

# Project Catalyst

## Alternate Row Irrigation Economics: 2018-19 Case Study

### Burdekin Delta grower: Robert Zandonadi

*Growers participating in Project Catalyst trials worked with economists from the Department of Agriculture and Fisheries to identify costs and benefits of the trials.*

In this study, Robert Zandonadi and Farmacist compared alternate row irrigation with conventional irrigation. System change impacts on irrigation costs, yields and profitability were examined.

#### Trial Design

Farmacist and Robert Zandonadi established the trial with two treatments, conventional and alternative row irrigation, on the same paddock. Half the paddock received irrigation down every furrow and the other half, only every second furrow. All other operations and inputs were the same for both treatments. Six measurements of cane yield and CCS were taken within each of the two treatments. The treatments were not randomised and so measurements were not representative of independent replicates but rather an average representation of each treatment. This study presents trial results from the 2018 & 2019 harvest seasons and compares the net revenue generated by each treatment.

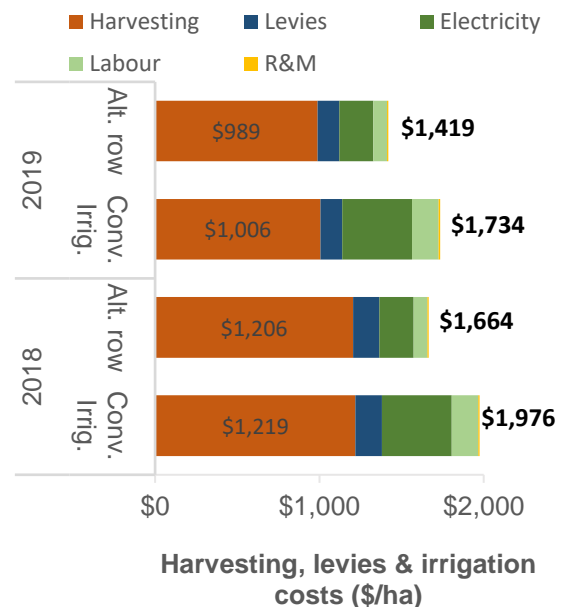
#### Costs

The only variation in growing costs was due to differences in irrigation related costs, harvesting costs and levies. Figure 1 shows a breakdown of these costs for each treatment. Each irrigation practice had the same number of irrigation events, but the amount of water received by the

#### Key findings

- With lower irrigation costs and an improved CCS, alternate row irrigation gave a \$624/ha higher net revenue when compared to the conventional treatment. However, further validation is required.
- Alternate row irrigation reduced irrigation related costs by \$297 per hectare.

alternate row treatment was only half that of conventional practice. There were no variable water costs at the site. Hence, alternate row irrigation costs were half those of the conventional treatment (\$298/ha vs \$595/ha).



**Figure 1: Levies, Harvesting & Irrigation cost comparison.**

\* R&M refers to repairs & maintenance costs.

## Results

The average cane yields and CCS obtained from each irrigation treatment for 2018 and 2019 are shown in Table 1 and Table 2. Average cane yields were similar between irrigation practices for both years, but average CCS was higher for

alternative row irrigation in both years. Given replicates in the trial were not randomised, ANOVA could not be used to determine if this difference was statistically significant. Instead, confidence intervals (95%) for each mean were determined.

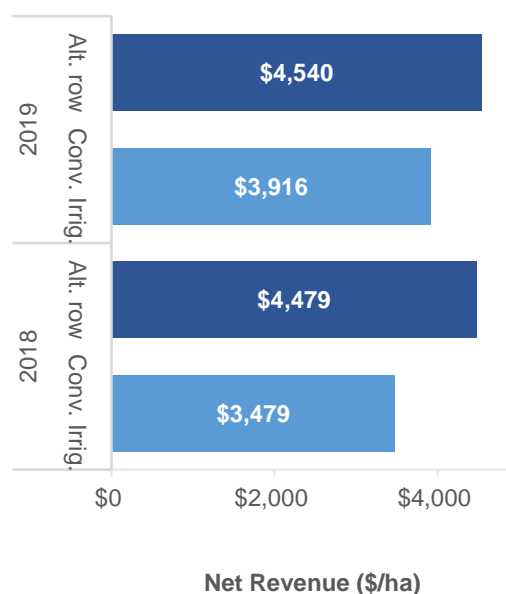
The confidence intervals overlapped for cane yield but did not overlap in the case of CCS in both years. However, non-overlapping CCS confidence intervals do not prove the means were different. Without independent and randomised replicates, the differences in CCS cannot confidently be attributed to the treatments.

**Table 1: Average cane yield and CCS results**

		Cane yield, tch		CCS, units	
		Avg	*Lower/ Upper	Avg	*Lower/ Upper
2018	Alt. row	167.5	158.1 176.9	13.50	13.3 13.7
	Conv.	169.3	158.2 180.3	12.30	12.0 12.7
2019	Alt. row	137.4	129.6 145.2	15.36	14.95 15.76
	Conv.	139.7	124.6 154.7	14.58	14.38 14.77

*\*Lower and upper bounds of 95% confidence interval.*

Irrigation costs, harvesting costs and levies were subtracted from revenue to compare the net revenues (profitability) of each irrigation treatment. Figure 2 shows the net revenues of the two treatments. Alternative row irrigation had a higher net revenue (additional \$624/ha) due to the higher average CCS (although not necessarily attributable to the alternate row irrigation treatment).



**Figure 2: Average net revenue**

## Conclusion

In 2019, the alternative row irrigation treatment obtained a higher average net revenue (additional \$624/ha) compared to conventional irrigation, driven by the higher CCS and irrigation cost saving. Overall, the results obtained for 2018 and 2019 show similar trends, however, due to trial design limitations, statistical testing could not confirm that CCS improvements were due to the treatment effect. The non-overlapping confidence intervals, while not conclusive, suggest a difference in CCS between the irrigation methods, highlighting the need for further investigation. The use of replicates within the trial design, albeit logistically difficult for irrigation, would assist in further validating the impact of irrigation treatments on production and profitability.

**Note: The trial results are specific to this grower, paddock and prevailing conditions.**

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