

PHOSPHORUS & POTASSIUM

Fertilizer Response Support Tool (FRST) Legacy Data Guide

We are looking for legacy data from **soil test phosphorus (P) and potassium (K) correlation/calibration trials** for the Fertilizer Recommendation Support Tool (FRST) database. The data do not have to be from trials that established fertilizer recommendations in your state.

Data can be provided in **any format**, including published articles, extension bulletins, facts sheets, dissertation/thesis, spreadsheets, project summaries, etc. All values must have **clearly defined units** associated with them. If means are given, the **standard errors** or **standard deviation** for each mean and other statistical values are desired. The data is entered into the P and K data template (<https://soiltestfrst.org/resources/>) which will be submitted and uploaded into the FRST database.

The 10 ‘**Essential Information**’ items listed below are required for data inclusion. If Essential/Required information like trial year, soil sample depth, and soil series are not available (items with an *), the trial data/metadata should be reviewed by FRST Project leadership before the data are excluded from the database. The Required information may be available from recommendations or researchers. The information listed as “**Recommended (desired)**” is not required but is important and should be recorded for inclusion in the FRST database if available. If you have legacy data to contribute, please reach out to one of the FRST project contacts listed on page 2.

| Essential (Required) Information | |
|---|---|
| <ul style="list-style-type: none"> ○ Soil test P and/or K values before fertilization (for individual site years) ○ Soil test extraction and analysis methods ○ Trial location (state and county*) | <ul style="list-style-type: none"> ○ Replication number (must be > 2) ○ Yield values (for individual site years) ○ Fertilizer-P or -K treatment rates (including a control) |
| <ul style="list-style-type: none"> ○ Soil Sample depth* ○ Soil Series* | <ul style="list-style-type: none"> ○ Trial year* ○ Trial harvest year* |
| <i>*Denotes required items that may be estimated based on state recommendations, publication year, or location</i> | |
| Recommended (desired) Trial Information | |
| <ul style="list-style-type: none"> ○ Researcher information (name, contact info.) ○ Publication information (if published) ○ Experimental design & structure | <ul style="list-style-type: none"> ○ Trial location (nearest city, GPS coordinates) ○ Plot size ○ Trial duration |
| Recommended (desired) Soil Information | |
| <ul style="list-style-type: none"> ○ Sand, silt, and/or clay content ○ Number of composites collected ○ Soil mapping unit ○ Soil pH, CEC, SOM, Ca, Mg, etc. & methods | <ul style="list-style-type: none"> ○ Soil test P or K method metadata (soil mass or volume, extractant solution to soil ratio, soil moisture status, soil drying temperature, laboratory name) |
| Recommended (desired) Crop Information | |
| <ul style="list-style-type: none"> ○ Crop and cultivar ○ Irrigation (yes/no) and method ○ In-season precipitation ○ Previous crop | <ul style="list-style-type: none"> ○ Fertilizer applied to previous crop ○ Dates of planting, harvest, sampling ○ Row spacing ○ Plant population |
| Recommended (desired) Yield Information | |
| <ul style="list-style-type: none"> ○ Fertilizer source ○ Fertilizer timing (preplant, at planting, etc.) ○ Fertilizer placement (banded, broadcast, etc.) ○ Manure information (yes/no, rate, etc.) | <ul style="list-style-type: none"> ○ Yield values & variance (e.g., standard error of means) ○ Crop harvest stage & moisture content ○ P values (if means are given) |
| Recommended (desired) Plant Tissue Analysis | |
| <ul style="list-style-type: none"> ○ Plant part sampled ○ Growth stage at sampling | <ul style="list-style-type: none"> ○ Sample collection date ○ Nutrient content (N, P, K, etc.) |

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Project Overview

Soil testing provides the backbone for nutrient management programs in modern, intensive agricultural production systems. Most science-based, soil-fertility-recommendation-systems base phosphorus (P) and potassium (K) fertilizer guidance on correlation and calibration research. Soil testing has goals of determining where fertilizer is needed and how much to apply. However, soil testing laboratories may use different soil analytical methods, interpretative terminology, and philosophical approaches to develop fertilizer recommendations. These differences often result in dissimilar fertilizer recommendations, leading to end-user confusion and reduced confidence in soil-test-based nutrient management that ultimately proves detrimental to research and educational efforts that encourage 4R Nutrient Stewardship. 4R Nutrient Stewardship provides a framework supporting the Right fertilizer source, applied at the Right time, in the Right place, and at the Right rate in a well-managed cropping system to meet specific performance objectives.

The Fertilizer Recommendation Support Tool (FRST) decision aid was released in April 2024 and utilizes a relational database currently containing data and metadata from approximately 2600 P and K fertilization trials to provide novel insight into crop fertilizer response and soil testing. The long-term goal of FRST is to develop more consistent, transparent, and science-based nutrient management recommendations across the USA. The FRST project supports innovative soil fertility research to advance site-specific, precision nutrient management to augment existing fertilizer P and K recommendations.

For general information about FRST, to contribute data, or ask other questions:

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Acknowledgments

Funding sources for this project include USDA-ARS National Programs for Natural Resources and Sustainable Agricultural Systems (Grant 58-8070-8-016), the USDA-NRCS (NR203A7500010C00C & NR233A750011G016), Hatch Funds provided by the National Institute of Food and Agriculture, US Department of Agriculture, and Hatch and Smith-Lever funds that support collaborator research and extension projects.

This project wouldn't be possible without the 100+ team members and contributing scientists from more than 40 state, federal, and private (industry) institutions.