

RESOURCES FOR COTTON GROWERS ON SIPHONLESS LAYOUT DESIGNS, IMPLEMENTATION AND AUTOMATED MANAGEMENT USING SMART IRRIGATION TECHNOLOGIES



DEVELOPED BY SYNTIRO
AGRICULTURAL SERVICES PTY LTD

Smart Irrigation Supplier Self-Assessment

A supplier self-assessment has been completed by current suppliers of remote and automated irrigation systems servicing the cotton industry. An overview of participating suppliers is provided, followed by their detailed self-reported assessment of capabilities.

However, there is a multitude of other irrigation sensing, monitoring and scheduling technology providers which have not been included. Some of these are listed in the [Irrigation Tools and Technologies resource](#).

This factsheet is part of the *Smart Irrigation for Siphonless Systems* series. For background on smart irrigation concepts, components, benefits and challenges, see *Factsheet 1: Introducing Smart Irrigation for Siphonless Systems*. For guidance on what to look for when evaluating suppliers and systems, see *Factsheet 2: Selecting and Implementing a Smart Irrigation System*. To read about a practical example on farm, see the *Case study: Scaling Smart Irrigation – learnings from early adopters*.

PARTICIPATING SUPPLIERS

The following suppliers have contributed to this self-assessment:

Agri-mation was founded by farmers for farmers, developing purpose-built automation solutions for Australian broadacre flood irrigation. We understand the challenges of extreme distances, harsh environments, labour shortages, and the pressure to do more with less water. We've built robust electronics, reliable telecommunications, and mechanical systems that integrate seamlessly with existing infrastructure and has been proven across thousands of hectares of commercial operations. Our farmer-devised interface follows the philosophy: 'use our app less, make better decisions'. Come see one of the automated farms we've deployed at St George and experience the difference firsthand.

Phone: 0408 585 387

Website: <https://www.agri-mation.com.au/>



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Bidgee Automation delivers irrigation automation solutions built by farmers for farmers. We specialise in remote monitoring and automation for lift pumps, channels, bay outlets, and whole-of-farm networks. Our systems provide real-time data, activity confirmation, and instant alerts for issues like rain events, pump failures, or channel problems. Solutions reduce labour, minimise water losses, and eliminate constant physical monitoring through secure remote access. Contact us to view operational systems at Coleambally Demo Farm or near Whitton.

Phone: Accounts: 0404 763 842
Giuseppe: 0407 556 210 | Andrew: 0488 762 335

Environode is an electronics and software design company with 31 years' experience. Since 2014, we've focused on farm automation and IoT, designing and manufacturing all products locally and in house. As a result, we can provide detailed technical support and frequently visit customer sites with good, long term, relationships with them. We are always available and regularly speak to our customers. We are a NSW DPIRD Farms of the Future supplier.

Phone: Ric Otton: 0417 936 329
Website: <https://environode.com.au/>

FarmConnect (Rubicon Water) integrates irrigation automation within a single platform, reducing labour, saving water, and lowering energy costs. Leveraging Rubicon Water's two decades of experience, the system uses IoT-enabled nodes with in-field actuation systems for gates and valves, pump control, sensors for soil moisture, water levels, and micro-climate monitoring. Smart software integrates third-party devices, providing real-time and historical data for confident decision-making. Not only does FarmConnect take the grunt work out of irrigating, but it also removes the guesswork by putting accurate measurement, smart sensor data and precise control at your fingertips.

Phone: Peter O'Donnell: 0447 338 820
Website: <https://farmconnect.com/>

Padman Automation is a family-run Australian business supporting farmers for over 30 years with practical irrigation solutions. We deliver technologies for cotton, rice, and mixed farming systems engineered for Australian conditions. Our range includes permanent, portable, time-based, and sensor-based automation starting under \$15,000. Foolproof on-screen scheduling requires no complex communications. With facilities in Strathmerton and expanding to Moree, and Ayr, we are committed to remaining "The Farmers' Friend" providing proven technology that enhances water efficiency, boosts crop performance and delivers more time back to growers and their families.

Phone: 1800 254 594
Website: <https://www.padmanautomation.com.au/>

Supplier Self-Assessment

The table below presents each supplier's self-assessment across key system components including:

- » Service offering
- » Inlet/Outlet controllers
- » Pump controllers
- » Sensors
- » Communication
- » Control systems
- » User interfaces.



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This information was current as of the 2025-26 season and reflects supplier-reported capabilities.

Light blue shading indicates recommended key considerations.



		Agri-Mation Australia	Bidgee Automation	Environode	Padman	Rubicon Water (FarmConnect)
SERVICE OFFERING						
Coverage	Regions currently deployed	SW QLD. Service capability across MDB	Riverina	Moree, Narrabri, Griffith	NSW, QLD, WA	Throughout NSW
	No. controllers deployed in cotton	100's	100's	10's	100's	100's
Support	Pre commitment offering	Pilot/demo by arrangement	n/a	Pilot program available	Try before you buy at certain time of year	Paid pilot programs available
	Initial installation	DIY kit or technician	Technician	Technician	DIY or technician	DIY or technician
	Troubleshooting support	Remote support during extended business hours - included in subscription. Afterhours by arrangement	Business Hours - Free	Phone / SMS/ email - 7 days early until late - free.	24/7 - included in subscription	24/7
	Repairs and maintenance	Onfarm service or factory service, remote diagnostics; RMA process for complex repairs	In-field technician, all components are able to be purchased & self installed, some controllers require additional set up that can be completed remotely by technician.	On-site tech support. Equipment can be sent for repair / replacement.	In-field technician, Swap & Go in Moree. Strathmerton drop off available for service and repairs.	In-field technician, Swap & Go, Factory drop off.
	Warranty	12month hardware warranty; software updates and remote support included	2 yr warranty on all components except in cases of customer caused damage or misuse	5 years for all EnviroNode products, 3 years for solar cells. Excludes batteries	As per manufacturer	Typically, 12mths return to base
	Self-help resources	Online knowledge base, quickstart guides, and howto videos	None at this stage	None at this stage	Online, printed guides, video's	Online guides and videos

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		Agri-Mation Australia	Bidgee Automation	Environode	Padman	Rubicon Water (FarmConnect)
INLET / OUTLET CONTROLLERS						
Infrastructure Compatibility	Outlet types	Undershot, overshot, screw gate, pipe & riser	Undershot, overshot, screw gate, pipe & riser	Smart Siphons, Undershot, overshot, screw gate, pipe & riser	Undershot, overshot, screw gate, pipe & riser	Overshot and Pipe & Riser
	Drive mechanisms supported	Cable winch, Rack & Pinion style, screw type, actuator based	Cable, linear actuators, hydraulic. All 12 Volt DC	Any inc. smart siphons	Cable, Rack and Pinion, Gear Drive, Actuator	Cable/ gearbox /dc motor
Trigger & Opening	Triggering Outlet action	Remote commands, timer, sensor link	Remote commands, timer, sensor link	Schedule prepared on Envirodash. Remote command from dash.	Remote commands, timer, sensor link	Remote commands, timer, sensor link
	Outlet opening capability	Multi-stage opening	Multi-stage opening	Multi-stage opening	Multi-stage opening	Multi-stage opening
Override	Manual override	Ondevice buttons; quick detachment + cordlessdrill drive; direct phone for timer mode	Ondevice buttons & removal	Android Bluetooth App as well as Plug in Pendant Control	Ondevice buttons and easy removal	Ondevice buttons, Bluetooth control, removal
	Portability / Detach controller	1 person; <1 min	1 person; 15-30 mins	1 person; ~10 mins.	1 person; <1 min	1 person, 1-2hrs
	Anti-theft protection	GPS locator (within Agrimation network range); can be physically locked to structure	Nothing specific at this point.	Nothing specific at this point.	GPS tracking	Password protection for local Bluetooth & remote portal control, can padlock radios
Height	Typical controller height above outlets	CyberDrive ~45 cm above structure; AutoArm ~95 cm	Rubber flat stops ~ 50 cm. Slide doors ~1m	Typically 0.5 - 1m	30c- 120cm (Depending on the unit/drive type)	1.2m
Power	Power supply	Solar & Battery	Solar & Battery	Solar & Battery	Solar & Battery	Solar & Battery
	Battery	LiFePO4; 5year replaceable	AGM Battery - Expected life 5 years	Lead acid or LiFePO4. 5 years typical	SLA / Lithium 3+	Lead acid (4-5yrs) and Lithium (7-8yrs)
Costs	Up-front standard device cost	\$2-3k (typical)	\$3-5k for outlets, \$8-10k for pumps	\$3-5K	\$2-4k	\$2-4k
	Ongoing cost	None for timer + direct phone mode; annual for telemetry/app management	None	Cloud costs \$10/month for LoRa devices, \$20/month for Cat-M1 devices.	Monthly/annual tiered on # devices	Annual

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		Agri-Mation Australia	Bidgee Automation	Environode	Padman	Rubicon Water (FarmConnect)
PUMPS						
Pumps	Pump monitoring	Pressure and/or flow (as required)	Oil Pressure, Coolant Temperature, Low Coolant, RPM, Flow, Status, Engine Hours, Service Reminders, Drainage and Supply Channel Heights, Fuel Level, Battery Voltage, Blocked air filter sensor, Optional prime tank sensor, Engine oil level sensor.	Status, In and Out pressure, flow.	n/a	Status, pressure, flow
	Pump control	Yes e.g., Kensho diesel via RS485; softstarter mains; others on request	Yes - Ability to remotely start and adjust engine RPM to suit desired flow rate. Diesel and Electric (on/off & VSD controlled electric) pumps supported. All pumps can start / stop based on supply or drainage heights.	Anything that can be controlled via a relay contact or MODBUS.	n/a	Yes - I/O and modbus interface
	Pump control failsafe features	Failsafes handled by installed controller; user alerts on trips; optional pump shutdown via sensor feedback or user based IFTT parameters	Watch dog shut down based on oil pressure, oil level, coolant temperature, low coolant, no flow & low RPM.	Overpressure, no flow, In/out pressure differential.	n/a	Failsafes handled by installed controller, we are effectively a SCADA interface with our controller. We shut down IO control switches on a fault signal

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		Agri-Mation Australia	Bidgee Automation	Environode	Padman	Rubicon Water (FarmConnect)
SENSORS						
Proprietary Sensors	Are sensor devices open to others to integrate into their system (Proprietary open)?	API access to Agrimation sensor data	No	We can provide interfaces to all of our equipment. Eg 4-20mA, RS485 MODBUS, SDI-12,	Closed	We only have water level sensors and use 3rd party sensors for others (i.e. Sentek for probes)
Sensor Types	Connectivity	Wired and wireless	Wired and wireless	Wired and wireless	Wired and wireless	Wired and wireless
	Water sensor type	Wet/dry & Water height (pressure transducer)	Height measurement (ultrasonic and resistance based)	Wet/dry & Water height	Wet/dry & Water height	Height and percentage (scaled)
	Soil moisture sensing	Gypsum Block Type and C-Probe type	n/a	Available - Enviropro, Sentek, WET	n/a	Sentek drill and drop range
	Crop sensing	n/a	n/a	Dendrometer,	n/a	Third party 4-20mA temperature sensors
	Weather station	Basic station: rain, wind speed/direction, temperature	n/a	Available - Temp, pressure, humidity, rain, hail, wind, deltaT, ET	n/a	Rainfall, temperature, humidity, wind speed/direction, solar radiation and atmospheric pressure
	Flow meters	Modbusbased (accommodated to specification)	Liquid fertiliser flow sensor	Not standard but can connect to pulse based sensors.	n/a	Yes - Pipe, BladeMeter, SlipMeter, PikoMeter, FlumeGate
Physical Characteristics	Sensor height above ground	Fixed or portable tripod; adjustable height	Outlet sensor 0.5 m above top of concrete, in-field sensor 20cm above furrow.	Variable	~1m	Sensor range is 3m
	Sensor portability	Fixed & Portable (tripod design)	Outlet height sensor = fixed, In-field sensor = portable & intended to be installed at the beginning of irrigation season and removed before harvest	All portable	Fixed & Portable	Fixed and Portable

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		Agri-Mation Australia	Bidgee Automation	Environode	Padman	Rubicon Water (FarmConnect)
Power	Sensor power supply	Solar + 6000 mAh LiFePO4 (5year replaceable)	Outlet height sensor = solar + battery (AGM battery 5 years) In-field sensor = battery only (4 x AA Batteries & lasts full season).	Solar + battery	Solar + battery (SLA / Lithium 3+)	Solar + battery & battery only
Cost	Cost per sensor	\$30 / sensor / yr + \$1,250 / farm / yr (management apps)	In-field sensor \$1k-1.5k, Outlet Height Sensor <\$500	<\$500 - \$10K. Depends on sensor	In-field sensor \$1.2 - 1.6k Wired water height \$600	\$500 - 2k
3rd party sensor integration	3rd party sensor integration	Yes — APIs/ direct/gateway as required; can trigger automations (potentially outlet / pump control)	No - We don't currently integrate third-party sensors, but the system is designed with the capability to add them in future.	Yes -Anything with analogue, SDI-12, RS485, contact or similar output	No	Yes - Sentek probes, Keller pressure sensors, 4-20ma flow/ level/temperature/ pressure
	Integration method	API's , or can accommodate according to specific requirements	Direct Connection & Remote Access	API, Direct connection.	n/a	API, Direct connection
	Technical support for 3rd party sensors	Casebycase collaboration; engineering time billed	n/a	Full support.	n/a	Limited

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		Agri-Mation Australia	Bidgee Automation	Environode	Padman	Rubicon Water (FarmConnect)
COMMUNICATION						
Method	Controller connectivity	LoRa, Cellular, Standalone timer	Radio, Cellular	Cellular, LoRa, Wired, Satellite	Cellular, LoRaWAN	LoRaWAN to gateway, Cellular to host system
	Sensor connectivity	LoRa / LTE / Datalogger mode via direct phone connection		Modbus to LoRaWAN radio		
	Backup communication if primary fails	Multipath options (e.g., SIM + Starlink); devices roam across overlapping base stations	Radio	Hub on site can run schedules locally.	n/a	Bluetooth local control, local control switches and manual overrides
Infrastructure & Range	Required connectivity infrastructure	Base stations + Sim cards	Laptop, base repeater tower & Sim card (only required for text message service)	We supply all system components	Gateway or SIM cards	Gateway
	Max no. devices supported / gateway	100's	800	50+	50	Typically 100-150
	Communication range of LoRa / Radio	5–10 km (terrain/interference dependent)	All units act as a repeater, base tower range 10-15km line of sight.	1 - 10km	10-15km	1-5km
Comms acknmt	Acknowledgment system	Yes — uplinks/downlinks acknowledged with automatic retries, issues alerted,	System online, alerts if offline	All protocols are two way with ack, error check and retries	Both	Acknowledgement - Chirpstack for LoRaWAN
Cost	Communication Infrastructure set up	Base station ~\$4.2k + labour (where no Agrimation network is present)	\$5k	Scalable. Depends on size of installation.	\$0 (LTE) \$5-10k (LoRaWAN)	5k +
	Ongoing communication cost	\$30 / device/year data + AU\$1,250/farm/year business app licence	\$0	Cloud costs \$10/month for LoRa devices, \$20/month for Cat-M1 devices.	Varied depending on # units	Annual

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		Agri-Mation Australia	Bidgee Automation	Environode	Padman	Rubicon Water (FarmConnect)
CONTROL SYSTEM						
Architecture	System architecture	Hybrid: cloud + ondevice edge. Devices store rules/ last commands locally, execute autonomously, buffer data, and sync to cloud for visualisation, reporting, and fleet management	Local	Cloud interface for monitoring and high-level control. Low level control is local on site.	Hybrid	Cloud
	Failure scenario	Device functionality during internet or communication outage	Local automations continue (timers, sensor thresholds, sequenced events). Safe fallback states can be configured per device. Commands queue and sync when comms restore	System continues to operate as per settings during power or internet outage, system settings are loaded onto outlet controllers & are unaffected by computer or internet outages, laptop is only used as interface for irrigation set up.	Schedules downloaded to Hub and so will continue to run without internet.	Device continues last command or fallback to manual scheduling
	Remote diagnosis of communication issues	Yes. Device/repeater health, RSSI/SNR, last contact, battery/ solar telemetry, motor current, and event logs visible for fault isolation.	Yes	Yes. Extensive system health monitoring on dashboard	Yes	Yes
Timing	System check frequency	Default 30 mins; configurable down to shorter intervals where telemetry budgets permit	Live	10 mins typically	1-2 mins	30 min reporting typical (configurable) for all devices, on-change bursting for alarms, host reports loss of communications after 2 hours
	Data transmission frequency	Edge intelligence determines when to uplink new data, which enables near real time sensor measurements and gate status.	On demand	Every 10 mins, 1 minute in live mode	On demand	Configurable (30 min default) reporting per device, on-change bursting for alarms and critical data, can be manually polled through the host system
	Controller response time	Near real time / Instant	Instant, real time.	1 min in live mode, 10 - 20 mins otherwise.	1-5 mins	15-20 seconds

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Decisions	Decision-making capabilities (e.g. water ht, time, upstream status)	Userdefined IFTTT rules and timers; single and multisensor thresholds	Multi sensor rules & time based.	Multi-level	Time, single or multi-sensor based	Timer, single or multi-sensor
	Manually override automated decisions	Full manual override at any time from app or device	Yes, either remotely or using manual buttons	Yes	Yes	Yes
Alerts	Alert types available	Low battery; device overload; offline; motor stall; command not executed; threshold breaches (level/pressure/flow); pump events; unusual consumption patterns	Yes, Error codes (low battery, sensor faults, door position fault), command complete (all door movements & pump activity, start/stop & RPM change), water height warnings, set change warnings and auto door triggers.	Alerts can be configured for all parameters, and many parameters are monitored	Command receipt and execution acknowledgements, error/warning alerts for device malfunctions, confirmations	Water thresholds, device malfunction, battery low, communication loss, configurable alarms available on all data points
	Standard alert delivery methods	Dashboard, mobile app notification	Text	SMS, Email	Mobile app notification	SMS, email (push-notifications in development)
	Critical alert delivery methods	SMS, Mobile app, dashboard	Text	SMS, Email	SMS	As above
	Critical alert acknowledgment required?	Optional. Can require acknowledgement and keep escalating until cleared.	No	No	No	No, it is optional
Updates	Software/firmware update frequency	Active engineering team updating and improving our solution continually	Updates are issued as required to maintain system performance and reliability.	Several times each year typically.	6 mths	3-6 mths
	Update delivery method	Apps and cloud over the air. Devices in field - only required when new features are needed. Devices can be updated wirelessly	In-field manual (Provision for future updates to be over the air).	In field at present	Over the Air (LTE) in the field (LoRaWan)	Over the air for FarmConnect portal, in field manual for control & monitoring devices
	Can updates be scheduled?	Yes— windowed to avoid irrigation events and peak operations.	Yes	Yes	Yes	Cloud based - all customers in AU at once, announced via FarmConnect portal so farmers can plan around any outage (outages are typically <1hr)
	Update cost structure	Included with subscription	Included	Free for systems under subscription	Included in subscription	Included in annual device fees

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Security	Data ownership & export capability	Client owns data. Export available anytime (CSV/JSON via API)	User owned. User can currently export data.	Customer	Padman owned. Export on request	Owner can export data
	Data storage period	Active projects: full detail retained; archived snapshots kept per client policy.	Indefinitely - data stored on laptop	Indefinite	5 years (limited)	Indefinite
	Security	Encrypted in transit and at rest; signed firmware; rolebased access; audit trails for commands and user actions.	Password protected	All comms is proprietary. Not easily hacked.	Password protected, firewalls, etc.	Azure directory for identity management, role-based permissions/ authorities, all data is encrypted using HTTPS/SSL
	System backup	Redundant cloud hosting with automated backups and monitored recovery procedures.	On drive	Backed to SD card in Hub and to Cloud database. Restored from SD card if needed.	Online, rollback	Amazon cloud back-up system. Platform failures are detected by monitoring systems, triggering critical incident response action
Forecasting	Irrigation forecasting integration	Planned: weather and cropmodel inputs to recommend start/ stop windows and risk alerts (roadmap)	Not yet	Not yet	Not yet	Rubicon FarmConnect irrigation data and sensor data can be pushed to SWAN Systems for irrigation scheduling

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		Agri-Mation Australia	Bidgee Automation	Environode	Padman	Rubicon Water (FarmConnect)
USER INTERFACE						
Interface	Interfaces available	IOS/Android Mobile apps, web-based app	IOS/Android Mobile apps, web-based app	Android and web	IOS/Android Mobile apps, web-based app	IOS/Android Mobile apps, web-based app
	Controller on-device controls	Physical buttons and standalone direct device Bluetooth app for timer-based solution	On device open / close	BLE app and/or plug in pendant	Physical buttons, screen	Physical buttons, Bluetooth and cloud-based portal
Access	Multi-user platform functionality	Yes — roles/permissions	Unlimited users, Admin & User permission level.	Multiple users with different permission levels	Unlimited	Unlimited users, irrigator (user) and agronomist (viewer) permissions available
	Permission levels available	Owner/Admin (full + manage users), Manager (full control), Viewer (incl. 3rdparty)	Admin & User Permission Level (Both have full access. Admin can add and remove users.	Engineering, Scheduling and Control, View only.	Admin (Full access with ability to edit, add create users), Manager (full access without admin rights), Farm Hand (View only)	Irrigator - can operate devices, schedule programs. Agronomist can view all data.
Visualisation	Interface customisation	Devices are managed separately to farm and then mapped to farm infrastructure to preserve paddock/irrigation data integrity if devices are move or swapped. Organised by Business-Farm-Field-Bay	Technician required to customise dashboard.	We do that as required	Yes	Rename devices, organise by device names or field names.
	Visual field mapping	Google maps	Google maps	Yes	Yes	Google maps
	Can field boundaries be imported?	No	No	Yes	No	No
	Colour-coded status display (e.g. red= fault, green = door closed)	Yes	Yes	Yes	Yes	Yes

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		Agri-Mation Australia	Bidgee Automation	Environode	Padman	Rubicon Water (FarmConnect)
Set up	Device grouping (organised by field/farm)	Yes	Yes, technician required in initial set up	Yes	Yes	No
	Default templates	Templates are used for complex irrigation events so that Irrigators can reuse last irrigation strategy with required tweaking optimisation, saving considerable time	Yes, ability to save template for field min/max run times & trigger heights.	System health, Schedule Management, Irrigation Monitor, Water Level Management, Water Advancement Management.	Yes	No - each device is its own object with its own template
Data	Data visualization (Graphs), Reports & CSV Export	Graphs, Irrigation event summaries, failed command executions, CSV export	Graphs, Water Height (outlet and remote), door position, batter voltage, date and time.	Graphs, customise reporting, CSV export	Graphs, On request, CSV export	Graphs, custom request for reports, CSV export.
Integration	Integration with other farm management software	Not yet	No	CISCOWeb, Pairtree,	No	Yes - SWAN Systems
	Remote sensing integration (Satellite imagery / Drone data / Other)	Under consideration - medium to long term on roadmap	No	No	No	No
	Open API available for custom integration onto other platform	Yes	No	Yes	Yes (on approval)	Yes
Cost	Platform ongoing cost	\$30 per device per year, \$1250 per farm business per year	None	Cloud costs \$10/month for LoRa devices, \$20/month for Cat-M1 devices.	Included in above	Annual per device

Footnotes

¹ Irrigation Tools and Technologies. Smarter Irrigation for Profit Phase II. 2018.

² “Consultant Case Study: Southern Irrigation Development” CottonInfo, 2023.

³ “New tech integrated smart sensing & automation for cotton: Application in bankless channel irrigation” SIP, 2021.

⁴ “GVIA Application of digital technologies for automated irrigation” SIP, 2021.

⁵ “Evaluating the Performance and Opportunity Cost of a Smart-Sensed Automated Irrigation System for Water-Saving Rice Cultivation in Temperate Australia” MDPI, 2023.

⁶ “Staged automation of irrigation in cotton systems” SIP, 2023.

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CONTRIBUTORS:

Matt Champness led the project and developed the smart irrigation content, with review and editing of siphonless system design content. **Harriet Brickhill** developed the siphonless systems content and provided review and editing of smart irrigation technologies content. **Glenn Lyons** provided technical input and review of siphonless system content.





GLOSSARY

Naming conventions differ between regions and have changed as systems have evolved. Where multiple terms exist, bold text indicates terminology used within this document.

API (Application Programming Interface): A set of rules and protocols that allows different software applications to communicate with each other. In smart irrigation, APIs enable sensors from different manufacturers to share data with control platforms.

Automated Irrigation: Systems where the decisions about when to open/close inlets/ outlets or start/stop pumps are made automatically by the supervisory system based on sensor data and programmed rules, without requiring human intervention for each action.

Bay: A section of a down the slope field that is separated by banks running from supply end to tail drain.

Basin: A section of a field where there is no or minimal slope along the furrow, that is separated by banks running from end to end.

Bankless Channel/bankless head ditch: Used in GL Bays & Basin systems. A below field height levelled area that is filled prior to water entering furrows. It acts as the supply and drain. Drainage is through a check structure into the next stepped bay or basin.

Bankless Side Channel: Used in Rollover Bankless. A below field height channel that runs in the same direction as the furrow and supplies water to a bankless channel at each end of the furrow.

Bankless Check: Drop board, rubber door or gated pipe that controls the passage of supply water from bay to bay – or basin to basin.

Command: An instruction sent from the supervisory system or user interface to a controller, directing it to perform an action (e.g., open outlet, close valve, start pump).

Communication Network: The connectivity layer that transmits data and commands between field devices (controllers & sensors) and the supervisory system. May use cellular, LoRaWAN, radio, or Wi-Fi.

Controller: A device that opens and closes irrigation infrastructure (inlets, outlets, valves) based on commands from the supervisory system or direct user input. May include motor/actuator mechanisms and control electronics.

Cross Fall: lateral slope across the field (as opposed to down the slope of the furrow).

Dispersion Pond/ distribution basin / distribution bay/ dispersion basin/ pontoon area: Used in PTB systems. Below field height levelled area between head ditch and furrows that is filled prior to water entering furrows. This is only a supply and is at the upper end of the field.

Gateway: A device that receives data from field sensors or controllers using one communication protocol and translates it for transmission to the supervisory system using another protocol. Common in LoRaWAN and radio networks.

GL Bays: A siphonless system consisting of terraced bays stepping down the landscape with furrows running perpendicular to the natural slope. Water is supplied via bankless channels, with tailwater reused between adjacent bays.

Handshake: A communication protocol where the receiving device confirms it has received and executed a command. Provides verification that actions have been completed successfully.

Head Ditch: The main supply channel for the field, which enables supply via manual hand siphons, small pipe through bank or large pipe through bank. This controls water head height.

Level Basin/ flat bays, flat flat, beds in bays, bankless channel: A siphonless basin system with zero or minimal slope (typically flat or 0.01% down slope) along furrow length. Water enters and drains through bankless channels at each end of the furrows. Field is divided into terraced basins stepping down the landscape.

LoRaWAN (Long Range Wide Area Network): A low-power, long-range wireless communication protocol designed for IoT devices. Requires a LoRa gateway on the farm and is well-suited for large farms with many distributed sensors and controllers.

Offtake: Primary point of delivery from the irrigation scheme/river.

Outlet: An overarching term for a structure used in irrigation systems to control the flow of water. Includes inlets and check structures.

Pipe through Bank (PTB)/ Large PTB, Pontoon: A siphonless system where large diameter gated pipes (250-750mm) are installed through the head ditch bank to deliver water to a dispersion pond. Water then flows simultaneously into multiple furrows (typically 12-96 furrows per pipe). Field slopes down to taildrain.

Platform: The software system (web-based or app-based) that provides the user interface for monitoring and controlling smart irrigation equipment. May include data visualization, scheduling tools, and alert management.

Protocol: A set of rules defining how data is transmitted between devices in a communication network. Different protocols (e.g., LoRaWAN, Modbus, MQTT) have different characteristics for range, power consumption, and data capacity.

Radio (RF): Short-range wireless communication between nearby devices using radio frequency signals. Typically requires line-of-sight and may use mesh networks where devices relay signals to extend range.

Remote Irrigation Control: Irrigation systems where human operators make decisions about when to irrigate and manually trigger actions (open/close outlets, start/stop pumps) through a remote interface (app or web platform), without travelling to the field. Differs from automation where the system makes decisions.

Repeater: A device that receives and retransmits signals to extend the communication range of a wireless network, particularly important for large farms or areas with terrain obstacles.

Rollover / Rollover Bankless: A siphonless basin system where furrows follow the natural slope direction (allowing machinery to “rollover” from one basin to the next). Requires very flat terrain (<0.04% slope). Uses bankless side channel and bankless channels for water supply and drainage.

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Sensor: A device that measures physical parameters (water height, soil moisture, weather conditions, flow rate) and transmits data to the supervisory system to inform irrigation decisions.

Sill: The point in the bay where the field slope changes to a negative slope.

Siphonless Irrigation: Surface irrigation systems that deliver water at high flow rates from an inlet to a below-field-level area where water spreads evenly before entering all furrows simultaneously, eliminating the need for hand-placed siphons and 2-meter rotobucks.

Smart Irrigation: An umbrella term for advanced irrigation technologies that use real-time data and automation to optimise irrigation management. Includes sensing/monitoring, remote control, and automated irrigation systems.

Small Pipe Through the Bank (Small PTB): A system using permanent 75-90mm pipes installed through the head ditch at consistent levels. Still requires 2m rotobucks. Variations include stepped set, double head ditch, and smart siphon configurations. See Chapter 1, Section 4 for detailed descriptions

Supervisory System: The central control or decision-making system that processes sensor data, interprets field conditions, and triggers controller actions (opening or closing infrastructure).

Supply Channel: A channel that carries water throughout the farm to supply the head ditch or fields.

Supply Inlet: a structure that allows water to enter the system, usually from the supply channel

Tail drain: Tail drains remove runoff from the field created by both irrigation and rainfall events.

Tail drain Checks: Drop board, rubber door or gated pipe that controls the passage of tailwater from bay to bay.

Tail drain Outlet: Drop structure and pipe that passes the tailwater to the recycling system.

Tailwater Backup (TWB): The slope at the tail drain end of the field is reduced to allow tailwater to back up slower furrows. This backed-up water is then drained and reused in the subsequent bay.

Terraced Basin: A basin system configuration where basins step down the landscape with minimum 15cm vertical drop between each basin level. Used in both Level Basin and Rollover systems.

Time-based Controller: A controller that operates on pre-programmed time schedules to open/close infrastructure or start/stop pumps. May lack sensor feedback beyond basic fail-safe protection.

User Interface: The platform (local buttons/screen, Bluetooth connection, mobile app, or web portal) where operators monitor system status, view data, and control irrigation equipment manually or remotely.

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