



Washington  
State Department of  
Agriculture

# Soil Health Initiative

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## Biennial Report to the Legislature

October 2020

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## Summary

The Washington State Department of Agriculture (WSDA) has been successfully implementing the Soil Health Initiative (SHI) since spring 2020 and submits this report to Governor Jay Inslee and the Washington State Legislature. This report includes an assessment of success in meeting the SHI's goals and objectives including creating a biennial work plan, detailing any proposed legislation, budget requests, or administrative rules; and a list of deliverables and timelines for proposed actions needed to fulfill each collaborating agency's responsibilities. Our collective effort is to initiate and implement the programmatic components and advance SHI goals and objectives in the upcoming biennium.

## Introduction

Healthy soil is the foundation of agricultural viability, positive environmental outcomes, and securing Washington's capacity to provide nutritious food for current and future generations. Soil health, as defined by the U.S Department of Agriculture's Natural Resources Conservation Service (USDA-NRCS), is "the continued capacity of the soil to function as a vital living ecosystem that sustains plants, animals, and humans." Supporting and improving soil health now ensures the long-term viability of our agricultural economy, food security, and natural resources. Maintaining and improving soil health is key to preventing soil depletion and ensuring the long-term viability of our agricultural economy, food security, and natural resources.

WSDA, Washington State University (WSU), and Washington State Conservation Commission (WSCC) will work together in a collaborative partnership to create and implement the Soil Health Initiative (SHI). The overall leadership for the SHI is through the WSDA Director's Office, including staff within Policy and the Natural Resource Assessment Section (NRAS) who will provide the overall science and management leadership for the SHI. The Washington State SHI has been a priority for Governor Inslee since 2017 and Substitute Senate Bill 6306 (passed during the 2020 legislative session) serves as the guide for this ongoing collaborative work.

## Soil Health Initiative Legislation

The SHI Bill, SSB 6306, passed the Washington Legislature in 2020, and serves as the foundation for the future collaborative work. WSDA Director Derek Sandison has lead the SHI collaboration and bill creation for several years with numerous Policy and NRAS staff assisting, along with partners at WSU and WSCC. Various industry, commodity groups, and nonprofit environmental and farm organizations have assisted. Creating the Washington SHI was successful due to work and sponsorship from the senators Marko Liias, Kevin Van De Wege, Judy Warnick, Christine Rolfes, Shelly Short, Joe Nguyen, Mona Das, Liz Lovelett, Emily Randall, Rebecca Saldaña and Claire Wilson. The work accomplished early in the 2020 session through the Senate Committee on Agriculture, Water, Natural Resources & Parks, and the House Committee on Rural Development, Agriculture, & Natural Resources was very important providing for success with SSB 6306.

## Agency Coordination

WSDA, WSU, and WSCC will work together in a collaborative partnership to create and implement the Soil Health Initiative (SHI). NRAS will lead the WSDA SHI effort, providing leadership and science support for the WSDA Director and Policy. WSDA Policy and NRAS staff work during 2020 has included regular conference calls and virtual meetings, planning for current and future research and grants, coordinating and working with conservation districts and agriculture commodity groups, implementing on-farm field research, creating an SHI work plan, and coordinating the SHI with the Sustainable Farms and Fields program.

## Mission of the Washington soil health initiative

- Promote soil health research, education, and demonstration projects.
- Develop technical assistance activities to identify, promote, and implement soil health stewardship practices that are grounded in sound science and can be voluntarily and economically implemented by farmers and ranchers across Washington's diverse agricultural communities, climates, and geographies.

## Goals and Objectives

Improve agricultural viability by:

- Improving farm profitability.
- Helping agricultural producers implement good soil health practices that build soil organic matter, reduce soil erosion, soil compaction, and production costs.
- Improve nutrient management, soil tilth, moisture infiltration, moisture retention, drought resilience, disease suppression, and the beneficial activity of microbes, fungi, earthworms, and other organisms.

Improve nutrition by:

- Increasing health-promoting nutrients, micronutrients, and microbial processes of agricultural soils.
- Improving nutrient uptake, thereby expanding access to nutritious food and improving human health.

Improve environmental function by:

- Reducing soil erosion, runoff, and leaching of nutrients and pollutants, thereby improving water quality.
- Promoting strategies to store carbon and build soil organic matter and other beneficial properties, thereby enhancing environmental functions of agricultural soils.

## **WSDA joint actions in collaboration with WSU and WSCC**

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### **Action 1 – Support the current Washington soil health advisory committee**

The soil health advisory committee works with landowners, funding entities, and government agencies to promote sustainable soil conservation practices. Committee members are and must continue to be qualified and knowledgeable regarding soil health stewardship. Members may include agricultural producers, soil scientists or specialists, and representatives of governmental, nongovernmental, and tribal organizations interested in soil health as it pertains to agricultural viability, nutrition, or environmental function.

Activities under this action include:

- WSDA, WSU, and WSCC will convene, staff, and develop agendas for each Washington soil health advisory committee meeting.
- WSDA, WSU, and WSCC will appoint committee members and subcommittee members as appropriate. All collaborating agencies must concur in the appointment.

### **Action 2 – Assess programmatic needs and build capacity**

Currently there are gaps and limitations in scientific research, economic assessment, staffing, technical assistance, grants administration, project implementation, data collection, data management, soil health indices, and monitoring tools surrounding healthy soil practices. To address gaps in SHI, NRAS will fund a lead soil health scientist position to collaborate with the current soil scientist located in Eastern Washington. NRAS soil scientists will work in tandem with WSU and WSCC to identify, promote, and implement soil health stewardship practices that are science based and are economically feasible.

Activities under this action include:

- WSDA will hire a Natural Resource Scientist 4 (NRS4), located in Olympia, Washington, to lead the agency as the expert soil health scientist.
- WSDA will create soil health research strategies, implement research with partners, and develop an overall strategic plan and reporting system.
- WSDA's NRS4 position will coordinate with the existing Natural Resource Scientist 3 (NRS3) in Eastern Washington to plan and manage SHI, utilize the general fund budget of \$200,000 per year provided by SSB 6306, plan and manage the soil health research, manage the current United States Department of Agriculture Specialty Crop Block Grant (SCBG) contract with WSU, and pursue additional funding and grant opportunities in a cooperative manner. The NRAS Section Manager will provide leadership and oversight while working with WSDA's Director and Policy Staff.
- WSDA will collaborate with WSU and WSCC to compile existing information associated with the ancillary environmental benefits tied to improved soil health, crop production, and viability of agriculture and assess additional ecosystem services benefits (i.e. positive changes in water quality, and prevention of erosion).
- WSDA, WSU, and SCC will prioritize in-state sourcing of needed SHI resources including, but not limited to, testing resources, seeds, compost materials, supplies, and equipment.

The NRAS SHI team will be collaboratively led by the NRS4 and NRS3, with support from the additional NRAS staff and WSDA Policy staff. General duties related to assessing programmatic needs and building capacity include:

- Providing technical science and strategic design and planning to create the statewide SHI within regional and local agriculture and food systems projects with partners located throughout Washington.
- Designing and promoting comprehensive research and implementation strategies to deliver scientific and defensible soil health programs and conservation benefits in cropping systems and major agricultural landscapes in Washington.
- Creating and implementing comprehensive scientific, information and data management systems, and reporting systems for SHI.

### **Action 3 – Employ adaptive management to improve soil health metrics, priorities, and activities**

In order to support the improvement and long-term viability of SHI, adaptive management will be employed to modify soil health metrics, priorities, and activities. Recommendations will maximize complementary net benefits for agricultural viability, nutrition, and environmental function. Chosen metrics will assess changes from baseline environmental function per unit of production.

Activities under this action include:

- WSDA will collaborate with WSU and WSCC to conduct a comprehensive research literature review to analyze and summarize existing soil health metrics, priorities, and activities used by other agencies and entities that are implementing sustainable soil health stewardship programs.
- WSDA, WSU, and WSCC will develop soil health metrics that are applicable and appropriate for use in Washington’s diverse agricultural systems using results from the literature review.
- WSDA will provide overall statewide leadership and oversight of SHI strategy planning and implementation, while coordinating with WSU, WSCC, and other partners including agricultural commodity groups, producers, conservation districts, NRCS, and USDA Agricultural Research Service.
- WSDA will employ adaptive management and recognize that goals and plans may require modifications based on what the research results show.

### **Action 4 – Plan, acquire, and manage SHI grants and research**

SHI work will include creating, acquiring, managing, and collaborating on cooperative grants and funding strategies to advance SHI research and implementation opportunities across Washington’s agricultural and cropping systems.

Activities under this action include:

- WSDA will prioritize research opportunities, as well as collaborate with partners to develop research designs, submit research proposals and grant applications, and carry out grant management responsibilities.

- WSDA will seek out SHI cooperative grant opportunities through SCBG, NRCS grants, other federal and state grants, non-governmental agency grants, Agricultural Commodity group grants and support, Soil Health Institute partner grant cooperators, Foundation for Food and Agriculture Research grants, and other foundation funding sources.
- WSDA will work with partners to create and utilize research grants and diverse funding to enhance partner research on partnering private farms, WSU Long-Term Agroecological Research and Extension demonstration (LTARE) sites, and other conservation district, state and federal research managed projects and locations.

## **Action 5 – Submit a biennial SHI progress report to the governor and legislature**

A biennial progress report is due to the governor and appropriate committees of the legislature by October 1, 2020 and every even-numbered year thereafter. The report must include an assessment of success in meeting the SHI’s goals and objectives; a biennial work plan detailing any proposed legislation, budget requests, or administrative rules; and a prioritized list of proposed actions needed to fulfill each collaborating agency’s responsibilities for programmatic components and advance SHI goals and objectives in the upcoming biennium.

Activities under this action include:

- WSDA will maintain accurate and thorough documentation of progress toward SHI goals and objectives.
- WSDA will document any challenges or limitations hindering progress toward SHI goals and objectives.
- WSDA will convene with WSU and WSCC to compile documentation on progress and hindrances to meeting SHI goals and objectives and develop a biennial work plan and prioritized list of proposed actions to advance SHI goals and objectives.

## **Actions that are primarily WSDA’s responsibility**

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### **Action 6 – Research agricultural viability and environmental function**

Information on the agricultural viability and environmental function effects related to agricultural soil management practices and regimes across the state’s diverse agricultural systems will be useful in identifying which practices are most consistent with sustainable soil health stewardship. Washington’s diverse food production zones, soil types, tillage systems, and cropping methods, require agricultural viability and environmental function effects information must be compiled for each the various agricultural systems.

Activities under this action include:

- WSDA will collaborate with WSU, WSCC, and conservation districts to connect with farmers and ranchers with farms that are representative of the various food production zones, soil types, tillage systems, and cropping methods.

- WSDA will compile existing information and identify data gaps associated with understanding and quantifying agricultural viability effects including assessments of yields, profitability, costs, and benefits.
- WSDA will compile existing information and identify data gaps associated with understanding and quantifying agricultural viability effects including assessments of water quality and water availability.
- WSDA will compile existing information on agricultural cropping and soil health management practices to determine the long term viability and environmental function effects related to agricultural soil management practices by agro-ecological regimes across the state.
- WSDA will compile existing information and identify data gaps associated with the ancillary environmental benefits tied to improved soil health (i.e. positive changes in water quality).

## **Action 7 – Establish a “state of the soils” baseline assessment**

The “state of the soils” assessment of statewide agricultural soil health practices and characteristic soil health indicators will provide a baseline for how sustainable current agricultural practices are in maintaining soil health. This baseline can be used to identify which practices most effectively promote soil health, as well as identify which practices lead to soil health depletion. The baseline can be used in a comparison to measure the effectiveness of SHI funded and promoted sustainable soil health stewardship practices. Additionally, the baseline assessment will direct future research and education.

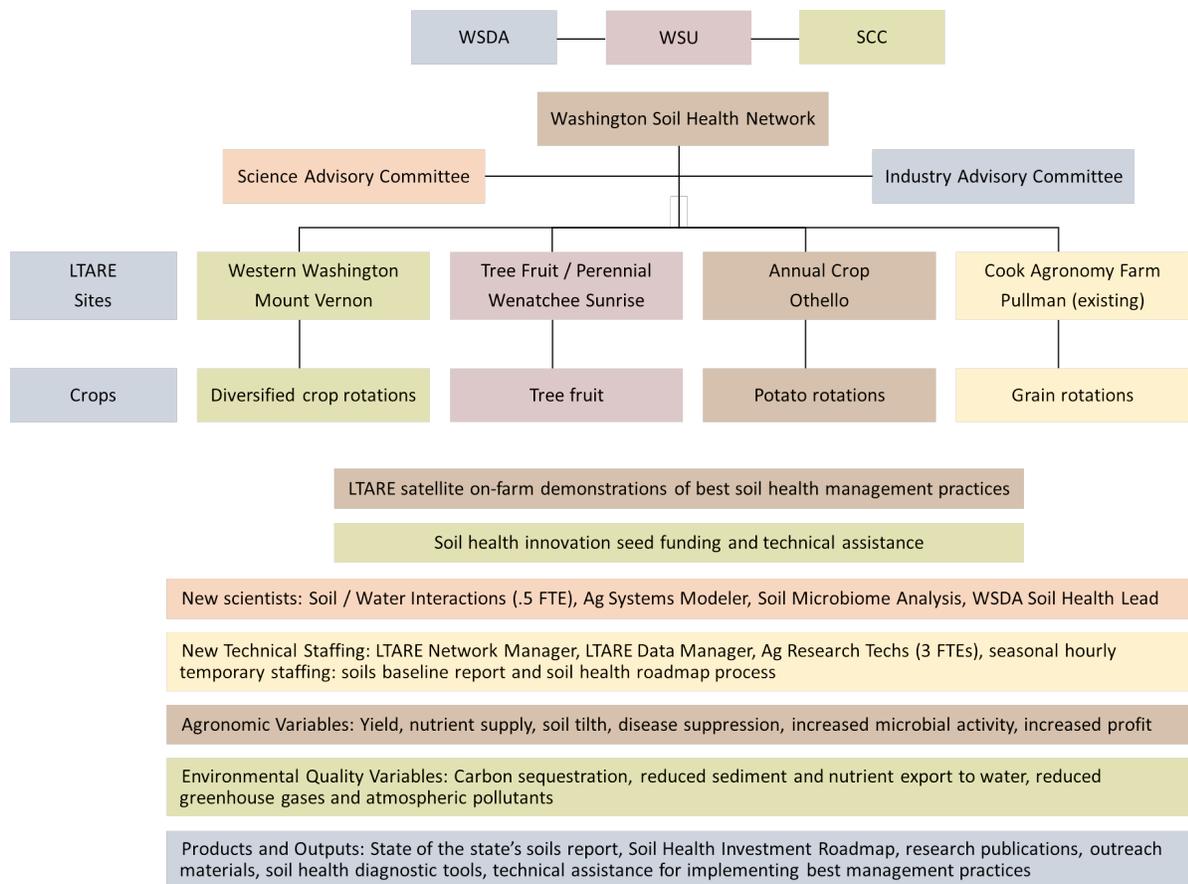
The assessment must be developed in a stepwise process to incrementally assess the baseline for each of Washington’s major food production zones, soil types, tillage systems, and cropping methods, including both conventional and organic food production systems. The assessment should include, but is not limited to, the following:

- Soil type
- Organic matter
- Aggregate stability
- Porosity
- Temperature
- Microbiology
- Pathogens
- Carbon storage
- Nutrient management
- Crop rotations
- Cropping techniques
- Tillage systems
- Plant biomass input, residue, and cover levels
- Water infiltration rate
- Water retention
- Root exudates
- Electrical conductivity
- Soil nutrient, vitamin, and mineral levels

Activities under this action include:

- WSDA will collaborate with WSU and WSCC to establish a "state of the soils" baseline assessment of statewide agricultural soil health practices and characteristic soil health indicators by also developing standardized methods and diagnostic tools to support accurate and cost effective measurement of key soil health indicators (see Action 8).
- WSDA will collaborate with WSU to utilize diverse scientific, data system, and refined metric information to create a statewide soil health roadmap to guide future public and private investment in SHI. WSDA will work to support WSU as the LTARE site network is established to understand and assess soil health practices across diverse crop production zones.

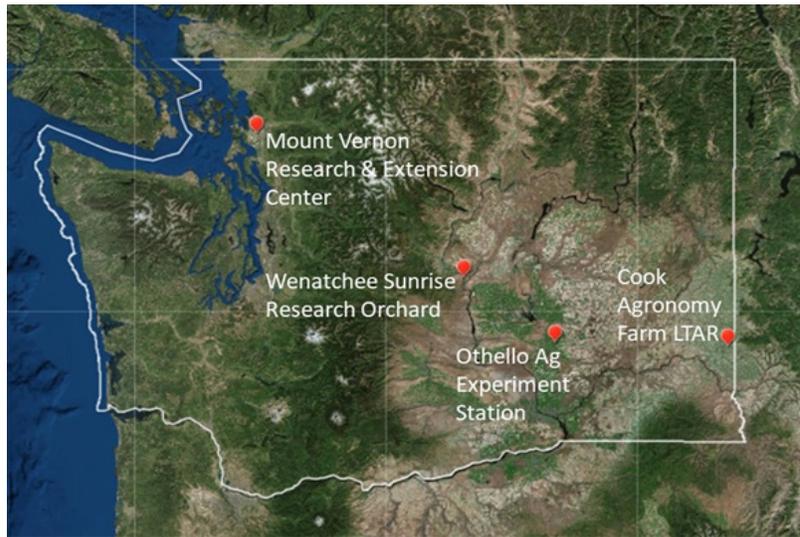
### Conceptual Schematic of the Washington Soil Health LTARE Network



## Location of Proposed LTARE Network Sites

Proposed LTARE network sites will be located strategically across the diverse crop production zones in Washington and in relation to the existing Cook Agronomy Farm LTARE.

Research on soil health may occur at other research sites, such as WSU's Irrigated Agriculture Research and Extension Center in Prosser.



## Action 8 – Develop standardized methods and diagnostic tools

Standardized methods and diagnostic tools will be developed to support accurate and cost-effective measurements of key soil health indicators at a scale and speed that supports broad implementation and verification of improved soil health stewardship across the state.

Activities under this action include:

- WSDA will consult with WSU and WSCC to conduct a comprehensive research literature review of established methods and diagnostic tools for assessing key soil health indicators that may be used by other agencies and entities.
- WSDA will consult with WSU and WSCC to connect with conservation districts, farmers, and ranchers to understand and summarize currently used methods and diagnostic tools for assessing soil health across the state's diverse agricultural systems.
- WSDA will consult with WSU and WSCC to develop standardized methods and diagnostic tools to assess soil health, based on the literature review and data collected from discussions with conservation districts and farmers.
- WSDA will consult with WSU and WSCC to identify data gaps associated with understanding and quantifying soil health and crop system dynamics.
- WSDA will consult with WSU and WSCC to improve tools to monitor soil health across the diverse agricultural systems in Washington and build a better understanding of management practices that improve soil health.

## **Action 9 – Develop an agricultural product marketing and promotion program**

An agricultural product marketing and promotion program will be developed in order to create opportunities for participating producers to benefit from the emerging market for Washington food products grown under good soil health stewardship

Activities under this action include:

- WSDA will collaborate with WSU and WSCC to develop, publish, and distribute outreach and education materials to help conservation districts, cooperative extension, and local entities emphasize the importance of soil health, and encourage farmers, ranchers, and land managers to voluntarily implement desired soil health stewardship.
- WSDA will provide professional presentations for various groups in state, and at meetings and conferences.
- WSDA will create reports, factsheets, social media products, Power Point presentations, and posters, to summarize information collected and analyzed from SHI research.
- WSDA will provide program presentations, briefings, and seminars to increase the program visibility, findings, and successes stories.
- NRAS will report on plans and progress to the WSDA Director, Policy, Communications, other cooperator leaders, and the legislature.

## **Action 10 – Manage SHI budget and grant funds**

The NRAS SHI work and duties are related to creating, acquiring, managing, and collaborating on cooperative grants and funding strategies to advance SHI research and implementation opportunities across Washington’s agricultural and cropping systems.

Activities under this action include:

- WSDA will maintain accurate records of the SHI budget and grant fund expenditures.
- WSDA will consider the SHI budget and grant funds when developing research proposals.
- WSDA will submit any budget requests to the governor and legislature in the biennial progress report.

## **Soil Health Initiative Budget**

The WSDA SHI budget includes the SSB 6306 allocation of \$200,000 per year for WSDA NRAS to hire a SHI lead scientist to manage the program and coordination while having some funding for operating and travel expenses. WSU and WSCC also received funding to fulfil research and coordination and work with conservation districts and on-farm work and outreach. NRAS has been working with WSU and conservation districts to design and submit applications for grants such as the USDA Specialty Crop Block Grant for \$500,000 and the recent application to the Pending USDA Conservation Innovation Grants (CIG) On-Farm Trials Grant FLOURISH Grant for a combined \$4,527,360. Below are the details of the various budget items from the SHI Legislation and also the SCBG and possible USDA CIG grant.

Budget Category	USDA Grants	WSDA (per year)	WSU (per year)	WSCC (per year)
<b>Continuing Funds (Annual)</b>		\$200,000	\$1,008,750	\$344,000
Personnel		\$105,000	\$708,750	\$70,200
Operating		\$ 95,000	\$300,000	\$273,800
Total Annual Continuing Funds		\$200,000	\$1,008,750	\$344,000
<b>Specific Grants and Research Projects</b>	<b>Grant Totals</b>			
WSDA USDA Specialty Crop Block Grant, contracted with WSU, 2019 - 2022	\$500,000			
Pending USDA CIG FLOURISH Grant - Pending, Fall 2020: \$3,395,520 – federal grant portion, \$1,131,840 – farm and agency/partner match	\$3,395,520	\$151,539		
<b>Research and Equipment Investments</b>	<b>Purchasing Totals</b>			
One Time Funds (FY2019) for SHI Field and WSU Mount Vernon Laboratory Equipment		\$100,000		
Soil Health Baseline and Road-mapping Process			\$250,000	
Equipment / Instrumentation			\$500,000	

## Progress to Date

### Soil Health Advisory Committee

The soil health advisory committee will consist of agricultural producers, soil scientists or specialists, and representatives of governmental, nongovernmental, and tribal organizations. The committee’s role is to work with landowners, funding entities, and government agencies to promote sustainable soil conservation practices. The development of the committee is underway for fall of 2020.

### Outreach

The SHI agencies have been coordinating on education and outreach for the academic and agency websites, social media, articles in publications, interviews with media and agricultural publications, conservation districts, farm tours, directly with producers, and presentations provided to various agricultural groups. WSDA NRAS staff provided education and outreach directly to farmers, ranchers, and industry professionals on soil health practices through the following invited presentations:

- Columbia County Conservation District Annual Meeting, January 2020
- Walla Walla Conservation District Annual Meeting, January 2020
- National Association of Conservation Districts Annual Meeting, February 2020
- Stevens County Soil Health Stewards Virtual Meeting, April 2020
- Oregon Soil Health Committee SUPER meeting, June 2020

NRAS worked with WSU for the SHI information to be presented at Farmers Network workshops in Pullman, Washington in January 2020. Approximately 200 farmers and agricultural professionals attended the winter workshops in Pullman. NRAS worked with

Okanogan and Kittitas conservation districts to provide two soil health workshops in February 2020. NRAS coordinated with other partners, such as USDA NRCS staff, to present on the SHI, basic soil health principles, best management practices, and cover cropping techniques. Approximately 100 farmers, ranchers, and agricultural professionals attended the workshop event.

An eastern Washington NRAS soil scientist worked directly with six conservation districts during 2020 to provide technical assistance and soil health expertise related to cover crops, grazing cropland, and best soil management practices. The same soil scientist is currently working with the Washington State Department of Ecology Agricultural Dust Group to increase soil health adoption in the Horse Heaven Hills region as a means to reduce wind erosion and dust pollution. NRAS staff participated in supporting the Western Cover Crop Council which is a Pacific Northwest Region organization. The committee is a collaborative group in the western United States to provide education, outreach, and grant funding to improve on-farm soil health and research for farmers and ranchers. NRAS coordinates with the WSCC on the Washington Soil Health Committee, which is funded by WSCC and NRCS. The committee provides education and outreach to Washington producers on soil health practices and mini-grants for research and extension on soil health work.

## **Progress of the WSU LTARE**

In 2019, WSU received provisional funds from the Legislature for the SHI, including a directive to establish LTARE site in Mount Vernon. In the fall of 2019, initial site characterization and “resetting” began, with planting of a cover crop on approximately 50 acres of farmland at the WSU Northwestern Washington Research and Extension Center (NWREC) in Mount Vernon. In December 2019, a farmer focus group was held at NWREC to assess the key soil challenges faced by annual crop growers in northwestern Washington and to identify primary research questions on which to focus the LTARE. This event was attended by WSDA and NRAS members Kelly McClain and Leslie Michel, who provided important feedback on WSDA’s role and policy directions for the SHI. Site characterization and reset for the Mount Vernon LTARE continues in 2020 in preparation for establishment of treatments in 2021.

## **NRAS Specialty Crop Block Grant Contract with WSU**

During 2019 NRAS designed, submitted, and successfully received a \$500,000 USDA Specialty Crop Block Grant (SCBG) to work with WSU to study soil health indicators in seven specialty crops in eastern Washington. NRAS staff along with WSU faculty and graduate students will continue this project for three years. NRAS and WSU have successfully maintained scientific and grant management success, and the team is maintaining commitments with WSU leading the implementation of the on-farm field work, interpretation of the data findings, and communication of the research findings to the participating producers and to broader agricultural and scientific audiences. The grower community associated with seven specialty crops in eastern Washington are benefiting greatly from this grant and team effort.

The SCBG Soil Health Assessment Survey aims to:

- understand the current soil health status and key soil challenges of major specialty crops in Washington
- contribute to developing scoring curves and threshold values for soil health measurements relevant to Washington's soils
- evaluate how soil management practices are influencing soil health metrics

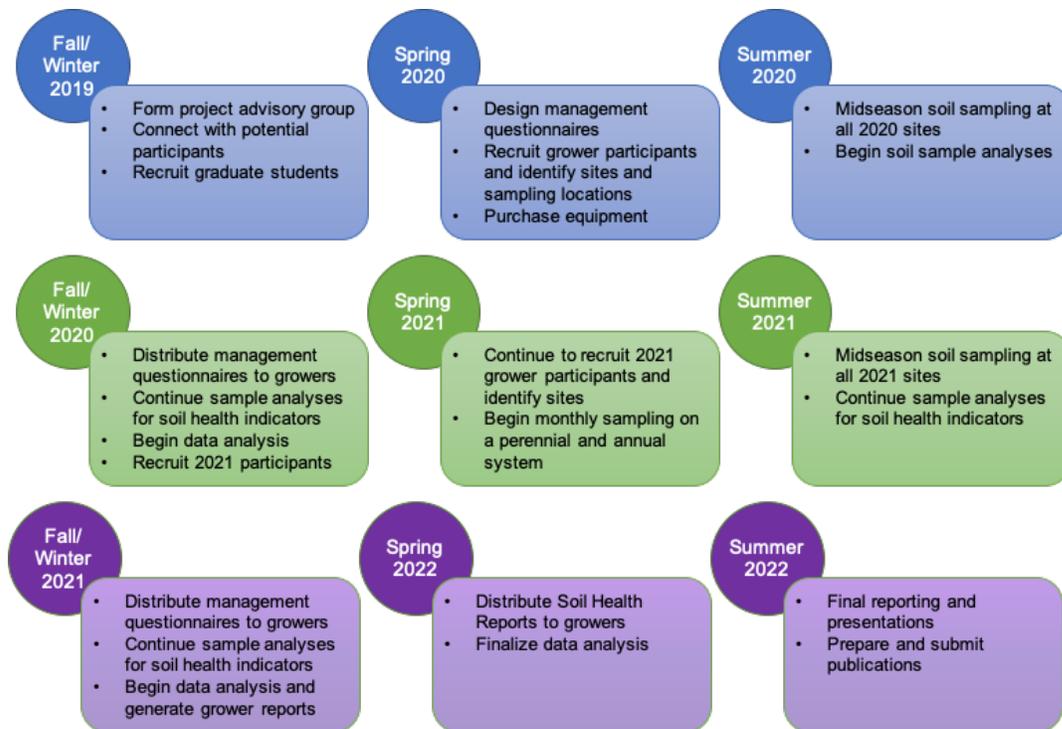
The project uses a survey approach, with sampling on paired sites that growers have identified as having high and low soil or plant health. Paired sites are on similar soil types to remove confounding factors of soil texture, which can greatly affect soil health indicator measurements. Management history meta-data is then collected to understand how system management (e.g. use of compost amendments or rotation length) is tied to soil health.

In the fall of 2019, the project team, led by WSU Assistant Professor Dr. Deirdre Griffin LaHue and WSDA NRAS Soil Scientist Leslie Michel established a project advisory group with members representing each of the crop industries that are a focus of the project, as well as a senior soil scientist at WSU. The advisory group was consulted in connecting with potential grower participants and in developing management questionnaires relevant to each production system. In fall 2019, two graduate students (Ph.D. student Kwabena Sarpong and M.S. student Molly McIlquham) were also recruited to work on this project.

In the spring and summer of 2020, the project team identified and completed soil sampling at 28 potato sites, 30 wine grape sites, 13 onion sites, and 8 sweet corn sites representing 19 farm operations. Sampling was done at midseason (June and July) for each crop, and paired sites were always sampled the same day. In 2021, monthly soil sampling will occur in one perennial and one annual system to better understand dynamics of biological and chemical soil health indicators over the growing season.

Sample analysis has begun, including measurements of soil bulk density, potentially mineralizable nitrogen, active carbon (permanganate oxidizable carbon and respiration incubations). Soil samples will also be sent to a contracted commercial soil testing lab for chemical and physical measurements, including soil texture, pH, electrical conductivity, total carbon, and extractable macro- and micronutrients.

Additional sites will be sampled in summer 2021 and will also include tree fruit, hops, and pulse crop production systems.



## Partnership and Application for USDA Conservation Innovation Grants (CIG) On-Farm Trials Grant

WSDA worked with the Palouse Conservation District, other conservation districts in Washington, Idaho and Oregon, WSU, University of Idaho, Oregon State University, the Oregon Department of Agriculture, American Farmland Trust and other agencies to submit an application to the USDA Conservation Innovation Grants (CIG) On-Farm Trials Grant in May of 2020. The grant application submitted is related to the USDA CIG Priority 4 - Soil Health Demonstration Trial, and is entitled Inland Northwest Farmers Leading Our United Revolution In Soil Health (FLOURISH).

The overall goal of the project is to form a farmer-led network to demonstrate effective strategies for cover cropping, interseeding, and cover crop-livestock integration in the dryland wheat regions of the Pacific Northwest. A secondary goal is to quantify and distribute information on soil health indicators, environmental co-benefits, and economic and social data through the partnership's peer-to-peer exchange of knowledge.

Specific project objectives include:

- Work with at least 30 producers to design targeted, cost-effective SHD trials on 30-acre plots across the region's three agro-ecologic zones (AEZ),
- Track changes in soil health properties (physical, chemical, and biological), environmental co-benefits (carbon sequestration and organic matter accumulation), economic cost-benefits, and social impacts among participating producers and communities

- Facilitate peer-to-peer knowledge transfer by sharing significant findings, lessons learned, and case studies through in-person events, online resources, and the formation of an organization to sustain these SHMS activities beyond the funding period.

The Palouse Conservation District would lead the multistate project that would total \$4.5 million in grant and in-kind matching funds. Funding would be allocated to the Palouse Conservation District in the fall 2020 if the project application is approved. The project total is \$4,527,360 with the federal portion equally \$3,395,520 and the non-federal contribution equally \$1,131,840.

NRAS is contributing in-kind staff match for this grant and would also receive some USDA funds to assist with field work and soil health metrics analysis. NRAS would provide a significant role to support the conservation districts to implement the project with soil health and agricultural economics expertise, and providing leadership coordination with the state agencies and research institutions from Washington, Idaho and Oregon. State agency leadership with the other state partners is part of our goal to institute comprehensive soil health goals in the northwest, which was one result of a northwest soil health workshop held in Pendleton, Oregon in April 2019.

This USDA CIG grant application is of state, regional and national significance and the partners will conduct on-farm research in Central and Eastern Washington (Asotin, Douglas, Grant, Lincoln, Okanogan, Spokane, Walla Walla, and Whitman counties), Eastern Idaho (Latah and Nez Perce counties), Northcentral and Northeastern Oregon (Morrow and Wasco counties). The FLOURISH project to create an innovative and coordinated approach to expand the full adoption of soil health management system principles through the formation of a farmer-led region-specific dryland soil health partnership (FLOURISH network).

Financial incentives, technical assistance, soil tests, and training will be provided to support farmers and to ultimately collect natural resource, economic and social outcome data. This data will be analyzed by a team of scientists, and then findings will be disseminated back to the FLOURISH network and shared to promote the adoption of soil health throughout the Inland Pacific Northwest. Grants like FLOURISH will assist with improving the current gaps and limitations in our scientific research, economic assessment, staffing, technical assistance, grants administration, project implementation, data collection, data management, soil health indices, and monitoring tools surrounding healthy soil practices.

## Ongoing and Future Work

WSU and NRAS will consider applying for grant funding in early 2021 with the Foundation for Food and Agriculture Research (FFAR) to conduct soil health research related to economic and environmental resilience of our food supply in vegetable and wheat cropland of eastern Washington. WSU and NRAS conducted scoping calls with FFAR, coinciding with the early 2020 COVID-19 stages and collectively determined that the timing wasn't right for applying for the FFARs Seeding Solutions grants. FFAR is a nonprofit organization that provides incentives and funding to assist in building unique partnerships to support innovative science addressing the nation's food and agriculture challenges. FFAR views

Washington State and the SHI team as an instrumental partner well positioned to receive funding and has asked that our team consider an application in early 2021. NRAS would need to have this NRS4 position in place very soon in order to adequately design, write, and submit this grant application in early 2021.

NRAS has also been coordinating with WSU on other on-farm research concepts and design ideas related to how to utilize soil health strategies to reverse lowering pH levels and impacts to crop production in eastern Washington farms, and the impacts of the utilization of livestock manure and soil health which can benefit crop production.

NRAS requests the exemption to be approved so the SHI NRS4 position can be filled and be operational soon to properly manage the existing SCBG, possible FLOURISH Grant, fully capitalize on the funding offer by FFAR, work with WSU and WSCC, properly support agriculture, and lead the overall SHI which has been a rapidly evolving effort for several years.

The NRAS manager continues to lead the overall SHI coordination and strategy, work plan development and October 2020 report to the Governor, SCBG administration, and work with the research partners, Conservation Districts, neighboring states, and agricultural commodity groups to support additional research and implementation efforts. These ongoing work and research efforts and potential new grants can't be properly sustained without hiring the NRAS SHI lead position.

WSDA NRAS partnered with WSU to submit a grant application to the USDA Western Sustainable Agriculture Research and Education (SARE) program. The SARE grant program is a Congressional funded program focused on requiring agricultural producer involvement in all phases of the project from inception to finish in the planning, design, implementation, and educational outreach of any funded project. NRAS and WSU worked to produce a SARE Research and Education Grant in May 2020. The focus of the grant was to work with canola producers in eastern Washington to intercrop oats or peas with canola and graze with livestock. Although this project was not funded, the NRAS and WSU team received positive feedback on how to improve an application for 2021.

NRAS also partnered with the American Farmland Trust to submit a second SARE Research and Education Grant in May 2020. The focus of the grant was to collect existing cover crop research data in dryland wheat and create usable a platform for engaging and involving farmers on soil health trends, assessment metrics and economics, and overall analysis. Although this project was not funded, the NRAS and WSU team received positive feedback on how to improve an application for 2021.

## Conclusion

Washington State and agencies that are working to implement the SHI are committed to creating research projects that provide quality data and interpretation, tools, and programs to assist farmers and ranchers to improve soils, production, food systems, and the environment. Farmers and ranchers play a critical role in using soil science results and on-farm research to manage soils in a way that improves soil function while also successfully implementing sustainable carbon friendly farming systems. The SHI will complement the Sustainable Farms and Fields program (SSB 5947) managed by WSCC. The SHI will be

successful by setting clear goals, incentivizing voluntary on-farm management practices, funding necessary research and demonstration projects, and working to promote interagency collaboration and increase efficiencies. WSDA NRAS has collaborated with WSU and WSCC to create initial timelines for actions, activities, and estimated completion dates.

## Preliminary Timeline

Action	Activity	Estimated Completion Date
Action 1 – Support the current Washington soil health advisory committee	Appoint committee members and sub-committee members	August – October 2020
	Develop operating procedures, meeting schedules, and overarching goals for committee	January – March 2021
Action 2 – Assess programmatic needs and build capacity	Hire lead NRS4 Soil Scientist	September – November 2020
Action 3 – Employ adaptive management to improve soil health metrics, priorities, and activities	Create a system for identifying top soil health practices for each significant cropping system, cropping regions, while utilizing the WSU road mapping process which would include relationships of soils, cropping regions and major and minor crops produced in WA	December 2021
	Develop an overall standard soil health assessment metrics process and protocol for WA soil and cropping systems while coordinating with WSU and WSCC	December 2022 - 2024
Action 4 – Plan, acquire, and manage SHI grants and research	Create a research priorities list in coordination with WSU and WSCC based on historical, ongoing, and needs assessment	December 2020 – March 2021
	Coordinate with WSU, WSCC on research priorities and coordinate on lead/roles per research category and priority; setting priorities with soils and crop systems objectives in mind and also personnel/resource constraints	Ongoing
	Pursue grant fund opportunities based on needs assessment and gap analysis for soil health priorities	Ongoing

Action 5 – Submit a biennial SHI progress report to the governor and legislature	Submit biennial progress report, input from WSU and WSCC	October 2020 - Ongoing
Action 6 – Research agricultural viability and environmental function	Compile list of 100+ farmers & ranchers throughout WA who are currently practicing suite of soil health principles across food production zones, cropping methods, and soil types.	October 2021
	Compile existing information and identify data gaps associated with yield, profitability, costs and benefits associated with top 10 producing crops in WA for soil health	October 2022
	Compile ancillary benefits, water quality and quantity, associated with improved soil health	October 2022
	Scope out, plan, pursue funding, and conduct research based study on ancillary benefits associated with improved soil health	October 2022 - 2024
Action 7 – Establish a “state of the soils” baseline assessment	Work with WSU to field test 200+ sites to begin to establish ‘state of the soils’ baseline. Coordinate with WSU to include the other faculty studies that may exist. Scope, design, and create a repository data base system to capture existing and new research data. Consider needs of the state, region, and national data and tracking systems.	October 2022
Action 8 – Develop standardized methods and diagnostic tools	Coordinate with WSU to prioritize conduct literature review and diagnostic methods for cropping groups, perennial and annual cropping systems, and major and minor crops in WA, related to the SHI, production. Coordinate and utilize WSU faculty guidance, and graduate students along with WSDA NRAS and WSCC staff.	October 2022
	Consult with WSCC, CD’s and farmers & ranchers on currently used soil health methods	October 2022

	Develop standardized practice list of methods and diagnostic tools for soils and cropping systems	October 2023
Action 9 – Develop an agricultural product marketing and promotion program	Coordinate with WSU, WSCC to plan and create publications. Set a plan to assess existing products, and future products to publish educational materials and outreach handouts on the importance of soil health, provide presentations and videos as possible	October 2022
	Present soil health educational information to various groups across the state and also consider video, online and virtual products	October 2022
	Create reports, fact sheets, or posters to summarize information	October 2022
	Provide regular reporting to WSDA Director, Policy, Communication and legislature	Ongoing
Action 10 – Manage SHI budget and grant funds	Maintain accurate accounting of SHI budget and grant fund expenditures	Ongoing
	Submit budget requests to governor and legislature	May 2021 - October 2022