# Precision Agriculture and it's Benefits

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# Getting the Basics Right

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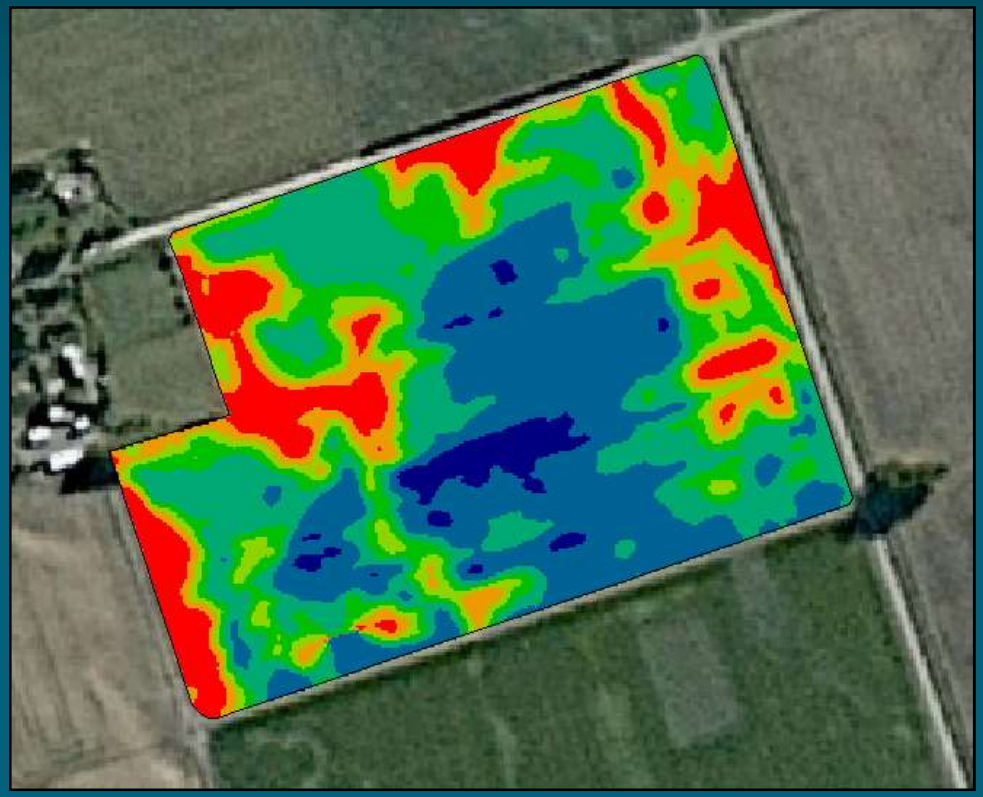
# Profit Mapping



Net Profit ($/ha)

- Minimum to 0.00
- 0.00 to 1500.00
- 1500.00 to 3000.00
- 3000.00 to 4500.00
- 4500.00 to 6000.00
- 6000.00 to 7500.00
- 7500.00 to Maximum

Its hard to be Green when you're in the Red

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# Getting Connected

## We're a Connected Farm

- 3G connection - farm office and machinery
- Wi-Fi connection - farm office and irrigators, soil moisture probes
- 3G connection - Irrigators, software server and cell-phones
- 3G connection - wells and irrigation auditor
- GPS on all irrigators, combine and tractors - all with auto-steer
- Lowra

**Rural Connectivity is a huge issue for NZ development**

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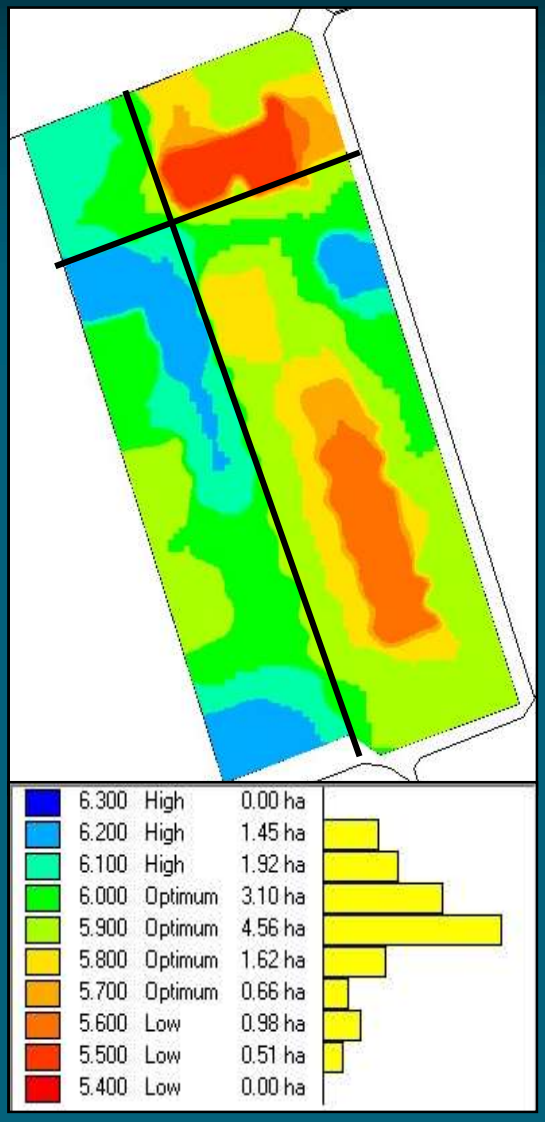
# Soil Testing : Combining Paddocks




- Lime
- Phosphorus
- Nitrogen

VARIABLE RATE APPLICATION:

- Application from traditional testing 75 tonnes
- Total application reduced to 10 tonnes
- Saving total $2,925.  $ 195/ha

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# Matching Crop Requirements

- Know soil types, spatial variability
- Good crop rotations
- Set realistic yield goals
- Wheat requires 25kg/N/tonne grain produced , what does grass require?
- Understand different species benefits and their requirements
- Spatially soil test


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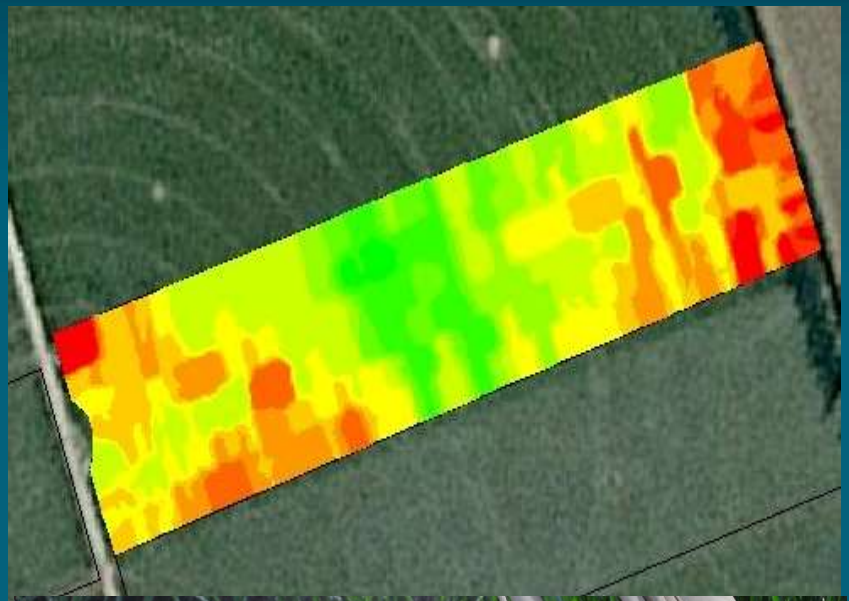
# An opportunity in precision spreading

| | pH | P | K |
|---|---|---|---|
| Inside drip line | 5.7 | 60 | 13 |
| Inside shade line | 6.2 | 44 | 11 |
| In between | 6.3 | 27 | 6 |

# Pasture Mapping with GreenSeeker




- Mapping biomass differences
- High Nitrogen levels
- Potential savings with the use of crop sensors

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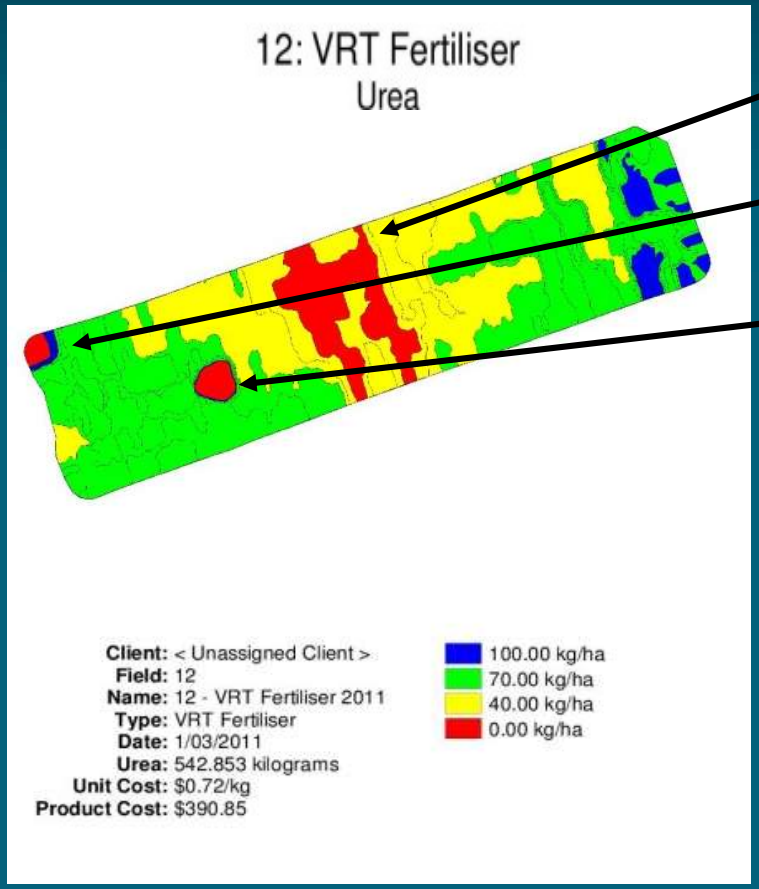
# Application & Exclusion Zones




- High nitrogen zone
- Gateway
- Water trough

VARIABLE RATE APPLICATION:

- Traditional application
  70 kg/ha Urea
- Average application rate reduced to 49 kg/ha Urea
- Saving 21 kg/ha Urea
  $19 /ha

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# Nutrient Budgets & Overseer®

Overseer Nutrient Budget

- Includes all nutrients
  e.g. fertiliser, effluent,
- Helps reduce fertiliser inputs
- Help access profitability
- Increased understanding of models for future use
-


•Trimble Juno for GPS location

OVERSEER®

http://www.overseer.org.nz

•Our next step is ensuring that we were making best use of our fertiliser inputs.

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# The Value of EM Mapping in Overseer

| | Estimated N Leached / Ha | | | |
|---|---|---|---|---|
| % OF AREA | EM, VV | EM, FV | EM, VF | EM, FF |
| 9% | 39 | 43 | 58 | 142 |
| 3% | 24 | 24 | 26 | 67 |
| 7% | 39 | 43 | 58 | 141 |
| 4% | 23 | 22 | 24 | 65 |
| 15% | 48 | 53 | 68 | 154 |
| 11% | 32 | 31 | 33 | 76 |
| 11% | 39 | 43 | 58 | 141 |
| 6% | 24 | 24 | 26 | 67 |
| 33% | 39 | 43 | 58 | 141 |
| **100%** | 39 | 42 | 54 | 127 |

| | Estimated N Leached / Ha | | | |
|---|---|---|---|---|
| % OF AREA | VV | FV | VF | FF |
| 12% | 39 | 43 | 58 | 142 |
| 12% | 39 | 43 | 58 | 141 |
| 26% | 48 | 53 | 68 | 154 |
| 18% | 39 | 43 | 58 | 141 |
| 33% | 39 | 43 | 58 | 141 |
| **100%** | 42 | 47 | 62 | 146 |

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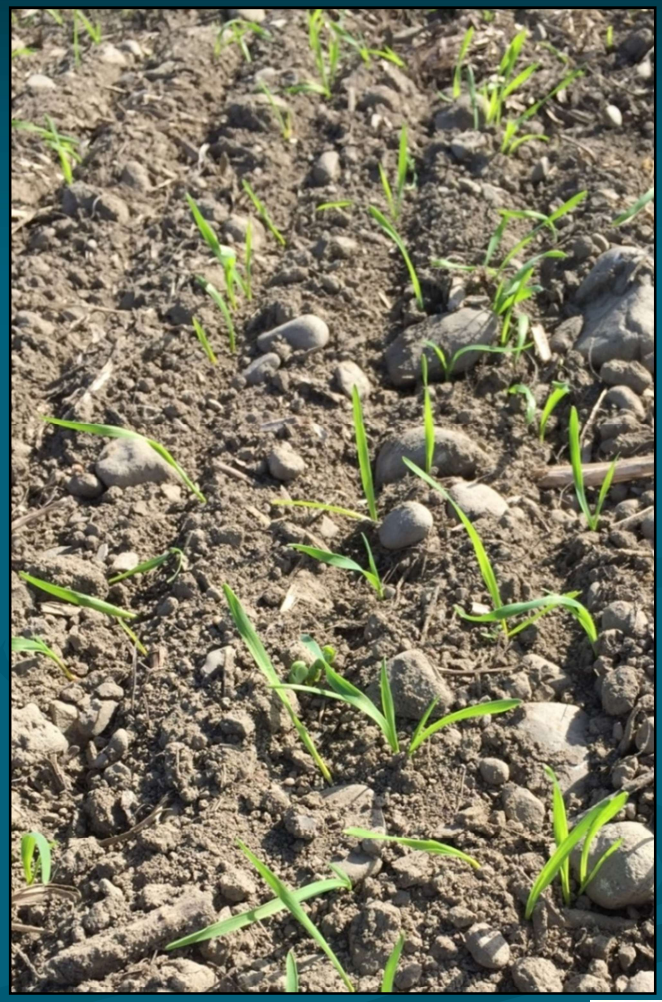
# From the Ground Up

## Farming starts with the soil

- Know your soil type
- Know your water-holding capacity (whc)
- Know your soil's potential
- Understand your farm's variability



**Sustainability needs to be built in - not bolted on**

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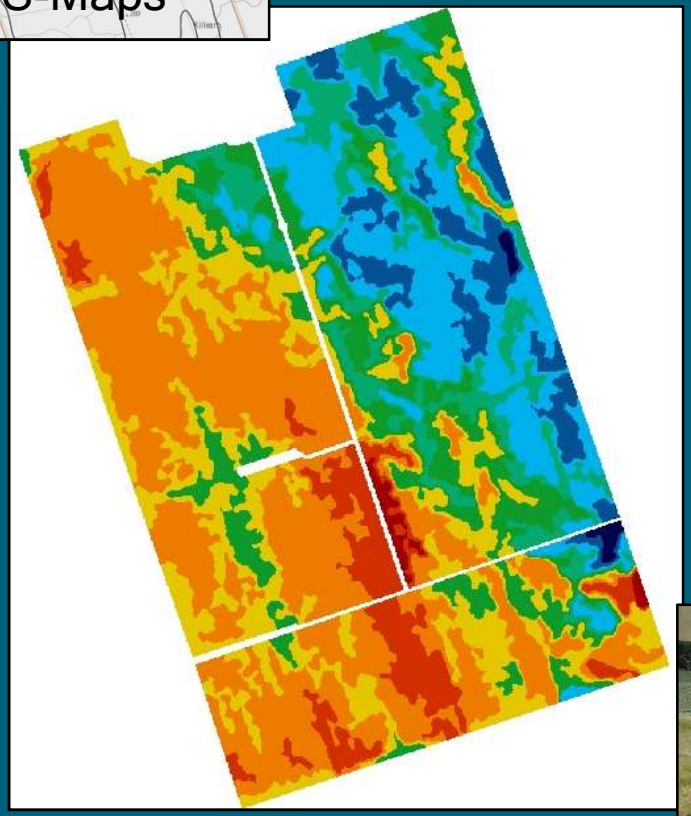
# Electromagnetic (EM) Mapping

- Different pattern to S-Map
- GIS site specific detail
- Accurate to individual farm
- Makes targeted management easier
- Useful going forward for informing Overseer inputs

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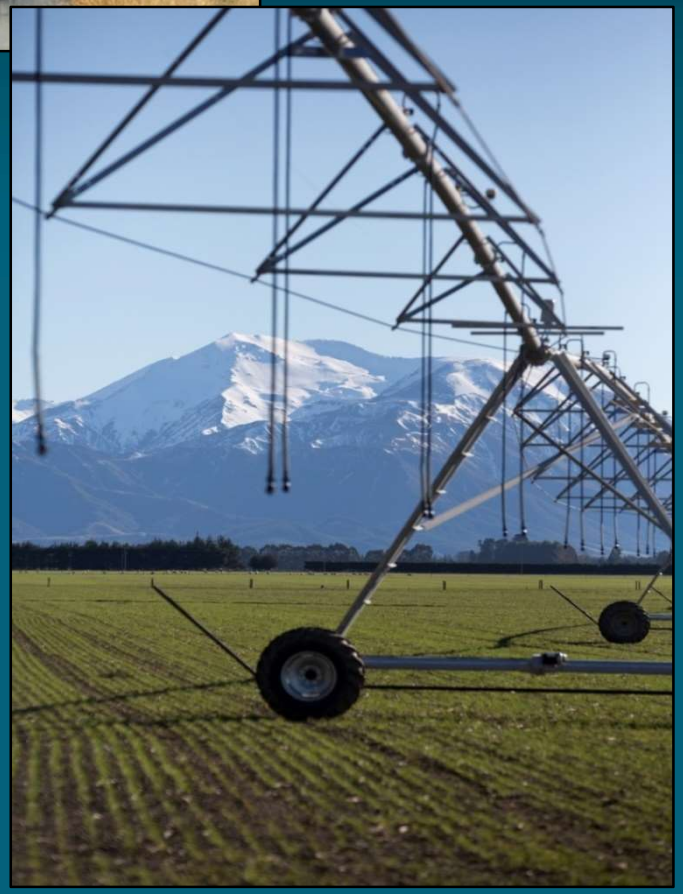

# Irrigation Management

- We've come a long way with technology, hardware and science
  We use variable rate irrigation (VRI)
- Get an accurate understanding of the spatial variability of soils.
  We use data from EM Survey
- Understand the water holding capacity of each soil type to be irrigated
- Situate soil moisture probes by zone and water holding capacity


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# UAV'S with Sensors

Octocopter

Yamaha RMAX UAV Sprayer

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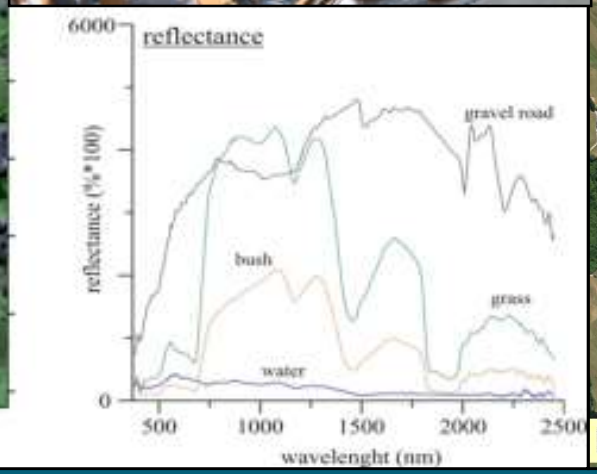
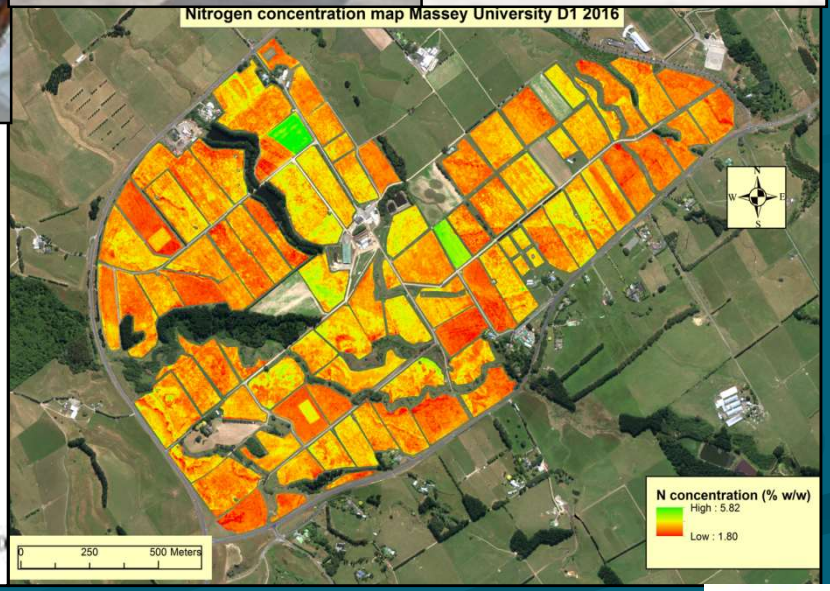
# Hyperspectral Imaging: Fenix Airborne Sensor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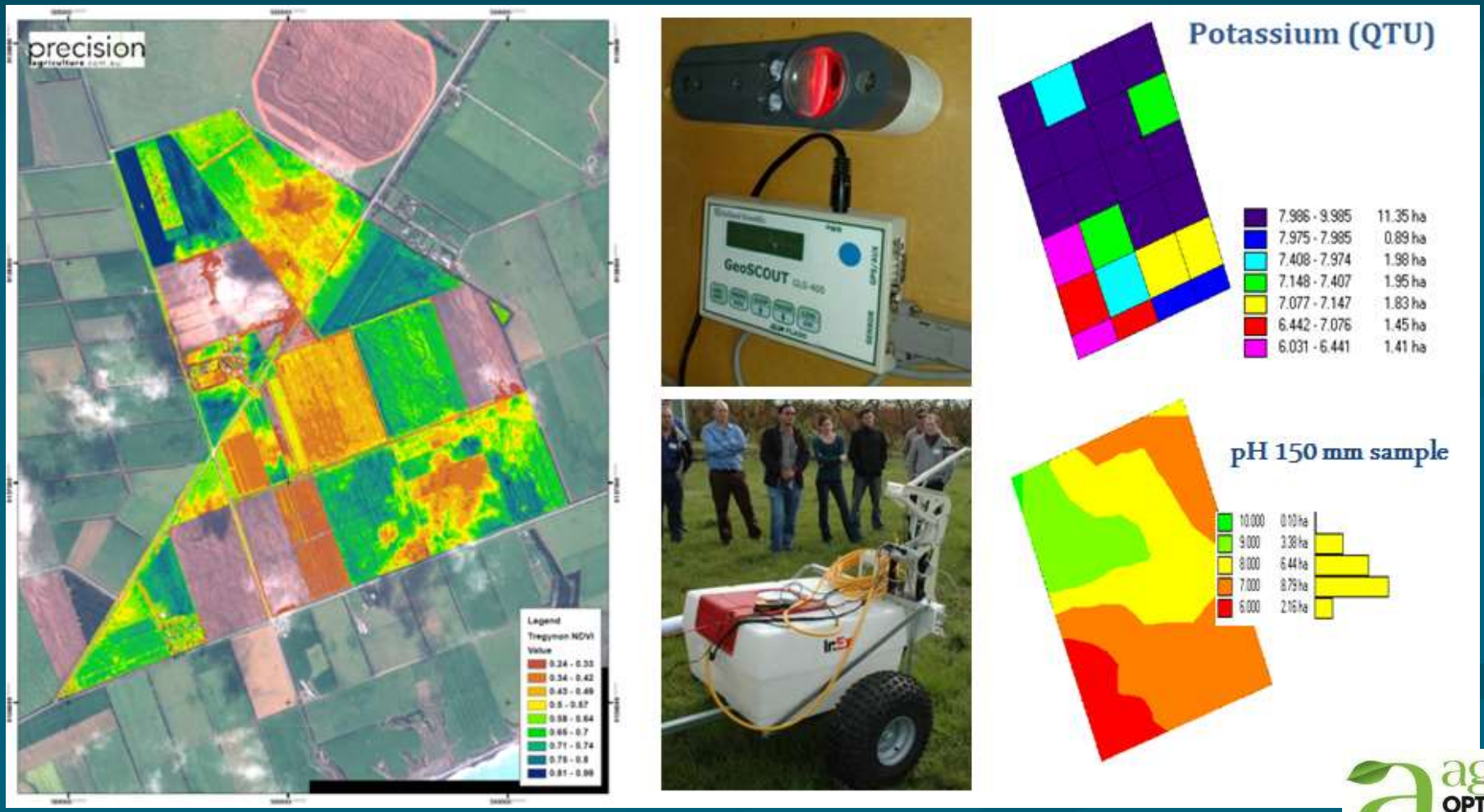
# Paddock Scale Sensing

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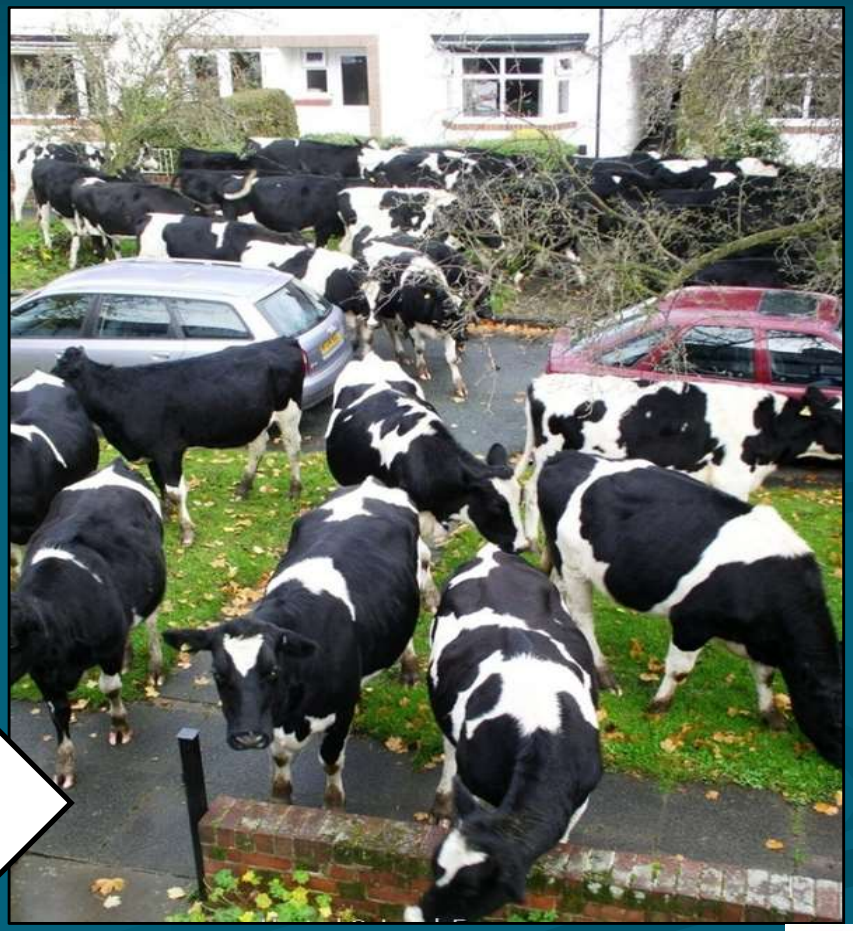
# Agbot Robot

# Where are my stock?


Meanwhile 2km down the road



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# Virtual Fencing



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# Virtual Fencing in Action

une University of New England

Precision Agriculture Research Group

sensible agriculture

# Climate Change
# - how to reduce our footprint

- Measure/ Model/ Mitigate
- Reduce Emissions intensity
- Use irrigation wisely
- Good sustainable farming practices and the most profitable farming practices go hand in hand.


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# What does the Future look like?

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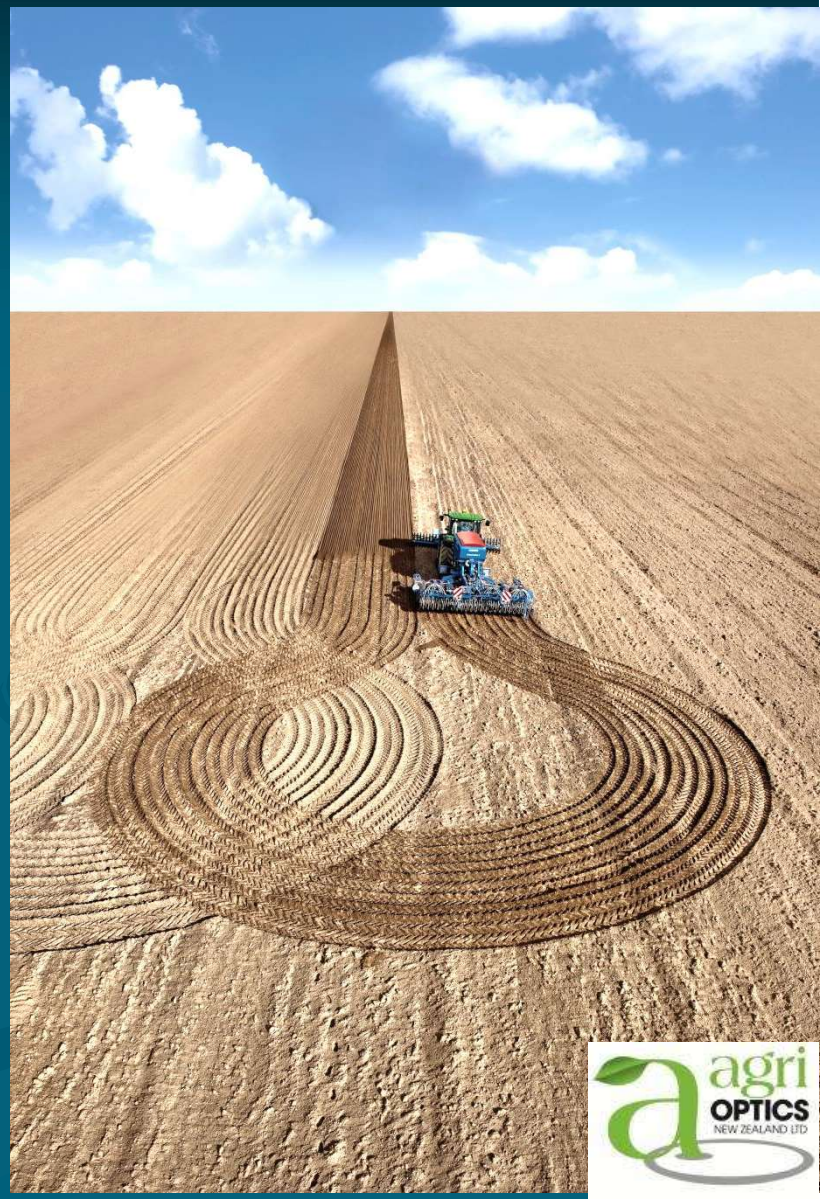
# What does the Future look like?

- Finger printing of our specialty products.
- Adding value to our products.
- Feeding an increasing wealthy market not just greater population.
- Retaining the right to farm.
- Paddock to plate tracking of products.
- Reduced  inputs with greater value of output.
- Making our Farmers more profitable.
- Increased levels of sustainability both environmental and financial
- Focus on water quality as a showcase for the world.



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# The Future…….


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