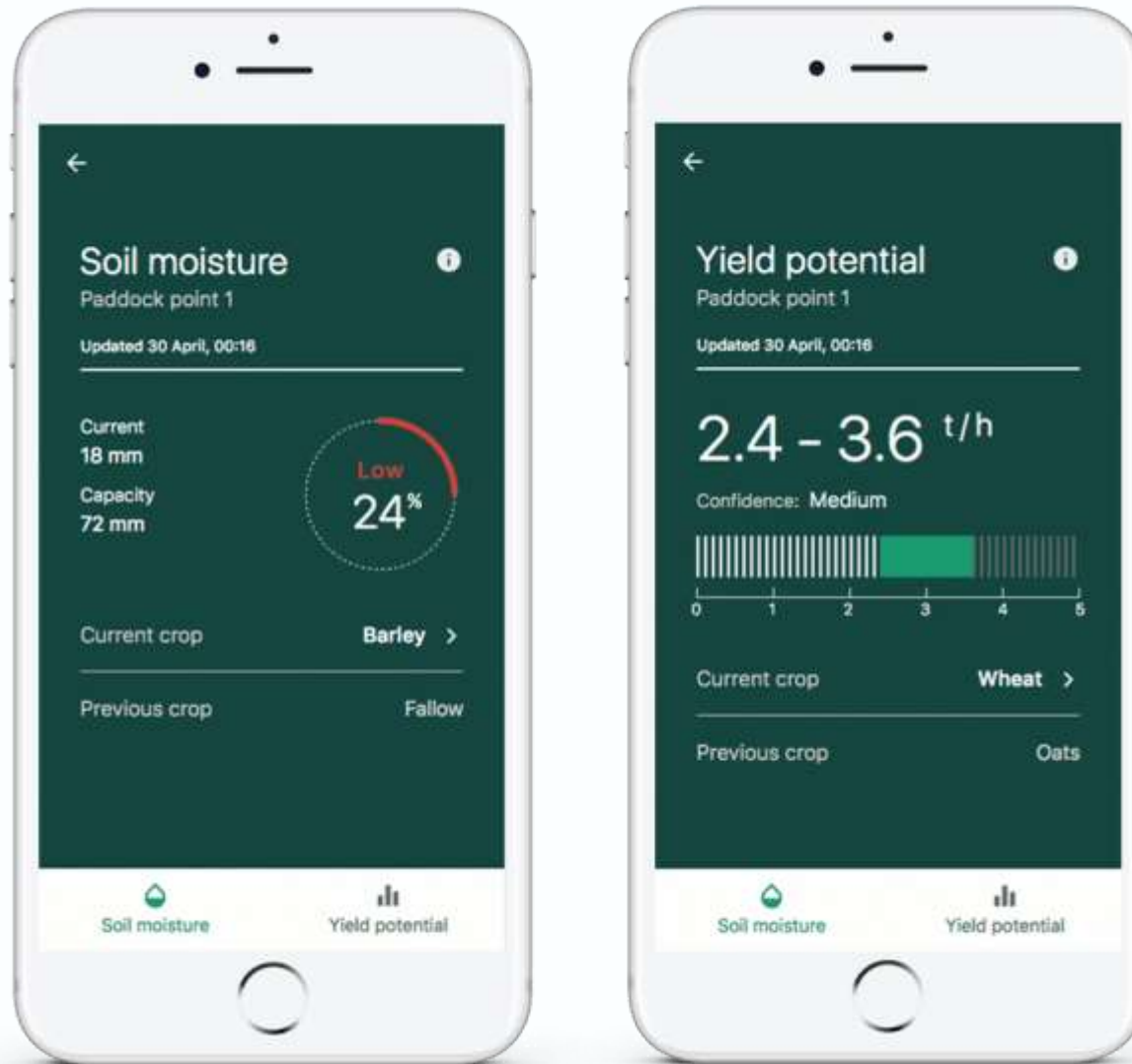


# 3. Use Satellite information for yield data

Wheat yields across a farm 30<sup>th</sup> Sept 2018



# 4. Soil Moisture derived from crop models



# 5. Assemble the components

- **In crop N status**
- **Soil water status**
- **Historical Yield**
- **Conduct the analytics**
- **Deliver the results**
- **The components necessary to make a complex N decision exist**
- **We now have to harness information from a range of sources to make the N decision in real time**
- **The digital economy is happening!**



# Future Farm – what it is and what it isn't

- A collaborative effort involving (and with funding from):



**Sydney  
Institute of  
Agriculture**



# Thank you



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