NutrientStar Field Trials

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Beneficiaries of NutrientStar
What does it take for them to benefit?

DATA

Who will benefit from NutrientStar?
- Farmers
- Advisors/Ag service providers
- Supply chain companies
- Developers of tools, technologies & products
- Ultimately, society

Field Practitioners

Need data that is scientifically valid to make appropriate decisions.
Traditional Approaches To Data Collection

Field Practitioners

Scientists
Bridging the Divide

Scientists
★ Replication & randomization
★ Account for variability
★ Statistical validity

Field Practitioners
★ Field scale results
★ Easy implementation
★ Local relevance
★ Economic impact
Review Panel Protocol

NutrientStar Review Panel

Kenneth Cassman
Researcher/Professor
University of Nebraska – Lincoln

Peter Kyveryga
Researcher/Data Manager
Iowa Soybean Association

Eric Davidson
Director/Professor
Appalachian Laboratory of the University of Maryland
Center for Environmental Science

Tom Morris
Researcher/Professor
University of Connecticut

Shannon Gomes
Certified Crop Advisor/Agronomist
Cedar Farm Crop Consulting

Chuck Rice
Researcher/Professor
Kansas State University

Jerry Hatfield
Researcher/Lab Director
USDA Agricultural Research Service

James Schepers
Former USDA Agricultural Research Service
Supervisory Soil Scientist
Professor Emeritus, University of Nebraska

Greg Kneubuhler
Certified Crop Advisor/Agronomist
G&K Concepts, Inc.

Wade Thomason
Researcher/Professor
Virginia Tech

Data required per trial:

FIELD TRIALS

Protocol for conducting production-scale field trials on nutrient use efficiency tools
# Field-Scale Strip Trial Protocols

- Randomized replicated design
- Documenting important soil, agronomic and environmental conditions affecting trials
- Designed to account for the 4Rs of each plot
  - Form, timing, placement & rate

![Plot with 4 Treatment with No VRT App. Equip.](image)

[www.nutrientstar.org](http://www.nutrientstar.org)
Agro Ecoregions or TEDs

www.nutrientstar.org
Data Collection Sheet

**GENERAL INFORMATION**
- Trial Id
- Location Name
- Latitude
- Longitude
- Trial Year
- Trial Crop
- Crop Maturity
- Planting Date
- Previous Crop
- Trial Treatment Count
- Trial Replication Count
- Tillage Method
- Trial Irrigated (y/n)
- Trial Tile Drained (y/n)
- Yield Data Collection Method

**SOIL INFORMATION**
- Trial in One Soil Type
- Trial Major Soil Type
- Major Soil Texture
- Major Soil OM
- Major Soil pH
- Lab Used
- Soil Notes

**TREATMENT INFORMATION**
- Treatment Name
- Treatment N Rate
- Treatment Material
- Treatment Date
- Treatment Place
- Treatment Notes

**YIELD INFORMATION**
- Treatment
- Replication
- Average Grain Yield
- Average Grain Moisture
- Yield Standard Deviation
- Moisture Standard Deviation
Where does assessment data come from?

- Companies
- University trials
- Peer-reviewed & gray literature
  - North American trials, major row crop & nutrient use efficiency factors
- NutrientStar Network trials
NutrientStar Network

- 19 Consultants with 100+ cooperating growers
- Consultants and growers trained and committed to collect accurate data
- Network expansion underway
Data Collection

- Utilizing the tools network cooperators have to collect data
  - As applied data & yield data, etc.
- Providing them with advanced analysis of their data
NutrientStar Network

Farmer Reports

★ Data returned to the farmer in summarized format

★ Data also shared with tool, technology & product manufacturer
Acceptable Data for Assessments

Decision Support Tools
- Small plot research data to show functionality
- Production scale field trial data to calculate NUE
- Reports, literature, or white papers with background information
- Additional information: costs, ease of use, etc.

Products
- Small plot research data to show functionality
- Production scale field trial data to calculate NUE and evaluate effectiveness
- Evaluation of conditions affecting product efficacy
NutrientStar Data

★ At least 20 trials over two years
★ TEDs well represented
★ Evaluation of nutrient use efficiency (NUE)

- NUE calculated by the Partial Factor Productivity method.
- Partial Factor Productivity defined as the yield divided by applied N rate.
- Expressed as pound of grain harvested per pound of N applied.

Calculation of percentage change in NUE at individual trial:

\[(\text{NUE}_{\text{dst}} - \text{NUE}_{\text{Ft}})/\text{NUE}_{\text{Ft}} \times 100\]
## Current Assessments

<table>
<thead>
<tr>
<th>Company – Product</th>
<th>Assessment Type</th>
<th>Current Status</th>
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</thead>
<tbody>
<tr>
<td>Koch – Agrotain, SuperU</td>
<td>Company Submission/Literature Review</td>
<td>Posted On Website</td>
</tr>
<tr>
<td>Agrium – ESN</td>
<td>Company Submission/Literature Review</td>
<td>Working with Agrium on findings</td>
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<tr>
<td>Dow – N Serve, Instinct II</td>
<td>Company Submission/Literature Review</td>
<td>Posted On Website, Instinct II 2016 NutrientStar field trials</td>
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<tr>
<td>Verdesian – Nutrisphere</td>
<td>Company Submission/Literature Review</td>
<td>Working with Verdesian on findings &amp; obtaining more company generated data</td>
</tr>
<tr>
<td>BASF – Limus</td>
<td>Company Submission</td>
<td>Working through submitted data.</td>
</tr>
<tr>
<td>Agronomic Technology Corporation – AdaptN</td>
<td>Company Submission/Field Trials</td>
<td>2015, 2016 NutrientStar field trials, Previous submitted data posted on website</td>
</tr>
<tr>
<td>DuPont/Pioneer – Encircra</td>
<td>Company Discussion</td>
<td>Discussions focused on sharing company field trials and further cooperation</td>
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<tr>
<td>Monsanto/Climate Corp – Nitrogen Advisor</td>
<td>Company Submission/Field Trials</td>
<td>Discussions focused on sharing company field trials, 2016 NutrientStar field trials</td>
</tr>
<tr>
<td>360 Yield Center – 360 Y-Drop</td>
<td>Company Discussion</td>
<td>2015 Submitted Data Review</td>
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Summary

- Using robust data to inform farmer management
- Providing common standards for research enabling better data analysis
- Informing supply chain sustainable sourcing efforts