**Multistate Research Project Annual Report**

**Project Number**: NC-1178

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

**Period Covered**: 6/1/2024 – 5/31/2025

**Date of this Report**: 7/31/2025

**Annual Meeting Dates**: 6/2/2025 – 6/3/2025

1. Participants:

*In person*: Sindhu Jagadamma, Madhav Dhakal, Sutie Xu, Larry Cihacek, Nahom Ghile, Yichao Rui, Asko Noormets, Kristopher Osterloh, Chung-Ho Lin, Rongzhong Ye, Xi Zhang.

*Online*: Srinivasulu Ale, Rattan Lal, Gary Pierzynsk, Felipe Aburto, DeAnn Presley, Xia Zhu-Barker.

1. Brief summary of annual meeting:

The meeting was hosted and presided over by Xi Zhang (University of Tennessee, Knoxville). Morning presentations were presented in order according to our agenda, but ran long due to engaging discussion following each presentation. Updates from Gary Pierzynski went at scheduled 11-11:30 timeslot because of his hard schedule needs.

During the business meeting the group discussed a possible symposium at the next tri-society meeting in Portland 2026 to showcase the historic work that NC1178 group has done, including inviting retired people to present on erosion, which was some of the original focus of the group. (Larry C, NDSU lead discussion). The group decided that it should submit a special topics proposal to the SSSA Journal (Rongzhong Y, Clemson lead discussion). Much discussion was had on the particular topics and who should submit. It was decided that we should start a shared doc (like google doc) where everyone can input their desired area of focus for journal article topics to avoid overlapping. A meta-analysis would provide a better impact and citations for articles, but there is also a large amount of soil carbon research being done by the group members currently.

The afternoon session ran according to schedule but again went over time due to group discussion and engaging questions for each presenter. The presentations ended at ~6:05 PM and dinner reservations were moved in order to alleviate time constraints.

On June 3, 2025 the group travelled to the UT Knoxville Organic Crops farm and took a tour of the ongoing research happening there. The tour included talks from the farm manager and several graduate students who were actively working on their projects.

1. Accomplishments:

*Research Activities*: During the past reporting year, the NC-1178 committee members made several accomplishments, including 14 papers on soil carbon and over 30 papers related to the impacts of management on soil properties. The committee continues to cover a wide range of management strategies in its collective research (reduced tillage, cover crops, burning and grazing managements, agricultural byproduct inputs, etc.) on soil organic C and soil health. This work by the committee also covers a broad range of environmental and cropping systems (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 breadth of committee member knowledge and subject matter expertise has allowed for productive teamwork in both direct research collaboration as well as critical feedback and guidance through our communication network. The team has met the 2024 milestones and will continue to implement the planned project. A special topics journal issue is planned for the upcoming year which will help promote the committee’s work and provide a resource for publishing coaligned research projects from the committee that can be accessed simultaneously by the public.

**Table 1**. Select major research activities conducted by NC-1178 participants during 2024-2025.

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| **State** | **PI** | **Research Activities** |
| CT | Shabtai | * To address increasing number of drought days throughout the growing seasons in the Northeast US, we tested the use of organic amendments to enhance soil water storage and reduce plant stress during drought conditions. We also sought to quantify changes to soil carbon stocks following organic amendment. A greenhouse experiment was set up for this project, growing collard green, a common vegetable crop grown in the area. Continuous measurements collected with soil moisture sensors indicated that application of compost resulted in less negative matric potential (i.e., more plant-available) in the drought treatment. Ongoing measurements will help clarify the implications on plant drought stress, yield, and quality. * Enhanced rock weathering (ERW) is a proposed strategy for atmospheric CO2 removal through accelerated silicate mineral dissolution and inorganic carbon (IC) sequestration. The dissolution of crushed silicate rock generates bicarbonate ions and releases base cations such as Mg2+ and Ca2+. Changes associated with ERW may in turn influence soil organic carbon (SOC) content. To address these knowledge gaps, we investigated how inherent soil characteristics influence basalt weathering rates and SOC pools. We conducted a 60-day microcosm experiment using three soil series: an alkaline coarse loamy soil (Georgia), a slightly acidic sandy soil (Windsor), and a strongly acidic high-clay soil (Scitico). Soils were either untreated or amended with 4 wt. % crushed basalt before planting with maize. The extent and downstream impacts of basalt weathering varied widely with soil type, with Scitico and Windsor exhibiting greater rock weathering than the alkaline Georgia soil. Work is currently being done to quantify changes to inorganic and organic C as a result of the rock weathering. |
| IN | Rui | * NIFA-funded project titled 'Empowering Indiana's Organic Farmers: Assessing Regional and Farm Scale Soil Health with a Farmer Network.' This project involves conducting a state-wide soil health census of organic farms in Indiana. |
| KS | Presley | * Aggregate data showed an overall trend of perennial systems increasing aggregation compared to cropped systems. * 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). * Measures of microbial diversity and activity were greater for systems with perennials, intermediate for cropping systems with 2 and 3 crops, and poorest for the continuous wheat systems |
| KY | Grove | * We executed field research following early season soil N supply and subsequent corn N nutrition at six locations. The treatments consisted of 2 rates of early N (0 and 40 lb N/A); 4 early N application times (at-planting, V2, V4 and V6) and 2 later (V8) N rates (120 and 160 lb N/A). * Site-average yields ranged widely, from about 165 to 260 bu/A. The yield results were interesting, in several ways. First, except for one site, applying all N at V8 was generally inferior to 40 lb N/A earlier and 120 lb N/A at V8. Applying only 120 lb N/A at V8 was generally inferior to all other treatments. And though split N application was generally superior at 3 sites, particular benefit was achieved when the first N application was delayed until at least V2-V4 at these sites. Applying 40 lb N/A at-planting/VE was problematic at lower yielding sites. This N appeared to be less effective, relative to initial applications made at V2-V4, suggesting some of the earliest N was lost before the crop could recover and utilize it. |
| MA | Keiser | * We published results of a study exploring the benefits of three different fall-planted cover crop species for spring C and N pools. The three cover crops varied in chemical quality (C:N) in their above and belowground components, which subsequently impacted spring decomposition trajectories and the amount of C and N released from the root and aerial residues. Overall, the study shows that initial litter quality and the placement of residues in no till systems influence nutrient management. * We also published a review exploring the impacts of bare soils, annual and perennial cover crops, and biofertilizers on soil nitrogen pools and losses. The review highlights the benefits, trade-offs, and complexity of managing agricultural soils for nitrogen which can maximize nitrogen retention. * This year, we continued a perennial cover crop project where we are examining impacts of cover crop management on soil carbon and nitrogen and soil microbial activity. We are beginning to plan an extension of this project where we compare and contrast the perennial cover crop system to annual and bare soil corn cropping systems with impacts on soil carbon and nitrogen transformations and stocks. |
| MA | Hestrin | * The Hestrin Lab at UMass Amherst has been investigating how land management practices, soil mineralogy, and plant-microbe interactions influence the size and composition of soil organic matter pools, their vulnerability to loss pathways, and their potential to supply nitrogen (N) to crops. |
| MA | Naughton | * Plot design that promotes concurrent studies of summer cover crop effect on soil health and vegetable yields. * Analysis of biomass, root properties, biochemical composition, and turnip yield plus basic soil physical and chemical features from Year 1. * Design of improved biochemical assays and sample preservation for these and soil microbial activity assays. * Design of a litter bag decomposition experiment. |
| MO | Lin | * Over the past year, our metabolomic investigation has shown that cover‐cropping in organic systems profoundly reshapes rhizosphere chemistry, enriching bioactive metabolites that bolster plant vigor, disease resistance, and nutrient uptake. By applying ultra-high-pressure liquid chromatography coupled with high-resolution mass spectrometry (UPLC-HRMS), we comprehensively profiled methanol‐extractable compounds from both organically managed plots with varied cover-crop termination methods and conventionally managed fields under rotational and monoculture managements. Targeted HPLC-MS/MS quantification then enabled precise measurement of key bioactive molecules, three of which exhibited potent inhibition against pathogenic soil bacteria. Complementary 16S rRNA and ITS metagenomic analyses linked these distinctive chemical signatures to shifts in microbial community structure, underscoring how long-term conservation practices foster soil environments that naturally suppress disease and improve crop nutritional quality. This integrated approach establishes metabolomic profiling as a powerful tool for evaluating the biochemical benefits of sustainable agriculture and demonstrates the capacity of cover-cropping strategies to enhance soil ecosystem services. |
| MS | Dhakal | * High rate of N application (297 kg ha-1) increased the N2O pulse events over low rate (247 kg ha-1) but did not increase cumulative CO2 equivalent (eCO2) during the corn growing season, when compared to low N rate. * Placing fertilizer deep into the soil (10-cm) reduced the total eCO2 by 9%, only under high N rate, but at low rate, there was no impact of depth. * Slow release fertilizer with N inhibitor (NBPT, N-(n-Butyl)thiophosphoric triamide) reduced N2O effluxes, which reduced the total eCO2 emissions by 5%. Results showed relative advantage of using slow release fertilizers over conventional UAN and Urea. * Closed trench after fertilizer placement increased the N2O emission in July, potentially due to change in soil pH level. |
| ND | Cihacek | * Routine processing of soils of the Prairie Pothole Region for carbon analysis may result in loss of total C and inorganic C which may impact soil C analysis. * Resampling paired soil sites on similar soils over 30 years shows that acidification of cropland soils has accelerated since 2010 due to no-tillage and increased fertilizer use. |
| OH | Lal | * The average corn grain yield at South Charleston of 12.1 Mg/ha was 36% more than that at Hoytville (8-9 Mg/ha). * There were no differences in grain yield among residue management treatments at either of the two sites. * The average Harvest Index (HI) was 61.9% at South Charleston compared with 60.4% at Hoytville. |
| SC | Ye | * Optimized conservation management practices to improve sandy soils in the context of soil organic carbon content, nutrient cycling and availability, microbial diversity, and agronomy production. |
| SD | Osterloh | * Soil pH in acidified topsoil shows improvement in preliminary results of a conservation tillage system * Dual Wave in situ sensors show promise for measuring soil carbon, but have less accuracy and utility compared to a broader range of spectra such as MIR. * Dynamic Soil Properties, specifically Soil Organic Carbon, vary across both landscape positions and management type, demonstrating the need for more intense SOC monitoring within management types in addition to between management systems. * Long term agricultural practices have caused significant erosion in SE South Dakota through tillage practices * Soil carbon has increased over the last 25 years but is still slightly lower than 100 years ago. |
| SD | Xu | * Three manuscripts were submitted (one published, two under review) generated from the research findings from cover crop-crop rotation study. * One PhD student graduated, one MS student defensed, and one PhD student passed the qualify exam. * Analyzes on biochar/manure and organic vegetable studies are on going, data has been collected for the majority of the dataset. |
| TN | Jagadamma / Zhang | * During 2024-2025, the University of Tennessee team conducted a series of research studies to assess the effects of various management practices (e.g., no/reduced tillage, cover cropping) on soil organic carbon (SOC), soil health and agroecosystem resilience. We worked to advance conservation production systems that enhance soil services/functions and agricultural sustainability through integrated research and extension efforts. |
| TX | Aburto | * Enhanced weathering of rock powders shows potential to become a substantial climate solution and nutrient amendment alternative for the agriculture and forestry sector in the southern USA. Our preliminary results highlight that soil intrinsic characteristics control the effectiveness of rock powder applications for C-capture and nutrient supply, and impacts on crop yield. * Using an over a century old experiment, we found evidence that agriculture intensification relying on synthetic fertilizer accelerates soil mineral weathering rates, depleting lithogenic nutrient pools when compared to unfertilized plots or organic nutrient amendments like manure. * Soil structure and biogeochemical functions in human-transported soils recover at rates faster than previously thought in a rewilded fly ash landfill. * Sea water flooding in coastal soils alters C, N, P, and S pools, dynamics, and mineral-SOM speciation more severely than freshwater flooding. |
| TX | Ale | * Changing the management from conventional tillage to no-tillage on all croplands of the Bushy Creek Watershed (i.e., in 35% of the watershed area) in the Texas Blackland Prairies region was found to reduce simulated future annual soil evaporation, surface runoff, and soil erosion by 46-52%, 27-33%, and 55-59%, respectively. * No tillage showed potential to maintain historical/baseline corn yields in the future. While future corn yields under conventional tillage were simulated to reduce by 4-24%, those under no-tillage were mostly similar to the baseline yields. |
| TX | Dou | * Field trials were conducted to test the effects of rice and energycane along with nitrogen application rates on crop production, biomass yield, and soil organic C and N. * For the rice cultivar assessment trial, total 16 new or popular cultivars were planted in April on a sandy loam soil and a clay soil. * For the energycane trial, two factors, winter cover crop vs. nitrogen application rate, were tested. Also soil samples were collected to test the effects of cropping system and nitrogen fertilization rate on soil C sequestration. |
| TX | Noormets | * Soil disturbances ((i) conventional intensive vs adaptive multipaddock grazing, and (ii) prescribed burning in pine forests) reduce total belowground carbon allocation, as well as soil microbial activity. These changes offset one another, with minimal effect on annual soil C balance. * Only 3-6% of GPP goes to new biomass production in mature shortleaf pine. 5-20% goes to non-structural carbon, of which a large part may go to exudates that stimulates soil heterotrophs and priming of the decomposition of old soil carbon. Plant respiration consumes 60-75% of GPP. Drought suppresses aboveground plant respiration, but not root respiration. * The diurnal variability of carbohydrate availability in the roots and soil affects heterotrophic soil CO2 efflux (Rh) more strongly than root respiration. Root activity is more directly controlled by temperature. Even though Rh was partly supported by newly assimilated C, overall it consumed older (more processed) C than autotrophic respiration. The same was true in both rangelands and pine forests. * The transfer of soluble non-structural carbon from leaves to the roots and soil is water-limited, and is observable on both diurnal and seasonal scale. * The afternoon decline in ecosystem respiration is originates mostly (>90%; ~10 μmol m-2 s-1) from the substrate-limitation of heterotrophic respiration, and in small part (<0.4 μmol m-2 s-1) from daytime suppression of foliar mitochondrial respiration (Kok effect). |

*Outputs*: The NC-1178 team generated a wide range of information and knowledge from their research (Table 2), which resulted in over 67 peer- reviewed publications and 130 conference presentations. Additionally, the team had over 17 extension presentations, field days, and/or workshops. These outputs meet and surpass the outputs set fourth in the project outline.

*Short-term outcomes*: Findings and data generated from the team’s research output demonstrate how management techniques can be used to improve soil health, SOC, and soil functions while maintaining or improving farm profitability (Table 2). Information from these findings was delivered to audiences in a multitude of ways including open access publication, direct conference presentations, and extension presentations. Results included, but are not limited to: 1) improved SOC and soil functions under conservation practices (cover crops, minimal tillage, residue management, increased bioproductivity) (IN, KY, MA, OH, TN, TX), 2) enhanced rock weathering can sequester organic and inorganic carbon while making soils resilient to changes (CT, TX), 3) improved understanding and outreach relating to soil microbial impacts on function and carbon (IN, MA), 4) agricultural production drives increased soil acidification, but liming can effectively mitigate this acidification under conservation systems to maintain soil health (ND, SD), 5)

*Milestones*: The team completed its 2024 milestone of “Site selection/treatment modifications at existing sites” and had enough results to begin early work on future milestones of workshops and meetings. These early results will be compiled into a special topics issue of peer reviewed publications.

**Table 2**. Selected major research findings generated by NC-1178 participants during 2024-2025.

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| **State** | **PI** | **Research Findings** |
| CT | Shabtai | * Our findings may help improve compost application recommendations to improve soil resilience to weather extremes. * Our findings may help improve enhanced rock weathering recommendations to enhance inorganic carbon sequestration. |
| IN | Rui | * With over 100 in the audience, I communicated the importance of soil microbial communities in supporting soil carbon building and functioning. From the feedback received, growers and audience gained an understanding about the importance of soil microbial management. |
| KS | Presley | * Perennial fields have greater water stable aggregation than no-till cropping systems with 2 and 3 crops in the rotation. The continuous wheat rotation had the poorest metrics of soil health. |
| KY | Grove | * Soil Organic Matter & Soil Health: The benefits to soil health practices that sustain or enhance soil organic matter levels can have a substantive benefit to corn N nutrition in dryland production systems. * Soil Organic Matter & Corn Productivity: Soil organic matter was generally positively related to corn yield when early applied N was applied at low rates and/or delayed for several weeks. * Corn N Management & Soil Organic Matter: Soil organic matter contributed to soil N supply resilience, increasing timing flexibility in corn N management. With greater soil organic matter, later corn N applications were less likely to result in corn yield loss. |
| MA | Hestrin | * Soils that span a range of geochemical characteristics and land management practices, the majority soil N is held within mineral-associated organic matter (MAOM). Our sequential chemical extractions suggest that approximately 20% of this MAOM-N could be mobilized by water or exudates released by plants and microbes. Conventional tillage practices, fertilization, and cultivation of annual grain crops resulted in a decline in the size and diversity of the MAOM-N pool. |
| MA | Keiser | * Cover crops provide many benefits for sustainable agricultural management, but we lack information linking cover crop management with soil microbial health, soil biogeochemical processes, and cash crop production. Our research is building a better understanding of how cover crops impact soil biogeochemical cycles through the exchange of C and N between plant-soil-microbial pools. Results from our research will provide new information allowing practitioners to improve cover crop farming techniques, improve soil health, and reduce negative ecological impacts. |
| MA | Naughton | * Without pesticide use, no-till routinely resulted in far lower turnip yield compared with till EXCEPT using sunn hemp as the summer cover crop, where no-till had slightly (insignificantly) higher turnip yield compared to till. * In general, aboveground and belowground biomass inputs of summer cover crops followed the same trends: sunn hemp > soybean ~ weed control > teff ~ oat. * Teff was a very aggressive cover crop that matured rapidly and limited weed presence; however, it was a difficult crop to plant into after mowing. * Summer cover crops generally did not increase fall turnip harvest compared to fallow plots except for sunn hemp, which did well under both till and no-till, pesticide-free management. |
| MO | Lin | * Enhanced Soil Biochemistry: Long-term organic management with cover cropping at Busby Farm generated unique rhizosphere metabolome profiles, significantly boosting concentrations of compounds that support plant health and nutrient acquisition. * Disease-Suppressive Metabolites: Comparative analyses revealed that years of cover-cropping lead to the accumulation of metabolites with demonstrated antibacterial activity, highlighting their role as natural soil-borne disease suppressants. * High-Resolution Compound Discovery: Methanol extraction and UHPLC-HRMS workflows enabled detailed detection and tentative identification of diverse soil-derived metabolites, laying the groundwork for focused quantification via tandem mass spectrometry. * Microbial-Chemical Interplay: By coupling metabolomic data with 16S rRNA and ITS sequencing, we mapped shifts in bacterial and fungal communities under different cover-crop treatments, pinpointing specific taxa that correlate with beneficial metabolite profiles. * Framework for Precision Assessment: The fusion of high-throughput metabolomics, targeted HPLC-MS/MS, and metagenomics offers a robust methodological platform for assessing how agronomic practices drive soil health services from nutrient cycling to pathogen resistance. |
| MS | Dhakal | * The preliminary results showed that surface management after fertilizer placement is tricky since closing trench using packer wheel increased the seasonal N2O emissions when the placement depth was shallow (<1 inch). Opening or closing the trench had no impact on emission when the placement was deeper (4 inches). This anomaly in N transformation might be due to inherent soil properties and other management practices such as irrigation, tillage, and crop growth stages. |
| ND | Cihacek | * Analysis of soil C data from a landscape study where carbonate concretions and nodules were removed prior to soil crushing and then analyzed separately before summarizing soil total C (TC), inorganic C (IC) and organic C (OC) showed that materials that are often screened out during the soil crushing process can influence the analysis of C in a soil profile. The carbonate fragments added as much as 3.9 kg C/m2/depth to the IC pool while as much as 0.25 kg C/m2/depth could be added to the OC pool due to OC being contained in the carbonate fragments. This may require modifying procedures where C stocks are being quantified below an 0.3 m depth and where carbonates occur in the soil profile.\ * Resampling eleven paired grassland/cropland sites first sampled in 1991-92 and again in 2010 showed slightly greater acidity between 1991-2 and 2010 but significantly greater acidification between 2010 and 2023. However, grassland soils remained similar or lightly more alkaline over the same time periods. One site where the grassland had ben converted to cropland showed a large increase in acidity between 2010 and 2023. (Note: increased acidity means lower pH). |
| OH | Lal | * The corn grain yield did not differ among residue management treatments. Thus, 25 to 33% of residue may be removed for other uses. * Low grain yield at Hoytville may be due to poor soil drainage and sub-optimal soil temperatures during the spring. * Similar to grain yield, stover yield at South Charleston was also about 30% more than that at Hoytville. * The HI decreased with increase in residue retention at South Charleston but increased at Hoytville. The cause/effect relationship may depend on soil/climate conditions during the growing season. |
| SC | Ye | * Living cover crops had more significant impacts on various soil biogeochemical properties than their incorporated residues. * No-till decreased soil bulk density but increase its organic carbon stocks in the topsoil, which, however, reduced organic carbon stocks in the subsurface. Similar pattern was also observed for organic nitrogen stocks with reduced magnitudes. * Cereal rye contributed more root-derived organic carbon to deep soils than hairy vetch. Vetch residue returns reduced soil organic carbon decomposition, which was not observed for the incorporations of rye residues. * Integrating winter cover crops did not change cotton lint yield responses to nitrogen fertilization in sandy soils. |
| SD | Osterloh | * Acidified topsoil can be potentially remediated without extensive tillage through the use of targeted application of pelletized lime and strip tillage systems. * Soil Organic Carbon varies significantly both within agricultural fields and between management types. The spatial variability and distribution of landscape positions is directly related to the amount of SOC variability and should be incorporated into long term DSP studies to better extrapolate temporal results across large spatial extents. * Average erosion rates in southeastern SD over the last 100 years have stayed steady and statistically consistent with rates seen in shorter studies. Yearly erosion rates over a 100 year period are lower than those over a 70 year period, indicating that an increased intensity in agricultural practices have also increased erosion rates. * Total soil carbon stocks have decreased significantly from the 1920’s to 1990’s. Recent changes in production, particularly the total amount of biomass produced from modern high input corn dominant systems, have increased soil carbon stocks. This increase is not yet statistically significant but is trending upward and supported by a number of studies across eastern South Dakota. |
| SD | Xu | * Enhanced the awareness of crop rotation, organic amendment and cover crops on soil carbon sequestration. * Promoted the understanding of sustainable practices impacts on soil health. |
| TN | Jagadamma / Zhang | * Long-term practice of management designed to improve soil health has the potential to buffer soil resistance and resilience to climate stress, which is important for optimizing land management practices for functional stability under climate variability. * Cover cropping can influence soil organic carbon and shape subsurface structure and hydrologic processes; however, the impacts are dependent on soil texture. This research provides a basis for optimizing site-specific cover cropping management to improve water use efficiency and sustain crop production. * Agroforestry systems serve as an effective land management strategy for restoring soil organic carbon. Silvopasture practices offer a promising approach to sequester carbon while sustaining productive agricultural landscapes in temperate regions. Our findings highlight the potential of temperate region silvopasture to enhance SOC storage and stabilization over time. |
| TX | Alburto | * Enhanced weathering of rock powders shows potential to become a substantial climate solution and nutrient amendment alternative for the agriculture and forestry sector in the southern USA. Our preliminary results highlight that soil intrinsic characteristics control the effectiveness of rock powder applications for C-capture and nutrient supply, and impacts on crop yield. * Using an over a century old experiment, we found evidence that agriculture intensification relying on synthetic fertilizer accelerates soil mineral weathering rates, depleting lithogenic nutrient pools when compared to unfertilized plots or organic nutrient amendments like manure. * Soil structure and biogeochemical functions in human-transported soils recover at rates faster than previously thought in a rewilded fly ash landfill. * Sea water flooding in coastal soils alters C, N, P, and S pools, dynamics, and mineral-SOM speciation more severely than freshwater flooding. |
| TX | Ale | * Results from our simulation study highlighted the effectiveness of no-tillage in improving the resilience of agricultural watersheds to extreme climatic conditions in comparison to conventional tillage. * Watershed-scale adoption of no-tillage was found to minimize the negative effects of future changes in climate on soil evaporation, surface runoff and soil erosion losses. |
| TX | Dou | * Cultivar selection had significant effects on rice production and thus biomass production. High yielding rice had the potential of more residual return for potential C sequestration. * Energycane crop can play a significant role in terms of soil C sequestration with optimal management due to less disturbance to soil. * Water or irrigation management had a significant effect on methane emissions in rice production with alternate wetting and drying emitting less methane. |
| TX | Noormets | * The contribution of coarse roots vs stemwood to soil C: Loblolly pine coarse roots decay faster than stemwood, with decay constant of 0.77 yr-1 vs 0.65 yr-1. * Effect of prescribed burning on soil C dynamics: (1)Annual and biannual prescribed burning suppresses belowground C allocation, and both root and heterotrophic activity, but not annual soil C balance compared to non-burned stand in shortleaf pine in east Texas. (2) Introduction of fire and frequent prescribed burning reduced tree density (62%) and increased tree size (48%) and biomass (46%) but reduced net primary production (28%). Fine root biomass was reduced by 20-30%, whereas fine root productivity was unaltered, resulting in 15% higher fine root turnover. * Carbon allocation in plants: (1) More than half of the available assimilated carbon (GPP-Ra) in mature shortleaf pine is in non-structural carbon, and less than half in structural growth. (2) Much of the non-structural carbon is exuded into the soil on a diurnal basis and is used by heterotrophic organisms, presumably supporting the priming of the decomposition of old (recalcitrant) soil carbon. (3) The diurnal variability of carbohydrate availability in the roots and soil affects heterotrophic soil CO2 efflux more strongly than root respiration. Root activity is more directly controlled by temperature. (4) The transfer of soluble non-structural carbon from leaves to the roots and soil is water-limited, and is observable on both diurnal and seasonal scale. (5)The afternoon decline in ecosystem respiration is originates mostly (>90%; ~10 μmol m-2 s-1) from the substrate-limitation of heterotrophic respiration, and in small part (<0.4 μmol m-2 s-1) from daytime suppression of foliar mitochondrial respiration (Kok effect). * Conventional vs adaptive grazing effects: (1) Adaptive multipaddock grazing provided 76-110 rest days between grazing events, compared to no dedicated rest under conventional grazing. (2) Peak standing biomass was 20-80% (10-33 g C m-2) greater under adaptive than conventional grazing. (3) No differences in net primary production were detected between adaptive and conventional grazing. (4) Biomass grazing and manure input were greater under conventional than adaptive grazing. (5) Soil moisture was higher in adaptive than conventionally grazing. (6) Heterotrophic respiration was greater and used slightly older soil C in adaptive than in conventional grazing. (7) The absolute annual soil C balance was uncertain, but was consistently more positive under adaptive than conventional grazing. |

1. Impacts:

The impacts of the above-mentioned research findings (Table 1) are extensive and cover each of the committee’s broader objectives for this project. Thee committee continues 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 ecosystem sustainability, 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. The collective impact of these finding provides a robust, data-driven framework to how management techniques will impact SOC across large areas and diverse environments, crucial for high level policy making and planning.

*Demonstrate the importance of soil health*. Building healthy and resilient soils is the central focus of most soil conservation programs being implemented worldwide. Committee members demonstrated the importance of soil health to various agroecosystem functions (yield, water quality, nitrogen efficiency) and that management strategies which prioritize soil health can still provide adequate 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.

*Highlighting the role of organic carbon in soil functions*. Soil organic carbon (SOC) is a critical component of soil health, playing a pivotal role in maintaining ecosystem functions and agricultural productivity. It serves as a key indicator of soil fertility, influencing nutrient availability, water retention, and soil structure. SOC also acts as a major carbon sink, helping to mitigate climate change by sequestering atmospheric carbon dioxide. Additionally, SOC improves soil resilience against erosion and degradation, supporting sustainable land use and enhancing the long-term productivity of diverse ecosystems. Committee members are evaluating the impacts of land management practices on soil carbon dynamics in agricultural, forest and urban soils. These studies help develop scientifically sound practices for managing and preserving SOC, which is essential for environmental sustainability, food security, and climate regulation.

*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 using low-rate liming to mitigate soil acidity will allow the development of management practices to mitigate the negative effects of acidification while reducing producers’ financial burden.

*Grant and Resources Obtained*: In addition to the equipment listed below, the team members secured more than $8.8 million in grants in total from project activities. Over a dozen of the grants obtained by committee members are directly related to land management impacts on soil properties.

*Equipment:*

*Aburto*: Laser Particle Size Analyzer, Malvern Panalytical Master Sizer 3000+ Ultra

*Aburto*: Soil Water Retention Curve and Unsaturated Hydraulic Conductivity Instrument. Meter Hyprop 2

*Aburto*: Agilent Echo2 Plate Reader Spectrometer

*Dhakal*: 6 Eddy Covariance flux towers (for row rice project), trace gas analyzers (N2O and CH4), and smart chambers (8 inch) from LICOR. Two PP-Systems CO2 analyzers were obtained from USDA-ARS.

*Dou*: Several new Teros soil moisture sensors, a new oven, incubator, and freeze dryer.

*Hestrin*: The Hestrin Lab at UMass Amherst has been developing customized growth chambers to trace carbon (C) fluxes in greenhouse experiments. These chambers leverage a dual carbon isotope analyzer for isotopic labeling with 13C-enriched CO2 gas. This year, a graduate student successfully designed and used these growth chambers to trace C fluxes in a greenhouse experiment that investigates how mycorrhizal fungi influence soil organic matter dynamics.

*Lin*: Thermo ISQ GC/MS equipped with an SPME TriPlus RSH SMART

*Naughton*: Costech ECS 8020 with autosampler for CHNS-O organic matter elemental analysis.

*Noormets*: LI-7200RSF infrared gas analyzer (Li-Cor).

*Rui*: A GVF hydropneumatic root elutriation system has been purchased to separate roots from soils in a high throughput manner, to facilitate the research on root-soil microbe associations.

*Shabtai*: Plant isotope pulse-labeling chamber; Thermo Scientific Orion Star T910 automatic pH titrator.

*Ye*: Picarro gas concentration analyzer.

*Ye*: LECO C/N analyzer.

*Funding:*

1. Aburto: CAREER: Disentangling the effect of land use intensification on soil weathering processes. National Science Foundation (NSF) CAREER Award. EAR-2442348. 2025. Total Amount Funded $891,220 (TAMU: $891,220). PI: Felipe Aburto.
2. Aburto: SSOIL COP: Soil Science Integrated Learning and Career Opportunity Partnership. USDA-National Institute for Food and Agriculture (NIFA). Hispanic Serving Institution Collaborative Education Project. 2024. Total amount funded: $1,199,485 (TAMU: $517,000). PI: Felipe Aburto. [www.soilcop.org](http://www.soilcop.org)
3. Aburto: Contrasting dynamic biogeochemical response to flooding in coastal soils. SPSD Cooperative Research funding opportunity. Total amount funded: $499,925 (TAMU: 499,925). 2024. PI: Katherine Szerlag, Co-PI: Felipe Aburto.
4. Ale: Lewis, K., Foster, J., DeLaune, P., Hussey, M., Muir, J., Burke, J., Gomez, N., Gentry, T., Goodwin, J.D., **Ale, S.**, Wright, A., and Keeling, W. 2024. Regenerative agriculture using treated produced water. Water Bridge Operating LLC. $4,339,143 (2024-2029).
5. Ale: DeLaune, P., Lewis, K., Jessup, R., and **Ale, S.** 2025. Intensified annual and perennial cropping systems to increase carbon sequestration and system resiliency. NRCS CIG. $200,000 (2022-2025).
6. Dhakal: **Dhakal, M**., T. Kharel, and K.N, Reddy. Identify agronomic interventions needed for climate-smart agriculture using remote sensing, cloud computing, machine learning and big data approach. Duration: 5 years (7/1/2024-7/1/2029). Agency: USDA-ARS, agreement# 58-6066-4-027 (CFDA#10.001), type: Non-Assistance Cooperative Agreement. Total Federal Amount: $192,991.56
7. Dou: **Dou, F**. and T. Gentry. Using winter cover crop for sustainable energycane production. 2024.USDA South Sun Grant Graduate Scholarship Program. 2024-2025. **$85,575**.
8. Dou: Mowrer, J., N. Raja, and **F. Dou**. Aertime: Calibrating AWD irrigation timing for Texas rice. 2023. USDA NIFA Foundation program. 2023-2027. **$739,340.**
9. Dou: Ma, X., **F. Dou**, and K. Chen. Elucidation the impact of nanoagrichemicals on paddy soil health and rice production through combined greenhouse studies and machine learning. 2023. USDA NIFA Nanotechnology program. 2023-2027. **$609,290.**
10. Dou: **Dou, F.**, X. Ma, J. Mowrer, and T. Gentry. 2023. Climate-Smart Alternate Wetting and Drying, AWD, Rice Production. Texas Water Research Institute. $250,000.
11. Grove: Developing an Affordable Soil Health Test for the Appalachian Region to Incentivize Sustainable Agricultural Production. Sustainable Agriculture Research and Education (SARE). 3/1/2021-12/31/2024. $63,380.
12. Grove: How Long Do No-Tillage Systems Benefit Kentucky Corn Growers In Sequestering Carbon In Soil? Kentucky Corn Grower Association. 12/01/2024-12/31/2025. 11,729.
13. Grove: Late Corn Nitrogen Nutrition: Understanding The Need For A Vt/R1 Nitrogen Application. Kentucky Corn Growers Association. 12/01/2022-12/31/2024. 72,000.
14. Noormets: Native Plant Society of Texas Ann Miller Gonzalez Research Grants for Graduate Students – Chali Simpson
15. Noormets: Native Plant Society of Texas Ann Miller Gonzalez Research Grants for Graduate Students – Benju Baniya
16. Osterloh: “Tillage Effects on Liming Efficiency in Acidified Topsoil (Year 2)” PI: Kris Osterloh, Co-PI: Peter Kovacs. South Dakota Nutrient Resource Education Council (NREC). Total proposal: $277,615, 2024 Funding: $93,241
17. Osterloh: “Field Monitoring of Precision Controlled Drainage for Water Quality and Yield Improvement- Phase 2” PI: Todd Trooien (ABE), Collaborators: Sushant Mehan (ABE), John McMaine (U of Kentucky), Ali Nafchi, Kris Osterloh. Dakota Nutrient Resource Education Council (NREC). 2025 Funding: $60,713
18. Presley: Expanding Soil Health Through Carbon Markets. 12/18/24 to 10/30/29. USDA-NRCS Regional Conservation Partnership Program, Subaward from American Coalition for Ethanol. $50,000,000 (financial assistance to farmers $37,500,000, Technical assistances $12,500,000, will be funded in 2 awards) KSU:Total $1,644,227 (Presley share $150,284)
19. Shabtai: **PI Shabtai, I**. Minerals matter: How does soil mineralogy control whether root exudates form new organo-mineral associations or disrupt existing ones. CAES BOC Award (38,123$)
20. Keiser: USDA, NRCS – Massachusetts Conservation Innovation Grant. ‘Integrating living mulch into Massachusetts corn silage production to reduce nitrogen application, minimize nitrogen loss, and improve soil health.’, Keiser (PI), Hashemi (UMass, co-PI), 2023-2026 ($290,730).
21. Xu: South Dakota Oilseeds Council. Impacts of N fertilizer placement method and rate on sunflower growth, yield, seed oil content and N use efficiency. 2024. ($24,320)
22. Hestrin: Larsen, I. (Principal Investigator), T. Cook, M. Winnick, \*A. Keiser, \*H. Naughton, and **R. Hestrin**. Quantifying the magnitude of the soil carbon sink in agricultural landscapes. UMass Amherst Center for Food, Agriculture, and the Environment.
23. Hestrin: **Hestrin, R.** (sole Investigator). Harnessing Mycorrhizal-Microbial Synergies for Agricultural Resilience and Health. Foundation for Food & Agriculture New Innovator Award.
24. Hestrin: Keiluweit, M. (Project Director) and **R. Hestrin** (co-Project Director). Acquisition of a Picarro Dual Carbon Isotope Analysis System for Sustainable Agricultural Research Using 13Carbon Labeling. USDA NIFA Equipment Grant Program.
25. Jilling, A. (Principal Investigator), A.S. Grandy, M. Keiluweit, and **R. Hestrin**. Mineral-associated organic matter: An overlooked source and mediator of bioavailable nitrogen. NSF Division of Environmental Biology.
26. 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
27. Lin: CAFNR Matching Assistantship Program C-MAP 1/1/2023-12/30/2027
28. 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
29. Publications:
30. Ahlersmeyer, A., Clay, D., Kovács, P., **Osterloh, K.**, Rekabdarkolaee, H. M., & Clark, J. (2025). Relationships among soil test potassium forms influenced by clay mineralogy. Soil Science Society of America Journal, 89(1), e70015.
31. Halverson, E., Malo, D., & Osterloh, K. (2025). Century-long soil profile truncation in eastern South Dakota agricultural fields. *Geoderma*, *460*, 117399.
32. Pham, T. H., **Osterloh, K**., & Nguyen, K. D. (2025). Mapping of soil sampling sites using terrain and hydrological attributes. *Artificial Intelligence in Agriculture*.
33. Westhoff, S., Clay, D. E., **Osterloh, K.**, Clay, S. A., DeSutter, T. M., Nleya, T., ... & Sandhu, D. (2024). An Introduction to Salinity and Sodicity. *Salinity and Sodicity: A Growing Global Challenge to Food Security, Environmental Quality and Soil Resilience*, 1. (Book Chapter)
34. Westhoff, S., **Osterloh, K.**, & Malo, D. (2024). Formation and Classification of Salt‐Affected Soils. *Salinity and Sodicity: A Global Challenge to Food Security, Environmental Quality and Soil Resilience*, 19-29. (Book Chapter)
35. Westhoff, S., Reese, C., Clay, S., Bhattarai, D., Joshi, D., Reicks, G., Miller, J., **Osterloh, K.**, Clay, D. Combining Gypsum with Establishment of Perennial Vegetation Improved the Restoration of Salt-Affected Soil in the North American Northern Great Plains. Accepted by the *Journal of Soil and Water Conservation*, 2024.
36. Castillo, P. Albornoz, M.F. Crovo, O. Atenas, A. Czimczik, C, Southard, R. **Aburto, F.** Natural forest conversion to exotic pine plantations induces soil mineralogical changes – Implications for soil organic carbon stabilization. ***Catena*** In Review.
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38. Merino Guzman, C. Jofre, I.A. Stock, S. Najera, F. Matus, F. Kuzyakov, Y. **Aburto, F.** Dorner, J. Rubilar, R. Dippold, M. A. Soil Recovery after fire: texture and Porosity Shape Microbial Function. **Catena**. Preprint: [http://dx.doi.org/10.2139/ssrn.5290330](https://dx.doi.org/10.2139/ssrn.5290330)
39. Anand, S.K. Bertagni, M.B. **Aburto, F.** Calabrese, S. Soil Structure and Mixing Controls on Water-Rock Contact: Implications for Enhanced Weathering. ***Earth System Sciences***. In review. Preprint: [10.22541/essoar.175181451.19659684/v1](https://doi.org/10.22541/essoar.175181451.19659684/v1)
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92. Aguilos M, Sun G, Liu N, Zhang Y, Starr G, Oishi AC, O'Halloran TL, Forsythe J, Wang J, Zhu M, Amatya D, Baniya B, McNulty S, **Noormets A,** King J (2024) Energy availability and leaf area dominate control of ecosystem evapotranspiration in the southeastern U.S. Agricultural and Forest Meteorology 349: 109960. https://doi.org/10.1016/j.agrformet.2024.109960
93. Delpierre N, Garnier S, Treuil-Dussouet H, Hufkens K, Berveiller D, Lin J, Morfin A, Wilkinson M, Beier C, Hale PM, **Noormets A,** King J, Koebsch F, Klosterhalfen A, Rebmann C, Pohl F, Schwartz MD, Ibrom A, Pilegaard K, Domec J-C, Cuntz M, Joetzjer E, Munger JW, Richardson AD, Hart KM, Curioni G, Denham SO, Dahlin K, Rothstein D, Desai AR, Soudani K (2024) Phenology across scales: an intercontinental analysis of budburst in temperate deciduous tree communities. *Global Ecology and Biogeography* 0: e13910. https://doi.org/10.1111/geb.13910
94. Yang L, **Noormets A** (2024) Asynchrony of the seasonal dynamics of gross primary productivity and ecosystem respiration. *Environmental Research Letters* 19: 084049. https://doi.org/10.1088/1748-9326/ad5d08
95. Mitra B, \*Minick K, Gavazzi MJ, \*Prajapati P, \*Aguilos M, Miao G, Domec JC, McNulty SG, Sun G, King JS, **Noormets A.** 2024. Toward spectrally truthful models for gap-filling soil respiration and methane fluxes. *Agricultural and Forest Meteorology* 353: 110038. https://doi.org/10.1016/j.agrformet.2024.110038
96. **Noormets A,** Miao G, \*Kim D, \*Ono M, McNulty SG (2024) Mitigation potential of forests: The integrated plant-microbe system. In McNulty SG, ed. Future forests, Elsevier. pp. 75-94. https://doi.org/10.1016/B978-0-323-90430-8.00013-7
97. Conference Presentations:

1. Osterloh, K. (2024) Aggregate Stability Variability across Scales and Test Methods [Abstract]. ASA, CSSA, SSSA International Annual Meeting, San Antonio, TX. https://scisoc.confex.com/scisoc/2024am/meetingapp.cgi/Paper/159573
2. Ali, M., Osterloh, K., & Kovacs, P. (2024) The Effectiveness of Liming to Correct Acid Topsoil Under Conservation Tillage Systems [Abstract]. ASA, CSSA, SSSA International Annual Meeting, San Antonio, TX. <https://scisoc.confex.com/scisoc/2024am/meetingapp.cgi/Paper/159239>
3. Pestereva, A. Navarrete, A. Torres, A. J.K Brumbelow, A.P. Smith, **Aburto, F.** Assessing Atta Cephalotes Bioturbation Impacts and Soil Property Predictability Using NIR Spectroscopy**.**  American Geophysical Union (AGU) Fall Meeting Abstracts 2024 (6), B24E-06.
4. Calabrese, S. Anand, SK. Bertagni, M.B. **Aburto, F.** Effects of Soil Pore and Rock Particle Size Distributions and Their Mixing on Enhanced Weathering Rates. American Geophysical Union (AGU) Fall Meeting Abstracts 2024, B14B-02.
5. Jha, AOP. **Aburto, F.** Calabrese, S. Experimental Quantification of the effect of microscale soil heterogeneity on soil microbial respiration. American Geophysical Union (AGU) Fall Meeting Abstracts 2024, B34A-07
6. Patabendige, N. **Aburto, F.** Exploring the pedological thresholds of Enhanced Weathering. *ASA, CSSA, SSSA International Annual Meeting*, San Antonio, TX, November 10-13, 2024.
7. Campos, S.  **Aburto, F.** Evaluating Fire Ants Bioturbation effects on water dynamics and greenhouse gases. *ASA, CSSA, SSSA International Annual Meeting, 2024 ASA, CSSA, SSSA International Annual Meeting*, San Antonio, TX, November 10-13, 2024.
8. Campos, S.  **Aburto, F.** Uncovering the hidden impacts of red imported fire ant’s bioturbation on soil nutrient cycling. *ASA, CSSA, SSSA International Annual Meeting*, San Antonio, TX, November 10-13, 2024.
9. Kerman, J. Wyatt, B. Mohtar, R. **Aburto, F.** Evidence of Fast Soil Recovery of a rewilded Fly Ash deposit using computed tomography. *ASA, CSSA, SSSA International Annual Meeting*, San Antonio, TX, November 10-13, 2024.
10. Atenas, A. **Aburto, F.** Soil Carbon Cycling Dynamics*: Insights from TG-FTIR Evolved Gas Analyses. ASA, CSSA, SSSA International Annual Meeting*, San Antonio, TX, November 10-13, 2024.
11. Atenas, A. **Aburto, F.** El remplazo del bosque natural por plantaciones de árboles exóticos induce cambios en la estequiometría del CNP del suelo y los microorganismos en suelos contrastantes. *ASA, CSSA, SSSA International Annual Meeting*, San Antonio, TX, November 10-13, 2024.
12. **Aburto, F.** Khadka, D. Margenot, A.J. Deng, J. Acceleration of mineral weathering after a century of agricultural use. *ASA, CSSA, SSSA International Annual Meeting*, San Antonio, TX, November 10-13, 2024.
13. Redell, I. **Aburto F.** T. Valdes Szerlag, K. Salt and Fresh Water Inundation Impacts on Nutrient Losses in Texas Coastal Soils. *ASA, CSSA, SSSA International Annual Meeting*, San Antonio, TX, November 10-13, 2024.
14. Kerman, J. Wyatt, B. Mohtar, R. **Aburto, F.** Rapid Soil Functional Recovery after rehabilitation of a fly ash landfill. *ASA, CSSA, SSSA International Annual Meeting*, San Antonio, TX, November 10-13, 2024.
15. Khadka, D. Pathirage, K. Rajan. N. Deng, J. Calabrese, S. **Aburto, F.** *Exploring the potential of enhanced weathering rock powder for carbon capture under field conditions in South Texas. ASA, CSSA, SSSA International Annual Meeting*, San Antonio, TX, November 10-13, 2024.
16. Khadka, D. Pathirage, K. Rajan. N. Deng, J. Calabrese, S. Ray R.L. **Aburto, F.**  *Rock Powder for C-Capture (greenhouse experiment). ASA, CSSA, SSSA International Annual Meeting*, San Antonio, TX, November 10-13, 2024.
17. *Pathirage, K. Khadka, D.* ***Aburto, F.*** *Salehin, S.M. Gomez, C. Miyanaka, N. Ray, R.L. Rajan, N.* Diurnal Emission of Soil CO2, CH4, and N2O from a corn field and the impact of crop growth and fertilizer application*. ASA, CSSA, SSSA International Annual Meeting*, San Antonio, TX, November 10-13, 2024.
18. Atenas, A., Sierra, C. A., Castillo, P., Trumbore, S., Czimczik, C., Smith, A. P., **Aburto, F.**  Soil Radiocarbon Unravel the Impacts of Forest Conversion to Exotic Plantations. ASA, CSSA, SSSA International Annual Meeting, San Antonio, TX. <https://scisoc.confex.com/scisoc/2024am/meetingapp.cgi/Paper/159069>
19. Quinonez, K., Smith, A. P., Gonzalez-Jimenez, E., **Aburto, F.,** Atenas, A., Watters, R. M.  Land Use Change Effects on Mineral-Organic Mechanisms of SOC Stabilization in Tropical Soils. ASA, CSSA, SSSA International Annual Meeting, San Antonio, TX. <https://scisoc.confex.com/scisoc/2024am/meetingapp.cgi/Paper/157865>
20. Shackelford, C. E. B., Coker, H. R., Dhar, S., Lin, C., De La Fuente, E., Deng, Y., Szerlag, K. D., Sparks, D. L., Smith, A. P., **Aburto, F.,** & Howe, J. A. Soil Mineral Interactions with Root Exudate Carbon from Drought and Well-Watered Plants. ASA, CSSA, SSSA International Annual Meeting, San Antonio, TX. <https://scisoc.confex.com/scisoc/2024am/meetingapp.cgi/Paper/161174>
21. **Aburto, F.** Khadka, D. Deng, J. Margenot, A.J. Soil Weathering Intensification and mineralogical Alteration after over a century of agricultural use. SSSA 2024 Summer Conference, San Juan, Puerto Rico, USA.
22. **Ale, S.**, Singh, B., Singh, H., Stotz, M., Samanta, S., Dowhower, S., Bawa, A., DeLaune, P., Steffens, T., Wang, T., Gomez-Casanovas, N. 2024. Enhancing soil health and ecosystem services through pasture cropping. A Community on Ecosystem Services (ACES) Conference. Austin, TX, December 9-12, 2024.
23. Samanta, S., **Ale, S.**, Mvuyekure, R. F. S., DeLaune, P. B., Mirchi, A., Wagner, K. 2024. Assessing the ecosystem service benefits of regenerative agricultural practices in the Upper Middle-Brazos-Millers Watershed in Texas. *ASA, CSSA, SSSA International Annual Meeting*, San Antonio, TX, November 10-13, 2024.
24. Samanta, S., **Ale, S.**, Hudson, D., Goebel, T.S., Singh, H., Lewis, K.L., Lascano, R.J., Baumhardt, R.L., Mauget, S.A., Gitz, D.C. 2024. Dryland crop production responses to potential variation in soil hydrological properties due to adoption of regenerative agricultural practices. *ASA, CSSA, SSSA International Annual Meeting*, San Antonio, TX, November 10-13, 2024.
25. **Ale, S.**, Singh, B., Samanta, S., Singh, H., Dowhower, S., Bawa, A., DeLaune, P. B., Gomez-Casanovas, N. 2024. Is pasture cropping a feasible regenerative practice for grazinglands of the Texas Central Plains? *ASA, CSSA, SSSA International Annual Meeting*, San Antonio, TX, November 10-13, 2024.
26. Singh, H., **Ale, S.**, Samanta, S., DeLaune, P. B., Lewis, K. L., Burke, J. A., Simbi Mvuyekure, R. F., Singh, B., Cobos, C., Mohtar, R. 2024. Determining cover crop termination periods for cotton production systems of the Texas Rolling Plains and Southern High Plains. *ASA, CSSA, SSSA International Annual Meeting*, San Antonio, TX, November 10-13, 2024.
27. Singh, H., **Ale, S.**, Kim, J., Samanta, S., Singh, B., Mohtar, R. 2024. Evaluating the long-term effects of adopting pasture cropping on ecosystem services in a rangeland-dominated watershed in North Central Texas. *ASA, CSSA, SSSA International Annual Meeting*, San Antonio, TX, November 10-13, 2024. (Poster)
28. Samanta, S., **Ale, S.**, Hudson, D., Goebel, T.S., Lewis, K., Lascano, R.J., Baumhardt, R.L., Mauget, S.A., Gitz III, D.C. 2024. Simulated effects of potential improvements in physical soil health properties on dryland crop production in the Texas High Plains. *ASABE Annual International Meeting*, Anaheim, CA, July 28-31, 2024.
29. Samanta, S., Mvuyekure, R.F.S., **Ale, S.**, DeLaune, P., Mirchi, A., Wagner, K. 2024. Simulated effects of no-tillage and cover cropping on crop production and ecosystem service benefits in the Upper Middle-Brazos-Millers Watershed. *ASABE Annual International Meeting*, Anaheim, CA, July 28-31, 2024.
30. Singh, H., **Ale, S.**, Kim, J., Samanta, S., Singh, B., Mohtar, R. 2024. Assessing the watershed-scale impacts of long-term adoption of pasture cropping on ecosystem services in north central Texas. *ASABE Annual International Meeting*, Anaheim, CA, July 28-31, 2024.
31. **Ale, S.**, Singh, B., Dowhower, S., Samanta, S., Singh, H., Bawa, A., DeLaune, P., Gomez-Casanovas, N. 2024. Challenges and opportunities for adopting pasture cropping as a regenerative practice on grazinglands of the Texas Central Plains. *ASABE Annual International Meeting*, Anaheim, CA, July 28-31, 2024.
32. Singh, H., Samanta, S., **Ale, S.**, Mvuyekure, R.F.S., Lewis, K.L., Burke, J.A., Cobos C., Mohtar, R. 2024. Simulated effects of rye cover crop termination date on cotton production in the Southern High Plains of Texas. *ASABE Annual International Meeting*, Anaheim, CA, July 28-31, 2024.
33. Mvuyekure, R.F.S., **Ale, S.**, Samanta, S., Gentry, T., DeLaune, P., Mohtar, R. 2024. Simulating watershed scale effects of regenerative agricultural practices on hydrology and water quality. *ASABE Annual International Meeting*, Anaheim, CA, July 28-31, 2024.
34. Mvuyekure, R.F.S., Singh, J., **Ale, S.**, Lewis, K., Burke, J., Cobos, C., Barnes, E., Mohtar, R. 2024. Simulated carbon, nitrogen, and soil water dynamics in cover crop based cotton production systems of the Southern High Plains. *ASABE Annual International Meeting*, Anaheim, CA, July 28-31, 2024.
35. Saasan, N., A. Mirchi, Z. Xiang, K. Wagner, **S. Ale**, L. Duro, J. Edwards. 2024. Modeling the field scale effects of regenerative agricultural practices at Altus, OK. 2024. *ASABE Annual International Meeting*, Anaheim, CA, July 28-31, 2024.
36. Landblom, D, S. Senturklu and **L. Cihacek**. 2024. Effect of Drought and Subsequent Precipitation (2016-2020) on Soil pH, Microbial Biomass, and Plant Nutrient Change in the Semi-Arid Region of Western North Dakota, USA. EGU24-7094. 2024 EGU General Assembly, Vienna, Austria. April 14-19, 2024. (Poster)
37. Batool, M., **L. Cihacek**, and R. Alghamdi. 2024. Variation of organic and inorganic carbon stocks with depth and slope under three land management systems in north central South Dakota. 79th SWCS International Annual Conference, July 21-24, 2024. Myrtle Beach, SC. (Oral)
38. **Cihacek, L. J**., R. Alghamdi, C. Augustin, R. Buetow, D. Landblom, and S. Senturklu. 2024. Can low lime rates be successful in mitigation soil acidity in the northern Great Plains. 79th SWCS International Annual Conference, July 21-24, 2024. Myrtle Beach, SC. (Oral)
39. **Cihacek, L.** 2024. Effects of diverse multi-crop rotations on soil pH balance. 2024 Soil Health Workshop: Principles, Structure, Texture, Water Infiltration & pH. NDSU Dickinson State Research Extension Center, September 18, 2024. Dickinson, ND. (Invited)
40. Lal, R. 2024. Managing Soil Health for Advancing Food and Nutritional Security. 20th International Congress of Soil Science, Soil Science Society of Pakistan and Pir Mehr Ali Shah Arid Agriculture University, Rawalpindi, Pakistan. 20-22nd February, 2024.
41. Lal, R. 2024. Managing Soils to Mitigate Abiotic Stresses on Crops for Enhancing Productivity and Environmental Sustainability. Natl. Conference on Novel Strategies for Mitigating Biotic and Abiotic Stresses on Crops: ICAR/NISBM & Amity University, Raipur, Chhattisgarh. India, 28-29th February, 2024.
42. Lal, R. 2024. Sustainable Agriculture and Soil Management for Climate and Food Security. Ellis Lecture I for faculty, Kansas State University, Manhattan, Kansas, USA. 26-27th March, 2024.
43. Lal, R. 2024. Soil and the Global Carbon Cycle. Ellis Lecture II for graduate students, Kansas State University, Manhattan, Kansas, USA. 26-27th March, 2024.
44. Lal, R. 2024. Why Carbon Farming? Co-PIs Annual Conference, Kansas State University, Manhattan, Kansas, USA. 27-28th March, 2024.
45. Lal, R. 2024. Managing Soil Health to Improve Human Health and Wellbeing. Presented at Coalition Health and Regenerative Agriculture Webinar. Online. 24th June, 2024.
46. Lal, R. 2024. Eco-Intensification of Agriculture for Producing More From Less. INTAGRI, Mexican Society of Soil Science, Guadalajara, Mexico. 10-11th July, 2024.
47. Lal, R. 2024. Soil Health as a Solution to Climate and Food Crisis. Aapresid Congress, Buenos Aires, Argentina., 7th August, 2024.
48. **Shabtai, I.A.\*** Hafner, B., Schweizer S., Hoschen C., Possinger, A., Lehmann, J., Bauerle, T. Examining the role of plant root exudates in formation and disruption of soil organo-mineral associations (2025). Goldschmidt 2025. Prague, Czech Republic.
49. **Dou, F.,** X. Li, X. Wang, X. Ma, W. Sun, and K. Chen. 2024. Effectiveness of nanomaterials and their conterparts in improving rice growth and yield under arsenic contamination. 61th Annual Meeting of the Clay Minerals Society and 5th Asian Clay Conference. HI, USA. June 2024.
50. Lasar, H., T. Gentry, S. Lamichhane, and **F. Dou**. Effects of different nitrogen rates on nitrogen use efficiency, rice physiology and agronomic under organic management. International Template Rice Conference. June 5-8, 2024, New Orleans, Louisiana.
51. Bera, T., Y. Yang, H. Araji, **F. Dou**, L.T. Wilson, W. Rooney, J. Morrison, B. Baldwin, J. Knoll, J. Jifon, A. Wight, C. Odero, H. Sandhu, A. Hale, H. Mula-Michel, and J. Wang. 2024. Seasonal Growth Dynamics of Energycane Along the US Gulf Coast. ASA, CSSA, and SSSA International Annual Meeting, November 10-13, 2024, San Antonio, Texas.
52. Bera, T., Y. Yang, F. Dou, X.G. Zhou, and L.T. Wilson. 2024. Sustainable Organic Rice Ratoon Systems in the Southern US. ASA, CSSA, and SSSA International Annual Meeting, November 10-13, 2024, San Antonio, Texas.
53. Petrowicz, H., T. Bera, Y. Yang, **F. Dou**, A. Lloyd, L.T. Wilson, P. White, and P. Inglett. Effects of winter cover cropping on soil microbial biomass carbon and nitrogen in Southeast Texas energycane systems. ASA, CSSA, and SSSA International Annual Meeting, November 10-13, 2024, San Antonio, Texas.
54. Hettiarachchi, N., **F. Dou**, X. Ma, K. Chen, and H. Lasar. Effect of nano agriculturalmaterials on rice production and zinc uptake. ASA, CSSA, and SSSA International Annual Meeting, November 10-13, 2024, San Antonio, Texas.
55. Lasar, H., T. Gentry, S. Lamichhane, and **F. Dou**. Soil biochemical and greenhouse gas emission dynamics response to nitrogen application rates in organic rice management. ASA, CSSA, and SSSA International Annual Meeting, November 10-13, 2024, San Antonio, Texas.
56. Yang, Y., T. Bera, H. Araji, **F. Dou**, L.T. Wilson, W. Rooney, J. Morrison, B. Baldwin, J. Knoll, J. Jifon, A. Wight, C. Odero, H. Sandhu, A. Hale, H. Mula-Michel, and J. Wang. 2024. Simulation of Biomass Dynamics of Energycane and Biomass Sorghum in the Southeast United States. ASA, CSSA, and SSSA International Annual Meeting, November 10-13, 2024, San Antonio, Texas.
57. **Dou, F.,** H. Lasar, AW. Lloyd, and M. Trevino. 2024. 2023 Varietal evaluation and N application for rice main and ratoon crop yield potential. Virtue Texas Rice Field Day at Beaumont Research Center. July 2024.
58. **Dou, F.**, J. Samford, S. Lamichhane, and A. Lloyd. 2024. Effects of rice variety on main, ratoon, and total crop yields. Texas Rice. 24-25.
59. Lamichhane, S., L. Tarpley, and **F. Dou**. 2024. Impact of excess magnesium salt supply on rice yield, physiological response, and grain mineral content. Texas Rice. 26-28.
60. Li, S., Y. Yang, J. Zhang, S. Samonte, **F. Dou**, L.T. Wilson, T. Bera, X. Zhou, D. Sanchez, and J. Wang. 2024. Assessing rice growth and yield through UAV images. Texas Rice. 28-30.
61. Bera, T., Y. Yang, **F. Dou**, X. Zhou, and L.T. Wilson. 2024. Sustainable organic rice ratoon systems in the southern US. Texas Rice. 41-42.
62. **Rui Y.** Emerging Concepts and Paradigm Shifts in Agroecology - Implications for Soil Health and Regenerative Agriculture. Indiana Grazing Schools. LaGrange, IN. Sept 28, 2024.
63. **Rui Y.** Emerging Concepts and Paradigm Shifts in Agroecology - Implications for Soil Health and Regenerative Agriculture. Argentina Farmer Group Training. West Lafayette, IN. Sept 24, 2024.
64. **Jagadamma, S**., Patra, R., and Rasu, E. 2025. Harnessing the potential of subsoil to store stable soil organic carbon in agroecosystems. *Soils for Our Future 2025-Manitoba Soil Science Society Conference*. July 20-25, Winnipeg, Canada *(Invited Talk)*
65. **Jagadamma, S**., Rasu, E., and Lazicki, P. 2025. Deep soil carbon storage across a range of pedogenic, climatic, and management variations in southeastern US croplands. *Soil and Water Conservation Society Annual Meeting*. August 3-6, Costa Mesa, CA (Abstract Accepted).
66. **Jagadamma, S**. 2024. Climate-smart agriculture for deep soil carbon storage. *1st Global Agriculture Multidisciplinary International Conference* (GAMIC 2024). November 22-23, University of Hawaii, Hilo, HI *(Invited Talk)*.
67. **Jagadamma, S**. 2024. Climate-smart agriculture for subsoil carbon storage, Part of ASA Environmental Quality Section Megaposium titled ‘Climate-Smart Agriculture Complexities: Connecting Innovative Science and Technology to Practical Solutions That Promote Environmental Quality in Agronomic Systems.’*ASA-CSSA-SSSA Annual Meeting*, November 10-13, San Antonio, TX *(Invited Talk).*
68. **Jagadamma, S**. 2024. Stability of soil organic carbon pool: challenges in accurate measurement and modeling, Part of ASA Global Climate Change Community Symposium titled ‘Frontiers in Carbon Sequestration Research and Methodology.’ *ASA-CSSA-SSSA Annual Meeting*, November 10-13, San Antonio, TX *(Invited Talk).*
69. Wooliver, R., Kivlin, S., and **Jagadamma, S**. 2024. Soil carbon cycling and microbial community response to drought and cover crop residue diversity. *ASA-CSA-SSSA Annual Meeting*, November 10-13, San Antonio, TX.
70. **Zhang, X.**, Ding, D., Shahadha, S., Wendroth, O., and Fan, Y. 2024. Transforming landscapes: unraveling the impact of land use change on soil structure dynamics and subsurface hydrologic processes. *7th International EcoSummit*, December 14-19, Zhengzhou, China.
71. Koop, A.N., Hirmas, D., Sullivan, P., Crompton, O., Ajami, H., Billings, S., Brunsell, N., Li, L., Cueva, A., **Zhang**, **X.**,Wen, H., Nemes, A., Souza, L., Flores, A., Rudick, A., Guthrie, A., Klamm L., and Unruh, M. 2024. Does surface and subsurface soil structure control macroporosity and ecohydrology. *ASA-CSSA-SSSA Annual Meeting*, November 10-13, San Antonio, TX.
72. Kallingal, B., and **Jagadamma, S**. 2024. Soil health impact of different methods of establishment of organic native warm-season grasses. *79th Soil and Water Conservation International Annual Conference*, July 21-24, Myrtle Beach, SC.
73. Albert-Black, C., **Jagadamma, S**., Franklin, J., and Saha, D. 2024. Assessing the impact of trees in a temperate organic agroforestry system on soil organic carbon accumulation. *79th Soil and Water Conservation International Annual Conference*, July 21-24, Myrtle Beach, SC.
74. Albert-Black, C., **Jagadamma, S**., Franklin, J., and Saha, D. 2024. Temporal and spatial distributions of soil organic carbon storage and stabilization of a temperate region silvopasture agroforestry system. *ASA-CSA-SSSA Annual Meeting*, November 10-13, San Antonio, TX.
75. **Zhang, X.**, Dai, W., Fan, Y., Ding, D., Feng, G., and Jeong, J. 2024. Building drought-resilient agroecosystems: the role of cover cropping in shaping soil structure and subsurface water dynamics. *ASA-CSSA-SSSA Annual Meeting*, November 10-13, San Antonio, TX.
76. Dai, W., **Zhang**, **X.**,Feng, G., Huang, Y., Tewolde, H., and Shankle, M. 2024. Size of aggregates and associated carbon retention as affected by cover crops, poultry litter and no-tillage. *ASA-CSSA-SSSA Annual Meeting*, November 10-13, San Antonio, TX.
77. Dai, W., **Zhang**, **X.**,Feng, G., Huang, Y., Tewolde, H., and Shankle, M. 2024. Comparing soil physiochemical and hydrological properties with cover crops and fertilizer treatments in a no-till system. *ASA-CSSA-SSSA Annual Meeting*, November 10-13, San Antonio, TX.
78. Peng, R., Feng, G., **Zhang,** **X.**,and Bi, G. 2024. Assessing runoff, soil wetness, and workdays in response to variable rainfall in spring across Mississippi. *ASA-CSSA-SSSA Annual Meeting*, November 10-13, San Antonio, TX.
79. Peng, R., Feng, G., **Zhang,** **X.**,and Bi, G. 2024. Designing drainage solutions to alleviate waterlogging and enhance soybean yields in a humid region. *ASA-CSSA-SSSA Annual Meeting*, November 10-13, San Antonio, TX.
80. Dai, W., **Zhang**, **X.**,Feng, G., Huang, Y., and Adeli, A. 2024. Boosting upland soil health by integrating soil amendments and cover cropping. *Mississippi Water Resources Conference*, October 9-11, Flowood, MS.
81. Dai, W., **Zhang**, **X.**,Feng, G., Huang, Y., and Shankle, M. 2024. The synergy of cover cropping and nutrient management improves soil health in a no-till dryland soybean cropping system in Mississippi. *Mississippi Water Resources Conference*, October 9-11, Flowood, MS.
82. **Zhang, X.**, Dai, W., Feng, G., and Reginelli, D. 2024. Alterations of aggregation in soils under various cover crops and poultry litter addition. *SSSA* 2024 *Bouyoucos Summer Conference*, June 10-12, San Juan, PR.
83. Dai, W., Feng, G., **Zhang, X.**, and Reginelli, D. 2024. Cover crop application affecting soil chemical properties in a silt loam soil. *SSSA* 2024 *Bouyoucos Summer Conference*, June 10-12, San Juan, PR.
84. **Keiser, A.**, S. Sadeghi, and M. Hashemi. Exploring the benefits of living much for corn silage systems. UMass Amherst Agronomy Field Day, August 2024
85. Cancel Vazquez, R.S. and **A.D. Keiser**, “Hyphosphere influence on plant growth and soil organic matter turnover under nitrogen-limiting conditions.” Ecological Society of America Mid-Atlantic Chapter Meeting, Longwood Gardens, PA, April 5, 2025.
86. Pokhrel S., Geza, M., **Xu, S.**, Capehart, W., Kommineni, V., Experimental and Numerical Investigation of Impacts of Soil Management Practices on Water Use Efficiency in Dryland Farms. Western SD Hydrology Conference. April 10, 2025, Rapid City, SD.
87. Vital, S., **Xu, S.**, & Sexton, P. J. Crop Rotations and Cover Crops Enhance Soil Microbial Structure, Labile, and Total Carbon Under No-till (Oral). ASA, CSSA, SSSA International Annual Meeting, November 10-13, 2024, San Antonio, TX.
88. Vital, S., **Xu, S.**, Nisrani, M. G., Sexton, P. J., & Wu, J. Greater Soil Moisture Retention Observed Under No-till: Field Measurements and Hydrus (2D/3D) Modeling (Poster). ASA, CSSA, SSSA International Annual Meeting, November 10-13, 2024, San Antonio, TX.
89. Joshi, N., **Xu, S.**, Lang, K., Nleya, T. M., Sexton, P. J., Burrows, R., Wang, T., & Mahal, N. K. Assessment of Soil Health Improvements through Living Mulch Integration in South Dakota's Organic Vegetable Production Systems (Poster). ASA, CSSA, SSSA International Annual Meeting, November 10-13, 2024, San Antonio, TX.
90. Joshi, N., **Xu, S.**, Lang, K., Nleya, T. M., Sexton, P. J., Burrows, R., Wang, T., & Mahal, N. K. Quantifying Soil Health Dynamics Under Living Mulch Integration and Different Tillage Practices in Organic Vegetable Production Systems in South Dakota (Oral). ASA, CSSA, SSSA International Annual Meeting, November 10-13, 2024, San Antonio, TX.
91. Kommineni, V., **Xu, S.**, & Nleya, T. M. Is Biochar Better Than N Fertilizer for Corn Production? (Poster). ASA, CSSA, SSSA International Annual Meeting, November 10-13, 2024, San Antonio, TX.
92. Kommineni, V., **Xu, S.**, Clay, D. E., Nleya, T. M., & Geza Nisrani, M. Biochar and Manure Enhance the Efficiency of Cover Crops and Improve Soil Health? (Oral). ASA, CSSA, SSSA International Annual Meeting, November 10-13, 2024, San Antonio, TX.
93. Winter, C., Clark, J., Lehman, M., & **Xu, S**. (2024) Soil Test Phosphorus Level Affects Microbial Parameters (Oral). ASA, CSSA, SSSA International Annual Meeting, November 10-13, 2024, San Antonio, TX.
94. Griffen, G., A.H. Whitaker, E. Bergh, A. Konya, M. Carrell, E. Knatvold, A.S. Grandy, A. Jilling, M. Keiluweit, and **R. Hestrin**. Mineral-associated organic nitrogen pool size and composition mediated by agricultural management. ASA, CSSA, SSSA Annual Meeting, San Antonio, TX, November 10-13, 2024.
95. **Presley, D**., A. Petty, P. Tomlinson. (2024). On-farm soil health assessments in Central Kansas. [Abstract] Soil and Water Conservation Society. Myrtle Beach. Oral presentation.
96. Correira, A., P. Tomlinson, K. Roozeboom, and **D. Presley**. (2024). Assessing corn response to cover crops and No-Till, Three-Year Rotation in Northeast Kansas. [Abstract] Soil and Water Conservation Society. Myrtle Beach. Poster presentation.
97. Correira, A. and **D. Presley**. (2024). Farming as a soil forming factor: are we changing inherent soil properties? [Abstract] Soil Science Society of America Summer Conference. San Juan, Puerto Rico. Poster presentation.
98. Correira, P. Tomlinson, K. Roozeboom, and **D. Presley.** (2024). Can you replace N fertilizers with cover crops in Kansas? [Abstract] Great Plains Soil Fertility Conference, Lubbock, TX. Oral Presentation.
99. Sakib, T.U., N.O. Nelson, S. Raugewitz, G. Hettiarachchi, G.J. Kluitenberg, **D.R. Presley**, K.L. Roozeboom, and P.J. Tomlinson. (2024). Improving surface water quality in cover cropping systems through sufficiency phosphorus management. [Abstract] Soil Science Society of America. San Antonio. Oral presentation.
100. Bourns, M.A., E. Yeager, N.O. Nelson, G.M. Hettiarachci, G.J. Kluitenberg, K.L. Roozeboom, **D.R. Presley** and P.J. Tomlinson. (2024). Improving surface water quality in cover cropping systems through sufficiency phosphorus management. [Abstract] Soil Science Society of America. San Antonio. Oral presentation.
101. Peterson, C., and 43 co-authors including **D. Presley**. (2024). The impact of a cover crop residue on infiltration in no-till soils at on-farm trial sites in 25 states over six years. [Abstract] Soil Science Society of America. San Antonio. Oral presentation.
102. Amissah, S., and 27 co-authors including **D. Presley**. (2024). Effects of cereal rye timing on weed suppression and corn yield. [Abstract] Soil Science Society of America. San Antonio. Poster presentation.
103. Pasket, A., N.O. Nelson, G.M. Hettiarachchi, G.J. Kluitenberg, K.L. Roozeboom, **D.R. Presley** and P.J. Tomlinson. (2024). Effect of sampling depth on dynamic biological soil health indicators in a three-year no-till corn-soybean rotation. [Abstract] Soil Science Society of America. San Antonio. Poster presentation.
104. Matthiesen, R., and 25 co-authors including **D. Presley**. (2024). Impact of a winter cereal rye cover crop on seedling disease and yield of corn across 16 locations in the United States. [Abstract] Soil Science Society of America. San Antonio. Poster presentation.
105. **Dhakal, M.**, P.P. Joshi, D. Spencer, Z. Reynolds, J. Krutz. 2024. Mitigating greenhouse gas emissions using improved N management strategies in corn. American Geophysical Union annual international meeting. 9–13 December 2024, Washington D.C.
106. **Dhakal, M.,** M.A. Locke, K.N. Reddy, M. Moore, W. Steinriede, J. Krutz. 2024. Soil-plant-water relations and water footprint of cotton and sorghum under minimum tillage and cover crop rotations. Annual meeting, ASA-CSSA-SSSA. Nov 9-13, 2024, San Antonio, TX.
107. **Dhakal, M.,** M.A. Locke, K.N. Reddy, M. Moore, W. Steinriede, J. Krutz. 2024. Water footprint of cotton and sorghum production under conservational management practices. Water Resources Conference 2024. Flowood, MS. Oct 9-11, 2024. *Poster Presentations*
108. **Dhakal, M.**, M.A. Locke, K. Reddy, M. Moore, W. Steinriede, L.J. Krutz. 2024. Improving soil water storage with no-till cover cropping in the Mississippi River Alluvial Basin. Bouyoucos Summer Conference, SSSA. 10–12 June 2024, San Juan, Puerto Rico.
109. Parajuli, B., Ye, R. (2025). Continual organic inputs modified microbial communities and the associated soil processes. 12th Annual Southeastern Biogeochemistry Symposium. North Carolina State University, Raleigh, NC.
110. Poudel, P., Ye, R. (2025). Root-derived carbons of the live winter cover crops: their fates and distribution in sandy soils. 12th Annual Southeastern Biogeochemistry Symposium. North Carolina State University, Raleigh, NC.
111. Oliver, F., Ye, R. (2025). Soil greenhouse gas flux responses to common organic management practices in sandy coastal plain soils. 12th Annual Southeastern Biogeochemistry Symposium. North Carolina State University, Raleigh, NC.
112. Madrid, L., Ye, R. (2025). Soil health indicators reveal complementarity rather than competition in interseeded cover crops in organic crop production. 12th Annual Southeastern Biogeochemistry Symposium. North Carolina State University, Raleigh, NC.
113. Parajuli, S., Ye. R. (2025). Food waste compost improved the sandy soil supporting peach orchards. 12th Annual Southeastern Biogeochemistry Symposium. North Carolina State University, Raleigh, NC.
114. Dam, T., Ye, R. (2025). Influences of cover crops on trace gas emissions from sandy soils: an on-farm study. 12th Annual Southeastern Biogeochemistry Symposium. North Carolina State University, Raleigh, NC.
115. Oladoye, C. T., Farmaha, B. S., Marshall, M. W., Payero, J. O., Bridges, W., & Ye, R. (2024) Short-Term Effects of Single and Multispecies Winter Cover Crops on Soil pH and Nitrogen Availability [Abstract]. ASA, CSSA, SSSA International Annual Meeting, San Antonio, TX. https://scisoc.confex.com/scisoc/2024am/meetingapp.cgi/Paper/161677
116. Oliver, F., Ye, R. (2024). Integrating Soil Conservation Management Practices Improved Climate Change Mitigation in Organic Vegetable Production in the Southeastern United States. AGU Fall Meeting 2024, held in Washington, D.C., 9-13 December 2024, Session: Biogeosciences / Soil Health (Management) Cycle II Poster, Poster No. 1609, id. B23F-1609.
117. Poudel, P., Parajuli, B., & Ye, R. (2024) Integrating Cover Crop for Climate Change Mitigation: Insights from Stable Isotope Technique for Residue Decomposition [Abstract]. ASA, CSSA, SSSA International Annual Meeting, San Antonio, TX. https://scisoc.confex.com/scisoc/2024am/meetingapp.cgi/Paper/160686
118. Wang, Z., Ye, R., & Saski, C. (2024) Cover Crops Altered N-Cycling Microbial Abundances. [Abstract]. ASA, CSSA, SSSA International Annual Meeting, San Antonio, TX. https://scisoc.confex.com/scisoc/2024am/meetingapp.cgi/Paper/160807
119. Wang, Z., Ye, R., Saski, C., & Oliver, F. E. (2024) Cover Crops Posed Different Impacts on Plant Biomass Decomposing Functional Traits in Sandy Soils [Abstract]. ASA, CSSA, SSSA International Annual Meeting, San Antonio, TX. https://scisoc.confex.com/scisoc/2024am/meetingapp.cgi/Paper/160806
120. Ye, R., Parajuli, B., & Poudel, P. (2024) Differential C/N Inputs Modified Soil Microbial Functions and Diversity [Abstract]. ASA, CSSA, SSSA International Annual Meeting, San Antonio, TX. https://scisoc.confex.com/scisoc/2024am/meetingapp.cgi/Paper/160955
121. Dam, T., Oliver, F., & Ye, R. (2024) A Quick Estimation for Nitrogen Availability in Soils [Abstract]. ASA, CSSA, SSSA International Annual Meeting, San Antonio, TX. https://scisoc.confex.com/scisoc/2024am/meetingapp.cgi/Paper/158268
122. Madrid, L., Ye, R., & Narayanan, S. (2024) Cover Crop Interseeding for Enhancing the Sustainability of Organic Corn Production [Abstract]. ASA, CSSA, SSSA International Annual Meeting, San Antonio, TX. https://scisoc.confex.com/scisoc/2024am/meetingapp.cgi/Paper/159948
123. Poudel, P., Dam, T., Oliver, F. E., & Ye, R. (2024) Nitrogen Addition Suppressed Root-Induced Microbial Respirations in Sandy Soils. [Abstract]. ASA, CSSA, SSSA International Annual Meeting, San Antonio, TX. <https://scisoc.confex.com/scisoc/2024am/meetingapp.cgi/Paper/160687>
124. Simpson CA, Smith AP, Tolleson D, Treadwell M, Kreuter U, **Noormets A** (2025) Grasslands and Domesticated Grazing and Their Role in the Global Carbon Cycle. Native Plant Society of Texas 2025 Virtual Spring Symposium, March 8, 2025.
125. Simpson CA, Smith AP, Tolleson D, Treadwell M, Kreuter U, **Noormets A** (2025) Quantifying carbon dynamics of adaptive multi-paddock grazing across spatial scales in northern Texas. Soil Survey and Land Resource Workshop, Bryan, February 5-6, 2025.
126. Kim D, \*Baniya B, \*Nkrumah M, \*Sarpong C, Miao G, **Noormets A** (2024) B41B-06. Understanding inhibition of daytime ecosystem respiration: Insights into diurnal dynamics and carbohydrate physiology. AGU Fall Meeting, December 8-13, 2024. https://agu.confex.com/agu/agu24/ meetingapp.cgi/Paper/1684155 (oral)
127. Baniya B, \*Kim D, \*Nkrumah M, \*Ono M, Miao G, **Noormets A** (2024) B41B-06. Carbon Dynamics in a Shortleaf Pine Forest Amidst a Two-Year Drought. AGU Fall Meeting, December 8-13, 2024. https://agu.confex.com/agu/agu24/meetingapp.cgi/Paper/1570657 (poster)
128. Aguilos M, Sun G, Liu N, Zhang Y, Starr G, Oishi AC, O’Halloran TL, Fosythe J, Wang J, Zhu M, Amatya DM, \*Banya B, McNulty SG, **Noormets A,** King JS (2024) Synthesis of Ecosystem Evapotranspiration Across a Network of Flux Towers in the Southeast U.S. AGU Fall Meeting, December 8-13, 2024. <https://agu.confex.com/agu/agu24/meetingapp.cgi/Paper/1642045>
129. Ono M, Mitra B, \*Baniya B, \*Nkrumah M, \*Kim D, **Noormets A** (2024) On the Carbohydrate Substrate Dependence of Soil Autotrophic and Heterotrophic Respiration. AGU Fall Meeting, December 8-13, 2024. https://agu.confex.com/agu/agu24/meetingapp.cgi/Paper/1560840 (poster)
130. Simpson C, Smith AP, Tolleson D, Treadwell M, Kreuter U, **Noormets A** (2024) Soil Carbon Balance Under Adaptive Multi-Paddock and Conventional Grazing in the Texas Southern Plains. ASA, CSSA, SSSA International Annual Meeting, San Antonio, TX. Nov. 10-13, 2025. <https://scisoc.confex.com/scisoc/2024am/meetingapp.cgi/Paper/161856>
131. Extension Services and Reports:
132. **Xu., S.** Sustainable Soil Health Management in California and Beyond, Brown bag seminar with USDA NRCS/ARS, April 18, 2025, Davis. CA.
133. **Xu., S.** Soil Health Management in Sustainable Agriculture & Organic Farming Systems. Terra Talk, Soils and Biogeochemistry Graduate Group, February 12, 2025, Davis, CA.
134. **Xu., S.** Introduction on the Living Mulch Organic Vegetable project. September 5, 2024. Soil Health and Cover Crops Field Day, Worthing, SD.
135. Joshi, N., **Xu, S.**, Lang, K., Nleya, T., Sexton, P., Burrows, R., Wang, T., & Mahal, N. Enhancing Soil Health Through the Integration of Living Mulch in Organic Vegetable Production Systems. Presented at Blue Sky Vegetable Co. September 5, 2024. Soil Health and Cover Crops Field Day, Worthing, SD.
136. Joshi, N., **Xu, S.**, Lang, K., Nleya, T., Sexton, P., Burrows, R., Wang, T., & Mahal, N. Reducing Tillage and integrating Cover crops for cabbage and Sweet Corn. August 8th, 2024. The SDSU SERF Organic Field Day.
137. Joshi, N., **Xu, S.**, Lang, K., Nleya, T., Sexton, P., Burrows, R., Wang, T., & Mahal, N. Evaluating the Impact of Living Mulch on Soil Health Across in different Organic Vegetable Production Systems. July 9th, 2024. The SDSU SERF Annual Field Day.
138. June 26, 2024. Two soil management questions.
139. July 8, 2024. Interviewed for Kansas Public Radio.
140. July 10-11, 2024. Soil health update for KARA field day 120 attended.
141. July 17, 2024. Summer camp for high school students. 24 attended.
142. August 13, 2024. Soils and onsite wastewater systems for Kansas Association of Rural Appraisers and Land Managers annual conference. Independence, KS. 40 attended.
143. August 14, 2024. Soil question from rural appraiser.
144. August 28, 2024. Cover crops and soil health talk at PT/WB/RL/GE soil conservation field day. 120 attended.
145. August 30, 2024. Biosolids and land application. Shawnee Co Extension meeting. 20 attended.
146. October 9, 2024. Problem soils and onsite wastewater systems. Kansas Environmental Health Association annual conference. Manhattan, KS. 60 attended.
147. October 10, 2024. Soil health efforts in Kansas. Retired Agronomists meeting. 20 attended., KS.
148. November 7, 2024. Soil and Water Conservation Society Membership panel. Online. 8 attended. December 18, 2024. Iowa Learning Farms. 152 live viewers, plus 81 online views as of February 20, 2025. <https://youtu.be/a1_Cl8xkK1U?si=Hw073bWs8CA5Lwiw>