2023

PROJECT CATALYST

Case Study

Optimising Irrigation Scheduling with Infield Sensors to Minimise Excess Nitrogen Loss and Increase Profitability

LANDHOLDER	PCCCF1022BAV41
LOCATION	Burdekin
CATCHMENT	Lower Burdekin
RAINFALL	984 mm/year
PROPERTY SIZE	52 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 bene its 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.

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Practice change adoption site

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Optimising Irrigation Scheduling with Infield Sensors to Minimise Excess Nitrogen Loss and Increase Profitability

Goal

In 2023, we successfully reduced applied inorganic N to older ratoons based on the presence of nitrates found in irrigation water. In 2024 we will now aim to optimise irrigation scheduling to prevent potential overwatering and improving production, profoitability and nitrogen use efficiency .

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Overview

The Burdekin is the largest fully irrigated area in the Australian Sugar Industry. Almost all of the irrigation is supplied through furrow irrigation, The main N loss pathways in irrigated systems is leeching, runoff and denitrification caused by waterlogging.
The main risk period of N loss through irrigation is in the first few irrigations after fertiliser application. This period after N application is also where plant uptake is limited due to minimal evapotranspiration due to small leaf surface areas from the growing crop.
Infield soil moisture sensors can provide guidance on when the crop needs water, thereby reducing overwatering potential when the crop is small which can lead to N losses.

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Action

Soil sensors help support the correct timing for irrigation. G-dots will be placed in a couple of Johns plant cane and calibrated to determine the optimal time for irrigation.

A large proportion of growers irrigate cane blocks on set intervals such as every 7 days. When cane is freshly planted in April to early June, choosing the right irrigation times during cooler months can be difficult as the crop has a smaller leaf index, soil temperatures are lower, and cane growth is typically slower. Irrigating on set schedules, such as every 7 days, can result in unnecessary irrigations during these cooler months and can put applied nitrogen at risk if the plant is not actively taking it up.

Using an irrigation tool such as a Gdot, and calibrating it to soil texture and crop growth response curves, will optimise irrigation schedules, improve crop growth, reduce unnecessary irrigations and help reduce the risk of moving nitrate out of the profile.

Outcome

Project Catalyst has always focussed on environmental and sustainable farming practices.

By integrating irrigation support tools on Johns farm, we can now focus on the correct timing of irrigation events to match soil and crop demand.

By reducing unnecessary irrigations, we can improve water quality outcomes and prevent nutrient and pesticides leaving farms and potentially impacting local waterways that feed into the Great Barrier Reef.

By matching crop water demand to localised growth pattens, we can also ensure irrigations occur when the crop needs it and thereby leading to better production, productivity, environmental sustainability and nitrogen use efficiency.

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