

# Minnesota Soil Health Resources

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NRCS State Agronomist

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## **Midwest Cover Crops Council**

- Minnesota Website: <http://www.mccc.msu.edu/states/minnesota.html>
- Cover Crop Decision Tool: <http://mcccdev.anr.msu.edu/VertIndex.php>

## **Minnesota Board of Water and Soil Resources (BWSR)**

- Website: <http://www.bwsr.state.mn.us/>

## **Minnesota Department of Agriculture (MDA)**

- Website: <http://www.mda.state.mn.us/>
- Conservation Funding Guide: <http://www.mda.state.mn.us/protecting/conservation/funding.aspx>
- Cover Crops: <http://www.mda.state.mn.us/protecting/conservation/covercrops.aspx>

## **Minnesota Soil and Water Conservation Districts (SWCD)**

- Website of Counties: [http://www.maswcd.org/SWCDs\\_On\\_The\\_Web/swcds\\_on\\_the\\_web.htm](http://www.maswcd.org/SWCDs_On_The_Web/swcds_on_the_web.htm)

## **Natural Resources Conservation Service (NRCS)**

- Minnesota NRCS Website: <http://www.mn.nrcs.usda.gov/>
- Soil Quality Website: <http://soils.usda.gov/sqi>
- Web Soil Survey: <http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm>
- NRCS Minnesota Programs: <http://www.mn.nrcs.usda.gov/programs/>

## **United States Department of Agriculture-Agricultural Research Service (USDA-ARS)**

- Minnesota** Soil Quality Contact: [Sharon.Weyers@ars.usda.gov](mailto:Sharon.Weyers@ars.usda.gov)
- **Morris:** North Central Soil Conservation Research Lab <http://www.ars.usda.gov/mwa/ncscl>
  - **St. Paul:** Soil and Water Research Management Unit <http://www.ars.usda.gov/mwa/stpaul/swrmu>
- Iowa** Soil Quality Contact: [Cindy.Cambardella@ars.usda.gov](mailto:Cindy.Cambardella@ars.usda.gov)
- **Ames:** National Laboratory for Agriculture and the Environment <http://www.ars.usda.gov/mwa/ames/nlae>
    - Soil, Water, and Air Resources Unit
    - Agro ecosystems Management Research Unit
- South Dakota** Soil Quality Contact: [Michael.Lehman@ars.usda.gov](mailto:Michael.Lehman@ars.usda.gov)
- **Brookings:** North Central Agricultural Research Laboratory <http://www.ars.usda.gov/npa/ncarl>
- North Dakota** Soil Quality Contact: [Kristine.Nichols@ars.usda.gov](mailto:Kristine.Nichols@ars.usda.gov)
- **Mandan:** Northern Great Plains Research Laboratory <http://www.ars.usda.gov/npa/ngprl>

## **University of Minnesota (UMN)**

- Department of Soil, Water, and Climate: <http://www.swac.umn.edu>
- Research Analytical Laboratory: <http://ral.cfans.umn.edu/>
- Soil Testing Laboratory: <http://soiltest.cfans.umn.edu/>

## **University of Minnesota Extension Service (UMES)**

- Agriculture Website: <http://www1.extension.umn.edu/agriculture/>

# Soil Health

- Synergistic Effects of conservation practices implemented as a system
- Partnership
- Challenges



# Synergistic Effects of conservation practices implemented as a system

- Use multiple practices in combination
- Result in environmental improvements
- Systems result in economic benefits
- Your tillage, irrigation, and runoff management decisions can protect your land and result in healthy soils to produce high quality and yielding crops.
- Conservation tillage system
- Contour farming

# Synergistic Effects of conservation practices implemented as a system

- Reduce soil disturbance, soil compaction, and soil crusting will increase soil biota and provide better rooting depth creating an overall improvement in soil quality
- Promote soil organic matter from crop residues
- Improved soil structure, increase in organic matter, and reduced erosion will increase water infiltration into the soil thus reducing runoff
- More soil water equates to more available water for plant use

# Synergistic Effects of conservation practices implemented as a system

- Low pressure application of irrigation water (to mimic natural rainfall) = reduced irrigation inputs.
- Soil and water management
- Recommended rate and timing of nutrient applications
- Higher yielding crops
- Increased crop residues for continued soil protection
- Improved nutrient cycling in the soil
- All of which improve the foundation of your farming operation....Your Soil.

# Minnesota Agencies

- Minnesota Conservation Partnership working with farmers



**ABOUT SOIL HEALTH**

**Soil Health Practices**

- Functioning No-Till System
- Cover Crops
- Nutrient Management
- Pest Management
- Buffers
- Smart Drainage Systems

**Soil Health Benefits**

- Balances biological community
- High organic matter that retains and cycles nitrogen and sequesters carbon
- Stabilizes soil aggregates
- Resists the erosive forces of water and wind
- Improves water infiltration
- Manages the effects of flood or drought
- Reduces fertilizer and fuel costs
- Enhances wildlife habitat

**NRCS**  
NATURAL RESOURCES CONSERVATION SERVICE

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Photo courtesy of NRCS.

# Natural Resources Conservation Service (NRCS)

- NRCS offers technical and financial assistance to help farmers use conservation practices and systems on cropland.
  - Environmental Quality Incentives Program (EQIP)
  - Conservation Stewardship Program (CSP)
- Minnesota NRCS Website
  - <http://www.mn.nrcs.usda.gov/>
- Soil Quality/Soil Health Website
  - <http://soils.usda.gov/sqi/>
- Web Soil Survey
  - <http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm>





# Soil Quality

**A foundation for cropland health and productivity**

The soil works for you...

...if you work for the soil

Soil quality affects:

To improve soil function and  
cropland health:

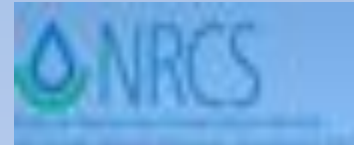
Organic matter  
Soil tilth  
Crop productivity  
Cation exchange  
pH  
Erosion potential  
Infiltration  
Compaction  
Available water  
Short-term drought  
tolerance  
Wildlife habitat  
Air quality  
Water quality

Plant high residue crops  
Double crop or use cover crops  
Add legumes and grasses to  
your rotation  
Practice rotational grazing  
Adopt no-till or strip tillage  
Keep the ground covered with  
residue  
Manage nutrients efficiently  
Avoid driving on wet soil  
Monitor soil quality and  
vegetation

[soils.usda.gov/sqi](https://soils.usda.gov/sqi)

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# Soil Quality

## A foundation for pastureland health and productivity

What are you doing for the soil?

To protect soil function and pasture condition:

- Maintain vigorous cover on the soil
- Increase or maintain plant production
- Practice rotational grazing to promote root growth and for uniform manure distribution
- Minimize grazing traffic when the soil is wet
- Maintain pH for desirable plants
- Control weeds to protect desirable plants
- Assess and monitor soil quality and vegetation for early indications of changes in soil function and pastureland condition

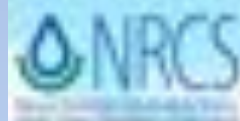
What is the soil doing for you?

Pastureland soil quality affects:

- Plant production
- Plant reproduction
- Plant mortality
- Erosion potential
- Vegetation composition
- Water availability
- Water quality
- Wildlife habitat
- Carbon sequestration

[soils.usda.gov/sqi](https://soils.usda.gov/sqi)

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# Soil Quality

## The Foundation of Air and Water Quality

"The nation that destroys its soil  
destroys itself."

— Franklin D. Roosevelt

For more information visit:  
<http://soils.usda.gov/>

There is an equal opportunity emphasis



To enhance soil organic matter, use:

- Cover crops
- Crop rotations
- Reduced tillage
- Rotational grazing

# USDA Agricultural Research Service (ARS)

- **Minnesota**

- North Central Soil Conservation Research Lab-Morris  
<http://www.ars.usda.gov/mwa/ncscri>

- Mission is to enhance productive conservation of agricultural and natural resources base, improve environmental health, and contribute to national food security through diversified, competitive, and resilient agro-ecosystems in the upper Midwest.

- Soil and Water Research Management Unit—St. Paul  
<http://www.ars.usda.gov/mwa/stpaul/swrmu>

- Mission is to develop and test agricultural management practices that improve water quality and soils and reduce emissions of greenhouse gases.

# USDA Agricultural Research Service (ARS)

- **Iowa**

- National Laboratory for Agriculture and the Environment—Ames

<http://www.ars.usda.gov/mwa/ames/nlae>

- Mission is to generate information which addresses critical problems in agriculture and watershed management leading to the development of innovative solutions which increase the efficiency of agriculture systems and reduce environmental risk.
      - Soil, Water and Air Resources Unit
      - Agroecosystems Management Research Unit



# USDA Agricultural Research Service (ARS)

- **South Dakota**

- North Central Agricultural Research Laboratory—  
Brookings <http://www.ars.usda.gov/npa/ncarl>
  - Mission is to incorporate ecological principles into integrated pest and crop management systems to improve the long-term resiliency and profitability of food production.

- **North Dakota**

- Northern Great Plains Research Laboratory—Mandan  
<http://www.ars.usda.gov/npa/ngprl>
  - Mission is to develop environmentally sound practices and add value to agricultural systems in the Great Plains in terms of food, feed, and biomass by conducting team-focused, systems-oriented research and technology transfer.

# University of Minnesota

- Research focus on Soil Quality/Health under different cropping systems
- Providing workshops
- Research Analytical Laboratory/UMN Soils Lab
  - Provides analysis of soils to university researchers, government agencies, public service groups, and producers.
  - Adding measures of soil quality to list of services
    - Aggregate stability, particulate organic matter, microbial biomass, and mineralizable C and N
    - Contact Keith Piotrowski ([kpiotr@umn.edu](mailto:kpiotr@umn.edu)) if interested in these testing procedures

# University of Minnesota Extension

- Education, research, and outreach along with demonstration acres
  - Cover Crops
  - Reduced Tillage and Equipment
  - Many more....
- Extension Educators are available to answer questions regarding the many aspects of soil health.



# Minnesota Department of Ag (MDA)

- Cover Crops
- Rain Simulator
- Nutrient Management
- Conservation Funding Guide



# Minnesota Department of Ag (MDA)

## Welcome to the Minnesota Conservation Funding Guide

Watch the Conservation Funding Guide Video Series: [Introduction](#) | [Selecting Conservation Practices](#) | [Getting Practice & Payment Information](#)

### Conservation Practices & Payments

[Search practice & payment information  
for over 50 conservation practices](#)



#### Get to know your local conservation professionals

- The Conservation Funding Guide complements, but does not replace, the customized local expertise available to landowners throughout Minnesota.
- Nearly every page of the Guide provides links to contact information for Minnesota's 91 local Soil &

### A note about the timing of conservation funding opportunities:

- Not all payments described in this guide are available all the time. Some programs (like the CRP Continuous Signup) are open for enrollment year-round but most programs have intermittent signups, sometimes on short notice.
- The guide includes general information on the timing of opportunities to enroll in each program, plus contact information to find out when the next opportunity will occur.



# MDA Conservation Funding Guide

Cover Crops Assistance: Side-by-Side Comparison of Programs				
AgBMP Loan Program	Conservation Stewardship Program (CSP)	Environmental Quality Incentives Program (EQIP)	Local & Regional Programs	Other Programs
<p><b>Cover Crops Loan:</b> In counties where Cover Crops qualify for AgBMP Loans and funds are available, the loan has a 3% interest rate and helps finance the purchase of supplies and services needed to establish Cover Crops, including the purchase or rental of specialized equipment. AgBMP loans may be combined with incentive or cost share payments from other programs.</p> <p>AgBMP loan applications are typically accepted year-round. To inquire, contact your local <a href="#">Soil &amp; Water Conservation District</a>.</p>	<p><b>The deadline to apply for the next CSP signup is expected to be announced in late January 2010.</b></p> <p>CSP payments related to Cover Crops: CSP payments in general (for all practices) are based on the environmental benefits of existing and proposed new conservation practices/activities across the entire farm—including many related to <a href="#">Cover Crops</a> such as <a href="#">Continuous Seasonal Cover Crops</a>, <a href="#">Cover Crop Mixes</a>, <a href="#">Nitrogen Scavenging Cover Crops</a>, <a href="#">Legume Cover Crops as a Nitrogen Source</a>, <a href="#">Non-Chemical Methods to Kill Cover Crops</a>, cover crops used in <a href="#">Transitioning to Organic Farming</a> or <a href="#">Beneficial Insect Habitat</a>, <a href="#">On-Farm Pilot Projects</a> and <a href="#">On-Farm Research &amp; Demonstrations</a>. Most of these activities have additional <a href="#">Minnesota-specific requirements</a>.</p> <p>As of the date below, USDA estimates that CSP payments for enrolled cropland will average \$12 to \$22 per acre, plus supplemental</p>	<p><b>The next EQIP application scoring period is expected to begin in February 2010. Payment rate information may change for 2010, the information below is for 2009. See contact information below to check for updates</b></p> <p><b>EQIP Payment for Cover Crop:</b> Annual payment of \$23 to \$40 per acre (or \$33 to \$58 per acre for farmers applying through the EQIP Organic Initiative) on up to 320 acres of cropland, for up to 3 years. The payment rate depends on the type of cover crop and when &amp; how planted, with legumes at the high end and spring-seeded small grains at the low end of the range. Higher payment rates apply to Historically Underserved Participants. See EQIP Cover Crops payment details for more information.</p> <p>EQIP applications are accepted anytime but there are deadlines for</p>	<p>Special financial incentives are sometimes offered to landowners in a particular county or watershed for selected conservation practices for a limited time – usually as part of a special initiative funded by a federal or state grant. To find out if any special conservation incentives are offered in your area at this time, contact your local <a href="#">Soil &amp; Water Conservation District</a>, <a href="#">watershed organization</a>, <a href="#">county Resource Conservation &amp; Development</a> office or other local contacts.</p> <p>For examples of special local &amp; regional offers or information about the enabling grant programs, click on <b>Local &amp; Regional Programs</b> at the top of this column.</p>	<p>To browse for other potential sources of financial or free technical assistance for Cover Crops on farmland, click on <b>Other Programs</b> at the top of this column, with special attention to Sustainable Ag &amp; Working Lands programs, esp. <a href="#">MDA Sustainable Agriculture Loans</a> and <a href="#">SARE Farmer Rancher Grants</a>.</p>



# Minnesota Board of Water and Soil Resources (BWSR)

- Conservation Implementation
- Resource Management and Planning
- State Soils Information
- Grants

## Soil and Water Conservation Districts (SWCD)

- Individual Conservation Districts
- Ag BMP Loan Program
- Local and Regional Programs
- Grants

# Midwest Cover Crops Council



IllinoisIndianaIowaMichiganMinnesotaNorth DakotaOhioWisconsinOntario



**Home**

About Us

History

Mission and vision

Supporters

MCCC meetings

Cover Crop Resources

Cover crop species

Cover crop selector tools

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Extension material

Publications

Multimedia

Links

Slurry seeding

Survey...coming soon

Calendar of Events

## Midwest Cover Crops Council Cover Crop Decision Tools

The Midwest Cover Crop Council (MCCC) Cover Crop Decision Tools are web-based systems to assist farmers in selecting cover crops to include in field crop and vegetable rotations.

[Instructions for Using the Cover Crop Decision Tool-Field Crops](#)

[Go to the Cover Crop Decision Tool-Field Crops](#)  
(If your browser is Internet Explorer (IE), please close the Favorites Pane for proper display)

*Vegetables (Michigan)*

[Instructions for Using the Cover Crop Decision Tool-Vegetables](#)

[Go to the Cover Crop Decision Tool-Vegetables](#)

Other states/provinces in the MCCC are currently developing their information. They will be added to the tools when complete. We welcome your input and comments on the Cover Crop Decision Tools. Send them to Dean Baas at [baasdean@msu.edu](mailto:baasdean@msu.edu).

### About the Cover Crop Decision Tools

The Cover Crop Decision Tools are an initiative by the MCCC to consolidate cover crop information by state to help farmers make cover crop selections at the county level. Information for each state/province is developed by a team of cover crop experts including university researchers, Extension educators, NRCS personnel, agriculture department personnel, crop advisors, seed suppliers and farmers. The team reviewed and refined information from the Sustainable Agriculture Research and Education (SARE) (<http://www.sare.org>) publication Managing Cover Crops Profitably, 3rd edition (<http://www.sare.org/publications/covercrops/covercrops.pdf>) to refine

# Cover Crop Decision Tool

[illegible]

# Challenges

- Prices
- Rent
- Climate –more extreme events
- Growing crops on vulnerable landscapes
- Winter Cover Crops adapted for Minnesota
- No-till/Strip Tillage adoption

# Questions?

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