

Multistate Research Project Annual Report

Project Number: NC1178

Project Title: Land use and management practice impacts on soil carbon and associated agroecosystems services

Period Covered: 6/01/2022-5/31/2023

Date of This Report: 7/25/2023

Annual Meeting Dates: 6/13/2023-6/14/2023

I. Participants:

In person: DeAnn Presley (deann@ksu.edu), Kristopher Osterloh (kristopher.osterloh@sdstate.edu), Yishui Rui (ruiy@purdue.edu), Itamar Shabtai (Itamar.Shabtai@ct.gov), Mohammad Golabi (mgolabi@triton.uog.edu), Rongzhong Ye (rongzho@clermson.edu), Xi Zhang (XiZhang@agcenter.lsu.edu), Larry Cihacek (larry.cihacek@ndsou.edu), Sindhu Jagadamma (sjagada1@utk.edu),

Virtually: Klaus Lorenz (lorenz.59@osu.edu), Srinivasulu Ale (sriniale@ag.tamu.edu), Xia Zhu-Barker (zhubarker@wisc.edu), Ching-Ho Lin (linchu@missouri.edu)

II. Brief summary of minutes of annual meeting:

The meeting was presided over by Dr. Rongzhong Ye (Clemson University). We clarified and defined the responsibilities of the project Chair and Chair-Elect. The majority agreed to meet in mid-June at the Connecticut Agricultural Experiment Station for the 2024 annual meeting. Dr. Itamar Shabtai will organize and plan the meeting. Drs. Xi Zhang and Kris Osterloh were elected to hold the 2025 and 2026 annual meetings in Louisiana and South Dakota, respectively.

We agreed to continue the discussions on generating review manuscripts and research proposals as a group, including a paper to introduce the history of the NC1178 to celebrate the 40-year mark. Larry Cihacek has agreed to take the lead on the 40-year paper. We agreed upon a tentative new title and objectives for the renewal proposal of NC1178 in 2024. A request for submitting a proposal renewal has been submitted and granted by Christina Holmes. Several in-person participants (DeAnn Presley, Yishui Rui, Rongzhong Ye, Xi Zhang, Sindhu Jagadamma, Kris Osterloh, and Itamar Shabtai) volunteered to contribute and lead the proposal renewal writing process. After the business meeting, each participant made a 20-minute presentation. More details can be found in the attached "Meeting Minutes".

III. Accomplishments:

Research activities: During the past reporting year, the NC1178 participants continued to carry out a range of research studies to evaluate the impacts of intensifying agroecosystems and management practices (e.g., reduced tillage, cover crop and grazing managements) on soil organic C (SOC), soil health, environmental footprint, and profitability (Table 1). Team members carried out a shared vision to promote conservation production systems that improve soil health and sustainability through research and extension services. The team has met the 2023 milestones and will continue to implement the planned project.

Table 1. Selected major research activities conducted by NC1178 participants during 2022-2023

State	PI	Research Activities
MI	Lin	<ul style="list-style-type: none"> Investigate effects of different conservation practices (e.g., cover crops) on the soil chemical profiles using the modern metabolomic approaches
WI	Zhu-Barker	<ul style="list-style-type: none"> Study effects of green waste and co-composted food waste and green waste on crop yield and soil nitrogen availability
NY	Wickings	<ul style="list-style-type: none"> Impact of lawn management practices and volcanic rock dust applications to turfgrass on belowground invertebrate diversity and soil carbon cycling
CT	Shabtai	<ul style="list-style-type: none"> Investigating accrual mechanisms of SOC in the rhizosphere Forest cutting methods on SOC stocks
GU	Golabi	<ul style="list-style-type: none"> Biochar amendment to increase soil pH and C sequestration
KS	Presley	<ul style="list-style-type: none"> Cover crop and no-till practices on SOC stocks and soil physical properties
LA	Zhang	<ul style="list-style-type: none"> Exploring the influences of cover cropping induced changes in soil physical environment on soil biogeochemical processes and crop production
MA	Hestrin	<ul style="list-style-type: none"> Investigating how soil mineralogy and management practices influence mineral associated organic matter stocks and soil nitrogen cycling
MA	Kaiser	<ul style="list-style-type: none"> Cover crop termination practices on SOM pools and N availability for crops and within soil pools Cover crop seeding rate impact on soil C and N pools
NB	Blanco	<ul style="list-style-type: none"> N fertilization on winter rye cover crop biomass production N fertilization of cover crops on corn yields
ND	Cihacek	<ul style="list-style-type: none"> Residue C/N ratio effects on decomposition and soil N availability Impacts of low-rate liming on reducing soil pH in no-till system
OS	Lal	<ul style="list-style-type: none"> Residue retention impacts on grain yield and soil properties
SC	Ye	<ul style="list-style-type: none"> Tillage impacts on soil health and SOC dynamics Interactive impacts of cover cropping and reduced tillage
SD	Xu	<ul style="list-style-type: none"> Soil health and soil carbon assessment under cover crop management, livestock integration, and no till management Integration impacts of cover cropping and livestock
SD	Osterloh	<ul style="list-style-type: none"> soil mineralogy impacts on the uptake of potassium fertilizer. Machine learning technology for creating precision agriculture management zones
TN	Jagadamma	<ul style="list-style-type: none"> No-tillage combined with cover cropping, crop rotation, and regenerative farming practices have been tested for net SOC storage. Deep-rooted cover crops effects on in increasing subsoil SOC accumulation
TX	Noormets	<ul style="list-style-type: none"> Management impacts on SOC balance and stock in forest soils Characterize belowground C sensitivity to environmental and biological factors,

		<ul style="list-style-type: none"> • Define role of belowground C in forest soil carbon dynamics • Assess the trade-offs between merchantable aboveground productivity of stemwood and soil carbon balance.
TX	Dou	<ul style="list-style-type: none"> • Rice variety and N fertilization impacts on soil C and N and yield • Biomass sorghum and N fertilization impacts on soil C and N and yield
TX	Ale	<ul style="list-style-type: none"> • Studying cotton yield, SOC and total N under cover crop treatments • Effects of grazing intensities/management on SOC stocks
TX	Aburto	<ul style="list-style-type: none"> • Evaluate the effect of long-term agricultural use on mineral weathering and secondary mineral formation and interaction with soil organic matter and elemental cycling • Assess the effect of mineral amendments (i.e., rock powders) on carbon sequestration and as a source of plant nutrients
IN	Rui	<ul style="list-style-type: none"> • Assess effects of land use and management practices on soil carbon and ecosystem services

Outputs: This team has generated a wide range of research-based information and knowledge (Table 2), which has resulted in more than 57 publications in peer-reviewed journals and 92 presentations in academic conferences and meetings. In addition, the team has made 51 extension presentations in field days and workshops during the same period, some of which were reported by local media or news outlets.

Short-term outcomes: Data generated by the research team advanced an understanding of how management practices can be optimized to improve soil health and productivity (Table 2). Research-based information was delivered to targeted audiences through extension services and academic publications. Resulting benefits included, but not limited to: 1) understanding the effects of different conservation practices (e.g., cover crops) on the soil chemical profiles using the modern metabolomic approaches (MI) and simulation models (TX), 2) creating precision agriculture management zones using machine learning technology (SD), 3) optimization of residue return for improving soil chemical and physical properties (e.g., OSU), 4) integrations of cover cropping with other conservation management practices (e.g., SC), 5) improved understanding of the spatial variability of soil physical properties on percolation and nutrient loss (LSU), 6) optimized nutrient management and crop selection for better management outcomes (e.g., TX), and 7) formulated and improved soil health assessment methodologies (e.g., TN). The resulting research data also demonstrated that the adoption of site-specific management recommendations and system-based conservation is necessary and critical to make agriculture a sound solution to climate change and other environmental issues.

Milestones: The team has reached and will soon pass the 2023 milestone of “completion of sample and laboratory analyses”. The next milestone in 2024 is “Workshops and meetings; Begin posting of findings on project website and state agricultural experiment station and extension service web sites”.

Table 2. Selected major research findings generated by NC1178 participants during 2022-2023

State	PI	Key Findings/Observations
-------	----	---------------------------

WI	Zhu-Barker	<ul style="list-style-type: none"> Organically managed soil exhibited higher rates of net N mineralization and nitrification than conventionally managed soil, leading to greater nitrate production. The rate of N mineralization in organically managed soil was also more sensitive to temperature increases. Compost application, while maintaining or increasing crop yield, lowered the use efficiency of fertilizer N and increased N mineralization from the soil. The findings underscore compost's role in N cycling and suggest the need for revised nutrient management strategies for more sustainable agriculture.
MI	Lin	<ul style="list-style-type: none"> The findings suggested the conservation practices significantly increase the concentrations of the bioactive compounds in the soils that are known to promote the plant health, disease resistant and micronutrients uptake.
CT	Shabtai	<ul style="list-style-type: none"> Maize root exudates preferentially associated with clay-sized particles (<2 μm) The chemical composition of organic C compounds in the rhizosphere was more diverse than in bulk soil. Increased spatial co-localization at the sub-micron scale of C and soil calcium in the rhizosphere than bulk soil indicate that root activity promotes the formation of organo-mineral associations.
GU	Golabi	<ul style="list-style-type: none"> SOC and soil quality increased in both southern and northern Guam soils, following the application of biochar. Chemical properties of the soil may be the main factor in determining whether land application of biochar could potentially improve the carbon sequestration of the soil.
KS	Presley	<ul style="list-style-type: none"> Aggregate data showed an overall trend of cover crops increasing aggregation compared to no cover treatments. Total carbon results differed with cover crop management, however, there were no differences when converted to a mass per unit area basis (Mg ha^{-1}). The P management strategies had no effects on the physical soil properties.
LA	Zhang	<ul style="list-style-type: none"> Based on clay content, the field can be divided into different zones. Different response behaviors of soil water under simulated rainfall were observed for different zones. Water percolation was limited in zones with high clay content, which caused higher surface runoff and higher risk of nutrient losses and impacted crop growth.
NB	Blanco	<ul style="list-style-type: none"> Research at the University of Nebraska-Lincoln suggests that the application of N fertilizer to winter rye cover crops at 50 and 100 kg N/ha may not enhance cover crops biomass production. The use of the cover crops in corn-soybean systems does not negatively impact main crop yields, which can lead to greater

		farmer acceptance of these cover crops management practices as they are less likely to affect their bottom line.
ND	Cihacek	<ul style="list-style-type: none"> • Heavy crop residue accumulation in cooler climates can cause a greater need for N fertilizers because of soil N immobilization during decomposition. • Utilizing cover crop residues for their low C:N ratios can potentially mitigate soil N immobilization while reducing the need of additional fertilizer applications in No-till systems. • Utilization of low-rate liming can be an economical means to manage soil acidity and maintaining or improving crop productivity as agricultural production practices intensify.
OS	Lal	<ul style="list-style-type: none"> • The data indicate that 25% of corn residues can be removed for other uses from soils which are similar to those of South Charleston and Hoytville. • Including a cover crop in the rotation cycle and grown during the off-season (November through April) is important to maintain an effective soil cover during Winter and early Spring.
SC	Ye	<ul style="list-style-type: none"> • Conservation tillage alone may not be efficient enough to increase soil organic C and overall soil health in the sandy Ultisols of the southeastern US. • Integrating cover crops with larger biomass production potentials or fertilizing the cover crop in the winter may be required to increase biomass production for beneficial outcomes.
SD	Xu	<ul style="list-style-type: none"> • Long-term no-till management improved soil microbial biomass. • Cover cropping benefited soil physical and biochemical properties.
SD	Osterloh	<ul style="list-style-type: none"> • The efficiency of potassium fertilizer is impacted by soil mineralogical type, but only at relatively high levels of fertilizer application. Smectitic soils show a smaller yield increase as K fertilizer rates reach 60+% of maximum recommended application rate, when compared to mixed or illitic mineralogy soils. • Environmental covariates show a strong correlation with soil management zones, allowing for the potential of machine learning tools to automatically create these management zones and optimize soil sampling numbers to reduce overall producer costs.
TN	Jagadamma	<ul style="list-style-type: none"> • Long-term conservation practices using deep-rooted grass-type cover crops resulted in significant subsoil SOC accumulation via a combination of a) increased mineral-associated SOC fraction and b) improved microbial functional traits associated with C cycling (potential extracellular enzymatic activity and carbon-use efficiency). • A core set of soil properties that are considered early indicators of changes in soil health were characterized.
TX	Noormets	<ul style="list-style-type: none"> • We have demonstrated that soil CO₂ efflux and ecosystem net CH₄ exchange are functionally coupled to the diurnally varying

		<p>availability of plant-derived carbohydrates as the metabolic substrate.</p> <ul style="list-style-type: none"> • We quantified belowground allocation and partitioning of carbon to fine root, fungi and auto- and heterotrophic respiration at different prescribed burn frequencies. The greatest soil C accumulation was observed at intermittent burn interval of 2-3 years compared to annual and no-burn regimes.
TX	Dou	<ul style="list-style-type: none"> • Our field studies indicated that biomass sorghum production could impact soil C sequestration depending on specific cultivar planted and nitrogen fertilization rate.
TX	Ale	<ul style="list-style-type: none"> • Cover crops improved simulated soil organic carbon by 11-19% and total nitrogen by 4-14%, and enhanced crop water productivity in the Texas Rolling Plains cotton production systems under both irrigated and dryland conditions. • Simulated adoption of adaptive multi-paddock grazing management on all grazing lands in a rangeland-dominated watershed (72% area) in northwest Texas increased soil organic carbon by 7.5% and reduced carbon losses in runoff and sediment by 51-54% when compared to heavy continuous grazing.
TX	Aburto	<ul style="list-style-type: none"> • Conversion from natural forest to plantation forest substantially alters carbon and nutrient biogeochemical cycling and the capacity of the soils to store organic carbon • Significant changes in weathering rates and patterns due to conventional agricultural practices using the over a century-old Morrow experimental plots in the U. of Illinois

IV. Impacts

During 2022-2023, the NC1178 project attracted at least five new researchers to join in the team. This project continued to assemble a wide range of expertise coupled with a long-term continuum of members and participants to provide a platform for new researchers to develop research that addresses evolving issues in crop production and environmental quality. The research and extension activities conducted by this team across the U.S. have not only scientific merits, but also ecological, economic, and social impacts.

Demonstrating the importance of soil health. Building healthy and resilient soils is the central focus of most soil conservation programs being implemented worldwide. Team members demonstrated the importance of soil health to various agroecosystem functions and its capacities to provide food, fiber and services to humans and animals. In addition, team members are developing soil health assessment frameworks, emphasizing the significance of site-specific indicators, to be used by professionals and the general public to guide sustainable agricultural management practices.

Promoting sustainable soil management. The outcome of this project reinforces the concept of using soil health principles in production agriculture. The research results provide information towards the development of management guidelines to improve the designed agronomic and environmental outcomes.

Social benefits to society. The results generated by the team research allow future researchers and farmers alike to improve N use-efficiency in row cropping systems by minimizing its losses as ammonia, nitrous oxide, and nitrate. The increased fertilizer use-efficiency will increase the economic competitiveness of production agriculture (i.e., less fertilizer inputs), mitigate its climate impacts (i.e., less greenhouse gas emissions), and reduce water degradation potential (i.e., less nitrate leaching to aquatic systems), all of which improve the well-being of individual in the society by improving air and water quality. Meanwhile, the studies on the responses of soil C dynamics will allow the development of management practices to mitigate the negative effects of climate change by promoting C sequestration.

Grant and Resources obtained: In addition to the below equipment, the team members secured more than \$6.2M of grants in total because of project's activities.

Equipment:

1. Osterloh, Kris: ATV mounted Giddings hydraulic soil sampling probe.
2. Noormets, Asko: Thermo FlashSmart NC Soil elemental analyzer, Eppendorf centrifuge.
3. Ye, Ronzhong: Shimadzu TOC analyzer, LECO CN analyzer
4. Lin, Chung-Ho: Waters UPLC TQ-XS MS/MS, Applied Biosystem digital AbsoluteQ PCR
5. Rui, Yichao: Molecular Devices SpectraMax iD3 Multi-Mode Microplate Detection Platform, Shimadzu TOC analyzer
6. Zhang, Xi: KSAT system (soil hydraulic conductivity analysis); (2) HYPROP system (wet end soil water retention analysis); (3) WP4C water potential meter (dry end soil water retention analysis); (4) VARIOS system (soil thermal properties analysis); (5) TEROS 12 sensor (soil volumetric water content, temperature, and EC measurements); (6) TEROS 21 sensor (soil matric potential measurement)
7. Xu, Sutie: Soil moisture sensors, deep soil sampler
8. Hestrin, Rachel: Dual carbon isotope analyzer.
9. Shabtai, Itamar: LICOR CO₂ analyzer, Bruker Invenio S FTIR.
10. Aburto, Felipe: Rigaku Primus iV Wavelength Dispersive X-Ray fluorescence spectrometer for total elemental analysis, Thermo Nicolet Fourier-Transform Infrared analyzer connected to a Waters Thermal Analysis Thermogravimetry-differential scanning calorimeter for evolved gas analysis.

Funding:

1. **Noormets, A.,** DeForest. Tracing the carbon flow from plants to soil. USDA-NIFA Fundamental and Applied Sciences. 08/2023-07/2026 (**\$749,846**)
2. Lee, J; **Jagadamma, S.** Row crop production under climate change – assessment of sustainable management practices and soil additives in sand deposited fields. USDA-Agricultural Research Service, 09-2022 to 08-2023 (**\$103,704**).
3. **Jagadamma, S;** Walker, F., Singh, S., Duncan, L., McClure, M., Upendram, S. Demonstrating the impacts of cover crops for soil health and farm profitability in Tennessee. Tennessee Department of Agriculture, 10-2019 to 09-2024 (**\$434,613**).
4. **Jagadamma, S;** Lee, J., Duncan, L.A., McClure, A., Raper, T.B., Kivlin, S. Optimizing plant-soil-microbial interactions through crop diversification to enhance sustainability in southeastern croplands. USDA-NIFA Foundational Program, 09-2020 to 08-2024 (**\$500,000**).

5. **Chun-Ho, Lin**, Impact of Long-Term Cover Cropped Organic Farming Practices on the Development of Disease Suppressive Soils USDA Organic Agriculture Research and Extension Initiative (OREI) 9/1/2022-7/31/2025 (**\$490,000**).
6. **Chun-Ho, Lin**, CAFNR Matching Assistantship Program C-MAP 1/1/2023-12/30/2027 (**\$50,000**).
7. **Chun-Ho, Lin**, Center for Agroforestry at the University of Missouri, USDA/ARS Dale Bumpers Small Farm Research Center under agreement number 58-6020-6-001 from the USDA Agricultural Research Service 1/1/2023-12/30/2027 (**\$50,000**).
8. Mowrer, J., N. Raja, and **F, Dou**. Aertime: Calibrating AWD irrigation timing for Texas rice. 2022. USDA NIFA Foundation program. 2023-2027. (**\$739,340**).
9. Ma, X., **F. Dou**, and K. Chen. Elucidating the impact of nanoagrichemicals on paddy soil health and rice production through combined greenhouse studies and machine learning. 2022. USDA NIFA Nanotechnology program. 2023-2027. (**\$609,290**).
10. Howe, J., A.P. Smith, A. Verhoef, B. McKnight, C. Trostle, D. Leskovar, D. Wald, D. Tolleson, E. Kimura, **F. Dou**, G. Smith, G. Carstens, G. Baath, H. Leggette, J. Mowrer, J. Muir, J. Foster, J. Banta, J. Outlaw, J. Cason, J. Dasilva, J. McGinty, J. Bell, J. Zou, J. Benavidez, K. Lewis, L. Redmon, L. Tarpley, L. Wilson, L. Riber, L. Tedeschi, M. Bhandari, M. Palma, M. Clayton, M. Rouquette, M. Maeda, M. Keshava, N. Rajan, P. Laune, Q. Xue, R. Srinivasan, R. Woodward, R. Jessup, T. Provin, and Y. Yang. Texas Climate-Smart Initiative. USDA NRCS SmartFarm Program. 2022 – 2027. (**\$65,000,000**).
11. Bera, T., **F. Dou**, L.T. Wilson, X. Zhou, and Y. Yang. 2022. Development of Sustainable Organic Rice Ratoon Production Systems in the Southern US. USDA Southern Sustainable Agriculture Research and Education program. 2022-2025. (**\$370,785**).
12. **Dou, F.** 2022. Multistate Hatch Support Program. (**\$30,000**).
13. **Dou, F.** 2022. Rice varietal evaluation, ratoon, and nutrient management improvement for Texas production practices. Texas Rice Research Foundation. 2022-2024. (**\$59,925**).
14. **Presley, DeAnn**, Enhanced Soil Carbon Farming as a Climate Solution, 9/9/22 to 7/31/23, Kansas Corn Commission, (**\$20,000**) annually for 5 years.
15. **Presley, DeAnn**, Enhanced Soil Carbon Farming as a Climate Solution, 3/1/22-3/1/27, FFAR, \$15,000,000 (KSU: **\$375,000**).
16. **Sutie, Xu**, USDA Organic Transitions Program. Can living mulch enhance soil health and ecosystem services of organic vegetable production systems in South Dakota? (**\$749,998**).
17. **Sutie, Xu**, South Dakota Oilseeds Council. Impacts of N fertilizer placement method and rate on sunflower growth, yield, seed oil content and N use efficiency. (**\$20,715**).
18. **Sutie, Xu**, South Dakota Nutrient Research and Education Council. Impact of Phosphorus Soil Test Level Differences on Crop Response in No-Till Soils in Central South Dakota. (**\$91,948**).
19. **Sutie, Xu**, Minnesota Soybean Research and Promotion Council: Site-specific Soybean Cyst Nematodes Detection Using EC Mapping. (**\$44,018**).
20. **Zhang, X.**, C. Jeong, S. Dodla and S. D. Conger. Spatial variability of soil properties in agricultural fields: what does this mean for soil water and nutrients management and crop production in Louisiana. *Louisiana Soybean and Grain Research and Promotion Board*. Apr. 2022-Mar. 2024. (**\$54,150**)
21. Support small-scale limited resources farmers for climate-smart commodities using innovative approaches. USDA-NRCS- Partnerships for Climate-Smart Commodities RFP # USDA-NRCS-COMM-22-NOFO0001139. Ram Ray (PI, PVAMU), Nithya Rajan (PI,

- TAMU), **Felipe Aburto** (Co-Pi, TAMU), UH, and Michigan Aerospace Corporation. Total funding: \$4,997,381, Dr. Aburto's Program: \$537,538
22. Unravel molecular soil and water organic and mineral structures through FTIR thermal evolved gas analysis. Texas A&M AgriLife Research FY23 Equipment RFP. PI: **F. Aburto**, CoPI: Calabrese, S, Deng, J. Howe, J. Mohanty, Binayak, Rajan, N. Smith, P. West, J. Total funding: 87,137 Dr. Aburto's Program: 87,137.
 23. Soil development and functional recovery after revegetation of a fly ash landfill. PIs: Dr. Aguayo, M. and **Dr. Aburto, F.** Agreement TAMU-UDEC SRS# 2208800. Total funding: \$582,000, Dr. Aburto's Program: \$217,987
 24. Runoff and Leaching Losses of Commonly Used Herbicides as Influenced by Urban Landscape Composition. TAMU – TICER NIH Pilot Projects Programs. Total Funding: 50,000. **Dr. Aburto's** Program: 5,000

V. Publications

1. Koehler-Cole, K., R.W. Elmore, H. Blanco-Canqui, C.A. Francis, C.A. Shapiro, C.A. Proctor, D.M. Heeren, S. Ruis, S. Irmak, and R.B. Ferguson. 2023. Cover crop treatments and planting practices determine their performance in corn systems. *Agron. J.* 115:526-543.
2. Blanco-Canqui, H. 2022. Does biochar conserve soil and water? *J. Soil and Water Conserv. J.* 77:79A-84A.
3. Blanco-Canqui, H. 2022. Cover crops and soil ecosystem engineers. *Agron. J.* 114:3096-3117.
4. Blanco-Canqui, H. R. Hassim, C. Shapiro, P. Jasa, and H. Klopp. 2022. How does no-till affect soil-profile susceptibility to compaction in the long term? *Geoderma* 425:116016.
5. Klopp, H., and Blanco-Canqui, H. 2022. Implications of crop residue removal on soil physical properties: A review. *Soil Sci. Soc. Am. J.* 86:979-1001.
6. Ruis, S.J., H. Blanco-Canqui, P. Jasa, and V.L. Jin. 2022. No-till farming and greenhouse gas fluxes: insights from literature and experimental data. *Soil Tillage Res.* 105359.
7. Kim, J., S. Ale, U.P. Kreuter, W.R. Teague, S.J. DelGrosso, and S.L. Dowhower. 2023. Evaluating the impacts of alternative grazing management practices on soil carbon sequestration and soil health indicators. *Agriculture, Ecosystems and Environment*. Volume 342, 1 February 2023, 108234. <https://doi.org/10.1016/j.agee.2022.108234>
8. Singh, J., S. Ale, P.B. DeLaune, S.K. Himanshu, and E.M. Barnes. 2022. Modeling the impacts of cover crops and no-tillage on soil health and cotton yield in an irrigated cropping system of the Texas Rolling Plains. *Field Crops Research*. Volume 287, 15 October 2022, 108661. <https://doi.org/10.1016/j.fcr.2022.108661>
9. Himanshu, S.K., S. Ale, P.B. DeLaune, J. Singh, S.A. Mauget, and E.M. Barnes. 2022. Assessing the effects of winter wheat cover crop on soil water use, crop water productivity, and soil carbon and nitrogen in no-till cotton production systems. *Journal of the ASABE*. 65(5): 1163-1177. <https://doi.org/10.13031/ja.15181>
10. Mauget, S.A., Himanshu, S. K., Goebel, T., Ale, S., Payton, P., Lewis, K., and Baumhardt, R.L. 2022. Modeling Management of Continuous Dryland Cotton with an Intervening Winter Wheat Cover Crop in a Semiarid Climate. *Frontiers in Sustainable Food Systems*. 6: 1043647. <https://doi.org/10.3389/fsufs.2022.1043647>

11. Ledbetter, K., S. Ale, J. Kim, and U. Kreuter. 2023. [Stocking rangeland for carbon considerations](#). AgriLife Today. April 13, 2023.
12. Wang R, Bowling DR, Gamon JA, Smith KR, Yu R, Hmimina G, Ueyama M, Noormets A, Kolb TE, Richardson AD, Bourque CPA, Bracho R, Blanken PD, Black TA, Arain MA (2023) Snow-corrected vegetation indices for improved gross primary productivity assessment in North American evergreen forests. *Agricultural and Forest Meteorology* 340: 109600. <https://doi.org/10.1016/j.agrformet.2023.109600>
13. Noormets A, *Miao G, *Kim D, *Ono M, McNulty SG (2023) Mitigation potential of forests: Challenges to carbon accrual in the ecosystem. In McNulty SG, ed. *Future forests*, Elsevier. (In press)
14. McNicol G, Fluet-Chouinard E, Ouyang Z, Knox SH, Zhang Z, Aalto T, Bansal S, Chang K-Y, Chen M, Delwiche K, Feron S, Goeckede M, Liu J, Malhotra A, Melton J, Riley W, Vargas R, Yuan K, Ying Q, Zhu Q, Alekseychik P, Aurela M, Billesbach D, Campbell D, Chen J, Chu H, Desai A, Euskirchen E, Goodrich J, Griffis T, Helbig M, Hirano T, Iwata H, Jurasinski G, King JS, Koebisch F, Kolka R, Krauss K, Lohila A, Mammarella I, Nilson M, Noormets A, Oechel W, Peichl M, Sachs T, Sakabe A, Schulze C, Sonntag O, Sullivan R, Tuittila E-S, Ueyama M, Vesala T, Ward E, Wille C, Wong G, Zona D, Windham-Myers L, Poulter B, Jackson R (2022) UpCH4: A global freshwater wetland methane emissions product for 2001-2018 from upscaled eddy covariance fluxes. *AGU Advances*: In press (2023-05-15).
15. Oliveira FCC, Bacon A, Fox TR, Jokela EJ, Kane MB, Martin TA, Noormets A, Wade Ross C, Vogel J, Markewitz D (2022) A regional assessment of permanganate oxidizable carbon for potential use as a soil health indicator in managed pine plantations. *Forest Ecology and Management* 521: 120423. <https://doi.org/10.1016/j.foreco.2022.120423>
16. Aguilos M, Warr I, Irving M, Gregg O, Grady S, Peele T, Noormets A, Sun G, Liu N, McNulty S, Pettay F, Bhattacharya S, Penney S, Kerrigan M, Yang L, Mitra B, Prajapati P, Minick K, King J (2022) The unabated atmospheric carbon losses in a drowning wetland forest of North Carolina: A point of no return? *Forests* 13: 1264. <https://doi.org/10.3390/f13081264>
17. Morkoc S, Aguilos M, Noormets A, Minick KJ, Ile OJ, Dickey DA, Hardesty D, Kerrigan M, Heitman J, King J (2022) Environmental and plant-derived controls on the seasonality and partitioning of soil respiration in an American sycamore (*Platanus occidentalis*) bioenergy plantation in the Piedmont of North Carolina, USA. *Forests* 13: 1286. <https://doi.org/10.3390/f13081286>
19. Miao G, Noormets A, Gavazzi M, *Mitra B, Domec JC, Sun G, McNulty S, King JS (2022) Beyond carbon flux partitioning: Carbon allocation and nonstructural carbon dynamics inferred from continuous fluxes. *Ecological Applications* 32:e2655.
20. Li, X., Lazicki, P., Neelipally, R.T., Walker, F.R., and Jagadamma, S. 2023. Can surface-applied biochar improve soil health and plant performance in a perennial cool-season grass forage system? *Soil Science Society of America Journal*. In Press. DOI: <https://doi.org/10.1002/saj2.20533>.
21. Wooliver, R., and Jagadamma, S. 2023. Response of soil organic carbon fractions to cover cropping: A meta-analysis of agroecosystems. *Agriculture, Ecosystems and Environment*. 351: 108497.

22. Patra, R., Saha, D., and Jagadamma, S. 2022. Winter wheat cover crop increased subsoil organic carbon in a long-term cotton cropping system in Tennessee. *Soil and Tillage Research*. 224: 105521.
23. Wooliver, R., Kivlin, S.N., and Jagadamma, S. 2022. Links among crop diversification, microbial diversity, and soil organic carbon: Mini review and case studies. *Frontiers in Microbiology*. 13: 854247.
24. Neupane, A., Lazicki, P., Mayes, M.A., Lee, J., and Jagadamma, S. 2022. The use of stable carbon isotopes to decipher global change effects on soil organic carbon: present status, limitations, and future prospects. *Biogeochemistry*. 160(3): 315-354.
25. Bansal, S., Yin, X., Schneider, L., Sykes, V., Jagadamma, S., and Lee, J. 2022. Carbon footprint and net carbon gain of major long-term cropping systems under no-tillage. *Journal of Environmental Management*. 307: 114505.
26. Parajuli, B., Szogi, A., Ye, R. 2022. Mineral N suppressed priming effect while increasing microbial C use efficiency and N₂O production in sandy soils under long-term conservation management. *Biol. Fertil. Soils*. (DOI:10.1007/s00374-022-01665-6).
27. Poudel, P., Parajuli, B., Park, D. Ye, R. Cover crop residues decomposition and nutrient releases in a sandy Ultisols of U.S. Coastal Plain: impacts of termination timing. *Communications in Soil Science and Plant Analysis*. (in press) Wang, X., J. Jiang, F. Dou, X. Li, W. Sun, and X. Ma. 2022. Zinc fertilizers modified the formation and properties of iron plaque and arsenic accumulation in rice (*Oryza sativa* L.) in a life cycle study. *Environmental Science & Technology* 56:8209-8220.
28. Li, X., J. Jiang, J. Guo, AM. McClung, K. Chen, MV. Velarca, HA. Torbert, and F. Dou. 2022. Effect of nitrogen application rate under organic and conventional systems on rice (*Oryza sativa* L.) growth, grain yield, soil properties, and greenhouse gas emissions. *Journal of Plant Nutrition*. <https://doi.org/10.1080/01904167.2022.2093746>.
29. Wang, X., X. Li, F. Dou, W. Sun, K. Chen, Y. Wen, and X. Ma. 2022. Impact of three copper amendments on arsenic accumulation and speciation in rice (*Oryza sativa* L.) in a life cycle study. *ACS Sustainable Chemistry & Engineering* 10 (14):4504-4511.
30. Lal, R., 2022. Reducing carbon footprints of agriculture and food systems. *Carbon Footprints*, 1(1), p.3.
31. Layek, J., Das, A., Ghosh, P.B., Rangappa, K. Lal, R., et al. 2022. Double No-till and Rice Straw Retention in Terraced Sloping Lands Improves Water Content, Soil Health and Productivity of Lentil in Himalayan Foothills. *Soil and Tillage Research*, Elsevier, 8 Apr. 2022, <https://www.sciencedirect.com/science/article/pii/S0167198722000678>.
32. Lal, R. 2022. Promoting carbon sequestration in soils: the importance of soil, region and context-specific interventions. In: *Understanding and fostering soil carbon sequestration*. Burleigh Dodds Science Publishing. ISBN: 978-1-78676-969-5. <https://doi.org/10.19103/AS.2022.0106.20>
33. Das, A., Layek, J., Yadav, G.S. Lal, R. et al. 2022. Managing soil organic carbon in croplands of Eastern Himalaya, India. In R.Lal (Ed) “Soil Organic Matter and Feeding the Future: Environmental and Agronomic Impacts”, Taylor and Francis/CRC, Boca Raton, FL. 279-303. <https://doi.org/10.1201/9781003102762>
34. Mrabet, A., Moussadek, R., and Lal, R. 2022. No-till farming in the Maghreb region: Enhancing agricultural productivity and increasing organic carbon in soils. In R. Lal (Ed). “Soil Organic Matter and Feeding the Future”, Taylor and Francis, Boca Raton, FL. 339-363. <https://doi.org/10.1201/9781003102762>

35. Young, R.A., J.K. Turk, N.A. Jelinski, A.D. Anderson, K.M. Clark, C.J. Moorberg, K. Osterloh, and D. Presley. Cognitive and affective outcomes of intercollegiate collaboration at a soil judging competition <https://doi.org/10.1002/nse2.20104>
36. Lancaster, P.A., D. Presley, W. Fick, D. Pendell, A. Ahlers, A. Ricketts, and M. Tang. 2022. Net conversion of human-edible vitamins and minerals in the US Southern Great Plains beef production system. *Animals*. <https://doi.org/10.3390/ani12172170>
37. Tatarko, J., D. Presley, and K. Mankin. 2022. Wind erosion potential from stover harvest in the Central Plains: Measurements and simulations. *Soil Tillage Res.* <https://doi.org/10.1016/j.still.2022.105486>
38. Bolan, N., G. Nortje, S. Bolan, P. Srivastava, M. Kumar, H. Wang, D. Presley, and M.B. Kirkham. 2023. Soil Crust: Formation, Influence on Soil Productivity, and Management. In: *Soil Constraints and Productivity* Eds. N.S. Bolan and M.B. Kirkham. 2023. CRC Press, Boca Raton, FL.
39. Cai, A., Han, T., Ren, T., Sanderman, J., Rui, Y., Wang, B., ... & Xu, M. (2022). Declines in soil carbon storage under no tillage can be alleviated in the long run. *Geoderma*, 425, 116028.
40. Pearsons, K. A., Omondi, E. C., Zinati, G., Smith, A., & Rui, Y. (2023). A tale of two systems: Does reducing tillage affect soil health differently in long-term, side-by-side conventional and organic agricultural systems? *Soil and Tillage Research*, 226, 105562.
41. Tian, Y., Wang, Q., Gao, W., Luo, Y., Wu, L., Rui, Y., ... & Zhang, W. (2022). Organic amendments facilitate soil carbon sequestration via organic carbon accumulation and mitigation of inorganic carbon loss. *Land Degradation & Development*, 33(9), 1423-1433.
42. Zhu, X., Xie, H., Masters, M. D., Rui, Y., Luo, Y., He, H., ... & Liang, C. (2023). Microorganisms, their residues, and soil carbon storage under a continuous maize cropping system with eight years of variable residue retention. *Applied Soil Ecology*, 187, 104846.
43. Pearsons, K. A., Chase, C., Omondi, E. C., Zinati, G., Smith, A., & Rui, Y. (2023). Reducing tillage does not affect the long-term profitability of organic or conventional field crop systems. *Frontiers in Sustainable Food Systems*, 6, 1004256.
44. Wen, H., P. Sullivan, S. Billings, H. Ajami, A. Cueva, A. Flores, D. Hirmas, A. Koop, K. Murenbeeld, X. Zhang and L. Li. 2022. From soils to streams: connecting terrestrial carbon transformation, chemical weathering, and solute export across hydrological regimes. *Water Resources Research* 58: e2022WR032314.
45. Xu, S., S., Jagadamma, S. Cui, R. N. Oakes, and J. O. C. Kubesch. 2023. Forage species composition influenced soil health in organic forage transitioning systems. *Agric Ecosyst Environ.* 342, 108228.
46. Li, Z., S. Xu, N. Rajan, S. Nair, S. Jagadamma, R. Nave, ... and S. Cui. 2022. Productivity and nutritive value of no-input minimum tillage organic forage systems. *Nutr. Cycling Agroecosyst.* 124(3): 335-357.
47. Davenport, R., Bowen, B.P., Lynch, L.M., Kosina, S.M., Shabtai, I.A., Northern, T.R., Lehmann, J. (2023). Decomposition decreases diversity and ecosystem similarity of soil organic matter. *Proceedings of the National Academy of Sciences*, 120(25), e2303335120.
48. Leite, A.A., Melo, L.C.A., Carlos, L., Hurtarte, C., Zuin, L., Piccola, C.D., Werder, D., Shabtai, I.A., Lehmann, J. (2023). Magnesium-enriched poultry manure enhances phosphorus bioavailability in biochars. *Chemosphere*, 331, 138759.

49. Kummel, M.L., Shabtai, I.A.*, Nir, S., Mishael, Y.G. (2023). DOM removal from surface water by activated carbon vs. a nanocomposite: an experimental and modeling approach to optimize treatment. *Environ. Sci.: Water Res. Technol*, 9, 1531-1544.
50. Shabtai, I.A.*, Das, S., Inagaki, T.M., Azimzadeh, B., Richards, B., Martínez, C.E., Kögel-Knabner, I. and Lehmann, J. (2022). Soil organic carbon accrual due to more efficient microbial utilization of plant inputs at greater long-term soil moisture. *Geochimica et Cosmochimica Acta*, 327, pp.170-185.
51. Erazo-Mora, K. Montalvan-Burbano, N. Aburto, F. Matus-Baeza, F. Jofre, I. Duran-Cuevas, P. Dorner, J. Dippold, M. Merino, C*. 2023. Four Decades in Fires Research - a Bibliometric Analysis About the Impact on Mineralogy and Nutrients. *Catena*. 226, 107065. <https://doi.org/10.1016/j.catena.2023.107065>
52. Matus, F. Mendoza, D. Najera, F. Merino, C. Kuzyakov, Y. Wilhelm, K. Boy, J. Aburto, F. Jofré, I. Dippold, M. 2023. Freezing-Thawing Cycles Affect Organic Matter Decomposition in Periglacial Maritime Antarctic Soils. *Biogeochemistry*. 163, 311-325. <https://doi.org/10.1007/s10533-023-01032-z>
53. Leal, F. Aburto, F*. Navarro, N. Echeverría, C. Gatica-Saavedra, P. 2023. Forest degradation modifies litter production, quality, and decomposition dynamics in Southern temperate forests. *Frontiers in Soil Sciences*. Volume 3. <https://doi.org/10.3389/fsoil.2023.1111694>
54. Gatica-Saavedra, P*. Aburto, F.* Rojas, P. Echeverría, C. 2022. Soil health indicators for monitoring forest ecological restoration: a critical review. *Restoration Ecology*. <https://doi.org/10.1111/rec.13836>.
55. Calabrese, S*. Wild, B. Bertagni, M.B. Bourg, I.C. White, C. Aburto, F. Cipolla, G., Noto L.V. Porporato A. 2022. Nano- to Global-Scale Uncertainties in Terrestrial Enhanced Weathering. *Environmental Science & Technology*. <https://doi.org/10.1021/acs.est.2c03163>
56. Atenas Navarrete, A. Aburto, F.* González-Rocha, G. Merino Guzmán, C. Schmidt, R. Scow, K. 2022. Anthropogenic degradation alters surface soil biogeochemical pools and microbial communities in an Andean temperate forest. *STOTEN*. <https://doi.org/10.1016/j.scitotenv.2022.158508>
57. Spohn M*. Aburto F. Ehlers, T.A. Farwig N. Frings P.J. Hartmann H. Hoffmann T. Larsen A. Oelmann Y. 2022. Terrestrial ecosystems buffer inputs through the storage and recycling of elements. *Biogeochemistry* 156, 351–373. <https://doi.org/10.1007/s10533-021-00848-x>

VI. Conference Presentations

1. Ahlersmeyer, A., Clark, J., Clay, D. E., & Osterloh, K. (2022) Improving Potassium Fertilizer Recommendations for South Dakota Corn Growers with Soil Test Correlation and Calibration Techniques [Abstract]. ASA, CSSA, SSSA International Annual Meeting, Baltimore, MD. <https://scisoc.confex.com/scisoc/2022am/meetingapp.cgi/Paper/141499>
2. Osterloh, K. (2022) High Resolution Spectral Imagery to Map Surface Soil Carbon [Abstract]. ASA, CSSA, SSSA International Annual Meeting, Baltimore, MD. <https://scisoc.confex.com/scisoc/2022am/meetingapp.cgi/Paper/142762>
3. Zhu-Barker, X. Compost Application in Sandy Soils: Unpacking the Environmental Implications of Nitrogen Cycling within the Framework of Climate-Smart Agriculture. Global Conference Sandy Soils. Madison, WI. June 4- 8, 2023
4. Zhu-Barker, X. 2023. Dairy-land management: Methods to minimize environmental impacts. PDPW Business Conf., 15-16 Mar. 2023, Wisconsin Dells, WI
5. Zhu-Barker, X. 2023. Nitrous Oxide Emissions and compost management. Agroecology Seminar series. March 29, 2023

6. Savannah M. Hass, William R. Horwath, Xia Zhu-Barker. Compost Effects on Nitrogen Cycling: Isotopic Investigation. ASA-CSSA-SSSA Annual Meeting, Baltimore, MD. November 7, 2022
7. Cole Smith, Maria de la Fuente, Xia Zhu-Barker, William Horwath. Organic Amendments Impact Fertilizer N Crop Uptake and Soil Retention. ASA-CSSA-SSSA Annual Meeting, Baltimore, MD. November 7, 2022
8. Geoffrey Koch, Xia Zhu-Barker, William Horwath. Unexpected Fate of Leached Nitrogen: Attenuation By Denitrification in the Vadose Zone. ASA-CSSA-SSSA Annual Meeting, Baltimore, MD. November 9, 2022
9. X. Zhu-Barker. Sustainable Agricultural Management for Meeting the Challenges of Climate Change. Department Research Day. Sept. 6, 2022
10. Xia Zhu-Barker. Organically Managed Crop Systems are More Resilient to Climate Change than Conventional Systems: Isotopic Evidence. World Congress of Soil Science, Glasgow, UK. August 1, 2022
11. Geoff Koch, Xia Zhu-Barker, William Horwath. Nitrate Leaching Potential From Dairy Manure Composting Operations in California: Attenuation by Denitrification in the Vadose Zone. World Congress of Soil Science, Glasgow, UK. August 2, 2022
12. Cole Smith, Maria de la Fuente, Xia Zhu-Barker, William Horwath. Organic amendments reducing fertilizer derived N₂O emissions dependent on climate conditions. World Congress of Soil Science, Glasgow, UK. August 4, 2022
13. Ale, S., Samanta, S., Singh, J., Himanshu, S.K., DeLaune, P.B., & Morgan, C.L.S. 2022. Simulated field- and watershed-scale effects of conservative practices in semi-arid rainfed crop production systems. International Conference on Reimagining Rainfed Agro-ecosystems: Challenges & Opportunities. Organized by ICAR-Central Research Institute for Dryland Agriculture, Hyderabad, India. December 22-24, 2022.
14. Ale, S., Singh, J., Singh, B., Bawa, A., Stotz, M., Dowhower, S., DeLaune, P., Steffens, T., Wang, T., Gomez-Casanovas, N., and Teague, W.R. 2022. Improving soil ecosystem health and resilience through cover crops and pasture cropping. A Community on Ecosystem Services (ACES) Conference. Washington, D.C., December 12-15, 2022.
15. Singh, J., Simbi Mvuyekure, R. F., Ale, S., Lewis, K. L., Burke, J. A., & Cobos, C. 2022. Evaluation of the DNDC Model on an Amarillo Fine Sandy Loam Soil at Lamesa in the Southern High Plains of Texas. ASA, CSSA, SSSA International Annual Meeting, Baltimore, MD, Nov. 6-9, 2022.
16. Singh, B., Ale, S., Singh, J., Bawa, A., DeLaune, P. B., Teague, R., Dowhower, S., & Gomez-Casanovas, N. 2022. Pasture Cropping - an Initiative to Improve Soil Cover, Health, and Resilience in the Texas Plains. ASA, CSSA, SSSA International Annual Meeting, Baltimore, MD, Nov. 6-9, 2022.
17. Samanta, S., Ale, S., Bawa, A., Singh, J., Simbi Mvuyekure, R. F., DeLaune, P. B., Morgan, C. L. S., & Jain, S. 2022. Estimation of Soil Water Content Under Different Conservation Practices Using Supervised Machine Learning Algorithms on Images Collected Using Unpiloted Aerial System. ASA, CSSA, SSSA International Annual Meeting, Baltimore, MD, Nov. 6-9, 2022.
18. Samanta, S., Bawa, A., Singh, J., Mvuyekure, R.F.S., Ale, S., DeLaune, P.B., Morgan, C.L.S. 2022. Evaluation of the effects of improved soil management practices on crop water stress in dryland cotton systems using Unpiloted Aerial Systems. ASABE Annual International Meeting, Houston, TX, July 17-20, 2022. (Poster)

19. Ale, S., Bawa, A., Dowhower, S., Singh, J., Singh, B., DeLaune, P.B., Teague, W.R. 2022. Baseline soil and vegetation measurements for investigating the soil health and ecosystem service benefits of pasture cropping. ASABE Annual International Meeting, Houston, TX, July 17-20, 2022. (Poster)
20. Samanta, S. Ale, S., Morgan, C.L.S., Bagnall, D.K. 2022. Evaluating the potential of conservation tillage and cover crop practices in mitigating the negative effects of climate change on runoff and sediment losses. ASABE Annual International Meeting, Houston, TX, July 17-20, 2022.
21. Singh, J., Ale, S., DeLaune, P.B., Barnes, E.M. 2022. Potential benefits and consequences of growing cool-season cover crops in Texas semi-arid cotton production systems. ASABE Annual International Meeting, Houston, TX, July 17-20, 2022.
22. Fischer M, Katul G, Noormets A, Pozníková G, Domec KC, Orság M, Trnka M, King JS (2023) Evaluating and bridging the flux-variance and surface renewal methods. EGU General Assembly, Vienna, Austria, April 24-28, EGU23-9744.
23. Noormets A (2023) Süsinikuringest vanus metsis. Metsakonverents, Tallinn, Eesti. February 1, 2023.
24. *Kim D, *Banjiya B, *Ono M, Noormets A (2022) Is Drought the Primary Driver of the Seasonality of Carbon Allocation in a Subtropical Pine Forest? AGU Fall Meeting, December 12-16, 2022.
25. *Yang L, Liu M, Noormets A (2022) Assessing the Seasonality of Greenness and Photosynthesis Simulated by TRENDY Ecosystem Models. AGU Fall Meeting, December 12-16, 2022.
26. *Ono M, Noormets A, Mitchell S, *Massery S (2022) The Effect of the Frequency of Prescribed Burning on Annual Soil Carbon Balance in Loblolly-Shortleaf Pine Forest in East Texas. AGU Fall Meeting, December 12-16, 2022.
27. *Aguilos MM, Warr I, Irving M, Gregg O, Grady S, Peele T, Noormets A, Sun G, Liu N, McNulty SG, Pettay F, Bhattacharaya S, Penny S, Kerrigan M, *Yang L, *Mitra B, *Prajapati P, Minick K, King JS (2022) Sea level rise impacts on wetland forest hydrologic and carbon fluxes in North Carolina, USA. AGU Fall Meeting, December 12-16, 2022.
28. Noormets A (2022) What does it take to sequester carbon? BIOGEOMON 2022, Tartu, June 26-29.
29. Noormets A (2022) Flux partitioning and beyond. Belowground carbon dynamics in three acts. Institute of Geography, University of Tartu, June 21.
30. Jagadamma, S. 2022. Climate-smart agriculture and subsoil carbon storage in the southeast US, Department of Natural Resources and Environmental Sciences, University of Illinois, Urbana-Champaign, September 9.
31. Wooliver, R., Kivlin, S.N., McClure, A., Lee, J., and Jagadamma, S. 2022. Soil microbial communities, soil carbon, and crop yields after two years of crop diversification in Tennessee. ASA-CSA-SSSA International Annual Meeting (Poster), November 6-9, Baltimore, MD.
32. Lazicki, P., and Jagadamma, S. 2022. Deep C Diving: Exploring how soil health management affects subsurface carbon in Tennessee soils. ASA-CSA-SSSA International Annual Meeting (Poster), November 6-9, Baltimore, MD.
33. Neelipally, R.T.K.R., Saha, D., Cui, S., Hawkins, S.A., and Jagadamma, S. 2022. Organic grain rotational systems for agronomic and soil health outcomes. ASA-CSA-SSSA International Annual Meeting (Poster), November 6-9, Baltimore, MD.

34. Patra, R., Saha, D., and Jagadamma, S. 2022. Microbial functional traits regulating subsoil organic carbon distribution under long term no tillage and cover cropping practices. ASA-CSA-SSSA International Annual Meeting (Poster), November 6-9, Baltimore, MD.
35. Patra, R., Saha, D., and Jagadamma, S. 2022. Do subsoil organic carbon under deep-rooted cover cropping systems increases from microbial community composition associated with C cycling? ESA and CSEE Annual Meeting (Oral), August 14-19, Montreal, Canada.
36. Osmond, D.L., and Jagadamma, S. 2022. What does soil health mean in the southern United States: challenges and opportunities. ASA-CSA-SSSA International Annual Meeting (Invited Oral), November 6-9, Baltimore, MD.
37. Osmond, D.L., and Jagadamma, S. 2022. What does soil health mean in the southern United States: challenges and opportunities. Soil and Water Conservation Society Annual Conference (Invited Oral), July 31-August 3, Denver, CO.
38. Ye, R. (2023). Bridging the gaps: investigating soil biogeochemical processes to understand and improve soil health. PES Department Seminar, Clemson, SC.
39. Canisares, LP., F. Miguez, R. Thapa, S. Mirsky, R. Ye, et al. (2022). Legumes cover crops can reduce the corn reliance on nitrogen fertilizer when compared to cereal rye across multi-state field experiments. ASA-CSSA-SSSA International Annual Meeting. Baltimore, MD.
40. Parajuli, B., Ye, R. (2022). Clay amendment increased cover crop biomass production but reduced residue decomposition rates in sandy soils. ASA-CSSA-SSSA International Annual Meeting. Baltimore, MD. The student won 2nd place in the Graduate Student Competition.
41. Wang, Z., Saski, C., Ye, R. (2022). Diverse organic inputs modified microbial activities and community composition in soils under organic production. ASA-CSSA-SSSA International Annual Meeting. Baltimore, MD.
42. Ye, R., Szogi, A., Parajuli, B. (2022). Nitrogen amendment reduced priming effect while improving microbial C use efficiency and N₂O production in sandy soils under 40-year conservation management. ASA-CSSA-SSSA International Annual Meeting. Baltimore, MD.
43. Parajuli, B., Hopkin, J., Poudel, P., Ye, R. (2022). Compost application improved microbial activity and nutrient availability in southeastern Piedmont soils. ASA-CSSA-SSSA International Annual Meeting. Baltimore, MD.
44. Parajuli, B., Ye, R. (2022). Cover crop affected microbial abundance and enzymatic activities in sandy Ultisols. ASA-CSSA-SSSA International Annual Meeting. Baltimore, MD.
45. Poudel, P., Parajuli, B., Ye, R. (2022). Clay amendment suppressed microbial enzymatic activities while increasing nitrogen availability in sandy soils. ASA-CSSA-SSSA International Annual Meeting. Baltimore, MD. The student won 2nd place in the Graduate Student Competition.
46. Williamson, C., Farmaha, B., Ye, R. (2022). Cover cropping and organic amendment improved nutrient availability and microbial activities in sandy soils under organic production. ASA-CSSA-SSSA International Annual Meeting. Baltimore, MD. The student won 2nd place in the Graduate Student Competition.
47. Bera, T., H. Araji, Y. Yang, F. Dou, L.T. Wilson, J. Jifon, N. Winans, W. Rooney, J. Morrison, B. Baldwin, J.E. Knoll, A.L. Wright, C. Odera, H.S. Sandhu, H. P. Mula-Michel, and A. L. Hale. 2022. Dynamics of biomass yield and composition under energy crop productions in the southern USA. Annual Meeting of ASA-CSSA-SSSA. Baltimore, MD. November 2022.
48. Bera, T., H. Araji, Y. Yang, F. Dou, L.T. Wilson, J. Jifon, N. Winans, W. Rooney, J. Morrison, B. Baldwin, J.E. Knoll, A.L. Wright, C. Odera, H.S. Sandhu, H. P. Mula-Michel, and A. L.

- Hale. 2022. Effects of energy crop production on water quality in the southern USA. Annual Meeting of ASA-CSSA-SSSA. Baltimore, MD. November 2022.
49. Bera, T., H. Araj, Y. Yang, F. Dou, L.T. Wilson, J. Jifon, N. Winans, W. Rooney, J. Morrison, B. Baldwin, J.E. Knoll, A.L. Wright, C. Otero, H.S. Sandhu, H. P. Mula-Michel, and A. L. Hale. 2022. Greenhouse gas emissions affected by energy crop productions in the southern USA. Annual Meeting of ASA-CSSA-SSSA. Baltimore, MD. November 2022.
 50. Lamichhane, S., Dou, F., and McClung, A. 2022. An Evaluation of Different Organic Soil Amendments on Grain Yield, Yield Components, and Milling Qualities in Rice. ASA, CSSA, and SSSA International Annual Meeting, Baltimore, MD. November 2022.
 51. Lamichhane, S., Dou, F., Yang, Y., Laser, H., and Gentry, T. J. 2022. Evaluation of RGB-Based Vegetation Indexes from UAV Imagery to Estimate Nitrogen Status and Grain Yield in Rice. ASA, CSSA, SSSA International Annual Meeting, Baltimore, MD. November 2022.
 52. Lal, R. 2022. Soil Carbon Sequestration as a Mechanism for Reducing Emissions. Bioenergy Workshop. Bioenergy Technology Office, DOE, Washington, D.C. 28-29 March.
 53. Lal, R. 2022. Managing Soils for Healing the Land. State of the Planet. Earth Day Event. IUGS Earth Day. 22 April 2022.
 54. Lal, R. 2022. Regenerative Agriculture for Soil Carbon Management and Sequestration. Regenerative Society Foundation Meeting. Milan, Italy. 4 May 2022.
 55. Lal, R. 2022. Managing Soils for Sustainable Production of Soybean in Brazil. IX Brazilian Soybean Congress. Iguassu Falls, Brazil. 15-17 May 2022.
 56. Lal, R. 2022. No-Tillage System, Improving Soil Life, Environmental Sustainability and Social Wellbeing. 18th National Meeting on Direct Planting in Straw and First World Meeting of the Direct Planting System. Grand Carima Resort and Convention Center, Iguassu Falls, Brasil. 5 July.
 57. Kortokrax, A, N. Nelson, K. Roozeboom, G. Kluitenberg, P. Tomlinson, D. Sweeney, G. Pierzynski, A. Sheshukov, and A. Bhandari. 2022. Development and Evaluation of a Component Phosphorus Index for the State of Kansas. [Abstract]. Governor's Water Conference, Manhattan, KS.
 58. Correira, A., P. Tomlinson, and D. Presley. 2022. Effects of over crops on soil moisture retention and yield in four on-farm sites in Kansas. [Abstract]. Governor's Water Conference, Manhattan, KS.
 59. Stahl, K., D. Presley, G. Kluitenberg, K. Roozeboom, P. Tomlinson, G. Hettiarachchi, and N. Nelson. 2022. Evaluating difference in soil properties and management on a long-term watershed study in Kansas. [Abstract]. Governor's Water Conference, Manhattan, KS.
 60. Sakib, T., N. Nelson, S. Raugewitz, D. Presley, G. Hettiarachchi, G. Kluitenberg, K. Roozeboom, and P. Tomlinson. 2022. Runoff water quality as influence by cover crop use and sufficiency P fertilization strategy in a no-tilled corn-soybean rotation. [Abstract]. Governor's Water Conference, Manhattan, KS.
 61. Stahl, K. D. R Presley, G. Kluitenberg, K. Roozeboom, P. Tomlinson, G. Hettiarachchi, and N. Nelson. 2022. Evaluating cover crops effect on soil physical properties in a long-term cover crop study in Kansas. [Abstract] Soil Science Society of America. Baltimore, MD. Poster and 5-minute rapid oral session.
 62. Correira, A., P. Tomlinson, K. Roozeboom, and D. Presley. 2022. [Abstract] Soil Science Society of America. Baltimore, MD. Oral presentation.

63. Canisares, Lucas and many authors including D. Presley. 2022. Legumes cover crops can reduce the corn reliance on N fertilizer when compared to cereal rye across multi-state field experiments. [Abstract] Soil Science Society of America. Baltimore, MD. Oral presentation.
64. Nelson, N., E. Khosh Manzar, P. Tomlinson, G. Hettiarachchi, G. Kluitenberg, D. Presley, and K. Roozeboom. 2022. [Abstract] Soil Science Society of America. Baltimore, MD. Poster presentation.
65. Sakib, T., N. Nelson, S Raugewitz, D. Presley, G. Hettiarachchi, G. Kluitenberg, K. Roozeboom, and P. Tomlinson. 2022. Runoff water quality as influence by cover crop use and sufficiency P fertilization strategy in a no-tilled corn-soybean rotation. [Abstract]. Soil Science Society of America. Baltimore, MD. Poster and 5-minute rapid oral session.
66. Stahl, K, S. Baughman, and D. Presley. 2022. Water Stable Aggregation: Comparing Lab Methods with a Smartphone App, and the Potential Use for Ag Extension and Education. [Abstract] American Society of Agronomy. Baltimore, MD. Oral presentation.
67. Lancaster, P.A., M. Tang, D. Presley, W. Fick, L. Doro, D.L. Pendell, A. Ahlers, A. Ricketts. 2022. Outcomes of Simulated Combinations of Rangeland Management Scenarios on Soil and Nutrient Processes. [Abstract]. ASAS-CSAS Annual Meeting. Oklahoma City, OK. Oral presentation.
68. Correia, A., D.R. Presley, P. Tomlinson. (2022). Effects of cover crops on soil moisture retention and yield in four on-farm sites in Kansas. [Abstract]. Soil and Water Conservation Society of America Annual Meeting, Denver, CO. Poster.
69. Stahl, K., D.R. Presley, N.O. Nelson, P. Tomlinson, G.J. Kluitenberg, K. Roozeboom. (2022). Evaluating differences in soil properties and management on a long-term watershed study in Kansas. [Abstract]. Soil and Water Conservation Society of America Annual Meeting, Denver, CO. Poster.
70. Lancaster, P.A., M. Tang, D. Presley, W. Fick, L. Doro, D.L. Pendell, A. Ahlers, D. Ricketts. (2022) Outcomes of Simulated Combinations of Rangeland Management Scenarios on Soil and Nutrient Processes. [Abstract]. ASAS-CSAS Annual Meeting, Oklahoma City, OK.
- Nelson, N. O., Tomlinson, P. J., Kluitenberg, G. J., Schnarr, C., & Presley, D. R. (2021) Cover Crop Effects on Edge-of-Field Water Quality: An on-Farm Demonstration Study [Abstract]. ASA, CSSA, SSSA International Annual Meeting, Salt Lake City, UT. <https://scisoc.confex.com/scisoc/2021am/meetingapp.cgi/Paper/136962>
71. Pachon, J., D. Hirmas, H. Ajami, P. Sullivan, S. Billings, M. Sena, X. Zhang, L. Li, K. Singha, J. Nippert, A. Flores and X. Cao. Visible to the eye, now in the model: parameterizing dual porosity water retention functions in structured soils. EGU General Assembly, Vienna, Austria. Apr. 23-28, 2023.
72. Hirmas, D., X. Zhang, P. Sullivan, H. Ajami, S. Billings, M. Sena, L. Souza, L. Li, J. Pachon and A. Flores. Predicting rapid macroporosity and hydraulic conductivity response to soil moisture. ASA-CSSA-SSSA Annual Meeting, Baltimore, MD. Nov. 6-9, 2022.
73. Duro, A., Hirmas, D., H. Ajami, D. Giménez, S. Billings, P. Sullivan, X. Zhang, A. Flores, L. Li and V. Moreno. Horizon-scale spatial analysis of soil properties across naturally rough, intact monoliths using visible-near infrared hyperspectral imaging. ASA-CSSA-SSSA Annual Meeting, Baltimore, MD. Nov. 6-9, 2022.
74. Ghimire, N. and S. Xu. 2022. Impacts of cover cropping and livestock integration on soil hydro- physical properties South Dakota Student Water Conference. (Poster presentation).
75. Pokhrel, S., M. Geza, and S. Xu. 2022. Improving Water Use Efficiency in Dry Land Production Systems using Soil Amendments. South Dakota Student Water Conference.

- (Poster presentation).
76. Xu, S., S. Vital, and C. Zilverberg. 2022. Impacts of Cover Crop Mixtures on Productivity, Forage Quality and Soil Health (Oral presentation).
 77. Ghimire, N, S. Xu, P., Chakraborty, and P., Sexton. 2022. Impacts of cover cropping and livestock integration on soil hydro-physical properties in SD crop rotation systems. ASA CSSA SSSA annual meeting. (Poster presentation).
 78. Ghimire, N, S. Xu, and P. Sexton. 2022. Soil bio-chemical properties under cover crops and livestock integration in SD row cropping systems. ASA CSSA SSSA annual meeting. (Oral presentation).
 79. Vital, S., S. Xu, and P. Sexton. 2022. Impacts of crop rotations and cover crops on labile carbon fractions under long-term no-till practices. ASA CSSA SSSA annual meeting. (Oral presentation).
 80. Vital, S., S. Xu, and P. Sexton. 2022. How do different tillage practices affect soil organic carbon, total nitrogen, and microbial PLFA on commercial farms in central South Dakota? ASA CSSA SSSA annual meeting. (Poster presentation).
 81. Kommineni, V., S. Xu, D. Clay, A. Bly, and M. G. Nisrani. 2022. Response of soil health to biochar and organic manure amendments in cover crop systems in South Dakota. ASA CSSA SSSA annual meeting. (Oral presentation).
 82. Shabtai, I.A., Hafner, B., Lehmann, J., Bauerle, T. Organo-mineral interactions in the water-stressed rhizosphere: leveraging isotope pulse labeling and synchrotron-radiation spectromicroscopy (2022). American Geophysical Union Fall Meeting. Chicago, IL, USA.
 83. Shabtai, I.A., The role of minerals, microbes, and roots in controlling soil organic carbon dynamics - from field scale to sub-micron scale (2022). UConn Natural Resources and the Environment Seminar Series.
 84. Palmer, C. A., & Keiser, A.D. (2022) Recommended Cover Crop Seeding Rates Do Not Maximize Soil Health Metrics. ASA, CSSA, SSSA International Annual Meeting, Baltimore, MD.
 85. Crovo O.*#Aburto F. Aguilera N. Leal F. (Oral) Response of Soil Functions to Soil Covers after Rehabilitation and Rewilding of a Fly-Ash Landfill. XIV Soil Science Society of Chile Congress: “Suelos para el Soporte del Bienestar Social y Protección del Medio Ambiente”. Valdivia, Chile. 22-25 Nov 2022. [Supervised Graduate Student Oral Presentation]
 86. Leal F.*# Aburto F. Aguilera D. Echeverría C. Gatica P. (Poster) Forest degradation alters litter production, decomposition dynamics, and soil mesofauna community in southern temperate forests. XIV Soil Science Society of Chile Congress: “Suelos para el Soporte del Bienestar Social y Protección del Medio Ambiente”. Valdivia, Chile. 22-25 Nov 2022. [Supervised Graduate Student Oral Presentation]
 87. Olmos De Aguilera, N.*# Crovo, O. Aburto, F. (Poster). Changes in soil c reservoirs and respiration fluxes after native forest replacement by plantations. XIV Soil Science Society of Chile Congress: “Suelos para el Soporte del Bienestar Social y Protección del Medio Ambiente”. Valdivia, Chile. 22-25 Nov 2022. [Supervised Undergraduate Student Oral Presentation]
 88. Aburto, F. Castillo, P*. Alborno, M.F. Crovo, O. (Poster). Forest conversion to plantations induces changes in soil chemistry and mineralogy. XIV Soil Science Society of Chile Congress: “Suelos para el Soporte del Bienestar Social y

Protección del Medio Ambiente”. Valdivia, Chile. 22-25 Nov 2022. [Supervised Postdoc Presentation]

89. Aburto, F.* Crovo, O#. (Oral) Differential response of carbon, nitrogen and phosphorous pools after conversion from native to exotic plantations in soils of contrasting origin. 418 Division 2 Commission 2.2 -3. 22nd World Congress of Soil Science, Glasgow UK 1-5 Aug 2022.
90. Aburto, F. Castillo, P*. Albornoz, M.F. (Poster) Forest conversion to plantations induces changes in soil chemistry and mineralogy World Congress of Soil Science, Glasgow UK 1-5 Aug 2022.
91. Aburto, F*. (Oral) Rapid response of soil functions to soil cover after rehabilitation of a fly ash landfill. 42 WG3.3-2. 22nd World Congress of Soil Science, Glasgow UK 1-5 Aug 2022.
92. Aburto, F. (Oral) Soil Forest CNP dynamics and pools altered after deciduous native forest conversion to pine plantations. 41 WG3.2-2. 22nd World Congress of Soil Science, Glasgow UK 1-5 Aug 2022.

VII. Extension Services and Reports

1. Aburto, F. (Oral). Forest degradation and recovery. 60th Annual Soil Survey and Land Resource Workshop, College Station, TX, USA. 7-8 Feb 2023.
2. Aburto, F. (Oral). Soil Type Dependency of C:N:P and mineralogical alterations after native forest conversion to Plantations. 59th Annual Soil Survey and Land Resource Workshop, College Station, TX, USA. 8-9 Feb 2022.
3. Xia Zhu-Barker. N management and cropping systems: compost, manure, and environmental impacts. Discovery Farm Conference. Dec 14th, 2022. Wisconsin Dells, WI
4. Bera, T, Y. Yang, H. Araji, F. Dou, and L.T. Wilson. Biomass Yield Dynamics of energy crops in southeast Texas. Annual Field Day of Texas A&M AgriLife Research and Extension Center. Beaumont, TX. July 2022.
5. Madrid, L., R. St Aime, R. Ye, S. Narayanan (2023). “Cover-up” for environmentally friendly farming. Southern cover crop conference. Baton Rouge, LA. The student won 2nd place in the Graduate Student Competition.
6. Dou, F., J. Samford, and S. Lamichhane. 2022. 2021 Varietal evaluation and N application for rice main and ratoon crop yield potential. Texas Rice Field Day at Eagle Lake Research Station. June 2022.
7. Dou, F., and S. Lamichhane. 2022. 2021 Varietal evaluation and N application for rice main and ratoon crop yield potential. Texas Rice Field Day at Beaumont Research Center. July 2022.
8. Lamichhane, S., Tarpley, L., and Dou, F. (2022). Effect of Excess Magnesium Supply on Growth, Physiology, Yield, and Mineral Content in Rice. Texas A & M AgriLife Research Center, Beaumont, TX, 74th Annual Field Day. July 2022.
9. Wilson, L. T., R.E. Tabien, S.O. P.B. Samonte, X.-G. Zhou, L. Tarpley, F. Dou, and Y. Yan. 2022. Rice crop: Growth and development. In Texas Rice Production Guidelines, eds. L.T. Wilson, X.-G. Zhou, S.O. P.B. Samonte, B. Morace, and M. O. Way. Texas A&M AgriLife Research. B-6131: 3-12.
10. Samonte, O.P.B., R.E. Tabien, X.-G. Zhou, F. Dou, L.T. Wilson, Z. Yan, M-H. Chan, M.O. Way, and S.K. Talukder. 2022. Rice crop: Varietal selection. In Texas Rice Production Guidelines, eds. L.T. Wilson, X.-G. Zhou, S.O. P.B. Samonte, B. Morace, and M. O. Way. Texas A&M AgriLife Research. B-6131: 15-25.

11. Yang, Y., L.T. Wilson, J. Wang, J. Samford, F. Dou, and L. Tarpley. 2022. Rice crop: Development advisory. In Texas Rice Production Guidelines, eds. L.T. Wilson, X.-G. Zhou, S.O. P.B. Samonte, B. Morace, and M. O. Way. Texas A&M AgriLife Research. B-6131: 25-28.
12. Dou, F. and Y. Yan. 2022. Agronomic Management: Land and seedbed preparation. In Texas Rice Production Guidelines, eds. L.T. Wilson, X.-G. Zhou, S.O. P.B. Samonte, B. Morace, and M. O. Way. Texas A&M AgriLife Research. B-6131: 29-31.
13. Tarpley L., M.O. Way, X.G. Zhou, and F. Dou. 2022. Agronomic Management: Seed treatments. In Texas Rice Production Guidelines, eds. L.T. Wilson, X.-G. Zhou, S.O. P.B. Samonte, B. Morace, and M. O. Way. Texas A&M AgriLife Research. B-6131: 31-32.
14. Dou, F. and L. Tarpley. 2022. Agronomic Management: Nitrogen management. In Texas Rice Production Guidelines, eds. L.T. Wilson, X.-G. Zhou, S.O. P.B. Samonte, B. Morace, and M. O. Way. Texas A&M AgriLife Research. B-6131: 37-41.
15. Tarpley L., F. Dou, M.O. Way, X.G. Zhou, and R.E. Tabien. 2022. Agronomic Management: Ratoon crop management. In Texas Rice Production Guidelines, eds. L.T. Wilson, X.-G. Zhou, S.O. P.B. Samonte, B. Morace, and M. O. Way. Texas A&M AgriLife Research. B-6131: 42-45.
16. Kommineni, V., S. Xu, D. Clay, A. Bly, and M. G. Nisrani. 2023. Investigating soil health under cover crops integrated with organic amendments in South Dakota cropping systems. Midwest Cover Crops Council Annual Meeting. (Poster presentation).
17. Ghimire, N., P. Chakraborty, S. Xu, and P. Sexton. 2023. Soil Hydro-Physical Properties Under Cover Cropping and Livestock Integration in South Dakota Crop Rotation Systems. Midwest Cover Crops Council Annual Meeting. (Poster presentation).
18. Vital, S., S. Xu, and C. Zilverberg. 2023. Impacts of Mixtures of C4-C3 Grass Species Cover Crops on Soil Organic Carbon and Total Nitrogen, Water Extractable Carbon, Dry Aggregate Distribution, and Aggregate-Associated Carb, Midwest Cover Crops Council Annual Meeting. (Poster presentation).
19. §Noormets A (2022) Multiobjective forest management: balancing timber, wildlife habitat and climate mitigation services in the changing world. Texas Society of American Foresters Meeting, April 7, 2022, Lufkin, TX.
20. Wang, H., G. Schnabel, J.C. Melgar, R. Ye, M. Vassalos, and B. Blaauw. (2023). Development of sustainable strategies for managing bacterial diseases and improving tree health in the peach production system. Southeast Regional Fruit and Vegetable Conference, Savannah, GA, January 2023.
21. Rui, Y. 2023. Understanding the Role of Microbes in Soil Organic Matter Building and Functioning. Indiana Hort Conference & Expo. West Lafayette, IN. 24 January.
22. Rui, Y. 2023. Soil Health and C Building in Row Crop and Pasture Systems. Indiana Grazing Schools. Southern Indiana Purdue Agricultural Center, Dubois, IN. 10 June.
23. Rui, Y. 2023. Soil Health and C Building in Row Crop and Pasture Systems. Indiana Grazing Schools. Randolph County Extension Office, Winchester, IN. 16 June.
24. Zhang, X. Soil physical processes and soil health. Red River Research Station Water Quality and Irrigation Workshop, Bossier City, LA. Sep. 1, 2022.
25. Shabtai, I.A., Soil organic carbon: a key component of soil health in a changing climate. (2022) CAES Plant Science Day, Hamden CT.
26. Shabtai, I.A., Soil organic carbon sequestration for soil health and climate change mitigation (2022), Connecticut Agricultural Expo 2022.

DeAnn Presley:

27. September 13, 2022. Soil health and forage field tour. McPherson Co, KS. 40 attended.
28. September 14-15, 2022. Compost Operators School. Manhattan, KS. 20 attended.
29. September 30, 2022. On farm meeting with landowner in Pottawatomie County KS to discuss soil health.
30. October 5, 2022. Healthy Soils for Landscapes and Gardens. K-State Garden Hour online webinar series presenter. 416 attended live. <https://youtu.be/YqEsFfbzT98>
31. November 9, 2022. Soil health and soil carbon. Grass and Grain Farm and Ranch Show. Manhattan. 15 attended.
32. December 6, 2022. Grazing cover crops and crop residue. Ag Econ Extension Update. Salina. 30 attended.
33. December 22, 2022. Answered email question from extension agent about a crop residue burn. Flint Hills District.
34. December 22, 2022. Answered phone question about tillage and soil moisture from a central KS farmer.
35. December 21, 2022. Answered phone question about compost and salts from an KC area landowner.
36. January 10, 2023. Answered email question about soil texture accuracy from an onsite wastewater systems designer.
37. January 12, 2023. Cover crops and tillage research in McPherson and Harvey counties, KS. Flickner Innovation Winter Meeting, Inman, KS. 80 attended.
38. February 17, 2023. On-farm chat with landowner about cover crops. Pottwatomie Co., KS.
39. February 21, 2023. Soil health update to KS Corn Commission. Manhattan, KS. 15 attended.
40. February 22, 2023. On-farm chat with landowner about soil carbon. Pottwatomie Co., KS.
41. March 3, 2023. Recorded podcast for onsite wastewater systems. Sedgwick Co. 2 attended.
42. March 24, 2023. Cover crops and soil health. On farm field day, Pott County, KS. 40 attended.
43. March 28-29, 2023. Site and soil evaluation for onsite wastewater treatment systems. Kansas Small Flows Association. Wichita, KS. 30 attended.
44. April 5, 2023. Climate change adaptation. KS NE Regional Envirothon. 50 attende.
45. April 6, 2023. Soil question from county health department official.
46. April 14, 2023. Environmental soil science and painting with soil: Science meets art. Rock Creek Middle School STEAM event. 50 attended.
47. April 20, 2023. Compost training and testing. KS WORKS conference, Manhattan, KS. 20 attended.
48. April 21, 2023. Cropping systems tour of eastern KS with SASES students. 50 attended.
49. April 24, 2023. On-farm composting for Agron 305 classes. 60 attended.
50. April 29, 2023. Soil and water conservation merit badge training for boy scouts. 12 attended.
51. May 16, 2023. Meeting with Wisconsin dairy equipment salesman to talk about soil crusting and sand applications.

NC1178 Annual Meeting
6/13/2023-6/14/2023
PeeDee Research Education Center, Florence, SC

6/13/2022 9:00am-6:10pm

Participants:

In-person: DeAnn Presley, Itamar Shabtai, Mohammad Golabi, Rongzhong Ye, Xi Zhang, Kristopher Osterloh, Yishui Rui, Larry Cihacek, Kristopher Osterloh, Sindhu Jagadamma

Virtually: Srinivasulu Ale, Klaus Lorenz, Xia Zhu Barker, Ching-Ho Lin.

What Happened/Discussed:

Vice Chair duties and responsibilities:

1. Vice-Chair will be the Chair for the following year
2. Take notes for the annual meeting
3. Summarize meeting minutes
4. Compile project report to Gary; synthesize in more detail following the guideline in a timely manner
5. Plan and host the next annual meeting as the Chair

Items agreed upon:

1. The 2024 annual meeting will be hosted by Itamar Shabtai at the Connecticut Agricultural Experiment Station, New Haven, CT
2. Xi Zhang volunteered to serve as the Vice-Chair for 2023-2024 (Chair 2024-2025); the annual meeting will be held at the Red River Research Station, LA, in 2025.
3. Kris Osterloh will be the Vice-Chair for 2024-2025, the annual meeting will be held at SD State in 2025
4. Gary Pierzynski will continue to be the Administrative Advisor for our project.

Project update presentation (20 min each):

1. Srinivasulu Ale, Texas A&M AgriLife Research
2. Klaus Lorenz, The Ohio State University
3. Itamar Shabtai, Connecticut Agricultural Experimental Station
4. Kris Osterloh, South Dakota State University
5. Sindhu Jagadamma, University of Tennessee
6. Larry Cihacek, North Dakota State University
7. Xi Zhang, Louisiana State University
8. Mohammad Golabi, University of Guam
9. Yichao Rui, Purdue University
10. DeAnn Presley, Kansas State University
11. Rongzhong Ye, Clemson University

Project proposal renewal:

1. The project needs to be renewed by 9/30/2024.
9/15/2023 is the deadline to request to write a proposal.
10/15/2023 is the deadline to submit proposal Objectives and Issues and Justifications sections.
12/1/2023 is the due day for the full proposal submission.

2. A new project title was proposed “*Optimizing soil and land use management for climate-resilient agroecosystems*” as well as new project objectives:
 - Evaluate management effects (e.g., tillage systems, crop residues, cover crops, biochar application, perennial systems) on soil organic C, soil health, productivity, environmental footprints (e.g. GHG emissions, water quality/quantity, soil erosion, input use efficiency), and conservation.
 - Evaluate soil functions and ecosystem services using systems-based approaches to improve management decisions in working agricultural lands.
 - An online draft of the proposal is available [here](#).
3. Kris Osterloh, Deann Presley, Rongzhong Ye, Itamar Shabtai, Yishui Rui and others volunteered to lead the writing of the proposal renewal.
4. *Proposal writing timeline:*
 - 8-10/2023 finalize Objectives and Issues and Justification sections
 - 10/2023-12/2023 finalize proposal
 - 1/2024-7/2024 proposal revisions if necessary
 - project start in October 2024
5. Appendix E. All members will need to resign to join the renewed project.
6. For more information on the proposal renewal process, please visit [here](#).

Other matters:

1. Writing a review of the NC1178 History to a peer-review journal to celebrate the 40-year remark. Dr. Larry Cihacek has volunteered to take the lead.
2. The Annual report will be submitted 60 days from now.