



Recognizing Soil Health


Focus on Regenerating Soil Structure and the Soil Ecosystem

By Aaron Hird, NE NRCS Soil Health Specialist

Extreme Weather



Resilient Soil



PASSIVE SOIL MANAGEMENT
Spring conditions in a crop field after soybeans harvest the previous year.

Manage For Healthy Soil! The Chemical, Biological and Physical Aspects of Soil

- “Start where you are. Use what you have. Do what you can.” A.R. Asche Jr.
- “Diversification is a protection against ignorance. This makes very little sense to those who “know” what they are doing.” Warren Buffet

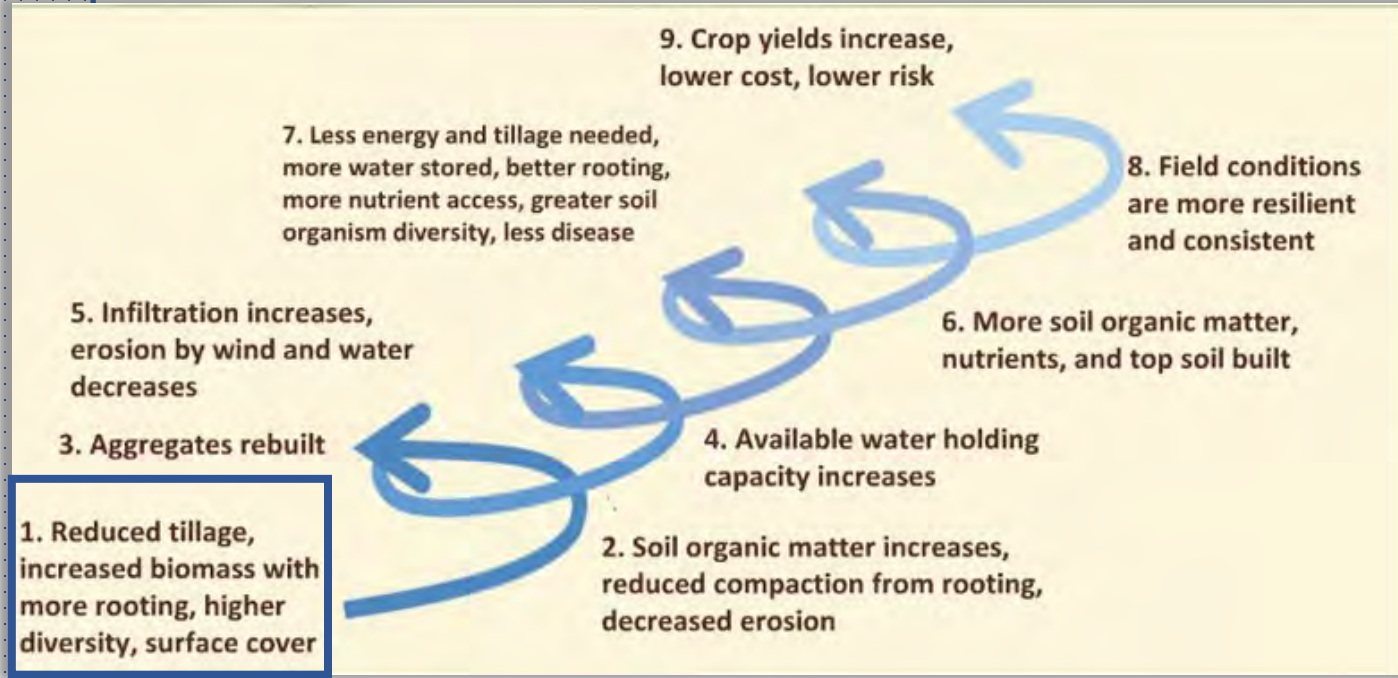
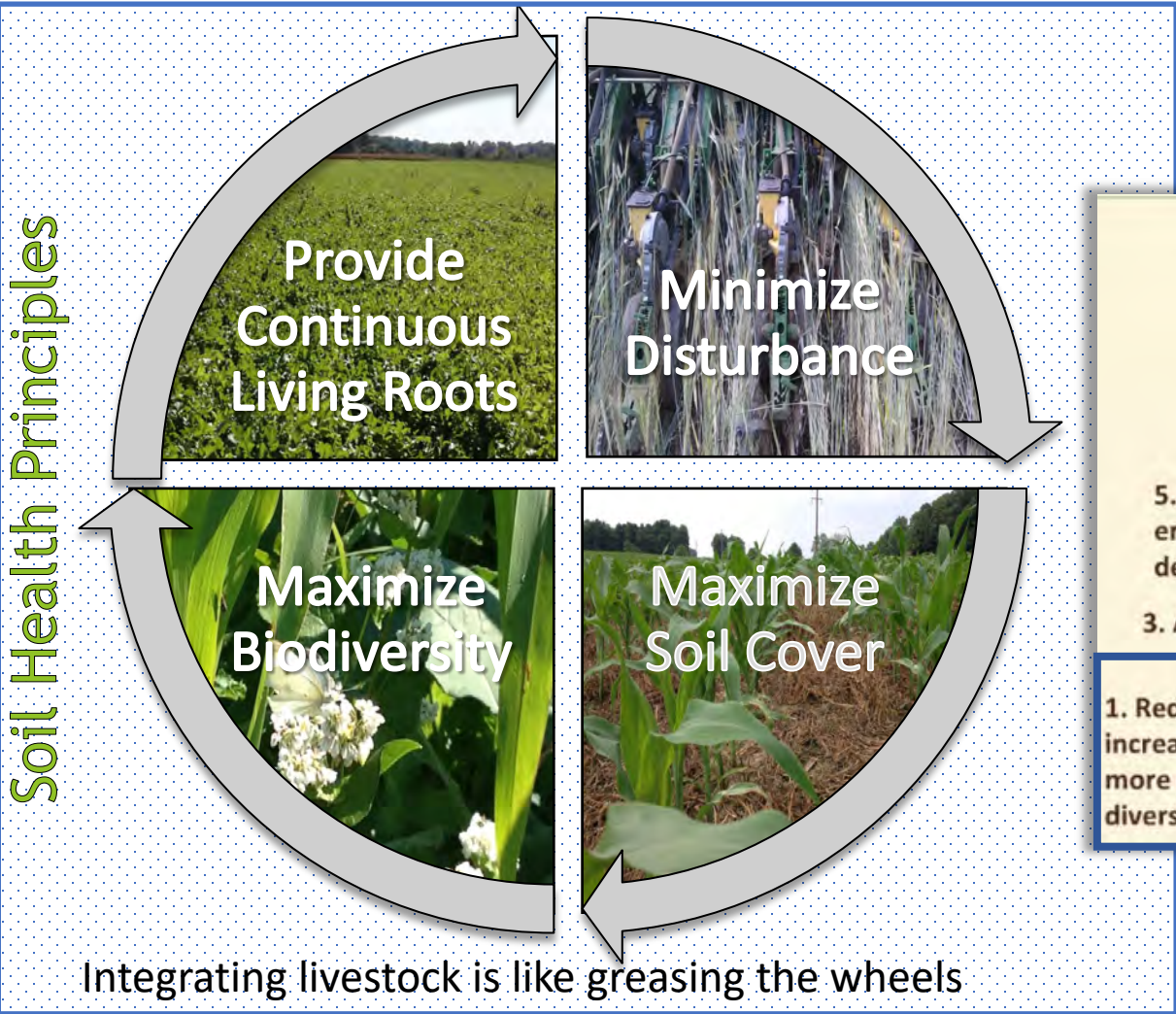
ACTIVE SOIL MANAGEMENT
Cover Crops planted after harvest for Erosion Control and to Address Compaction. Pictured after grazing.

Soil Health Defined:

- The continued capacity of the soil to function as a vital living ecosystem that sustains plants, animals, and humans.

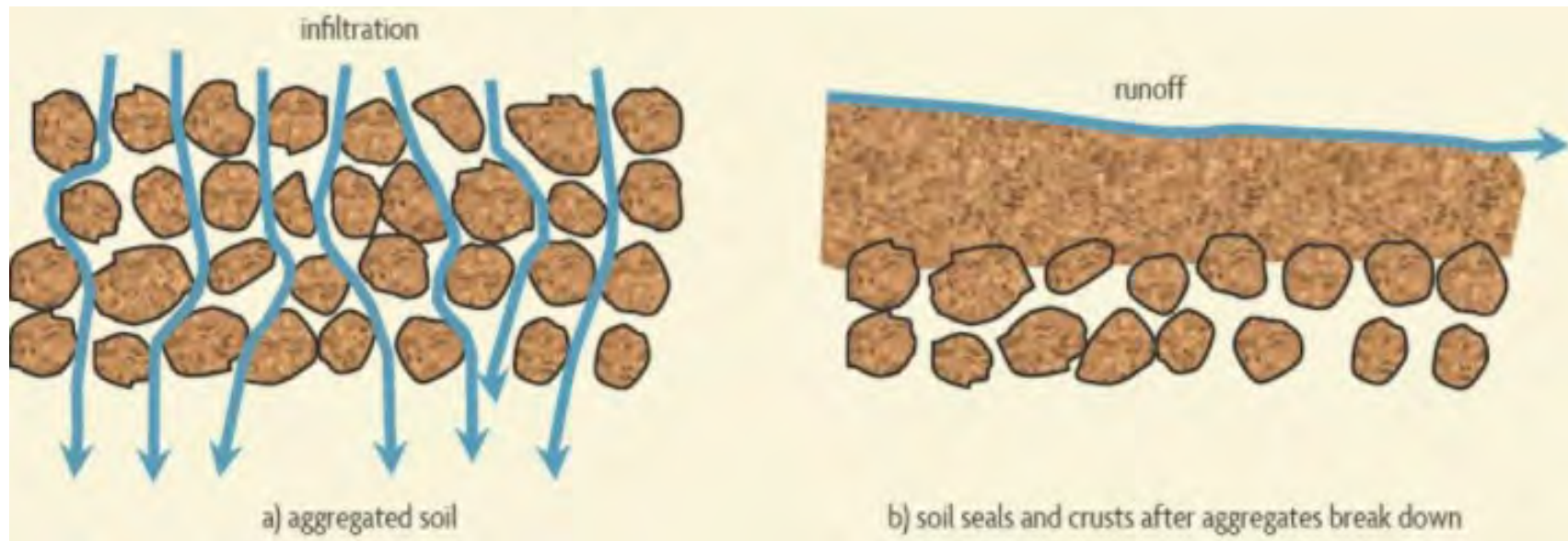


Regenerating Soil Health is achieved by taking Step 1 - Implement the Soil Health Principles.



Handouts provided

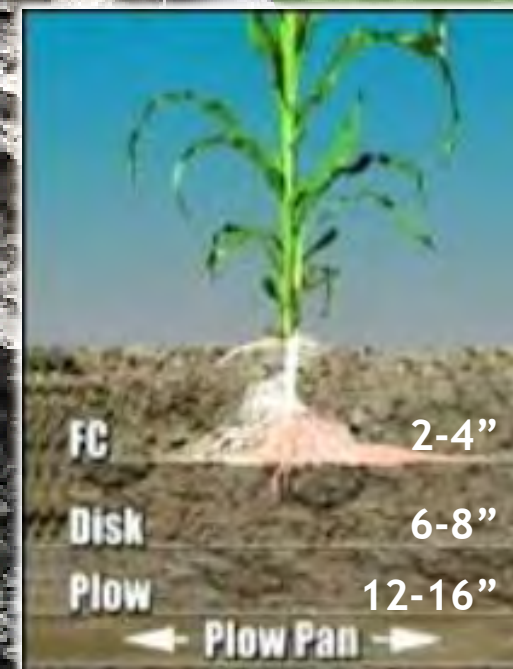
Manage for Habitat; organisms will form Wet Stable Aggregates, increasing water infiltration, drainage, aeration and building Soil Organic Matter.



Building Soils For Better Crops, Sustainable Soil Management, 3rd edition, page 16, SARE Publication.

Soil Function is influenced primarily by biology which is impacted by management. **(90% of Soil Function is mediated by soil microbes)**

A Common problem in Nebraska: Tillage Induced, Root Restrictive, Compaction Layers



Cover Crops have a High Rooting Pressure Tolerance and Can Penetrate High Bulk Densities!

NE NRCS Soil Health Assessment is based on Dynamic Soil Properties

- As the Dynamic Soil Properties change the Soil Functions change

Dynamic Soil Properties

Biological Activity

Bulk Density

Color

Aggregate Stability

Structure

Soil Functions

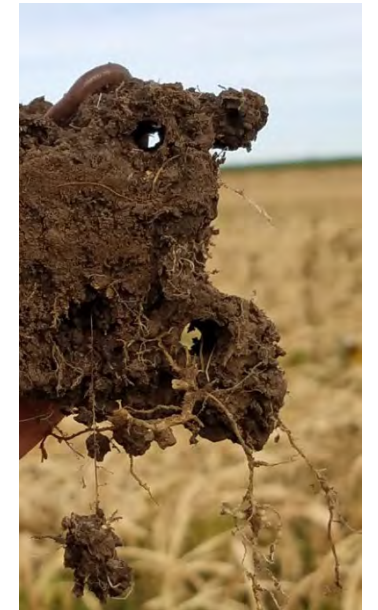
Nutrient cycling

Water (infiltration & storage)

Filtering and Buffering

Physical Stability and Support

Habitat for Biological Activity



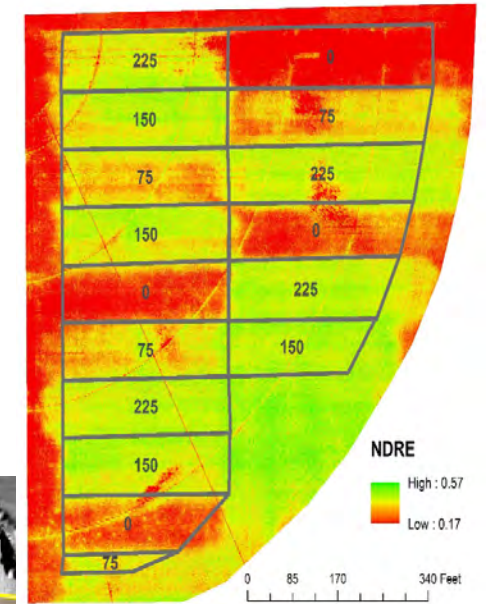
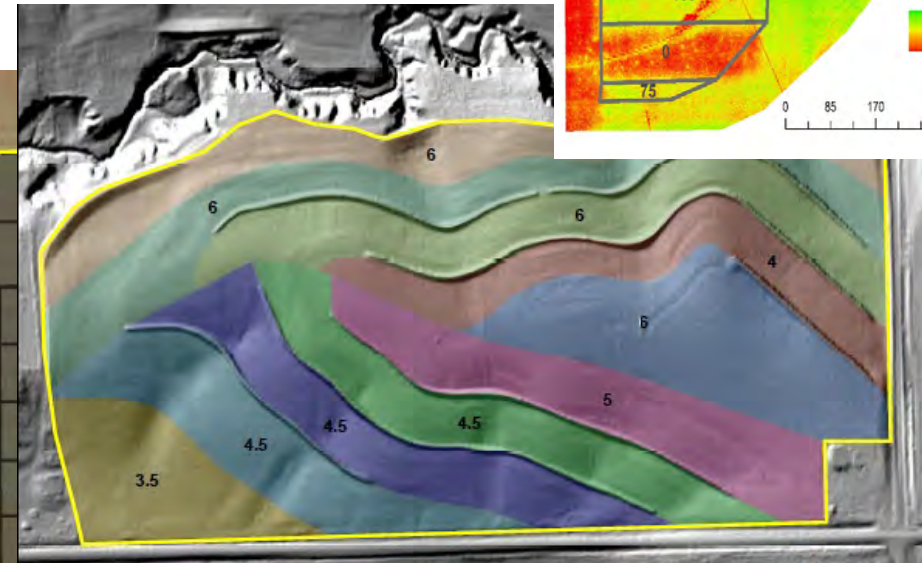
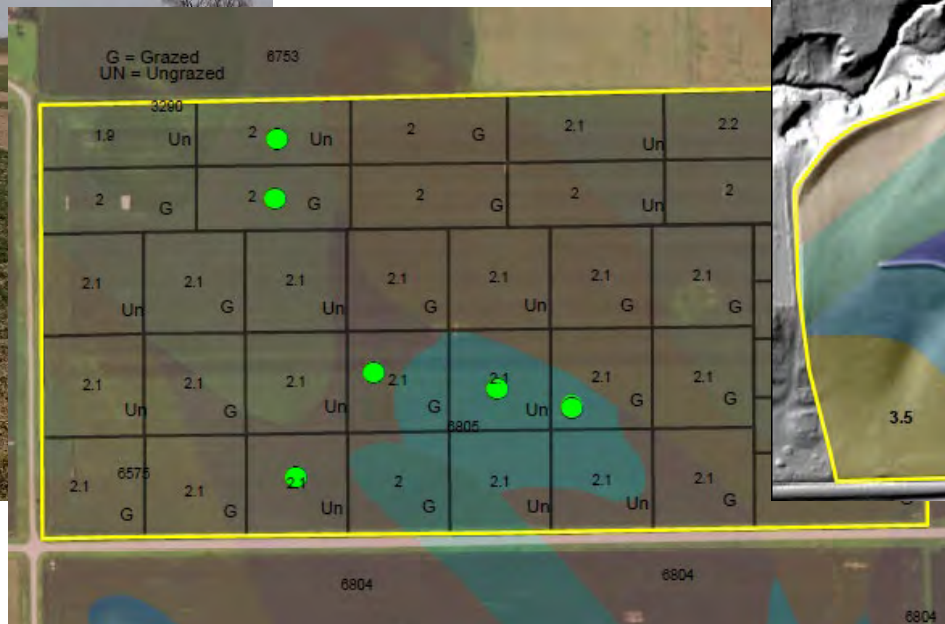
Nebraska NRCS Soil Health Initiative

- Partnerships remain our central focus.
- Continue to geographically distribute key outreach and educational resources.
- Example: Fund and monitor a network of **Demonstration Projects on Farms and Ranches** across the state.
- The Goals of the EQIP Demonstration Farms
 - Provide a local source of information to answer common questions
 - Validate Soil Health Management Systems locally via case studies and field days.
 - Focus on the Communication about Soil Health through outreach, education, training and partnership opportunities



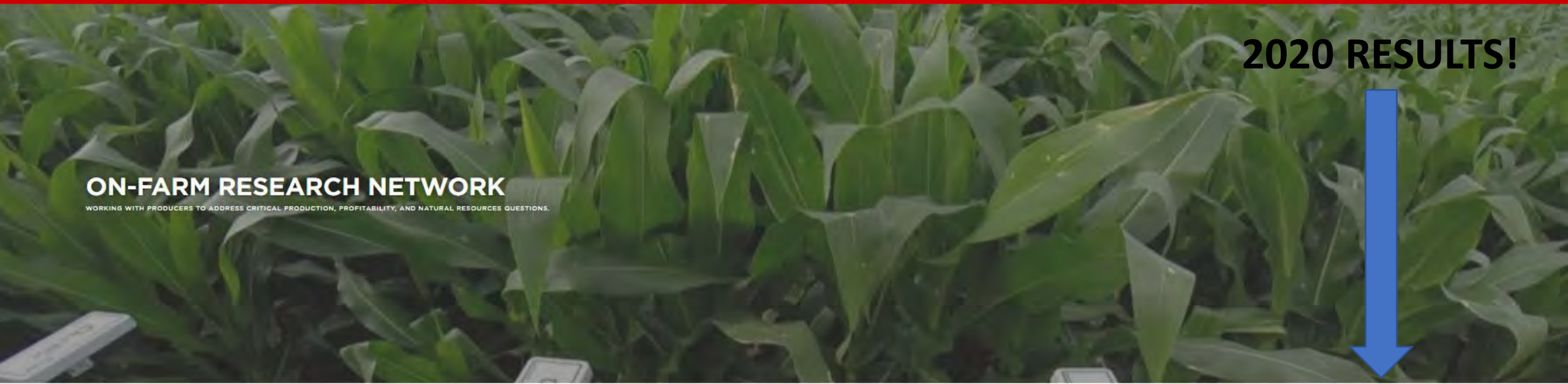
Demonstration Fields = On Farm Research

- A 5 year, field scale, comparison of two Cover Crop Adaptive Management Activities
- A system comparison throughout a 5-year expanded crop rotation
- Randomized and Replicated Plots
- Soil Health Assessments, Soil Lab Analysis and Economic Evaluations
- Opportunity to include partners, including UNL Extension & NE On Farm Research Network.



Interested? Contact your local NRCS office!

NDRE Source: NE ON FARM RESEARCH



2020 RESULTS!

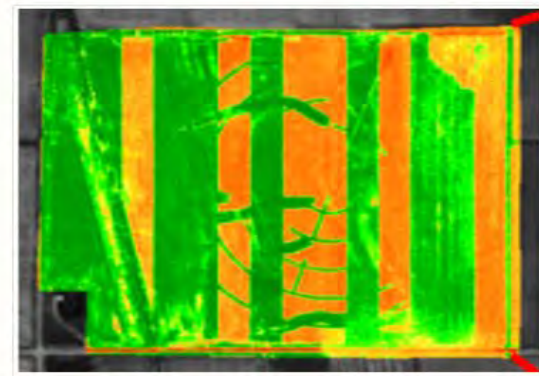
ON-FARM RESEARCH NETWORK

WORKING WITH PRODUCERS TO ADDRESS CRITICAL PRODUCTION, PROFITABILITY, AND NATURAL RESOURCES QUESTIONS.

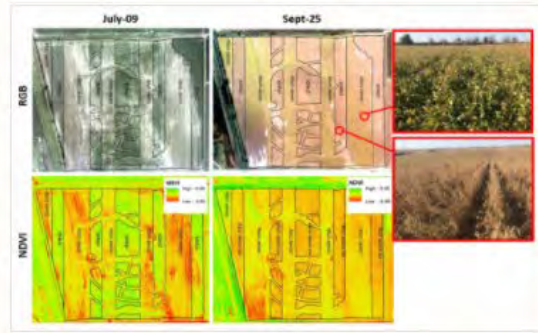
Related Articles



Interested in Testing Nitrogen Stabilizers on Your Farm?
JANUARY 19, 2021



Assessing Cover Crop Biomass Using Aerial Imagery: Lessons Learned During the UNL-NRCS Soil Health Initiative
OCTOBER 15, 2020



Using Aerial Imagery to Help Determine the Impact of Cover Crops on Cash Crop Growth and Development
OCTOBER 15, 2020

ON-FARM RESEARCH NAVIGATION

- On-Farm Research Home
- Resources for On-Farm Research
- On-Farm Research Media
- On-Farm Research Results
- Precision N Management
- Project SENSE
- About On-Farm Research
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NE On-Farm Research @OnFarmResearch
Interested in joining our team this summer? We are looking for an undergraduate summer intern! Details and application are here: [cropwatch.unl.edu/OnFarmResearch](#)

2020 Cover Crop Research – Dodge Co

Incorporation of Small Grains and Cover Crop in a Corn-Soybean Rotation, NRCS Demo Farm

Table 1. Soil physical, chemical, and biological properties for check and intensive system treatments.

Treatment	Infiltration (in/hr)	Soil moisture (%)	Bulk density (g/cm ³)	Soil temp. (F)	Soil respiration ¹	Total soil health score ²
2017 (1 sample per treatment replication, n=4 per treatment; samples collected on Nov. 14, 2020)						
Check	0.015 A*	24.5 A	1.21 A	41.9 A	3.67 A	12.6 A
Intensive System	0.480 A	23.5 A	1.06 A	42.5 A	3.92 A	15.2 A
P-Value	0.551	0.3471	0.315	0.500	0.678	0.272
2019 (1 sample per treatment replication, n=4 per treatment; samples collected on Nov. 6, 2019)						
Check	1.84 A	26.8 A	1.06 A	39.92 A	3.12 A	14.9 B
Intensive System	3.20 A	25.8 A	1.06 A	39.95 A	3.00 A	18.5 A
P-Value	0.2692	0.591	0.869	0.718	0.638	0.0721
2020 (2 samples per treatment replication, n=8 per treatment; samples collected on Nov. 3, 2020)						
Check	1.36 A	28.7 A	1.14 A	44.1 A	2.94 A	17.8 B
Intensive System	3.46 A	28.7 A	1.14 A	44.0 A	2.94 A	18.6 A
P-Value	0.117	0.969	0.992	0.781	1.00	0.055

¹Soil respiration (Modified Solvita burst).

²Score based on field assessment. The overall indicator score is based on the sum of 8 indicators (1=degraded, 2=in transition, 3=healthy): soil structure, structure type, surface condition, soil management, soil pores, earthworms, biological activity, and smell. Soil assessment was not completed in 2018 as it was originally planned for every other year interval.

*Values with the same letter are not significantly different at a 90% confidence level.

Table 3: 2020 corn moisture, yield, and net return for check and intensive system treatments.

	Moisture (%)	Corn Yield (bu/ac) [†]
Check	14.7 A	183 B
Intensive System	14.3 A	202 A
P-Value	0.168	0.00413

[†]Values with the same letter are not significantly different at a 90% confidence level.



Home

Weather (GDD & ET) Info & Resources

Crops

Management

Online or In-Person, February 25th or 26th at multiple locations!

ON-FARM RESEARCH NETWORK

WORKING WITH PRODUCERS TO ADDRESS CRITICAL PRODUCTION, PROFITABILITY, AND NATURAL RESOURCES QUESTIONS.

2021 Annual Results Update

LOOKING FOR LOCAL & RELIABLE AGRONOMIC INFORMATION?

Nebraska Farmers are conducting research across the state in cooperation with Nebraska Extension. There are 100+ projects this year! Come hear what we are learning, meet other innovative farmers, and consider conducting research on your own farm.

REGISTRATION

Pre-registration is required!

- Seating is limited to provide a low density environment - register early! **Events are subject to change.** In-person meetings may be cancelled based on local health measures. If a location is canceled, we will contact you and provide an online option.
- **Get latest information & register at go.unl.edu/2021onfarmresearch.**
- Questions: onfarm@unl.edu or 402-624-8030

February 25

- **AUBURN** - 4-H Building Nemaha County Fairgrounds, 816 I St., Auburn, NE
- **BEATRICE** - Gage County Extension Office, 1115 West Scott, Beatrice, NE
- **CLAY CENTER** - Clay County fairgrounds, 701 N Martin Ave, Clay Center, NE
- **DAVID CITY** - David City Library, 399 N 5th St, David City, NE
- **WAHOO** - Lake Wanhoo Education Building, 655 County Road 16, East side of Lake Wanhoo, Wahoo, NE
- **YORK** - Cornerstone Event Center, Fairgrounds York, 2400 N. Nebraska Ave., York, NE
- **ONLINE ONLY OPTION AVAILABLE**

February 26

- **ALLIANCE** - Knight Museum, 908 Yellowstone, Alliance, NE
- **CLAY CENTER** - Clay County fairgrounds 701 N Martin Ave, Clay Center, NE
- **KEARNEY** - Buffalo County Extension Office, 1400 E. 34th (Fairgrounds), Kearney, NE
- **NEBRASKA CITY** - Kimmel Orchard Education Building, 5995 G Rd. Nebraska
- **NORFOLK** - Madison County Extension, 1305 S. 13th Street, Norfolk, NE
- **NORTH PLATTE** - West Central Research, Extension, and Education Center (WCREEC), 402 W. State Farm Road, North Platte, NE
- **OSCEOLA** - Polk County fairgrounds, Ag Hall, 12931 N Blvd, Osceola, NE
- **SEWARD** - Harvest Hall, Fairgrounds Seward, 1625 Fairgrounds Circle, Seward, NE
- **WEST POINT** - Nielsen Center- West Point, 200 Anna Stallo Ave, West Point, NE
- **WILBER** - Saline County Extension Office, 306 W 3rd Street, Wilber, NE
- **ONLINE ONLY OPTION AVAILABLE**

Sponsored by:

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ON-FARM RESEARCH UPDATE SCHEDULE

Times are Central Standard Time. 8:30 a.m. Central / 7:30 a.m. Mountain: Check-in

- 8:30-9:00 Attendee check-in at local facilities
- 9:00-9:10 Welcome!
- 9:10-9:30 Leveraging Precision Ag Technologies to Conduct Reliable On-Farm Research Studies – *Dr. Joe Luck, Precision Ag Specialist*
- 9:30-9:40 Introduction to the Nebraska On-Farm Research Results Update Book – *Nathan Mueller & Laura Thompson, Extension Educators*
- 9:40-10:45 Local on-farm research results discussions
- 10:45-10:55 Break
- 10:55-11:10 Presentation 1: *Option A: Update of NRCS Soil Health Demo Farm Projects - Fernanda Krupek OR Option B: Manure and Mulch applications for Crop Production and Soil Properties - Karla Melgar Velis*
- 11:10-11:25 Presentation 2: *Option A: Sensor Based Nitrogen Management for Dry-land Corn - Samantha Teter OR Option B: Sensor Based Fertigation - Jackson Stansell*
- 11:25-11:35 Presentation 3: *Precision Nitrogen Management Project - Crop Model Based Nitrogen Management - Laura Thompson and Laila Puntel*
- 11:35-11:45 Upcoming research opportunities
- 11:45-12:15 Group discussion of research topics for their area
- 12:15-12:25 New On-Farm Research Products
- 12:25-12:30 Thank you to participating farmers and recognition
- 12:30 Evaluation and dismissal



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Institute of Agriculture and Natural Resources

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SOIL HEALTH INITIATIVE

DEMONSTRATING SOIL HEALTH MANAGEMENT ACROSS NEBRASKA

The University of Nebraska, the Natural Resources Conservation Service, and Nebraska farmers and ranchers are participating in a state-wide effort to enhance the adoption of soil health and rangeland health management systems through the Soil Health Demonstration Farms and Ranch Initiatives. These initiatives will establish in-field management comparisons across the state to showcase grazing management and cropping system comparisons.

SOIL HEALTH INITIATIVE

[About the Soil Health Initiative](#)



How can you improve
Nebraska's Soil Health?

Dig In and Learn A Lot!

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(866) 632-9992. Submit your completed form or letter to USDA by:

- (1) mail: U.S. Department of Agriculture
Office of the Assistant Secretary for Civil Rights
1400 Independence Avenue, SW
Washington, D.C. 20250-9410;
- (2) fax: (202) 690-7442; or
- (3) email: program.intake@usda.gov.

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Contact Info

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