SMART Farm

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CropScan

Evaluation of Geospatial Protein Content Grain Analysis During Harvest with CropScan 3300H:
Near Infrared Transmission Grain Analyzer (3-year project)

CropScan: An aftermarket on-combine digital technology to measure protein, oil content, moisture content and colour while harvesting.
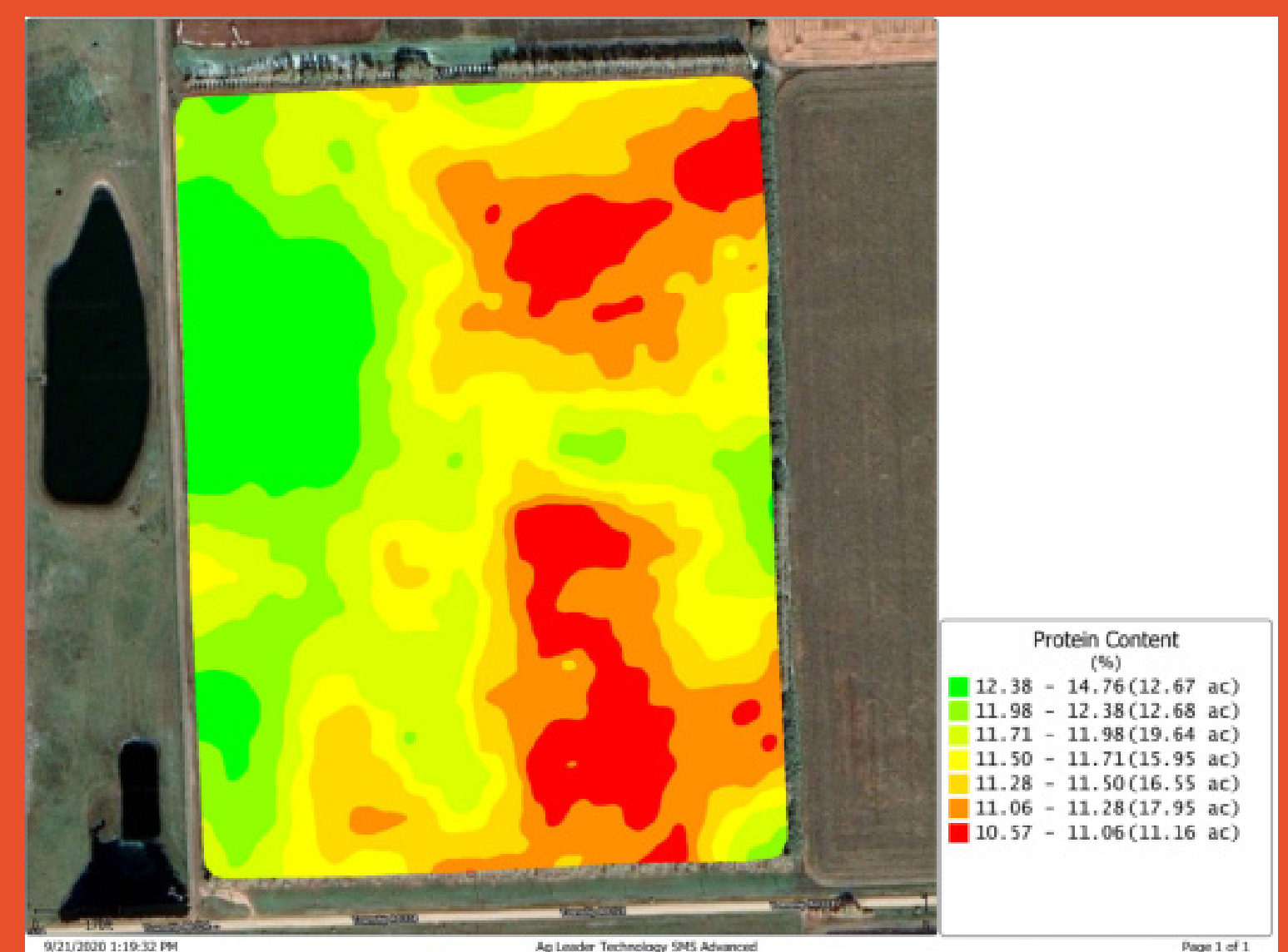

Method:

- CropScan 3300H was installed on the Smart Farm combine (2004 John Deere 9660) to assess accuracy and functionality in measuring protein content of barley.

- Prior to harvest, protein measurements were obtained by ground truthing the field; barley samples from eight field locations were sent to the analytical chemistry laboratory of the National Research Council of Canada.

- Protein content estimates of the CropScan unit were compared from the same locations.

Results:

Analysis	Mean (Protein %)	Min (Protein %)	Max (Protein %)	Range (%)
CropScan NIR	11.22	9.01	13.42	4.41
NRCC Analytical Chemistry	10.59	9.33	12.24	2.91

- CropScan predictions aligned with the true protein measurement of the barley.

- The equipment was simple to set up and operate with minimal added time to harvest activities.

- Next Instruments (CropScan) and Vantage Canada (Canadian dealer) provided excellent service and training regarding care, calibration and operation of the CropScan unit.

Note: All testing (whether NIR spectrometry or analytical chemistry procedures) has a certain error threshold which is inherent to the procedure. Typical NIR models used for agricultural production are able to explain about 93% of the variation measured for total protein. Analytical chemistry procedures typically have a higher accuracy rate, but are also much more costly and time consuming.

The resulting data from CropScan is mapped, providing valuable geospatial information of the field.

Protein Content map of Field 15/16.