



## Optimised Irrigation Row Configuration.

In 2014-2015, 2015-2016 and 2016-2017 Optimised Irrigation Row Configuration Trials were planted at Keytah and Auscott in the Gwydir Valley.

The trials investigated water-use efficiency and relative yield potential of four different row configurations under siphon irrigation. This information will help growers determine the most appropriate row configuration for their operation.

The trial involved the comparison of 30inch, 40inch, 60inch and 80inch configurations. Each row configuration was watered as required with the aim to maximise the yield of each treatment.

Auscott has utilised the findings from the trials to make adjustment in their farming systems. They are moving their irrigation to 30inch row spacing. This change will mean machinery with three meter centres can be used in both irrigated and dryland farming. This will reduce the percent of fields wheeled and hence subject to compaction.

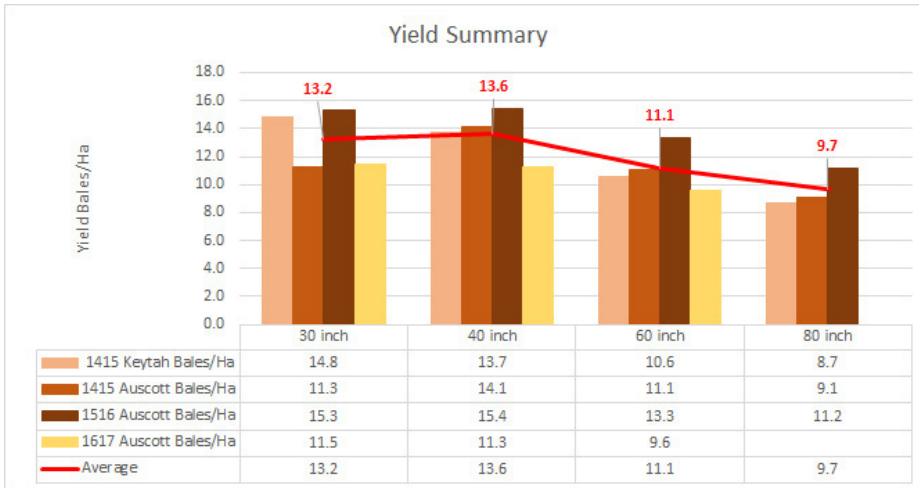
The Smarter Irrigation for Profit Grower-led Project was made possible through funding from the CRDC and the Australian Government Department of Agriculture and Water Resources as part of its Rural R&D for Profit program.

### Key Results

- The 30inch and 40inch plots were very similar in both yield and irrigation WUE.
- The 60inch yielded an average 18% less than 40inch with 33 percent less green hectares.
- The water use efficiency of the 60inch relative to 40inch was 95 percent.
- The 80inch yielded an average of 33 percent less than 40inch from 50 percent less green hectares.
- The water use efficiency of the 80inch relative to 40inch was 93 percent.
- Narrow row spacings are best suited to full irrigation.
- Wider row spacings are more suited to limited water.
- Good bed structure is critical. Beds should be developed well in advance of planting.



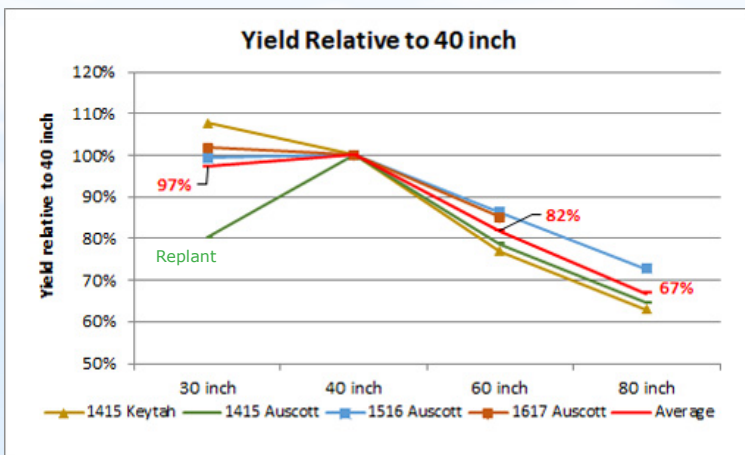
# Yield Comparison



The average yield from the 30inch plots for the four trials was 13.2 Bales/Ha, which is comparable to the 13.6 Bales/Ha average for the 40inch configuration. The highest yield achieved for both configurations were over a bale more, at 14.8 bales/Ha in the 30inch plots at Keytah in 2014-2015 and 15.4 Bales/Ha in the 40inch plots at Auscott in 2015-2016.

For the 60inch, the highest yield was 13.3 Bales/Ha at Auscott in 2015-2016. The average 60inch yield was 11.1 Bales/Ha.

In the 80inch plots, the highest yield



When yield and irrigation WUE are compared relative to the industry standard 40inch, the data shows that the 30inch yielded on average three percent less and used three percent less water than the 40inch. This makes it comparable to the 40inch.

The 60inch plots which have 33 percent less green hectares than the 40inch, used five percent less water, and yielded on average 18 percent less than the 40inch.

## Discussion of Results

The four row configuration trials have demonstrated that the 30 and the 40inch row configurations are both very similar with regard yield potential and irrigated water use efficiency. This is encouraging as it means that cotton growers who grow a range of irrigated and dryland crops can adjust their farming systems to tractor wheel spacing of three meters. This will provide them scope to move towards true control traffic farming a technique critical to reducing compaction and hence water use and nutrient use efficiency in agriculture.

One important finding from the 2014-2015 season was that to achieve maximum yield potential field preparation and bed structure are very important regardless of whether 1m or 1.5m beds are used. This is especially important for the solid plant 30 or 40inch configurations. Where bed structure is not ideal it can impact on establishment, potentially reducing yield and water use efficiency.

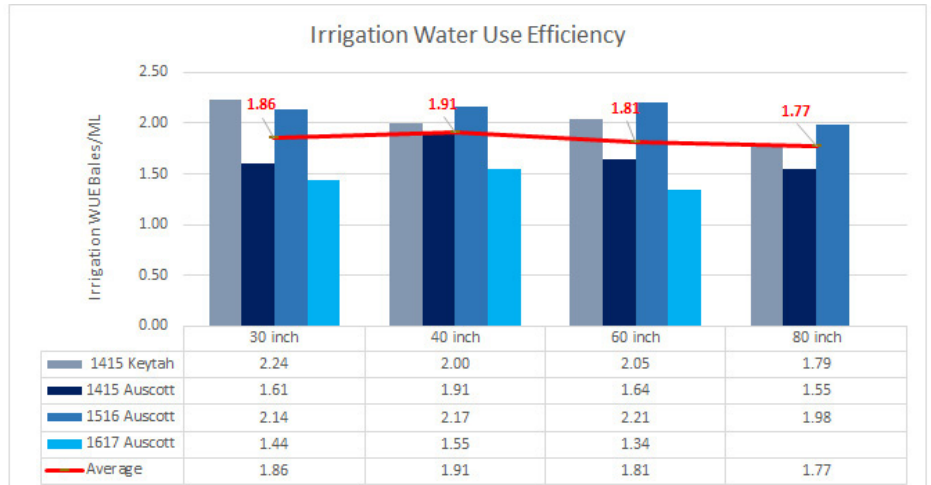
The yield performance of the two narrow row configurations is very similar, with a yield variance of only four

# Water Use Efficiency Comparison

was 11.2 Bales/Ha at Auscott in 2015-2016. While the average was 9.7 Bales/Ha. The 80inch configuration was not included in 2016-2017 as it is not expected to be commonly planted.

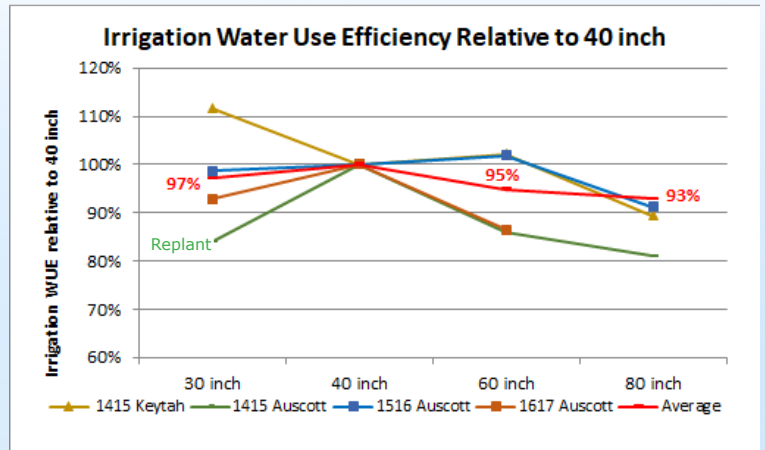
When Irrigation Water Use Efficiency (WUE) is determined for each of the four row configurations, it shows that there is very little difference between the 30, 40 and 60inch plots over four trials. The average irrigation WUE is 1.86, 1.91 and 1.81 respectively.

The yields and WUE in the 2016-2017 season were impacted by a hot spell which reduced yields across the region.



In the 80inch plots, where there are 50 percent fewer green hectares than the 40inch; there was an average yield reduction of 33 percent, and an irrigation WUE that was seven percent less than the 40inch.

NB: The Auscott 2014-2015 30inch was replanted due to poor establishment. This did impact on yield, but it has still been included in the determination of the 30inch yield and irrigation WUE calculations.



percent (including the replanted 2014-2015 data). Where there is sufficient water to fully irrigate the findings suggest that either a 30inch or a 40inch row configuration would produce high yields. They both also have good irrigation water use efficiency. The choice will depend on the farming system and equipment on farm.

In situations where irrigation water is limited and a solid plant may not be appropriate, growers can now make more well informed decisions on what configuration to plant. The 60inch configuration was found to be a more viable option than 80inch as the yield and water use efficiency were strong. In situations where irrigation water becomes available after planting, the trials suggest that irrigating the 60inch plots has the potential to produce good yields.

The final decision as to which row configuration is most appropriate will depend on crop rotation and the farm operations.

# Optimised Irrigation Row Configuration Summary

Variable	Keytah	Auscott Watervale	Auscott Watervale	Auscott Midkin
Year	2014-2015	2014-2015	2015-2016	2016-2017
Standard farm row spacing	30inch on 1.5m beds	40inch on 1m beds	40inch on 1m beds	40inch on 1m beads
Soil type	vertisol	vertisol	vertisol	vertisol
Soil variation from EM survey	<9%	<5%	<5%	<5%
Planting date	27 <sup>th</sup> Oct 2014	9 <sup>th</sup> Nov 2014	18th Oct 2015	12th Oct 2016
re-plant		60inch: 21 <sup>st</sup> Nov 30inch: 27 <sup>th</sup> Nov		
30inch irrigation and yield	6.62ML/Ha 14.8Bales/Ha	6.99ML/Ha 11.3Bales/Ha	6.62ML/Ha 15.3Bales/Ha	7.96ML/Ha 11.5Bales/Ha
40inch irrigation and yield	7.37ML/Ha 13.7Bales/Ha	7.38ML/Ha 14.1Bales/Ha	6.86ML/Ha 15.4Bales/Ha	7.28ML/Ha 11.3Bales/Ha
60inch irrigation and yield	5.17ML/Ha 10.6Bales/Ha	6.75ML/Ha 11.1Bales/Ha	5.17ML/Ha 13.3Bales/Ha	7.17ML/Ha 9.6Bales/Ha
80inch irrigation and yield	5.53ML/Ha 8.7Bales/Ha	5.88ML/Ha 9.1Bales/Ha	4.83ML/Ha 11.2Bales/Ha	
Rainfall	254mm Oct - April	266mm Dec - May	242mm Oct - Feb	283mm Oct-May
Picking	18 <sup>th</sup> and 19 <sup>th</sup> May 2015	1 <sup>st</sup> to 3 <sup>rd</sup> June 2015	4th and 5th April 2016	12th May 2017



**Australian Government**  
**Department of Agriculture**  
**and Water Resources**



**Australian Government**  
**Cotton Research and**  
**Development Corporation**

The GVIA acknowledges the financial assistance of the Cotton Research and Development Corporation Australian Government Department of Agriculture and Water Resources in order to undertake the grower led research in irrigation system comparison project.

Disclaimer: The CRDC accepts no responsibility for the accuracy or completeness of any material contained in this publication. Additionally, the CRDC disclaims all liability to any person in respect of anything, and of the consequences of anything, done or omitted to be done by any such person in reliance, whether wholly or partly, on any information contained in this publication. Material included in this publication is made available on the understanding that the CRDC is not providing professional advice. If you intend to rely on any information provided in this publication, you should obtain your own appropriate professional advice

