
Russell Jordan has gained significant efficiencies by automating his furrow irrigation.

# Automation delivering efficiency in Burdekin gravity-fed irrigation

*A project investigating automation of furrow irrigation has found that the system works effectively on gravity-fed irrigation systems, as shown through on-the-ground experience in the Burdekin.*

Russell Jordan has saved precious time and water through the use of automation technology for his gravity-fed furrow irrigation at his Upper Haughton farm in the Burdekin.

Not only that, because this farm is about 10km away from his home farm, he is no longer a slave to multiple trips, at specific times, to change irrigation shifts.

"Before the automation, I'd be around to this farm at least twice per day and most times more often. I also found that the shifts didn't fit the same rotation as the other farms," Russell explained. "That could lead into the night, and with the 10km each way I was easily losing 30 to 45 minutes each time."

Like many farms in the BRIA, water is gravity-fed from the SunWater channel. This farm does not have recycle pits, so Russell has always tried to be as efficient as possible – but this is now a much easier task with the installation of the technology.

The automation equipment was established at Russell's farm as part of an SRA-funded project called *Modernisation of furrow irrigation in the sugar industry*, which was led by Dr Malcolm Gillies at the University of Southern Queensland and the National Centre for Engineering in Agriculture (NCEA).

Steve Attard with AgriTech solutions has worked on the project and said that the work at Russell's property showed that you did not need mains power or pumps to make automation work.

"With advance sensors in the field, about 100 metres from the tail end, Russell can turn his first irrigation set on, and then when the water reaches that advance sensor, the system automatically recognises that, opens the next valve, and closes the first valve," Steve said.

"Russell can now avoid the frustrating situation of being close to the end of a job on the tractor, but having to pull up stumps and go to another farm to avoid a flood at the end of the paddock. He knows this system is working."

The sensors were originally placed closer to the end of the 1.3 km long field but based on initial measurements and modelling the correct position was determined so that water reaches the end of the block, while minimising the volume that runs off.

With Russell now having confidence in the position of those sensors, they will be trenched in permanently and deep enough to avoid damage from in-field cultivation.

The trenching and long cabling runs for these sensors increases the costs compared to the other sites in this project where the advance sensors are placed in drains close to the radio.

A pressure transducer is installed in the first cylinder from the channel outlet. This transducer provides a fail-safe by notifying Russell when the water pressure gets too high, such as if the valves haven't opened. If grates are blocked, or valves have remained open, or fluming has blown off, he also receives a notification if the water level drops too low.

"If anything goes wrong, the system shuts down and sends you an SMS or an email, which most people now have in their pocket 24/7. On this farm it is only gravity fed, so it is not as crucial, but this fail-safe is crucial if you had a pumping system," Russell said.

Five irrigation sets have been automated. Each cylinder has only one outlet which means one radio controls just one actuator.

This increases the cost of the overall system, although if there were two outlets per cylinder, each radio could control two actuators, which would reduce the cost.

Russell admitted that the technology was a bit daunting and needed to earn his trust initially, but he now has confidence in the system.

Russell has completed 85 hectares out of 104ha on this farm, and plans to expand with the technology to his other farms.

"I can see the savings, especially my own time. But there's also fuel and wear on my ute, plus the water savings. We also want to be efficient with our water – I'd much prefer to put the precise amount on my paddock.

"The costs are substantial, so it will be a job that we will stagger over a few years. But it will be great to get it all done."

This farm is also the focus of a federally funded Smarter Irrigation for Profit program, a collaborative project between the sugar, cotton and dairy industries.

In this project, Russell is continuing to work with Malcolm Gillies and Steve Attard on other technology that would improve the scheduling of irrigation events including growth measurement cameras, soil moisture probes, rain gauges, and weather stations.

"These cameras are in their early stages, but I think down the track we may be able to use them for growth measurements instead of slopping around in the mud, and then we may be able to optimise our irrigation scheduling."

### For more information

To see the CaneClip on Russell's experience, visit https://sugarresearch.com.au/sra-information/media/

**Russell Jordan**

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| System costs (approximate) | |
|---|---|
| Area automated | 82 hectares |
| Total cost | $49,700 |
| Cost per hectare | $606 |
| | |
| Base station, computer & software | $6,900 |
| Pump controller & installation[1] | N/A |
| Pressure transducer | $800 |
| Water meter[2] | N/A |
| Actuator control radios x 5 | $15,000 |
| Actuators x 5 | $2,500 |
| Actuator brackets & fitting | $2,000 |
| End of field radios x 3 | $9,000 |
| Advance sensors x 5 | $2,500 |
| Advance sensor installation[3] | $6,000 |
| System commissioning[4] | $5,000 |

**Footnotes:**

(1) Gravity fed system, pump controller not required

(2) Water meter not required

(3) Advance sensor installation costs cover: trenching 150 m, conduit and cabling for each sensor

(4) System commission costs cover installation of base station and field radios and checking that all are working correctly.