2021

PROJECT CATALYST

Case Study

Electromagnetic (EM) Mapping and Legume Rotations to Improve Soil Health and Reduce Nutrient Runoff

LANDHOLDER	John Galea
LOCATION	Munburra
CATCHMENT	Alligator Creek
RAINFALL	1600mm annually
PROPERTY SIZE	99 ha
ON-GROUND PROVIDER	Farmacist Pty Ltd Author: John Turner

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.

Fig.1 Winter crop of New Bunya entering flowering period

Fig.2 Phil Galea in paddock of harvested New Bunya

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Goal

To use EM maps to identify poor soils and improve the soil health of these areas by adopting legume cropping and/or soil ameliorant management practices.

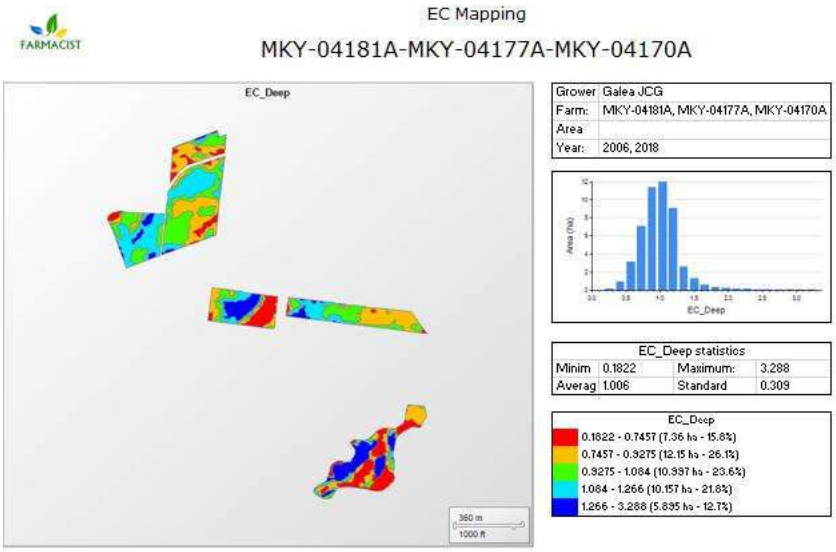

Fig.3 EC map of John's farm generated by an Electromagnetic (EM) survey of his farm

Overview

Variability in topography, soil type, soil moisture and soil health characteristics can be significant within a paddock. This is most often reflective in yield outcomes. Lower yield performance can be due to factors such as soil sodicity, acidity and poor drainage.

Responding to the variation in potential yield performance of a paddock, by tailoring fertiliser and soil ameliorants and/or incorporating legume crops, will improve the overall performance of the site. There are immediate benefits including savings on input costs, increased farm profit and reduced nitrogen (N) loss to the environment. Longer-term, soil health is improved.

Action

Farmacist determined management areas by conducting an EM survey across John's paddocks. This technology maps changes in soil type and soil moisture by measuring electro-conductivity (EC).

The information was used by Farmacist, in consultation with John, to recommend soil ameliorant and reduced fertiliser inputs and identify potential legume cropping sites.

John had several paddocks on his farm that exhibited significant yield variation. The EM maps allowed the strategic location of soil samples to provide the level of information required to correctly manage and develop nutrient plans for each paddock.

John's standard practice was a clean bare fallow, with only occasional soybean as a green manure crop. In the 2019/2020 season he grew a soybean crop to grain. The plant cane crop that followed had the N reduced at top-dress.

Outcome

John is rotating legumes within the sugarcane system. The current rotation is winter soy (New Bunya) followed by summer soy (Karanda), harvesting both for grain. The New Bunya yielded 2.5 t/ha.

Department of Agriculture and Fisheries research found reducing N after a well grown legume had no reduction on the following sugarcane crop.

The legume crop improves soil health and reduces the rate of inorganic fertiliser to be applied. Reduced N application decreases the risk of nutrient runoff from the paddock.

The legume crop also provides the grower with an alternative income, while reducing his input costs for the plant cane crop.

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