



NutrientStar

Assessment program for nutrient use efficiency tools, technologies and products

The NutrientStar program is intended to provide a clear and transparent process to assess commercially available tools, technologies and products (tools) marketed to improve nutrient management. The NutrientStar program will provide farmers, agronomy advisors, commodity buyers, food companies and consumers with reliable information about tools' capabilities to improve nutrient management and potentially meet sustainability goals. The NutrientStar program focuses first on nutrient use efficiency (NUE) benefits – primarily tools that claim to increase nitrogen use efficiency in corn, due to the current predominance on the market of such tools. Eventually, assessment will expand to include additional fertilizer products and products or technologies designed for soil health purposes. This information is increasingly important for farmers and farm advisors as they seek to manage nutrients, protect soil and water resources on their farms, and address growing public concern over nutrient leaching from farms.

Environmental Defense Fund is partnering with S Squared Partners, LLC to administer the assessment process. A team of scientists and practitioners comprises the NutrientStar Review Panel and provides objective, third-party analysis of the NUE tools. Review panel members are listed below.

Position	Name	Association or Location
Researcher/professor	Kenneth Cassman	University of Nebraska Lincoln
CCA/Agronomist	Shannon Gomes	Iowa (Cedar Basin)
Researcher	Jerry Hatfield	USDA/ARS
Researcher	Peter Kyveryga	Iowa Soybean Association
Researcher/professor	Tom Morris	University of Connecticut
Researcher/professor	Chuck Rice	Kansas State University
Professor Emeriti	James Schepers	University of Nebraska Lincoln
Researcher/professor	Wade Thomason	Virginia Tech

NutrientStar assessment

Tools are assessed on their ability to deliver improvements in nutrient use efficiency (NUE) over farmer practice in production-scale field trials. The measure of NUE is defined as the ratio of N applied to crop yield. Field trial data is needed to perform an adequate assessment of a product or technologies' ability to achieve stated outcomes. Data is preferred from at least 20 successful field trials conducted over two years across a range of agroecoregions (map in development) that encompass the 3 to 4 major soil types in the agroecoregion. The demonstrated benefits achieved in field trials each season will be summarized and shared publicly via the NutrientStar website (to be launched in March 2016). Although NUE is the leading key performance indicator for NutrientStar purposes, other performance indicators beyond NUE achieved that are important to farmers and advisors will also be shared via the website - including cost of the tool, ease of use or deployment, impacts on yield, estimates of economic benefit, and other factors able to be gleaned from publicly available information. The website will also seek to educate users on the most appropriate modes of action in the framework of the 4Rs (timing, placement, source, rate) that the product or tool is designed for and/or within which it is most effective, provided that data is available. Knowing the potential for NUE, the cost/benefit ratio possible and the production impacts that might result through use of a tool will benefit users and the agriculture community, as well as supply chain companies interested in sourcing sustainable grain products.

If insufficient field trial data is available for an assessment of the NUE achieved (from the scientific literature or from publicly available information), and/or the company does not have or cannot provide field trial data to inform the analysis, the NutrientStar team can offer an infrastructure for testing tools through Certified Crop Advisors trained and experienced in the appropriate research protocol – the NutrientStar Field Testing Network.

The NutrientStar team will work with companies wanting to submit a tool for assessment on a plan to implement field trials that will generate the needed data. Field trials can be conducted through the existing NutrientStar networks, or by tool provider companies in collaboration with a university or other entity of their choosing so long as the trials meet the NutrientStar protocol requirements. The protocol requirements are provided upon request from tool service provider companies, but the general format follows established university guidelines for replicated strip trials on farms.

In case no publicly available field trial data exists for a tool and companies do not wish to enter into an agreement with the NutrientStar team to conduct the trials, the NutrientStar administrative team itself may choose to test the tools beginning in 2016 using the NutrientStar Field Testing Network already mentioned above.

Company Participation in NutrientStar

To summarize, there are several avenues and entry points through which tool provider companies can engage in the NutrientStar process. Companies can also choose not to engage in the NutrientStar process, and in this case the NutrientStar team will rely only on information that is publicly available – and until field trial data is generated - when reporting about that tool on the NutrientStar website and in other NutrientStar communications. Our intent is to provide as much information as is obtainable about all of the tools available to farmers that purport to improve NUE, so farmers and their advisors have this information at their fingertips.

The two questionnaires included below serve as a guide for those companies who wish to fully participate in the NutrientStar process. **The first questionnaire is for companies with tools or technologies that they wish to submit for assessment; the second questionnaire is slightly different and is to be used exclusively for products assessments.** The questions show the full range of information the NutrientStar review panel seeks.

The NutrientStar team invites companies to consider full participation in NutrientStar to get the assessment process underway. If tool service provider companies wish to engage at a later time, there will be ample opportunities and varying levels of engagement available as described above. The NutrientStar team remains open to dialogue and discussion to clarify, answer questions, more fully explain the process, and collaborate at all levels with tool provider companies.

For questions please contact Karen Chapman, Project Manager at Environmental Defense Fund, kchapman@edf.org, (740) 739-1809 or John McGuire, Simplified Technology Services, m McGuire9@gmail.com, (419) 212-0479.

NutrientStar Assessment Form for Tools and Technologies

Contact information

- 1) Name of tool or technology:
- 2) Contact phone and email:
- 3) Company name, website, address and phone number:

Section 1. How the technology works to improve Nutrient Optimization and/or Soil Health

1. Provide a brief introductory description of the tool or technology and how it optimizes fertilizer use (purpose, nutrients targeted, platform, etc) (200 words or less).
2. What data sources and inputs does the technology require (weather station data, soils databases, imagery, producer management data, field characteristics, etc)? Attach documents or samples where relevant.
3. Describe the chain of custody for the data and how producer privacy is protected.
4. Describe in detail how the data or information generated by the tool is analyzed and processed and in what form the information is provided back to the user, such as reports, guidance, application recommendation, benchmarking, etc. Please attach examples of reports or guidance.
5. Describe the mechanism for providing that information back to the user, such as meetings, discussion, presentations, etc. and how the learning process occurs.

Section 2. Calibration and validation of the technology or program

1. Describe in detail ALL calibration, testing, or field use results completed for the technology thus far, including geographies and crops, field trials and trial results. Describe the protocol used for the field trials, the entity conducting the trials, conditions and any other supporting documentation describing how the field trials were conducted and by whom.
2. If the technology uses modeling, describe which models are used and how the technology uses the models, as well as any associated validation procedures and results.
3. Please provide any available documentation on the effectiveness of the technology and its ability to increase nutrient optimization and by what percentage -- such as journal articles, reports, farmer surveys or other information external to your own entity (provide links or attach complete report).

Section 3. Use of Nutrient Use Efficiency technologies & platforms

1. For whom is the tool or technology designed (farmers, retail, consultant, seed company, etc.)?
2. Describe the cost/benefit ratio for the user of the technology; e.g. how much does it cost (per acre) and what savings does it provide (per acre) back to the producer?
3. On average, how much time does it take a typical user to input the required data (per acre, if known)?
4. Describe the assessment and refinement/improvement process for the technology, if any.
5. Describe the experience, training and education required of the advisor or service provider to demonstrate use of the technology, interpret results, and ensure producer engagement.

Section 4. Soil health promotion and implementation programs

1. Does the technology include promotion, information, and/or implementation of soil health-building measures? Core soil health building practices include Conservation Crop Rotation, Cover Crop, Residue Management – Conservation Tillage, Forage and Biomass Planting, and Prescribed Grazing (NRCS).
2. Describe how soil health building measures are included in the technology and the mechanisms for delivery of outreach, technical assistance, and implementation for soil health practices.

NutrientStar Assessment Form for Products

Contact information

- 1) Name of product:
- 2) Contact phone and email:
- 3) Company name, website, address and phone number:

Section 1. Calibration and validation of the product

1. Provide a brief introductory description of the product and how it optimizes fertilizer use (200 words or less).
2. Describe in detail ALL testing completed for the product thus far, including geographies and crops, any field trials completed and trial results.
3. Please provide any available documentation on the effectiveness of the product and its ability to increase nutrient optimization and by what percentage -- such as journal articles, reports, farmer surveys or other information external to your own entity (provide links or attach complete report).

Section 2. Use of the product

1. Please describe the conditions for effective use of the product; what are the methods for determining rate, timing and placement of applications?
2. Describe the experience, training and education required of the advisor or service provider promoting the product: including demonstrating proper and safe use of the product, interpreting results, and ensuring producer education about the product.
3. Please describe the conditions that might reduce or hinder the efficacy of the product and how these conditions are communicated to the customer.
4. Describe the cost/benefit ratio for the user of the product; e.g. how much does it cost (per acre) and what savings does it provide (per acre) back to the producer?
5. If applicable, describe the feedback process to collect data on the use of the product.

Section 3. Alternative impacts of the product

1. Are there any documented impacts to soil microbiology or soil health associated with the use of the product? Please provide relevant documentation of any such impacts.