This is a co-publication of the University of Minnesota’s Center for Urban and Regional Affairs (CURA), Southwest Regional Sustainable Development Partnership, and the Sustainable Farming Association of Minnesota.

The Community Assistantship Program (CAP) is a cross-college, cross-campus University of Minnesota initiative coordinated by the Center for Urban and Regional Affairs (CURA) and the Regional Sustainable Development Partnerships (RSDP). Funds for CAP have been generously provided by the McKnight Foundation. The content of this report is the responsibility of the author and is not necessarily endorsed by CAP, CURA, RSDP, SFA or the University of Minnesota.

The Southwest Regional Sustainable Development Partnership brings together local talent and resources with University of Minnesota knowledge to drive sustainability in agriculture and food systems, tourism and resilient communities, natural resources and clean energy. The Partnerships are part of University of Minnesota Extension.

The cover photo was provided by the Sustainable Farming Association of Minnesota - all other photos in this document were taken by Kathy Dooley. All quotes can be attributed to the farmer(s) in the corresponding case studies. Pages 2 and 3 were written by Theresa Keaveny, Dean Current, and Anne Dybsetter.

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Project Partners

Southwest Regional Sustainable Development Partnership (SWRSDP) works toward region-wide sustainability in southwest Minnesota. University of Minnesota Extension’s Regional Sustainable Development Partnerships bring together community and University resources to support local projects. Community members and University faculty and staff work hand-in-hand to identify and nurture locally grown projects. SWRSDP is committed to bringing together people with diverse backgrounds and perspectives to jointly work on sustainability issues. For more information, see rsdp.umn.edu.

The Sustainable Farming Association of Minnesota (SFA) is dedicated to protecting and enhancing farming resources, air, land, water and people, by supporting the sustainable agriculture principles of environmental stewardship, economic resilience and strong communities. A farmer-to-farmer network, SFA advocates the use of soil health practices including minimizing soil disturbances, keeping the soil covered, planting diverse species, deepening root systems, and adding livestock to the landscape. For more information, see www.sfa-mn.org.

The Center for Integrated Natural Resources and Agricultural Management (CINRAM) at the University of Minnesota is a partner-based organization that catalyzes the development and adoption of sustainable, integrated land use systems. CINRAM links the expertise of University with the experience and insights of people and organizations who work with and have understanding of, opportunities and issues across the landscape. For more information, see www.cinram.umn.edu.

Acknowledgements

Several people and organizations were involved in preparing this report. Theresa Keaveny, Dean Current, and Anne Dybsetter were the primary supervisors for this project. Vanessa Voller, Lisa Murillo, Kristen Murray, and C Terrance Anderson provided valuable support from the University of Minnesota. The advisory committee: Carmen Fernholz, Kent Solberg, Dorian Gatchell, Jerry Ackermann and Don Reicosky offered feedback, advice, and resources throughout the semester. Student researcher Lauren Budenski conducted prior interviews in 2016. Finally, thank you to all the farmers who inspired this project and volunteered their time, knowledge, and stories to help us produce this report.
The Sustainable Agriculture Case Studies project is a partnership among several organizations and numerous individuals. The project reflects the partners’ understanding that farmers learn best from each other and that strong connections across the landscape will result in wider adoption of effective practices.

In 2016, the Southwest Regional Sustainable Development Partnership (SWRSDP) natural resources working group discussed the economic and soil health benefits that cover crops and other sustainability practices were providing to farmers. In an effort to encourage a greater number of farmers to adopt soil health practices and experience the economic and environmental benefits, the working group decided to develop case studies of farmers who had been successful in practicing sustainable agriculture and soil health, including the use of cover crops.

The Center for Integrated Natural Resources and Agricultural Management (CINRAM) at the University of Minnesota participates in the SWRSDP natural resources working group. The Center enlisted a University student researcher in summer 2016 to begin gathering farmer case studies.

In 2018, those case studies have been updated and more farmers’ stories have been added with the help of the Sustainable Farming Association of Minnesota (SFA) and Kathy Dooley, Research Assistant through the University of Minnesota’s Center for Urban and Rural Affairs (CURA). For nearly a decade, SFA has led soil health education efforts through workshops, field days, webinars and farmer networking.

The following case studies are the basis of this farmer-to-farmer networking tool, adapted to a variety of outreach platforms so interested farmers can connect with and receive advice from those with soil health experience. The ability to talk to a peer about benefits, successes, challenges and costs on issues related to soil health is a powerful motivator for adoption and provides a source of continued support.

SFA, SWRSDP and CINRAM are pleased to partner on these case studies, which provide important networking opportunities for those who are beginning their soil health and sustainable agriculture journey. We are grateful for the help of our advisory team: Carmen Femholz, Kent Solberg, Dorian Gatchell, Jerry Ackerman and Don Reicosky and for the prior work of student researcher Lauren Budenski.
Case Study Participants

SFA and the University of Minnesota selected case study participants based on their incorporation of one or more of the following soil health principles:

1. Keep a living root in the soil.
2. Keep the soil covered.
3. Use diverse crop rotations.
4. Reduce soil disturbance.
5. Integrate livestock.

Most participants use several of these principles, and each of them has experienced positive changes in soil health. The farmers in these case studies all transitioned to more environmentally and economically sustainable farm operations over time. None of them currently farm the way they did when they started their careers; the majority of them continue to experiment with new cover crops blends, crop rotations, tillage techniques, or other agricultural practices.

Case Study Interviews

Each case study participant was interviewed at his or her farm in the fall of 2018. The interviews were conducted as free-flowing conversations, but discussions focused on the following topics:

1. Factors that led them to pursue a career in agriculture.
2. Overview of overall farm operation.
3. Changes made since they began farming.
5. Practices implemented for the purpose of improving soil health.
6. Challenges encountered when adopting new agricultural practices.
7. Helpful resources and information sources.
8. Advice they have for other farmers.

Each interview lasted one to two hours in length and included a tour of the farm. The content of these interviews are summarized into a table and individual case studies. The case studies include a background, soil health practices, benefits of those practices, and challenges encountered. Additional information gathered in these interviews will be published on an online database in 2019.
Soil Health Practices
About ten years ago, Jerry and Nancy began using cover crops through a study with the University of Minnesota. Since then, they have continued using cover crops for weed control, greater infiltration, increased yields, and greater soil organic matter. They strip-till corn and no-till soybeans, which not only decreases erosion and improves soil health but also saves them $20 per acre on machinery and fuel costs.

Economic Success
The Ackermans’ healthy soil has led to substantial economic benefits. Their cover crops have allowed them to stop using pre-emergent herbicide, they do not have stalk rot because their soil is covered, and they have reduced their nitrogen inputs. Their neighbors are starting to take notice of these benefits and have begun asking to borrow Jerry’s no-till drill.

Weather Resiliency
Like all farmers, Nancy and Jerry must adapt to variable weather. Heavy rains mixed with a short growing season can be challenging. However, they believe that due to the stronger structure and increased infiltration of their soil, their farm is more resilient in undesirable weather. They are also already preparing for the future by taking part in an agriculture production group on how to adapt their practices to work with climate change.
Soil Health Practices
A shared set of values and long-range goals guide the decisions behind their agricultural practices. They “take a lesson from the great prairies to diversify” with their integration of several plant species and livestock to improve soil health. They primarily grow perennials and keep the ground covered all year long. They also have extensive and diverse perennials to protect against wind, and to provide timber, fruits, nuts, ornamentals, and medicines.

Soil Health is Human Health
Both Richard and Audrey emphasize the benefit of knowing that the way they farm allows the ecosystem to thrive. They believe everything is connected and that maintaining the health of the soil is directly related to their own health and the health of others. Although they do conduct soil tests, they say that walking the land is the best way to monitor the soil. Their practices have decreased erosion and water pollution, which have the additional benefit of allowing them to use their waterways for canoeing, swimming, and fishing.

How to Market?
Although they have been successful producers, marketing is sometimes challenging. They are far from urban markets and mostly rely on word of mouth to sell directly to restaurants and consumers. They value the farming community, working together with other producers, and helping educate others.
DAWN & GRANT BREITKREUTZ

38270 Kenwood Ave.
Redwood Falls, MN 56283

(507)-430-0607
gdbreitkreutz@hotmail.com

Products
Corn, soybeans, beef, small grains

Acres
800

Notable Practices
No till, cover crops, non-GMO, managed grazing

Background
Grant and Dawn farm the land that Grant grew up on. He was born and raised on a farm, and he was always certain he wanted to be a farmer. However, his wife and step-daughter motivated him to question his conventional practices by constantly asking him “why?” By continuously questioning the reasoning behind his practices, the Breitkreutz farm began adopting new practices that care for their health, economic sustainability, and support a home for wildlife.

Soil Health Practices
We are “learning to manage an ecosystem instead of just a field.” The Breitkreutzes view their farm as a complex ecosystem full of biodiversity and several living parts that come together to nurture their corn, soybeans, and beef. They became entirely no-till seven years ago and began incorporating a 14-species cover crop mix as a means to integrate managed grazing into the crop rotation.

Economic Benefits
After adopting these practices, the results quickly became clear. Their infiltration increased from 1 inch to 12 inches in just two years. The corn “nutrient density skyrocketed” and no-till protected their soybeans from white mold and increased their overall yield. Their veterinary bills decreased and their cattle are healthier.

Before the Rewards
The Breitkreutzes shared that there are several steps to regenerative agriculture that must be accounted for. In addition to the learning curve, it can take an emotional, social and financial toll on the family. When they began transitioning, they tried to make all of the changes at once and they didn’t know any other farmers who were trying similar techniques. Grant never dreamed that he would be a public speaker, but now he embraces speaking at conferences and spreading their knowledge to help other farmers out in any way they can.
CARMEN FERNHOLZ

2484 Highway 40
Madison, MN 56256

(320)-598-3010
fernholz001@gmail.com

Products
Corn, soybeans, small grains, alfalfa

Acres
450

Notable Practices
Cover crops, certified organic, minimum tillage, small grain rotation, residue

Background
Carmen grew up on a farm, but he did not consider working in agriculture until after college. Prior to farming, he was an English teacher for five years, and he believes that his liberal arts education has led to a broader world view. This curiosity has led him to be open to new ideas and experimentation in the way in which he grows his crops.

Soil Health Practices
The agricultural practices Carmen chooses are primarily based on their ability to improve the health of the soil. He uses alfalfa to minimize perennial weed pressure. He eliminated deep tillage to prevent erosion and promote organic matter, and he leaves crop residue on the field to protect against wind and rain. The roots of his cover crops reduce soil compaction and enhance soil microbes. Incorporating these practices hasn't impacted yields and has allowed him to reduce inputs.

Visible Impact
Although Carmen uses soil tests to monitor changes in the health of his soil, he emphasizes that “going out and looking is a practice that needs to be incorporated a lot more.” He can visually see the roots of his pea plants full of nitrogen nodules, which he knows are helping keep his land fertile. He has also noted an increase in earthworm activity and enhanced soil texture.

Collaborative Decisions
Carmen emphasizes that each farm is unique and finding the right mixture of cover crops or other specific practices requires time and experimentation. He also recommends getting information and ideas from a variety of outlets: reading, attending workshops, learning from experts such as Gabe Brown and Ray Archuletta, watching YouTube, and trying the options which are best for each individual farm.
<table>
<thead>
<tr>
<th>Location</th>
<th>Nancy and Jerry Ackermann</th>
<th>Carmen Fernholz</th>
<th>Audrey Arner &amp; Richard Handeen</th>
<th>Dawn &amp; Grant Breitkreutz</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acreage</td>
<td>1,200</td>
<td>450</td>
<td>250</td>
<td>800</td>
</tr>
<tr>
<td>Main Sources of Income</td>
<td>Corn, soybeans, and alfalfa</td>
<td>Corn, soybeans, small grains</td>
<td>Grass-fed beef</td>
<td>Corn, soybeans, grass-fed beef, small grains</td>
</tr>
<tr>
<td>Environmental Benefits</td>
<td>Increased infiltration, More wildlife, Increased SOM</td>
<td>Decreased erosion, More earthworms, Increase in SOM</td>
<td>Higher water quality, More wildlife, Increased SOM, Decreased erosion</td>
<td>Increased SOM, Increased earthworms, Increased wildlife, Increased infiltration</td>
</tr>
<tr>
<td>Economic Benefits</td>
<td>Fewer input costs, Greater weed suppression</td>
<td>Decrease in fuel, fertilizer, Ability to enroll in assistance programs</td>
<td>Premiums for grass-fed beef, Diverse crops offer multiple sources of income</td>
<td>Increased nutrient density of crops, More disease resistant crops &amp; livestock, Higher yield</td>
</tr>
<tr>
<td>Motive</td>
<td>Higher net income</td>
<td>Improve soil health, which benefits his own health and the productivity of the land</td>
<td>Being good stewards of the land</td>
<td>Higher net income, Caring for the environment and wildlife, Personal well-being</td>
</tr>
<tr>
<td>Challenges</td>
<td>Weather, Planting at the right time, Herbicide drift from neighboring fields</td>
<td>Weather, Initially thought that organic required deep tillage, Initially had lower yields</td>
<td>Social and familial pressure, Contamination from neighboring farms, Finding viable markets</td>
<td>Lots of big changes all at once are difficult to manage, Peer pressure</td>
</tr>
<tr>
<td>Scott Haase</td>
<td>Dan Moberg</td>
<td>Darwin Roberts</td>
<td>Bruce Tiffany</td>
<td>Daniel Tiffany</td>
</tr>
<tr>
<td>------------</td>
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</tr>
<tr>
<td>Blue Earth</td>
<td>Clinton</td>
<td>Granada</td>
<td>Redwood Falls</td>
<td>Redwood Falls</td>
</tr>
<tr>
<td>•Cover crop •Reduced tillage •Buffer strips along waterways</td>
<td>•Cover crops •Minimum tillage</td>
<td>•Cover crops •Minimum tillage</td>
<td>•Cover crops •Reduced tillage •Strip-till •Public speaking •Water control structures •Split nutrient applications</td>
<td>•No grain or growth hormones in livestock •Minimum and no-till •Cover crops •Leaves crop residue •managed grazing</td>
</tr>
<tr>
<td>1,400</td>
<td>1,800</td>
<td>800</td>
<td>2,000</td>
<td>215</td>
</tr>
<tr>
<td>•Corn and soybeans</td>
<td>•Corn and soybeans</td>
<td>•Corn and soybeans</td>
<td>•Corn and soybeans</td>
<td>•Corn, soybeans, and beef</td>
</tr>
<tr>
<td>•Decreased runoff •Reduced fertilizer •Increased SOM</td>
<td>•Decreased runoff •Increased SOM</td>
<td>•Increased nutrient retention •Increased SOM •Increased wildlife •Decreased runoff</td>
<td>•Higher water quality •Decreased runoff •Decreased erosion •Increase in natural vegetation along river</td>
<td>•Decreased runoff •Reduced inputs •More beneficial microbes</td>
</tr>
<tr>
<td>•Can start cutting back on fertilizer •Increased infiltration</td>
<td>•Recued inputs (reduced weed pressure, fuel costs) •Higher yields</td>
<td>•Eligible for sustainability related assistance programs •Increased infiltration helps yield</td>
<td>•Reduced inputs •Higher quality crops (increased protein) •Increased infiltration helps yield</td>
<td>•Decreased fertilizer •Decreased herbicide •Healthier crop •Machinery more easily works the soil</td>
</tr>
<tr>
<td>•Incentive programs make it easier to begin implementing practices •Sustaining biodiversity and natural cycles</td>
<td>•Reduced input costs •Better for the environment</td>
<td>•Economic incentives •Caring for the environment •Personal/human health</td>
<td>•Desire for the land to be economically and environmentally sustainable for future generations •Values impact of practices on a global scale</td>
<td>•Being a good steward of the land</td>
</tr>
<tr>
<td>•Getting buy-in from farming partners</td>
<td>•Weather •Skepticism from neighbors •Would like to have a more diverse rotation but not economically viable</td>
<td>•Weather •Taxes associated with land and selling machinery</td>
<td>•Continuous experimentation and learning (this is also a benefit) •Uninformed public opinion</td>
<td>•Weather •No ability to control market prices</td>
</tr>
</tbody>
</table>

SOM = soil organic matter
SCOTT HAASE

8574 377th Ave.
Blue Earth, MN 56013

(507)-525-8428
scott@bluedirtfarm.com

Products
Corn, soybeans

Acres
1,400

Notable Practices
Cover crops, no-till (soybeans), strip-till (corn)

Background
Scott grew up on a farm but really started to become passionate about food when he was in college. He worked in a restaurant, which made him more interested in health and nutrition. He began to think about self-reliance and freedom that comes with producing food, and also began thinking about how much energy there is in ecosystems. If we tip the energy balance in our favor, we can efficiently produce crops while caring for the environment.

Soil Health Practices
Planting cover crops, reducing inputs, and minimizing tillage all contribute to the health of the soil on the land Scott manages. He notes reducing tillage also saves fuel and frees up time. He values biodiversity and tries to use at least nine species in each cover crop blend. He previously integrated livestock through the Pasture Project and would like to bring animals back in to the farm operation.

Working with Nature
Scott emphasizes the ecological benefits of his practices. These environmental improvements also help the farm operation by increasing the soil structure, soil organic matter content, and infiltration. He has also been able to start cutting back on fertilizer due to the increase in natural soil nutrients.

Collaborative Decisions
Scott says the greatest challenge is the transferal of understanding and beliefs. It can be difficult to convince others, on his farm or across the fence, of the tangible benefits to switching up what is already seemingly working. Scott has managed to be persuasive through giving presentations, outlining the economic costs and benefits, and taking the lead on researching implementation plans. As a result, he has been able to incorporate changes that he believes will be beneficial in the long run.
DAN MOBERG

68666 320th St.
Clinton, MN 56225

(320)-287-0761
shell467@hotmail.com

Products
Corn, soybeans

Acres
1,800

Notable Practices
Cover crops, minimum tillage

Background
Dan grew up farming and has been running combines since he was twelve years old. He currently owns a corn and soybean farm with his brother. The motivations behind the way he farms are a combination of economic feasibility and environmental sustainability. Even though he has farmed his whole life, he is constantly learning and willing to try new practices.

Soil Health Practices
Dan has been using 75% no-till and 25% minimum tillage practices for the past twenty years. About five years ago, he began incorporating cover crops. While Dan started out with only rye, he now uses a diverse cover crop blend. He planted perennials along waterways to prevent nitrogen runoff and is moving toward more ecologically-friendly herbicides with precise application methods.

Beneficial Cover
Dan has observed an increase in earthworms and soil organic matter, which soil tests have shown has reached nearly 8%. He is experiencing healthier soil in the spring, and attributes that to the cover crops and their roots, which increases microbial activity. Cover crops also make a good natural mulch, which reduces the need for additional chemicals, which in turn saves money.

Confounding Factors
These last two years have produced the highest yield he has seen, but due to the many uncontrolled variables that go into growing crops, it is impossible to pinpoint a single practice and give it credit for those changes. Dan has found that incorporating a practice and sticking to it for several years helps to understand the long term benefits. He advises that "cover crops are a good route to go. The benefits are there. They don't show up early, but I know that they do."
DARWIN ROBERTS

1838 260th Ave.
Granada, MN 56039

(507)-236-6663
darfarms@yourstarnet.net

Products
Corn, soybeans

Acres
800

Notable Practices
Cover crops, bioreactors, minimum tillage

Background
Although Darwin is an eighth-generation farmer, he did not initially choose to pursue a career in agriculture. He studied airline and traffic management in college, was a metallurgical engineer, and even helped design a lunar landing module. While working at Honeywell Inc., he decided “if I work all my life, I want to do something tangible” and went back to farming in 1987.

Soil Health Practices
When Darwin speaks of his land, he is quick to point out the link between soil health and water quality. He controls his water drainage through tiling, has a bioreactor, and uses saturated buffers and drainage ponds that contain water quality monitors. He has hosted several on-farm demonstrations and is passionate about educating the public.

Rewards of Covered Land
Darwin started using cover crops six years ago and says that after about three years the positive impacts started to become noticeable. He compares the infiltration of his land to that of his neighbors, who do not use cover crops: “Their water is standing all over the field, my water has gone right down through.” Cover crops greatly reduce his need for herbicide and help cut back on fertilizer as well as providing a healthy habitat for earthworms.

Challenges
At 75 years old, Darwin has seen many improvements in agriculture throughout his life. “Farming is easy now” compared to previous conditions. He recalls returning from his fields with his clothes damp with chemical spray and sitting in tractors in freezing conditions. His father died from “farmer’s lung” and Darwin understands the impact of practices on human health. Darwin actively tries to ensure the well-being of others by minimizing chemicals and closely monitoring water quality.
BRUCE TIFFANY

32503 327th St.
Redwood Falls, MN 56283

(507)-828-0193

Products
Corn, soybeans, sweet corn

Acres
2,000

Notable Practices
Cover crops, strip-till, split nutrient application, water control structures, public speaking

Background
Bruce has always been interested in agriculture and farming. He started out as a young kid working on his parents’ farm. When he was eight years old he got a loan to buy cattle, and three years later he started renting land. He gradually acquired more land, ultimately resulting in the 2,000 acres he farms today.

Soil Health Practices
When making agricultural decisions, Bruce thinks of how he can “harvest the sunshine and put it into a form that people can use.” When asked what he is most proud of, Bruce displays a list of 33 different conservation practices. Cover crops help increase soil fertility and decrease erosion. No-till and strip-till not only increase soil health but also save fuel, reduce his carbon footprint, and help keep soil off his soybeans.

Tracking Progress
Bruce assesses the impact of his practices through conducting soil health tests, comparing yield, and visually monitoring the land. By overlaying soil type, practices, and yield he can get a picture of which practices are making a noticeable impact. One stark visual he shows is a map with a line of high-density yield right where he had a strip of oat and rye cover crops.

The Big Picture
It is important to Bruce that his farm makes a positive impact in the global economy. Lower production can lead to hunger, which leads to unrest. Figuring out how to manage his farm to best serve the world requires constant experimentation, adaptation, and risk management. He understands that “everything has tradeoffs: when you change one thing you’re changing something else” and carefully balances the pros and cons of each practice he chooses.
DANIEL TIFFANY

Redwood Falls, MN

(507)-640-0993
dtiff@redred.com

Products
Corn, soybeans, grass-finished beef

Acres
215

Notable Practices
Cover crops, minimum tillage, managed grazing

Background
Whether it is joining the Army, living in Korea, or figuring out how to fix a mechanical problem, Daniel has always been open to change, constant learning, and new challenges. This mindset has been essential to the success of his farm operation, which has undergone a series of changes and experimentation as Daniel lives up to his mission of caring for the land: “We’re stewards of the land. We’re here too protect what is our livelihood and preserve it for the next generation.”

Soil Health Practices
Keeping a living root in the ground all year is one of Daniel’s core practices. The types of cover crops are chosen based on soil health and the integration of cattle. He harvests cover crops in June and preserves them for food throughout the year. The cattle, in turn, provide free fertilizer in the form of manure and urine. He implements managed grazing, which allows the forage to recover.

Multiple Benefits
He quickly saw a visible difference in soil quality and crop health. The machinery worked the soil more easily, there was an increase in soil organic matter, and there were more beneficial insects and microbes. He says “it’s been proven time and time again that cover crops work.” They help with infiltration and have allowed him to cut down on herbicide, which saves him time and money.

Farmer to Farmer Outreach
Daniel says he is convinced that “it is a benefit to keep Mother Earth covered,” and now he is looking for ways to spread his knowledge to other farmers. He believes education is the single most important thing other farmers can do to improve their operations. He suggests going to classes, seminars, and listening to success stories. He thinks test plots, experimenting with different varieties and different times of the year, would be beneficial and plans to begin doing that himself.
SOIL HEALTH PRACTICES

Keep a living root in the soil

Each farmer used cover crops on at least a portion of his or her farm. The cover crops have helped create a positive environment for soil microbial activity and have reduced the need for herbicide. Carmen said, "You have to look at microbes as livestock as well. You have to feed them, and the best way to feed them is through a living plant." Cover crops ensure that there are living roots in the ground for most or all of the year. Many of the farmers, including Dan and Scott, recommended a complex blend of at least nine species.

Keep the soil covered

In addition to cover crops, keeping crop residue on the ground is a great way to keep the soil covered. Bare soil is more susceptible to water and wind erosion, and the impact of raindrops hitting the ground damages soil structure. Covered soil also helps protect beneficial microbes from severe temperatures, improves nutrient retention, and promotes water infiltration. Grant and Dawn Breitkreutz explain that weeds are "Mother Nature’s way of protecting herself" and keeping the ground covered will reduce the need for that protection.
Use diverse crop rotation
All of the case study participants currently grow or have grown corn and soybeans. The majority of corn and soybean farms in Minnesota rotate through those two crops without additional diversity. Many of our farmers have included a third crop into their rotation; Carmen and the Ackermanns grow alfalfa, Bruce Tiffany grows sweet corn, and Audrey and Richard have transitioned to primarily growing perennials.

Minimize soil disturbance
Every case study participant reduced tillage to some extent. The full Breitkreutz farm is no-till, while others, such as Scott Haase and the Ackermanns, no-till soybeans and strip-till corn. Reducing tillage is another way to help keep the soil covered, and it increases soil organic matter content.

Integrate livestock
Three of our case study farms have livestock, but each of them integrate their livestock with their crops in a different way. Since Audrey and Richard primarily grow perennials, they do not rotate their crops on the same land as their livestock like the Breitkreutzes do. Instead, they use custom grazing and let the land rest and recover after being grazed, and they remind us that “nature doesn’t try to farm without animals.” Daniel keeps his cattle pastures separate from his corn and soybean fields, but he still views the urine and manure as free fertilizer, helping keep the soil healthy.
Next steps

This document highlights nine farms in southwest Minnesota. This study will continue expanding to include more farms of all types and geographic regions in Minnesota. These farms will be added to this document, as well as listed on an online database that includes more detailed information on soil health practices and soil test results. There are also plans to create a smartphone app that includes a map of the farms.

The goal of this project is to facilitate farmer-to-farmer outreach and communication regarding sustainable agriculture. The hope is that farmers interested in adopting new soil health practices will be able to connect to others in their region who have tried similar techniques and have knowledge and advice to share. Several farmers cited peer pressure and social stigma as a main deterrent for implementing new practices. If several farmers share the economic and environmental benefits they have experienced as a result of adopting these practices, it may encourage others to be more open to trying them.