



Case Study

Reducing Nitrogen Rates in Response to High Groundwater Nitrate Irrigation Water in the Burdekin



LANDHOLDER	PCCCF2022BAV41
LOCATION	Burdekin
CATCHMENT	Lower Burdekin
RAINFALL	984mm (2019)
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 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.



Complete three row sidedresser



Demonstration site



●●●● Goal

To implement reduced nitrogen rates in response to high groundwater nitrates in irrigation water.



Demonstration site installation

●●●● Overview

A number of Burdekin sugarcane growers irrigate with bore water high in ground water nitrates. In this mobile form, nitrogen-nitrate is bio available for crop uptake and is subject to nutrient loss pathways just like mineralised nitrogen from fertiliser. These pathways include loss to deep drainage and surface runoff.

Reducing nitrogen fertiliser rates in response to quantity of groundwater nitrates applied to sugarcane is one way Burdekin growers are working to optimise yields, while reducing inputs. Seasonal water sampling and irrigation record keeping are two important jobs for growers to manage their nitrate levels and ensure relative reductions are being made.



●●●● Action

John irrigates his 52 ha farm with two water sources, channel and bore. Both sources are commonly combined to service the farm area, however some paddocks are bound by limited infrastructure and receive each source in alternation. The channel and bore were consecutively measured for ground water nitrates in 2022, with the bore supplying 9.4 mg-N/L on average, and the channel, 4.5 mg-N/L.

In 2023, a demonstration site was installed on paddock 05-01, which receive irrigation water sources in alternation. Two treatments were applied, with Treatment 1 representing grower practice and receiving nitrogen rates according to the Six Easy Steps at 200 N kg/ha and Treatment 2 receiving nitrogen rates at 150 N kg/ha. This was to help build the grower's confidence in the practice.

A whole farm nutrient plan was also developed where reduced nitrogen rates were recommended on late-cut ratoons (lower risk of yield penalties).

●●●● Outcome

Due to the late harvest last year this demonstration site was installed on 17th November 2022. Since then we have received 743 mm of rainfall (as of 5th February 2023).

We are anticipating a reduction in applied groundwater nitrates due to less frequent irrigations, which may increase the treatment effect.

Nevertheless, John is eager for the 2023 harvest to see if accommodating for ground water nitrates on his farm improves returns.

Building confidence in this practice will encourage John to make changes in the upcoming 2024 season, where he will look to reduce nitrogen rates on late cut ratoons as a first step to managing groundwater nitrates on his farm.

