



WHAT'S IN A BLOCK? USING TECHNOLOGY TO FIND THE ANSWER

THE SRA ADOPTION TEAM IN THE SOUTHERN REGION HAS BEEN WORKING WITH LOCAL INDUSTRY TO BETTER UNDERSTAND AND MANAGE PROBLEM AREAS ON FARM. BY HANNAH RUSSELL, SRA.

Would you buy and use a second-hand tractor without knowing the hours used or what condition it is in? Would you use that tractor for work on your property without checking the oil or its ability to perform the work it's supposed to?

It's the same situation with your sugarcane block. Although years of experience can tell you where the poorly performing areas are and perhaps why, how well do you really know your farm? For example, survey data has shown that compaction in blocks is a major issue in the Southern Region. Could plough pans at 250-300mm under the surface be your problem? How are these variables affecting your yield?

Understanding the variability in your blocks and across your farm may be the first step to improving your productivity. Block characterisation surveys can help with this.

THE WHAT

Block characterisation involves using electromagnetic (EM) mapping to identify block variability. When using EM38 technology, a source of current is passed over the soil surface without making physical contact. The feedback given from the soil is then converted into colourful maps which may suggest variability in the soil such as moisture

and clay content, salinity, organic matter and iron content.

It is recommended that the EM maps are ground truthed by taking soil samples from targeted areas of the paddock. Typically, soil samples are taken from a high apparent electrical conductivity (ECa) zone and a low ECa zone.

The soil test results may help explain the differences between your ECa zones and may deliver a solution.

THE WHY

What are you going to do with that information? EM mapping can add value to the farming operation through understanding the block and potential solutions to any underlying issues.

One grower, Isaac Schmidt, had a portion of his farming land surveyed as part of the *Testing Today's Technology* project in September 2019.

"It was quite interesting to see how the system worked to identify different parts of the paddock, take the samples and get the results back," said Isaac. "Not just the regular soil testing, but also the top 20cm and at depth as well."

One particular result of the mapping and soil testing process was beneficial for Isaac: the variable rate gypsum application. Tidal flooding had left some

areas of the block more saline than others, and using the variable rate map, Isaac was able to strategically apply his gypsum.

"If I had done a soil test and collected one sample over the paddock, it may have come back and said to apply a certain amount of gypsum and you would have just applied that over the whole paddock. It means that if I'm spending the money, I can put more on where it needs it and none where I don't need it," he said.

"I think for blocks that you have problems with, it certainly would be worthwhile. Certainly, for any sort of problem blocks where you can see big differences across the block for no particularly obvious reasons, it would be worth getting them done."

TESTING TODAY'S TECHNOLOGY: THE PROJECT

Under the *Testing Today's Technology* project, two service providers were used: Trimble and Vanderfield. The two services each surveyed the same three sites in cane growing areas around Bundaberg, Childers and Maryborough.

For a cost of \$40 +GST/hectare at the time of survey in September 2019, Vanderfield utilised a DualEM 215 EM sensor to measure changing ECa at multiple depths in the soil profile. As the

sensor was suspended at 25cm above the ground, the process resulted in maps with the following readings:

- DualEM 50cm = 0 to 25cm of soil profile depth
- DualEM 100cm = 0 to 75cm of soil profile depth
- DualEM 150cm = 0 to 125cm of soil profile depth
- DualEM 275cm = 0 to 250cm of soil profile depth

Elevation data was also collected through a GPS system and transformed into a map.

Vanderfield offered a short follow up afterwards, which included discussing the EM process, running the results through a water flow simulation software to indicate drainage patterns, and walking the block to assess soil at the highest and lowest ECa zones.

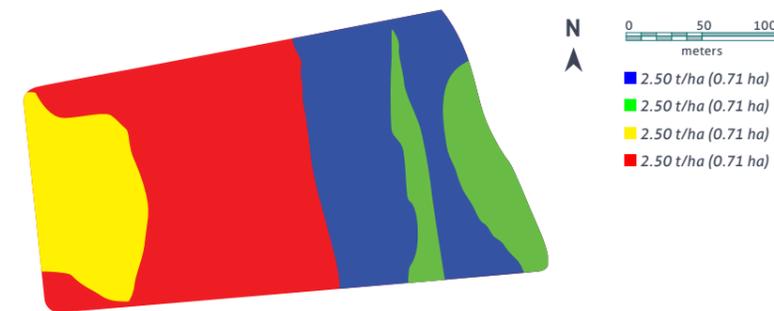
Vanderfield offers a more in-depth interpretation of results for an additional fee of \$500 +GST for a half day consultation and \$1,000 for a full day consultation. Vanderfield also recommends ground-truthing the EM maps by taking soil cores which may be taken through your local agronomist or Vanderfield at a per hour and day rate.

Trimble used a Soil Information System with a dual EM sensor and has a series of five steps. During the *Testing Today's Technology* project, the first four steps were completed over one day.

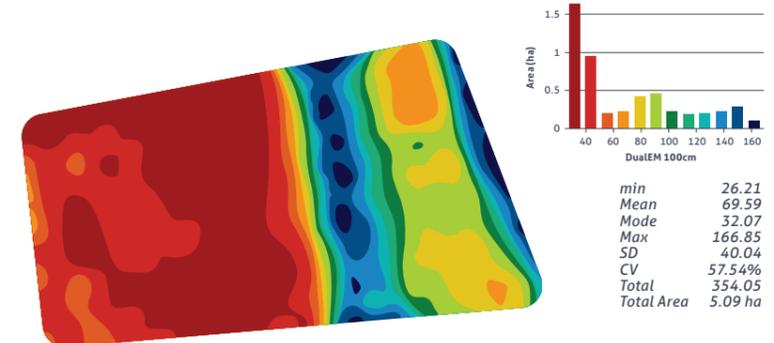
1. Define paddock boundary with RTK GPS and feed results to the on-board computer.
2. Collect variability and elevation information every metre with dual EM surfer and GPS.
3. Collect data from probe at locations identified by the on-board computer. The probe measures tip force, sleeve resistance, moisture and electrical resistance.
4. Collect two soil cores at each location as defined by the computer after considering EM map and probe data. Soil cores are collected at 0-600mm and 600-1200mm.
5. Results are obtained from the EM maps, probe data and soil cores and converted into maps.

At the time of the project surveys in September 2019, this service was priced at \$140 + GST/hectare with a travel fee of \$120+GST/hour to and from the location

Trimble Spreading Gypsum



Vanderfield DualEM 100cm



of the service provider (in this case, Ayr). For an area of less than 15 hectares, there was a fixed price of \$2,100 + GST.

Owing to Trimble's system of completing the EM and elevation maps, taking probe data and taking soil cores all at once, Trimble was able to offer several data layers of both surface and subsurface mapping, including compaction, pH, plant available water, chloride and organic matter. Included in the price was an account to their online database of the results and a follow up with the Trimble representative. This included an overview of the results and a series of maps to assist productivity improvement such as variable rate gypsum applications and drainage solutions.

The aim of the *Testing Today's Technology* project was to provide information on block characterisation survey technology and to showcase two service providers that have the capability to conduct the surveys within our region. Vanderfield and Trimble both utilise EM technology, but each has a different approach and range of services associated with it. There are also other companies that provide a similar service. You are encouraged to make your own enquiries into the services and choose which one is suitable for your situation. ■

More information regarding the technology may be found in the *Precision Agriculture for the Sugarcane Industry* manual by Sugar Research Australia and the following sites:
vantage-wa.com.au
vanderfield.com.au/images/EM_Mapping_Summary.pdf

This project was funded through the Queensland Government Reef Water Quality Program via the Burnett Mary Regional Group.

(Over page left): Trimble's Soil Information System. (Over page right): Vanderfield's DualEM sensor suspended above ground. (Above top): Trimble's variable rate gypsum prescription. (Above): Vanderfield's DualEM 100cm map.