

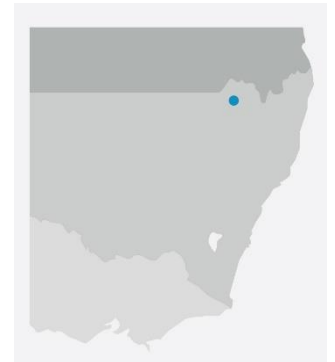


Automated irrigation systems: Gwydir Valley demonstration of new digital irrigation technologies

1. What is the project about?

Automation of irrigation in the Australian cotton industry has the potential to improve water productivity, whilst addressing the challenges of labour resourcing and optimising water use efficiency.

This project is providing growers with commercially relevant information about how to best utilise irrigation monitoring tools and decision support systems to optimise irrigation. It is also providing advice on the installation and management of automated and autonomous irrigation systems.



2. Why do irrigators need to know about it?

The project builds on the previous six years of Irrigation System Comparisons at Keytah, Moree, where drip, lateral move, siphon and bankless channel have been assessed for their water use efficiency and yield performance. Now the project includes automation options for each of the systems, to investigate how automation can improve water use efficiency and address labour resourcing challenges. Many growers are moving to bankless systems, so in 2020 an additional bankless channel field, a 500ha field with three sets of five bays linked by automated gates was added to the comparison sites. The system comparison and automation information will help Irrigators select the design and system that suites their farms most accurately.



The project trialled automation on the new bankless development which was fitted with 30 Padman Stops Bankless Channel Bay Outlets incorporating Auto-winchers and level sensors enabling remote irrigation of the whole 500ha field. The field was used by the Deakin University team for their smart sensing and automation project. Auto-winch level sensors can be used to trigger transitions between bays. Soil moisture data can inform irrigation scheduling. Additional fields are being tested at Keytah in the 2021 season to add to the data set. The field was also fitted with nine GoField probes incorporating soil moisture and canopy temperature sensors. Data from these probes provide additional information to aid in scheduling irrigations.

Automated siphon irrigation is possible with the Smart Siphons. Smart Siphons are a small pipe through bank, fitted with a rotating elbow. The remote siphon controller the EnviroNode Farm Automation Controllers (EFAC) and EnviroNode Hub enables the up to 150 smart siphons to be started or stopped via the EnviroDash from any web enabled mobile device. The system includes Weir controls, channel level sensors and water advance sensors to monitor water movement across the whole field.

The automated subsurface drip tape has been replaced by a new surface drip tape which utilises the existing pump and filter set up. Instead of sub surface tape it utilises a recyclable surface tape which is replaced each season. Irrigators who do not have an existing drip pumping and filter system will be able to hire one in a container to implement a drip system.

Optimisation of surface irrigation is important; the project is working with USQ and EnviroNode IoT to collect additional information on the application of the SISCO model to siphon irrigation. A typical siphon field has been fitted with a channel level sensor and water advance sensors. Infiltration characteristics and water advance will be assessed for the field. Irrigation scheduling information will be provided to the co-operator to inform start and stop times for irrigation events.



Additionally, the project is collaborating with CottonInfo, Padman and USQ to collect data on irrigation performance and efficiency of the siphon-less tailwater backup design.



3. How will the research benefit irrigators?

- Extension of key learnings from the Keytah Systems Comparison site incorporating water use efficiency measures, design specifications and engineering considerations in the adoption of automated irrigation.
- Field testing of new sensors and systems including the infrastructure necessary to convert a typical siphon system into an automated system. It is identifying the requirements for fitting a bankless system with automation and is investigating the potential fit of drip systems using the surface tape and transportable pumping and filtering setup.
- Reviewing measurement tools and decision support systems designed to enhance the efficiency of water use in irrigation, improve productivity, and support more precise utilisation of limited resources

4. Key results to date

The most recent crop was planted in November 2020 with picking May 2021. Establishment issues in the lateral and siphon fields have impacted the performance of both systems.

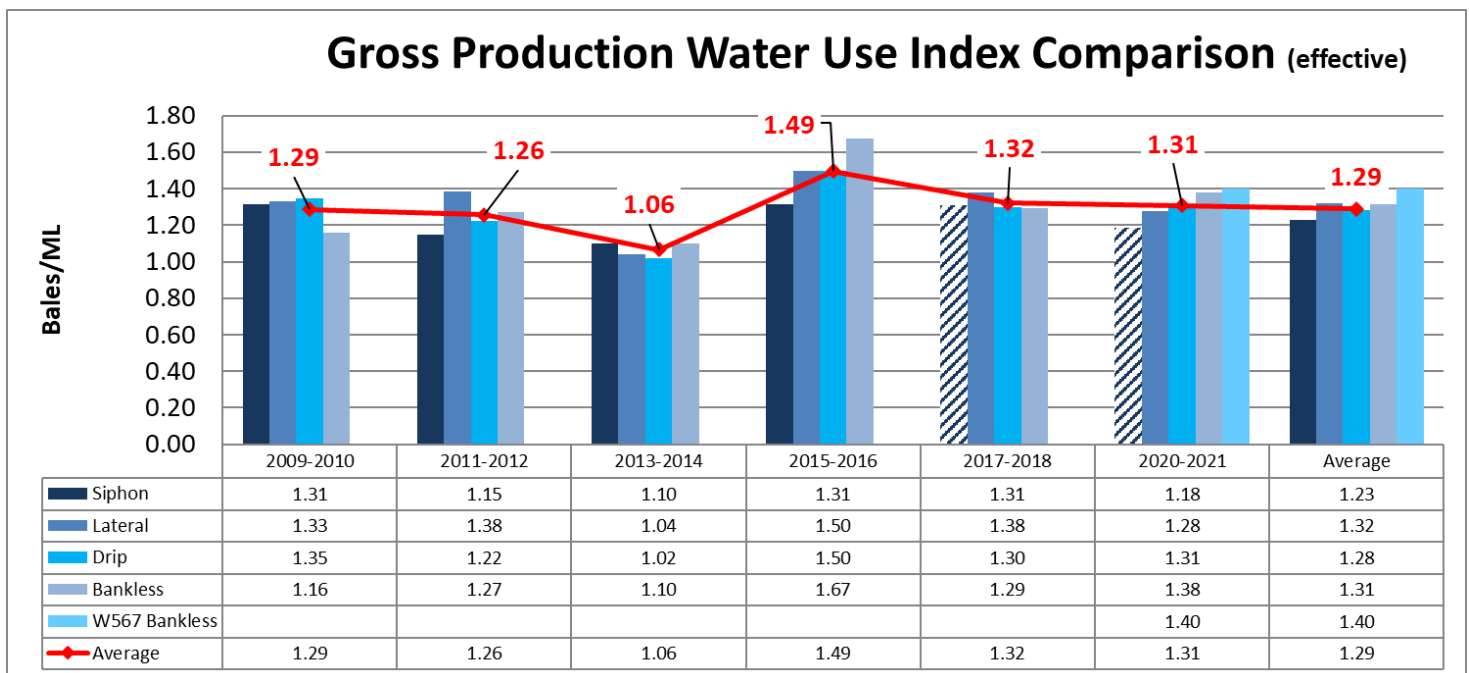
The siphon EFAC system worked well, and the weir controller and channel level sensors along with 15 water advance sensors in the field to enable more precise irrigation management.

The new surface drip had initial problems with crows damaging the tape. This required ongoing repairs until row closure. There were also challenges with the timing of irrigations based on agronomy and soil information. It however performed very well.

The lateral move watered throughout the season without any problems.

Both bankless fields watered without any issues.

The GVIA field day was held on the 10th of February with visitors from sugar, grains, rice and horticulture, included presentations from SIP2 research teams and commercial partners. There was a field day booklet prepared and seven videos developed from interviews during the day.



For more information visit the [Smarter Irrigation for Profit](#) and the [GVIA websites](#).

Padman Stops: <https://smarterirrigation.com.au/grant-oswald-from-padman-stops-talks-about-the-levels-of-automation-available-to-irrigators/>

Smarter Irrigation for Profit PHASE II



EnviroNode IoT: <https://smarterirrigation.com.au/gvia-field-day-2021-environode-iot-tools-for-irrigation/>;
<https://smarterirrigation.com.au/environode-iot-solution-for-smarter-irrigation/>
Gwydir Valley Irrigators Association Field Day Booklet, 2021. Available at: <https://smarterirrigation.com.au/gvia-application-of-digital-technologies-for-automated-irrigation-field-day-booklet/>
Smarter Irrigation for Profit Phase 1 economic case study, *Small pipe through the bank*. Available at:
<https://smarterirrigation.com.au/wp-content/uploads/2021/04/Small-Pipe-Through-Bank-sPTB-in-cotton-production-Jan-2021.pdf>

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Australian Government
Department of Agriculture,
Water and the Environment

This project is supported by funding from the Australian Government Department of Agriculture, Water and the Environment as part of its Rural R&D for Profit program.

