**SERA-IEG-6 Multistate Research Activity**

**Accomplishments Report**

**Project/Activity Number: SERA6: Methodology, Interpretation, and Implementation of Soil, Plant, Byproduct, and Water Analyses**

**Period Covered: June 2024- June 9, 2025**

**Date of This Report: August 4, 2025**

**PARTICIPANTS**

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**BRIEF SUMMARY OF MINUTES OF ANNUAL MEETING**: Link to 2025 Minutes <https://soillab.tennessee.edu/wp-content/uploads/sites/129/2025/08/SERA-6-2025-Meeting.pdf>

12:00 –1:00 PM Registration and Lunch

1:00 PM Dr. Franta Majs: “When Extractable P Becomes Law”

1:20 PM Dr. Rishi Prasad "PSR as a tool for P management for Alabama soils"

1:50 PM Break

2:00 PM Dr. Jessica Davis: “Building a Usable and Sustainable Customer Application”

2:20 PM Dr. Nathan Slaton: “Summary of the terminology and basis used for soil-test-based crop fertilizer recommendations in the South.”

2:45-5:00 PM Business Meeting and State Reports

* Multistate project discussion- Nathan Slaton (AR) provided presentation with suggestions for universal terms for soil test levels in the Southern region; Vaughn Reed (MS) agreed to spearhead the project
* Other business discussion
* Length of term for officers- decision for 2-year terms, as has been followed in recent years
* SERA6 website and listserv- currently hosted by UGA, offer from TN to update and host
* Register on NIMSS (scan QR code); updates coming to NIMSS site
* Passed around sign up for email listserv
* 2026 meeting site: Decided on West Virginia
* State Reports: AL, AR, FL, GA, KY, LA, MS, NC, OK, PR, SC, TN, TX, VA, WV
* Group photo

Photos are available at: <https://soillab.tennessee.edu/sera-6/sera-6-photos/sera-6-2025-photos/>

**ACCOMPLISHMENTS**

**OUTCOMES**

**Agricultural Analysis for Stakeholders and Researchers:** Twelve reporting laboratories (AL, AR, FL, GA, KY, LA, MS, NC, OK, SC, TN, & TX) provided routine soil analysis on 746,847 soil samples for clients and researchers including fertilizer and lime recommendations on a large percentage of the samples (stakeholder or non-research samples). Analyses were also completed on 46,761 water samples, 37,893 plant samples, 21,699 forage samples, and 17,877 byproduct/manure samples, facilitating sound nutrient management, animal health, and water quality (Appendix, Figure 1 & Table 2).

**OUTPUTS**

**Manure DB**: A project lead for the national Manure DB project (<http://manuredb.umn.edu/>), Dr. Nancy Bormann, presented the effort to the SERA6 group in 2023 at Auburn University and sought collaborators. Since 2023, six state institutions from SERA6 (University of Arkansas, University of Georgia, North Carolina Department of Agriculture, Oklahoma State University, Clemson University, and Stephen F Austin University) have provided data for the national project. This project sought to partner with laboratories and universities that analyze manure to create a manure nutrient database in collaboration with the Minnesota Supercomputing Institute. The project is ongoing as datasets are requested for continuing years.

**FRST Project**: The current NRSP-11 Project evolved from the FRST Project, which is composed of over 100 individuals representing 41 land-grant (40 states and one territory), two state universities, one private university, three USDA divisions (Agricultural Research Service, Natural Resources Conservation Service and Farm Service Agency), three not-for-profit organizations, and one State Department of Agriculture. Many of the FRST collaborators are members of one of the four existing multi-state soil testing projects: NCERA-13, NECC-1012, SERA-6, and WERA-103. (*From NRSP-11 Project Outline*). The four regional soil testing groups are represented on the FRST/NRSP11 executive committee. SERA-6 is represented on the NRSP11 executive committee by Dr. Luke Gatiboni (regional lead) and Nathan Slaton (Overall Project Lead). Official members of NRSP11 from the South Region include Gerson Drescher (University of Arkansas), Luke Gatiboni (North Carolina State University), David Kissel (retired, University of Georgia), Jay Lessl (University of Georgia), Rao Mylavarapu (University of Florida), Deanna Osmond (retired, North Carolina State University), Nathan Slaton (University of Arkansas), & Jim Wang (Louisiana State University), but many other members participate. The South Region has representatives on the Lime survey Committee [Nathan Slaton, Frank Sikora (retired, R), Deanna Osmond (R)], lime calibration committee [Shannon Alford, Luke Gatiboni, David Kissel (R), Deanna Osmond (R), Vaughn Reed, Nathan Slaton], Sulfur Minimum Dataset Committee (Luke Gatiboni, Deanna Osmond (R), Nathan Slaton] Calibration Committee, and Soil Test Survey Committee (Luke Gatiboni, Deanna Osmond (R), Nathan Slaton].

**Listserv**: The SERA6 groups maintains an active listserv to support laboratory operations and personnel decisions. The listserv is hosted by UGA and updated annually to maintain current participants. In 2024, twelve topics were discussed amongst the laboratories using the listserv. (Appendix, Table 1)

**Website**: SERA6 has maintained a website for its members and the public to access for decades, hosted by Clemson University and more recently by University of Georgia. Updates have been made in recent years, but to maintain relevance with the online presence, a new platform is being developed and hosted by the University of Tennessee. All publications, minutes, photos, and lab/member list are being migrated to the new platform. Event details and updates for the 2026 meeting will be posted on the website.

The website address for the new webpage is live at https://soillab.tennessee.edu/sera-6/.

**ACTIVITIES**

1. Dr. Vaughn Reed of Mississippi State University volunteered to lead a SERA6 project based on developing a proposal for universal soil test level terms for the Southern region. This project will involve representation from each of the 14 states and is in the beginning stages of development. Dr. Reed will form a committee to develop a unified suggestion for fertilizer recommendations and provide a proposal to the larger SERA6 workgroup at the 2026 meeting.
2. Soil Depth Study: Ten states (AR, FL, GA, LA, MS, NC, OK, TN, VA, & WV) contributed 62 total soils for the Soil Sample Depth Project coordinated by NRSP11 and led by Dr. Steve Culman (Oregon State Univ). A manuscript is being developed with all contributors as co-authors.
3. Lime Calibration Study: Thirteen states (AL, AR, FL, GA, KY, LA, MS, NC, SC, TN, TX & VA) collected 40 soils (33% of total soils) for the national lime calibration trial coordinated by NRSP11 and led by Dr. Amy Shober, University of Delaware, & Bob Miller, ALP). The study is being coordinated and performed at the University of Arkansas’ Marianna Soil Test Laboratory. Several SERA6 laboratories are contributing to the effort to characterize the soil’s chemical and physical properties to ensure their state’s lime requirement procedures are represented in the final database and perform pilot trials to establish the protocol with preliminary data (see sub-bullet).
	1. Bee Chim (Oklahoma State Univ) and David Hardy/Don Edralin (North Carolina) led pilot trials to collect information comparing the effect of soil mass (scooped vs weighed soil samples) on soil pH and modified-Mehlich buffer pH, respectively. Results will be reported at the 2026 annual meeting.

**IMPACTS**

* The most tangible short-term impact of the SERA6 workgroup to stakeholders is the collective service provided to the agricultural industry in the Southern region. Collectively, the twelve (12) reporting SERA6 laboratories provided soil testing for more than 746,000+ soil samples, 68,000+ water and forage samples, 37,000+ plant samples, and 17,000+ byproduct/manure samples. (Appendix, Figure 1 & Table 2). SERA6 members are major contributors to their institution/agency’s agricultural research, Extension, and service efforts. Many state labs provide additional testing for soilless media, feed, and other sample types such as fertilizer, nematodes, microbiological, soil health, and research.
* The mid- to long-term impact of SERA6 is evident from its impact on the analytical methods used in scientific reporting. The 2014 publication entitled “[Soil Test Methods From the Southeastern United States](https://aesl.ces.uga.edu/sera6/MethodsManualFinalSERA6.pdf)” has been cited 147 times in the past 10 years. ([Soil Test Methods From the Southeastern United States - Google Scholar](https://scholar.google.com/scholar?hl=en&as_sdt=0%2C4&q=Soil+Test+Methods+From+the+Southeastern+United+States&btnG=)). Scientists routinely use the methods in this manual or use it to cite the methods used by the SERA6 service laboratories that provide analytical data on byproduct, plant, soil, & water samples. Likewise, another publication from 1994 “[Reference Sufficiency Ranges for Plant Analysis in the Southern Region of the United-States”](https://soillab.tennessee.edu/wp-content/uploads/sites/129/2025/07/Reference-Sufficiency-Ranges-for-Plant-Analysis-in-the-Southern-Region-of-the-United-States-So.-Coop.-Ser.-Bull.-394.-2000-1.pdf) has been cited 269 times in the last 30 years ([reference sufficiency ranges for plant analysis in... - Google Scholar)](https://scholar.google.com/scholar?hl=en&as_sdt=0%2C4&q=reference+sufficiency+ranges+for+plant+analysis+in+the+southern+region+of+the+united+states&btnG=). Both publications represent foundational work from research and Extension scientists participating in SERA6.
* The faculty and staff working the SERA6 laboratories are highly collaborative, and the group collectively serves as resources for one another with interactions at the SERA6 annual meeting, SERA6 LISTSERV, and NRSP11 committees. The members help each other troubleshoot lab problems, communicate about equipment performance and durability, lab supplies & services, and position vacancies. Evidence of the impact is that 14 of the 15 (all except Puerto Rico) states in the Southern Region were represented at the annual meeting along with representatives from two additional states (Delaware and Missouri).

**PUBLICATIONS**

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* Antonangelo, J.A., S. Culman, & H. Zhang. (2024). Comparative analysis and prediction of cation exchange capacity via summation: influence of biochar type and nutrient ratios. Front. Soil Sci. doi:10.3389/fsoil.2024.1371777
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**APPENDIX: TABLES AND FIGURE**

**Table 1. Use of SERA6 Workgroup Listserv for 2024-2025**

|  |  |  |  |
| --- | --- | --- | --- |
| **Date** | **Topic sent out** | **Originator** | **# Responses** |
| 2/2/2024 | Soil bag sample providers  | Stephen F Austin | 5 |
| 3/3/2024 | QA position announcement open  | University of Kentucky |  |
| 4/15/2024 | Lab position open announcement  | University of Missouri |  |
| 4/23/2024 | REMI Group Lab service contract experiences | University of Florida |  |
| 4/29/2024 | Soil survey for non-yield responsive soils to added fertilizer | Louisiana State University | Survey link |
| 5/2/2024 | Trouble with Fisher pH probes | Clemson University | 6 |
| 5/15/2024 | Clients and access to an online portal for the lab | North Carolina Dept of Ag.  | 7 |
| 6/6/2024 | Experience with MARS microwave digestor | Clemson University | 2 |
| 8/2/2024 | Position open at lab | North Carolina Dept of Ag. |  |
| 11/11/2024 | Soil extension specialist position open | University of Kentucky |  |
| 11/26/2024 | Automation of Walkey-Black organic matter | University of Florida | 5 |
| 12/13/2024 | Lime buffer  | Oklahoma State University | 1 |



**Figure 1. Soil Samples \*Tested in Southern Region State Laboratories**

\*Numbers represent samples reported per state laboratory by the time of report generation, with not all state laboratories in SERA6 reporting. Zero is a default and not true zero.

**Table 2. Agricultural Samples Tested in Southern Region State Laboratories**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **State** | **Plant Tissue** | **Byproduct** | **Water/Solutions** | **Soilless Media** | **Feed/Forage** | **Other** |
| **AL** | 146 | 16 | 272 | 114 | 913 | 18 |
| **AR** | 461 | 831 |   | 760 | 2276 |   |
| **GA** | 7087 | 905 | 10712 |   | 7869 | 6912 |
| **FL** | 9145 | 85 | 22388 | 100 |   | 3115 |
| **KY** |   | 212 | 61 | 71 |   |   |
| **LA** | 2127 |   | 4795 | 365 |   |   |
| **MS** | 5459 |   |   |   |   |   |
| **NC** | 12196 | 13128 | 3188 | 1310 |   |   |
| **OK** | 737 | 1027 | 4983 | 603 | 7567 | 7472 |
| **SC** | 535 | 1363 | 317 | 68 | 1225 | 4429 |
| **TN** |   |   |   |   | 1784 | 775 |
| **TX** |   | 310 | 45 | 21 | 65 | 10 |
| **Total** | 37893 | 17877 | 46761 | 3412 | 21699 | 22731 |