SOIL CON

2023

TAKING PRINCIPLES TO PRACTICE

RESOURCE ROUNDUP

WASHINGTON SOIL HEALTH INITIATIVE

WASHINGTON STATE UNIVERSITY
Center for Sustaining Agriculture and Natural Resources

WESTERN SARE
Sustainable Agriculture Research & Education

2023

IMPACT

1026 *registrants*

316,557 *acres farmed**

27 *speakers*

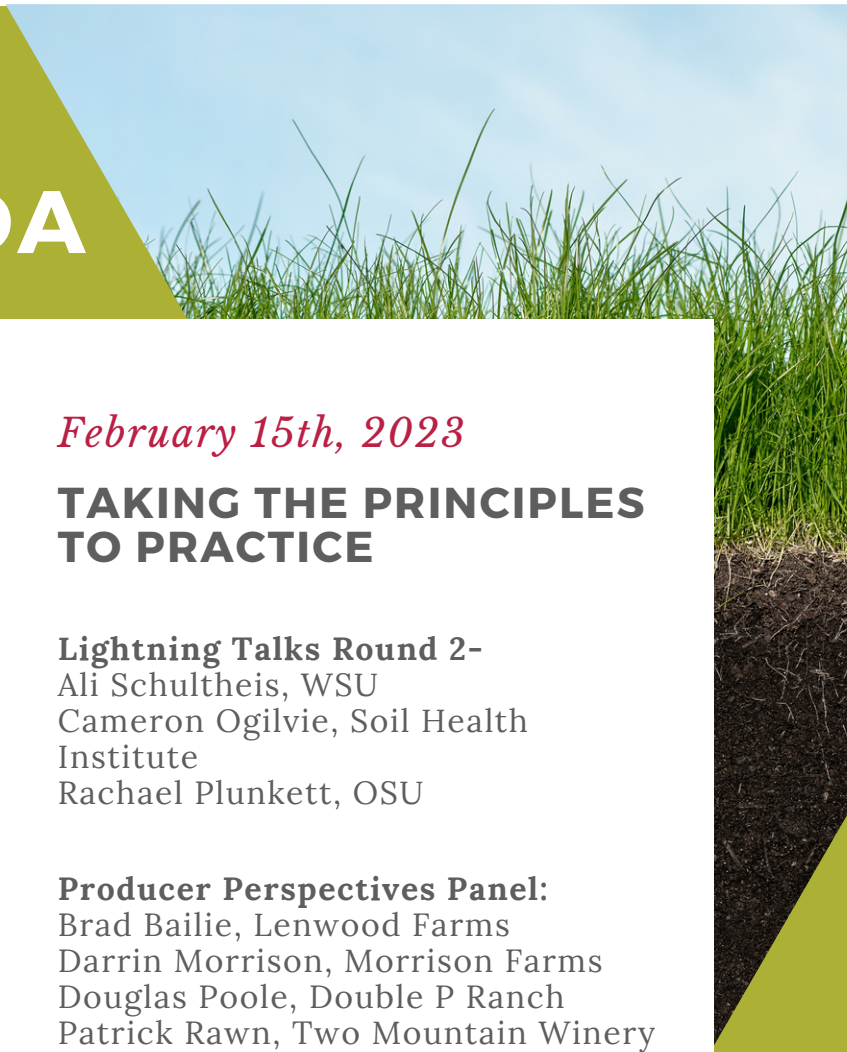
19,334,851 *acres consulted**

11 *represented institutions*

>10 *cropping system types**

* represented by registrants

This conference was supported by the WSU Center for Sustaining Agriculture and Natural Resources (CSANR) and the USDA Sustainable Agriculture Research and Education program (SARE). This material is based upon work that is supported by the National Institute of Food and Agriculture, U.S. Department of Agriculture, under award number G203-22-W7905 through the Western Sustainable Agriculture Research and Education program under project number WSP20-008 and ESP20-001. USDA is an equal opportunity employer and service provider. Any opinions, findings, conclusions, or recommendations expressed in this publication are those of the author(s) and do not necessarily reflect the view of the U.S. Department of Agriculture



overview

2023 AGENDA

February 14th, 2023

THE SOIL HEALTH PRINCIPLES

WA State Soil Health Initiative Update- Dani Gelardi, WSDA

Fertilizer pricing: implications for farm management- Gary Schnitkey, UI Urbana-Champaign

Lightning Talks Round 1-
Bradley Crookston, USU
Brady Goettl, NDSU
Madeline Desjardins, WSU

Agroecosystems that regenerate soil C over time- Randy Jackson, UW Madison

The role of soil organic matter in soil health: build, store it, and keep it there!-
Kirsten Ball, WSU

Cover Crop Economics-
Michael Brady, WSU

What does "feeding your microbes" really mean?-
Teal Potter, WSU

Can we replace synthetic nitrogen with microbes?-
Maren Friesen, WSU

Key Takeaways

February 15th, 2023

TAKING THE PRINCIPLES TO PRACTICE

Lightning Talks Round 2-
Ali Schultheis, WSU
Cameron Ogilvie, Soil Health Institute
Rachael Plunkett, OSU

Producer Perspectives Panel:
Brad Bailie, Lenwood Farms
Darrin Morrison, Morrison Farms
Douglas Poole, Double P Ranch
Patrick Rawn, Two Mountain Winery

Sustainable Farms & Fields Program Update- Karen Hills, WSCC

Academic Roundtable:
Dani Gelardi, WSDA
Doug Collins, WSU
Erin Silva, UW Madison
Hero Gollany, USDA-ARS
Miguel Cabrera, UGA

Lightning Talks Round 3-
Anita Paneru, WSU
Claire Phillips, USDA-ARS
Evan Domsic, WSU
Rana Farrasati, UN Lincoln

Resource Roundup

Sessions

SOIL HEALTH RESOURCES & FUNDING OPPORTUNITIES

Dani Gelardi, WSDA

Click title of each presentation to watch recording

WA STATE SOIL HEALTH INITIATIVE OVERVIEW

Key Takeaways:

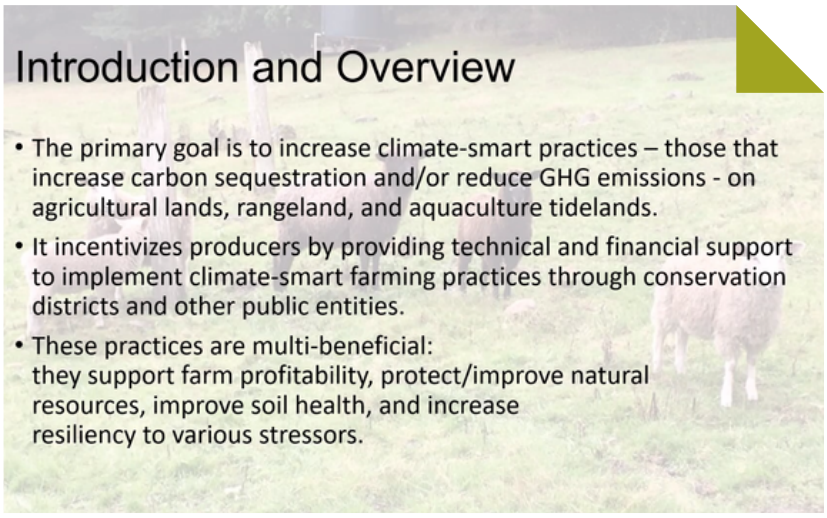
- The State of the Soils Assessment is live for WA.
- Sustainable Farms and Fields is providing new soil health opportunities.
- The WaSHI Roadmap will guide future WA soil health efforts.

Resources:

Washington Soil Health Initiative
WA State of the Soils Assessment
Sustainable Farms and Fields
WaSHI Roadmap

Karen Hills, WSCC

SUSTAINABLE FARMS & FIELDS PROGRAM UPDATE



Key Takeaways:

- SFF is currently open to CDs and other public entities for eligible projects.
- Climate Smart Practices prioritize those that increase carbon storage and reduce emissions of methane and nitrous oxide.

Resources:

Sustainable Farms and Fields
SFF Program Guidelines
SFF Guidelines Webinar
WA Climate Smart Estimator

Sessions

THE ROLE OF CARBON IN SOIL HEALTH

Randy Jackson, UW Madison

CLIMATE-SMART AGRICULTURE AND HEALTHY SOIL COMES FROM AGROECOSYSTEMS THAT REGENERATE SOIL C OVER TIME

Key Takeaways:

- Pasture and grassland shows greater potential for regenerative systems.
- A goal of systems is to store carbon at all rather than lose carbon.
- Technology can help us assess efficacy, but we have enough information to act in storing carbon.

Summary

1. Annual row crops losing SOC, even with min till and cover crops (Sanford et al. 2012)
2. Well-managed grazing on perennial grasslands promotes persistent SOC (Rui et al. 2022)
3. SOC either growing faster under grassland or shrinking slower (Becker et al. 2022)
4. All 5 soil health principles, fully implemented, key to healthy soil (Augarten et al. 2023)

Resources:

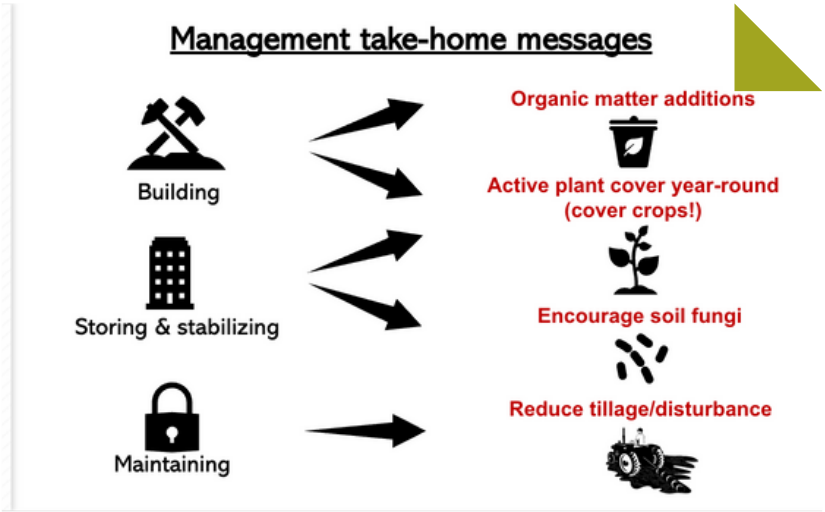
Jackson Lab Website
Augarten et al. 2023
Sanford et al. 2012
Rui et al. 2022.
Becker et al. 2022

Kirsten Ball, WSU

THE ROLE OF SOIL ORGANIC MATTER IN SOIL HEALTH: BUILD, STORE IT, AND KEEP IT THERE!

Key Takeaways:

- Microbial necromass is a massive contributor to SOC.
- Soil aggregates can protect SOC from degradation.
- Effects on SOC from organic amendments are over the long-term, not short-term.



Resources:

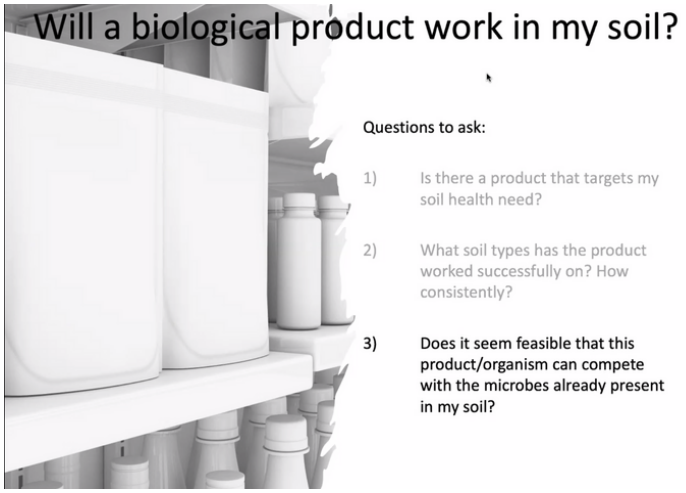
Kallenbach et al. 2016
Cortufo et al. 2019
Weidhuner et al. 2021
Kan et al 2020

Sessions

THE ROLE OF NITROGEN IN SOIL HEALTH

Teal Potter, WSU

WHAT DOES "FEEDING YOUR MICROBES REALLY MEAN?



Key Takeaways:

- Feeding your soil microbes can increase or decrease soil C and N, the phrase is not precise.
- The hope for “feed your microbes” is to leverage the services they can provide in working soils, but the science is far from optimizing.
- Microbial communities are resilient
- Back to the basics of keeping soil on your field- if experimenting with biologicals, start small and ask questions.

Resources:

The science behind microbial and biological products Koch et al. 2018

Maren Friesen, WSU

CAN WE REPLACE SYNTHETIC NITROGEN WITH MICROBES?

Key Takeaways:

- Synthetic nitrogen has changed the world.
- Certain crops have mechanisms to fix nitrogen from the atmosphere.
- No silver bullets: use practices to promote the growth and function of existing N fixers.

Resources:

Microbial Inoculants: Silver Bullet or Jurassic Park

Sessions

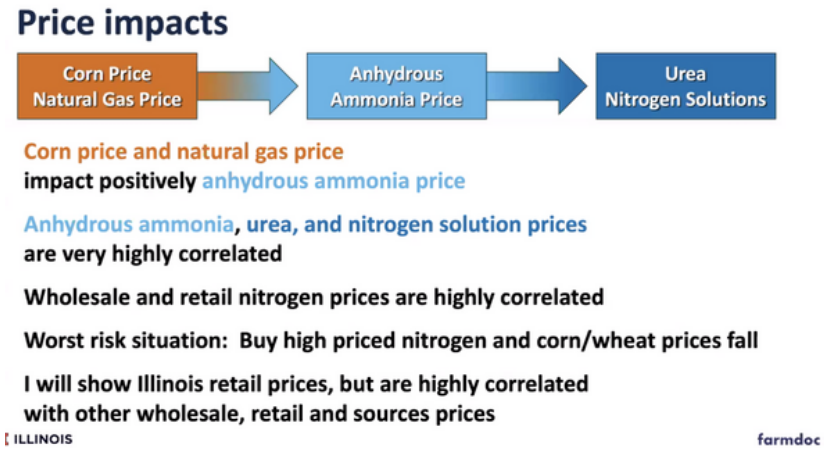
IMPLEMENTING COVER CROPS & RESIDUE MANAGEMENT

Gary Schnitkey, UI Urbana-Champaign

FERTILIZER PRICING: IMPLICATIONS FOR FARMERS

Key Takeaways:

- Corn prices are correlated to fertilizer price (demand).
- Big producers of fertilizers use natural gas.
- Inputs are not guaranteed to be available at historical rates.



Resources:

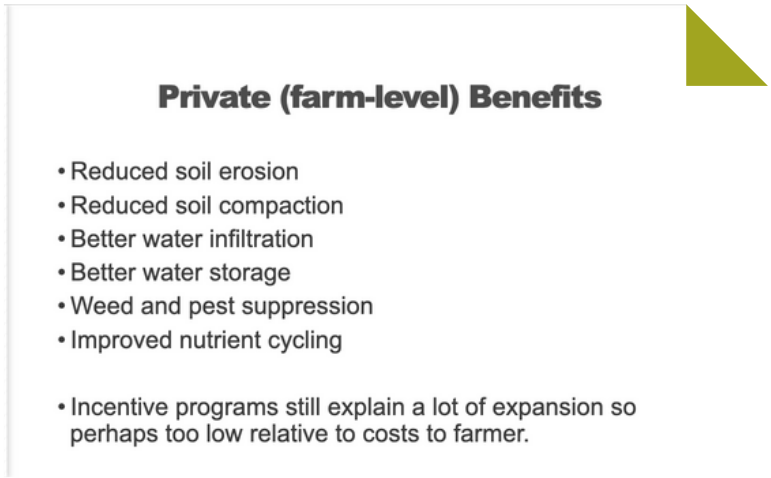
Farmdoc Website

Michael Brady, WSU

COVER CROP ECONOMICS

Key Takeaways:

- There is a push to place economic value on cover crops' public benefits.
- Increasing prevalence of studies on cover crops and public benefits.
- 1/3 of cover cropping receives financial assistance for the practice.



Resources:

NRCS Environmental Quality Incentives Program

NRCS Conservation Stewardship Program

Jones, 2020

Wallander et al. 2021

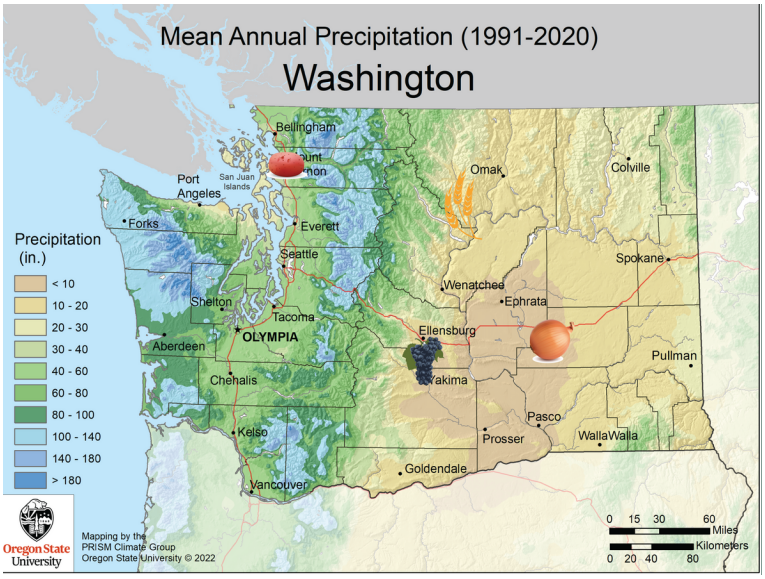
Achakulwisut et al. 2019

Sessions

PRACTICAL COVER CROPPING & RESIDUE MANAGEMENT

PRODUCER PERSPECTIVES PANEL

Brad Bailie, Lenwood Farms
Darrin Morrison, Morrison Farms
Douglas Poole, Double P Ranch
Patrick Rawn, Two Mountain Winery



Key Takeaways:

- A practice might not work the first time, ask around and try something different.
- Doing more with less is possible after years of trying.
- Context is the 6th soil health principle.

Resources:

NRCS Conservation Stewardship Program
WSU Farmers Network

ACADEMIC ROUNDTABLE

Doug Collins, WSU
Erin Silva, UW Madison
Hero Gollany, USDA-ARS
Miguel Cabrera, UGA

Key Takeaways:

- You don't have to transition all at once.
- Plant 1-2 species cover crop, including a legume, if your climate allows.
- Timing of termination is critical.

Resources:

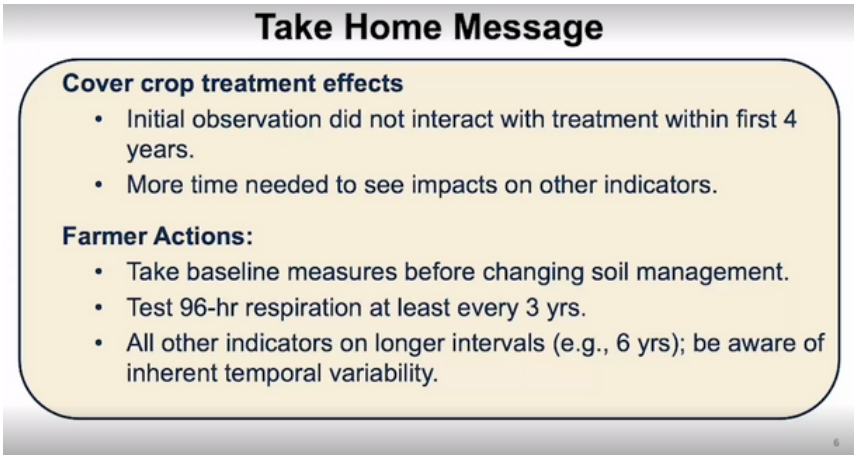
Web-Based Model of Cover Crop Residue Decomposition and N Release
Western Cover Crop Council
High Residue Cultivation in Organic Strip-Till Sweet Corn
Roller crimp in Wisconsin
Midwest Cover Crop Council
SARE Cover Crop Resources
Washington's Sustainable Farms and Fields program
Farmer-led watershed groups in Wisconsin
Where to find your county extension agent

Sessions

LIGHTNING TALKS

Bradley Crookston, USU

MICROBIAL RESPIRATION INDICATES SOIL HEALTH IMPROVEMENT FOLLOWING COVER CROPS IN THE MIDWEST



Key Takeaways:

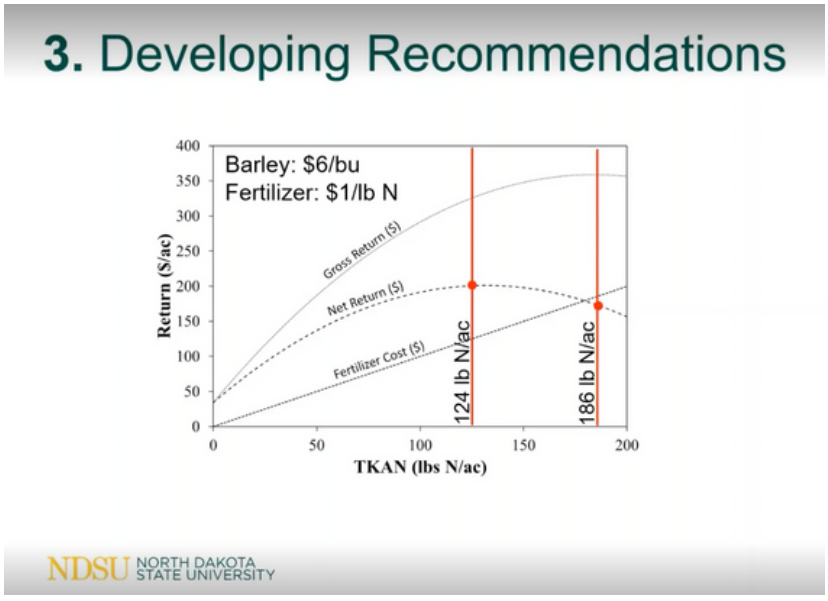
- Measuring soil health metrics help inform effective practices.
- Long-term monitoring will be more accurate as change happens over time.

Resources:

USU Plants, Soil, and Climate

Brady Goettl, NDSU

THE ECONOMIC APPROACH TO NITROGEN MANAGEMENT



Key Takeaways:

- Combining economical nitrogen rates with sustainable soil practices can promote profitability and reduce environmental impact.
- Applying N for maximum yield is not always maximum profitability.

Resources:

NDSU AgHub

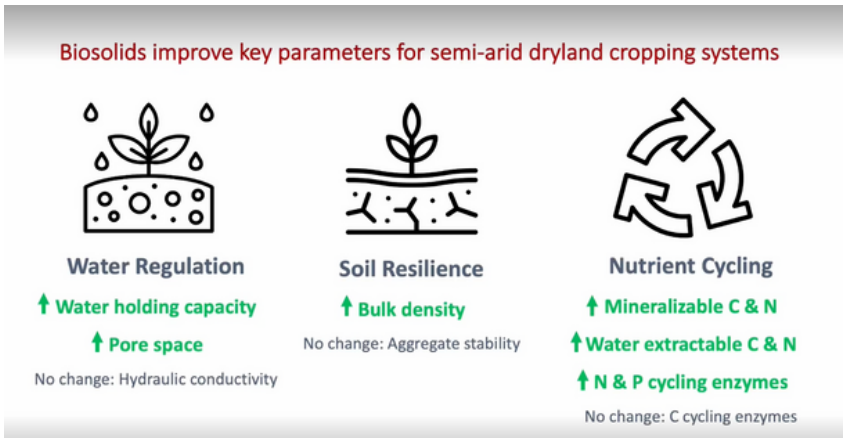
NDSU Soil Health

Sessions

LIGHTNING TALKS

Madeline Desjardins, WSU

EFFECTS OF LONG-TERM BIOSOLIDS APPLICATIONS ON PHYSICAL, CHEMICAL, AND BIOLOGICAL SOIL HEALTH PROPERTIES IN SEMI-ARID DRYLAND SYSTEMS



Key Takeaways:

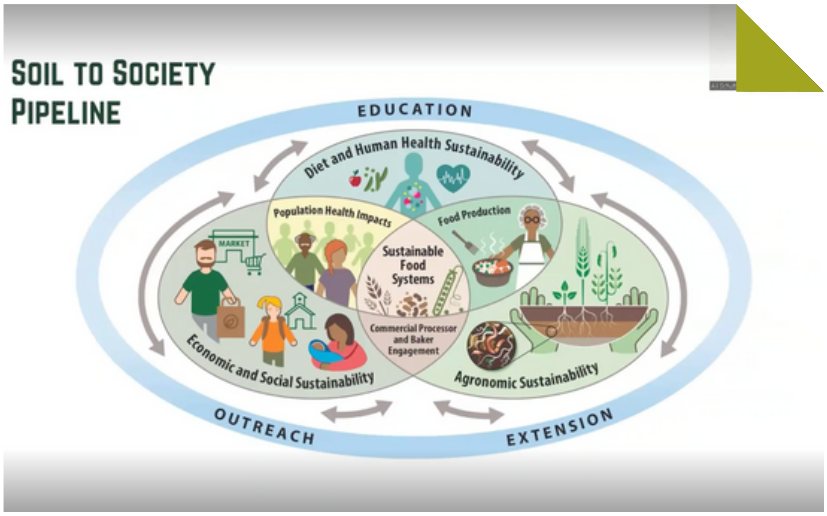
- Biosolids can be alternatives to synthetic amendments and improve soil health characteristics.
- Biosolids can improve water characteristics in dryland systems.

Resources:

WSU Mount Vernon NWREC
King County Biosolids

Ali Schultheis, WSU

OPTIMIZING HUMAN HEALTH AND NUTRITION: FROM SOIL TO SOCIETY



Key Takeaways:

- The soil to society pipeline: tracks the flow of nutrients from the ag system through the food production process and into the bodies of consumers.
- Plant breeding can be used to improve quality, not strictly yield.

Resources:

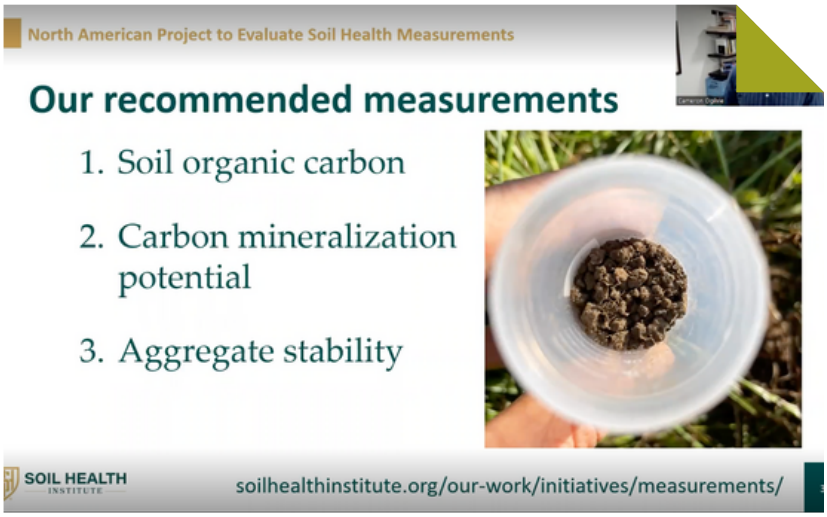
Soil to Society Website
@soiltosociety on Twitter and Instagram
Soil to Society on Facebook and Linkedin

Sessions

LIGHTNING TALKS

Cameron Ogilvie, Soil Health Institute

SETTING SOIL HEALTH TARGETS



Key Takeaways:

- Inherent soil properties are determinants of soil health status.
- The Soil Health Institute has simplified the texture triangle and combined with drainage class.

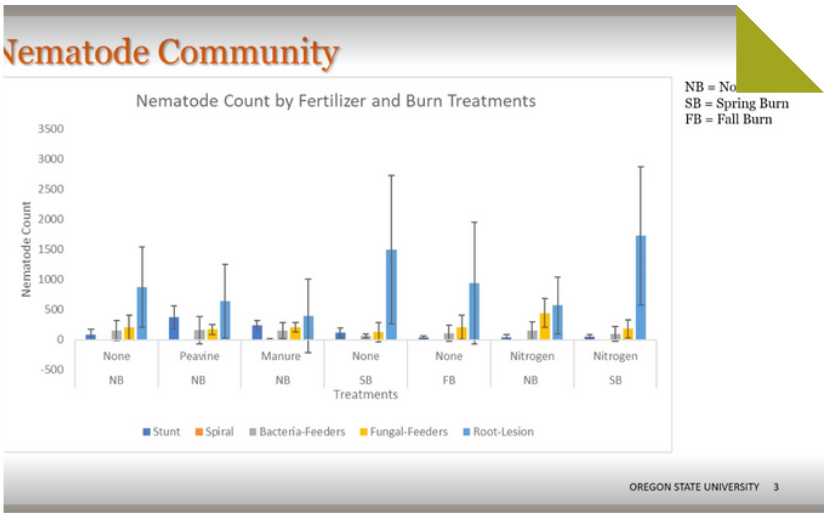
Resources:

The Soil Health Institute Resources

Soil Health Institute announces recommended measurements for evaluating soil health

Rachael Plunkett, OSU

HOW SOIL HEALTH INTERACTIONS CONTRIBUTE TO NEMATODE COMMUNITY IN WHEAT-FALLOW CROPPING SYSTEMS IN NORTHEASTERN OREGON



Key Takeaways:

- More work is to be done investigating nematode communities and soil health.
- Root lesion nematodes are most abundant.

Resources:

Columbia Basin Agriculture Research Center

Sessions

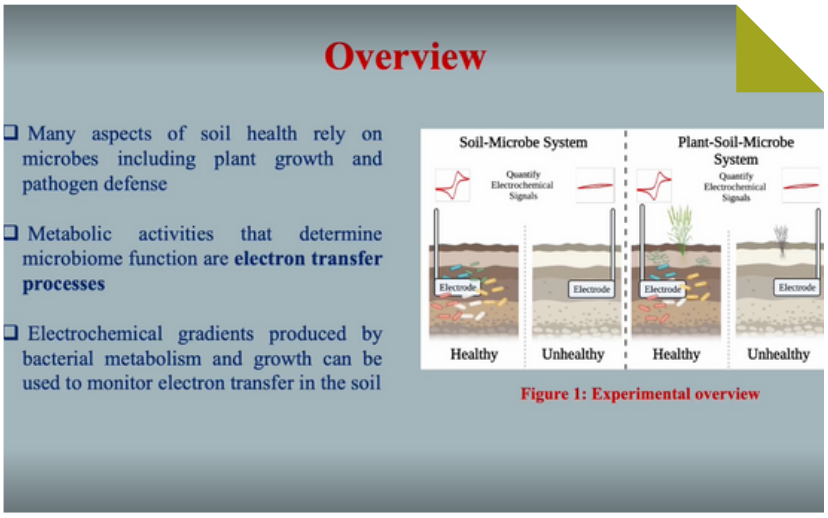
LIGHTNING TALKS

Anita Paneru, WSU

INVESTIGATION OF SOIL MICROBIOMES USING ELECTROCHEMICAL AND MOLECULAR METHODS

Key Takeaways:

- We can measure microbe metabolic activity with electrochemical methods.



Resources:

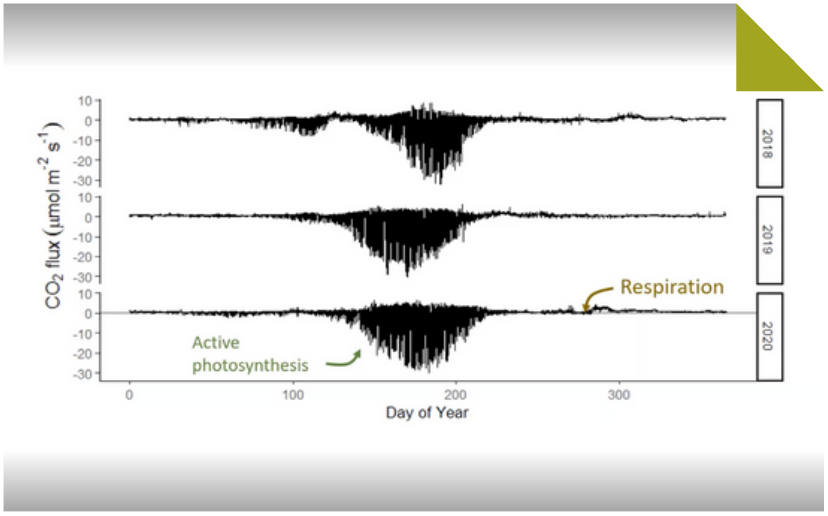
WSU Department of Plant Pathology

Claire Phillips, USDA-ARS

LONG-TERM TILLAGE IMPACTS ON ECOSYSTEM CARBON BALANCE IN A DRYLAND WHEAT SYSTEM

Key Takeaways:

- Changes in soil organic carbon are not uniform across fields.
- CO2 flux change in direction and amount during the year.
- Wheat is a larger carbon sink than garbanzo and canola in Eastern Washington.



Resources:

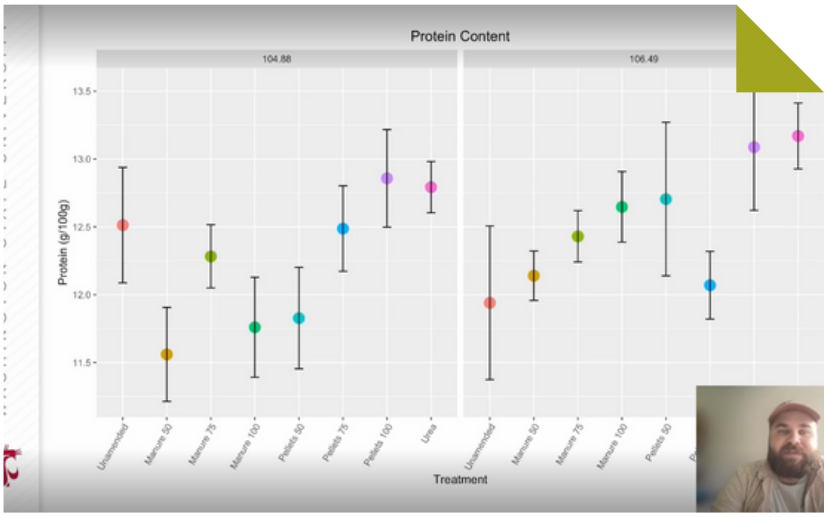
USDA-ARS Northwest Sustainable Agroecosystems Research

Sessions

LIGHTNING TALKS

Evan Domsic, WSU

ENHANCING QUINOA NUTRITIONAL QUALITY THROUGH SOIL HEALTH AND CROPPING SYSTEM OPTIMIZATION



Key Takeaways:

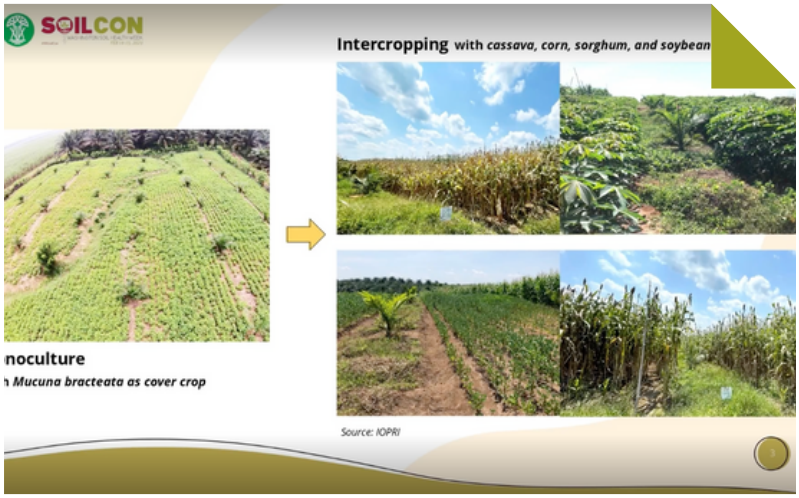
- Quinoa is unique, having high protein and amino acids.
- Different soil amendments impact measured quinoa protein.

Resources:

Soil to Society Website

Rana Farrasati, UN Lincoln

INTERCROPPING: A NATURE-BASED SOLUTION TO IMPROVE SPACE FOR DIVERSIFICATION AND SOIL HEALTH IN IMMATURE OIL PALM



Key Takeaways:

- Oil palm plantations with Intercropping improve biological activity.
- Intercropping with cassava, soybean, corn, and sorghum can have environmental and economic benefits.

Resources:

Indonesian Oil Palm Research Institute In the news

2023

COMMON THEMES

- Moving away from synthetic inputs may become more necessary as we move into the future.
- Reducing tillage and relying on longer-term input management can help improve carbon storage and reduce reliance on inputs.
- Positive all-farm and public benefits can come from implementing soil health practices.
- Context is the 6th soil health principle.
- Change will take time and may take multiple attempts. Flexibility and resilience are key.

WaSHI Resources

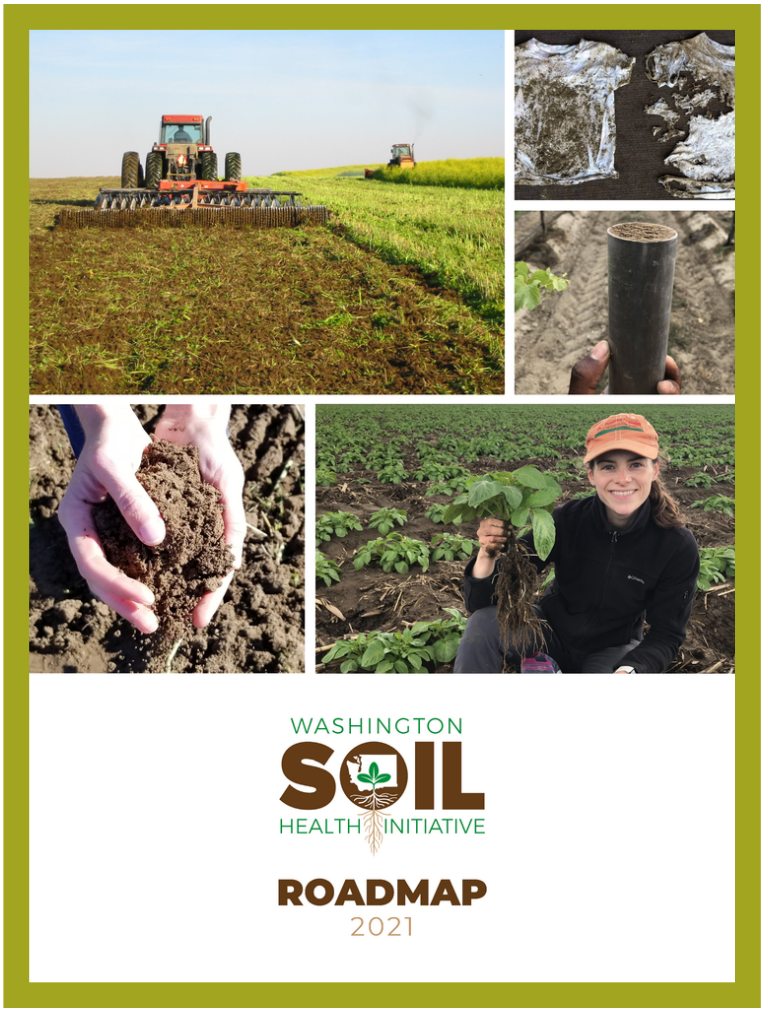
Want to get started soil testing?

https://youtube.com/playlist?list=PL0pB20prk7Ni1daEYiEEXSWy8CfwO34FC

State of the Soils Assessment

https://nras.maps.arcgis.com/apps/dashboards/d4b2d135d47a4ff7a89285fecf67cef2

WaSHI ROADMAP



To effectively map how to **increase** and **sustain** soil health, the initiative's partners interviewed stakeholders across the state using listening sessions, interviews, and focus groups.

This roadmap will guide the focus of WaSHI for years to come.

soilhealth.wsu.edu/washington-state-soil-health-roadmap/

Keep in touch with WaSHI!

@WSU_SoilHealth

@WSU_SoilHealth

Newsletter

https://bit.ly/3KXo7vq

Email: soil.health@wsu.edu

Website: soilhealth.wsu.edu

2023

SOIL ART CONTEST WINNER

ANGELO ADAME

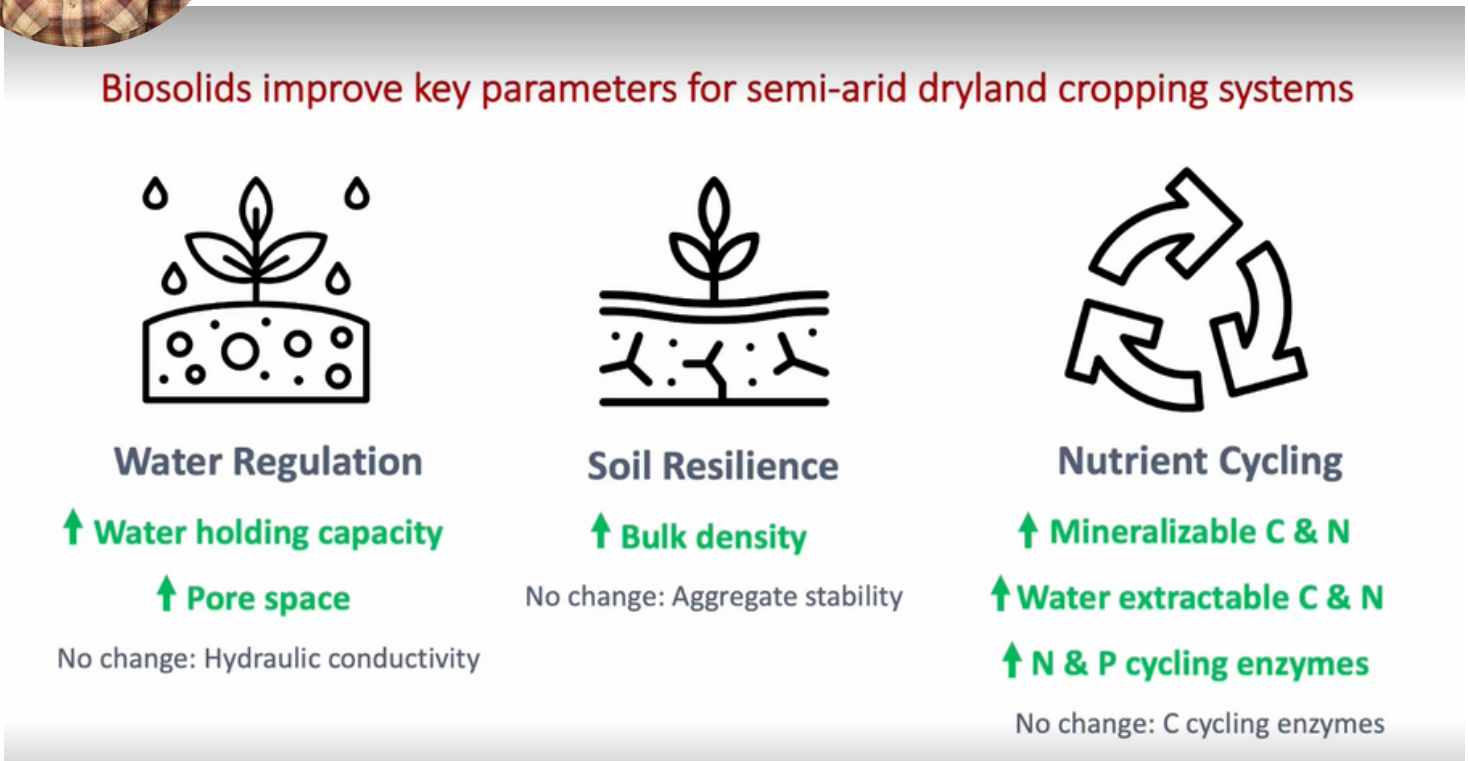
Elementary Soil Health Curriculum

If you are interested in soil health curriculum for the 3rd-5th grade age range, check out this video series from Dr. Tarah Sullivan on the importance of soils, soil sampling, and soil analysis.

www.youtube.com/playlist?list=PLBU9aYUI-eYKQrLYrNl1_5lcZVYfiwVkn

2023

STUDENT LIGHTNING TALK WINNER



MADELINE DESJARDINS

WASHINGTON SOIL HEALTH WEEK

SOILCON23

FEBRUARY 14TH & 15TH

SOIL CON

2023

TAKING PRINCIPLES TO PRACTICE

THANK YOU TO OUR EVENT ORGANIZERS

In alphabetical order:

Betsy Schacht
Carol McFarland
Chris Benedict
Dani Gelardi
Deirdre Griffin LaHue
Gabe LaHue
Katie Doonan
Lynne Carpenter-Boggs
Maren Friesen
Molly McIlquham
Steve Culman
Tarah Sullivan
Teal Potter
Vincent Alverez

AND OUR EVENT SPONSORS!

WASHINGTON SOIL HEALTH INITIATIVE

WASHINGTON STATE UNIVERSITY
Center for Sustaining Agriculture and Natural Resources

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