

# SOIL HEALTH

## A Global Imperative



## REPORT

### 4<sup>th</sup> Annual Meeting

July 16-18, 2019

Hyatt Regency

Sacramento, California USA



**SOIL HEALTH**  
— INSTITUTE —

UNIFY ■ RESTORE ■ PROTECT

# CONTENTS

EXECUTIVE SUMMARY .....	3
PLENARY SESSIONS	
Policy .....	7
Research and Development .....	8
Economics .....	10
Consumer and Farmer Education .....	11
Measurement, Standards, and Assessment .....	13
Special Session: Connections to the Land .....	14
ACTION TEAM BREAKOUT REPORTS	
Economics .....	15-16
Measurement, Standards, and Assessment .....	17-21
Research and Development .....	22-23
Consumer and Farmer Education .....	24-26
Policy .....	27-29
POSTER SESSION .....	30
REGISTERED ATTENDEES .....	31-39
CONCLUSION .....	40
SAVE THE DATE: 5 <sup>TH</sup> ANNUAL MEETING .....	40
SHI FUNDERS and PARTNERS .....	41
ABOUT THE SOIL HEALTH INSTITUTE .....	42

# EXECUTIVE SUMMARY

On July 16-18, 2019, the Soil Health Institute (SHI) convened 345 attendees representing 197 organizations as part of its 4<sup>th</sup> 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 (12 female and 16 male presenters) and 64 poster presentations.

SHI's annual meetings serve the soil health community by catalyzing collaboration; spurring continued engagement of diverse stakeholders, partners and Action Team Volunteers; and serving as a platform for cross-pollination of ideas and projects that advance soil health.

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 soil health policies in action, advances in soil health research, filling the economics gap for farmers, dimensions of adoption, determining effective measurements, and a special session on connections to the land.

Links to video, slides and full text descriptions of each presentation can be found [here](#).

## **Inaugural PED Talk: "Soil: It's Alive!"**

**Dr. Shannon Cappellazzi** opened the 4<sup>th</sup> Annual Meeting of the Soil Health Institute with the first installment of the new **PED Talk** series. Dr. Cappellazzi launched her PED Talk by bringing together definitions and functions of soil health, sharing that soil health is defined as the soil's capacity to function as a living system sustaining biology, promoting air and water environments, and sustaining plant, animal, and human health. Dr. Cappellazzi then outlined five functions of healthy soils to provide a framework for evaluating soils. The first function is that of soil as a decomposer and recycler of organic matter. Next is a soil's ability to infiltrate, filter, and store water. The third function is soil as a modifier of the atmosphere. Fourth, is soil functioning as a habitat. The fifth function is soil as a medium for plant growth.

## **Priorities and Strategies for Advancing Soil Health**

With the increasing severity of droughts, arctic melting, and hypoxic zones, feeding the growing global population becomes more difficult, explained **Dr. Wayne Honeycutt**, SHI President and CEO, as he addressed the 4<sup>th</sup> annual meeting. Farmers, ranchers and foresters have great potential as key drivers of positive change through their investments in soils, but many other stakeholders are needed to share the load of research, policy making, and financing, Dr. Honeycutt said.

SHI is evaluating [more than 30 different indicators of soil health](#) in order to provide the agricultural industry with a short list of the most effective measurements for farmers. Moreover, Dr. Honeycutt indicated there will be opportunities for SHI and its stakeholders to develop recommendations farmers can use to protect resilience, such as exact crop rotation recommendations that enhance disease suppression as well as methods to quantify impacts of carbon sequestration and water availability.

# EXECUTIVE SUMMARY

## Soil Health Leadership in Action

Much of Wednesday's Plenary Sessions reviewed policy decisions that have been developed to promote soil health as well as research that prioritizes the future of soil health – including its impact on human nutrition and health. After **Dr. Timothy Griffin**, Director of the Agriculture, Food and Environment Program as well as Associate Professor at the Friedman School of Nutrition Science and Policy, Tufts University, provided an overview of [soil health policy momentum](#) in the United States, **Ms. Karen Ross**, Secretary, California Department of Food and Agriculture, provided an example. She outlined her [state's notable achievements](#), which include instituting the first program that asked farmers to calculate estimated greenhouse gas emissions reductions. **Ms. Alyssa Charney**, Senior Policy Specialist at the National Sustainable Agriculture Coalition, provided a [summary of the 2018 Farm Bill's soil health provisions](#). Ms. Charney and SHI intern **Ms. Katie Harrigan** have analyzed the impact of the 2018 Farm Bill on soil health, available [here](#).

Five soil health leaders focused on advances in soil health research. **Dr. LaKisha Odom**, Scientific Program Director, Foundation for Food and Agriculture Research, noted the organization has provided [\\$89 million in private:public research funding for soil health projects](#). **Dr. Libby Porzig**, Director of the Working Lands Group at Point Blue Conservation Science, outlined the success of the [Rangeland Monitoring Network](#), which has reached 88 ranches in 24 counties collecting 796 soil samples from 453 locations. Later, speakers shared their scope of the future of soil health research. **Dr. Alex McBratney**, Director of the multi-disciplinary Sydney Institute of Agriculture, indicated that soil scientists will be able to [plot the trajectories of soil change](#), referencing the capacity and condition of soils down to a watershed, working with local producers to enhance global soil security. **Dr. David Knaebel**, National Program Leader for Soil Biology in the Natural Resources & Sustainable Agricultural Systems Division, USDA-ARS, outlined how soil microbiome and soil ecosystem research will evolve into an extensive research enterprise. **Dr. David Collier**, Professor of Pediatrics and Health Disparities at the Brody School of Medicine, East Carolina University, then [connected soil health research to human health protection](#), summarizing the next steps identified by more than 180 attendees from more than 120 different organizations representing both agriculture and medicine during the [Conference on Connections Between Soil Health and Human Health](#).

## Filling the Economics Gap for Farmers

**Dr. Rob Myers**, Regional Director of Extension Programs for the USDA-NIFA North Central Region Sustainable Agriculture Research and Education (SARE) program, summarized the business case to support cover crops, a crucial component of soil health management systems. Dr. Myers indicated the median cost invested in seed, planting, and termination of cover crops per year was \$37, according to 2012-2013 cover crop survey data.

**Dr. Shefali Mehta**, Executive Director of the Soil Health Partnership, reviewed the progress of evaluating three core trial types: tillage, cover crop, and nutrient management. The [Soil Health Partnership](#) has recently added grazing and cash crop trials as well. Their plan calls for benchmarking yield and soil data, providing information to their 120 farmer partners, during Years 1 and 2. Years 3 and 4 will include soil health comparison of baseline versus year 2 with a treatment and control yield comparison. Year 5 will include similar treatment to control

comparisons along with 3 sets of soil health sample comparisons.

**Mr. Bruce Knight**, Principal and Founder of Strategic Conservation Solutions, outlined the progress being made by the [Ecosystem Services Market Consortium](#), which was formed to invest in technology and research for a 2022 national market launch. Mr. Knight said protocol pilots are planned for 50,000 acres of ranch and cropland. [An initial market analysis](#) estimates a total volume and value of carbon and water quality market demand at nearly \$14 billion, he said.

### Dimensions of Adoption

**Ms. Pipa Elias**, Soil Health Strategy Manager at The Nature Conservancy, addressed the role [non-operating landowners](#) can play in the adoption of soil health and the urgency in educating these individuals so they can become strong advocates of soil health investments. Interestingly, a survey revealed that although non-operator landowners indicated they believe in the merits of soil health, they expressed limited interest in conservation interventions.

Farmers, on the other hand, respond to visual comparisons, according to **Dr. Bill Robertson**, Cotton Extension Agronomist with the University of Arkansas System Division of Agriculture Cooperative Extension Service. He asks producers to set up small portions of their fields with [cover crops and no-till next to their conventional methods](#). He then can show them the differences of their side-by-side plots throughout the year, both anecdotally and with measurements.

**Dr. Christine Morgan**, Chief Scientific Officer of the Soil Health Institute, noted that farmers who had adopted [soil health practices](#) in Central Texas referred to an informal mentoring network and that both adopters and non-adopters have a strong ethic toward stewardship of soil for future generations.

### Determining Effective Measurements of Soil Health

Soil Health Institute scientists recently completed their North American soil sampling of long-term research sites across North America. By the end of Spring, 116 of 120 sites had been sampled, totaling 1,891 of 2,024 experimental units. Laboratory data are expected by December 2019.

The scientists outlined their sampling methodology, preliminary data analyses, and reviewed the database design that will ensure those who research soil health management systems have a new, rich data resource. The expectation is to begin to release reports in 2020.

### Connections to the Land

Today as soil health has gained traction as a global imperative, many have expressed an interest in farm families' and indigenous populations' historic relationship with the land. A few of those deeply rooted traditions were provided by four individuals who represented the broad diversity within the soil health community – **Mr. Nick Tipon**, Elder and Member, Federated Indians of Graton Rancheria; **Dr. Jessica Hutchings**, Kaupapa Māori Researcher; **Mr. Klaas Martens**, an organic producer from New York, and **Mr. Jimmy Kinder**, a fourth generation Oklahoma farmer. All shared their passion and deep respect for the environment, including wisdom inherited from individuals they respect.

## Exciting Activities Planned for 2020

After recapping 2018-2019 progress, SHI Action Teams established clear next steps on Thursday morning.

Action Team	2020 Priorities
Economics	Provide plan for partial budget distribution and education, policies that will protect producers' confidentiality; develop concepts to calculate CO <sub>2</sub> emissions impact, ecosystem services and land values; economic evaluation of pests in fields managed for soil health vs. conventional systems.
Measurements, Standards, and Assessments	Isolate important factors to address as the SHI scientists analyze soil health indicators; identify stakeholder information needs; and gain insight from laboratories.
Research and Development	Increase transdisciplinary research; evaluate cover crop options, research pest management in systems with cover crops, compare cover crops to perennial systems, and research crops with greater economic value that may provide producers with cover crop alternatives.
Consumer and Farmer Education	Provide an events calendar with soil health event promotional capabilities, build a library of soil health education resources, and create an inclusive soil health social media program.
Policy	Provide further review of 2018 Farm Bill implementation and advise agencies as well as assist with facilitation, e.g., RCCP contract provisions and forest research.

## MARK YOUR CALENDAR



July 29-31,  
2020

**5<sup>th</sup> Annual  
Meeting**

Des Moines,  
Iowa USA

In 2020, SHI will host its  
**5<sup>th</sup> Annual Meeting**  
**July 29-July 31**  
**Des Moines, Iowa USA**

To save the date  
**CLICK**

▼ ▼ **HERE** ▼ ▼





# PLENARY SESSIONS

## ■ POLICY

### ***Session: Soil Health Policies in Action***

***Moderator: Dr. Timothy Griffin, Tufts University***

#### **Connecting the Policy Dots for Soil Health**

**Dr. Timothy (Tim) Griffin**, Associate Professor at the Friedman School of Nutrition Science and Policy, Tufts University, discussed how policies from various government agencies affect soil health and the work of the Soil Health Institute. While governmental policies and programs have a great influence on soil health, he explained, soil health is a rare issue where there is virtually unanimous agreement for the need for improvement. Figuring out how to align the interests of various policy makers is where the work of the Soil Health Institute can be incredibly beneficial.

#### **California's Healthy Soils Program**

**Ms. Karen Ross**, Secretary of the California Department of Food and Agriculture, highlighted California's Climate Smart Agriculture programs, starting with the on-farm water use efficiency program. This was the first program that asked farmers to calculate their estimated greenhouse gas emissions reductions.

California has an overall goal to reduce methane emissions from the dairy and livestock sectors by 40% by 2030. The estimated reduction in greenhouse gases is nearly 40 million metric tons. Secretary Ross has climate-smart agriculture delegations around the world. Many countries in the European Union have started to adapt and adopt similar soil health practices to those championed by the Soil Health Institute.

#### **What's in the Farm Bill for Soil Health?**

**Ms. Alyssa Charney**, Senior Policy Specialist at the National Sustainable Agriculture Coalition (NSAC), an alliance of grassroots organizations working to advance the sustainability of agriculture, food systems, natural resources, and world communities, provided an overview of the soil health provisions in the 2018 Farm Bill.

Some of the reforms in the 2018 Farm Bill that may influence soil health are the restructuring of conservation programs, increased monetary incentives to farmers, land and soil protections, widening access to financial and technical assistance, provisions for soil health data collection, and reforms to crop insurance. Ms. Charney outlined increased payments for cover crops, crop rotations, advanced grazing management, new conservation buffer initiatives, the new Soil Health Demonstration Trial, and more.

# PLENARY SESSIONS

## ■ RESEARCH and DEVELOPMENT

**Session: Advances in Soil Health Research**

**Moderator: Dr. LaKisha Odom, Foundation for Food and Agriculture Research**

### Next Frontiers in Soil Health

**Dr. LaKisha Odom**, Scientific Program Director of The Foundation for Food and Agriculture Research (FFAR), addressed the mission, current progress, and long-term vision of FFAR for soil health.

Since 2016, FFAR, which emphasizes private-public partnerships by matching funding partners dollar for dollar, has awarded more than 100 grants, allocating \$200 million at a 1 to 1.25 ratio. Soil health projects have netted \$89 million of those funds. FFAR focuses on research opportunities that have a few key components: Projects must fill research gaps and strive to address emerging issues in food and agriculture. These projects might consider new paradigms, adaptability at scale, resolve intractable issues, emphasize a tech transfer, and/or feature disruptive technologies and methods. The specific focus areas at FFAR consist of research supporting a fully functional ecosystem services marketplace, linkages between farm productivity and soil health, and incorporating soil health into ecosystem goods and services from grazing lands.

### The Rangeland Monitoring Network: Connecting Soil Health to Biodiversity and Stewardship on California's Rangelands

**Dr. Libby Porzig**, director of the Working Lands Group at Point Blue Conservation Science (PBCS), showcased the Rangeland Monitoring Network, which measures the ecological function of rangelands with standardized protocols across California. Researchers at UC Davis have estimated 80% of California's surface water is captured by or flows through rangelands. With that in mind, Rangeland Monitoring Network seeks to find correlations among soil properties and variation in water infiltration with the hope of using that information to help landowners become better stewards of these systems. Rangeland Monitoring Network partners with NRCS biologists on the local level to support conservation planning and provide feedback to producers. Sites are resampled every three years with indicator results sent to participants. The monitoring progress has reached 88 ranches in 24 counties collecting 796 soil samples from 453 locations.

### One Size Does Not Fit All

**Dr. Alex McBratney**, Director of the Sydney Institute of Agriculture, placed soil health at the nexus of seven global challenges. The seven global challenges identified are food security, energy sustainability, human health, biodiversity protection, climate change, water security, and food security. In order to gauge the influence of soils on those challenges, some dimensions and functions of the soil security have also been identified, he added. The soil security dimensions identified for this research are capability, condition, capital, connectivity, and codification. Functions of the soil identified are biomass



A nexus of **seven** global challenges



production, storage/filtering/transforming of nutrient/substances/water, biodiversity pool, physical and cultural environment, as a source of raw materials, carbon sequestration, and as an archive of geological and cultural heritage. By these calculations, 5 dimensions and 7 soil functions equal the large challenge of 35 evaluations to be made to have a holistic picture of the importance of soils.

## **ARS Soil Microbiome and Soil Ecosystem Research – Brief Overview and Example of An Extensive Research Enterprise**

**Dr. David Knaebel**, USDA-ARS National Program Leader, provided an overview of research projects conducted by USDA-ARS on the soil microbiome. At USDA's request, that presentation was not recorded.

## **Exploring Soil Health – Human Health Connections**

**Dr. David Collier**, Professor of Pediatrics and Health Disparities at the Brody School of Medicine at East Carolina University (ECU), summarized insights from the Soil Health Institute's *Conference on Connections Between Soil Health and Human Health*. The conference on soil health and human health connections gathered individuals and groups in the medical community and soil science community together to allow each to understand different perspectives and share insights from multiple disciplines. Presentations involved the influence of soil health on human nutrition and food safety, the interconnections within the soil-food-human microbiome, intersections/ disconnections in food/ag and human health policies, as well as funding opportunities and challenges.

According to the World Health Organization, 23% of all global deaths are linked to the environment, Dr. Collier explained. The causes of death illness ranging from the frequency of weather disasters, rates of pathogen spread, respiratory disorders due to air quality issues, and more can be linked, in some part, to soil health.



By the end of the conference, 10 priorities were established, including research on microbiome structures, connecting existing research of human microbiome to the soil microbiome, integrating existing data of soil health to human health, understanding soil health and regenerative systems around the world, and framing future research questions from the perspectives of both farmers and health care providers.

## ■ ECONOMICS

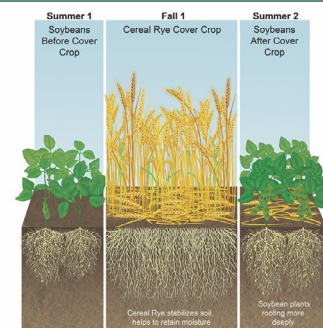
**Session: Filling the Economics Gap for Farmers**

**Moderator: Dr. Rob Myers, USDA-SARE**

### Evaluating the Dollars and Sense of Cover Cropping to Improve Soil Health

**Dr. Rob Myers**, Regional Director of Extension Programs for the USDA-NIFA North Central Region Sustainable Agriculture Research and Education (SARE) program, reviewed the “dollars and sense” of cover cropping. Dr. Myers delivered highlights from the recently published USDA Sustainable Agriculture Research and Education (SARE) in-depth report about the economics of using cover crops. The report outlined seven management challenges that affect cover crop economic returns. These scenarios include herbicide-resistant weeds, compacted soils, fertility costs, converting to no-till, grazing cover crops, cover crop incentive programs, and water retention.

Extension of Corn Root Surface Area through Mycorrhizal Fungi



With extra return of \$58/acre on corn and \$65/acre on soybeans, cover crops pay off in year one

Myers compared the initial cost of investing in cover crops to

other long-term investments like lime applications and equipment purchases. While these activities are somewhat costly in year one, they have a net positive return on the investment over longer periods of time. The three key aspects of cover crop economics are efficiency, using a multi-year timeline to evaluate returns, and cover crops' impact on the resiliency of a cropping system, he added.

### The Economics of Soil Health

**Dr. Shafali Mehta**, Executive Director of the Soil Health Partnership, delivered an overview of the work of the Soil Health Partnership (SHP), which partners with farmers as they try new soil health management practices with the goal of improving soil health. The Soil Health Partnership is a farmer-led initiative including 120 partners covering 15 states. The research centers around long-term, on-farm trials on active farmlands. The SHP strives to connect three elements of on-farm engagement, data and science, and communications and outreach. The SHP has 3 core trial types: tillage, cover crop, and nutrient management. They have recently added grazing and cash crop trials. In years one and two, benchmarking yield and soil data will be provided to the SHP farmer network. Years 3 and 4 will include soil health comparison of baseline versus year 2 with a treatment and control yield comparison. Year 5 will include similar treatment to control comparisons along with 3 sets of soil health sample comparisons.

## Catalyzing a National Ecosystem Services Market

**Mr. Bruce Knight**, Strategic Conservation Solutions, reviewed the history of ecosystem services markets and their potential to incentivize farmers and ranchers to improve soil health.

After a few years of working groups, the Ecosystem Services Market Consortium was formed to invest in technology and research for a 2022 national market launch. The protocol pilots are planned for 50,000 acres of ranch and cropland. In order to serve a broader set of demands and practices, the ESMC Market has tiered, modular protocols for multiple assets and demands. Additionally, the market is set up to be systems-based, outcomes-based, and practice agnostic in order to encompass a wider variety of solutions. An initial market analysis estimates a total volume and value of carbon and water quality market demand at nearly \$14 billion. This demand is split between carbon and water quality credits.

## ■ CONSUMER and FARMER EDUCATION

**Session: Dimensions of Adoption**

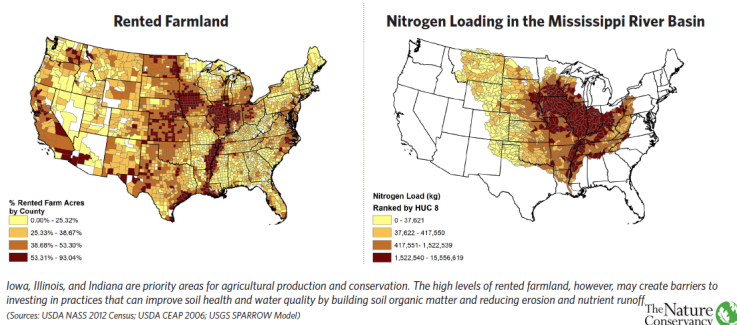
**Moderator: Ms. Pipa Elias, The Nature Conservancy**

### Non-Operator Landowners: Demographics and Opportunities for Engagement on Soil Health

**Ms. Pipa Elias**, Soil Health Strategy Manager at The Nature Conservancy, demonstrated the importance of soil health education among non-operator landowners. These individuals rent their farmland to active farmers and ranchers.

Ms. Elias used two maps to unveil the overlap between majority-rented farmland and nitrogen loading in the Mississippi River Basin. The presentation then focused on non-operator landowners (NOLs) in Iowa, Illinois, and Indiana, the majority of which are retired. A survey from the American Farmland Trust uncovered that nearly all said they value conservation and soil health, avoiding erosion, maintaining soil productivity, and avoiding waterway contamination. Yet only half of all NOLs expressed limited interest in periodic conservation interventions. What's more, the majority of NOLs were not interested in joining peer learning groups or working with private businesses for conservation needs.

### Why Non-operator Landowners



# PLENARY SESSIONS

## **Enhancing Adoption of Soil Health Systems: The Arkansas Experience**

**Dr. Bill Robertson**, Cotton Extension Agronomist with the University of Arkansas System Division of Agriculture Cooperative Extension Service, shared efforts to win over farmers to advance soil health, highlighting collaboration among the University of Arkansas DOA (research and extension), USDA NRCS, USDA ARS, the Arkansas Soil Health Alliance, and others.

Dr. Robertson explained how he uses visuals to compare and contrast field areas. He asks producers to set up small portions of their fields with cover crops and no-till next to their conventional methods. He then can show them the differences of their side-by-side plots throughout the year, both anecdotally and with measurements.

## **Actionable Links to Promote Adoption of Soil Health Systems: A Transdisciplinary Economic, Social, and Soil Science Approach**

**Dr. Cristine Morgan**, Chief Scientific Officer of the Soil Health Institute, focused on the “Actionable Links to Promote Adoption of Soil Health Systems: A Transdisciplinary Economic, Social and Soil Science Approach.”

Dr. Morgan recounted the large disconnect between the literature about the benefits of soil health practices and NAS surveys of adoption rates of soil health practices throughout Texas. She decided to research why adoption rates were so low, hypothesizing sociological and economic factors as influences. The goals of the sociological studies were to discover which soil health changes are meaningful to farmers’ welfare and to discover common themes around perceptions of adoption of soil health practices. The two major themes that emerged from these discussions were water management and organic matter.

Focus groups also provided insights into how soil health practice adoption had occurred in a few areas in Texas. These farmers had built communication channels with a mentor assisting and guiding their first steps into soil health. The farmers who had not adopted soil health practices alluded to a yield culture among neighbors.



Photo by Katie Harrigan, Soil Health Institute 2019 Intern



# PLENARY SESSIONS

## ■ MEASUREMENT, STANDARDS, and ASSESSMENT

**Session: *Determining Effective Measurements of Soil Health***

**Moderator: *Dr. Cristine Morgan, Soil Health Institute***

### **North American Project to Evaluate Soil Health Measurements**

**Dr. Cristine Morgan**, Chief Scientific Officer of the Soil Health Institute, moderated fast-paced summaries of the ambitious North American Project to Evaluate Soil Health Measurements (NAPESHM).

The North American Project to Evaluate Soil Health Measurements (NAPESHM) has almost finished the soil sampling phase of the project, which analyzes long-term management on 31 selected soil health indicators. Of the 154 site applications considered, 120 were selected for long-term research sampling. By the end of Spring, 116 of 120 sites had been sampled, totaling 1,891 of 2,024 experimental units with laboratory data expected by December 2019.

- ▶ **Dr. Shannon Cappellazzi**, project lead scientist for the western United States and who also leads the team for soil health in pastures and rangeland, reviewed the NAPESHM protocols.
- ▶ **Dr. Kelsey Hoegenauer**, project lead scientist for the southern United States, provided a synopsis of cropping systems and soil health promoting practices that are being reviewed.
- ▶ **Dr. Charlotte Norris**, project lead scientist for Canada, provided an overview of the grazing systems as well as a look at varying climates and soils that are involved in the study.
- ▶ **Dr. Paul Tracy**, project manager, discussed the soil health indicators assessment project in Mexico.
- ▶ **Dr. Gregory (Mac) Bean**, project lead scientist for Missouri, Illinois, Indiana, Kentucky, Pennsylvania, Delaware, Virginia, and West Virginia who also leads soil pedology and genesis evaluations, reviewed the assessments of saturated hydraulic conductivity across the sites.
- ▶ **Dr. Dan Liptzin**, project lead scientist for the High Plains, explained how the project will evaluate soil organic carbon and enzyme dynamics.
- ▶ **Dr. Elizabeth (Liz) Rieke**, project lead scientist for the northern Midwest and northeastern United States who also leads assessment of microbial population dynamics, provided a brief overview of the selected genomic indicators, including how the project scientists hope to uncover genomic indicators of soil function.
- ▶ **Dr. Michael Cope**, the project's statistician and database manager, outlined how the team will capture, categorize, analyze and report out the massive assorted data.

Scientists indicated they will begin to provide meaningful insight and information as early as 2020.

# PLENARY SESSIONS

## Special Session: CONNECTIONS TO THE LAND

**Moderator: Dr. Wayne Honeycutt, Soil Health Institute**

**Dr. Wayne Honeycutt**, President and CEO of the Soil Health Institute, moderated a unique “Connections to the Land Panel” to close the Plenary Session. The goal: to reveal the diversity of passion for soil health across cultures through real-life stories as all seek to learn from multiple perspectives and build partnerships that advance soil health globally.

**Mr. Nick Tipon**, an enrolled member and elder of the Federated Indians of Graton Rancheria (Coast Miwok and Southern Pomo), described ways in which Native American people have been connected to and traditionally cared for soils. He outlined current measures being adopted by Native people, as well, such as granting of personhood to rivers in order to better protect these natural resources.

**Dr. Jessica Hutchings**, who holds senior management and leadership roles in the Māori science and research sectors, discussed the perspectives of those native to Aotearoa, New Zealand, giving examples of traditional Māori beliefs that inform her research.

**Mr. Klaas Martens**, a farmer, began transitioning his farming operations to organic in 1993. Mr. Martens spoke about his challenges, partnering with researchers from Cornell University, and then resolving how to use specialized planting to increase the health of soils and yields. He said nearly any intractable problem was remedied after he added a new crop and diversity into his system.

**Mr. Jimmy Kinder**, a 4th generation farmer/rancher from Cotton County, Oklahoma, examined the historic impact of the Dust Bowl in his area and how families learned from tragedy to promote sustainable agricultural practices.



Photo by Katie Harrigan, Soil Health Institute 2019 Intern



# ACTION TEAM BREAKOUT REPORTS

## ■ ECONOMICS

Economic partial budget data will be acquired and analyzed to assist in determining the return-on-investment from soil health practices. Empirical economic analysis is needed to determine profitability. Once revealed, a plan will be required to effectively educate producers so they implement the practices that appear to be profitable and improve soil health. The Economics Action Team discussed the approach that will be used and evaluated opportunities to improve the accuracy of information.

Projects Providing Raw Data	Scope of Project
North American Project to Evaluate Soil Health Measurements (NAPESHM)	123 long-term research sites – Canada, Mexico, and the United States
Healthy Soils for Sustainable Cotton	Cotton producers who are implementing soil health practices
NACD	25 producers
Economic Assessment of Soil Health (Cargill Project)	100 producers

## QUESTIONS DISCUSSED

Questions	Responses
What practices? Just cover crops?	No. The raw data will indicate practices to be evaluated.
What about externalities with no market, e.g. biodiversity	Most likely that would need to be a separate analysis.
Could greenhouse gas emission reductions be coupled to this analysis since management practices could be inputs for model?	Economic model can look at CO <sub>2</sub> , but doing so is not planned within this project.
Do the acreages divide fate of corn soybeans into food/fuel/fertilizer?	Yes.
If farmers implement, how will they know if practices are better? Do they need to keep track of anything extra to see changes?	Research includes controls as well as practice adoption, including exactly how they are changing. Farmers often implement digital tools to check on practices.
For enterprise budgets, is there any way to look at error in forecasts?	Enterprise budgets are not a probabilistic model, so there isn't a measurement of accuracy.
Can you collect information on what else might change besides planned practice changes? For example, might you have less pathogens after practice adoption?	Good idea to include as soil health practices.
What about looking at extreme weather effects?	Good idea, would need time series of yields.
Can you look at farming system as a whole instead of individual practices?	Farmer questionnaire will capture changes that they implement.
Can you incorporate land value instead of just revenue?	Not directly, but changes in yields over time would imply changes in land value.
For NAPESHM, what are the goals of knowing management?	Can take management data and quantify it, e.g. disturbance index, number of days with cover....

# ACTION TEAM BREAKOUT REPORTS

## ■ ECONOMICS *(continued)*

### RECOMMENDATIONS

Dissemination of partial budgets	<ul style="list-style-type: none"><li>• Field Days (invite bankers/loan officers), Crop Insurance, farmer networks, agency/ NGO local/state/national newsletters, corporate groups (e.g. Field to Market)</li><li>• Need agents of change that are close to the farmers</li><li>• Can SHI produce materials, but rely on other organizations to do outreach/education?</li></ul>
Logistics/Content/Diplomacy of interviews	<ul style="list-style-type: none"><li>• Make sure that you have confidentiality policy</li><li>• Semi-structured interviews with must-ask questions with flexibility for other questions</li><li>• Could farmer data be collected with anonymous surveys instead of in interviews?</li><li>• Can you have incremental ask? Ask for 5-year yield? Ask are you willing to share more detailed data?</li><li>• Variability is important to quantify as soil health practices might decrease variability</li><li>• Make sure that people being interviewed have something to gain from process – provide results to them, build long-term relationship</li><li>• Consider interviewing other influencers: CCAs, fertilizer distributors/retailers, nutrient management planners</li><li>• Let commodity boards/farm groups on board with survey so that their members might be more willing to participate</li><li>• Include place for anecdotes on survey</li></ul>
Future efforts	<ul style="list-style-type: none"><li>• Calculate CO<sub>2</sub> emissions</li><li>• Pest suppression</li><li>• Values for ecosystem services</li><li>• Changes in land values</li></ul>
Opportunities for data analysis	<ul style="list-style-type: none"><li>• Multivariate, mixed effects models</li></ul>

## ■ MEASUREMENT, STANDARDS, and ASSESSMENT

### SOIL HEALTH INDICATORS | IMPORTANT FACTORS TO ADDRESS

Variability of Soils	<ul style="list-style-type: none"> <li>• Temperate vs. Tropical</li> <li>• Silicate Based Soils vs. Organic Soils vs. Volcanic Soils</li> <li>• Lumping by Texture – could potentially keep it broad – sandy, loamy, clayey</li> </ul>
Importance of Calibration	<ul style="list-style-type: none"> <li>• Requires time</li> <li>• Must move beyond Proficiency Testing</li> <li>• Must recognize realities within the lab – commercial labs need to be high throughput and turn a profit</li> </ul>
Different stakeholder groups value/need different things when selecting indicators; weight/importance of these considerations varies by stakeholder group	<ul style="list-style-type: none"> <li>• Ease of sampling</li> <li>• Ease of measurement</li> <li>• Cost</li> <li>• Interpretability</li> <li>• Sensitivity to Management</li> <li>• Accuracy</li> <li>• Reliability</li> </ul>
Priorities vs. tradeoffs of various indicators	<ul style="list-style-type: none"> <li>• May need to develop a core list with add-ons based on your intended use/outcome</li> <li>• Need to consider adaptability to other contexts (i.e., smallholder farmers/ socioeconomically disadvantaged communities)</li> <li>• Organize by stakeholders or by use/outcome to verify?</li> </ul>

### ACTION TEAM NEEDS

Technical Advisory Board	Develop a list of top 3, top 5, and/or top 10 indicators (different price points, time/resource commitments so as to have an adaptable index)
Landscape Analysis	<p>What commercial and analytical labs are currently doing in regard to soil health:</p> <ul style="list-style-type: none"> <li>• What they recommend in regard to sampling protocol</li> <li>• How they are processing soils</li> <li>• What metrics/indicators they are analyzing</li> <li>• What methods they are using/how are they analyzing samples</li> <li>• What their QA/QC protocol looks like</li> <li>• Blanks?</li> <li>• Standards?</li> <li>• Spiked Samples?</li> <li>• Proficiency Testing?</li> <li>• What metrics they would be willing to add</li> <li>• What resources/support they would need to add on these tests</li> </ul>

## ■ MEASUREMENT, STANDARDS, and ASSESSMENT (continued)

### CONSIDERATIONS REGARDING DISCUSSION OF INDICATORS BASED ON STAKEHOLDER NEEDS

Farmers	<p>Ultimately needs to be broken down by rangelands vs. cropping systems; smallholder farmers vs. large scale farmers</p> <p><b>Needs:</b></p> <ul style="list-style-type: none"> <li>• Resource Concerns</li> <li>• Interpretability of results</li> <li>• Return on Investment</li> <li>• Risk Mitigation and Resilience</li> <li>• NUE &amp; WUE</li> <li>• Water Capture</li> <li>• Disease Control</li> <li>• Regionally relevant information</li> <li>• Management guidance for long-term sustainability                             <ul style="list-style-type: none"> <li>» Scalability</li> <li>» Feasibility</li> </ul> </li> <li>• Erosion Control</li> <li>• Impact on overall labor needs and costs                             <ul style="list-style-type: none"> <li>» Field sampling for assessing indicators</li> <li>» Adoption of management practices</li> </ul> </li> <li>• Access to markets</li> </ul>	<p><b>Metrics:</b></p> <ol style="list-style-type: none"> <li>1. Infiltration Rate – cheap but labor intensive and highly variable → NRCS coming out with a simple, validated field method by year's end</li> <li>2. Aggregate Stability – Slake app</li> <li>3. Soil Organic Carbon – SOM part of a regular lab test</li> <li>4. Water Holding Capacity</li> </ol>
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## ■ MEASUREMENT, STANDARDS, and ASSESSMENT (continued)

<p><b>Bankers/ Insurers/Risk Assessors</b></p>	<p><b>Needs:</b></p> <ul style="list-style-type: none"> <li>• Ability to assess risk → NRCS already has inroads to Risk Management Agency <ul style="list-style-type: none"> <li>» Erosion risk</li> <li>» Impact on Water Quantity/Quality <ul style="list-style-type: none"> <li>&gt; What to look at for water quality? How to test?</li> </ul> </li> <li>» Pest/pathogen pressure</li> <li>» Biodiversity – role in resiliency</li> </ul> </li> <li>• Ability to calculate return on investment (ROI) <ul style="list-style-type: none"> <li>» Banks follow yield relationships</li> <li>» Concerned with overall profit, not just yield</li> <li>» Need predictive models to determine financial benefit <ul style="list-style-type: none"> <li>&gt; Most common models used at present: DNDC/ Daycent → focuses on C/N, GHG, nutrient cycling</li> <li>&gt; Need to add in water quantity/quality and erosion risks</li> </ul> </li> <li>» Need continued collection of more/better data to improve predictive models</li> </ul> </li> <li>• Averages <ul style="list-style-type: none"> <li>» By region</li> <li>» By soil type – by texture, climate, etc.</li> <li>» Need to provide with context of threshold ranges</li> </ul> </li> <li>• Other Considerations <ul style="list-style-type: none"> <li>» When should sampling occur?</li> <li>» How frequently?</li> <li>» Where? At random?</li> </ul> </li> </ul>	<p><b>Metrics:</b></p> <ol style="list-style-type: none"> <li>1. SOC</li> <li>2. Infiltration Rate</li> <li>3. Aggregate Stability</li> <li>4. AWHC</li> <li>5. Sediment Loss/Erosion</li> <li>6. Water Quality</li> <li>7. Pest/Disease Pressure/Loss</li> <li>8. Yield</li> <li>9. Costs (Inputs, labor, utilities, etc.)</li> </ol>
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# ACTION TEAM BREAKOUT REPORTS

## ■ MEASUREMENT, STANDARDS, and ASSESSMENT (continued)

<p><b>Policymakers – GHG Policy vs. Water Policy</b></p>	<p><b>a. GHG Policy</b></p> <ul style="list-style-type: none"> <li>• Issue of Permanence – these practices buy us time; if it's stored in soil, it's not in atmosphere; may not have to be permanent (some have proposed rentals)</li> </ul> <p><b>b. Water Policy</b></p> <ul style="list-style-type: none"> <li>• Need regional specificity. Must consider:             <ul style="list-style-type: none"> <li>» Nutrient Management Plans</li> <li>» Water regulations/restrictions</li> </ul> </li> </ul>	<p><b>GHG Metrics:</b></p> <ol style="list-style-type: none"> <li>1. TOC</li> <li>2. Bulk Density</li> <li>3. Texture</li> <li>4. pH?</li> </ol> <p><b>Water Metrics:</b></p> <ol style="list-style-type: none"> <li>1. Water Quality             <ol style="list-style-type: none"> <li>a. Nitrate</li> <li>b. Toxins</li> <li>c. DOC</li> </ol> </li> <li>2. <math>K_{Sat}</math> – can't just use NRCS data, because structure and management changes</li> <li>3. Infiltration Rate/AWHC</li> <li>4. Salinity</li> <li>5. NUE</li> <li>6. Extractable N and P</li> <li>7. Aggregate Stability</li> <li>8. Erosion</li> </ol>
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## ■ MEASUREMENT, STANDARDS, and ASSESSMENT (continued)

### NEXT STEPS/CALLS TO ACTION

Labs need to turn a profit and must operate at high-throughput. This leads to:

- Changes in Standard Operating Procedures (SOPs)
- Potential for less precision and accuracy

Therefore, the Action Team wants direct communication with labs → could be a product to work on?

- Conduct a Survey of labs → already one from NRCS?
  - » What sampling protocol do you recommend?
  - » What “soil health” indicators do you analyze? (Provide list of 19 indicators)
  - » How do you process soils for various soil health tests?
  - » What methods do you use for various soil health tests?
  - » Of the tests that you don’t currently offer, are there any that you would be willing to add?
  - » What resources/support would you need to be able to offer those additional tests?
  - » Are there incentives that would encourage you to offer others?
  - » What does your QA/QC protocol entail?
  - » Do you participate in cross lab validation? Which (i.e., North American Proficiency Testing)?
- Challenge – adjust thinking
  - » Develop thresholds based on edaphic characteristics
- Encourage policy to conduct lab training and develop equipment for high-throughput soil health analyses
- Need QA/QC calibration for soil health metrics (heavily emphasized)
- Need transparency
- Need to develop a Private/Public Method SOP

## ■ RESEARCH and DEVELOPMENT

### Session Objective:

Facilitate a discussion grounded in production reality, which recognizes that cover cropping is not a plug- and-play practice in California conditions and cropping systems. We want to catalogue what is happening with cover cropping in California systems, with what effects noted – be they benefits or management problems.

### Targeted Actionable Session Outcomes:

1. How are cover crops being used in California
2. Challenges experienced in using cover crops
3. Benefits observed using cover crops
4. Additional information, technology or policy support would help those who wish to use cover crops but have challenges they have not yet overcome
5. Specific Research Questions that growers hope to see addressed
6. Resources that people have found useful, additional resources (print, online, etc.) desired

### ASSESSING SOIL HEALTH PRACTICES ADOPTION IN CALIFORNIA

Restrictions to adoption	<ul style="list-style-type: none"> <li>• Growers accepting change</li> <li>• Long list of very diverse specialty crops in California – 250+ with many having complicated management issues that may not be conducive to cover crops</li> <li>• Fear of damage to expensive infrastructure (Trellises, drip lines, etc.)</li> <li>• California climate, water limitations, etc., put added pressure on cover crop agronomics/economics</li> <li>• The majority of acres are farmed by non-owners who may not want to share the cost associated with cover crops, especially if benefits occur after their current contracts with the landowner expire</li> <li>• High value crop contractors/processors have huge influence on farmers and any delays in production caused by cover crops are negatively received, especially early season premiums</li> <li>• Cover crops have been known to introduce contaminants into the food supply and harbor disease and insect vectors that are extremely damaging to high value crops</li> <li>• Cost of growing the cover crop</li> </ul>
Positive reasons for adoption	<ul style="list-style-type: none"> <li>• Increasing soil organic matter and soil carbon in a region where it is commonly very low</li> <li>• Environmental benefits (carbon sequestration, erosion control and especially nitrate retention before it leaches into to the groundwater in areas that require high nitrogen demand for specialty crops</li> <li>• Other soil health/human health issues</li> <li>• Society policy cost burden sharing through regulatory relief</li> <li>• Food quality and social acceptance (consumer demand/preference) of sustainable farming operations</li> </ul>

# ACTION TEAM BREAKOUT REPORTS

## ■ **RESEARCH and DEVELOPMENT** *(continued)*

Options/Research Priorities Moving Forward	<ul style="list-style-type: none"><li>• There is a huge need for transdisciplinary research</li><li>• How to deal with the pest management problems cover crops potentially create</li><li>• Cover crops in annual vs. perennial systems in California is a challenge</li><li>• Incorporating alternative crops that have some economic value as opposed to a true cover crop</li><li>• Much work needs to go into cover crop species/cultivar selection to match the huge diversity of crops grown in California</li><li>• Temporal/Spatial systems need worked out</li><li>• How to develop cover crops in raised bed systems that are prevalent in California</li><li>• Need to step back and conduct a literature review on cover crop options in California</li></ul>
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# ACTION TEAM BREAKOUT REPORTS

## ■ CONSUMER and FARMER EDUCATION

### Session Objective:

Provide counsel and assessment on two online website assets:

- A Soil Health Events Portal that will serve as a soil health event hub for partners.
- An Education Portal that will serve as a soil health education resource center for all stakeholders.

### EVENTS PORTAL

In 2018, the Action Team decided to add ability for a soil health partner to:

- Target audience by geography and/or interest;
- Have a page for “individual” event information and archives;
- Have easy-to-use promotional tools/support.

Events Landing Page	Add Past Events to top navigation Add My Events to top navigation (which will provide access to password protected, individual event web pages and a self-select promotional push campaign)
Past Events	Add Find Events button that takes visitor to organization’s events, including Agenda, video, and organization’s previous event archives.
Archives Pages	Archives pages will include event logo; event name; location; dates; short event summary; links to Word documents, PDF documents, YouTube video, and photo gallery; testimonials/ quotes; and event sponsor logo(s)
Target Audience - Promotional Selections	<ul style="list-style-type: none"><li>• People interested in agriculture – general farm and ranch audiences</li><li>• Primarily small acreage farmers and hobbyists</li><li>• Primarily livestock producers</li><li>• Primarily certified organic farmers</li><li>• Primarily urban farmers</li><li>• Gardeners</li><li>• Primarily individuals who have expressed interest in community supported agriculture and farm-to-table programs</li><li>• Agribusiness Professionals</li><li>• Soil scientists</li><li>• Microbiome researchers</li><li>• Horticulturists</li><li>• Landscapers</li><li>• Environmental engineers</li><li>• Parks &amp; recreation professionals</li><li>• Forestry professionals</li><li>• Educators</li><li>• Policy makers</li><li>• General Public</li><li>• Environmentalists</li><li>• Nutritionists</li><li>• Restaurateurs</li><li>• Legislators</li><li>• K-12 Students</li><li>• Other: _____</li></ul>

# ACTION TEAM BREAKOUT REPORTS

## ■ CONSUMER and FARMER EDUCATION *(continued)*

### EDUCATION PORTAL

Soil health educations seek an information and curricula resource hub for use by all stakeholders in the soil health community. The site would include multiple links to existing online assets.

Website name selected: **Soil Health Learning Zone**

Slogan selected: ***Your Soil Health Learning Portal***

Adult Targets	<p>Link to those who require convenience as they access/seek soil health education resources:</p> <ul style="list-style-type: none"> <li>• USDA-ARS</li> <li>• USDA- NRCS</li> <li>• SARE</li> <li>• Agricultural Extension Specialists</li> <li>• Agricultural Extension Agents</li> <li>• Ag Retailers</li> <li>• Crop, Range Management Consultants</li> <li>• Agriculture and Conservation Organizations</li> <li>• Commodity Groups</li> <li>• Land Management Organizations</li> <li>• Ag Journalists   Broadcasters</li> <li>• Assistant Professors</li> <li>• Doctoral Candidates</li> <li>• Ag Public Relations Practitioners</li> <li>• State and Local Governments</li> <li>• Future Agricultural Educators</li> <li>• Current Vocational Agricultural Educators</li> <li>• Farmers</li> <li>• Ranchers</li> <li>• Master Gardeners</li> <li>• Corporations – SDG Leaders</li> <li>• Environmental Organizations</li> <li>• Healthcare Professionals</li> </ul>
K-12 Targets	<ul style="list-style-type: none"> <li>• Science (S.T.E.M.) Teachers</li> <li>• Future Farmers of America Advisors</li> <li>• Parks and Rec Program Leaders</li> <li>• Communities</li> <li>• 4-H Leaders</li> <li>• Church Youth Group Leaders</li> <li>• Environmental Organizations</li> <li>• Healthcare Professionals</li> </ul>

# ACTION TEAM BREAKOUT REPORTS

## ■ CONSUMER and FARMER EDUCATION *(continued)*

SEGMENT SEARCH BY

Production System	Organic Conventional
Resource Concern	<ul style="list-style-type: none"> <li>• Soil Structure</li> <li>• Soil Organic Matter</li> <li>• Water Availability</li> <li>• Nutrient Management</li> <li>• Erosion</li> <li>• Insects</li> <li>• Disease</li> <li>• Weeds</li> <li>• Risk Reduction</li> <li>• Money</li> <li>• Also: Studies, Reports and Links</li> </ul>
Function	Environmental Farming/Ranching Lawn/Garden
Geographical Area	Based on SARE regions
Crop/Crop Rotation	Initially: <ul style="list-style-type: none"> <li>• Soybeans</li> <li>• Corn</li> <li>• Wheat</li> <li>• Cotton</li> <li>• Peanuts</li> </ul>
Soil Science	<ul style="list-style-type: none"> <li>• Physical</li> <li>• Chemical</li> <li>• Biological</li> </ul>



## ■ POLICY

The Policy Action Team reviewed the 2018 Farm Bill provisions, indicated implementation challenges, and discussed providing feedback through informal recommendations and during the rulemaking period. (Interim final rules are anticipated by the end of November.)

### DISCUSSION – PROVISIONS

#### Conservation Reserve Program (CRP)

- CRP land: increase to the total acreage allowed for enrollment (10-year contracts). Can you harvest parts of your CRP land? Yes, but it depends (can't harvest for bioenergy).
- CRP doesn't necessarily improve soil health because it doesn't include management. If CRP could include management, it could be used to improve soil health.
  - » Partial field enrollment may help accomplish this.
- The ground coming out of CRP could be included in a program that includes no-till/cover crops, etc.
- TIP (transition incentive program part of CRP): eases the transition and connecting between farmer wanting to transfer land to socially disadvantaged farmer. Farmer doing the transferring gets two years' worth of CRP rent.
- They changed the definition of "retiring farmer." Letter gets sent to the retiring farmer with options as land is coming out of CRP.
- Included in CRP is establishing good pollinator forests.
- Are there any seeding recommendations with CRP?
  - » Yes, but things tend to go to monoculture because CRP acres generally aren't managed.

# ACTION TEAM BREAKOUT REPORTS

## ■ POLICY *(continued)*

<b>Environmental Quality Incentive Program (EQIP)</b>	<ul style="list-style-type: none"> <li>• Advanced payment options; producer gets 50% of capital needed to adopt practices upfront. Before this option wasn't made clear, now it is made clear. This is supposed to make this program readily available to more farmers. Clearer directions on handing over the money from state to farmer will be given to avoid "return of funds."             <ul style="list-style-type: none"> <li>» In Missouri, there isn't a lot of "return of funds" but "delay funds" until the next year.</li> <li>» It seems that there aren't a lot of new farmers taking advantage of NRCS programs (EQIP). NRCS is trying to come up with more resources to change this.</li> <li>» Provision to EQIP that gives states flexibility to identify what the 10 most important practices are. Give the state the ability to offer more incentives/money for those practices.                 <ul style="list-style-type: none"> <li>&gt; States don't have to necessary take advantage of this.</li> </ul> </li> <li>» A percentage of EQIP practices funds have to go to livestock (50% of EQIP).</li> <li>» Two different points of influence, state technical level, and then the national level. SHI could provide guidance to NRCS (national level) who would then give guidance at the state-level.</li> <li>» 170 practices available for cost share through EQIP. Practices range from manure storage facilities to tillage to cover crops to irrigation. Farmers go to local NRCS office and apply to which practices they want support for.</li> <li>» Have a "system" approach instead of just a "practice approach."</li> <li>» Total funding for EQIP is \$1.7 billion for 2019. This funding is often tapped into for emergency.</li> <li>» Any certification/accountability/evaluation for this program?                 <ul style="list-style-type: none"> <li>&gt; Not directly, but NRCS is working on it; trying to include an "outcomes" portion to the program.</li> </ul> </li> <li>» Only conservation program that has a measurement aspect is the soil health provision (10 million given to take the measurement).                 <ul style="list-style-type: none"> <li>&gt; NRCS staff capacity may prevent more evaluation and monitoring capacity. NRCS can't do it alone. They do a random sampling for some of these programs, but that's it. Missouri has a cover crop cost share program. Part of that program is to take a measurement that is then run through the state lab. Missouri may be a good example for other states/federal programs.</li> </ul> </li> </ul> </li> </ul>
<b>Conservation Innovation Grants (CIG)</b>	<ul style="list-style-type: none"> <li>• The government will provide incentives to producers to implement practices that improve soil health and increase soil carbon. Can funding be made available to educate producers and farmer to learn how to do the practice? How can educators take better advantage of this funding?</li> </ul>
<b>Conservation Stewardship Program (CSP)</b>	<ul style="list-style-type: none"> <li>• Producers are paid at a minimum 125% of the determined annual payment amount for all activities pertaining to cover crops.... Farmers need to be educated on this option.</li> <li>• How are these activities verified?             <ul style="list-style-type: none"> <li>» NRCS goes to verify and certify producers. Again, NRCS capacity may limit how much this happens. Is there third-party verification? There is a need for more funding to evaluate and verify these activities. There are not enough "TSP" personnel.</li> </ul> </li> <li>• Recommendation: SHI or others weigh in soil health management practices to ensure those practices are included in the program.</li> <li>• Government is to manage CSP, to the greatest extent possible, to enhance soil health.</li> </ul>

# ACTION TEAM BREAKOUT REPORTS

## ■ POLICY *(continued)*

<b>Crop insurance and cover crop termination</b>	<ul style="list-style-type: none"> <li>• Much greater flexibility for when cover crops can be terminated now.</li> <li>• Allows the practice of cover cropping without affecting a cash crop's insurability. Also allows cover cropping in place of summer fallow, where summer fallow is an insurable practice, without jeopardizing the insurability of the summer fallow. Allows farmer to 1) follow NRCS guidance, 2) refer to local extension publications, or 3) get local experts, but no matter what they are guaranteed to have cover crop insurance. Should be much more flexible for farmers going forward.               <ul style="list-style-type: none"> <li>» Outreach: an effort is needed to help get this information out. Less than 1% of farmers know about this change.</li> <li>» Summer fallow provision: in a summer fallow situation you can use a cover crop without any consequences.</li> <li>» Goal is to get the federal government to offer incentives to adopt conservation practices that may prevent future crop insurance pay outs. Crop insurance people want to see thousands of fields worth of data to support this. Need data to show conservation is reducing yield losses.</li> </ul> </li> </ul>
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## DISCUSSION – MISSING PROVISIONS | NEEDS | OPPORTUNITIES

ITEM	RECOMMENDATION
Temporary Fencing	Recommend that temporary fencing needs to be included.
Update the list of 170 conservation practices	Review conservation practice standards within 1 year of Farm Bill; development of an expedited revision process. The goal was to think about and update the list of 170 conservation practices.
RCCP (regional conservation concept project)	<p>RCCP allows grant agreements and alternate funding arrangements with eligible partners for up to 15 projects annually with the program. The USDA grants funding to eligible partner to carry out technical and financial assistance.</p> <ul style="list-style-type: none"> <li>• Standalone program with its own funding</li> <li>• Producers will have RCCP contracts. What these contracts “look” like is still unsure. This will be separate from NRCS.</li> <li>• Rules have yet to come out. Once the rules are out, then contracts will be rewarded.</li> <li>• Any group can apply to this program and then give money to farmers to help educate farmers on soil health practices and implement programs. Maybe work through SHI to help give examples of how other groups have used this money to do soil health practices.</li> </ul>
Forest research	EQIP/cost share practices for forestry are included in the Farm Bill. Part of the bill is allocated to forest research. It is recommended that SHI become involved in this research.

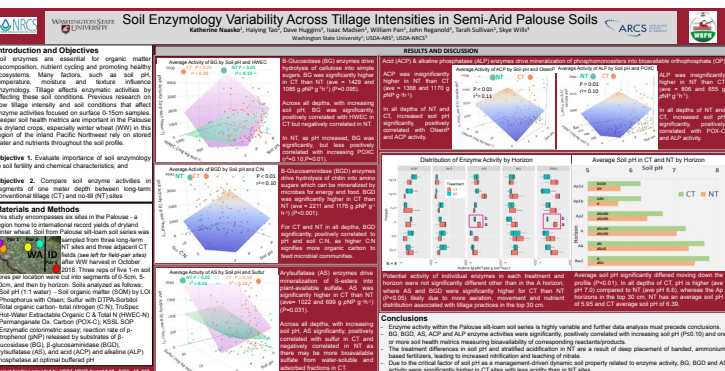
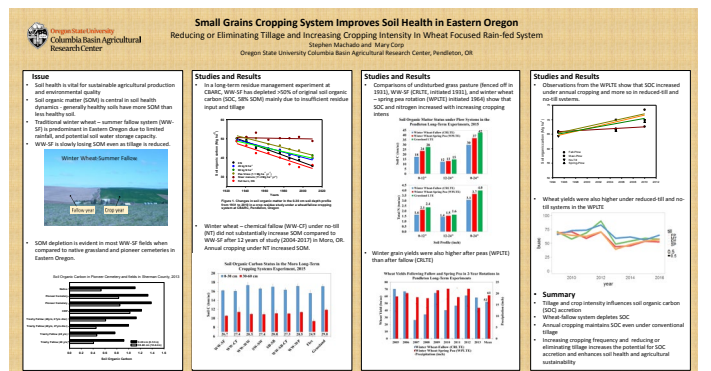
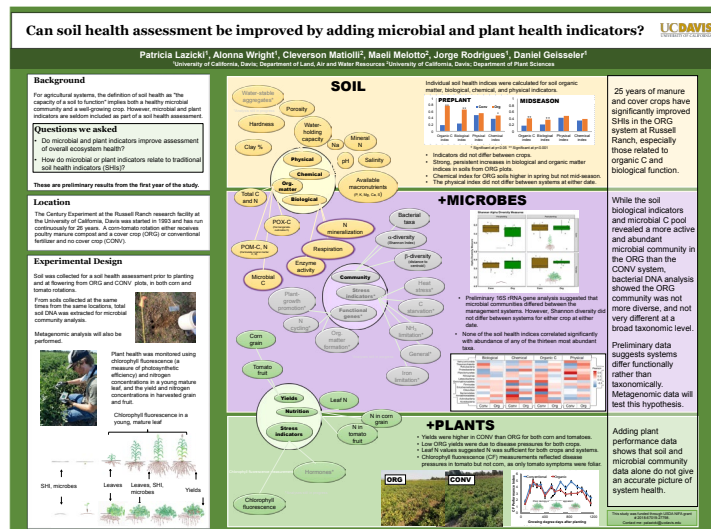
# POSTER SESSION



Source: Eric McCarthy

The 4<sup>th</sup> Annual Meeting Poster Session included 64 poster entries. Presenters covered the broad spectrum of soil health research. **Dr. Jae Yang**, Department of Biological Environment, Kangwon National University, summarized active research in GIS-based technology, while **Dr. Jennifer Moore-Kucera**, American Farmland Trust, reviewed agricultural practices that support the US Climate Alliance's climate mitigation goals, and **Dr. Kade Flynn**, Texas A&M University, discussed how smartphones play a role in helping a farm manager or scientist measure aggregate stability.

The Poster Session presentation summary is available [here](#).





# REGISTERED ATTENDEES

NAME	ORGANIZATION
Gregory (Mac) Bean	Soil Health Institute
Sean Bloszies	Soil Health Institute
Bill Buckner	Soil Health Institute Board of Directors
Shannon Cappellazzi	Soil Health Institute
Alyssa Charney	National Sustainable Agriculture Coalition
Michael Cope	Soil Health Institute
Pipa Elias	The Nature Conservancy
Archie Flanders	Soil Health Institute
Bill Flory	Flory Farms, Soil Health Institute Board of Directors
Robert Foster	Foster Brothers Farm Inc, Soil Health Institute Board of Directors
Earl Garber	NACD, Soil Health Institute Board of Directors
Timothy Griffin	Friedman School of Nutrition Science and Policy at Tufts
Katie Harrigan	Soil Health Institute
Kelsey Hoegenauer	Soil Health Institute
Wayne Honeycutt	Soil Health Institute
Jessica Hutchings	Te Waka Kai Ora (National Māori Organics Collective)
Diana Jerkins	OFRF, Soil Health Institute Board of Directors
Sheldon Jones	Soil Health Institute
Jimmy Kinder	Kinder Farms
David Knaebel	USDA-ARS
Bruce Knight	Strategic Conservation Solutions, LLC
David Lamm	Soil Health Institute
V. Larkin Martin	Martin Farm, Soil Health Institute Board of Directors
Andy LaVigne	American Seed Trade Association, Soil Health Institute Board of Directors
Daniel Liptzin	Soil Health Institute
Klaas Martens	Lakeview Organic Grain, Soil Health Institute Board of Directors
Neal Martin	Dairy Forage Research Education Consultation, Soil Health Institute Board of Directors
Shefali Mehta	Soil Health Partnership
Lara Moody	The Fertilizer Institute, Soil Health Institute Board of Directors
Cristine Morgan	Soil Health Institute
Jeff Moyer	Rodale Institute, Soil Health Institute Board of Directors
Rob Myers	Univ. of Missouri/SARE
Nick Tipon	Graton Rancheria
Charlotte Norris	Soil Health Institute
LaKisha Odom	Foundation for Food and Agriculture Rese
Janel Ohletz	Soil Health Institute
Elizabeth Porzig	Point Blue Conservation Science
Byron Rath	Soil Health Institute
Sidney Reynolds	The Signature Agency, Soil Health Institute

# REGISTERED ATTENDEES

NAME	ORGANIZATION
Tyler Reynolds	The Signature Agency, Soil Health Institute
Steve Rhines	Noble Research Institute, Soil Health Institute Board of Directors
Elizabeth Rieke	Soil Health Institute
Bill Robertson	University of Arkansas System Division of Ag
Karen Ross	California Department of Food and Agriculture
John Shanahan	Soil Health Institute
Paul Tracy	Soil Health Institute
Jay Vroom	Vroom · Leigh · Agriculture, LLC, Soil Health Institute Board of Directors
Janeva Williams	Soil Health Institute
Jennifer Alvarez-Sagrero	University of California, Merced
Derek Azevedo	Bowles Farming Company
Dianna Bagnall	Texas A&M University
Eric Bendfeldt	Virginia Tech/Virginia Cooperative Extension
Keith Berns	Green Cover Seed
Hava Blair	University of Minnesota
Kelsey Brewer	UC Davis
Jessica Chirtas	UC Davis
Janice Cooper	Wheat Marketing Center
Susan Cousineau	UC Merced
Peter Crew	
Cynthia Creze	UC Davis
Bradley Crookston	Utah State University
Harley Cross	Land Core
Daniel Cruz	
Sidney Davis	Vinehill Vineyard
Kalyn Diederich	University of California, Davis
Kit Duggan	
Jane Evanson	NoBitingRanch, LLC
Tsz Fai Wong	
Kade Flynn	Texas A&M University
Christina Fossum	UC Berkeley
Janis Garber	
Danielle Gelardi	University of California, Davis
Aidee Guzman	UC Berkeley
Steve Hagy	STERLING AG
Sarah Hetrick	Texas A&M University
Debbie Hughes	NMACD
Susan Jennings	Arthur Morgan Institute for Community Solutions–Agraria
Geoffrey Koch	UC Davis



# REGISTERED ATTENDEES

NAME	ORGANIZATION
Kirsten Kurtz	
Cuahtemoc Landeros	Indian Child and Family Preservation, Sym Soil Inc, OrganicX Matters
Paul Lum	
Roderick Malloy	N & R Publications
Krista Marshall	UC Davis
Zouheir Massri	Soil Physics & Fertility Research Manager, AgroLiquid
Matt Mayer	
John McEntire	Arva Intelligence Corp
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Chase Olagaray	
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Chris Rishwain	French Camp Ranch
Carey Robertson	
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Keli Rutan-Jorgensen	
Wesley Sander	Foothill Biological Soil Health Services
Wendiam Sawadgo	Iowa State University
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Veronica Suarez	UC Davis
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Arthur Allen	UMES
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Luis Alvarez	
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Jose Benito Guerrero	The Nature Conservancy
Travis Blacker	Idaho Potato Commission
Daniel Bloedel	
Christopher Boomsma	
Ben Bowell	Oregon Tilth
Timothy Bowles	UC Berkeley
Kevin Boyer	Regener
Katy Brantley	Mendocino County Resource Conservation District
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Timothy Brennan	Farm Foundation
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Fred Briones	
Valerie Bullard	
Chelsea Carey	Point Blue Conservation Science
Isabelle Caugant	International Alliance for Phytobiomes Research
Guihua Chen	California Department of Food and Agriculture
Rajesh Chintala	Innovation Center for US Dairy
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Gina Colfer	Wilbur Ellis
Ignacio Colonna	AgriThority
Mary Corp	OSU - Columbia Basin Agricultural Research Center
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Dorn Cox	OpenTEAM
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Peter Fahnestock	
Jamie Fanous	NCAT
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Sarah Fox	Nutrien Ag Solutions
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Mingxin Guo	Delaware State University
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Kristie Maczko	Sustainable Rangelands Roundtable
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Jaakko Rauhala	Carbo Culture
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Alejandra Sanchez	
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Kristen Veum	USDA-ARS
Keith Vodrazka	
Jonathan Wachter	Marin Agricultural Land Trust
Heidi Waldrip	USDA-ARS
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Jane Zelikova	Carbon180
Nan Zeng	The Nature Conservancy
Hailin Zhang	
Xiaoquan Zhang	TNC China
Stacy Zuber	University of Missouri





# CONCLUSION

Enhancing global soil health is one of the most important endeavors for ensuring a sustainable food supply and conserving our natural resources. Achieving improvements at scale requires collaboration across multiple organizations. SHI is dedicated to supporting the continued engagement and collaboration of its many partners.

A special thanks to our **Action Team Volunteers, Plenary Session speakers, and poster presenters**. Thank you to **The Samuel Roberts Noble Foundation, Walton Family Foundation, General Mills, Foundation for Food and Agriculture Research, Walmart, Wrangler, VF Corporation, United Soybean Board, Cargill, and McKnight Foundation** for your generous and continued support.

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Also, please accept our genuine thank you to each of you for supporting soil health and the Soil Health Institute. We look forward to working with you throughout 2019-2020, and we'll see you next year for the **Soil Health Institute's 5<sup>th</sup> Annual Meeting, July 29-31, 2020 in Des Moines, Iowa!**

## SAVE THE DATE



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The Soil Health Institute works with its many stakeholders to identify gaps in research and adoption; develop strategies, networks and funding to address those gaps; and ensure beneficial impact of those investments to agriculture, the environment and society.

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**OUR MISSION:** SAFEGUARD AND ENHANCE THE VITALITY  
AND PRODUCTIVITY OF SOIL THROUGH SCIENTIFIC  
RESEARCH AND ADVANCEMENT

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