



Modernizing Fertilizer Recommendations: Fertilizer Recommendation Support Tool (FRST)

What The Modernizing Fertilizer Recommendations: Fertilizer Recommendation Support Tool, or “FRST”, project is foundational to farmers and conservation efforts. By optimizing nutrient use and decreasing nutrients at the source, and thereby increasing the effectiveness of conservation practices, both farmers and taxpayers will save millions of dollars annually.

Why Soil testing provides the backbone for nutrient management in modern agricultural production systems. Most science-based soil fertility recommendation systems derive phosphorus (P) and potassium (K) fertilizer guidance from often decades-old soil-test relationships. While soil testing has the common goal of determining which nutrients and how much fertilizer to apply, soil-testing laboratories in the U.S. apply different analytical methods, interpretation, and philosophical approaches to fertilizer recommendations. These differences often result in diverging fertilizer recommendations among labs within and across states, leading to end user confusion and reduced confidence in soil testing, which ultimately proves detrimental to research and educational efforts that encourage 4R Nutrient Stewardship. Scientifically defensible soil-test recommendations are fundamental to agricultural production and environmental protection.

How This project consists of a three-pronged approach.

1) We surveyed soil fertility faculty at land-grant universities in 48 states to gain a better understanding of the current status of soil testing across the U.S., identify opportunities to harmonize nutrient management guidelines, and inform collaborative efforts among states and regions.

2) By working with soil fertility land-grant faculty throughout the U.S., the FRST project has identified the minimum data necessary for researchers in their conduct of soil-test correlation and calibration field trials; these trials will then provide additional data for the FRST decision tool.

3) We are building a soil-test and crop-response-to-fertilization searchable web-based decision tool to provide more consistent, transparent, and science-based decisions for nutrient recommendations on major crops, such as corn, cotton, grain sorghum, peanuts, soybean, and wheat. This decision tool consists of a relational soil-test correlation and calibration database initially populated from historical data from published literature, theses and dissertations, and state records. Results from both short (single year), intermediate (2-6 years), and long-term (>6 years) trials are included. By July 2020, we have compiled data from over 1000 soil-test P or K correlation trials from 29 states; data continues to be added. To ensure proper credit, original authors contributing data will receive attribution for their data. The relational database will be linked to a web-based, front-end platform that allows users to select input variables, such as soil-test method, geographic location, yield level, and crops, and then provides basic data analysis to identify critical soil-test nutrient ranges (correlation) and potential sufficiency approach interpretations for nutrient rate calibration.

Who The FRST project is comprised of over 80 individuals representing 38 land-grant universities, two state universities, one private university, Agricultural Research Service, Natural Resources Conservation Service and Farm Service Agency personnel, two not-for-profit organizations, and one State Department of Agriculture. We are looking for additional data, team members, and funding to support our next phase of state-lead soil fertility correlation and calibration trials. Please contact us if you are interested in being a part of or contributing to the FRST project.

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