

Project Catalyst

Case study



Sam Marano trials the application of reduced Nitrogen (N) rates

Grower Name: Sam Marano

Entity Name: Myola Farming Co.

Mill Area: Inkerman

Total Farm Area: 48ha

Area under Cane: 48ha

Trial Subdistrict: Causeway

Growers participating in Project Catalyst trials worked with economists from the Department of Agriculture and Fisheries to provide data that were analysed to identify the costs, revenues and profitability of the trials.

In this study, Sam Marano and Farmacist trialled the application of reduced Nitrogen (N) rates to determine the impact on yield performance given his irrigation water supplied additional N in the form of nitrates. Economists determined profitability to compare the treatments.



TRIAL DESIGN

The randomised strip trial was established on a third ratoon crop of Q208 during 2017. This was harvested in 2018. Sam generally applied 190kg N/ha in his older ratoons on the trial block, while SIX EASY STEPS recommended applying 210kg N/ha (yield potential of 180 t/ha). To determine the impact of applying reduced N rates with groundwater nitrates, the trial compared two different N rate treatments of 170kg and 100kg of N/ha. Each treatment had four replicates.

| | |
|----|-------------|
| T1 | 170 kg N/ha |
| T2 | 100 kg N/ha |

Table 1 - Treatments

KEY FINDINGS

- Applying a lower N rate (100kg N/ha) reduced fertiliser costs by \$113/ha.
- A higher average CCS and gross margin was achieved at the lower N rate (100 kg N/ha), although differences in gross margin were not statistically significant.
- Results suggest it is worthwhile investigating the contribution of ground water nitrates to crop N uptake further.

COSTS

Figure 1 shows a breakdown of all the variable costs in the third ratoon for each treatment (average). The 100N treatment had less fertiliser applied and thus costs were \$113/ha lower. Harvesting costs and levies also varied as these were charged in proportion to yield. All other costs were the same for both treatments.

RESULTS

Both the 170N and 100N treatments obtained similar average cane yields although observations for the 100N treatment showed more variability between replicates. However, average CCS was higher for the lower N rate (100N) and almost statistically significant at the 0.05 level ($p=0.051$).

Variable growing costs were subtracted from revenue to compare the gross margin (profitability) of each N rate treatment. Figure 2 shows that the average gross margin for 100N was higher than for the 170N treatment. A statistical analysis of the economic results indicated that the differences in gross margins were not statistically significant (likely due to the large cane yield variability) and therefore could not confidently be attributed to the different treatments.

What it's about

Project Catalyst is a grower-led innovation project in sugar cane that was formed to explore and validate farm management practice change leading to improved water quality for the Great Barrier Reef. For more information on Project Catalyst please visit our website <https://www.projectcatalyst.net.au/> or phone Catchment Solutions on 07 4968 4216.

| | T1 | T2 | p-value |
|-------------------|-------|------|---------|
| Cane yield, tc/ha | 87.2 | 89.4 | 0.695 |
| CCS, units | 16.38 | 16.7 | 0.051 |

Table 2: Average cane yield and CCS

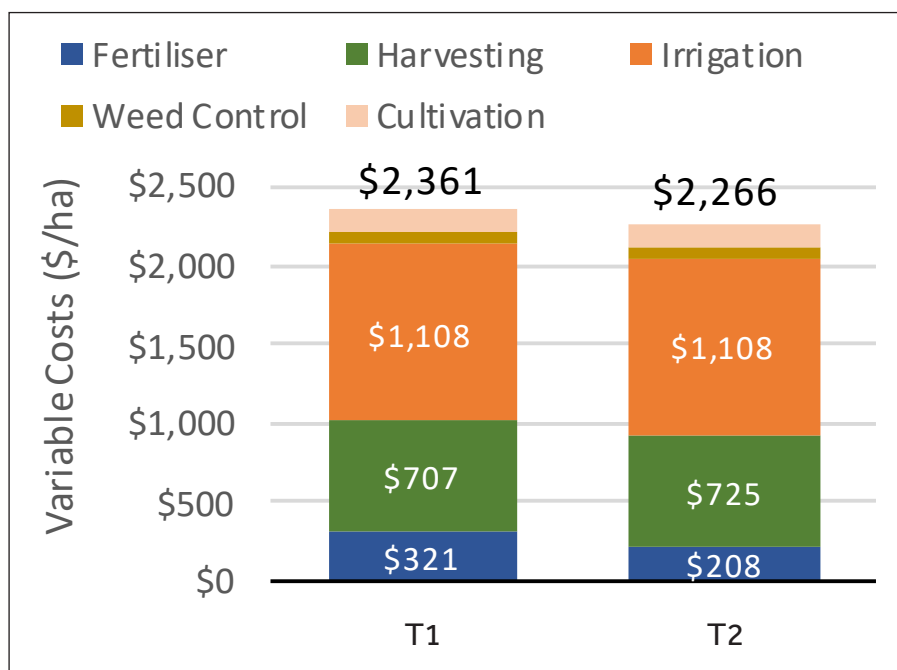


Figure 1: Variable Cost Breakdown

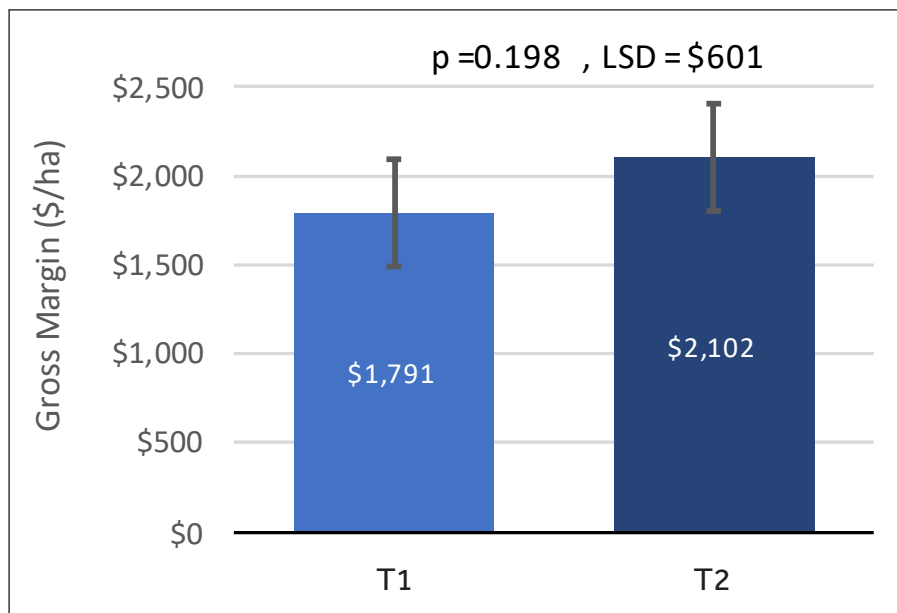


Figure 2: Average gross margin – error bars indicate the 95% least significant difference (overlapping bars indicate no significant difference).

CONCLUSION

The groundwater used for irrigation in this locality was identified as being high in nitrates.

This trial sought to determine the extent to which applied N could be reduced, while maintaining yield and profitability. Coupled with a higher average CCS, applying lower levels of N reduced variable costs resulting in a higher average gross margin. While these gross margin differences were not statistically significant, the results suggest it is worthwhile investigating the contribution of groundwater nitrates to crop N uptake further.

Introducing a control treatment (zero N) into the trial design would further validate the trial results. Measurement of nitrate levels in irrigation water and repeated trials would also provide more data for the validation of results. With a better understanding of the nitrate levels already available in the irrigation water, adjusted nutrient management plans could potentially improve the profitability of Sam's cane farm as well as improve water quality outcomes.

For more information on the economic analysis please contact Tichaona Pfumayaramba via phone (07) 3330 4507 or email Tichaona.Pfumayaramba@daf.qld.gov.au

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