Case Study 003: Real Time Data from the CropScan 3000H On Combine Analyser used by Grain Broker to sell grain off farm.

Introduction:

Storing grain on farm can provide farmers with an increase in profit if the prices increases post harvest. However the need for cash often obligates growers to sell their grain at harvest. Domestic buyers are keen to acquire parcels of grain that meet their requirements but are rarely interested in offering more than the grower will receive from the bulk handlers.

During the 2014 harvest, Luke Follett, Euston, NSW, in conjunction with his grain broker , Fabian Devereux, Ag Farm, Swan Hill, found that by using the CropScan 3000H On Combine Analyser to post protein and moisture data to a web site in real time from the combine allowed them to manage the storage of his grain on farm. As a result, Mr Devereux was able to capture an extra $5 per tonne from a flour mill delivered to Melbourne for H2 grade wheat.

The CropScan 3000H On Combine Analyser is a Near Infrared analyser designed to operate on a Combine Harvester to measure protein, oil and moisture in grains and oil seeds as they are harvested. As grain travels up the clean grain elevator, grains drop into the Remote Sampling Head where they are trapped between a top and bottom flap. Light passes through the sample of grains and is collected by a fiber optic cable on the opposite side. The light is transmitted back to the NIR spectrometer located inside the harvester's cabin. The light is separated across the wavelength range from 720-1100nm. Within this region of the electromagnetic spectrum, protein (N-H), water(O-H) and oil(C-H) bonds absorb NIR light. The amount of NIR energy absorbed at the resonant frequencies for protein, water and oil are proportional to the concentration. The Touch Screen PC located in the combine's cabin computes the protein, oil and moisture of the grains and presents the data in the form of real-time paddock maps, trend plots and bin by bin tabulation. The data can then be posted to a web site where it can be viewed on a smart phone, tablet or PC.

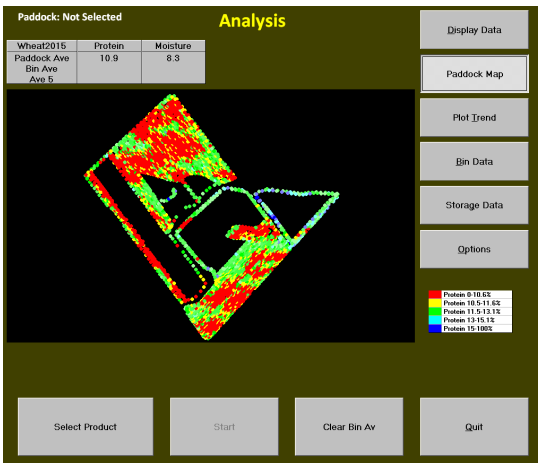
This Case Study presents data collected from the CropScan 3000H On Combine Analyser and how it was used to manage and sell grain stored on farm.

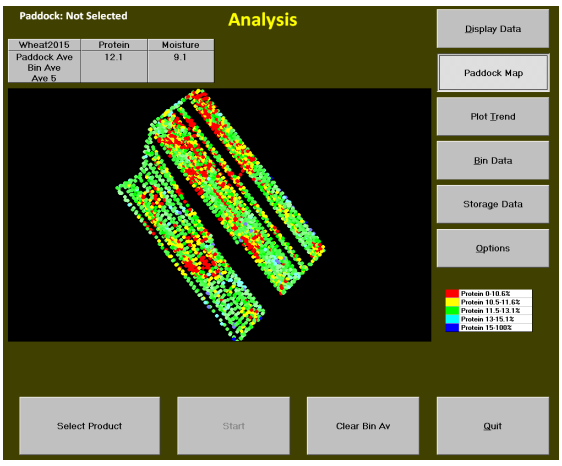
Description:

The grower produces around 6,000 tonne of wheat that ranges from APW to H1 grades across all his paddocks. The farmer runs 2 x Case IH 8120 combines and stores grain on farm in 6 x 1000 tonne silos.

The CropScan 3000H On Combine Analyser was fitted to the clean grain elevator of one of the two CASE IH 8130 Combine harvesters. The CropScan 3000H takes a measurement of the grain at approximately 11 second intervals. The Touch Screen PC, located inside the cabin, reads a set of GPS coordinates with each measurement of protein and moisture. A real time paddock map, see figures 2 and 3, for protein is generated on the Touch Screen PC. After the bin is full, the operator enters the silo location where the grain is to be segregated and stored back at the farm. The average protein and moisture for each bin load is posted to the CropNet web site where it can be viewed by the grower and the grain broker.

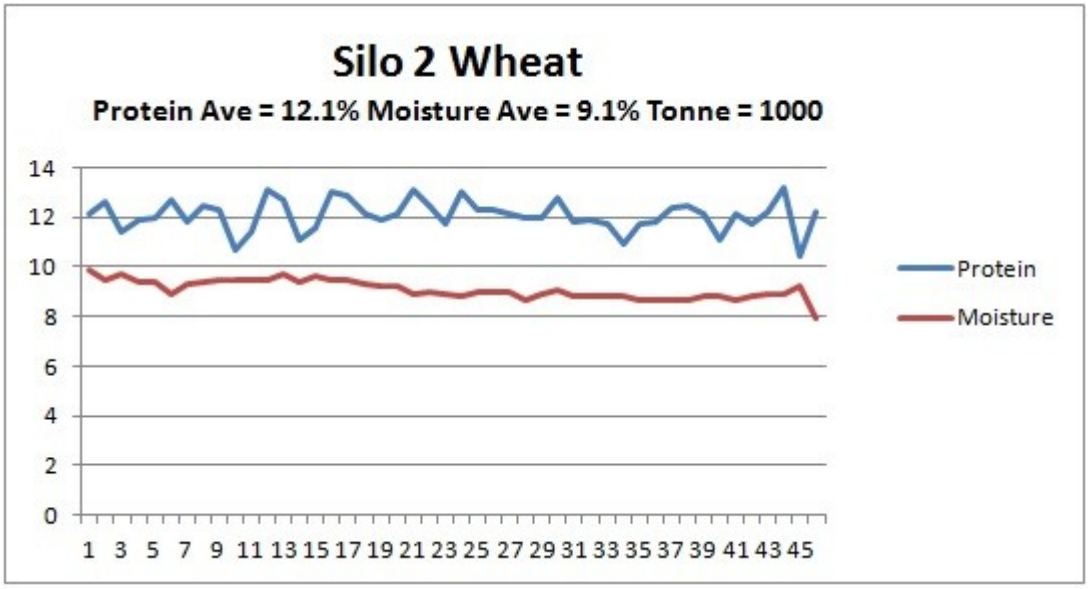
Figure 1. Picture of the CropScan 3000H Remote Sampling Head mounted to the clean grain elevator

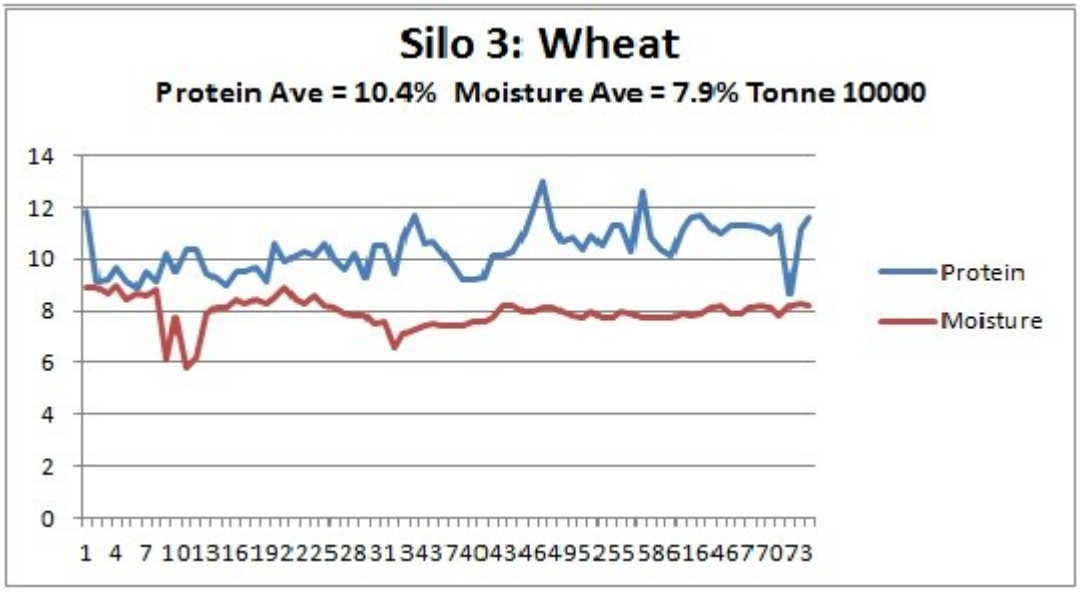




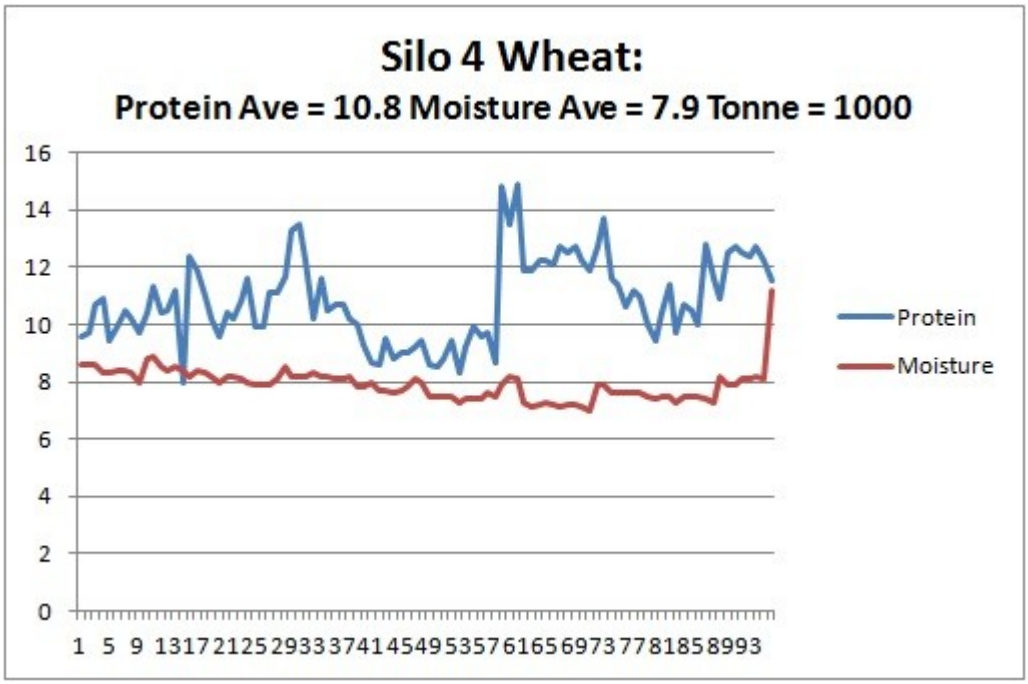
Figures 2 and 3 show protein paddock maps generated from two paddocks.

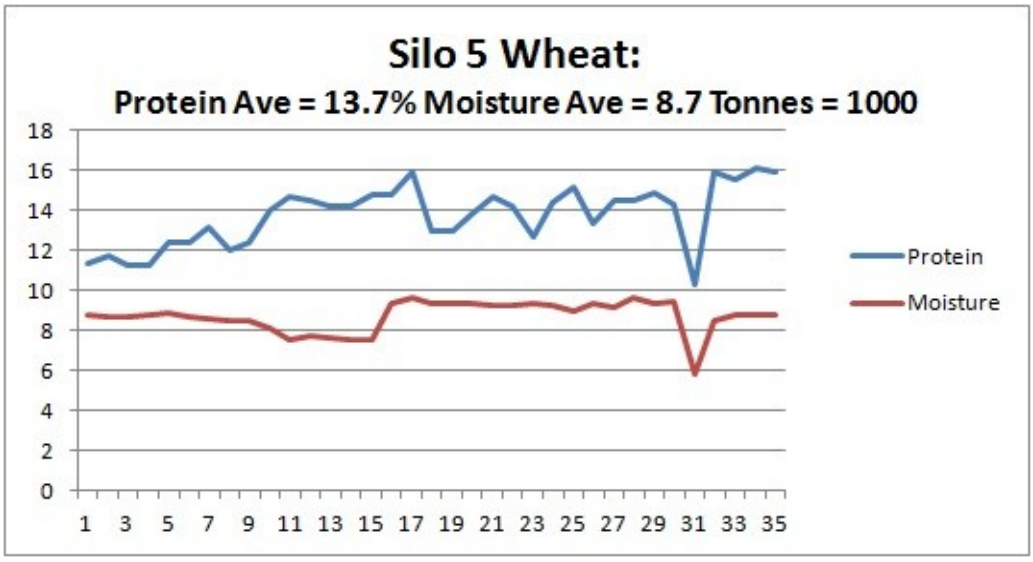
The CropNet Farm Data Management software retrieves the data from the web site and saves the data in a spreadsheet for each silo. Figures 4 through 8 show the distribution of protein in each silo as it is generated from the CropScan 3000H.

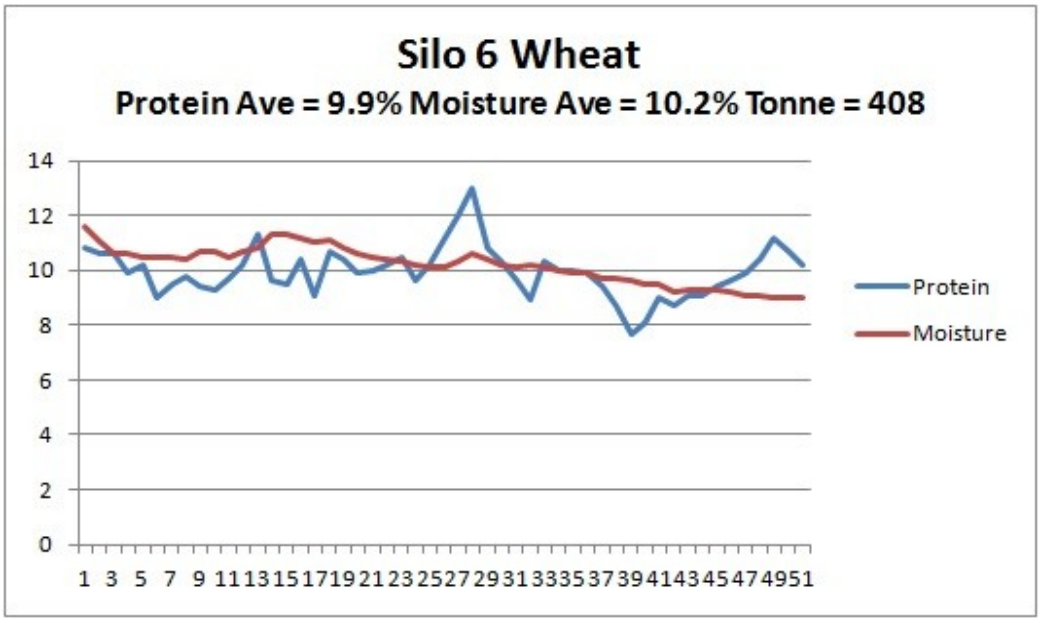




Next Instruments
B1 366 Edgar Street, Condell Park, NSW, Australia
Tel: 612 9771 5444, Fax: 612 9771 5255
Email: sales@nextinstruments.net Web: www.nextinstruments.net



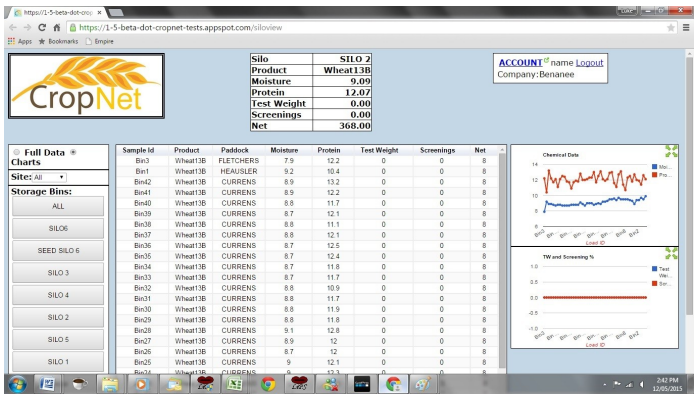




Next Instruments
B1 366 Edgar Street, Condell Park, NSW, Australia
Tel: 612 9771 5444, Fax: 612 9771 5255
Email: sales@nextinstruments.net Web: www.nextinstruments.net

Discussion:

The plots shown in figures 2 to 6 record the protein and moisture of the loads that were stored on farm. The protein and moisture data was generated directly from the CropScan 3000H On Combine Analyser. As each bin was out loaded to the chaser bin, the average protein and moisture and the tonnage were sent to the CropNet web site. The combine operator nominated into which silo the grain was to be stored. The CropNet web site stores the bin load data and generates a running average for each silo.



The farmer can then upload his data from the CropNet web site using the CropNet Farm Data Management software installed on his office PC or laptop. He can also view the CropNet website from a tablet. Figure 9 shows an example of data downloaded from the CropNet web site to the farmer's PC.

The data provided by the CropScan 3000H can be used to:

1. Blend grain based on protein
2. Generate paddock maps for protein and yield
3. Maintain a complete record of every load of grain stored on farm
4. Maintain a complete record of every load delivered to end users or the local silo.

Mr Follett had taken up several Forward Sold contracts for 2000 tone of wheat based on supplying ASW, APW and H2 grades. Having the protein, moisture and tonnage data from the CropScan 3000H enable him to fulfill his contracts with confidence. He was able to deliver all loads of grain to the end users without incurring any penalties for low protein grain.

He was also able to make decision on how to outload the stored grain to generate additional revenues and profit post harvest.

1. Silo 2 was sold as H2 grade to a flour mill for $320 per tonne. Mr Devereux was able to use the CropNet web site plots to show the miller the uniformity of protein and moisture in the silo and was thereby able to secure a $5 per tonne premium for loads where the protein was above 12%. The resulted in an additional revenue of $2500.
2. Silo 4 shows that the protein level at the early stages of filling the silo was around 11.3%, where as in the middle of filling the silo, the average dropped to 9.1% and finally increased to 11.8%. The middle loaded grain resulted in the overall protein average to be 10.8%. However since silos tend to empty in the same way it was filled, it is possible to out load the first and last thirds of the silo separately from the middle section and thereby increase the average protein to 11.5%, i.e., a jump from ASW to APW grades. The estimated increase in payments is 670 tonne by $5 equals $3350.

3. Silo 5 has an average protein of 13.7%, i.e., APH2 grade. The premium for APH2 is very attractive to the farmer and if he can blend 250 tonne from Silo 5 with Silo 2, which has an average protein of 12.1% i.e., H2 grade, then he can upgrade some wheat from Silo 2 to APH2 grade for an additional $47 per tonne for an increase in revenues of $11750.
4. Silo 3 has an average protein level of 10.4%, i.e., ASW grade. However the plot shows that the early loads into this silo were lower protein, thus lowering the silo average. By selectively out loading the grain into two halves, it would be possible to upgrade half the silo from ASW to APW with an increase of $5 per tonne, i.e., 500 tonne by $5 equals $2500.

Fabian Devereux had access to the farmer's CropNet web site and he could download the same data to his PC as the farmer. Based on the information available form the web site, Fabian was able to market the grain with a higher degree of confidence to end users.

Using the information provided by the CropScan 3000H and by managing the silos based on the recorded protein levels, the farmer had the potential to increase his revenues by approximately $20100. This increase in revenue is actually profit because all the operating expenses to grow and strip the grain have been expended. The only effort required to capture this extra profit is to utilize the information provided and to be prepared to blend loads to meet grade specifications.

Conclusion:

On farm storage is an expensive investment. The average price is $100 per tonne of storage. To justify large storage capacity as per this case study, there has to be a return on investment. The real profit for this particular farmer is realized by storing the APH1 and APH2 grade wheat until he can achieve the best price after harvest. The additional profit from better management of the grain stored on farm rather than delivering the grain directly to a bulk handler and taking the price offered, is gravy for his farming operation.

Mr Follett has put systems into place so that he can market his grain to achieve the best price and to provide the best quality grain to his customers as per their contract specifications.

CropScan… Know your grain… Know your paddock, enables growers to maximize their crop payments based on protein. The CropScan 3000H On Combine Analyser provides real time data directly from the paddock and allows the grower to segregate his grain as it is being stripped. The CropNet Farm Data Management software allows the grower to then manage his inventory to best meet his forward sold contracts and to blend silos to upgrade from lower to higher grades.

Next Instruments
B1 366 Edgar Street, Condell Park, NSW, Australia
Tel: 612 9771 5444, Fax: 612 9771 5255
Email: sales@nextinstruments.net Web: www.nextinstruments.net