



# Water management

## from an irrigator's perspective

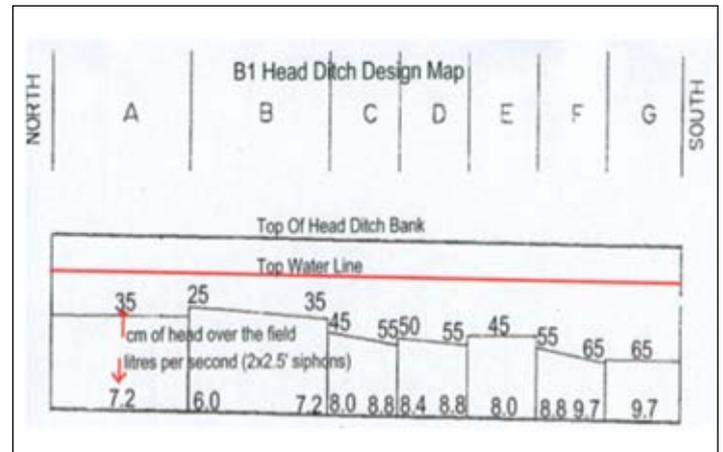
Water management from an irrigator's perspective  
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Nathaniel Phillis has been irrigating for 20 years. He is currently the Irrigation and Earthworks Manager with Sundown Pastoral Company (SPC) and manages a team that is dedicated to improving the management of water on 'Keytah'.

Nathaniel drives improvements in water use efficiency (WUE) on 'Keytah'. He manages the water from the time it arrives on farm either from the river system or rainfall. Nathaniel's team moves the water around farm and applies it to the fields with the aim to reduce losses and therefore improve the WUE of all components of the irrigation system – storages, distribution (channels) and fields.

Nathaniel's role as Irrigation and Earthworks manager means he can effectively and efficiently manage the whole system. This has significant implications for whole farm WUE. The irrigation team are responsible for all aspects of water management including: gate maintenance, rota bucks, supply channels, head ditches and tail drains. They also monitor the movement of water across the whole farm and implement a maintenance program for the whole system.

Every structure on the farm has been recorded, numbered and prioritised for any repairs and



**Figure 1:** Difference in head height and flow rate across a field.

maintenance. This is vital, especially with the number of structures on-farm. For example there are over 400 gates on 'Keytah'.

An important first step to improving WUE was to understand the hydrology of 'Keytah's' field design. This meant measuring the head height differences along the head ditch and matching siphon size and number, to ensure a consistent flow rate along the length of the field.

Figure 1 shows the difference in head height and flow rates if all sets were watered with two 2.5" siphons on one 'Keytah' field. The flow rate ranges between 6L/s and 9.7L/s. This variation in flow rate has a significant effect on the advance with water reaching the end of the tail drain at various times.

If siphons were pulled at the one time the distribution uniformity would vary between furrows, with parts of the field under watered, while other parts would be over watered.

Ensuring a consistent flow rate has improved uniformity and assisted with labour management. Tail water flows are more consistent, therefore irrigators are not waiting for rows to come through and they can irrigate more hectares per day.

Field and head ditch maintenance is crucial for improving irrigation performance. Lasers are used on graders during the maintenance program to ensure the delivery systems and structures are as close to design as possible. Tail drains and drop box heights are also managed to reduce the amount of silt.

With plenty of tractor driving experience, Nathaniel says the hardest tractor driving operation on the farm is building rota bucks, and believes the person starting the siphons should build the rota bucks as they are the individual on the shovel if there are any breakouts during the irrigation. This ensures greater care in their placement.

Nathaniel has been responsible for managing the irrigation of a range of trials conducted each season on 'Keytah' including variety, scheduling, row configuration and irrigation system trials. The Gwydir Valley Irrigators Association (GVIA) Irrigation System Trial is located on 'Keytah'. Nathaniel not only irrigates using the traditional siphon system, but also manages a drip, bankless and the lateral move irrigation system in the trial.

After three seasons managing four different irrigation systems, Nathaniel sees big advantages in labour savings and energy use for the bankless channel. "It's probably the easiest system to manage, but getting the design right is crucial." Nathaniel reckons it takes

a couple of seasons to get a really good handle on operating the lateral move, and also understanding how best to manage the crop underneath. "It requires a different mindset to siphons, and you obviously have more control of the water." "It's (lateral move) a great system, but you want a reliable water supply to ensure you don't have the machine sitting idle. This can also be said for the drip system." If considering a change in irrigation systems, irrigators have to look at their own farm, what suits one might be disastrous for another. Nathaniel said, "There is a lot to consider, but especially your soil type, topography, water reliability and capital outlay."

On-farm water measurement has been crucial to the success of the GVIA Irrigation System trial. Nathaniel's understanding of water flow and metering is exceptional and has been vital to the success of the irrigation trials. Measuring water flow is certainly a challenge, but through perseverance and determination he has installed a network of flow meters to measure water on and off various trial sites. The use of real time web based communication which enables Nathaniel to track water flows without physically being at the site has made running the GVIA trial much more efficient.

All storages have been surveyed to obtain an accurate depth-volume calibration curve so storage volumes are known and they are monitored on a regular basis.

These changes in water management do cause greater demands on the irrigators both physically and mentally and a good team is vital for improved irrigation performance. It is a challenging exercise to increase awareness of management that improves WUE and encourage practice change. However, this has been achieved by actually calculating and benchmarking their WUE, striving for further improvements and putting a dollar value on these improvements.