On-the-Go Variable Rate Nitrogen Assessment on Corn  
Ottawa Rideau Regional Partner Grant – Final Report

**Purpose:**
This Project was conducted to establish a return on investment (ROI) for Crop Sensing Technology within a standing corn crop in the V6 – V8 Stages. We are making an effort to educate our local organizations about the power of this new technology, to help eliminate the fear of trying new things and thinking outside the box. We are looking to establish a Correlation between Crop Health and nitrogen use efficiency (NUE) in Eastern Ontario and help to improve crop health with environmentally sound practices. We are comparing these new field practices with older standards in grower best management practices (BMP).

**2013 Methods:**
In 2013 4 plots were established with multiple growers, on different farms, and fields across our county. Within those plots we had a minimum of 2 replications, comparing the following treatments:

1. no side dress nitrogen (0-N) application,
2. allowing the GreenSeeker System to determine the optimum application rate based on the Sensors on the toolbar.

Next we will look at the application data from the GreenSeeker system and determine the average nitrogen application per pass and apply the next repetition pass with the fixed rate based on the GreenSeeker recommendation, from there we will apply a fixed rate based on the standard side dress grower rate base on a PSN Test or OMAFRA N Calculator (whichever is available at that time)

**2013 Summary:**
This is the 2nd season that we have a set of results on this project. Utilizing the 2 main variables ($3.00 bu/Corn and $2.25/gal UAN 32%) that we had at the time of the application of the nitrogen side dress, the GreenSeeker was able to:

1. detect the variability in the field, on the fly.
2. fairly accurately assess the Nitrogen use Efficiency (NUE) and
3. adjust the rate quick enough to apply the correct amount of product where it was needed and thus showing a return on investment.

Granted this was a smaller return in the 2013 growing season then in the 2012 growing season, but where we would have blanket applied this field based on the OMAFRA or PSNT recommendation we would have spent more on the side dress nitrogen and had more yield at the end of the season, but not more money in the bank. Year 2 of this project is showing very positive results towards this technology, and On-the-Go Variable Rate Crop Sensing should be considered throughout more regions.

**2014 Methods**
In the 2014 growing season, we worked with different operators to push the window into the late V8 stage of corn. Timing was difficult as the weather was a factor and 6 of the planned plots were not completed. In the end we setup 5 plots with 5 growers, 2 of the
Crop Advances: Field Crop Reports

4C Lazidee Farms Ltd  Plot 1 Armstrongs

**UAN Rate Rep 1**
- Average UAN Variable: 28.45 GPA
- Standard Fixed Rate: 28.00 GPA
- Net Yield Gain: 2.0 Bu/Acre
- Net ROI: $6.60 / Acre

**UAN Rate Rep 2**
- Average UAN Variable: 26.96 GPA

**UAN Rate Rep 3**
- Average UAN Variable: 31.31 GPA

**Yield Variety Report**

<table>
<thead>
<tr>
<th>UAN Rate Rep 1</th>
<th>27.35 GPA</th>
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<tbody>
<tr>
<td>UAN Rate Rep 2</td>
<td>26.96 GPA</td>
</tr>
<tr>
<td>UAN Rate Rep 3</td>
<td>31.31 GPA1</td>
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plots were with NH3 and unfortunately the harvest for those 2 growers didn’t allow for a weight wagon or yield monitor to accurately capture the harvest information, we were however able to capture the data for the other 3 plots.

4C Lazidee Farms Plot 2 Home Farm

<table>
<thead>
<tr>
<th>Crop: 3E9F V12P</th>
<th>2.67 acres</th>
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<tbody>
<tr>
<td>Crop: 3E9F V12P</td>
<td>11.61 acres</td>
</tr>
<tr>
<td>Crop: 3E7F V12P GreenSeeker Variable</td>
<td>7.14 acres</td>
</tr>
<tr>
<td>Crop: 3E9F V12P</td>
<td>2.68 acres</td>
</tr>
</tbody>
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**UAN Variable**
- Average: 25.55 GPA
- Standard Fixed Rate: 28.00 GPA
- Savings: 2.45 GPA

**Net Yield Gain**
- 13.13 Bu/Acre

**Net ROI**
- $54.96 / Acre
Tranquility Agriculture Ltd.

UAN 18.23 GPA Variable

UAN 18.83 GPA Variable

UAN 15.64 GPA Variable

Average UAN Variable 17.56 GPA
Standard Fixed Rate 30.00 GPA
Savings of 12.43 GPA

Net Yield Gain 3.45 Bu/Acre
Net ROI $40.89 / Acre
2014 Field Summary

This growing season was very challenging with sidedress application of Nitrogen as weather was offering a few new challenges. Temperatures were low and ground was saturated with water. With the 3 plots of Data that we were able to get complete, all 3 showed either a reduction of N except for 1 rep which showed a slight increase in N. Soil and field variability is a large factor in N application and the variable rate N on the go with Crop Sensing technology is showing a positive increase over flat rate. In all of the Plots and side by sides the GreenSeeker showed a ROI and increase in yield.

This Concludes our Project

We at Ottawa Carleton Soil and Crop are very impressed with this technology and the simplicity of operation within the Field and the Data that we were able to collect because of it. The Growers who participated have a greater understanding of the operations day to day and have all seen the ROI potential for this type of system, for better improving Crop Health and application of Nitrogen Sidedress at V6 – V8. Although other projects have been completed with other organizations and Research plots, we feel that we can detect field variability and apply the correct corresponding rate of Nitrogen that the plant requires.

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