

# Eyes in the sky monitor crop health

BY PETER GREDIG

Scanning the earth from satellites or aircraft with sensors or cameras to gather information is called remote sensing. It's been around for a long time in a peripheral way, but it's finally finding traction.

There have been significant improvements in recent years in the ability to monitor plant health from the sky using NDVI, or normalized difference vegetation index. Special cameras measure the difference in reflectivity between near-infrared light, which vegetation reflects, and red light, which vegetation absorbs. The comparison gives an indication of how healthy or stressed a crop is at that time.

Two major players offer satellite-driven crop imagery across Canada. Climate Corporation has FieldView, and Corteva's product is called Encirca Pro.

Marvin Talsma is Field Product Specialist with Climate FieldView. "The uptake has been encouraging. For 2019, we are already at millions of acres across Canada signed up for FieldView. There are numerous ways to take advantage of the imagery, but field scouting is probably one of the biggest benefits."

Talsma has a background in traditional field scouting, as in walking fields. "Even a diligent field scout can only see three or four per cent of the field when walking. FieldView's reflective imagery can make it easier to direct scouting activities to specific areas."

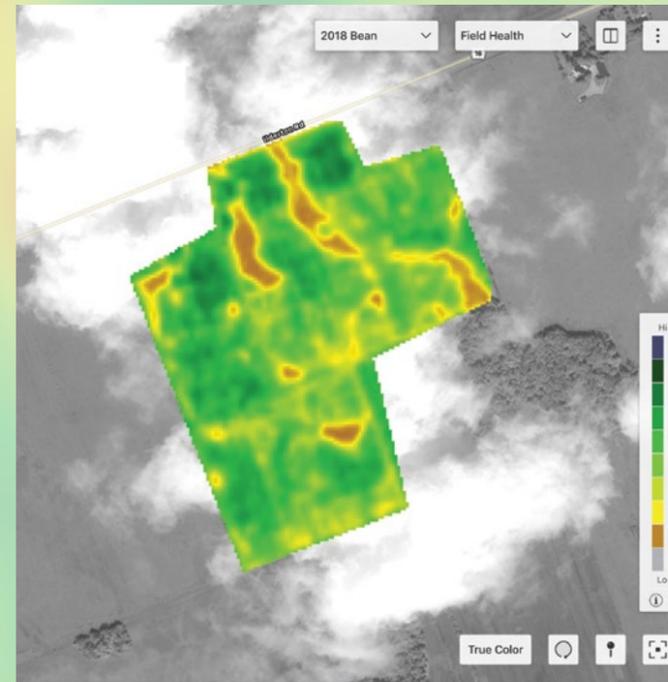
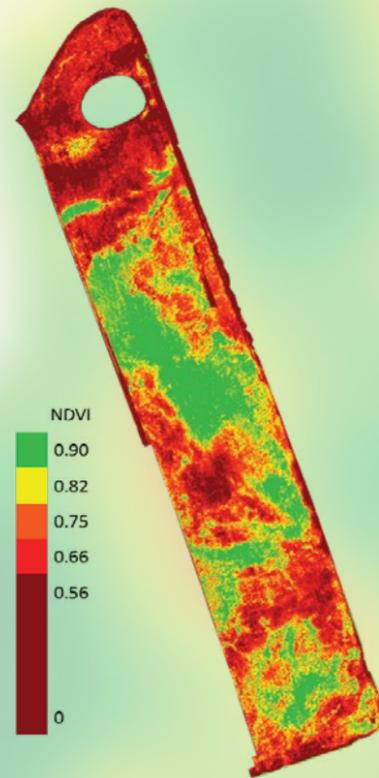
Farmers know their fields better than anyone, so the first step is to look at the imagery and apply that local knowledge. FieldView's scouting imagery uses five different colours to accurately show relative plant health in each field.

"Often it just validates something the farmer already knows, but what's more valuable is when it shows something that you can't explain with historical knowledge, variety selection, etc." At that point, Talsma says, it's time to get the boots on the ground and investigate.

There are some tips that help interpret what you are seeing. "Some growers use FieldView to compare treatments and check strips in a field. It's important to know that different crop varieties can have different reflective characteristics which may not mean one is better than the other," Talsma says.

"We look for seasonal patterns relating to the current growing conditions, varietal and man-made patterns that are the result of things the farmer has done, and long-term patterns related to soil type, drainage, compaction or some other issue. We're getting better and better at figuring these things out."

Kaye McLagan is the Encirca Pro rep for southwestern Ontario. She says the best way to describe Encirca Pro crop health imagery is that it sees things we can't. You can drive by or walk in a field and see very little difference in the plants, but there may be a dramatic difference in what the satellite cameras see.



"Encirca Pro uses a variation of the NDVI algorithm. We've tweaked it for specific crops because corn grows and looks different to the camera than a crop like soybeans or canola," McLagan says. "Encirca Pro imagery resolution is down to a 3x3-metre level of accuracy, but it's going to get better and better." Different colours denote low, medium and high health.

Interesting trends started popping up in 2018, the second year for Encirca Pro. "Some of our growers have found that a plant health image of a corn field at the V6 growth stage can be a very good yield predictor. We're also learning that in soybean fields, areas showing very high crop health in June and July can go backwards in August due to white mould. We can adjust the seed population prescription in those areas next time soybeans are grown to manage the disease."

### The advantages of satellite systems include:

- a low cost of about \$1 per acre for the entire growing season
- daily or frequent coverage
- mobile apps to access the imagery

It's an opportunity for farmers to dip their toe in the technology without a big investment in time, equipment and money. But satellite imagery has one undisputed weakness – cloud cover. For high value crops or for those producers looking for greater detail and cloud proof imagery, aerial drone services are another option.

Deveron UAS Corp. is a Canadian-based company that uses aerial drones to collect and analyze NDVI and other data to help farmers monitor their crops. "Depending on the task at hand, a closer look at a crop using a drone might be warranted, especially at critical timings such as in-season nitrogen applications or disease management," says Jacob Nederend, a research agronomist with Deveron UAS. "Drone image services cost a bit more, but go beyond what satellites can do when trying to assess things like emergence or plant counts."

"Beyond the in-season value of monitoring crop health for scouting and crop protection decisions, these images can help with soil sampling and zone management strategies for next season," Nederend says. The other advantage to using a service like Deveron is that they own and fly the drones so farmers don't have to. They generate the field imagery and make it available via smartphone for \$2 to \$3 per acre per pass.

Whether using satellite or drone technology, there's potential to integrate NDVI crop health imagery with other data such as yield, fertility, soil type, topography and more to help build production zones and create variable rate prescriptions. It's emerging as a powerful and accessible precision farming resource. ■