AUTOMATION OF FURROW IRRIGATION
AARON LINTON

Site details
• LOCATION: Kirknie Road, Leichhardt
• WATER SOURCE: River pumping, Recycle pit (used to irrigate drip fields)
• Eleven irrigation sets automated, covering approximately 53 hectares
• This farm is representative of a BRIA farm with pumping from the Burdekin River and recycling. The blocks on the river bank are irrigated with furrow irrigation, and another 42 hectares on the other side of Kirknie Road is under drip irrigation. There are two pumps on the river bank and all the run-off water is captured in the recycling pit. The recycled water is used for irrigating the drip blocks.

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<th>COST BENEFIT SUMMARY</th>
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<td>Area automated</td>
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<td>Total cost</td>
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<td>Life span (minimum expected)</td>
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<td>Vehicle R, M &amp; fuel saving</td>
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<td>Benefit - Cost</td>
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Costs associated with borrowing money have not been factored into this analysis

ANNUAL PER HECTARE SAVINGS

- PUMPING COST SAVING, $36
- LABOUR SAVING, $149
- ELECTRICITY TARIFF SAVING, $122
- VEHICLE R, M & FUEL SAVING, $70
- WATER SAVING, $1

ANNUAL COST: $184/HA
ANNUAL BENEFIT: $378/HA

Aaron Linton’s farm is a mixture of furrow and drip irrigation, with 42 hectares of drip irrigation in addition to the 53 hectares of furrow. The entire farm and associated pumps are now controlled by a single automation system.

It was clear almost from the start of this project that one of the greatest benefits of the automation for Aaron was going to be a reduction in the amount of time he spent travelling to his farm just to set up or check on irrigation. This has been confirmed with the economic analysis showing that he is saving over 11,000 km and 170 hours per year in driving.

The other major economic benefit for Aaron is that he has been able to modify his irrigation management so that he is only irrigating during off peak electricity times. This could only be achieved by automating the start and stop times. Doing this has allowed him to convert to tariff 62 which is the lowest cost tariff available for off peak usage and is saving him over $6000/year when compared to his old tariff (tariff 66). As well as making it possible to irrigate within a certain time window, the automation is allowing Aaron to alter how he waters in order to improve his watering efficacy. Some of the blocks on this farm have poor lateral soakage and water runs through very quickly, even with low inflow rates. With weekly irrigations the typical application was 0.3-0.5 ML/ha, of which 20-30% was lost as run-off. To overcome this he has been experimenting with irrigating in short events of 1 hour, then returning for another short irrigation for an hour or 2 in the same night. He is also testing whether multiple irrigations per week will improve the soakage and his crop growth.

Apart from the economic benefits Aaron has found that the time he used to spend travelling to the farm to manage his irrigation can now be spent on managing his business and identifying other areas for improvement, as well as spending time with his young family.
BREAKDOWN OF BENEFITS ($/YEAR):

No of irrigations per year—220
  • 11 blocks x 20 events = 220

Vehicle costs—$3,706
  • 3 trips/week @ 70 km = 10,920 km/yr
  • 20 events x 1 trips/event x 3 km/trip = 660 km/yr
  • R, M & FUEL COST:
    11,580 km @ 32 c/km = $3,706

Labour saving—$7,880
  • 220 events x 1 trips/event x 25 min/visit = 91.7 hr
  • 91.7 hr x $30/hr = $2,750
  • TRAVEL TIME TO FARM:
    10,920 km @ 86 km/hr = 127 hr
  • TRAVEL TIME ON FARM:
    660 km @ 15 km/hr = 44 hr
  • 171 hr x $30/hr = $5,130

Electricity tariff saving—$6,487
  • Energy cost tariff 66 = $15,207
  • Energy cost tariff 62 = $8,720
  • Saving from moving to tariff 62 = $6,487

Pumping cost saving —$1,902
  • 20% extra energy use when under manual control
  • 20% extra use on tariff 66 = $1,902

INFRASTRUCTURE INSTALLED:

• 1 base station, computer and software
• 2 pump controllers
• 6 actuator control radios, one per cylinder
• 11 actuators and brackets
• 2 pressure transducers, one per pump
• 2 water meters (SunWater)
• 2 drainage detection (end of field) radios
• 3 drain sensors

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