



Autonomous irrigation - irrigation data analysis platforms

Key points

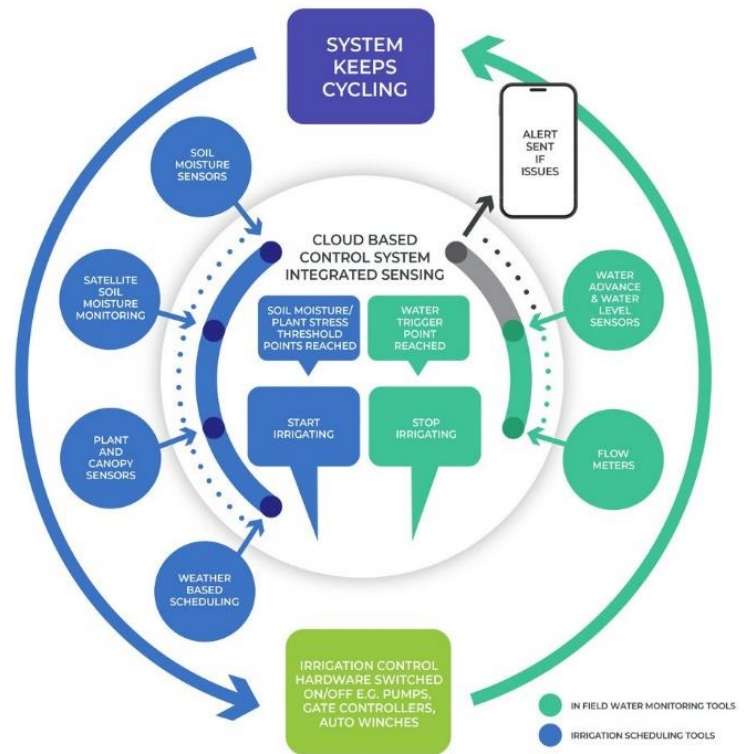
- the use of a data analysis platform gives an irrigator oversight of all of the components in a smart automated irrigation system
- data is taken from the sensors in real-time, analysed and a recommendation is provided back to the irrigator or directly to the automation system
- data analysis platforms can be used with siphon furrow systems, small pipe through the bank systems and bankless systems
- they can be integrated with the gate actuation, pumping systems and the channel control systems

How does an irrigation data analysis platform work?

Automated irrigation systems use a range of sensors and scheduling tools to monitor the crop and avoid moisture stress.

The function of the irrigation data analysis platform is to bring all the information together and provide robust recommendations to optimise every irrigation event. The adjacent illustration outlines the main components of a fully autonomous irrigation system.

Two examples of Smarter Irrigation for Profit supported irrigation data platforms are **SISCOweb** and **IRRISENS**. Both types of system have the ability to link with the automated irrigation structures to adjust flow rates and the timing of opening and closing structures. They also are able to provide advice on irrigation planning and scheduling.



Surface Irrigation Simulation, Calibration and Optimisation (SISCOweb)

SISCOweb, developed by the University of Southern Queensland, uses water level sensors in the supply channel and water advance sensors in the field. Information is captured in real-time on water delivery flow rates and water advance rates down a field to determine the infiltration characteristics of the soil during an irrigation.

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The data from the sensors is analysed to provide a recommendation on optimal flow rates for each irrigation run allowing flow rates to be modified to improve the uniformity of the irrigation across variations in the field.

Instead of having a pre-programmed cut off time the system alerts the irrigator of a proposed change to the irrigation schedule. The irrigator can choose to accept or ignore the change.

Irrigation requirements change throughout the season and this system provides information on how to adjust irrigations to manage these changes.

More detailed information on SISCOweb including access and costs is available from the [Smarter Irrigation for Profit website](https://smarterirrigation.com.au/). <https://smarterirrigation.com.au/>.

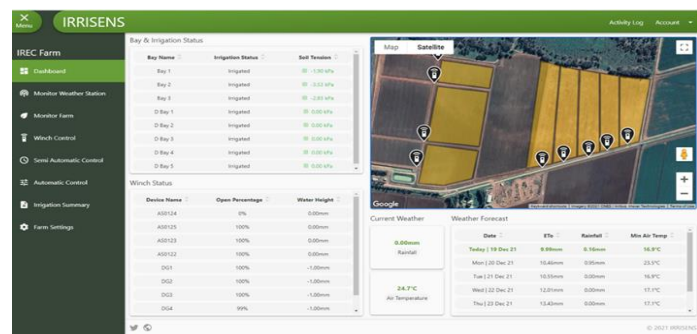
Video-SISCOweb Cruise Control for Surface Irrigation. Part 1 Tools and Technologies
<https://smarterirrigation.com.au/siscoweb-cruise-control-for-surface-irrigation-part-1-tools-and-technologies/>

Video-SISCOweb Cruise Control for Surface Irrigation. Part 2 Optimising the irrigation event
<https://smarterirrigation.com.au/siscoweb-cruise-control-for-surface-irrigation-part-2-optimising-the-irrigation-event/>

Video- SISCOweb Cruise Control for Surface Irrigation. Part 3 Practical Applications and Cost
<https://smarterirrigation.com.au/siscoweb-cruise-control-for-surface-irrigation-part-3-practical-applications-and-cost/>

IRRISENS

IRRISENS, developed by Deakin University is a Google cloud-based management platform that undertakes data analytics and control of irrigation system hardware. A range of sensors measuring soil, weather and plant performance are used to parameterize irrigation scheduling and irrigation management events. These sensing networks are connected to irrigation control hardware capable of remotely controlling irrigation outlets across irrigation bays.



IRRISENS dashboard showing bay and winch status and weather parameters. Note two irrigation layouts and associated smart sensing and automation systems are being controlled, a “Bankless” and a “pipe through bank downslope furrow” system.

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IRRISENS uses the data to build a 'digital crop model' and provide recommendations on the status of the crop. It is suitable for both row cropping and rice production systems. In cotton, the seven-day soil water tension forecast enables irrigators to schedule irrigation when plants start showing symptoms of water stress. In traditional rice systems, water height instead of volumetric water content is monitored and analysed reducing the risk of yield damage from low temperatures at the microspore stage and guides the irrigator when to raise the water level when low temperatures are forecast.

IRRISENS has a planning and irrigation control option that enables farmers/agronomists to monitor the soil moisture status or water heights at each bay as well as the status of the irrigation control actuators. This means that the platform has the capability to monitor the percentage that a specific gate is open (0 to 100%) and open or close the gates to start or stop irrigation, depending on the parameters monitored (soil moisture and water height).

The sensing and hardware use a range of Wi-Fi, LoRA and CatM1 communication protocols established across farms and linked to the IRRISENS Google cloud-based management Platform.

More detailed information on IRRISENS is available from the [Smarter Irrigation for Profit](https://smarterirrigation.com.au) website.

Presentation – Irrisens platform

<https://smarterirrigation.com.au/wp-content/uploads/2022/04/Irrisens-Platform-Irrigation-control-cotton-and-rice-Deakin.pdf>



Video – Smart Irrigation in rice

<https://smarterirrigation.com.au/smart-automation-in-rice/>



Smarter Irrigation for Profit: Irrigation Tools and Technologies (2022).

<https://smarterirrigation.com.au/irrigation-tools-and-technologies/>



Detailed information on a range of integrated irrigation automation and sensing platforms is available from the ***Smarter Irrigation For Profit: Irrigation Tools and Technologies (2022)*** including:

- SISCOweb
- Padman Automaton Management System
- IRRISENS
- Rubicon Farm Connect
- Pasture.io
- PESSL
- IrrigWeb
- Wildeye Enterprise
- Plexsus Network



[*Smarter Irrigation For Profit: Irrigation Tools and Technologies \(2022\)*](#) includes sections on satellite and telemetry solutions to enable communication between sensors and cloud based control systems.

One option to solve connectivity issues: Starlink

The irrigation industry has progressed to smart sensing and automation over recent years, but a major constraint has been establishing and preserving connectivity to allow sensors, forecasting services and automated irrigation structures to be linked to each other.

Recent research with the IRRISENS analysis system tested portable high bandwidth communication hubs linked to the Starlink satellite internet constellation operated by SpaceX. Previously, there was no mobile service at the research sites. The mobile communication units can be towed to a site for an irrigation season to provide Starlink connectivity across farms for smart sensing and automation as well as general AgTech use. The units are self-sufficient and operate on solar battery power.



The possibility of using a Starlink internet connection in rural areas as a portable internet network and extend its coverage by means of point-to-point connections solves the main disadvantage of 4G/5G Wi-Fi coverage.

Smarter Irrigation for Profit Phase II (SIP2) was led by the Cotton Research and Development Corporation in conjunction with Dairy Australia, AgriFutures, Sugar Research Australia, Grains Research and Development Corporation, CSIRO, University of Melbourne, University of Tasmania, University of Southern Queensland, Deakin University, University of Sydney, NSW Department Primary Industries, Agriculture Victoria and Gwydir Valley Irrigators Association. SIP2 was supported by funding from the Australian Government Department of Agriculture, Fisheries and Forestry as part of its Rural R&D for Profit program.