



Case Study

Irrigation Efficiency with G-Dot Scheduling and Timed Actuators



LANDHOLDER	PCCCF2023BAV48
LOCATION	Burdekin
CATCHMENT	Lower Burdekin
RAINFALL	868.2 mm/year
PROPERTY SIZE	184.2 ha
ON-GROUND PROVIDER	Farmacist-Burdekin

Project Catalyst is a grower led, sugar cane innovation and adoption project that explores, develops and validates farm management practice change to improve the enduring water quality of the Great Barrier Reef.

BROADER ADOPTION VALIDATION & GROWER SUPPORT

Founded in 2009, the project operates in the Mackay Whitsunday, Burdekin and Wet Tropic regions to deliver valued practice change outcomes and develop methods for industry adoption. Under the Broader Adoption and Grower Support program, professional on-ground service providers assist selected growers to adopt and validate appropriate change practices. Service providers continue to monitor implementation benefits and derived environmental performance improvements. Through targeted extension activities, the program seeks to accelerate the uptake and broader adoption of improved farming practices at local, regional and industry levels.



Initial baseline irrigation event.



The grower recording an irrigation event



Great Barrier Reef Foundation



Goal

The goal of the project was to optimise irrigation technologies that would assist the grower in scheduling his irrigations and working towards automation. This project would be supported by the implementation of strategic fertiliser planning to avoid excess nitrogen application.

Overview

A timed actuator is a device that switches an irrigation set from one side of a T-piece to the other after a specified time period. By implementing a timed actuator, irrigation sets can be scheduled precisely without increasing stress on the irrigators workload. This may include applying shorter hours per set which can be difficult to do consistently due to labour constraints. GDots are simple irrigation scheduling tools that can help the grower apply irrigations according to crop requirement rather than a set schedule. The Grower will also receive a strategic nutrient plan provided to them to manage the risk of excess nitrogen and phosphorus application while still maintaining or even increasing production.

Date	G-Dot Reading	Irrigation Set (hr)
30/10/23	6	16 hr
7/11/23	7	13 hr
16/11/23	5	23 hr
24/11/23	6	18 hr
30/11/23	6	15 hr
10/1/24	4	24 hr
17/1/24	7	23 hr
24/1/24	6	18 hr
11/2/24	3	15 hr

Irrigation record & soil moisture readings.



Installing irrigation control equipment

Action

A N&P budget was provided that suggested a reduction in application rates across the farm, particularly aiming at old ratoons or high NUE varieties.

The initial benchmarking exercise indicated the block was being under watered. Traditionally the grower applied 0.52ML/ha on a 14-day schedule. It is likely the crop was experiencing water stress and therefore, an increase in water applied was suggested. The grower trialled various scenarios, changing hours/irrigation, timing between irrigations (1-2 weeks), all while recording soil moisture levels.

Recording helped determine which scenario was going to optimise yield (and reduce water stress) and minimise runoff.

Outcome

From the records over the peak growing season of 2023/24, we were able to benchmark the new practice. There was significant variation between irrigations. This is likely due to being a plant cane crop and the associated lack of soil consolidation. This makes it difficult to compare to the previous years practice. The best outcome for productivity was when they increased duration of irrigation and reduced days between irrigations. This reduced water stress on the crop allowing for more biomass production. Crop yield will be monitored when harvested to see if the observed improvement in plant growth results in productivity gains in terms of biomass and sugar content increases.

The grower saw great potential for water and labour savings and is keen to roll the technology out in other blocks across the farming area.

Fertiliser N application rates were also safely reduced on older ratoons by 10 kg/ha and there appears to have been no yield penalty across the farming enterprise at this time (to be confirmed at harvest).