

Maximising on-farm irrigation profitability project

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Key findings

- » Significant water allocation cuts have forced irrigators to optimise production with the amount of water available.
- » The project has an agronomy component and a hydrology component.
- » Experiments are located in Whitton, Kerang and Finley.

Introduction

'Maximising on-farm irrigation profitability' is a new project that had its first season of field experiments in the ground during the 2015–16 summer. The project is a component of a joint Rural Industries Research and Development Corporation (RIRDC) project titled 'Smarter irrigation for profit'.

Reductions in water availability in the southern Murray–Darling Basin of around 30% have caused irrigators to place much greater emphasis on optimising production with less water. The project's overall objective is to develop sustainable broadacre irrigation systems that increase the profitability and flexibility of farming systems in the region.

The project has two components: an agronomy component that will assess the impact of varying surface irrigation management strategies (scheduling and frequency) on nitrogen use efficiency, water use efficiency and overall system profitability; and a hydrology component that will develop irrigation design criteria that will allow precise application of water in basin irrigation layouts, such as bankless channel systems, allowing flexible management to match recommendations from the project's agronomy component.

The project uses the research experience from both NSW DPI and Deakin University and has been established in conjunction with three grower groups across the region. Each grower group hosts field experiment sites for the project. These are key sites for sharing project findings between sites as well as with advisory organisations such as Local Land Services, CottonInfo and Rice Extension.

Site details

Irrigation Research and Extension Committee (IREC) – Whitton

Given the recent rapid growth of cotton production in southern NSW, IREC members considered it important to gain further understanding on the relationship between nitrogen (N) and irrigation management for this relatively new crop. This site focuses on the interaction between nitrogen use efficiency and irrigation management in cotton (Figure 1).

In the 2015–16 summer season there were five N rates (0, 80, 100, 150 and 250 kg N/ha). All treatments were applied pre-planting and received two irrigation frequency treatments.



Figure 1. Planting the upfront N treatments for the cotton field experiment at the IREC field station, Whitton, which is investigating the interaction between N and irrigation management.

Southern Growers (SG) – Finley

A particular interest for SG is improving profitability in the rice farming system. This research is investigating if it is possible to continuously double crop (producing two grain crops within a 12-month period) using a short-season rice variety and a short-season barley variety. Beds were incorporated into the bay layouts to determine what role they could have in reducing the turnaround time between crops and if they have any effect on the soil chemistry which often provides unfavourable conditions for winter crops that immediately follow rice.

The site's focus is to improve the performance of the winter crop component of the rice farming system as a means of improving the overall system profitability. To do this, an emphasis is being placed on further understanding the soil chemistry that could limit winter crop production immediately after the rice crop.

The rice was established using a standard drill sowing technique and the winter crop will not be irrigated, forcing it to use the residual moisture from the rice crop (Figure 2).

Irrigated Cropping Council (ICC) – Kerang

Growers within the ICC growing region were interested in investigating the interaction between N management and irrigation management as technologies such as automated delivery increase the flexibility of their systems.

The site was established at Numurkah with fully automated border check surface irrigation with maize as the crop sown. The budgeted N requirement (218 kg N/ha) for the target yield of the crop was varied through differing N strategies: 75% upfront and 25% in-crop; and 40% upfront and 60% in-crop. There were also two irrigation frequency treatments using approximately five- and seven-day intervals.

An additional area was also sown as an initial investigation into the role that enhanced efficiency fertilisers might have in the system. This work is expected to increase throughout the project (Figure 3).



Figure 2. Establishing the short-season rice variety YRM70 on beds at Rice Research Australia Pty Ltd.

Hydrology component

There are no criteria currently available to design basin irrigation systems, including bankless channels. The hydrology component of the project will focus on developing design criteria to ensure that new layouts are able to achieve suitable watering times (target of water on and off in 10 hours) given the intended design characteristics and infrastructure. This is intended to deliver irrigation layouts that are more water productive, flexible and profitable.

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Figure 3. Inspection of the Irrigated Cropping Council maize N and irrigation management field experiment by the research team and members of the project Steering Committee in February 2016 (Carlos Ballester Lurbe).