



SOIL HEALTH NEWS

2019 – Volume 4, Number 3

SOIL HEALTH
A Global Imperative

Soil Health Institute Sets Course for an Exciting Year Ahead

This summer, 345 attendees representing 197 organizations convened to take part in the Soil Health Institute’s (SHI) 4th Annual Meeting in Sacramento, CA. Attendees traveled from as far as Australia, New Zealand, South Korea, and China. This year’s meeting, **SOIL HEALTH: A Global Imperative**, included 28 invited oral presentations and 64 poster presentations. By the end of the two-day conference, SHI had a number of actionable steps to take during 2020, including guidance on the initial report from the National Project to Evaluate Soil Health Measurements.

This year’s participants represented diverse backgrounds and experience in soil science, agribusiness and production, public policy, economics, consumer education, and scientific research. During the two-day conference, experts engaged in conversations and listened to presentations on the 2018 Farm Bill, which will impact the U.S. soil health movement. They also reviewed soil health practices that provide a demonstrated return on investment. Finally, participants looked towards the future, identifying benefits that may arise

from better understanding the soil microbiome, soil health-human health relationships, and others.

A highlight was the inaugural PED Talk, given by SHI Project Scientist Dr. Shannon Cappellazzi. Several organizations have collaborated to launch a series of 10-to-15-minute “PED Talks” on soil health, engaging viewers on topics ranging from how we define soil health to how the movement to improve soil health will literally change the world.

- ▶ See Dr. Cappellazzi’s talk [here](#).
- ▶ Links to annual meeting video, slides and full text descriptions of each presentation can be found [here](#).
- ▶ Link to the annual meeting report [here](#).

Thank you to everyone who helped make the 4th annual meeting a success.

SAVE THE DATE

SOIL HEALTH INSTITUTE

July 29-31, 2020 | **5th Annual Meeting** | Des Moines, Iowa USA



WHY MEASUREMENT MATTERS

Investing in Soil Health and Regenerative Agriculture

In October, Mr. Byron Rath, Sustainability Specialist at the Soil Health Institute (SHI), attended the [Regenerative Agriculture Investment Forum](#) in Oakland, California to learn about the challenges, opportunities, needs and nuances of sector investors. Attendees represented financial institutions, companies, nonprofits, and a few farms. Panelists commented on the challenges of investing in regenerative agriculture and soil health.

The complexity of a soil ecosystem – its variation across farm fields, soil types, climatic zones, and production systems; the fact that its health is a function of inherent soil properties and management over time; and the biological, physical, and chemical interactions therein – have hindered efforts to standardize soil health measurements to date.

“That is why the Soil Health Institute has taken a strategic approach to evaluate and identify the most effective measures of soil health across different climates, soils, and production systems,” said Mr. Rath. “Among investors, soil health measurements are useful to the extent that they can help to quantify financial risk on the balance sheet, set benchmarks and goals, and translate to cash flow for farmers and ranchers. Measurements also help farmers make more informed management decisions as they strive to be more profitable. In farming, where margins are thin, knowing the outcomes that we are working toward (as a community of farmers, investors, scientists, business leaders, and policymakers) can help us address pressing existential challenges. It is through strategic investments in soil health outcomes that we can make efficient use of our resources and drive innovation.”



GENOMICS STUDY

16S rRNA, ITS Amplicon Analyses Underway; Shotgun Metagenomic Analyses On Deck

A gram of soil is capable of harboring more than a billion bacteria and hundreds of thousands of fungi. While it is commonly accepted that soil microbial community members are responsible for enhancing soil health through beneficial nutrient cycling, degradation of organic inputs and enhancement of soil structure in agricultural soils, far less is known regarding ‘who’ performs specific functions. To address this gap in knowledge, the North American Project to Evaluate Soil Health Measurements (NAPESHM) included 16S ribosomal ribonucleic acid (16S rRNA) amplicon sequencing, internal transcribed spacer (ITS) amplicon sequencing and shotgun metagenomics.

Dr. Elisabeth (Liz) Rieke, Project Scientist who is coordinating the NAPESHM genomics analyses, says 16S rRNA and ITS amplicon sequencing will allow us to identify microbial community members present in soils under different management practices as a preliminary step in identifying microbial indicators of soil health. Shotgun metagenomics will then provide information on functional genes present in the soil to identify soil health management strategies which hold the potential to promote nutrient cycling, suppress pathogens, and reduce greenhouse gas emissions. The 16S rRNA and ITS amplicon analyses are underway, while shotgun metagenomic analyses are anticipated to begin in March 2020.

Field Days Kick Off Healthy Soils for Sustainable Cotton Project



Soil Health Field Day events were held in Arkansas, Georgia and North Carolina to kick off the [Healthy Soils for Sustainable Cotton](#) project in July and August. Participants at each event were able to visit the farms of soil health farmer mentors in each state and hear firsthand about their soil health management system. Each host led a discussion on the equipment used to plant and terminate cover crops and answered questions related to planting “green,” pest issues and cover crop selection.

Each farm visit offered a different twist to a successful system. In Arkansas, Adam Chappell is using 60” row cotton and flood irrigation successfully along with no-till planting of all crops. He says he believes that cover crops are most successful when a drill is used to plant. In addition, he’s looking at incorporating livestock grazing on some of his acres.

Sony Price, Dillion, SC, follows a strict crop rotation that includes cover crops to ensure a living root is present throughout most of the year. Participants were able to see his summer cover crop mix that was planted three weeks prior to the event and hear Sony discuss his thoughts on planting cover crops using a Phillips harrow and broadcast seeder, allowing him to cover all of the 6,000 acres he farms.

The Georgia field day included a visit to University of Georgia (UGA) research plots looking at No-Till vs. Strip Till cotton along with a long-term cotton soil health management system study that includes peanuts in the rotation. Cover crops are used to help offset the soil disturbance that occurs during peanut harvest. UGA entomologist Jason Schmidt also discussed the pest management benefits being discovered as producers use cover crops to provide habitat for beneficial insects.

In addition to the farmer mentors, each field day made use of a “rainfall simulator” to show the impact of management on rainfall infiltration and runoff. Practices that add diversity, minimize soil disturbance, maintain living roots, and keep residue cover, allowed water to infiltrate and be stored in the soil profile. Traditional systems tended to seal over, forming a crust, and resulted in more runoff.

Common themes from each field day revolved around production and **profit**. Each of the farmer mentors has



discovered that highest yield doesn’t necessarily translate into highest profit. The secrets to their success start with improving soil functions needed to grow cotton. Having a robust nutrient cycle in their soil has allowed them to reduce fertilizer input cost while maintaining yield. The second item in importance was capturing all water possible, whether from rain or irrigation. Each farmer mentor has found that their fields have less runoff and more plant-available water.

Farmers participating in the field days were invited to participate in the “Healthy Soils for Sustainable Cotton” challenge on their farms. This involves being willing to work with the project’s soil health specialist to develop and implement a soil health management system on two fields starting this fall.



Looking back at the most significant soil health grant in history: **FFAR Shows Commitment to Soil Health**



On December 5, 2017, The Foundation for Food and Agriculture Research, a nonprofit established through bipartisan support in the 2014 Farm Bill, announced a [\\$9.4 million grant](#) to the [Soil Health Institute](#), the [Soil Health Partnership](#) and [The Nature Conservancy](#) to improve soil health and, ultimately, support positive economic and environmental outcomes for American farmers. The grant, matched by corporations, trusts, foundations, and individual donors, created a total soil health investment of nearly \$20 million.



“The needs for advancing soil health remain far greater than any single organization can provide – public or private,” said Wayne Honeycutt, President and CEO of the Soil Health Institute (SHI). “That’s one reason why this project is so important. It leverages public funds authorized by Congress through the Foundation for Food and Agriculture Research with resources provided by other foundations and corporations through the combined capacities of the Soil Health Institute, Soil Health Partnership (SHP), and The Nature

Conservancy (TNC). This kind of partnership creates a way to advance soil health for the benefit of all who need safe, high-quality products from agriculture, natural resources to sustain human and all other life, thriving communities, and a strong economy. In other words, it benefits *everyone*.”

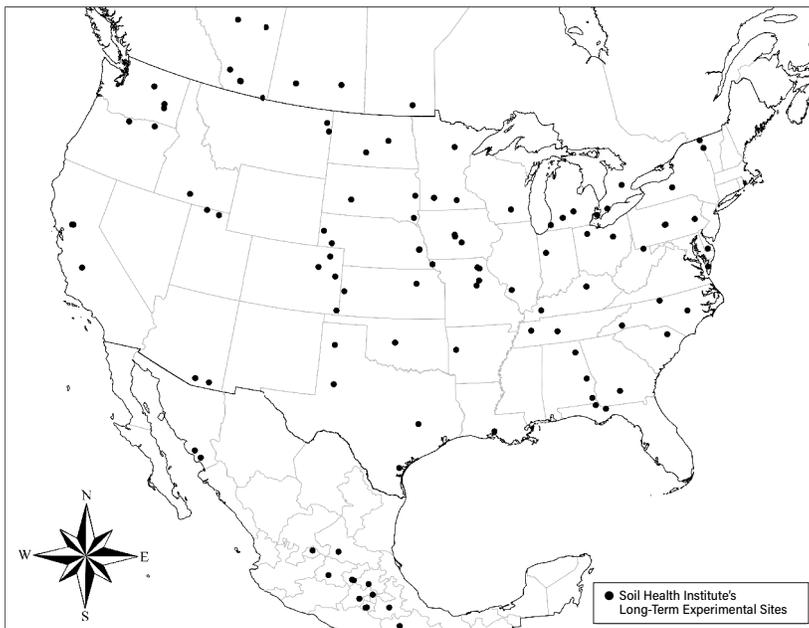
Two Years, Rapid Progress

So far, the investment has resulted in impressive, well-defined progress. SHI currently is receiving laboratory data from six contract laboratories, closing out an ambitious soil sampling activity of North America’s long-term research sites – measuring 31 indicators and three evaluation frameworks across 124 locations, each with at least 10 years of scientist-recorded management practices. In 2020, SHI will begin to release information on indicator performance as well as which soil health management practices seem to improve carbon sequestration, soil function, and resiliency. Researchers believe the insight gained will have a significant impact on North American soil health measurement standards.

“Already we’re seeing some pretty exciting early outcomes from the different aggregate stability tests, and we have four that look very interesting,” explained Dr. Paul Tracy, SHI Project Manager. “We look forward to analyzing the data and releasing the findings during the next two years.”

Collaboration at Work: Looking at the FFAR Grant’s Impact

In addition to SHI’s National Project to Evaluate Soil Health Measurements, collaborators TNC and SHP are providing insights into our cumulative knowledge of soil health as well as enhancing the awareness of its importance as we all work together to have a lasting impact on agriculture sustainability.



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Communication Is Key to Advance Soil Health on Rented Farmlands

With farming and ranching occurring in all 50 of the United States, there is an opportunity to invest in our nation's soil health – and ultimately in the well-being of our farming families and the sustainability of our food systems. It starts with collaboration throughout the supply chain – including between the farmer and the landowner.

Many farmers don't own the land they work, but instead rent from non-farming landowners, or non-operating landowners (NOLs). In fact, NOLs own 62 percent of Midwest farmland, including up to 80 percent of land in certain counties.

To better understand the relationship between farmers and NOLs, TNC and Purdue University are conducting a multi-year research and trial program to understand the challenges and opportunities faced by both parties when it comes to adopting soil health and nutrient practices on rented land in Illinois, Indiana and Iowa. Some 3,700 landowners are engaged in the study.

Other research includes a workshop series of NOL advisors



Soil Health Partnership Grows from 17 to 220 Active Farms, Spans 16 States

According to SHP leaders, FFAR contributed significantly to the growth of SHP, helping it grow from a research program to a full-fledged multi-state, farmer-led soil health effort. FFAR funding has positioned SHP to fully leverage the unique data set and build strong partnerships with SHI and TNC.

This year, SHP is celebrating its 5th anniversary as a farmer-led initiative fostering transformation in agriculture through improved soil health. SHP has grown from 17 active farms in 2014 to 220 active farms in 2019. SHP holds research trials on over 6,000 acres, spans across 16 states and partners with over 100 organizations at the federal, state and county levels.

The FFAR investment in SHP supports collaborative research and education that accelerates adoption and benefits of soil health management systems nationally. Soil health is a critical component of a productive and sustainable agricultural

This article was contributed by TNC.



and farmland stakeholders, and surveys conducted by American Farmland Trust (AFT). The research shows there is a clear opportunity to bring soil health more squarely into conversations between NOLs and farmers. [A new report from TNC](#) cites the research led by AFT that lays out both the extent of this opportunity and the complexity of increasing conservation practices on rented farmland.

To build on this work, TNC is working with [Trust In Food](#), a division of *Farm Journal*, to help facilitate productive conversations about conservation practices between farmers and NOLs in Illinois, Indiana and Iowa, where NOL farmland ownership is particularly high. Learn more about this effort at trustinfood.com/conversations.

Together, NOLs and their farmers have the power to transform the agriculture system, ensuring a healthier landscape for growing our food, safeguarding our drinking water supplies and creating a sustainable food system for a growing world.

This article was contributed by SHP.



system. Farming practices that improve soil health can increase profitability while protecting natural resources like air and water for communities.

Through FFAR's support, SHP has strengthened existing research and expanded the SHP team to maintain quality data collection and farmer engagement. The expanded SHP team allows increased collaboration with varying organizations and farmers in new geographies to better access where SHP can best serve a larger audience of growers. Increasing the SHP network opens opportunities where improvement is needed and identifies where farmers' greatest needs reside.

SHP's group of expert [field managers](#) works closely with farmers to determine trials. Farmers can reach out to a field manager in their area to determine the best soil health strategies for their farms.

ECONOMIC ASSESSMENT OF SOIL HEALTH

Dr. John Shanahan named Project Manager – Agronomy



Dr. John Shanahan has been named Project Manager – Agronomy, overseeing the day-to-day activities of the Soil Health Institute's Economic Assessment of Soil Health, including conducting in-depth interviews with participating farmers.

Dr. Shanahan's 37-year career in Agronomy has spanned both public and private sectors with roles as Director of Agronomy at Fortigen fertilizer company, Agronomy Research Manager at DuPont Pioneer (now Corteva Agriscience), Research Agronomist at USDA-ARS, and Professor at Colorado State University. He has served the tri-societies (American Society of Agronomy, Crop Science Society and Soil Science Society) in many roles, including division chairs,

ASA board rep and chair of the ASA finance committee. He was named an ASA fellow and received the ASA Werner L. Nelson Award for Diagnosis of Yield-Limiting Factors. Dr. Shanahan has a B.S. in Agronomy from the University of Nebraska, an M.S. and Ph.D. in Agronomy from Colorado State University.

The Economic Assessment of Soil Health, funded through the generosity of Cargill, will assess the profitability of soil health systems on 100 farms in order to establish the business case for soil health, as described in SHI's Action Plan.



SHI is also partnering with the US Department of Agriculture – Natural Resources Conservation Service (USDA-NRCS) and the National Association of Conservation Districts (NACD) to assess the profitability of soil health systems on 25 NACD Soil Health Champion farms.

Dr. Dianna Bagnall Joins Staff as Research Soil Scientist



Dr. Dianna Bagnall has been named Research Soil Scientist for SHI. From 2014 to 2016, she served as a project manager for AgriLife Research's Corporate Relations Office, developing proposals and managing projects. She managed sponsored research projects in soil and crop science, renewable energy, and agricultural engineering. In 2016, she joined the newly established Soil Security Team at Texas A&M University composed of soil scientists, economists, and sociologists. Her Ph.D. research received departmental and international recognition and included on-farm soil health assessments, qualitative analysis of farmer interviews, and development of novel soil structure scanning methodology.

Dr. Bagnall received an M.S. in Soil Science at Texas A&M University in 2014 working on a National Science Foundation project. The research used both modeling and field experiments to investigate water movement on shrink-swell clay soils in Texas.

Ms. Camille Hesterberg Named Communications & Administrative Specialist



Ms. Camille Hesterberg, a content strategist and social and public health advocate, has been named as Communications and Administrative Specialist to promote conversations about soil health and the Soil Health Institute's work. Prior to joining the team, Ms. Hesterberg served in a communications role for a private sector consulting firm. She has experience working in non-profits, think tanks, and educational institutions.

Ms. Hesterberg received her B.A. in Global Studies from Appalachian State University and her M.A. in Public Policy from Central European University.

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