PROJECT CATALYST

Case Study

Irrigation Efficiency with G-Dot Scheduling and Timed Actuators

LANDHOLDER	PCCCF2023BAV47
LOCATION	Burdekin
CATCHMENT	Lower Burdekin
RAINFALL	868.2 mm/year
PROPERTY SIZE	60.77 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.

G-dot displaying full water profile - plant available

Furrow Irrigation

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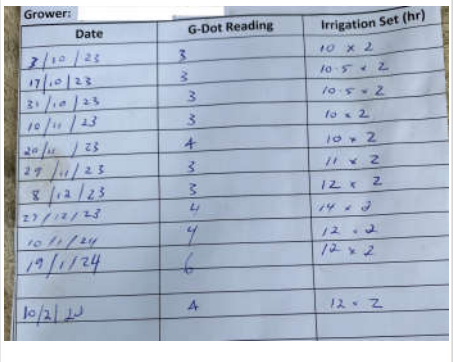
Goal

The goal of the project was optimise implement 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.

Timed actuator fully set up, with accompanying moister sensor (G-dot).

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.


Grower:

Date	G-Dot Reading	Irrigation Set (hr)
3/10/23	3	10 x 2
17/10/23	3	10.5 x 2
31/10/23	3	10.5 x 2
10/11/23	3	10 x 2
20/11/23	4	10 x 2
29/11/23	3	11 x 2
8/12/23	3	12 x 2
27/12/23	4	14 x 2
10/1/24	4	12 x 2
19/1/24	6	12 x 2
10/2/24	4	12 x 2

Irrigation records & moisture readings

Action

Traditionally, the grower applied approximately 1.25ML/ha/irrigation on a 14day schedule during peak irrigation (November to February). Using this data, the grower's initial practices were benchmarked at approximately 10ML/ha during peak irrigation. It is likely that the grower was initially over irrigating (the soil is unlikely to hold 1.25ML/ha, leading to losses), and then under irrigating because the soil is unlikely to support 14days between irrigations without losing production. Following benchmarking, the timed actuator and GDot were installed on Block 04-03, sets A and B. The GDot was calibrated to ensure that irrigations were applied to minimise crop stress. The timed actuator enabled the grower to apply shorter sets (10hrs rather than 12), reducing the per irrigation applications. The grower kept records of the GDot readings and hours of irrigation per event. The set flow rate was determined to be approximately 100L/s (1.8L/s/cup). A nutrient management plan was provided to allow for effective nitrogen and phosphorus applications.

Outcome

2023/24 irrigation records were used to benchmark the grower's previous irrigation practices to provide a starting point from which new practices could be compared. Though the grower applied more water between Nov-Feb while using the new technology (13.97ML/ha), it was applied more efficiently and as this paddock could not sustain a 14day schedule in peak demand (shortened to 9-10days). Applying according to crop requirement reduces the risk of moisture stress and because the irrigations are being applied more frequently, the hours of irrigation were shortened from 12 to 10 (in most events). This led to the irrigation volume matching crop requirement and reduced the risk of tailwater loss to run off and deep drainage. The grower is now refine the irrigation set-up to include end-of-row sensors.
N application rates were also reduced by 10 kg/haon ratoon cane and Phosphorus rates were reduced where appropriate. Productivity levels have been maintained as a result of these irrigation and nutrient management practice changes and yield will be monitored in coming seasons to see if there

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