Adapt-N
Setting The Standard in Nitrogen Management
Adaptive Management

Plan

Adjust

Implement

Evaluate
How do you determine optimal N rate in a given growing season?
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$$50 \text{ lb N x } $0.40/\text{lb} = $20 / \text{acre}$$
How do you determine optimal N rate in a given growing season?

50 lb N x $0.40/lb = $20 / acre

6 bu x $3.50/bu = $21 / acre
How do you determine optimal N rate in a given growing season?

Can you look at a field and know if you are within 6 bu/a of optimal for N?
How do you determine optimal N rate in a given growing season?

Can you look at a field and know if you are within 6 bu/a of optimal for N?

No, you can’t!
History

1970’s - 2000’s: Cornell University
• Research on time/spatial response to N
• Initial software model development and intensive strip trials

2013-2017: Licensed to Agronomic Technology Corp
• Cloud-based platform built, rolled out through retailers & CCAs
• 2 flagship products: Adapt-N and N-Insight
• Expanded research, strip trials, and validated results
• $30/acre improved grower profit with 35% reduction in N losses

Current:
• Acquired by Yara International for Digital Farming portfolio
• Tulane Challenge Winner (77 Global Entries)
• Continued commitment to unbiased, scientific approach
• International expansion
The N Management Challenge

- Many sources of N
- Many loss pathways
- Highly dynamic system
- Highly influenced by production environments: weather, soil, and management

OUR SOLUTION:
- Data and computation
- Integration and education
Our strengths
- Strong science base
- Proven precision and benefits
- Transparency
Setup Process

Data Entry Options

- Shapefile import
- Sync with a Source
- Enter values manually
- Bulk import tools

Variables Considered

- Soil texture/slope
- Soil organic matter
- Planting recs
- Yield expectations
- Nitrogen related applications
- Manure, irrigation
- Late spring nitrate calibration
- Cover Crops

Good Data In = Good N Recs Come Out
Daily Variable Rate Recommendations

Recommendation for 07/10/2018
0 / 44 / 85 / 2,515
lbs N/acre (min/avg/max/total)

Grower: Adapt-N 2017 Cambridge
Farm: Home
Field: West 57
Acres: 57

ZONE RECOMMENDATION STATISTICS

<table>
<thead>
<tr>
<th>N Mineralization</th>
<th>min</th>
<th>avg</th>
<th>max</th>
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<tbody>
<tr>
<td>Total N Loss</td>
<td>30</td>
<td>58</td>
<td>84</td>
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<tr>
<td>N Uptake</td>
<td>105</td>
<td>119</td>
<td>133</td>
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<tr>
<td>Virtual PSNT</td>
<td>&lt;5</td>
<td>&lt;5</td>
<td>6</td>
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<tr>
<td>Soil Water Available %</td>
<td>2</td>
<td>9</td>
<td>20</td>
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<tr>
<td>Rainfall Since Planting</td>
<td>-</td>
<td>16.7&quot;</td>
<td>-</td>
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<tr>
<td>Estimated Growth Stage</td>
<td>-</td>
<td>V16</td>
<td>-</td>
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</tbody>
</table>

Recommendation in lbs N/acre
- 0 (21.53 acres)
- 1 - 14 (0.00 acres)
- 15 - 28 (0.00 acres)
- 29 - 42 (0.00 acres)
- 43 - 56 (6.54 acres)
- 57 - 70 (11.54 acres)
- 71 - 84 (0.00 acres)
- 85 - 100 (17.21 acres)

Field Configuration
- Planting Date: 04/11/2018
- Maturity Class: 88 day corn
- Previous Crop: Grain Corn
- Tillage Method: Fall Tillage
- Cover Crop: None
Engage growers in a real conversation about nitrogen using their farm, practices, and weather
Comparing management scenarios to see how N performance might be improved
Understanding how the weather impacts N loss
Getting growers on board with the concept of more progressive nitrogen management
How Do Customers Use Our Products?

- Achieving higher yields
- Validation of field observations
- CCA’s are expanding scope of services
- Reducing growers’ N loss risk
- Establishing trust with customers
- Including Adapt-N in premium service packages
Talking Points

• Unbiased, scientifically driven modeling tool

• Robust and unmatched peer reviewed data showing that the tool works

• Advanced Features: stabilizers, variable-rate prescriptions, manure analysis, cover crops, multi-year analysis, integrations, alerts, and more

• Designed to be a key tool in the service provider’s toolbox.

• Focused on win-win outcomes
N losses are reduced with Adapt-N rates as compared to Grower Rates

Leaching losses reduced by 35%

Gaseous losses reduced by 40%

Reductions in N loss are achieved by identifying when higher or lower N rates are appropriate.

In cases where Adapt-N recommended less N, there was no statistically significant impact on yield, yet growers profit/acre increased and N loss reduced.

In almost every case where Adapt-N recommended higher N rates, growers saw increased yields.

![Graph showing the relationship between difference in N rate (lb/acre) and difference in yield (bu/ac).]
Model Calibration and Testing

- Published, peer-reviewed results via:
  - Multi-rate nitrogen response trials
  - Grower rate vs. Adapt-N rate trials
- Summary results:
  - $30/acre average grower profit increase
  - 80%+ success rate
  - N losses reduced by 35%
- Many additional “informal” trials by users

- Currently engaged in similar trials internationally and with additional crops
Thanks!