

# JOURNAL

FOR IRRIGATION PROFESSIONALS

**Professional development feature:**  
Packed schedule for 2020 delivering Certificate III in Irrigation Technology

**Controller upgrade**  
helps improve water management in council parks

**Irrigation Australia International Conference and Exhibition 2020**  
Event update

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CHANNEL AUTOMATION EXPLAINED  
USING SATELLITE IMAGERY TO DETECT WATER STRESS  
ESSENTIAL IRRIGATION STATS

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**ON THE FRONT COVER:**  
 Scott Whyte from Atomic Irrigation in Townsville checks plans for the installation of drip line in the main street of Winton in Queensland's channel country. Scott is currently completing training as part of becoming a Certified Irrigation Installer.



# WELCOME



## CHAIRMAN'S MESSAGE

What a start to the new year with drought, bushfires, hail and flooding rains all experienced in the last months!

Australia is no stranger to the ravages of natural disasters, and the events described in the headlines below have affected us all at some time.

*Farmers are facing ruin across New South Wales and Queensland in what some are calling the worst drought in living memory, with costs of stock feed and transport spiralling* ABC News online January 2020

*More than 2400 homes have been destroyed and five million hectares burnt. The scale of these bushfires is unprecedented, and NSW is experiencing the most devastating natural disaster in living memory.* Naracoorte Herald 4 February 2020

*It has been Australia's lost summer. Drought, hail, floods and, worst of all, bushfires have ravaged communities all over the nation.* Illawarra Mercury 7 February 2020

*The Reserve Bank has conceded that China's coronavirus outbreak could hit Australia harder than the 2003 SARS epidemic.* The Australian Business Review, 8 February 2020

In fact, when penning my article at the same time last year, I wrote: "At this time, many in our community are not feeling much love for our country, with parts of Australia variously in the grip of prolonged drought; experiencing severe flooding; and succumbing to extreme bushfires."

Internationally, the novel coronavirus and its impact on global movement of people and products are yet another threat to our economic viability (not to mention our health).

The fact that such crises are part and parcel of living in Australia does not make them any easier to deal with, and Irrigation Australia acknowledges the strength, spirit and resilience of our community in responding to recent events.

Members of Irrigation Australia have an important role to play in supporting our communities during recovery from crisis. This may include replacing irrigation infrastructure damaged during fires or floods and re-establishing irrigation systems unused during long periods of drought.

Importantly, it may also include optimising both irrigation system operating cost and water use efficiency at times when money will be tight, when the need for efficient system operation in support of economic recovery is critical.

Irrigation Australia's mission statement includes that IAL will provide professional development for the irrigation industry supporting economic sustainability in Australia. It does this through a broad range of activities, including:

- providing industry certification for members, assisting end users to have confidence in the service providers they engage
- facilitating training to ensure members can design, supply, construct and operate cost-effective and efficient watering systems
- supporting the national training framework for the irrigation industry, one result of which was the establishment of trade recognition for the Certified Irrigation Technician qualification late last year
- providing the Centre of Irrigation Excellence

website as a single online source of irrigation knowledge about both training and products, provided by industry partners and made readily available for member reference as required

- facilitating member engagement through regional activities as well as national and international conferences (including the 2020 conference in Sydney this September)
- engaging with government at all levels to encourage their support for structured industry training, and to provide our support for water management activities promoting efficient and equitable use of available irrigation water.

The uptake of both irrigation and meter-related training by Irrigation Australia members in the past two years has been substantial. I'm sure this has been driven, not only by the changed regulatory approach to metering of water use, but also by recognition of the need to be more efficient in our use of water. Irrigation Australia will continue to support this by delivering training programs throughout the nation, targeted as much as possible to local requirements as advised through the regional committees.

It is critical for the economic recovery of our communities which rely on irrigated cropping that Irrigation Australia members use their knowledge, skills and experience in providing the most efficient and cost-effective means of delivering water in accordance with crop requirements.

**Andrew Ogden**  
Chairman



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## EDITORIAL

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## FROM THE CEO

Happy New Year to our members and readers.

I note with interest that when a search for 'irrigation' is entered into the job search website SEEK it returns numerous listings of employers looking for an 'Irrigation Technician'. Fortunately, irrigation technician is now a recognised trade qualification and was listed on the government website [www.training.gov.au](http://www.training.gov.au) late last year (this website is the official national register for training).

I'm sure many in the industry would agree that a trade in irrigation is well overdue. The introduction of irrigation technician as a recognised trade provides a great boost to the industry as it allows for a career path for school leavers and a recognised minimum standard of competency, something we have been working towards since the 1990s.

The irrigation technician qualification requires people to complete all 22 units that make up the necessary packaging requirements from the National Training Register for Certificate III in Irrigation Technology (AHC32419). In addition, they need to complete workplace assessments, assignments, multiple choice and short answer questions for each unit to show volume of learning. The certificate will be delivered in four blocks of learning. Irrigation Australia has now started delivering it at various locations across Australia, with our very first course held in Melbourne in February.

Irrigation business employers and employees can now be the first people in Australia to achieve this trade qualification and lead the market as

recognised tradespersons, which will eventually be the minimum accepted standard for irrigation work in this country. Don't get left behind; check out the locations for our next Certificate III course in Irrigation Technology on our website. Remember, if you currently hold a Certificate III in Irrigation then you can register for a top-up course of an additional eight competencies to obtain the qualification. For more information, go to the article on page 16.

### Metering update

The renewed focus on metering policy, particularly by some key Murray-Darling Basin states, continues to provide a demand for certified meter installers and validators and we are responding by scheduling more courses this year.

The training team led by Geoff Harvey have increased the length of the course to three days. The big advantage in this is that students can complete their certification on the third day before they leave rather than providing assignments at a later date. The new course fee includes certification for two years.

Still on the topic of metering, manufacturers are entitled to feel disappointed with the decision of some states to not fully comply with the objectives of the National Framework for Non-Urban Water Metering, which was an agreement reached with the Council of Australian Governments. The 2009 objective was that all required meters would meet the standard within 10 years. The current eight meter manufacturers with AS 4747 approved

meters have all gone through a very expensive and arduous process to have their meters approved only to find that in some states non-pattern approved meters can be installed.

### Call for abstracts

We have announced our call for abstract submissions for the combined Irrigation Australia Conference and ICID 24th International Congress to be held in Sydney in September this year. Submissions close 13 March, and you can find more information about topics on the conference website [www.icid2020.com.au](http://www.icid2020.com.au). This event will also see the introduction of a breakfast and forum on Women in Irrigation which will highlight the important and often under recognised role that women have in the irrigation industry. Stay tuned for more announcements and information, including on a sponsor and exciting keynote speakers.

**Bryan Ward**  
CEO

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## CONTROLLER UPGRADE HELPS IMPROVE WATER MANAGEMENT IN COUNCIL PARKS

Last year, Watermatic Irrigation, a retail and installation business based in Sydney's north, was awarded a contract by Waverley Council in the eastern suburbs to upgrade its irrigation control system.

The council had 20 sites that needed upgrading for two key reasons.

According to James Simpson-Lee from Watermatic, the first was because of its desire to maintain its commitment to effective and sustainable irrigation management. The other was that the makes and models of existing irrigation control systems varied and did not support a common, centrally managed computer platform for remote operation.

"This had a big impact in terms of reducing efficiency, both with managing staff time and with the operation of the irrigation systems," said James.

### Project specs

The council specified that the project involved upgrading irrigation controllers in all their parks so that they were standardised and allowed for watering schedules for each site to be managed centrally.

"As with most jobs like this, the controllers also needed to incorporate a capacity to be operated both manually and remotely," said James.

A number of other requirements were specified, as follows:

- The controllers had to be supplied from the one manufacturer and be interchangeable so they would still be operable if site configurations changed.
  - The software platform had to be cloud based.
  - The controllers needed to be operated by constant 240 V AC power rather than being battery operated.
  - An option to integrate rain and flow meter sensors to support efficient watering schedules.
  - The ability to communicate information sourced from the Bureau of Meteorology as well as local weather stations to the centrally managed software platform, so that it could be incorporated into watering schedules.
- The system also had to be able to support both predictive and historical rainfall events.

### The solution

James explained that there were several ways of tackling this project for Waverley Council to achieve its aims.



Watermatic Irrigation recently upgraded the irrigation control system for twenty of Waverley Council's outdoor recreation areas.

"We nominated two conforming options and the council elected to go with a Hunter Hydrowse platform and compatible controllers," he said.

Having the one system was important for council staff as it meant that all users, including grounds staff, have become familiar with the base platform rather than being required to familiarise themselves with several different systems.

Watermatic supplied controllers to suit each site, most of which were Hunter HCCs, although some sites with space limitations required Hunter Pro-HCs. To save time in the field, all the controllers were set up and configured in the company workshop.

"This included setting up zones, watering schedulers, basic predictive watering parameters, sensors and weather station details," said James.

As part of the company's procedure, a dilapidation report and field wiring continuity test were conducted before the old infrastructure was removed.

Time was a factor in the changeover as it was important not to have parks unavailable for community use so coordination between the installing team and the council was crucial. The old controllers were taken out and new ones installed and commissioned on the same day.

Watermatic worked with the council's IT department to implement their own security protocols as far as the WiFi connection was concerned.

"This means there was no downtime for any of the sites during installation," said James.

The successful rollout of the new controllers took place over a few weeks, followed by training for staff, including sessions on advanced features of the product, such as advanced programming features, reporting and alert set up.

### Satisfied customer

An important reason underpinning the successful installation of these controllers for Waverley Council was communication and coordination between the Watermatic Irrigation team and council staff.

This contributed to the project being completed on time and within budget, with the result that the council now can manage irrigation schedules for all its parks remotely, saving time and improving water application efficiency.

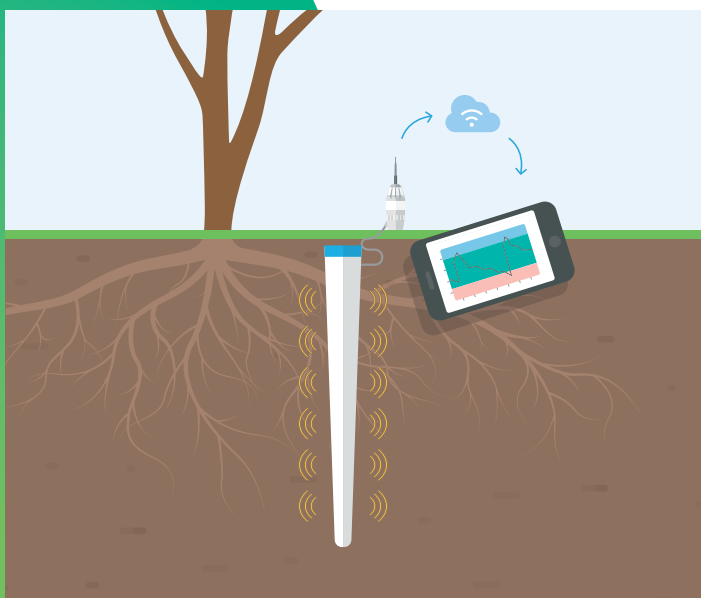
Alerts will also be provided to identify any operating faults with the irrigation system before they become a major problem, e.g. high flows due to pipe or sprinkler damage. It will also allow remote operation from in the field via a mobile device, e.g. phone or tablet. This feature will make maintenance and inspection processes far more efficient because access to plant rooms is not required by staff.

An important consideration for this project was the impending tightening of water restrictions in Sydney. Watermatic Irrigation is a member of Irrigation Australia and James Simpson-Lee is an active member of the Sydney Region Committee.

Last year the committee worked closely with Sydney Water on developing water efficiency recommendations. While the exact shape of future restrictions is unknown, weather-based controllers and sensors will be important components of a compliant control system.

With water savings of between 50 and 60 per cent since the new system was installed, Waverley Council is already ahead of the game and ready for a future where water use efficiency will assume greater importance than in the past.

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## IRRIGATION, VERSATILITY, SUCCESS IN A NUTSHELL

Improving their farm's versatility was the priority when Jamie and Marie Schembri planted almonds in 2015 on their farm, Greenview, near Griffith in the centre of the Murrumbidgee Irrigation Area in New South Wales.

Jamie and Marie previously focused on annual horticulture crops including watermelons and rockmelons, but a scare with a melon virus in the early 2000s prompted the change of strategy to a perennial tree crop.

The first stage of their expansion was 180 ha of almond trees, and they've since planted a second stage of another 250 ha. According to Jamie, adding

the almonds has taken considerable investment in plant stock and irrigation system set up, but their calculations indicated that there would be a positive on the balance sheet.

"For us the negative side of that is the initial water use but the return on investment on water will still play towards the nuts," Jamie said.

Standing them in good stead is their experience with irrigation. The Schembris have worked in irrigation for the best part of 25 years, starting with Jamie's parents before they started their own farms at Cowra and Eugowra. They made the move to Greenview Farm in 2011.

### Do it right, the first time

To maximise the benefits from irrigating, Jamie knew that things had to be done correctly and to best practice standard, starting with designing the system. Their certified irrigation designer worked with satellite imagery to plan out the orchard.

Working from the industry standard, the trees are planted 5 m from each other, 7 m between each row.

Jamie went with Toro equipment, in part because of his long-standing relationship with them. The designer recommended pressure-compensating drip tube, which Toro supplied from its Neptune range.

The tube is designed to ensure a consistent spread of water across the almond grove, and the pressure compensation means the flow rate is the same all along the line. Importantly, their investment is a long-term one with the tube expected to last 15 years with regular maintenance.

Water is supplied from a dam and is piped into several tanks and filters before being distributed around the orchard.

### Lessons learned after first season

This season is set to be the first that almonds will be harvested, after concern about the health of the trees saw harvest missed in 2018.

The almond trees initially had one line of drip tube delivering a mix of water and fertiliser.

"On stage one we ran single for two years, and then put in a second on year three, but we found that we would have been better off putting two tubes at the start," Jamie explained.



Jamie Schembri says that the investment in drip irrigation for the family's 430 ha of almonds is a significant one that will pay off over time. (Background: Michael Lenehan from Toro)

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Pressure-compensating drip tube has been installed down both sides of each row of almond trees.

The two tubes on either side help encourage a better and more stable root system.

Jamie said almonds could have first been harvested in the third year, however, they held off to protect the trees' health and ensure their root systems weren't disrupted.

"We left (harvest) last year because we didn't want to shake the trees," Jamie said.

Since planting the second stage of the almond grove, the Schembris have used two lines of drip tube, which has been manufactured to a custom length. This helps ensure there's no waste when it's laid down alongside the trees.

It also means the Schembris don't have to cut or add tubing, and using fewer joiners in the tube means there's a smaller risk of leaks. It can simply be rolled out and connected.

Four varieties of almond tree were planted in the first stage – Nonpareil, Monterey, Supa Pareil and Wood Colony. Only Nonpareil and Shasta varieties were planted at the second stage. Nonpareil makes up around half the plantation, which is standard industry practice. The trees were all sourced from a Griffith nursery.

Unlike row crops, which can have plastic covering the ground to reduce competition from weeds, Jamie said keeping the almond grove free from weeds was a challenge.

Dust settling on the weeds makes certain chemicals inert meaning spraying must be done soon after rain.

### Keeping it on the farm

As well as the investment in setting up the almond orchard, the Schembris will do their own harvesting and are importing specialised equipment from the United States.

Doing their own harvesting gives the Schembris the chance to maintain an element of control in the process as well as ensuring their 10 permanent staff have work.

The nuts are usually harvested around February to March and they'll be taken to a de-shelling factory in Griffith before going for further processing.

**Note.** Article provided by Toro Australia.



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## NEW SOFTWARE TOOL FOR COMPARING ECONOMICS OF RAINFED, SURFACE AND PRESSURISED IRRIGATION SYSTEMS

In October last year, USQ's Centre for Agricultural Engineering presented ISAT (Irrigation System Assessment Tool), a new software-based tool it had developed, to a meeting of Central Downs Irrigators Limited in Dalby in Queensland.

The aim of the tool is to help growers assess the merits of converting from dryland or surface irrigation systems to pressurised irrigation systems or improved efficiency surface systems. While ISAT has been developed for irrigators in the Central Darling Downs, it can be modified to suit other regions if there is a need.

### Need to assess system conversion

For some time, Condamine groundwater users based in the Central Downs have felt that irrigation systems such as lateral moves and centre pivot irrigators could offer benefits in terms of labour and water savings, however, there was not much detailed economic information to support this belief.

The recent adjustment of Condamine Alluvium groundwater entitlements, as part of the Murray-Darling Basin Plan, and general concerns around long-term water availability have increased grower interest in alternative irrigation systems.

**What ISAT does.** ISAT considers factors like water use, on-farm irrigation approaches, soil types, crop types and yield performance, energy consumption, labour use, as well as capital and operating costs.

It uses a gross margin analysis for current "before" and a range of scenarios of improved "after" situations. Economic analysis includes internal rate of return (IRR), nett present value (NPV) and benefit cost ratio on possible capital investments.

It is important to note that while it can be used to assess a single block of land where a new irrigation system is proposed, it is not designed to optimise whole-of-farm water management.

**System financial comparison.** Using ISAT, a grower can:

**Step 1. Identify** a field on an interactive map.

**Step 2 Evaluate** the existing system of rainfed or furrow irrigated cropping to set baseline performance. Crop rotations of back-to-back cotton or cotton-wheat/barley-long fallow can be evaluated.

**Step 3 Evaluate** alternative irrigation system. New irrigation equipment investment scenarios can then be evaluated over 50-years of consecutive crop rotation for chosen water allocation, crop sequence, planting dates and irrigation application efficiency. Results are compared with the existing scenario.

**Step 4. Generate** reports. Various on-line and pdf printable reports can be generated to allow for off-line side-by-side comparison of various strategies.

Capital costs of new irrigation systems are entered by the grower. If total costs are unknown, side calculators can be used to help figure out capital cost. Typical costs and technical parameters for different irrigation systems have been provided as defaults.

Revenue from the existing and alternative irrigation system is calculated from yield and crop price. It can be adjusted to account for risk of crop failure based on damage to an irrigation system due to wind, flooding etc. This is based on the probability of occurrence and the percentage loss of crop. Gross margins of before and after system scenarios can be compared. The NPV, IRR and cost benefit are determined by assessing discounted life-time costs and benefits over a 30-year horizon.

Climate records from local weather stations were used to predict crop yields with the APSIM model based on different scenarios of crop, soil type, water allocation and risk. Soil information from the ApSoil database was used to guide local soil selection. Data sourced from AgMargins (<http://agmargins.net.au>) was used to support economic analysis.

Crop yields from crop rotations over 50 consecutive years and resulting economics are provided for "average", "good" and "bad" years. Sensitivity analyses can be undertaken to assess changes to any selected input parameter (e.g. water allocation, input cost and yield expectation).

### Case study analysis

Ian Hayllor, a Darling Downs irrigator, evaluated the ISAT tool to assess the potential for converting a 200 ha rainfed cotton-barley long-fallow rotation on a field at Ranges Bridge (current system) to surface irrigation and a new lateral move. The soils have a high plant available water content (PAWC = 240 mm).

Modelled crop yields based on 50 years of Macalister weather data adjusted for local experience were used with AgMargins economic data to estimate current revenues and a new gross margin. The median rainfed cotton yield was estimated to be 4.6 bales/ha and barley yield was 1.9 t/ha, resulting in a gross margin of \$494/ha a year. This increased to \$2,445/ha a year in a "good" year (exceeded in only 25% of years) and reduced to \$99/ha in a "poor" year (exceeded in 75% of years).

### New irrigation equipment scenario.

Assessments were completed on the potential improvements using optimised furrow irrigation or a lateral move, based on an annual water allocation of 3.5 ML/ha (equivalent to 700 ML/year across the 200 ha block). Results are summarised in the table (next page).

Crop yields were estimated to be slightly higher under the \$360,000 lateral move when compared with surface irrigation as a result of better irrigation performance and more flexible irrigation management (smaller applications more frequently to maximise rainfall capture). Furrow irrigation performance was assumed to be high (65%) given the extensive experience with these systems.



A new software-based tool is helping Central Darling Downs irrigators assess the merits of converting from dryland or surface irrigation to pressurised systems.



**TABLE. ANALYSIS OF POTENTIAL IMPROVEMENTS USING OPTIMISED FURROW IRRIGATION AND LATERAL MOVE COMPARED WITH RAINFED CROPPING BASED ON AN ANNUAL WATER ALLOCATION OF 3.5 ML/HA.**

Scenario	Gross margin (\$/ha/yr)	Median yield cotton (b/ha), barley (t/ha)	Application efficiency for irrigation (%)	Capital investment \$/ha	Increase in gross margin with new irrigation equipment (\$/ha/yr)	Benefit cost ratio	IRR (%)
Rainfed	\$494	Cotton: 4.6 Barley: 1.9	-	-	-	-	-
Optimised furrow	\$2,471	Cotton: 12.2 Barley: 4.5	65%	\$1,000	\$1,977	27.7	198%
lateral Move	\$2,831	Cotton: 13.4 Barley: 6.4	85%	\$1,800	\$2,337	16.1	130%

The overall pumping costs used with the lateral move were \$47/ML compared to \$29/ML for the furrow system, given higher pump pressures. Labour costs for the lateral move were significantly lower.

The lateral move resulted in a higher increase in gross margin (\$2,337/ha/year) compared to furrow irrigation (\$1,977/ha/year) given better yields. However, the higher capital investment resulted in a lower benefit-cost ratio and IRR. Both systems provided a very good return on investment.

### The bottom line

After he used ISAT, Ian Hayllor identified its key benefits for him.


“The tool is very useful to look at a range of scenarios, test assumptions, for example the impact of reduced water allocation or capital cost, and guide investment decisions,” he said.

The ISAT tool allows assessment of the impact of a range of water allocation scenarios on profitability. The sensitivity of changes in cost of labour and energy can also be assessed. Field shape can also be

taken into consideration when comparing systems as some systems (e.g. centre pivot) may not allow the full area to be irrigated.

### ISAT project funding

ISAT was commissioned by Cotton Australia and was funded through Queensland Department of Natural Resources, Mines and Energy (DNRME) and Cotton Australia under the Murray-Darling Basin Regional Economic Diversification Program.



**Free download.** ISAT is available, free of charge, to irrigators via the link <https://isat.usq.edu.au>

Erik Schmidt and Joseph Foley, USQ Centre for Agricultural Engineering, Toowoomba

## HOW THE NATION'S BUSHFIRE CRISIS COULD BECOME A WATERWAYS CRISIS

In January this year a paper highlighting the dangers of Australia's recent bushfire crisis turning into a waterways crisis was published by Adjunct Professor Max Finlayson from Charles Sturt University's Institute for Land, Water and Society and Jason Alexandra from RMIT.

“Floods after bushfires: rapid responses for reducing impacts of sediment, ash, and nutrient slugs” was published online in the *Australasian Journal of Water Resources* and urges immediate action to minimise the impact of fires on Australian waterways.

The paper describes the risks posed to waterways, catchments, wetlands, lakes, and estuaries when rainfall washes silt and ash into them. Fire-affected areas are susceptible to erosion so heavy rain could wash sediment, ash, and nutrients into waterways.



The result is potential algal blooms, problems for urban water supplies, and fish kills.

The article identifies four focus areas:

- assessing the risk and options for co-ordinated policy responses
- making water supplies a priority for assessment and treatment
- identifying important habitat areas and at-risk species of fish

- increasing monitoring and health warnings for the public.

Professor Finlayson said investing in water supplies and quality benefits human health and reduces economic loss. Quick reaction will ensure the bushfire crisis does not become a waterways crisis.

“There are short-term, medium-term, and long-term considerations for post-fire recovery,” he said.

“State and Commonwealth governments need to use past experiences and the information gathered during this crisis to design and co-ordinate recovery programs to ensure the longevity of our waterways after bushfires.”

**Information.** To download the paper, go to website <https://www.tandfonline.com/doi/full/10.1080/13241583.2020.1717694>

## Channel automation explained

One of the strategies for improving the efficiency of water supply delivery in the last two decades has been modernising irrigation channel supply systems through redesign and refurbishment and by using sophisticated automation solutions. This article describes what is involved in automation and its benefits for water supply efficiency.

While the aims of modernisation vary, they usually include improving service, transparency, equity and reducing distribution losses, the majority of which are commonly the result of outfalls (operational spills), i.e. water that flows out of the system unused. Other sources of loss are leakage, seepage, evaporation and theft, all of which are usually minor compared to spills.

In the last two decades, automation has been a big contributor to reducing spills by precisely matching supply with demand, thus supplying water when and where it is needed for more efficient on-farm use. It is a major improvement on manually operated systems, where orders are placed for water and staff in the water supply company manage the logistics of operating channel regulating gates to move water through the channel network.



Channel modernisation through automation has contributed significantly to improving system efficiency and cutting losses resulting from water flowing out of the system unused.

TABLE. DEGREES OF AUTOMATION OF CHANNEL CONTROL.

LEVEL <b>1</b>	<b>REMOTE MONITORING</b> Remote monitoring of environmental variables such as flow rates, channel, dam and tank water levels. Information is remotely accessible, but operators have to travel to a device to make control adjustments.	<b>BENEFITS</b> • Operators can make more informed decisions based on real-time and historical information
LEVEL <b>2</b>	<b>REMOTE MONITORING AND CONTROL (SCADA)</b> In addition to remote monitoring operators can control channel gates remotely.	<b>BENEFITS</b> • Operators can adjust devices without having to travel to the site. Devices can be adjusted more frequently than under full manual control
LEVEL <b>3</b>	<b>LIMITED AUTONOMOUS CONTROL</b> A SCADA solution with control devices (gates) that can autonomously control water levels and flows in their immediate area. Devices operate independently of each other but can be networked later. Human operators remotely set a control objective for each device.	<b>BENEFITS</b> • Investment in technology is largely future-proof, with the ability to increase the level of autonomous control over time
LEVEL <b>4</b>	<b>AUTONOMOUS CHANNEL CONTROL</b> Flows and water levels in an entire channel are autonomously controlled using networked gates. Each gate's embedded software determines the required gate movement and performs the actuation according to system control objectives. The collection of water delivery requests and the scheduling of deliveries is still manually managed. Farm supply points are manually operated.	<b>BENEFITS</b> • The system maintains stable water levels • All farms receive consistent flows through farm outlets • Spills are substantially reduced • Reduced labour costs
LEVEL <b>5</b>	<b>FULLY AUTONOMOUS OPERATION</b> In addition to channel automation, business functions are automated. Water delivery requests are collected online. The system automatically confirms users' water rights, and schedules requests to maximise water deliveries within capacity constraints. Gates autonomously operate to deliver orders. Farm supply points automatically open and close, record water use and report to a control centre. Invoices for water use are automatically generated. Human input is limited to network monitoring and managing exceptions.	<b>BENEFITS</b> • Supply is precisely matched with demand, eliminating spills • Water is delivered almost on-demand • Excess water use on-farm is minimised reducing salinification and nutrient runoff • Up to 90% delivery efficiency increases water availability

### SNAPSHOT: Benefits of implementing autonomous channel control

- Increased water availability by improving distribution efficiency
- Almost on-demand supply means farmers can closely match watering to crop needs, improving yields and quality
- On-demand irrigation makes investment in high-efficiency application systems like sprinkler, drip and micro worthwhile
- Increased equity – all farmers receive the same standard of service no matter where their land is located
- Increased agricultural productivity of existing irrigation areas by exploiting the command area to its full potential
- Better use of available water leads to better crop production and, ultimately, increased farmer revenue
- Increased agricultural productivity by expanding the overall irrigated area

In fact, automated systems can increase water delivery efficiencies to 90 per cent or better and provide equitable and near on-demand delivery of water to irrigators, irrespective of their geographical location.

### DEGREES OF AUTOMATION

There are varying degrees of automation, from basic solutions that enable human operators to monitor and operate individual control devices remotely (SCADA), through to autonomous systems that process and schedule water orders within channel capacity and where channel gates automatically act in a coordinated manner to deliver requested water (see table).

### COMPONENTS OF CHANNEL CONTROL

Autonomous channel control meets changing water use requirements by precisely measuring water level and flow data at regulating gates and farm supply points and automatically adjusting flow rate in response to the data. The following are required to achieve this:

- Automated channel gates that feature integrated flow and water level measurement. They operate autonomously in synchronisation with other gates in the network. The gates can make hundreds of adjustments per day. This networked operation enables gates to precisely match supply with demand, eliminating outfalls.
- Radio communication infrastructure to enable inter-communication between the water control gates, farm supply points and a central computer.
- Management software that collects and automatically schedules water orders, then operates control gates to deliver water where and when it is required. By processing and prioritising water orders, the software ensures that channel capacity is fully used, and service levels are maximised.

Importantly, autonomous control is different from SCADA, which is often referred to in the irrigation industry as channel automation. The autonomous control scale in the table on the previous page shows levels of automation from

the most basic to most advanced, with SCADA at Level 2. The scale and complexity of irrigation district operations mean that human operators are not capable of making the many thousands of adjustments required without mismatches between supply and demand occurring. This makes SCADA insufficient for achieving both the high levels of water savings and the service improvements required to increase agricultural productivity.

With autonomous control, software and hardware automatically act on data at very small intervals to ensure that high-level control objectives are met, without human intervention. For example, a single gate operating under autonomous control may make several hundred flow adjustments each day. Level 5, the highest level of autonomous control, achieves the greatest water savings and service improvements. This is the level that has been implemented in the Murray- Darling Basin. The figure below illustrates the operation of a Level 5 system.

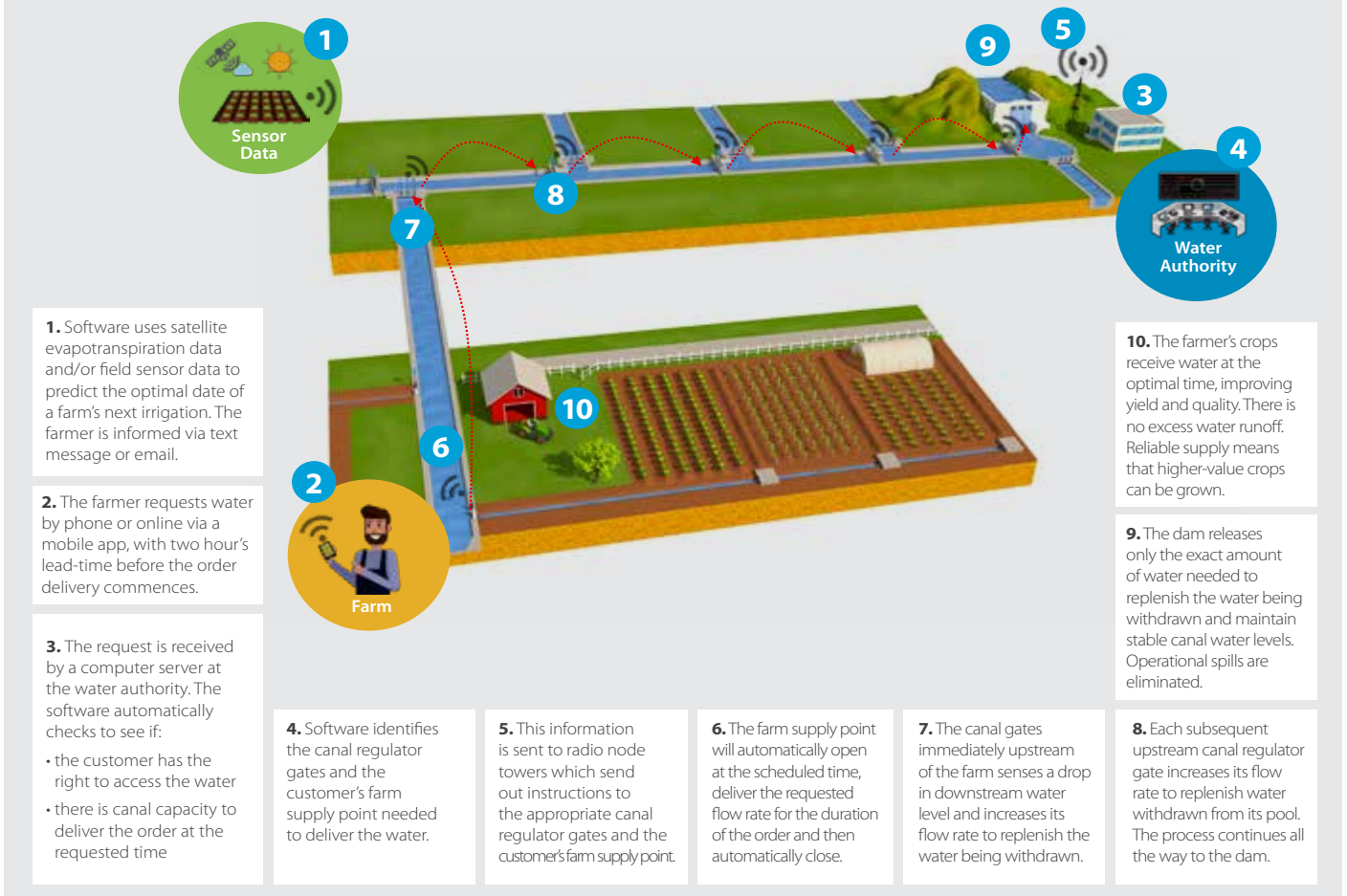
## Types of control strategies

The control strategy is the plan for controlling the delivery of water in a channel network or system. The response of each gate to measured changes in flow rate and water level at adjoining gates depends on the control strategy adopted. A strategy is chosen to balance factors like responsiveness to change in demand, need for volume storage, basin topology and construction costs.

The general types of operating strategies are:

- upstream control (also known as supply control)
- downstream control (also known as demand control)
- hybrid or mixed control, which is a combination of the above.

**FIGURE. A LEVEL 5 FULLY AUTONOMOUS IRRIGATION SUPPLY SYSTEM USING A DOWNSTREAM CONTROL STRATEGY.**



# CENTRAL CONTROL AND AUTOMATION

## HOW WATER MANAGEMENT IS IMPROVED

The improvements to water management from high-level autonomous control are many and justify the investment. The key improvements are as follows:

**Water budgeting.** Automation software provides irrigation authorities with tools to spatially and temporally forecast their water requirements, so they can better match the available supply in storages with the demand in an irrigation supply network. This can be achieved by formally defining the crops grown, the area, and the volume of water that has been applied to each crop. When these data are combined with weather forecasts, future demand can be estimated with more confidence.

**Water accounting.** Accurately measuring flow rate and volume supplied to farms is the basis of sound water accounting. Software systems can accrue these measurements and keep track of remaining resources by comparing measurements with the allocation system. Software also enables these measurements to be made transparently available to stakeholders.

A modernised system also offers the opportunity to better account for water that is lost by enabling continuous water balance analyses. Unauthorised water use or losses in a section of channel will generally result in an imbalance in volume. These losses can be pinpointed and investigated for targeted remediation.

Water accounting is also crucial to compare each irrigator's measured consumption against their allocation for billing purposes if water is a chargeable resource.

**Water auditing.** Centralised measurement data enables audits to be conducted transparently and easily. Modern software systems enable these audits to be conducted in real-time and reports on compliance made transparent. The large amount of data stored by automated systems provides a way to audit all aspects of system operation, including:

- the health of hardware including control gates, farm supply point meters and the radio communication network
- water ordered compared with water delivered
- water losses
- operator behaviour

- root cause analyses to categorise, prioritise and remedy problems.

**Water delivery.** With an autonomous system, water can be delivered to irrigators almost on demand and equitably throughout the channel network system. By constantly maintaining water volume or water level in channels, automation provides equity of service to irrigators, irrespective of location.

Water that is reliably and equitably supplied on demand enables irrigation authorities to have a much smoother relationship with irrigators. As well, disputes are much less likely when irrigators perceive they are receiving equal treatment.

**Water use efficiency.** Water delivery efficiencies are improved because the autonomous control system only releases from storage the exact amount of water required to meet demand. Since water is available almost on demand, the farmer can irrigate the crop at the optimal time, thereby increasing crop water application efficiency, resulting in increased water productivity on farm.

**Acknowledgment.** This is an edited extract from *Australia's Approach to Improving Agricultural Water Use*, published by Rubicon Water

## CASE STUDY: GOULBURN-MURRAY IRRIGATION DISTRICT

The modernisation of the Goulburn-Murray Irrigation District (GMID) is Australia's largest water saving project costing AU\$2 billion. The GMID is managed by Goulburn-Murray Water (G-MW), a state government owned corporation which manages water-related services across 68,000 km<sup>2</sup>. Its gravity channel network supplies water to more than 14,000 customers.

Before modernisation, up to 900 GL of water was lost in the network annually. A detailed investigation into water recovery options found that automating channels was much more cost-effective than lining reflecting the fact that more losses came from spills rather than leakage and seepage.

The core of the project is a Rubicon autonomous channel control solution, including automated FlumeGate channel regulator gates, automated farm supply point meters and software to remotely monitor and control the network, automate the collection and scheduling of water requests, check use rights, and analyse and report performance.

In stage 1 of the project, autonomous control was implemented on 3,000 km of primary (backbone) channels. Stage 2 is rationalising some canals and connecting farms on smaller channels to the backbone.

### The bottom line

When the project is completed this year, it is estimated there will be an average increase in water delivery efficiency from 70 to at least 85 per cent. Already this target is being exceeded, with 90 per cent efficiency being achieved in modernised areas

This will generate savings of 429 GL of water per year, of which 214 GL of savings will be returned to the environment. The rest will be shared between irrigators and Melbourne urban water users.

For the GMID's farmers, autonomous channel control means water is available almost on-demand, with consistent flow rates. Farmers can get the water their crops need, at the right time, enabling more efficient and productive water use on-farm.

### Shepparton Irrigation Area improvements.

In the GMID's Shepparton Irrigation Area, where modernisation has been completed, efficiency is already at 90 per cent. The project has resulted in major operational improvements:

- delivery efficiency improved from 70 per cent in the 2007-08 season to 90 per cent in the 2010-11 season
- improved management control and planning with detailed, real-time information
- compliance with new government metering and reporting regulations

- farmers are benefiting from a reliable system with delivery almost on demand
- greater water use accountability, transparency and distribution equity for all stakeholders
- the 29 per cent improvement in delivery efficiency has resulted in the annual recovery of 39 GL of water.

Source of recovered water

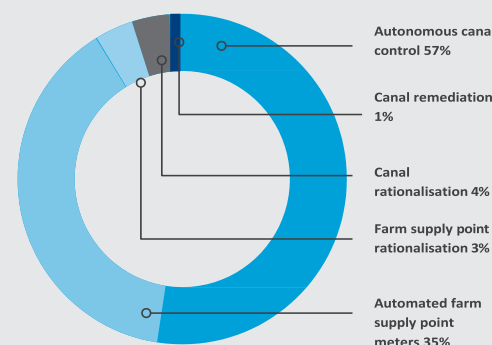


Figure. Most of the 39 GL recovered in the Shepparton Irrigation Area was a result of autonomous channel control. Source: Cardno 2011.

**Acknowledgment.** This case study is from the publication, Rubicon (2019), *Australia's Approach to Improving Agricultural Water Use*

# Councils look to central control for savings

The drought that has affected a significant portion of Australia, along with the projected long-term impacts of climate change on water supply, have prompted local councils to review their irrigation infrastructure and scheduling technologies.

The answer for many has been to upgrade their controllers so that they are managed centrally and can be accessed by qualified staff from anywhere at any time.

Councils are finding that the savings in upgrading equipment are significant. Staff can manage all irrigation systems from the works depot or a remote location rather than travelling to each site. This is a significant saving in staff time and fuel. Weather data can be incorporated in scheduling software, resulting in irrigation water savings. The technology also detects and can alert managers in real time of the location of problems such as a water leak or equipment failure allowing them to be dealt with promptly and before they cause even bigger issues.

The City of Melton, located in Melbourne's west and one of the fastest growing municipalities in Australia, is an example of a council that is seeing the benefits of upgrading its control network.

The city has a commitment to deliver higher standards of sporting fields, in part as a result of pressure from users and rate payers for better facilities.

While the council already had stand-alone controllers across 50 sites, it decided to invest in a more efficient way of managing its irrigation network by installing a central control system

that would be managed by its parks and gardens contractor Citywide Services.

Melton City Council approached Hunter to develop a solution for a better way to manage its irrigation network. Having already installed stand-alone Hunter ICC controllers in over 50 sites, the council sought an affordable, central control system for their contractor, Citywide Services.

They settled on retrofitting a Hydrowise facepack for the original ICC controllers, allowing a cost-effective upgrade to a Wi-Fi based central control system. One of the big advantages was that installation was completed with minimal fuss and downtime.

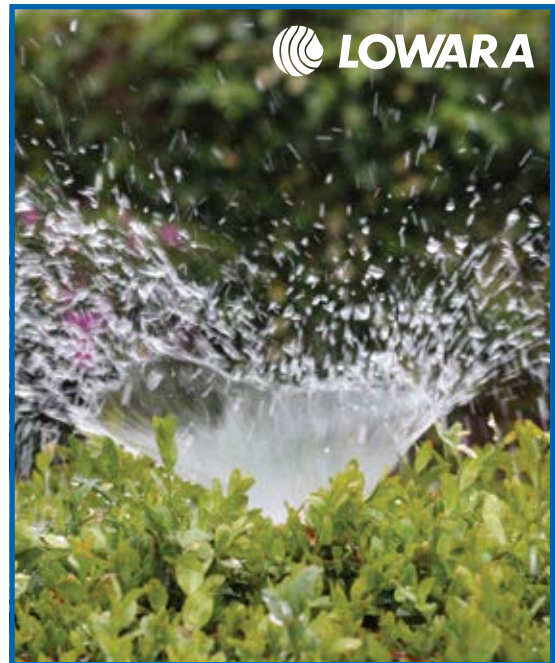
Leigh Stewart, Sportsfields and Irrigation Supervisor, and his staff at Citywide run the system for council from their mobile phones, saving time driving to sites and monitoring all irrigation events on a regular basis.

Some sites have also been converted to a hybrid decoder and conventional wire system. Using existing wire looms, decoders were added, and the old system brought online.

The result for the council has been that its sports grounds and parklands are better irrigated and monitored, while for contractors there is more time to carry out general irrigation maintenance and preventative maintenance, which means no system is down during critical periods.

In the final analysis, residents and sports ground users are the big winners in the City of Melton.

**Acknowledgment.** Article provided by Hunter Industries.



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# THE BIG ISSUE

## RAINWATER HARVESTING TO PLAY BIGGER ROLE IN WATER MANAGEMENT

The contribution of rainwater harvesting to water management strategies is growing in importance and being recognised as a big issue by more people in the irrigation industry in Australia.

In fact, rainwater harvesting is the first and essential element in managing the relationship between human land use systems and water. All buildings in Australia should have rainwater harvesting, and all agricultural land should include basic rainwater harvesting passive design features.

The current drought in much of Australia and predictions of significantly decreased streamflow into many of our creeks and rivers provide a window to the future and demonstrate the need to develop a range of water sources for our growing population. These sources include dams, desalination, rainwater harvesting and recycled water. Having many sources of water means that we can use water in new, and much more efficient, combinations.

### Benefits of rainwater harvesting

Rainwater is always local, so it doesn't have to be transported long distances to your home or land. When it falls on your roof there are relatively few opportunities for contamination, so treatment costs are much lower than for other kinds of water.

The temptation for many people with rainwater tanks is to save the captured water for "later". With modern technology we don't need to save all our rainwater, rather it is better to use it and save more expensive, treated water that might have to be transported 100 km to your home. This means that the smart way to use rainwater is to use it first, and then use another source of water when it runs out. The tank then will be empty enough to capture water when it rains.

Rainwater harvesting can be used for many different things. Some people grow plants with it, some people drink it, some flush their toilets with it or use it to wash clothes, water animals or use it to recharge groundwater, while others use it to improve the health of local waterways and reduce flooding. Some people use it for lots of these things at the same time. Each local community has its own special needs, climate, culture and way that it wants to use water.


### Rainwater harvesting can make a difference

An important message for the industry to be relaying to the community is that although you might only have a small roof and a small tank, rainwater harvesting can make an important difference.

While we all know about big storms, unless you live outside few of us appreciate the many smaller rainfall events that fall from the heavens. Because a roof is a hard surface, even a small amount of rain will flow from the roof and run into a tank. Lots of small rainfall adds up to a steady stream of water flowing into the tank over hours, days and weeks. We can match this supply with a steady stream of small uses for rainwater. Lots of water flows into the tank, and lots flows out, but not all at the same time. So, a small tank can capture much more water than it can hold at once - ten or twenty or a hundred times as much.

Even if it only rains for a part of the year in your area, using rainwater in these times makes a much bigger difference than most people realise. The simple act of harvesting rainwater can change the world and make it a better, more efficient place that works with, not against, nature.





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# Hunter®

## Packed schedule for 2020 delivering new Certificate III in Irrigation Technology and upgrade courses

Irrigation Australia has set a packed schedule to deliver the new Certificate III in Irrigation Technology AHC32419 (Trade Level) for the first half of this year.

The first course, held in Melbourne in the first week of February, was well received by participants according to Geoff Harvey Irrigation Australia's National Training, Certification and Marketing Manager.

The format of the course, which comprises 22 units of competency (nine core and 13 elective) completed over 18 months to two years, is four lots of 4-day training periods, called "blocks".

"As well as attending the courses, students must complete workplace assessments, assignments and short answer questions," explained Geoff.

Irrigation Australia members receive a discount to enrol in the Certificate III in Irrigation Technology, and people who live or work in South Australia could be eligible for subsidised training.

There is also an option for industry members who have previously completed the Certificate III in Irrigation (AHC32416).



Two participants in the Certificate III in Irrigation Technology course held in Melbourne get acquainted with the workings of a pump.



The Certificate III in Irrigation Technology has a range of learning activities from being out in the field such as these students completing a session on soils, to being in the classroom.

"Irrigation Australia is also offering upgrade courses from Certificate III in Irrigation to the new Certificate III in Irrigation Technology, and this involves completing an additional eight units of competency," said Geoff.

The first of these upgrade courses, which comprise two blocks of four days each, is being held 14 to 17 April in Brisbane, with other events scheduled in other states later in the year.

### OTHER COURSES SCHEDULED

Irrigation Australia is also offering a range of other training opportunities for industry members.

"These options include popular courses we have been offering for a number years, such as the two-day Irrigation Efficiency course, as well as the urban and commercial design courses we introduced last year," said Geoff.

### INFORMATION

To check courses on offer, go to the Irrigation Australia website, [www.irrigationaustralia.com.au](http://www.irrigationaustralia.com.au) and look under the "Training" tab.

If you are interested in becoming trade qualified as an irrigation technician, contact Geoff Harvey, email: [geoff.harvey@irrigation.org.au](mailto:geoff.harvey@irrigation.org.au) or phone 07 3517 4000 for more information and to register your interest.

### IRRIGATION EFFICIENCY COURSE HELPS WITH CERTIFICATE III

Sol de Jonge is a leading hand with Darwin City Council where he has been employed for 9 years. He works in the Water Ward, which involves parks and reserve maintenance. Last year he completed an Irrigation Efficiency course and we spoke with him about the course and how it will help him with his role with the council.



#### IA. What types of projects are you and your team mainly involved in?

**Sol.** Before I was promoted to leading hand, I was part of the irrigation team which maintained more than 600 ha of parks, ovals and reserves under irrigation. We also installed new systems.

#### IA. What do you enjoy most about working with irrigation?

**Sol.** I enjoy the variety of work, from maintaining irrigation systems to installing and wiring up controllers.

**IA You have recently completed an irrigation efficiency course. What was the reason for this?**

**Sol.** I completed the irrigation efficiency course as a module to obtain my Certificate III in Irrigation.

**IA. What was the best thing about the course?**

**Sol.** I found it very informative and well delivered.

**IA. If someone was thinking about doing the irrigation efficiency course, what would your advice be?**

**Sol.** It's a good starting point for people looking to enter the irrigation industry so if this is where you are at professionally, I would certainly go ahead and do it.

## RAINWATER HARVESTING TRAINING MODULE

Irrigation Australia's rainwater harvesting sub-committee recently released a Rainwater Harvesting Training Module on its training portal. The module, which is completed on line, is designed to highlight industry best practice and scientific research on all aspects of rainwater harvesting.

It describes the operation of the system from the roof, through the tank and delivery to the household; and is presented so it can be used and understood by a broad audience, including engineers, irrigators, builders, plumbers and end users.

For information about the module go to the Irrigation Australia website, [www.irrigationaustralia.com.au](http://www.irrigationaustralia.com.au) and look under the "Training" tab.

## TRAINING DIARY 2020

Irrigation Australia has been busy developing its training diary for 2020. Courses planned so far are listed in the table below.

If you are looking to upgrade or update your skills and you would like to find out more about one of the courses listed or other training provided by Irrigation Australia, go to the training pages on our website [www.irrigationaustralia.com.au](http://www.irrigationaustralia.com.au), or contact Kahla McKinless, the Irrigation Australia training and compliance officer, e: [kahla.mckinless@irrigation.org.au](mailto:kahla.mckinless@irrigation.org.au), p: 07 3517 4000. She can also help you if you have general questions about training and requirements.

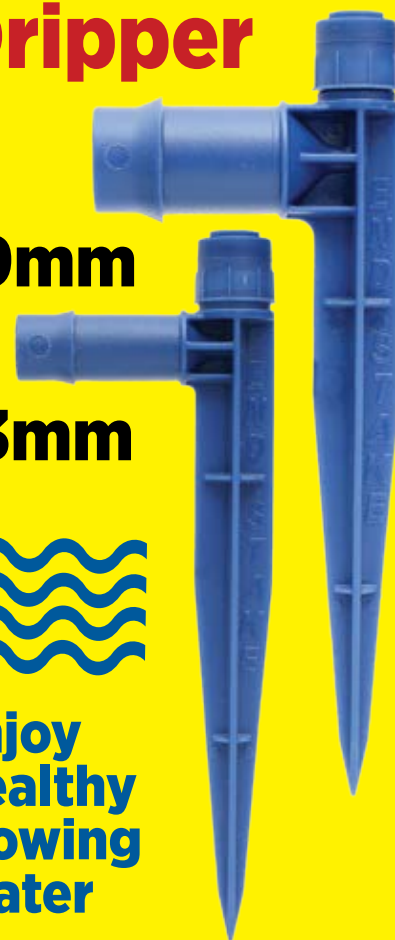
DATE	COURSE	LOCATION
24 March	Meter Validation & Installation – 3-day course	Goondiwindi, Queensland
26 March	Meter Validation & Installation - install only	Goondiwindi, Queensland
31 March	Certificate III in Irrigation Technology - Block 1 of 4 (NSW)	Tocal College, Paterson, NSW
31 March	Irrigation Pumps & Systems – 2-day course	Perth, WA
31 March	Meter Validation & Installation – 3-day course	Adelaide, SA
14 April	Certificate III in Irrigation UPGRADE Course – 4 days	Brisbane, Queensland
28 April	Certificate III in Irrigation Technology - Block 2 of 4 (Vic)	Melbourne, Victoria
5 May	Certificate III in Irrigation Technology - Block 2 of 4 (WA)	Perth, WA
5 May	Meter Validation & Installation – 3-day course	Moree, NSW
12 May	Urban Irrigation Design – 2-day course	Peth, WA
12 May	Certificate III in Irrigation UPGRADE Course – 4 days	Tocal College, Paterson, NSW
14 May	Basics of Wiring & Electrical Troubleshooting	Canning Vale, WA
19 May	Certificate IV in Irrigation - Block 1 of 2 (WA)	Perth, WA
26 May	Certificate III in Irrigation Technology - Block 2 of 4 (Qld)	Brisbane, Queensland
2 June	Commercial Irrigation Design – 2-day course	Perth, WA
2 June	Meter Validation & Installation – 3-day course	Toowoomba, Queensland
16 June	Concepts of Drip Irrigation	Perth, WA

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# PROFESSIONAL DEVELOPMENT

## CERTIFICATION BOARD UPDATE

The role of Irrigation Australia's Certification Board is to oversee our certification program and to ensure that its quality and credibility are maintained. This includes ensuring that certified professionals adhere to the code of conduct, resolving disputes and auditing the processes for issuing, recording and promoting certification.

Gennaro Vellotti provides an update on recent activities and priorities for 2020.

In a major step for the CID process, the updating and metrification (from US units to metric) of the *Principals of Irrigation*, has been finished and passed on the IA to review and publish. This is the main textbook for the CID exams and will allow us to renew and streamline our exams. In the long term, it will reduce the CID qualification from four exams to three.

At the end of last year, as per the terms of reference for the Certification Board, the two

longest standing members stood down for re-election and EOIs were put out to certification professionals to join the board.

From these elections, we farewelled long-serving board member Jim Phillips and welcomed back Peter Smith who was re-elected for a further two years. Thanks to Jim, who was a committed and valuable board member. Welcome to new board member Clive Croxford, who was appointed as a result of the EOI and the member poll.

Don't forget that if you are a certified professional, you don't have to spend time developing your own marketing. Irrigation Australia has created a certification marketing toolkit, available on IAL website under the certification tab.

### Focus for the next six months

The board has a busy schedule planned for the next six months, including:

- preparing to update the Australia CID exams (based on the metricated *Principals of Irrigation*)

- planning for the Irrigation Australia Conference and Exhibition and ICID Congress in Sydney, where we will provide a CID update and recognise those certified professionals serving 20+ years as a CID and hold a luncheon for them.
- releasing to the market the Certified Irrigation Assessor certification.
- Certified Meter Installation program and training.

### CERTIFICATION BOARD MEMBERS

Gennaro Vellotti, Netafim. Chair

Peter Brueck, Water Wise Consulting

Clive Croxford, Croxford Irrigation Design, Perth

John Harvie, Irrigation Systems Australia

Daniel Rose, HydroPlan

Peter Smith, Sapphire Irrigation and Non-urban Water Meter Governance Officer, Irrigation Australia

Geoff Harvey, Irrigation Australia

Gennaro Vellotti, Chair, Certification Board

## USING SATELLITE IMAGERY TO DETECT WATER STRESS

Satellite imagery detects changes in plants that our eyes are unable to see. Water stress – either too much or too little – is particularly evident. Until recently, adoption of satellite imagery as an irrigation management tool has been limited, owing to the high cost and complexity of available products.

Toowoomba-based precision ag company DataFarming has been on a mission to change this, and to bring spatial data into mainstream farming, with their free satellite image tool released 18-months ago.

The tool, which provides 10 x 10 m satellite imagery with NDVI that is updated every five days, has been adopted by 14,000 farms around the country since it was launched in 2018.

DataFarming Managing Director Tim Neale says the tool is being used to monitor and improve water use efficiency.

"Yield varies by three to five times across almost every paddock in Australia, so water use efficiency will also vary by this amount. By allowing you to pinpoint and monitor problem areas, satellite imagery can be a great weapon against reducing crop variability as well as temporal (time) variations to improve water efficiency," he said.

According to Tim, the combination of multiple spatial layers such as elevation, yield and imagery, combined with targeted soil testing can provide insights into irrigation performance and help detect problem areas, particularly with surface irrigation.

"It's also a case of measure to manage," he said. "We need to measure crop performance in relation to other factors to understand what is driving productivity, and this is best done spatially using maps."

This can be in relation to the placement of sensors such as soil water or using tools like EM mapping or historical satellite imagery to help with understanding field variability (especially soils) before placing them in field. Understanding elevation is also critically important in the case of surface irrigating.

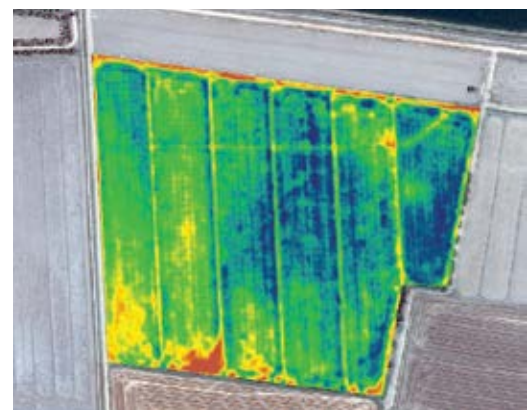
"In rice for example, we know that cut areas from land levelling are directly correlated with soil constraints and fertiliser requirements – so we need to variably apply nutrients and soil ameliorants based on this. Using satellite imagery to create variable rate zones makes this possible."

DataFarming's free tool has mapped 7.8 million ha since 2018. The company also offers several low-cost

tools that include sub 1-metre high resolution satellite images (see photo), a multi-year satellite image stacker (used for longer-term analysis of paddock performance), and an auto-zone variable rate tool that generates a file to put into your tractor.

**Information.** Visit [datafarming.com.au](http://datafarming.com.au) to learn more or start mapping your paddocks with a free account at [maps.datafarming.com.au](http://maps.datafarming.com.au).

**Note.** Article provided by DataFarming.



A sub 1-metre high resolution satellite image example showing NDVI.

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# IRRIGATION AUSTRALIA NEWS

## REGIONAL ROUNDUP

What's going on in the regions and with membership by Tracy Martin, Irrigation Australia's National Membership and Regions Manager.

### South-East Queensland

Members in the South-East Queensland region can look forward to a busy year of activities with the committee having settled on a bimonthly meeting schedule for 2020 – the last Monday of the month in March, May, July, September and November. As well as committee meetings, a regional event will be organised quarterly.

### Western Australia

A very successful soil moisture monitoring field day was organised by the regional committee, in partnership with Harvey Water, and held at Harvey Citrus. There was great interest in the event, which was a good introduction to data-based management tools for use in farming, with more than 70 people attending.

DPIRD's Rohan Prince was engaged to present how data is gathered and interpreted and can be used as a farm management tool. Aquamonix, Wildeye, Swan Systems, HR Products and MAIT Industries/Farmlink Rural, suppliers of moisture monitoring equipment, were on hand with products and technical information.

The final member breakfast for 2019 was hosted by City of Kalamunda. Daniel Nelson, Project Manager Water Projects, provided an overview of the recent upgrades to Stage II of the Managed Aquifer Recharge project infrastructure. These upgrades included a new automated controller for the injection valve, an upgrade to the activated carbon filter and a new injection bore.

The new automated injection valve controller has significantly increased the overall performance and efficiency of the scheme, with far less disruption during injection.

The WA Regional Committee will meet on the third Tuesday of every month in 2020.

### Melbourne – Urban

Last year, the committee held their annual Christmas Breakfast for Irrigation Professionals 27 November. Fifty-four industry colleagues joined the Committee for brief presentations on the committee's activities throughout the year and to celebrate the festive season.

Melbourne members can also mark their diaries for this year with the committee having set its schedule for 2020 – monthly committee meetings, two field events and a Christmas breakfast.



Jim Marchbank, Melbourne Regional Committee Chair, addressing industry members at the 2019 Christmas breakfast, while Gary Horton (foreground) was on standby to assist.

### South Australia

The region's three subcommittees – rural, urban and training – have set their 2020 schedule, with meetings being held bimonthly and an industry event each quarter. The aim is to hold four urban and four rural events. The urban committee will start the ball rolling in March with an industry event at the Roy Marten Reserve, Taperoo.

### Sydney

Stage 2 water restrictions were implemented by Sydney Water in mid-December. In what was a timely development, the *Sprinkler Watering Run Time* flyer, put together and printed by Irrigation Australia, was sent to Sydney retail members for handout at counter level and customer engagement. Members have been encouraged to continue to hand out and talk through the flyers with their customers, while also referring them to the Sydney Water website for the latest watering restrictions.

## Find an Irrigation Specialist



### IRRIGATION SPECIALISTS AT YOUR FINGERTIPS

If you are looking for an irrigation specialist, then the Irrigation Australia website is your one-stop-shop. Just type in a postcode and irrigation professionals listed in the area will be shown, along with their contact details.

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# The Largest Combined Irrigation Conference and Exhibition in the Southern Hemisphere

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## CONNECTIONS PROJECT ON TRACK FOR COMPLETION THIS YEAR

The Connections Project in Victoria is on-track to be finished in October this year. Now more than 90 per cent complete, the project is on target to achieve its key objective of a total of 429 GL/year water savings.

In 2019, the project installed nearly 100 km of pipeline, decommissioned more than 250 km of channel, installed more than 40 regulators, remediated about 2 km of channel and installed more than 700 meters. In the 12 months, 1459 landowners were connected to the upgraded irrigation network

This year the team will focus on the remaining channel decommissioning, pipeline installation and individual on-farm works packages across the Goulburn-Murray Irrigation District (GMID).

The \$2 billion Victorian and Australian Government investment is continuing to convert the GMID from an ageing, leaking inefficient system to a modern delivery network.

**Source.** Goulburn-Murray Water



Equipment working on a section of the project area near Numurkah in Victoria. This included decommissioning 1,100 m of channel, one regulator, a road crossing and 13 outlets as well as four meter upgrades and the installation of 100 m of pipeline.

## NSW WATER REGULATOR CHARGES FOR BREACHING NSW WATER LAWS

In January 2020 the Natural Resources Access Regulator (NRAR) announced that it had charged three companies and seven individuals, taking them to court for alleged breaches of NSW water laws.

Of the five new prosecutions, four relate to taking water outside the flow conditions of water access licences, and one relates to taking water without the relevant licences and approvals.

The charges relate to companies and individuals in the north-west and west of the state and on the north coast.

“With the state struggling through the worst drought on record it is especially important that all water users

familiarise themselves with their water access licence conditions and their current water account balances to avoid any potential breaches,” NRAR’s director of regulatory innovation Kaia Hodge said.

In times of scarce supply, she said that every drop counts, making NRAR’s role in ensuring compliance with water regulations more important than ever.

NRAR’s investigators and compliance officers inspect properties and assess compliance with water users’ licences and the Water Management Act 2000.

**Information.** For more information about NRAR and what it does, visit <https://www.industry.nsw.gov.au/natural-resources-access-regulator>

## TASMANIA GEARS UP FOR NEXT IRRIGATION SCHEME

Tasmanian Irrigation is gearing up for its next project, in the Tamar region. In December, it invited landowners in the region to attend a community meeting to hear about the proposed Tamar Irrigation Scheme and to lodge an expression of interest for irrigation water.

The proposed Tamar project is one of 10 being investigated as part of the Tranche Three Pipeline to Prosperity initiatives. The focus is on delivering high-surety irrigation water to properties in the Tamar region.

While landowners had previously submitted initial expressions of interest during the first round of consultation about 18 months ago, the high level of interest meant that Tasmanian Irrigation had to go back to the drawing board to expand the concept design to deliver additional water to this high-value agricultural region.

It is estimated that when fully implemented, the 10 Tranche Three projects could deliver 78,000 ML of water through 479 km of pipeline to farmers, creating 2,600 full-time jobs and increasing annual on-farm production by \$114 million at the farm gate.

According to Tasmanian Irrigation, all schemes it develops are designed to last 100 years, deliver water at an average reliability of greater than 95 per cent and built to satisfy demand in each region.

**Information.** Website [www.tasmanianirrigation.com.au](http://www.tasmanianirrigation.com.au)

## SA WATER STAFF TAKE TO THE AIR

SA Water’s Riverland team has adopted the use of drones to monitor its infrastructure. According to the authority, this improves operational efficiency,

customer experience and enable greater safety outcomes.

Currently, it has seven licensed drone pilots using the technology to inspect infrastructure, particularly at sites that are hard to access.

The drones are used to remotely view and film the condition of structures, such as outlet towers and tunnels, providing close-up, high-quality images, even in the dark.

As well as eliminating safety risks by removing staff from potentially dangerous situations, SA Water said that their use is reducing the time taken to complete tasks, which in turn, is reducing operational costs.

Along with asset inspections, the drones are being used to capture aerial and thermal photography and videography to provide greater perspective to large-scale ground operations, assess environmental health and evolution over time, and monitor the progress of capital projects.

**Information.** Website [www.sawater.com.au](http://www.sawater.com.au)

## NEW GNANGARA GROUNDWATER PLAN BEING DEVELOPED

In January this year, the Western Australian government announced that Gnangara groundwater – Perth’s largest, most accessible, lowest cost source of fresh water – was out of balance as a result of less rainfall and continued groundwater use.

This groundwater system supplies almost half of Perth’s water, and is used by farmers, local government, schools, industry and householders. Its groundwater areas cover about 2200 km<sup>2</sup> in the northern part of Perth.

In response to the groundwater source being out of balance, the Department of Water has set new allocation limits and is developing a new water allocation plan to manage water use so that it continues to be sustainable under a drying climate. The aim of this plan, being developed with water users, is to find ways to adjust and to bring the Gnangara groundwater system back into balance by 2030.

The current *Gnangara groundwater areas allocation plan* was released in 2009, and has been evaluated against the plan’s objectives in 2011 and 2014.

**Information.** For more information on the plan go to website [www.gnangara.dwer.wa.gov.au](http://www.gnangara.dwer.wa.gov.au)





## WATER WARS

In this column, irrigator, researcher and MacLean-Iedema Award winner Ken Crawford gives his view on the clash between the interests of coal mining and water users.

Agriculture and mining are important contributors to the Australian economy. Iron ore and coal combined make up almost a quarter of the value of our export income, and agriculture about 14 per cent (2016-17).

The expansion of mining in the last two decades and pressure on irrigators to improve irrigation water use efficiency have seen growing competition in regional Australia between rural communities and mining for water and land resources.

With a range of applications for new coal mines and extensions to existing mines and coal seam gas projects currently being assessed, and different water access rules for mining and agriculture in some instances, rural communities are understandably very concerned by the potential risks to town drinking water, as well as supplies for irrigation and stock use.

Against this backdrop of competition between sectors for water, unprecedented drought, bushfires and hailstorms heralded in the new decade. For the irrigation and water sectors, these climatic challenges added to those of policy development and implementation at state and federal level.

This has intensified the competition we see today - from the Galilee Basin in north Queensland to the Gunnedah Basin and Hunter Valley in New South Wales - in securing our scarce natural resources for productive use. Often, water simply goes to the highest bidder.

### Complete understanding of resource necessary

Before any new development it is crucial that costs – both short and long-term - are considered, as well as their benefits. This applies particularly to our precious freshwater resources, especially groundwater. Any assessment must understand the nature of these resources and the impact of development, including on what is below the surface as well as what is above.

While regulatory and approving authorities have a reasonably good understanding of surface water resources, understanding of underground resources is problematic. For this reason, mapping the underground bedrock landscape, as has been done in some valleys such as the Upper Namoi, should have a high priority before mining goes ahead in any area and be considered in any assessment process.

### Is there a solution?

The stage is set in 2020 for many valleys in Australia to decide what they want. The question is, do we need more new coal mines and coal seam gas proposals at the expense of access to surface water and groundwater? Fossil fuel or water; can rural communities have both?

I believe that agriculture and mining can co-exist if there is mutual understanding and respect. Understanding surface water and groundwater in the real catchments of valleys is paramount. Hydrology and hydrogeological field studies are the key and political expediency must be put aside.

The science must be presented to assure the catchment communities that their voice will be heard and that the assessment process will be transparent and accountable.



Part of the northern area of the Liverpool Plains, where an extension to a coal mine is being considered. The black soil plains shown overlie quality alluvial groundwater. Photo: Ken Crawford 1991.

Principles important to apply include: not crossing prime agricultural floodplain land with mining infrastructure; no longwall coal mining under the plains; no large, open cut mines in the aquifer recharge areas of the side-slope catchment; and assessing aquifer interference through run-off and deep drainage recharge in all new proposals, including extensions to approved mines. Eyewitness accounts of flooding in the valleys must be listened to and acted upon. Built infrastructure on our dynamic floodplains should always be closely examined and, above all, the 'precautionary principle' should apply.

Groundwater is as precious as buried treasure, so we must value it.

We should be applying these principles currently to the Upper Namoi Valley, where an extension to the Vickery coal mine is being considered. The project includes building a coal handling and preparation plant, a train load-out facility and a spur rail line across the Liverpool Plains. It will take coal across the Namoi River and the river floodplain to Emerald Hill, where it will join the Mungindi to Werris Creek railway then to Newcastle.

If approved, this spur rail line will take coal from several mines across the river to create a mega mine. This will not do. The plains communities of Boggabri, Gulligal and Emerald Hill are understandably upset. They have been dealing with this threat to their livelihoods and families for over two years, as well as the unprecedented drought.

In my view, the science of the catchment - above and below ground - is not being considered by mine owners, who have instead relied on transient numerical models to predict future flood heights.

A safer option is to keep off the floodplain and use the alternative access already approved. In this manner the Namoi River and its floodplain will remain connected and the ecology of the river and its floodplain will be preserved in accordance with long-term planning principles.

These black-soil plains will be farmed for thousands of years if we care for them, while the coal mine is projected to last for 25 years. This raises the question of 'intergenerational equity'. We are custodians of this area for our children and grandchildren and we must take this responsibility seriously and not allow the northern end of the Liverpool Plains to be compromised in terms of land and water.

The Independent Planning Commission (IPC) will soon make the determination whether to give development consent. My view is that science should be allowed to prevail. This will assure the people who live and work on the plains that their voice will be heard and that the process is transparent and accountable.

Ken Crawford

## ESSENTIAL IRRIGATION STATS

A look through the latest Australian Bureau of Statistics figures for agricultural water use for 2017-18 provides some interesting essential statistics.

In 2010-11 the number of businesses irrigating was 28,463 compared to 2017-18, when it was 22,470. The trend over this seven-year period has been a gradual decline in the number of irrigating businesses.

The volume of irrigation water used varies considerably each year because of the highly variable Australian climate. The lowest consumption in the last decade was 6,645,375 ML in 2010-11, the end of the millennium drought, while the highest was 11,060,000 ML in 2012-13. The volume of water applied in 2017-18 was 9,734,182 ML.

### Water trade grows

A water trade occurs when the ownership of an entitlement or allocation is transferred from one legal entity to another with or without a change of location.

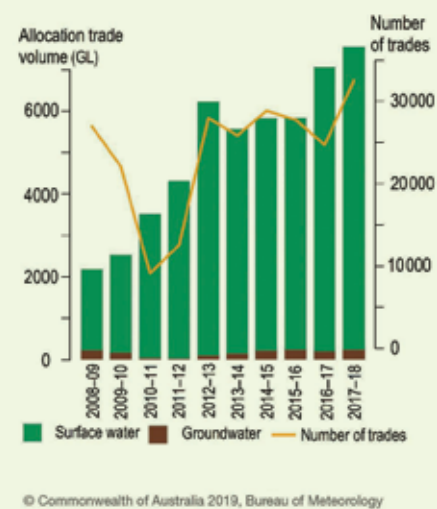
The Murray–Darling Basin is where most trade occurs, usually between agricultural users. The connected systems in the southern Murray–Darling Basin, which comprises 40 to 50 per cent of all Australian irrigated agriculture and makes up between 40 and 50 per cent of water used on Australian farms, account for 80 to 90 per cent of trading activity in Australia.

Since 2007, the number and volume of trades has grown substantially. In 2017–18, the total estimated turnover of the water market in Australia (entitlement and allocation trade) doubled from the previous year to around \$2.4 billion, with entitlement trade comprising 73 per cent of the total for 2017–18.

**TABLE 1. NUMBER OF IRRIGATING BUSINESSES AND WATER APPLIED FOR IRRIGATION, 2017-18.**

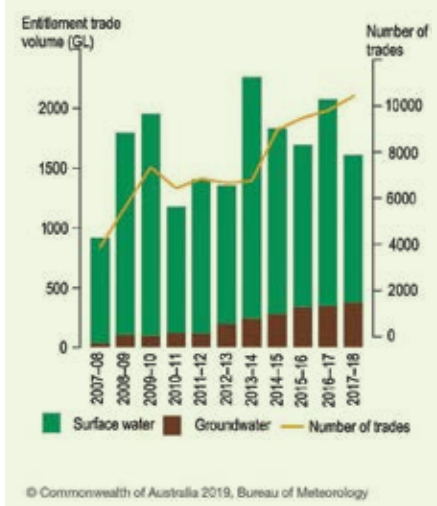
	Aust.	NSW	Vic.	Qld	SA	WA	Tas.	NT	ACT
<b>Agricultural businesses irrigating</b>	22470	5233	6091	5402	3071	1320	1212	136	6
<b>Water applied for irrigation ('000 ML) (c)</b>	9 734	3950	2155	2455	606	234	278	57	0.4

**FIGURE. VOLUME AND NUMBER OF WATER ALLOCATION TRADES NATIONALLY BY SOURCE, 2008-09 TO 2017-18.**



© Commonwealth of Australia 2019, Bureau of Meteorology

**FIGURE. VOLUME AND NUMBER OF ENTITLEMENT TRADES NATIONALLY BY SOURCE, 2007-08 TO 2017-18.**



© Commonwealth of Australia 2019, Bureau of Meteorology

### Gross value of irrigated agricultural production

The gross value of irrigated production (GVIAP) for Australia in 2017-18 increased by 14 per cent to \$17.7 billion.

The four commodities with the highest GVIAP were:

- fruit and nuts (excluding grapes) at \$4.2 billion
- vegetables at \$3.4 billion
- cotton at \$2.3 billion
- dairy products at \$2.2 billion.

These four commodity groups combined accounted for 69 per cent of total GVIAP for 2017-18.

The main irrigating states (by value) are Victoria (\$4.2 billion), Queensland (\$4.0 billion) and New South Wales (\$3.7 billion). These areas contribute largely to the Murray Darling Basin (MDB) region (\$7.2 billion).

**Source.** *Water in Australia 2017-18*, Bureau of Meteorology.

**TABLE 2. GROSS VALUE OF IRRIGATED PRODUCTION 2017-18.**

	Value (\$m)
Rice for grain	245.7
Cereals for grain and seed (a)	379.2
Cotton (b)	2 309.4
Sugar cane - cut for crushing	683.6
Nurseries, cut flowers and cultivated turf	1 366.0
Other broadacre crops	122.0
Hay	169.0
Vegetables (c)	3 379.0
Fruit and nuts (excluding grapes)	4226.4
Grapes	1 279.8
Dairy production (d)	2 231.9
Production from meat cattle	749.7
Production from sheep and other livestock (e)	554.1
<b>Total</b>	<b>17 695.6</b>

(a) Excludes rice  
 (b) Cotton lint (irrigated)  
 (c) Vegetables for human consumption only  
 (d) Value is calculated based on milk production from dairy cows in milk and dry  
 (e) Includes production of wool and eggs, and slaughtering and other disposals of sheep, lambs, pigs, poultry and other livestock n.e.c.

# WATER MARKET INFORMATION TO FLOW INTO WATER USERS' PHONES

A new app has been released that will allow irrigators and other water users easy access to water market information that is reliable and as close to real time as possible.

*Waterflow*, which was funded by the Australian Government and developed by Marsden Jacob Associates, is available to download free to mobile devices and desktop computers.

It gathers information from state governments, participating brokers and trading platforms and puts it into a user-friendly app that farmers and water traders, regardless of their knowledge and experience with water markets, can use when working remotely or in the office.

The app was developed with funding from the government's Business Research and Innovation Initiative (BRII). The BRII gives grants to small to medium-sized enterprises that can develop innovative solutions to challenges set by Australian Government agencies.

The challenge posed by the Department of Agriculture was to improve transparency and

reliability of water market information. The successful proposal to meet the challenge received funding, and the *Waterflow* app is the result.

Head of Murray-Darling Basin policy Matthew Dadswell said the app aims to help people to trade water for their business by bringing together information from multiple sources and differing formats.

"The app provides information on water prices, easy price comparisons, tailored reports and alerts, all of which will empower business owners to make informed decisions about buying and selling water," Matthew said.

The app collects data, as often as every 10 minutes, from more than 30 sources. These sources include the Bureau of Meteorology, state and Commonwealth governments, and water market brokers.

Information on the app is objective. *Waterflow* is not a brokerage or trading platform, and its developer Marsden Jacob Associates is not a market participant.

So far, the data covers the major regulated surface water catchments in the Murray-Darling Basin, apart from Queensland. The developers are working to expand coverage to include groundwater systems in the Basin, and other systems outside the Basin.

**Information.** You can register to use the app for free by going to website [www.waterflow.io](http://www.waterflow.io)



The *Waterflow* app allows water users to access water market information that is reliable and as close to real time as possible.

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## SIX MONTHS TO GO TO THE SOUTHERN HEMISPHERE'S BIGGEST-EVER IRRIGATION EVENT



**24<sup>th</sup> ICID**  
INTERNATIONAL  
CONGRESS  
71<sup>st</sup> IEC MEETING  
22-28 SEPTEMBER 2020



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In September this year, the Australian irrigation industry will showcase itself to the world in a weeklong demonstration of why it is regarded as a leader in irrigation practice and technology and policy development.

### A unique opportunity to showcase your products and services

With six months to go, Irrigation Australia CEO Bryan Ward is encouraging organisations thinking about joining companies from around the world who are already participating to get in reserve their exhibition space as soon as they can.

The three-day exhibition promises to be an enormous showcase of the latest in irrigation technology and services from Australia and around the world. With organisers preparing for 2000+ exhibition visitors, many of them product buyers and specifiers, this event will be a unique opportunity in the southern hemisphere to meet potential and current customers.

“Major companies such as Rain Bird, Sentek, Nelson Australia, MAIT, KSB and Brown Brothers Engineers have already signed up and many more are currently considering package options,” said Bryan.

**Information.** To find out more about exhibiting, go to the event website <https://www.icid2020.com.au/iace-home/exhibitors-iaec/>

### Tours to support regional Australia

Event organisers have developed an extensive post-conference technical tours program focusing on regional Australia. With drought, bushfires and floods having affected many regional irrigation areas in the last few months, not only will participants be able get an insight into irrigation and water management, taking a tour will be a great way of supporting local communities.

Irrigation Australia is currently calling for expressions of interest to attend the tours so it can assess interest in and the viability of running them.



## Post-conference technical tours are being organised for irrigation areas around Australia and New Zealand



Western Australia Photo: Voyager Estate



Murrumbidgee and Coleambally irrigation areas. Photo: Coleambally Irrigation



Langhorne Creek, South Australia. Photo [www.langhornecreek.com](http://www.langhornecreek.com)



North Queensland. Photo: Gsolsen [CC BY-SA (<http://creativecommons.org/licenses/by-sa/3.0/>)]

- Langhorne Creek, South Australia
- Regional New South Wales, incorporating the Murrumbidgee and Coleambally irrigation areas (modernised channel systems)
- Sydney Basin, looking at protected cropping (hydroponic and greenhouse production) and water reuse
- Western Australia, focusing on dairy farming, orchards, truffles and vineyards
- North Queensland, looking at water management and irrigation
- New Zealand, for water management, irrigation and food production.

**Information.** Further details about each tour and the expression of interest form are available via the conference website at <https://www.icid2020.com.au/iace-home/technical-tours-iace/>

### Conference registrations open

Registrations for Irrigation Australia Conference are now open.

Irrigation Australia and its partner organisation the International Commission on Irrigation and Drainage (ICID) are combining forces

for this unique event. Irrigation Australia is organising its Conference and Exhibition while ICID is organising its 24th ICID International Congress and 71st IEC Meeting.

Delegates who register for one event can attend both. The congress, conference and exhibition will be held at the International Convention Centre in Darling Harbour, Sydney, and there will be a range of activities and partner tours on offer and a fun night for all at the Outback Spectacular conference dinner.

These concurrent events will draw a significant audience and expert presenters from Australia and around the world. With organisers looking to play host to more than 1500 delegates from the 60+ countries expected to attend the congress as well as the Australian Conference, the event will provide an unprecedented opportunity to share ideas, knowledge and best practice between Australia and the world.

**Information.** For information about registering for the Irrigation Australia Conference go to website <https://www.icid2020.com.au/iace-home/registration-iace/>



## ICID 24TH INTERNATIONAL CONGRESS AND IRRIGATION AUSTRALIA CONFERENCE & EXHIBITION SYDNEY 2020

Preparations for the combined ICID and Irrigation Australia event are going full steam ahead.

The ICID 24th International Congress and 71st International Executive Council Meeting is combined with the biennial Irrigation Australia Conference and Exhibition, and delegates who register for one event can attend both. The venue for both events will be the International Convention Centre in Darling Harbour, Sydney and there will be a range of technical and partner tours on offer as well as the Outback Spectacular conference dinner.

The theme of the international congress, which is managed by ICID, is *Innovation and research in agricultural water management to achieve sustainable development goals*. The call for submission of abstracts closed in mid-February and organisers are aiming to notify presenters about acceptance of extended abstracts at the beginning of March.

A feature of the program is a special symposium on *Integrated approaches to irrigation management in future*. The symposium will discuss how climate change is directly affecting water availability in many parts of the world. These effects, which include extreme events like floods, droughts and higher temperatures, such as has been seen this summer in Australia, are not easily managed and represent a threat to agriculture along with water and food security. In this context, improved management of water resources in agriculture will be critical to addressing climate uncertainties as a way of mitigating the impacts of and adapting to the changing climatic conditions for improved water and food security.

Another feature of the congress is a special session on *Developing the future tools for managing uncertainty in irrigation management*. This promises to be a lively and interesting session that will focus on institutional arrangements, system modelling and crop agronomy and social adaptation.

### Information

For more information about the congress program outline go to the event website at <https://www.icid2020.com.au/program-outline/>

Exhibition space is selling well, and many major industry manufacturers and suppliers have already committed to the exhibition, which promises to be the biggest and best showcase yet of irrigation technology and services ever seen in Australia. For enquiries on exhibition space contact our event manager, Encanta at [info@encanta.com.au](mailto:info@encanta.com.au)

For information about Irrigation Australia 2020 Conference and Exhibition and the ICID Congress, go to [www.icid2020.com.au](http://www.icid2020.com.au)

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### IMPORTANT DATES

DATE	PLACE	DETAILS
16 – 19 March 2020	Marrakech, Morocco	<b>5th African Regional Conference on Irrigation and Drainage (ARCID).</b> Theme is sustainable Management of irrigation for improved resilience of agriculture in Africa. W: <a href="http://5arcid.ma/">http://5arcid.ma/</a>
22 – 28 September 2020	Sydney, Australia	<b>24th ICID International Congress and 71st IEC Meeting.</b> For more info E: <a href="mailto:info@irrigation.org.au">info@irrigation.org.au</a> , W: <a href="http://www.icid2020.com.au">http://www.icid2020.com.au</a>



**24<sup>th</sup> ICID  
INTERNATIONAL  
CONGRESS  
71<sup>st</sup> IEC MEETING  
22-28 SEPTEMBER 2020**



**INTERNATIONAL  
CONFERENCE & EXHIBITION | 22 -24  
SEP 2020**



## GREENING WINTON'S MAIN STREET

Atomic Irrigation is a design and installation business based in Townsville that was established in 2010 by Dan Smith. When he started Atomic Irrigation, Dan was no stranger to the industry having worked in it since he left school in 1996. We spoke to Dan about a recent project he completed in Winton, in the channel country in central west Queensland.

According to Dan, while he specialises in high quality residential and commercial irrigation systems in Townsville, having to travel to Winton was not unusual.

“Over our ten years of trading we have done many different projects all over north and western Queensland, including luxury villas on Hayman Island, plantation pine tree nurseries in Atherton, Lavarack Golf club upgrade with two new holes and, last year, the Winton main street redevelopment,” he said.



Drip line installed as part of the upgrade to the main street of Winton.



Irrigated turf adds a splash of green to the main street of Winton.

The project in Winton was initiated by Winton Shire Council, which wanted to bring life to the main street in the vibrant tourist town by adding a dash of green to the red dust. Atomic Irrigation had previously completed a project installing an irrigation system at the town's Catholic school, so the council approached Dan to tender for the project.

“We submitted a CAD design and price for a full commercial spec system and won the job, which we completed in August last year in ten days,” said Dan. “Council did their own landscaping and we worked in conjunction with them to install the irrigation.”

The project called for a design with a slightly higher precipitation rate than Atomic normally works with (about 20 mm/hr). This was to take account of a couple of factors. One was the extreme heat during summer, when average temperatures are between 36 and 38°C and have been as high 46.9°C.

The other was the limited water window which is the result of demands on the heat exchanger that supplies the town's water from a bore which free flows out at 85°C. A booster pump was installed to increase the system pressure as the town main pressure was under 160 KPA at 1 L/sec.

According to Dan, he and his team thought it was a great job to work on.

“The Winton Shire Council staff were very helpful, and we thoroughly enjoyed the small-town hospitality from the locals. Being a tourist town, Winton had plenty on offer for our days off and the weather was quite pleasant even if it got down to zero one morning,” he said.

Feedback from the council was positive so another irrigation job in the channel country could be possible in the future.



## RHETORIC, RECOMMENDATIONS AND LEGAL LIMITATIONS AT ODDS IN WATER REVIEWS

Irrigation rights in the Murray-Darling Basin are the focus of public attention, with multiple inquiries under way, but do reviews contribute to resolving underlying tensions between Basin stakeholders?

With extreme weather across the Murray-Darling Basin this summer, high temperatures, drought, fire and local deluges are set to remain a volatile backdrop to the pressure on regional communities dependent on water.

Water security and affordability remain urgent concerns for both water users and businesses that supply irrigators or rely on water for tourism and general commercial sustainability.

Confounding factors are the impact of climate change and drought on overall water supply, which are also intensifying demand as the landscape dries, along with the evolution of irrigated agriculture away from annual crops to larger scale, perennial horticulture commodities in key areas of the Basin. This evolution is changing the geography, timing and economics of water demand, adding new issues and inhibiting support for the Basin Plan - implementation of which is increasingly vexed by competition between sectors and interstate rivalries.

### Reviews and inquiries

Meanwhile, water management across the Basin continues to be the subject of multiple reviews.

Currently there is the ACCC inquiry into water trading in the Basin, due to report shortly, and the Keelty Review of each State's contribution towards the environmental water recovery (Mick Keelty is the inspector general for the Basin).

Other recent inquiries have included an "independent" review of Murray-Darling Basin Authority constraints modelling, a Productivity Commission exercise, the South Australian Royal Commission into the Basin Plan, and the Northern Basin Review.

The Keelty Review's terms of reference include how the environmental water requirement in the Basin is met, with the implication that South Australia's large coastal lakes are a questionable component in the Basin's environmental water requirement. Recent information gleaned from the

consultations also confirms he is looking closely at floodplain harvesting – a mainly upstream phenomenon - because "it is reducing the inflows, [and] wherever you're going to have a reduced inflow or a no-flow in the Darling, you're going to put more pressure on the Murray".

This is a surprising counterpoint to the way issues have been framed by NSW and Victoria, which have criticised the allocation of water for environmental interests in South Australia and pointed to evidence of bank erosion in the Barmah Choke, ostensibly caused by the pressure to meet downstream water demands.

Independent of the situation with the Barmah Choke, the Keelty Review insight about the Darling accords with the intention of Australian irrigation's founding fathers, the Chaffey brothers, who conjured the industry into being on lands at the corners of NSW, Victoria and South Australia by using the complementary resources of both the northern and southern river systems.

As recorded in the *Australian irrigation history Water into Gold* (1937), in this original Basin plan meeting the needs of all the states depended on a healthy Darling River, so that:

*The Darling, surging into the mainstream 160 miles up, ensured Renmark's supply even in the most meagre years. Many a time the old coach-drivers have heard George Chaffey telling W.*

*B: "Don't worry about Renmark, the Darling will look after Renmark. It's Mildura we have to guard."<sup>1</sup>*

Whether or not the Keelty Review ultimately buys into the conflict over the value of the South Australian lakes, if it concludes that floodplain harvesting is driving depletion of the Darling River, with deleterious impacts for the whole Basin, the debate will have returned full circle from the Chaffey's paradigm-setting irrigation plan 120 years ago.

### Common themes

In all the inquiries into water in the Basin, the presumption is that something is wrong, that the cause of the problem can be identified, and that a remedy can be prescribed. In a common refrain, the fix routinely advanced is protection of irrigators' access to water and advocacy for reliable provision of cheap water for irrigated agriculture. The general unifying theme is to avoid allocation away from

irrigators towards other interests, notably the environment. The compromise solution has been to publicly fund efficiency works, reducing the need to make returns to the environment.

More recently, alongside the environment, targets of criticism have included both cotton farmers (mostly northern Basin) and South Australian irrigation practices and priorities.

At this level, rhetoric surrounding the Basin Plan reflects the conflicted nature of water allocation, arising because any change is a zero-sum exercise in which some will lose if others gain. This is, unfortunately, unavoidable, because, as the South Australian Royal Commission found, the federal Water Act and nature itself make it so.

Under the Water Act, water allocation is not actually a juggling exercise between social, economic and environmental interests. Legally, water for the environment is the overriding value, determined by science and not by political factors, after which other interests are met. The legislation is binding on all stakeholders, including politicians, bureaucrats, irrigators, those charged with water governance and those commissioned to conduct reviews and inquiries and make reports and recommendations.

### Irrigation technology development remains essential

The Water Act was legislated to create a market and efficient water allocation across the Basin. Despite the offsetting effect of past funding for irrigation efficiency works, this means real business and industry cost curves exist and that for commercial growers and their suppliers, constant innovation is the difference between survival and failure.

With climate change impacts and structural change towards water-intensive commodity crops, new irrigation practices, techniques, engineering and equipment will be central to driving industry costs down.

### Information

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1. Ernestine Hill, *Water into Gold, Robertson and Mullens Ltd, 1937.*



## SAWM SEEKS PROMOTIONAL PARTNERS FOR NATIONAL 'ONE BUCKET CHALLENGE' INITIATIVE

In the last issue we talked about the research we conducted recently highlighting that most Australians are generally on autopilot when it comes to household water use. We hypothesised that by making water 'visible', Australians would relate to it, value it and want to use it efficiently.

When forced to experience their own personal water shortage, interviewees were shocked to see how much tap water they use and waste every day. Fifty-five per cent of Australians even agreed that they are addicted to turning on the tap and 63 per cent said once they knew more about the average water used around the home, they started thinking about how they use it. (Download the complete report *Australians' Relationship with Water* from [www.smartwatermark.org](http://www.smartwatermark.org).)

Since the last journal we have confirmed support from most of the major water utilities and some local councils to run a national initiative to encourage the 9 million households across the nation to take the 'One Bucket Challenge' in August 2020. Householders will pledge their participation to make do with one bucket of water from 5pm till 5am – no taps, no showers – no running water bar the toilet, although even then reduced flushes are suggested.

Water businesses and local government are responding positively to the initiative as something that can dovetail with and deepen the impact and success of their residential water efficiency campaigns.

### What does this mean for Smart Approved WaterMark licensees?

For existing Smart Approved WaterMark irrigation industry licensees like Hoselink, Hunter Industries and Rain Bird, awareness of the SAWM label will soar amongst resellers and consumers increasing the value of the mark for them.

For new licensees, 2020 is a great year for suppliers of smart irrigation systems and soil amendments as well as irrigation consultants and water efficient watering innovators to apply for certification. As a result of the One Bucket Challenge, SAWM and its licensees will be in the spotlight in national pre event media and associated with the success of this Australian initiative on the night and the water savings we expect the campaign to deliver six months on.

If you would like to partner with us on this initiative, please contact us today for more details.

### Smart Approved WaterMark – one-stop shop for water efficiency

This challenge opportunity is not the only benefit of having a SAWM license. The mark is often used as a requirement for rebates too.

Some Smart Approved WaterMark Service licensees are taking advantage of great opportunities such as those offered through the Smart Water Solutions Program, which delivers non-res water audits and smart metering recommendations.

The *Australians' Relationship with Water* report complements other tools available to SAWM licensees of approved water efficient products such as the website listing and placement in the Blue House as well as the opportunity to be part of the WA Waterwise Products Program and to have write ups in the newsletters regularly sent to 25,000 consumers and 1500 industry stakeholders.

### Information

For information about 'The One Bucket Challenge' or about applying for certification or our other water efficiency opportunities, contact Chris by email at [chris.philpot@smartwatermark.info](mailto:chris.philpot@smartwatermark.info).

Chris Philpot, CEO





## HOW TO DEAL WITH BEING IN DEBT

At some stage, most businesses accumulate a debt. Having your business in debt can be a daunting experience, but there are positive steps to take to get your finances back on track. This article, taken from the My Business Health website, provides some pointers on managing debt, from assessing your financial situation through to getting help.

### 1. Assess your financial situation

The first thing you should do is to assess your debts and the money owed to you. The best way to do this is to check your financial records and keep on top of your cashflow and your financial situation.

Don't leave your accountant out of this process as they may be able to provide some deeper insights into your situation.

You could also consider talking to a business adviser to help you through your process.

### 2. Prioritise your debt

Prioritising your debt can be a quick way to get creditors off your back. Begin by identifying what you can afford to pay now, what you can pay later and when to go on a payment plan. A budget can help plan and direct your money where it matters the most.

### 3. Chase up money owing to you

Contact late or non-paying customers. If you're having problems getting the money they owe you, do some research on how to deal with debtors who are reluctant to pay.

### 4. Talk to organisations you owe money to

Speaking to your creditors early can prevent late penalties or calls from debt collectors. When you talk to them:

- explain your circumstances
- ask if they have any hardship provisions
- ask if you can extend the due date, make a partial payment or go on a payment plan
- keep a record of your conversation.

If your debt has been passed onto a debt collector, there are certain laws they need to comply with. Find out your rights and responsibilities by:

- downloading MoneySmart's *Dealing with debt collectors* ([www.moneysmart.gov.au](http://www.moneysmart.gov.au))
- reading about debt and debt collection on the Australian Competition & Consumer Commission (ACCC) website ([www.accc.gov.au](http://www.accc.gov.au)).

### 5. Get advice and help

There are many agencies and experts who can help you manage your debt. These include:

- the National Debt Helpline on 1800 007 007 ([www.ndh.gov.au](http://www.ndh.gov.au))
- the Australian Taxation Office supporting your business on 13 28 66 ([www.ato.gov.au](http://www.ato.gov.au))
- government grants, incentives and other funding programs for businesses ([www.business.gov.au](http://www.business.gov.au))

### Health and wellbeing organisations

Being in debt can be an extremely stressful experience so don't forget to look after your mental health, and that of your staff and family. There are many organisations that can help you such as Beyond Blue, Lifeline Australia and Business in Mind.

Find out about organisations that provide information and support to help you with your health and wellbeing on the ATO website (<https://www.ato.gov.au/General/Financial-difficulties-and-serious-hardship/Small-business-owners-experiencing-mental-health-issues/Health-and-wellbeing-organisations/>).

### 6. Contact your bank

Talk to your bank about your finances and explain what you've done so far.

It's a good idea to prepare a profit and loss statement or cash flow forecast. These can give your bank an understanding of the issues your business is facing. This can help when applying for financial hardship.

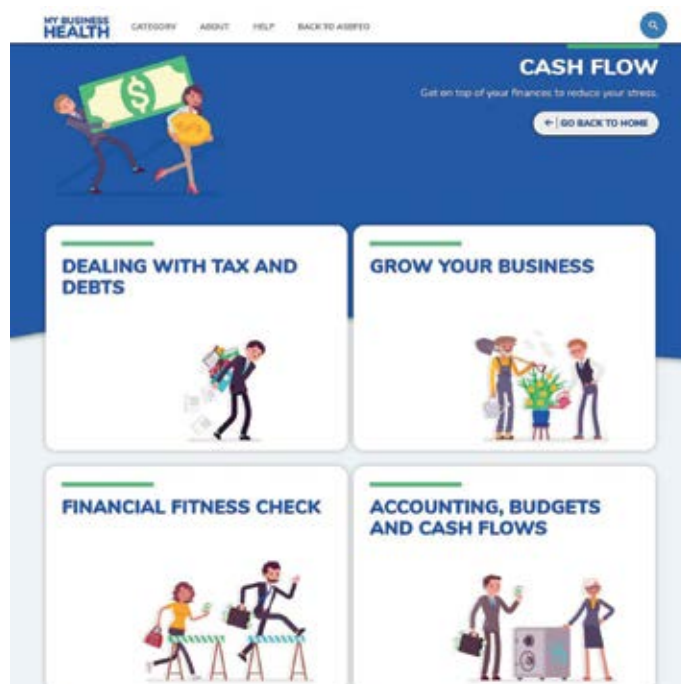
If you feel you can't reach a solution with your bank, consider contacting the Australian Financial Complaints Authority ([www.afca.org.au](http://www.afca.org.au)).

### About My Business Health

My Business Health is a website managed by the Australian Government.

With so much information available online it can be hard to know where to turn for business support. My Business Health helps small business owners navigate the system to find what they need to face challenges and identify opportunities to grow their business.

Pulling together a range of resources, My Business Health provides easy access to tools, templates and tips to manage stress and proactively engage with running a small business.



### Information

Go to website <https://www.asbfeo.gov.au/my-business-health/home>



## LEARNING FROM AUSTRALIA'S WATER USE HISTORY

In December last year, CSIRO Publishing released *A Water Story: Learning from the Past, Planning for the Future*, written by researcher and academic with a long-held interest in water use and management, Geoff Beeson.

The book is well timed considering the many challenges – and opportunities - emerging for Australia's water and irrigation resource managers and policy makers. Some of these challenges have been with us for some time, such as how we share water among its various users, over development and how we deal with historical over-allocation. Others are only just becoming issues, and significant among these are managing resources in the shadow of the threats caused by climate change, the challenge of energy use and cost, and food and water security for a growing population.

Geoff's book begins with a tour of the history of water use through the ages, from the earliest civilisations in the Middle East, to the Romans. Importantly, he also acknowledges that water management in Australia began with its Aboriginal inhabitants, who cared for water

resources, developed storages, and modified streams and wetlands to ensure their survival.

After setting this context, the book then goes on to describe how water has been managed since white settlement, including the Great Artesian Basin, the building of the Gold Fields Water Supply scheme from Perth to Kalgoorlie, construction of dams and the development of irrigation schemes.

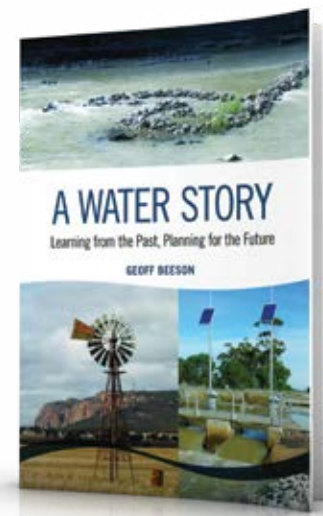
It is this part of the book that is its strength. It examines in detail how Australia has managed – and mismanaged – its freshwater resources, especially since irrigation development began in earnest from the mid-20th century.

The latter part of the book examines what we can learn from our past in "living with scarcity". Options canvassed would be familiar to many in the irrigation industry, and include desalination, recycled water, aquifer recharge, stormwater harvesting, water sensitive urban design, trading and using rainwater tanks.

*A Water Story* is a useful resource for water professionals and those with an interest in water and the environment. Its case studies show our water use successes and blunders, and documents lessons learned by water policy makers and managers.

It then uses this history as the basis on which to explore critical issues confronting Australia this century and suggests what we need to do to safeguard our water future.

The book is available through CSIRO Publishing, [www.publish.csiro.au](http://www.publish.csiro.au) in both hard copy and ePub formats.



### IN THE NEXT ISSUE

The **Winter 2020** issue of *Irrigation Australia Journal* will feature:

#### EDITORIAL

- > Centre Pivot/Lateral Move feature
- > Rainwater Harvesting
- > Affiliated Members

#### ADVERTISING FEATURES

- > Centre Pivot/Lateral Move feature

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### 5. Conference & Tradeshow Discounts

Member discounts on attending and exhibiting at the Irrigation Australia Biennial International Conference & Exhibition.



### 6. Members Only Portal

Gain access to the members only portal on the Irrigation Australia website. Through the portal you can manage your Irrigation Australia membership, access members only documents, presentations and other materials.



## eKnowledge

### 7. Access to eKnowledge

Irrigation Australia eKnowledge repository has vast resources of technical papers, conference papers, Irrigation Journals and FAQ's available only for Members.

### 8. Discounts on Publications and Merchandise

Irrigation Australia offers a wide range of books, eBooks and other merchandise through its online store. Members receive significant discounts on materials.

### 9. Invitations to Regional Meetings & Events

Irrigation Australia hosts a number of regional meetings, events and site visits across Australia. This is a great opportunity for members and industry colleagues to come together to discuss new challenges, technologies and network.



### 10. Monthly Electronic IrriNews Newsletter

Receive our monthly Irrigation Newsletter with the latest information on upcoming training, events as well as new products, information and industry news.



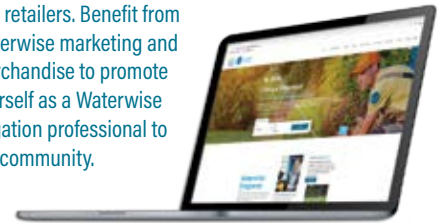
### 11. International Representation

Be part of the global irrigation community and gain access to international contacts via the Irrigation membership of the International Commission on Irrigation and Drainage (ICID).



### 12. Discounts on Waterwise endorsement

Receive significant member discounts on the Waterwise endorsement programs, relevant for domestic irrigation contractors, installers, landscapers and retailers. Benefit from Waterwise marketing and merchandise to promote yourself as a Waterwise irrigation professional to the community.



See [www.waterwiseprograms.com.au](http://www.waterwiseprograms.com.au) for more information.

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List your business or organisation for free in the National Irrigation Directory with printed copies reaching the wider irrigation industry.



### 14. Free Online Job Listing

List your upcoming job vacancies on Irrigation Australia's online job board which attracts significant targeted views every month.



### 15. Free Listing on Irrigation Australia's Website

List your business on Irrigation Australia's Website Directory which attracts significant page views every month.



### 16. Journal Advertisement Discounts

Receive significant discounts on advertising in the Irrigation Journal. Circulation is more than 2000 copies per quarter.





## SENTEK

### DRILL & DROP SOIL MOISTURE PROBE WITH BLUETOOTH

Finally! A cable-free solution for monitoring soil moisture.

Instead of using cellular modem telemetry, this new probe from Sentek uses a Bluetooth connection with a phone or tablet to collect and transfer the sensor data.

With sensors every 10 cm along the probe length, high quality data about soil water content, temperature, and even salinity readings can be collected.

Using the app, the user simply walks close to the probe in the field, makes the connection, then collects the data.

With the sensor readings stored on the phone or tablet, the data can later be uploaded to Sentek's IrriMAX Live software when in a Wi-Fi or mobile reception zone.

Rob Stevens is Sentek's regional manager and has been selling the new Bluetooth enabled probe to irrigation stores and crop agronomists since its release in August 2019.

"Consultants appreciate the simplicity of the probe," said Rob. "Taking away the solar panel, cables, modem and SIM card makes it easier to get started. It is ideal in situations where someone is out checking the field every week or so, so they can grab the soil moisture readings."

The Drill & Drop probe with Bluetooth suits a range of industries including, row crop vegetables, nurseries, research, turf and landscape, as well as ornamental plantings.

The soil moisture probe is powered by a small replaceable lithium battery that can last up to 3 years, depending how often the readings are taken.



The Drill & Drop Bluetooth probe is available in lengths of 30, 60, 90 and 120 cm, making it suitable for annual and perennial plants.

Features include:

- cable-free, using Bluetooth and a handheld device to collect and transfer the data
- powered by a long-life replaceable lithium battery
- precise readings of soil moisture to assist in irrigation decisions
- data is viewed in IrriMAX Live from your phone, laptop or tablet
- easy to install, and information is easy to extract
- probe can be moved as needed.

**Information.** Go to website [www.sentek.com.au](http://www.sentek.com.au).



## GIANT FLOW METER A COST SAVER

Last year, Aquamonix fabricated this huge end-insert mag meter for metering irrigation water on a cotton property on western New South Wales.

The flow meter is designed to mount inside a large concrete pipe (1500 – 1800 mm) and provide accurate metering of irrigation extractions from large river pumping stations.

According to Aquamonix, the insertion-style meter provides a significant cost and civil works saving over other technologies, coming in at under half the capital cost of other flow meters and able to be installed in less than a day.

The company has applied to have this meter pattern approved to AS 4747.

**Information.** Aquamonix website [www.aquamonix.com.au](http://www.aquamonix.com.au)



## LADCO

### HEALTHY WATERING

Wherever there is a beginning, there is an end, except for a sausage which has two ends.

Most irrigation systems start at the tap and end up somewhere in the garden.

And it is this 'end' that in many cases is the beginning of a potential problem. The problem is that because the water at the endpoint has nowhere to go, it sits there for a long time. This can happen for many years, in fact, and is a potential health problem in the making.

Rivers need to keep flowing to stay healthy; if the flow stops the river dies. Similarly, if the water stops flowing at the end of an irrigation system, the water potentially becomes toxic.

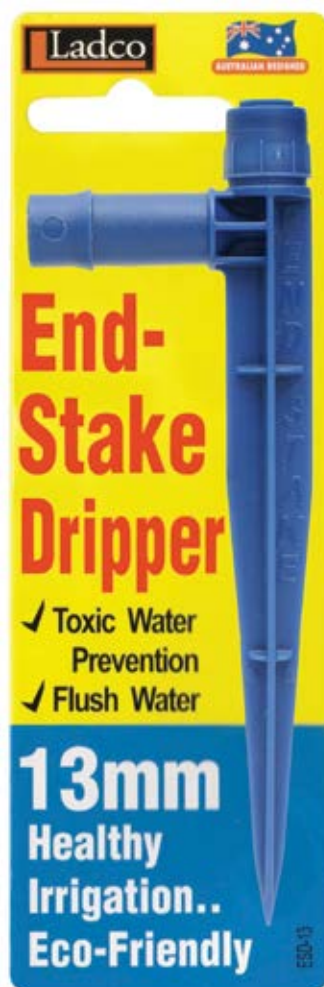
While water is an important part to sustain life for people, animals and plants, when it becomes toxic it has the opposite effect, causing illness and death.

Toxic water ending up in the soil and on plants could cause illness to pets and humans.

A simple but effective Aussie innovation stops the water at the irrigation line's endpoint from becoming stagnant. The 'End Stake Dripper' is a clever design that releases the water at a slow drip thereby solving the problem.

This simple, inexpensive way to keep the water, soil, family and pets healthy is now available at large hardware stores.

**Information.** Contact Norm Ladson, phone 0419 378 467, email: norm@ladco.com.au.









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