Rural Research and Development for Profit Programme

Smarter Irrigation for Profit

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Project overview

• Partnership between irrigation industries of Cotton, Dairy, Rice and Sugar

• Ten key activities across 4 industries with 16 R&D partners and 19 farmer managed learning sites across 5 states

• Three key components
  – Irrigation scheduling technologies
  – Smart automated irrigation
  – A network of farmer managed learning sites (Optimised irrigation farms)
Project 2b – Smart Automated irrigation

• Increasing farm profit through efficient use of irrigation input to dairy pastures

  – Five Farmer sites
    • 4 with human interface
    • 1 with Automation (VARIwise)
Key learnings for 2015/16

• Measures of variability
• Energy Use
• Pasture Productivity
• Automation
Variability - Montana site
Variability maps

EM 38

Landscape Change
Landscape Change
Energy use in pumping

- **Benchmarks**
  - 4-8 kWh/ML/meter head
  - 150-300 kWh/ML
  - $30-70/ML  Daley and Callow 2014

<table>
<thead>
<tr>
<th>Pivot Site</th>
<th>Flow m3/hr</th>
<th>Pump Size</th>
<th>Motor size (kW)</th>
<th>kWhr/ML $/kWhr</th>
<th>$/ML</th>
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<tbody>
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<td>1</td>
<td>232</td>
<td>150x125-315</td>
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<td>787</td>
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</table>
Energy savings

Site 5

- Pump and motor replaced
- 787 kWh/ML vs 206 kWh/ML
- Savings of $133/ML or $25000 for the season
Irrigation scheduling and Pasture productivity

Cressy – 6 ML/ha

Montana – 4 ML/ha
Pasture growth rates

- Cressy averaged 30-40kg DM/ha/d
- Opportunity loss of 20kg DM/ha/d
- Opportunity loss of 210t pasture on 117ha pivot replaced with purchased grain
- $200/t extra cost
- $42000 extra cost over three months
Cressy Pivot Water Balance
Automation
Cameras on TIA Dairy Research Farm

- Pasture height used for irrigation
- Height is measured using quad bike sensor
- Smartphone-based cameras on pivot upload image and location

TIA Dairy Research Facility

Locations of cameras on pivot

Sample image
Automated irrigation for dairy pastures

- Image analysis extracts average leaf length in camera image
- Compared with weekly quadbike height data

Height from quadbike sensor | Canopy cover from cameras

**Graph:**

- **Equation:** $y = 2.4226x - 150.46$
- **$R^2$:** 0.8127
Acknowledgements

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Alison McCarthy, NCEA

Five Farmers