sha
Sugar Research
Australia

sugarcane
SOIL

ELECTROMAGNETIC MAPPING TO IDENTIFY IMPROVED SOIL HEALTH OPPORTUNITIES

LOW RESOLUTION SOIL SURVEYS OFTEN OVERLOOK VARIATIONS IN SOIL PROPERTIES AT THE BLOCK LEVEL THAT MAY CALL FOR DIFFERENT MANAGEMENT APPROACHES.

One way to identify spatial soil variability is through using electromagnetic mapping (EM).

The Soil Health Project - Central conducted soil, biomass and root system comparative testing between sites having a history (>10 years) of different management practices. These were called *paired sites.* The measurements taken aimed to determine how these practices may influence soil health.

Figure 1 (above): The TSM was used to conduct an EM survey to determine variation in soil type that may each require different management practices to improve soil health and optimise yield potential.

HOW DOES AN EM SURVEY PROVIDE OPPORTUNITIES FOR IMPROVED SOIL HEALTH?

- Guide more targeted soil sampling, ensuring soil sampling programs represent soil variability and assist with preparing meaningful soil testing regimes.

- Identify areas most susceptible to soil acidity and sodicity. This assists growers to identify priority areas to alleviate these significant constraints to sugarcane yield.

- Survey data informs variable rate application so that soil ameliorants, such as lime and gypsum, can be more precisely applied to economically improve soil health.

- Identification of heavier and lighter textured soil variations within blocks may be useful for identifying potential canegrub 'hotspots' that tend to be located in lighter textured soils in the Central region.

- Assist with guiding precision application of the sugar industry's SIX EASY STEPS nutrient management program. Improved precision in nutrient application (e.g., applying the right product, at the right rate, at the right time and in the right place) assists with optimising inputs, meeting the crop's nutritional requirement and may reduce environmental losses.
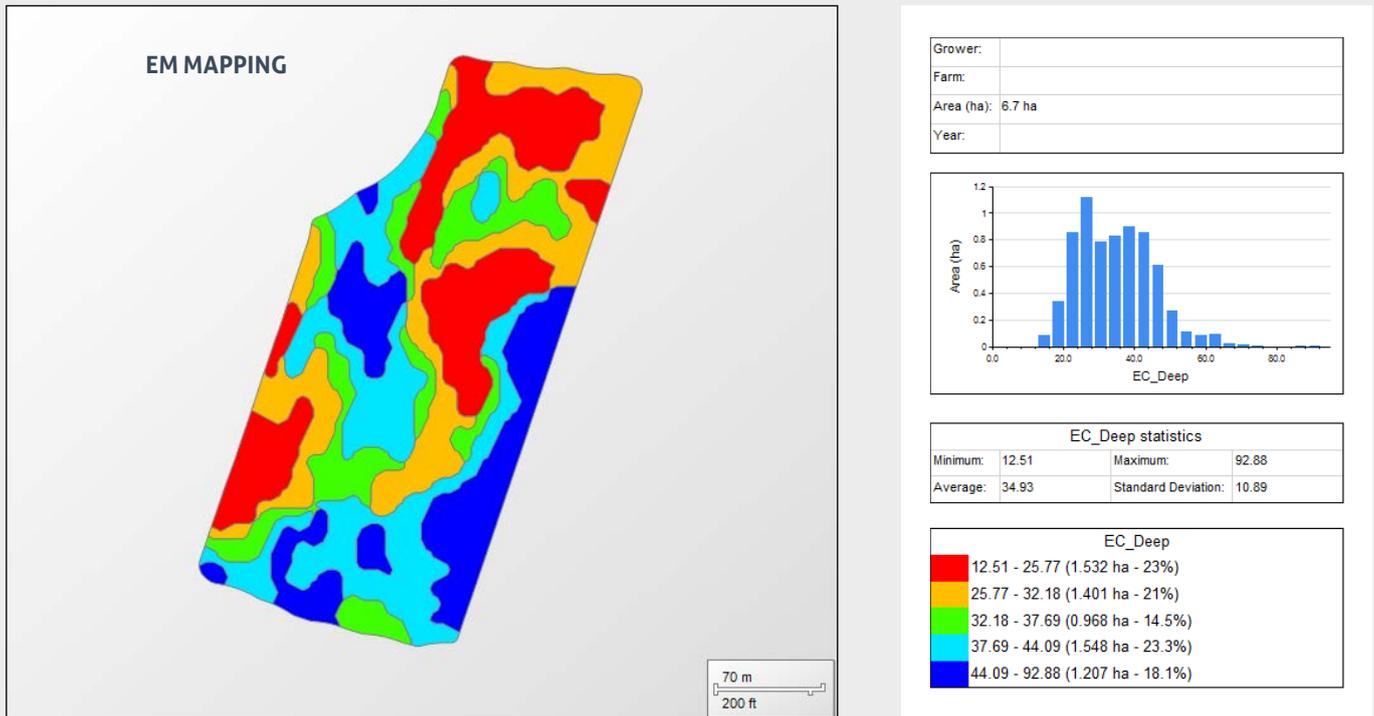
Figure 2: TThe TSM data allows spatial maps to be produced indicating changes in soil type within a paddock. This paddock demonstrates the significant soil variation that can occur within a single paddock.

To get the most representative results, EM mapping was utilised to identify sampling locations at the paired sites to ensure comparable sites were selected.

A *Geoprospector Topsoil Mapper (TSM) (Figure 1),* the latest advancement in EM mapping technology, was used to generate an EM survey for each site. The TSM relies on electromagnetic induction via sensors to generate conductivity measurements up to a soil depth of one metre. Changes in voltage of a returned signal is recorded at specific locations in the block. This indicates the concentration of electrically conductive material in the soil and can be used to identify variations in soil properties such as cation exchange capacity and clay content.

The information received is processed through software to produce a spatial map of soil variation. Colour changes are used to indicate variations in soil characteristics *(Figure 2).* The darker the colour, the higher the electrical conductivity which typically indicates 'heavier' textured soils.

Contact your trusted advisor for more information or to discuss opportunities to undertake EM mapping on your farm.

MORE INFORMATION

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