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 2025- June 10, 2026
Date of This Report: July 20, 2026

SERA6 PARTICIPANTS

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AGENDA & MINUTES OF MID-YEAR MEETING (January 14, 2026)- Virtual

Link to SERA6 Mid-Year Meeting Agenda and Minutes: https://soillab.tennessee.edu/2026-mid-year-meeting/

SUMMARY OF AGENDA & MINUTES OF ANNUAL MEETING (June 7-10, 2026)

Link to Joint Meeting and SERA6 Annual Meeting Agenda: https://soillab.tennessee.edu/2026-sera-6-agenda/

MINUTES OF SERA6 BUSINESS MEETING

Collaborative Projects and Publications

- Discussion of SERA6 white papers and need to update- considering the closure of the MS St U soil-testing laboratory and other threats to operations

Public Agricultural Services/Soil Testing Laboratories: their value and contributions in the Land Grant University

- Soil Test Terminology Committee Report: Vaughn Reed and Bronc Finch leading; presentation provided during joint plenary session
- Discussion of need to generate and implement survey to stakeholders regarding support of public agricultural service laboratories (Bronc Finch-U of AR and Greg Olson-LSU will lead)
- Discussion to update plant tissue sufficiency ranges (Kristin Hicks-NC DA and Jessica Davis- Auburn U will lead)
- Decision to develop groundwater report (Bee Chim- OK St U and Jay Lessl- UGA will lead)
- Administrative Update
  - Research Administrative Advisor- Nathan Slaton
- State Reports: AL, AR, FL, GA, KY (virtual), LA, MS, NC, OK, PR (oral), SC, TN, TX, VA, WV (not received)

Business Items

- Election of new SERA6 secretary for 2-year term
  - Reed Vaughn MS St U was elected
- Reminder to register on NIMSS (QR code provided)
- Reminder to sign up for email listserv
- Decide on 2026 meeting site
  - Established State Rotation- AR,GA,OK,SC,AL,TN,(WV-2026),TX,MS,NC,VA,LA,KY,FL

- Because no representative was present from TX, we decided on MS. We will return to TX in 2028 or 2029, as 2028 is a national joint meeting year, which should be hosted by the NECC1012 group.
- Installation of next SERA6 Chair- Robert Florence (University of TN)
- Group photo: Photos are available at: https://soillab.tennessee.edu/2026-pictures/

ACCOMPLISHMENTS

OUTCOMES

Agricultural Analysis for Stakeholders and Researchers: Thirteen reporting laboratories (AL, AR, FL, GA, KY, LA, MS, NC, OK, SC, TN, TX, & VA) provided routine soil analysis on 760,599 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 47,015 water samples, 52,337 plant samples, 30,292 forage and feed samples, and 19,249 byproduct/manure samples, facilitating sound nutrient management, animal health, and water quality (Appendix, Figure 1 & Table 2).

OUTPUTS

Manure DB: Seven state institutions from SERA6 (University of Arkansas, University of Georgia, University of Florida, North Carolina Department of Agriculture, Oklahoma State University, Clemson University, and Stephen F Austin University) have provided data for the national Manure DB project (http://manuredb.umn.edu/). This project partners 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, and its formation was catalyzed by SERA-6 members at the annual meetings held in Athens, GA, and Raleigh, NC. The NRSP11 is composed of over 100 individuals representing more than 40 land-grant institutions, USDA scientists and administrators, and members of the ag and soil testing industry. 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. 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), Bhupinder Farmaha (Clemson), Bronc Finch (University of Arkansas), Luke Gatiboni (North Carolina State University), John Grove (University of Kentucky), 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), Ana Morales-Ona Smith (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 maintain an active listserv to support laboratory operations and personnel decisions. The listserv is hosted by UGA and updated annually, to maintain current participants. In 2025, 28 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, the University of Georgia, and currently the University of Tennessee. All publications, minutes, photos, and lab/member lists have been migrated to the new platform as of 2026. Event details and updates for the upcoming 2027 winter mid-year and summer annual 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 involved representation on the planning committee from 10 of the 14 states within SERA-6. The committee put together a survey of the region to gauge interest and concerns on changing our current recommendation terminology schemes represented in the region. The survey was sent out on April 17, 2026, and was closed on May 26, 2026. The

survey was sent out across the US and scientific community of North America, and we received 91 responses, 34% of which were from the SERA-6 region. This committee is still ongoing and plans to make a recommendation to the SERA-6 working group this coming fall, as well as submitting a peer-reviewed manuscript outlining the results.

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). In addition to soil collection, SERA-6 members and laboratories have been prominently involved in NRSP11 research including the lime calibration project where 148 soils were characterized for a suite of routine soil test properties and buffer pH methods used in the Southern Region by Auburn University, Clemson University, LSU AgCenter, University of Arkansas, University of Georgia, and the University of Kentucky.
    a. 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.
4. NRCS CIG: In 2023, NRSP11 received funding from NRCS totaling nearly $1.5 million for an umbrella project ($630,861) led by scientists at the University of Arkansas (Slaton) and NC State University (Gatiboni, Buol, and Osmond) and from SERA-6 participants lead by Dr. Jim Wang (LSU AgCenter, $437,996). The Southern CIG project will mature in January 2027.
5. Bourns, M. (Purdue), Shober, A.L. (Univ. Delaware), Gatiboni, L. (North Carolina State Univ.), Reed, V. (Mississippi State Univ), & Slaton, N. (Arkansas). (2025, submitted) PARTNERSHIP: Lime Logic - Standardizing lime recommendations to improve soil health and build agricultural productivity. Funding Opportunity USDA-NIFA-AFRI-011134. Purdue University Lead Institution. $866,866 (Not funded)

IMPACT STATEMENTS

- 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 thirteen (13) reporting SERA6 laboratories provided soil testing for more than 760,000+ soil samples, 47,000+ water and forage samples, 52,000+ plant samples, and 19,000+ 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" has been cited 162 times since it was first published, and 27 times in 2025. (Soil Test Methods from the Southeastern United States - Google Scholar). 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" has been cited 290 times since it was published, including 22 in 2025 (reference sufficiency ranges for plant analysis in... - Google Scholar). Both publications represent foundational work from research and Extension scientists participating in SERA6. The Zhang et al (2021) manuscript on variations in soil test recommendations in the USA has been cited 31 times since publication, including 9 times in 2025.
- 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, discuss new technology and methods, and position vacancies. Evidence of the impact is that 15 of the 15 states in the Southern Region were

represented at the annual meeting, and one representative from the NCERA-13 always attends as an envoy.

- The faculty and staff of the SERA6 laboratories aim to collaborate on a national level as well as regional. To this end, the 2026 annual plenary sessions comprised a joint meeting with MASTPAWG (Mid-Atlantic Soil-Testing and Plant Analysis Workgroup) and NRSP11 membership, along with attendees from commercial laboratories.

PUBLICATIONS

Multi-Institution Collaborative Publications

1. Bourns, M., Buol, G., Spargo, J. T., Gatiboni, L., Yost, M. A., Slaton, N. A., & Osmond, D. L. (2025). The Fertilizer Recommendation Support Tool: A relational database and decision interface tool. Agricultural & Environmental Letters, 10, e70016. https://doi.org/10.1002/ael2.70016

2. Jones, J. D., Miller, R. O., Spargo, J. T., Sikora, F. J., Rakkar, M. K., Slaton, N. A., & Osmond, D. L. (2025). Assessment of soil pH and lime requirement methods and recommended lime rates for six reference soils across U.S. land grant institutions. Soil Science Society of America Journal, 89,e70116. https://doi.org/10.1002/saj2.70116

3. Lyons, S.E., Arnall, D.B., Ashford-Kornburger, D., Brouder, S.M., Christian, E., Dobermann, A., Haefele, S.M., Haegee, J., Helmers, M.J., Jin, V.L., Margenot, A.J., McGrath, J.M., Morgan, K.T., Murrell, S.T., Osmond, D.L. Pelster, D.E., Slaton, N.A., Vadas, P.A., Ventera, R.T., Volenec, J.J., & Wagner-Riddle, C. (2025). Field trial guidelines for evaluating enhanced efficiency fertilizers. *Soil Science Society of America Journal*, *89,* e20787. https://doi.org/10.1002/saj2.20787

4. Bourns, M.A., Osmond, D.L., Slaton, N.A., Spargo, J.T., Gatiboni, L., Lacey, C., Sawyer, D., & Yost, M. (2025). *Stakeholder engagement with soil testing: Practices and perspectives in U.S. agriculture* [Data set]. Ag Data Commons. https://doi.org/10.15482/USDA.ADC/29656808

5. Ortel, C. C., Roberts, T. L., Hoegenauer, K. A., Slaton, N. A., Ross, W. J., Purcell, L. C., & Parvej, M. R. (2026). Development of calibrated in-season corrective potassium applications for irrigated soybean. *Agronomy Journal, 118,* e70380. https://doi.org/10.1002/agj2.70380

6. Bourns, M., Osmond, D., Slaton, N.A., Spargo, J.T., Gatiboni, L., Lacey, C., Sawyer, D., & Yost, M. (2026). Stakeholder engagement with soil testing: practices and perspectives in U.S. agriculture. *Agronomy Journal*, 118, e70379. https://doi.org/10.1002/agj2.70379

7. Sinclair, T. R., Jafarikouhini, N., Turner, L., Gatiboni, L., Phillips, S., Diaz, D. R., ... Margenot, A. (2025, September 8). Triple super phosphate impact on maize transpiration and root hydraulic conductance on drying soils collected from six locations in the United States. PLANT AND SOIL. https://doi.org/10.1007/s11104-025-07851-3

8. Bourns, M., Osmond, D., Slaton, N., Gatiboni, L., Spargo, J., & Yost, M. (2025). Stakeholder Perspectives on Soil Test-Based Fertilizer Recommendations. FRST Fact Sheet #10. https://soiltestfrst.org/resources/how-stakeholders-view-soil-testing

9. Bourns, M., Slaton, N., Osmond, D., Gatiboni, L., Spargo, J., & Yost, M. (2026). Stakeholder Insights on Soil Sampling and Fertilizer Management Practices Stakeholder Insights on Soil Sampling and Fertilizer Management Practices. FRST Fact Sheet #11. https://soiltestfrst.org/resources/how-stakeholders-view-soil-sampling/

10. Singh, R., Miller, R., Spargo, J., Kissel, D., Shober, A., Gatiboni, L., & Slaton, N. (2026). Soil pH Response to Lime Source and Incubation Period: A Pilot Study to Guide a National Lime Calibration Project. FRST Fact Sheet #12. https://soiltestfrst.org/resources/pilot-study-to-guide-a-national-lime-calibration-project/

APPENDIX: TABLES AND FIGURE

Table 1. Use of SERA6 Workgroup Listserv for 2025-2026

2025 SERA 6 Email list conversations amongst the soil labs.				
Date	*Sender*	*Organization*	*Topic*	*Replies*
1/3/2025	Shannon Alford	Clemson	PFAS in soil?	5
1/9/2025	Hailin Zhang	Oklahoma State	Introduce new director	1
1/27/2025	Jessica Davis	Auburn	Velp CN analyzers	
2/13/2025	John Spargo	Penn State	Job opportunity at Penn State Agricultural Lab	
2/24/2025	Kendal Henderson	Oklahoma State	NIR forage	1
2/26/2025	Jessica Davis	Auburn	2025 Meeting in Raleigh	
3/12/2025	Kendal Henderson	Oklahoma State	Walkley-Black Organic matter	2
3/28/2025	Robert Florence	Tennessee	Soil grinder with built in shaker	3
4/8/2025	Shannon Alfred	Clemson	Elementar blank problems	
4/10/2025	Jessica Davis	Auburn	Conference reminder	
4/22/2025	Kendal Henderson	Oklahoma State	Chloride in manure	
5/6/2025	Frank Sikora	Kentucky	Vendors for paper soil bags	2
5/9/2025	Franta Majs	Florida	Plant tissue mill	3
5/14/2025	Rory Maguire	Viginia Tech	Guidance for PSNT kits	1
5/14/2025	Jessica Davis	Auburn	2025 Sera 6 meeting	
5/16/2025	Vaughn reed	Mississippi State	Portable sap testing usefulness?	1
5/22/2025	Franta Majs	Florida	Hiring lab manager for UF Lab	
6/2/2025	Jessica Davis	Auburn	Final update for 2025 meeting	1
7/14/2025	Michael Atkins	Clemson	CEM MARS microwave digestor	2
7/15/2025	Franta Majs	Florida	Cost recovery study	5
7/28/2025	Robert Florence	Tennessee	Print reports for clients still?	7
8/5/2025	Shannon Alfred	Clemson	Service for testing pesticides?	2
9/11/2025	Robert Florence	Tennessee	Agilent ICP or argon use on ICPs	1
9/18/2025	Kristin Hicks	North Carolina DA	SERA-6 2026 meeting?	3
9/19/2025	Solomon Kariuki	Kentucky	Automated system for KCl dispenser for pH analysis	2
10/24/2025	Kristin Hicks	North Carolina DA	IUSS Webinar	
11/7/2025	Ted Gauthier	LSU	Soil sample boxes	2
12/9/2025	Shannon Alfred	Clemson	Upcoming events for SERA 6 and MASTPAWG	

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.

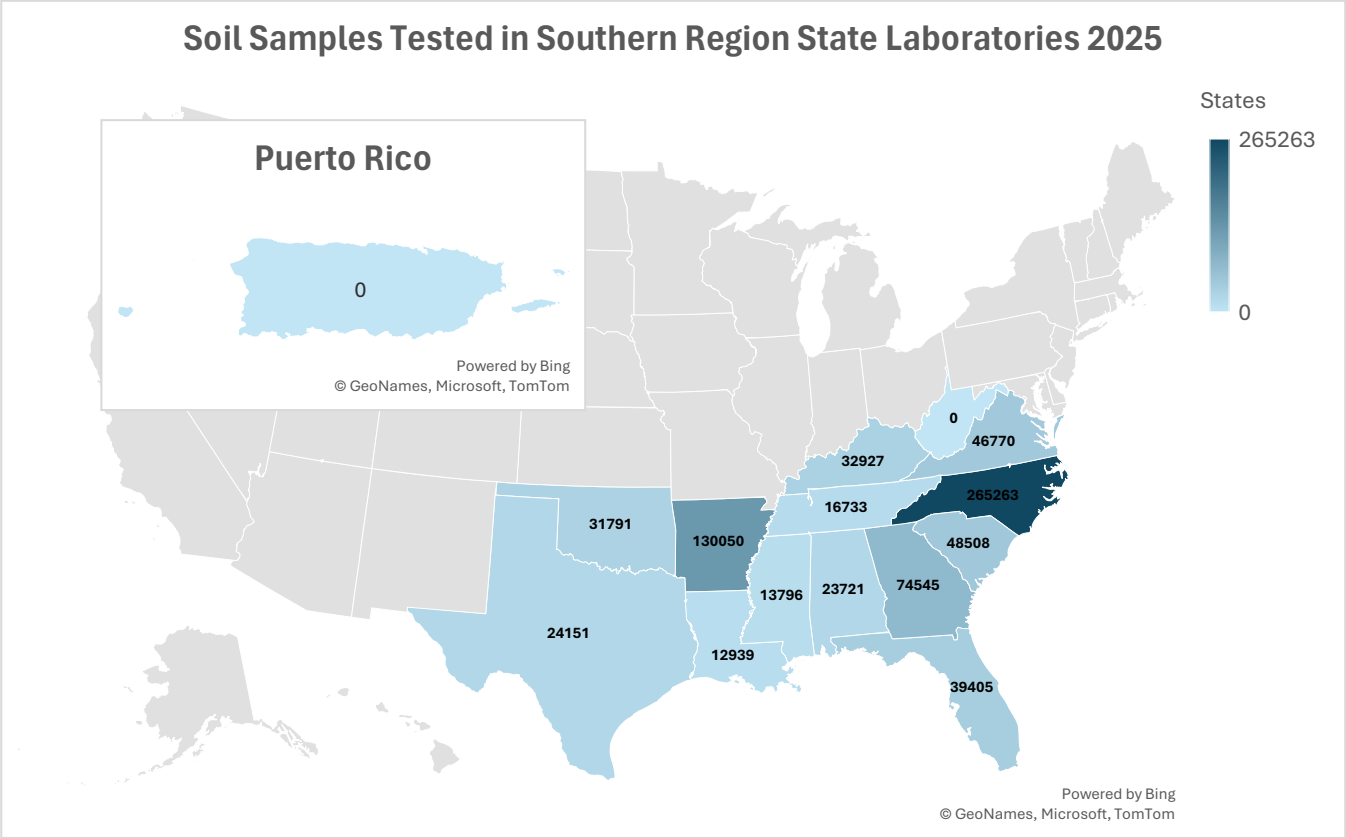

Table 2. Agricultural Samples Tested in Southern Region State Laboratories

State	University	Soils	Plant Tissue	Forage and Feed	Potting Media	Manure/Compost	Water	Research	Other
Alabama	Auburn University	23,721	1,429	767	181	263	447	600	8
Arkansas	University of Arkansas-Marianna Lab	130,050							
Arkansas	University of Arkansas-Fayetteville Lab		13,988	1,713	456	1,077		4,186	9,483
Florida	University of Florida	39,405	8,151	N/A	259	96	24,263		
Georgia	University of Georgia	74,545	6,581	7,951		1,115	10,412		3,368
Kentucky	University of Kentucky	32,927	0	328	17	137			98
Louisiana	Louisiana State University	12,939	4,134		287		134		
Mississippi	Mississippi State University	13,796	1,528						
North Carolina	North Carolina Department of Ag and Consumer Services	265,263	12,196		1,310	13,130	3,188		
Oklahoma	Oklahoma State University	31,791	2,879	11,016	719	1,245	4,653	17,801	
Puerto Rico	University of Puerto Rico Mayaguez								
South Carolina	Clemson University	48,508	615	1,111		1,274	280	4,553	
Tennessee	University of Tennessee	16,733	793	1,745	184				
Texas	Texas A&M University	24,151		5,552		619	3,532	5,220	543
Texas	Stephen F. Austin State University	2,578	43	109	10	293	106		11
Virginia	Virginia Tech University	46,770							
West Virginia	West Virginia University								
Total		**760,599**	**52,337**	**30,292**	**3,423**	**19,249**	**47,015**	**32,360**	**13,511**