Using satellites for on-farm decision making

By Tim Neale, DataFarming

AT A GLANCE...

- Growers and agronomists have access to free (and paid) precision agriculture (PA) tools to obtain immediate benefits for their crop management.
- Satellite imagery represents one of the simplest entry points to get started on the journey of precision agriculture.
- Many Australian farms have yield variation of more than 300 per cent in every single paddock.
- Combined with targeted soil and plant sampling, a deeper understanding of the factors impacting on production can be identified and remediated. Coupled with that, variable rate technology (VRT) offers the ability to better target crop inputs.

A GRDC/CSIRO survey several years ago showed that while around 75 to 80 per cent of farmers had adopted auto-steer GPS systems on machinery, only four per cent of farms had viewed a satellite image of their property, and only 10 per cent were using variable rate technology. DataFarming set about to identify the barriers to adoption of digital agriculture technologies, and narrowed them down to five main areas:

- Cost of entry;
- Complexity of the systems available;
- Ease of use and user experience;
- Connectivity (internet, and between equipment brands); and,
- Not getting instant value.

With many farmers embracing digital ag technologies, and farm managers and agronomists making more and more complex decisions on increasingly bigger farms and paddocks, there is a great opportunity to become far more efficient in the way we check, manage and treat crops.

Getting started

The first step is to get satellite imagery of your paddocks when the crop is growing. With the availability of 10 metre resolution data every five days anywhere in the world – essentially for free – this is a great starting point.

Tim Neale encourages farmers to access inexpensive, if not free, satellite imagery to gain immediate crop management benefits.

The key difference is that satellite imagery shows impacts beyond what our eyes can see – so we can detect crop problems earlier, and easily measure the impacted area.

A crop growth index called NDVI which measures in the infrared spectrum, picks up differences in crop health/greenness/biomass. This helps direct where to look when scouting or checking crops.

Figure 1 is an example from the DataFarming platform – where the blue areas of the paddock are high growth, and the areas in red are poorer growth.

After three years (up to the end of 2020) there are now 20,000 farms loaded in the DataFarming platform covering almost one quarter of the Australian grains industry, and eight million hectares of paddock level data processed.

Targeted soil and plant sampling

While technologies such as EM (electromagnetic) mapping have been around for decades, only a few key contractors offer the service in Australia.

With the advent of new tools, any agronomist can now capture soil type data using EM from the comfort of the ute. EM typically measures down to 1.5 metres into the soil to detect differences in

FIGURE 1: An example from the DataFarming platform – where the blue areas of the paddock are high growth, and the areas in red are poorer growth

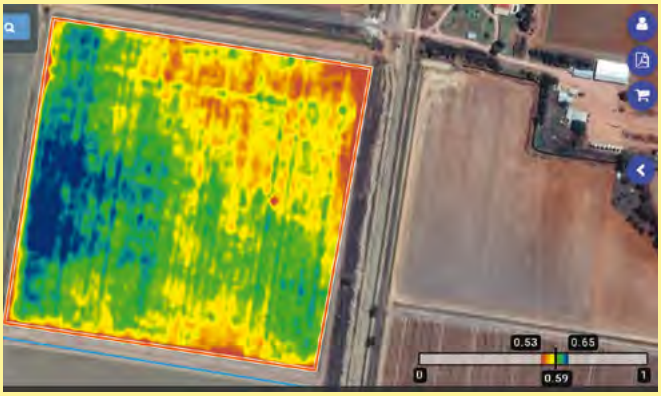


FIGURE 2: An example of an EM machine on the back of a ute (left) and the resulting data map (right)

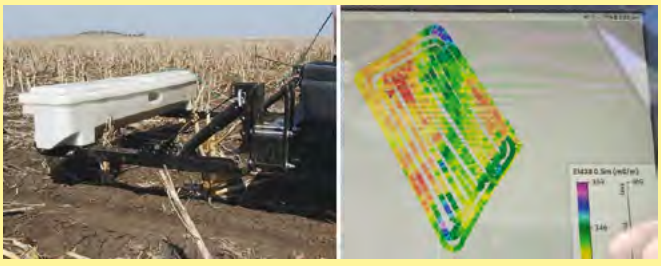


FIGURE 3: Zone maps in the Farm2Lab app, ready for soil sampling

clay content, moisture content and soil salts. Figure 2 is an example of one of these EM tools, with the resultant data on the right.

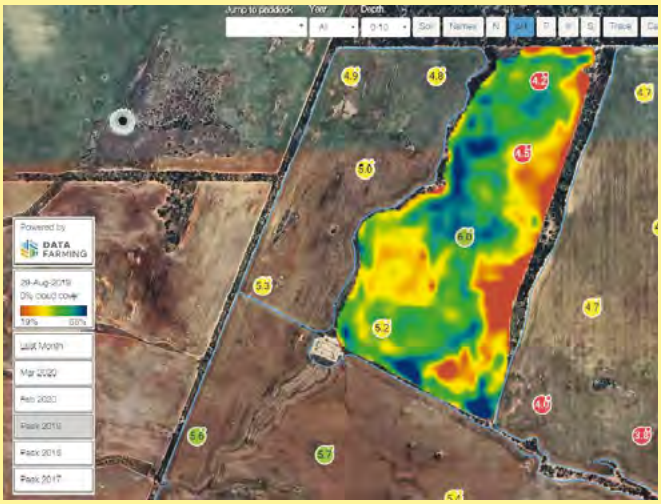
For agronomists collecting soil samples, the APAL Farm2Lab app takes out the paperwork and streamlines the whole process. It doesn't make the practical part of sampling any easier, but certainly speeds up the process and improves efficiency. You can add zonal layers at the planning stage, before entering the paddock, which helps select the right spot to sample.

Once sites are selected and you determine the suite of tests you want, the points are available in an offline app which directs you in the field.

Once collected, the geo-referenced results are presented back in the app for easy viewing and understanding. The results can also be pushed to BackPaddock or Agworld software for interpretation and building recommendations.

Figure 3 shows zone maps in the Farm2Lab app, ready for soil sampling.

FIGURE 4: Soil test levels overlaying the NDVI imagery in the Summit Fertiliser app



Results can also be displayed in other platforms. The image in Figure 4 shows the resultant soil test levels overlaying the NDVI imagery in the Summit Fertiliser app. This enables farmers and agronomists to get better value out of soil testing, and to understand and alleviate production limiting factors.

Acknowledgements: DataFarming acknowledges the funding it has received through the GrainInnovate fund managed through Artesian Venture Partners.

For more information: Tim Neale DataFarming Ph: 0409 634 006
Email: tim@datafarming.com.au

Key words: Satellite imagery, precision agriculture, sensors, adoption.