

Developing Common Evaluation Protocols for Enhanced Efficiency & Novel Fertilizers

January 23-24, 2024
Washington, DC

Overview

The Efficient Fertilizer Consortium (EFC) is a public-private partnership that will fund research to advance enhanced efficiency and novel fertilizer products and practices that are environmentally beneficial and agronomically productive. There are many innovative fertilizer products that are available or entering the market; however, there is a lack of rigorous scientific evidence validating the efficacy of these products despite positive agronomic and environmental industry claims. With increasing pressure to mitigate nutrient loss while maintaining or increasing crop yields, farmers need accurate, science-based information about products and practices that work in a range of different farm systems and climates to make informed nutrient management decisions. To improve our understanding and enable confident adoption of novel products, a rigorous evaluation framework is needed, including minimum data standards, common protocols and proper controls. Industry standard protocols developed by the scientific community will lead to proper verification of and confidence in new products entering the market.

Goals & Objectives

Through this convening event, scientific experts will come together to:

- Share experience with existing evaluation and database frameworks with EFC partners and fellow scientists;
- Identify key components that should be considered for inclusion in protocol and minimum data standards for evaluating a variety of alternative fertilizers; and
- Identify field trial priorities and scientific groups or individuals who should be involved in the research.

Acknowledgements

Thank you to the PACT Alliance and the EFC funding partners for making this consortium possible. We would also like to thank our speakers, panelists, facilitator, breakout group leaders, FFAR note takers and all other attendees for contributing to this event.

Agenda: January 23, 2024

9:00 - 9:30 am Welcome & Introduction
Dr. Saharah Moon Chapotin, FFAR Executive Director
Allison Thomson, FFAR Scientific Program Director
Dr. Sarah Lyons, FFAR Scientific Project Manager

Session 1: Current Evaluation Practices & Protocols

Facilitated by Dr. Jeffrey Volenec, Purdue University

9:30 - 10:00 am Industry Perspectives: Evaluating New Products
Dr. Jason Haegele, ICL

10:00 - 10:30 am Evaluating New Technologies: Biologicals
Dr. Lakshmi Manavalan, Bill & Melinda Gates Foundation

10:30 - 10:45 am Break

10:45 - 11:15 am Measuring Greenhouse Gases in Field Trials
Dr. Virginia Jin, USDA-ARS

11:15 - 11:45 am Evaluating Water Quality in Field Trials
Dr. Matt Helmers, IA State

12:00 - 1:00 pm Lunch

Session 2: Data Stewardship & Standards

Facilitated by Dr. Jeffrey Volenec, Purdue University

1:30 - 2:00 pm Data Stewardship & FAIR Practices
Dr. Sylvie Brouder, Purdue University

2:00 - 2:30 pm Open Access Efforts & Industry Insights
Dr. Sagi Katz, AgMatix

2:30 - 3:00 pm Minimum Dataset Development: Experiences from FRST
Dr. Nathan Slaton, University of Arkansas

3:00 - 3:30 pm Break

Session 3: Applying Common Protocols Across a Diverse Landscape

Facilitated by Dr. Jeffrey Volenec, Purdue University

3:30 - 5:00 pm Panel Discussion: Applying Common Protocols Across a Diverse Landscape
Dr. Andrew Margenot, University of Illinois Urbana-Champaign
Dr. Claudia Wagner-Riddle, University of Guelph
Dr. Scott Murrell, African Plant Nutrition Institute

Agenda: January 24, 2024

Session 4: Protocol Development Priorities

9:00 am - 10:45 am	Breakout Groups: Protocol development priorities
10:45 - 11:00 am	Break

Session 5: Protocol Development Next Steps

11:00 am - 12:00 pm	Breakout Groups: Protocol development next steps
12:00 - 1:00 pm	Lunch

Session 6: EFC Member Meeting

1:00 - 2:45 pm	EFC Member Meeting
2:45 - 3:00 pm	Break
3:00 - 4:00 pm	EFC Member Meeting

Post-Event Summary

This highly collaborative and successful working meeting brought together EFC member representatives and external scientists to work together towards a common goal: developing protocol and data guidelines for evaluating enhanced efficiency fertilizers (EEFs) and other novel fertilizer technologies in field trials. A draft version of the protocol and data guidelines, developed using other relevant frameworks and minimum datasets developed and vetted by the scientific community, was prepared and provided to all attendees in advance of the meeting.

The first day included a series of talks and a panel discussion where scientists shared their experiences related to protocol development for EEFs and other fertilizer products. In between the talks there was ample time for discussion, during which participants engaged in enthusiastic dialogue around this important topic. On the morning of the second day there were two sessions of focused, topic-specific breakout groups of six to eight people assigned based on their area of expertise. The breakout groups aligned with components of the protocol guidelines, including (1) core requirements and recommendations for fertilizer field trials, (2) measuring greenhouse gases in field trials, (3) measuring water quality in field trials, (4) data stewardship, (5) flexibility and adaptability of the guidelines on an international scale and (6) mode of action-specific considerations. Each group was assigned a leader who prepared questions and discussion points in advance, and a note taker from the FFAR staff to capture input on the protocol guidelines provided.

The collaborative discussion confirmed that a consistent way of evaluating fertilizer products in field trials is needed, and that this effort could help lead to more accurate and precise recommendations for both farmers and emissions factors across a range of fertilizer technologies. Overall, the initial draft of the guidelines contained the essential information; however, specific details warrant additional discussion and development. Product proof-of-concept in laboratory or greenhouse studies was deemed essential prior to investing in field trials, as field trials require a greater amount of funding and

labor and should only be used if the fertilizer product in question has evidence of potential. Furthermore, products should also have previously shown evidence of supporting crop production in field trials prior to more comprehensive studies involving water and/or emissions measurements, as these are extremely cost- and labor-intensive. It was also recommended that these guidelines remain flexible, not only to be applicable for new fertilizer technologies coming onto the market, but also to account for a variety of cropping systems, climates and infrastructure capacity to support functionality across a range of conditions, locations and situations. It was emphasized that while we need a minimum set of recommended data and metadata to collect, the experimental design of a trial is ultimately determined by the study objectives and should remain up to the discretion of the researcher.

Following the meeting, the feedback was compiled and incorporated, and a committee was formed (comprised of a selection of convening attendees) to review and finalize the protocol and data guidelines. A manuscript with the final version will be submitted for publication in the coming months. While these guidelines will be used in EFC-funded field trials, this work will be made publicly available so that it can be adopted and used for evaluating fertilizer products and practices in field trials by the broader academic and industry research communities. By supporting common data standards, this effort will catalyze a greater understanding of enhanced efficiency and novel fertilizers to benefit the larger agricultural community.

Program Contact

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