



Soil Health Case Studies

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Southwest Regional Sustainable
Development Partnership

UNIVERSITY OF MINNESOTA
EXTENSION



About This Project

The Soil Health and Agriculture Case Studies project is a partnership among several organizations and numerous individuals including the Pomme de Terre River Association and the University of Minnesota's Center for Integrated Natural Resources and Agricultural Management (CINRAM). 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 soil health practices.

Project Background

In 2016, the Southwest Regional Sustainable Development Partnership (SWRSDP) natural resources work 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 work 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 case studies were designed to feature farmers at the forefront of innovation who have been using a variety of soil health practices for three or more years and whose stories offer tangible examples, support, and encouragement to others. The Center for Integrated Natural Resources and Agricultural Management (CINRAM) at the University of Minnesota participates in the SWRSDP natural resources work group. The Center enlisted a University student researcher in the summer of 2016 to begin gathering farmer case studies. In 2018, UMN graduate researcher Kathy Dooley updated the case studies and more farmers' stories were added. In 2020, UMN graduate researcher Aidan Reed and Jared Luhman of the Sustainable Farming Association (SFA) developed two additional sets of case studies.

Because of the popularity of the case studies, CINRAM and Pomme de Terre River Association are again partnering to offer another set of case studies, featuring more stories. These new case studies, and the previous series, are the basis of FarmMaps.umn.edu, a farmer-to-farmer networking tool, adapted to a variety of outreach platforms allowing interested farmers to learn about, connect with, and receive advice from fellow farmers with experience successfully applying soil health practices. 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.

Acknowledgements

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project. Researchers Lauren Budenski, Kathy Dooley, Aidan Reed and Jared Luhman conducted prior interviews in 2016, 2018 and 2020 respectively. We are grateful for the help of local community partners who helped coordinate and facilitate interviews, especially Jared House (Grant SWCD), Andy Rice (Douglas SWCD), Brad Mergens (West Otter Tail SWCD), Matt Solemsaas (Stevens SWCD), Andy Albertsen (Swift SWCD) and Joe Otto (Big Stone SWCD). Finally, thank you to all the farmers who inspired this project and shared their time, knowledge and stories to help us produce this report.

Soil Health Principles

Soil Armor – Even after the growing season, it is important to keep vegetation, living or dead, on the soil. Leaving living cover crops or crop residue on the field reduces soil loss and protects the microbial soil community, as well as improves soil organic

matter (SOM) when incorporated into the soil.

Minimize soil disturbance

– This means to minimize soil disturbance both mechanically (tillage) as well as chemically (herbicides, insecticides, etc). Leaving the soil in place and undisturbed reduces nutrient loss, prevents erosion and allows the soil biology to thrive and form soil aggregates and fungal pathways.

Diversity – Increasing diversity in pastures or in crop rotations offers a diversity of plant root systems that improve the soil in different ways. Diversity protects against pests and diseases that can devastate a monoculture and provides habitat for beneficial wildlife and insects. Additionally, it provides diverse revenue streams, all of which help a farm be more resilient.

Keep a living root in the soil – Keeping a living root in the soil continues to feed biology below the soil surface, improve water infiltration, create soil aggregates and improve

soil structure. Living roots will begin growth earlier in the spring than those planted in the spring and can help dry out soil and prepare the seed bed for crops before you can get in the field with equipment.

Integrate livestock – Integrating livestock into an operation offers benefits that compound with other soil health practices and result in accelerated improvements to the soil. Grazing cover crops allows farmers to capture financial value in the form of pounds of meat from crop residue and cover crops. It also reduces the need for additional fertilizer and helps incorporate residue and organic matter into the soil.

Investing in each of these soil health principles helps improve the entire farming system as a whole and produces system-level benefits.

Who are the farmers?

This series of case studies features farmers in Central and Southwest Minnesota. Soil health practices can help farmers in this region protect their natural resources and those downstream. The farmers featured here were all selected with the help of local community partners from Pomme de Terre River Association and local Soil and Water Conservation Districts (SWCDs) based on their adoption of soil health practices and their incorporation of soil health principles. Each participant uses some or all of these principles and has integrated them into their operations in different ways. The farmers featured in these case studies reflect a wide variety of operations and demonstrate the many ways soil health practices can be implemented into an operation. The farmers have all volunteered their time and expertise to serve as resources for fellow farmers in this farmer-to farmer

networking tool. It is our hope that these case studies serve as an important resource and facilitate discussions between farmers on the successes and challenges of adopting soil health practices.

Interviews

The interviews were conducted over the phone in the spring of 2021 and consisted of free-flowing conversations that focused on the following topics:

- What factors led farmers to pursue careers in agriculture.
- An overview of the overall farm operation.
- Changes the participants had made since they began farming.
- What their motivations were for changing practices.
- What practices were implemented for the purpose of improving soil health.
- What resources and information sources were helpful in implementing soil health practices.

- Any additional advice they had for other farmers.

These studies include contact information, background, soil health practices, results of those practices and challenges encountered.

Additional information will be made available in an online database found at: farmmaps.umn.edu

Past case studies can be found at: www.sfa-mn.org/soil/



SOIL HEALTH PRINCIPLES

1. Keep the soil covered
2. Minimize soil disturbance
3. Increase crop diversity
4. Keep living roots in the soil
5. Integrate livestock

Greg Fynboh

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Email: gfynboh@fedtel.net

Address: 57002 180th St, Donnelly, MN 56235

Sources of Income: Mainly corn and soybeans with some wheat and rye seed

Acres: 850

Soil Health Management Practices: Rye cover crop flown onto corn, strip-till corn and no-till soybeans, livestock integration

Impact: Reduced iron deficiency chlorosis, efficient time management, reduced fuel costs, improved water infiltration and drier fields, reduced erosion



Photo Credit: Greg Fynboh

Background

Greg Fynboh grew up working with his father and brothers on the family's fields. Greg has always been drawn to farming and says that growing up his dad always made working on the farm look like fun. Greg also grew up with a conservation mindset which was instilled by his parents and has encouraged him to adopt soil conservation practices. After completing his undergraduate degree at the University of

Minnesota (UMN), Greg spent several years working as an agronomist before moving back home in 2005 to take over the family farm. Greg's love of farming, background in agronomy and conservation mindset instilled since his youth have all helped encourage him to test and adopt improved soil management practices.

Improving Efficiency Through Reduced Tillage

When Greg first began his farming operation, he was planting a corn and soybean rotation. To prepare his fields for planting he would lightly use a disk over everything. He began strip-tilling in 2009 and immediately preferred it to disking due to the time management benefits and reduced fuel costs. It felt efficient to put fertilizer on the soil and till as needed. Shortly

afterwards during a particularly wet spring, Greg was unable to get on his fields with his tractor to disk down corn stocks prior to planting soybeans. He decided to try to no-till the soybeans instead. When he did not notice a yield difference, he decided to stay with the no-till operation and save the time that he would typically spend on a tractor disking. Due to the common wet springs in the region, Greg will still occasionally run a Phillips Rotary Harrow to knock down corn stocks and dry the land prior to planting.

Rye Cover Crops

Greg first began considering cover crops to address problems with iron chlorosis in soybeans. Greg had previously tried using chelated iron, a supplement applied to soils in early spring before or as beans are being planted. However, he did not notice sufficient difference in yields to justify the cost of the supplement. Greg began considering rye as a cover crop after an agronomist from UMN pointed out research indicating that high nitrates could cause the problem and



Greg's strip-till machine. Photo Credit: Greg Fynboh

recommended using a nurse crop. Greg had also read about rye in several magazines and learned about rye at a conservation tillage conference. He decided to try it out on his land and calculated that rye would be cheaper than chelated iron even when using an airplane for planting. Greg

started inter-seeding rye as a cover crop in 2017. He started slowly at first with one field. After seeing positive impacts, now he wants cover crops on everything he does. While the fields look different, Greg said planting into green cover also yields many benefits compared to traditional



Photo Credit: Greg Fynboh

operations. For example, in addition to reduced labor and input costs, Greg is also excited about the improved soil structure and water management he has observed after reducing tillage and incorporating cover crops into his operation. The soil on his land is mostly heavy, poorly drained clay. The land is relatively flat except for a few low spots. While the soil is fertile, it is almost always wet and without much oxygen. The challenge on this land is mainly ensuring that water is not pooling. Greg sees cover crops as a way to improve oxygen and water infiltration. After three years, Greg is noticing better infiltration in his fields. The land with cover crops also seems to dry faster due to improved water infiltration.

He has also noticed less erosion. For example, during winters with poor snow cover, farms in the area face challenges with wind erosion. One winter, Greg had so much blowing dirt from nearby fields that it reduced the productivity of solar panels in his yard. While others in the area find themselves having to scoop dirt out of ditches back into the fields during the spring, Greg has not had the same problems.

Integrating Livestock

Greg has also found ways to engage with neighbors for mutual benefits. For example, he has recently partnered with a neighbor to graze cattle on fields planted with cover crops.

Greg was excited to try incorporating livestock into his land. He sees the incorporation of animals as important for sustainable agriculture. While he was initially worried about compaction, they have had cattle on a 40-acre field for two years in a row and it seems like it is going well. He planted into the fields after the cattle for the first time last year using a rotary harrow to level the ground. The cattle ate much of the corn and cover crop residue making it easy to plant soybeans. The cattle also provide manure for his fields.



Livestock grazing on cover crops. Photo Credit: Greg Fynboh

Glenn Hjelle

Phone: 320-760-1233

Email: glennhjelle@gmail.com

Address: 24613 140th Ave, Elbow Lake, MN 56531

Sources of Income: Wheat, soybeans, soybean seed and corn

Acres: 1600 acres of tillable land. 300 acres in the Conservation Reserve Program

Soil Health Management Practices: No-till, minimum-till, vertical-tillage, cover crops, cattle integration, participation in the Conservation Reserve Program, riparian strips along waterways

Impact: Reduced labor, repair and fuel costs; improved water infiltration, reduced algal blooms in local ponds, improved soil structure, reduced erosion



Photo Credit: Glenn Hjelle

Background

Glenn Hjelle operates a century farm and is proud to carry on his family's tradition. Glenn and his wife are currently the principle operators but his mother, who will be turning 80 soon, can occasionally be seen driving a grain cart around harvest. As a farmer, Glenn has always been concerned about the environment. After growing up on the farm, he went to college for agriculture and brought his knowledge of

sustainable agriculture practices back to the farm. He is always experimenting with sustainable practices and has now incorporated reduced tillage techniques and cover crops into his operations.

Soil Conservation in Cold Climates and Hilly Terrain

The region where Glenn farms is characterized by a cold northern climate. Although weather is unpredictable, springs are

often wet and growing seasons are often short. The region is also characterized by varied terrain. The soils Glenn farms vary from heavy black dirt to sand. Similarly, some fields are flat while others contain steep hills. Glenn has found success using reduced tillage and cover crops in these conditions.

For Glenn, soil erosion on hilly fields were the main source of inspiration for exploring minimum till options. He previously used a ripper but stopped



Photo Credit: Glenn Hjelle



using it and no longer disks after seeing the amount of blowing dirt it caused. Today, he tries to keep at least 30% residue on the fields after planting.

A third of Glenn's farm is in a corn and soy rotation. The rest of the farm is in a wheat and soybean rotation. Glenn has also been incorporating cover crops into his operation over the past five years. He began by trying cover crops on one 80-acre field and has been incorporating cover crops more and more as he sees the benefits. Last year he had cover crops on 300 acres. Today, he tries to incorporate cover crops into every acre of wheat

he plants. He typically puts in the cover crop after wheat because he has found it easier to get the cover crops started in wheat compared to corn and beans due to the region's cold climate and short growing season.

The Benefits of Soil Conservation

Glenn has also begun to observe the benefits of cover crops and reduced tillage. While Glenn was initially concerned that come spring the soil would not be warm or dry enough with the cover crops, he has found that the opposite is true. The fields where he has planted cover crops dry

faster, even with a mat of dead leaves, due to the improved porosity and increased firmness. During wet periods, he also notices that fields without cover crops have standing water while fields with cover crops do not. This allows him to get out and plant his soybeans earlier in fields with cover crops compared to the other fields. Last year, he tilled soybeans directly into the radish, turnips and wheat cover crops and it saved a lot of time and fuel.

Similarly, reduced tillage has significantly reduced runoff and improved soil structure. This was especially apparent two years ago when the region

had a particularly wet fall. When it came time to harvest, he was able to cross his field without leaving a rut while his neighbors were getting stuck. Cover crops and reduced tilling have also significantly reduced erosion. These changes have also had financial benefits as Glenn saves money on input costs and he has cut the amount of time he spends in a tractor by half.

Don't Be Afraid to Experiment with Sustainable Practices

Glenn also emphasizes the importance of experimenting to see what works best for your operation. For example, last year Glenn tried no-tilling and planting directly into wheat. It worked well and he plans to do it again. This year he is also going to try to inter-seed rye cover crop into corn test plots.

Glenn has also recently begun to work with a neighbor to integrate cattle into his cover crop operation. While he does not own livestock himself,



Livestock grazing. Photo Credit: Glenn Hjelle

his neighbor brings his cattle herd across the road to graze on the cover crops. Glenn calls this system “renting cattle.” He has noticed that the cattle themselves seem very happy to eat the fresh vegetables. He is planning on comparing fields that were grazed versus fields that were not grazed to observe any differences.

One of the things that helped Glenn get started with cover crops was the

Environmental Quality Incentives (EQIP) cost-share program. Once Glenn got started with cover crops, he noticed the cost savings in terms of soil health and reduced labor and input costs and has continued to invest in cover crops. Glenn points out that programs like EQIP, and other policies that remove financial barriers, have been very helpful because they reduce the financial risk of experimentation.



Photo Credit: Glenn Hjelle

Gregg Stoen

Phone: (320) 760-8102

Email: stfarms@runestone.net

Address: Lowry, Minnesota

Sources of Income: Corn and soybeans

Acres: 900

Soil Health Management Practices: No-till, strip-till, vertical-till, precision fertilizer placement

Impact: Reduced erosion, improved soil structure, improving yields over time, reduced fuel and labor costs, reduced input costs, reduced fertilizer needs, reduced equipment needs



Gregg and Denise Stoen

Background: A Family Operation

The Stoen Farm is a family operation run by Denise and Gregg Stoen. Gregg grew up on a dairy farm and became involved with 4-H and the Future Farmers of America from a young age. Gregg is the fifth generation farming Stoen family land, including a farm that was homesteaded by the Stoen family in 1869. While the Stoen farm was initially a

100-cow dairy operation, the Stoens sold their cows due to health reasons in 2007 and changed their operations to focus upon crop production. Today, this change gives Denise and Gregg more time to enjoy with their children and grandchildren.

No-Till is a No Brainer

Gregg started strip-tilling in 2005 and tried no-till for the first time in 2012. He

had previously been considering no-till, but the final nudge was a heavy fall snow that prevented him from getting one of his corn fields tilled. He has been strip-till/no-tilling ever since. Today, he does not till about one-third of his land and the rest is strip-till/vertical-tilled. He still uses a ripper on one field as part of a tillage plot.

Gregg has noticed the benefits of reduced tilling over time. He noticed that

in the first year untilled fields produced less bushels, but yields have been improving over time as the soil structure improves and takes in water better. Today, he does not notice a difference in yields between no-till fields and the ripped/dug fields in his tillage plot. He has also noticed reductions in fuel, equipment and labor costs. For example, with the reduced tillage, he puts in fewer than half the hours he previously put on the tillage tractor. It also prevents him from needing to purchase expensive tillage equipment. This method of crop production also reduces soil disturbance which helps prevent washouts from rain and wind. Gregg's farm has significantly less wind erosion compared to neighboring farms due to the reduced tillage. Erosion in the area is especially visible in winter when the ditches along tilled fields fill with dirty snow.



Photo Credit: Gregg Stoen

Getting Started: Don't Be Afraid to Ask

Gregg credits his father as his inspiration for adopting sustainable practices and trying new things. Gregg enjoys the variability of a day on the farm and he finds trying new practices to be very rewarding. Another factor that has allowed Gregg to get involved with conservation farming has been his

willingness to research and seek out support and expert guidance. Gregg learned about conservation tillage by attending local field days and University of Minnesota and North Dakota State University seminars, and by talking with other farmers at these events. Building relationships with people like Jodi DeJong-Hughes, a regional Extension educator, gave him a resource to reach out to with questions and helped

him connect with additional resources.

Participating in incentive programs also helped Gregg get started with strip-tilling and nutrient management. For example, Gregg received support to try strip-tilling through the EQIP program. Gregg also learned about the Conservation Stewardship Program (CSP) while attending a field day. He signed up in 2009 and was able to obtain grant money through their five-year program. That program helped him purchase an autosteer system for precision fertilizer placement. Gregg also took advantage of the Agriculture Best Management Practices (AgBMP) Loan Program which provides low-interest loans to farmers and landowners for equipment related to water quality.

In addition to seeking out resources, Gregg also recommends that individuals interested in reducing their tillage work with others to ask questions and test new systems. For example, finding a neighbor that is already practicing strip-till



Water quality investments on the Stoen Farm



and asking to try it on a small field is a good way to get started and experiment. Gregg also highly recommends working with a reputable crop consultant. Gregg's consultant from Centrol has helped him adapt his fertility and weed control practices as he has shifted from conventional tillage to low-till systems.

Prioritizing Water Quality

Gregg has worked to prioritize water quality on his land. He has installed sediment basins on his land in areas with ravines and rolling hills with the help of both privately contracted tilling companies and the Natural Resource Conservation Services (NRCS).

They install a berm on hills and put in a tile intake to stop water where it gathers the most and have it infiltrate before it picks up speed. The excess runs into the ground instead of continuing to flow and causing washes. The Stoens were also one of the first in their county to participate in the Minnesota Agricultural Water Quality Certification Program (MAWQCP). In order to participate in the program, the Stoens had to show that they were taking actions to protect local water quality. For example, they installed strainers on tile intakes to prevent sediment from entering intakes during hard rains. They like the program because it gives visibility to the public that farmers are doing good things for water quality.

John Kapphahn

Phone: 320-298-0005

Email: jmkdjkmk@runestone.net

Address: 28043 220th Ave, Elbow Lake, MN 56531

Sources of Income: Wheat and rye seed production, soybeans, corn and edible beans

Acres: 1632 acres

Soil Health Management Practices: Cover crops, reduced tillage, targeted spraying, pollinator plots

Impact: 23% reduction in fertilizer use, at least 15% reduction in fuel costs, improved soil structure, reduced erosion, improved weed control, improved ecosystem services, increased yield, reduced labor costs



John Kapphahn

Background

John Kapphahn started helping his father on the family farm when he was just five years old. Apart from time spent in college and serving with the United States Armed Forces in Vietnam, John has spent the majority of his career on the farm. During his long farming career, John has gained experience with a variety of livestock and crops. John is excited about the soil health practices that

he has incorporated onto his land. He has also successfully expanded his operation to incorporate diverse products and participate in a variety of value chains.

Diverse Products and Value Chains

John grows corn, soybeans, wheat and rye for seed. John has also been raising edible beans for over 30 years. He grows a variety of beans

including black turtle beans, navy beans, pinto beans and dark red kidney beans. Edible beans are more labor intensive compared to other crops because they require more cultivation and are not compatible with the use of glyphosate as weed control. However, John sees them as a terrific way to diversify his production. Crop diversification has helped John spread out his risk because he is not relying on a single market.



Seed production fields

In addition to growing a variety of products, John is involved in a variety of value chains. For example, he is one of the few Minnesota growers working with North Dakota State University to grow production seed and foundation seed. John also grows seed for a distillery in Iowa. John sees prioritizing relationship-building as a major factor that has allowed him to expand into these unique markets.

John is also always looking to experiment with new crops. For example, this season, John is experimenting with hybrid rye that has male and female plants. The advantage of this hybrid rye is increased yields and more winter hardiness. He is looking forward to seeing how the rye does this year and is planning to share some samples with the distillery in Iowa. John

is also working on incorporating barley into his operations. He has noticed a growing demand for barley during the COVID-19 pandemic due to increasing interest in homebrewing. He is focusing upon a new variety of barley developed by Cornell University that is resistant to high humidity growing seasons.

Combining Edible Beans with Cover Crops

John's typical rotation involves corn, then edible beans, followed by rye or sometimes wheat, then soybeans, then back to corn. John has been integrating cover crops into his operation for eight or nine years as a way to improve soil structure and increase organic matter on the land. He typically plants winter rye, radish

and turnips as cover crops. He has also used oats but prefers rye because he has noticed that it also helps with weed control. John uses cover crops after edible beans and has also started inter-seeding cover crops with corn. Cover crops work well with John's edible bean rotation because most years he can harvest in September and get a good cover crop established before it gets too cold. John sees the cover crops combined with edible beans as one of the most unique parts of his operations.

The soil on John's land is clay loam. Increasing organic matter on the land with cover crops and incorporating sediment basins and patterned drainage tile on to 85% of his land has helped increase water infiltration and reduce runoff. He has also found that the

combination of rye and cover crops has stopped soil erosion. In fact, in some years he notices his rye collecting blowing topsoil from neighbors' fields. Increasing organic matter and improving drainage on his land has also helped John reduce his tillage. John has begun to focus more upon experimenting with strip-tilling or not tilling at all.

Reducing Chemical Application

John has observed that incorporating rye as a cover crop has helped him improve weed control and reduce his pesticide use. John has also invested in a targeted spraying system for fertilizer and pesticides with the help of the Conservation Security Program. John has several irregularly shaped fields. Autosteer equipment with a targeted spraying system has helped him reduce his chemical use by 23% because he is avoiding over-applying.

Caring for Pollinators

In addition to improving soil health, John has invested in supporting ecological services on his land. For example, John has found innovative ways to care for pollinators. He is currently working with the Conservation Security Program to install pollinator plots in sections of his land that are difficult

to access such as areas under electricity towers. John was also worried about the impact that insecticides and fungicides coating seeds would have on pollinators and developed an innovative vacuum cleaner system for his planters. The vacuum system works like an air filter and helps prevent pesticides from being released into the air near pollinators during planting.



Proposed location for pollinator plots

John Ledermann

Phone: 320-815-5096

Email: lederjoh@gctel.com

Address: 7325 Co Rd 109 NW, Brandon, MN 56315

Sources of Income: Corn, soybeans, soybean seed production, spring wheat and cereal rye

Acres: 1,100

Soil Health Management Practices: Strip-tilling, no-till, cover crops

Impact: Reduced fuel, labor and equipment costs; more earthworms, improved soil structure, reduced erosion and runoff, improved water infiltration, improving weed



Photo Credit: John Ledermann

Background: Long history with reduced tillage

John Ledermann is a third-generation farmer. He lives next to the farm where he grew up and he took over the family operation once his father retired. John's family has a long history with soil conservation practices. His father began experimenting with ridge-tilling in the 1980s and even began a no-till operation in the 1990s. At the time, there were few

people in the area doing no-till and there was not much information available. While the family did have some success with no-till, they also encountered challenges due to poor weather and imperfect equipment. Due to these challenges, there was a period when the family stepped back from the reduced tillage practices.

John's experience with reduced tillage in the 1990s piqued his interest in conservation tilling. John spent time

researching and once he felt things were right to move back towards conservation tilling and he was comfortable, he



Photo Credit: John Ledermann

decided to try again. John began strip-tilling in 2011. The increasing availability of computer driven tractors with autosteer systems was what ultimately convinced him to try it out. The autosteer system is helpful with strip-tilling because it helps ensure that everything is lined up with the strip. It makes it easier to follow the same lines in the field consistently. John is also incorporating no-tilling systems into his operation.

Integrating Cover Crops for System-Level Benefits

At the same time John started with strip-tilling, he also began gradually integrating cover crops into his system. John views the integration of cover crops and strip-tilling as a practice that produces system-level benefits because the cover crops help improve the effectiveness of the reduced tillage. Last year he had cover crops on 75% of his land. John currently has an operation rotating spring wheat, corn and soybeans. He rotates spring wheat every four to

six years and then plants corn and soybeans in between. He has found it easiest to plant cover crops after spring wheat harvest. For the cover crop, he typically uses cereal rye and radishes. He is incorporating more multi-species mixes after wheat. He follows with soybeans the following year. He has also been interseeding annual rye

grass into corn in early/mid-June. In order to improve efficiency, John tries to combine cover crop planting with other activities. For example, he might strip-till, fertilize, and plant cover crop at the same time.



Photo Credit: John Ledermann

A Learning Process

Over time, John has learned to change his management and make modifications based upon what was working best. For example, after facing challenges with weedy fields after incorporating strip-till, cover crops and non-GMO soybeans, he learned he had to do a fall burndown after soybean harvest to control for dandelions. John has also done a lot of his own equipment modifications. For example, he put together his own strip-till bar, made his own fertilizer bar and modified his drill to be able to put down cover crop and fertilizer at the same time.

Seeing the Benefits Over Time

John has seen the positive impacts of his soil conservation practices over time. He immediately noticed reductions in fuel costs and labor. He has also reduced his equipment costs. He hopes that with no-till he will get down to only having a drill and planter.

John was also surprised by how quickly he began noticing soil benefits. During one of his first years strip-tilling, he did an experiment by splitting up fields and strip-tilling one and chisel plowing the other. The following spring, he noticed a big difference between the two fields. He noticed more earthworms and improved soil structure and less erosion on the strip-tilled field. The reduced tilling and cover crops have also helped to improve water infiltration and reduce runoff. He also has noticed a decrease in weedy perennials such as dandelions and thistle over time.

John also gains a sense of satisfaction from trying these new practices. As he explains: *“It is kind of rewarding to plant a crop into another green standing crop. The first time I did it I was thinking what am I doing. It is very different from what I was taught as a young boy. And to see that field green up right away as soon as the snow melts and then to plant a crop into that... You feel good about that even though it is a little nerve wracking.”*

Advice to Other Farmers: You Don’t have to Jump in 100% at First

For farmers interested in reducing tillage and/or integrating cover crops, John recommends taking your time to research by reading, watching videos and speaking with mentors who are already doing it. He also reminds people that it is fine to try it out before buying in 100%. You can try cover crops on a few acres and get a feel for it. If you want to try no-till or strip-till, reach out to people nearby that already have the equipment to try out.



Photo Credit: John Ledermann

Jake Risbrudt and Kyle Weets

Phone: 701-361-3717 (Jake) and 320-815-3260 (Kyle)

Email: j_risbrudt@yahoo.com or weetscustomservices@gmail.com

Address: Dalton, MN

Sources of Income: Corn and soybeans

Acres: 1700

Soil Health Management Practices: Strip-till



Kyle Weets and Jake Risbrudt on the Risbrudt family farm

Background

When Jake Risbrudt was growing up, he loved to spend time on the family farm over weekends. The farm has been in the Risbrudt family since 1868. Jake sees his father and grandfather as major influences that cultivated his love of farming. Jake went to school for agricultural system management and has been helping his dad out on the family farm for over twenty years. Today, Jake and his father own and manage the farm.

Kyle Weets also farms his own land and has been working with the Risbrudts on their land for the past four years. Kyle was also born into farming. He grew up riding in the back window of a tractor and has been farming since he was old enough to walk to the tractor. He explains that:

“Once it is in your blood it is tough to get rid of it.”

The operation on the Risbrudt farm involves a 50/50 corn and soybean

rotation. They have had that rotation for over a decade and sell their product to the local grain elevator. They plant in a variety of soil from heavy clay to sand.

Trying New things

Last fall, Kyle and Jake made the decision to try strip-tilling for the first time on the Risbrudt farm. Before last fall, they used conventional tilling methods on all of the land. Last fall, they leased a Soil Warrior and strip-tilled

700 acres including mostly corn and some soybeans. This spring was their first time planting into strip-tilled soil.

Kyle and Jake had several reasons for making the change from conventional to reduced tillage. They had been researching soil health practices online. They also attended several Soil Warrior meetings and spoke with farmers who have adopted strip-tilling and noticed improved water infiltration, fuel savings and fertilizer savings. They liked the idea of saving money and building up the soil on their land for the next generation. In the long run, they are also hopeful that strip-tilling will result in improved soil health, better utilization of

fertilizer, improved water infiltration in clay soils and reduced runoff. A major barrier to adopting strip-tilling in the past has been the high cost of equipment. However, they hope that the equipment will pay for itself in the long run.

Early Adopters

Kyle and Jake are the first people in their immediate area to try strip-tilling. While neighbors have not come to ask about it yet, they know that people are watching to see how it works. Other people in the area like the idea of strip-tilling and other conservation practices that help keep soil on the land. However, while many may be considering adopting these practices,

it is difficult to take the plunge and be the first one to try something new in the area. People are likely waiting to see how it turns out for Kyle and Jake in the local clay soils. Local agronomists are also excited to see someone trying strip-tilling in the area.

Reflections on the First Year

Kyle and Jake are happy to report that after their first season planting their confidence is growing and they are getting over the nervousness that comes with trying new practices. For example, while Kyle and Jake were initially worried that the planter would not properly line up with strips on hilly terrain,



Strip-tilled fields on the Risbrudt farm



Strip-tilled fields on the Risbrudt farm

they found that the auto-track systems they used were up to the challenge and everything lined up as intended. They are also pleased with how the system is working in their heavy soils.

They are also beginning to see some immediate benefits from the new system. For example, this year they used significantly less fuel. They also noticed that it was easier to get into the field and that the planter rode smoother on the fields. However, they also point out that adopting new practices comes with a learning curve and they have already identified some things they will do differently in future years.

For example, they are currently working with a local agronomist to adjust their fertilizer application.

All in all, Jake and Kyle are optimistic about the long-term benefits they will obtain from reduced tillage and are excited for the potential they see from low-till systems. They are also currently looking into participating in carbon credit programs that incentivize low-till agriculture. As a next step after strip-tilling, they are also considering cover crops. They are currently talking to others who have adopted cover crops in their area to see what works for clay soils.

Scott Olson

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Address: 2390 30th St NW, Appleton, MN 56208

Sources of Income: Corn and soybeans

Acres: 1600

Soil Health Management Practices: Reduced tilling, cover crops

Impact: Reduced equipment input and fuel costs, reduced labor, improved yields, improved soil structure, improved water infiltration, reduced erosion, and improved access to fields during wet seasons



Tilled fields on the Olson farm

Background

Scott Olson has been a farmer for over 30 years. Scott began farming with his grandfather and married into a farming family and began farming with his father-in-law. Scott's father-in-law was ridge-tilling when he began working with him and Scott has continued to adopt soil conservation practices on the farm. He currently manages his family's farming operation with his son. They produce corn and soybeans and sell their product to the local grain elevator and ethanol plant.

Combining Ridge-Tilling, Strip-Tilling and Vertical-Tilling

Scott started to integrate strip-tilling into his operation in 2010. He first considered strip-tilling after seeing a neighbor doing it. He noticed that his neighbor was driving around in a pickup while he was out tilling fields and that motivated him to look into strip-tilling. Over time, Scott has adopted more strip-tilling and vertical-tilling due to the benefits he has observed with reduced tilling. Scott often combines strip-tilling with ridge-tilling.

Previously, Scott would put fertilizer in the ridge. Today, he strip-tills up the ridge and applies fertilizer at the same time. He has noticed that this system helps with fertilizer application. Scott has also worked hard to reduce traffic on his fields. The ridges in his fields have never been driven on. Instead, vehicles drive in the same wheel tracks every time. This helps reduce erosion.

Scott has also noticed several benefits resulting from reducing tillage. For example, he noticed reduced equipment and fuel costs, as well as time



Strip-tilled ridges

savings. He explains that with reduced tillage he still makes trips through his fields, but they are faster and cheaper trips. In the fall he strip-tills, and in the spring, he goes over the fields quickly to knock down bumps and freshen strips before planting. He also has noticed improvements in crop production, improved soil structure and water infiltration as well as less erosion. For example, he notices that in the spring, his ditches are not full of soil and he has had less wind erosion compared to his neighbors. In addition, it has become easier to plant in wet conditions.

Experimenting with Cover Crops

Scott has also begun experimenting with cover crops. He has integrated some cover crops such as

radishes, wheat and turnips into ridges in his operation. He initially tried cover crops for the first time when he was unable to get out to plant one year due to wet conditions. He decided to experiment with cover crops instead and decided to continue after seeing that they were having a positive impact. He has noticed that the cover crops have also improved soil structure and made it easier to plant in the spring. This year he is going to experiment with winter rye after partnering with an Extension Educator from the University of Minnesota.

Don't Be Discouraged by the Learning Curve

Over time, Scott has invested in improving equipment and has

learned how to best manage his reduced tillage system. His advice to people considering reduced tillage is *“don't give up the first time.”* He explains that when he got started with reduced tillage, they did not have the equipment that they have today. For example, at first, Scott used a full-sized planter and it was difficult to manage during the common wet conditions in the region. The soil on Scott's land can range from very dry to extremely wet and muddy. During wet years, mud can be a challenge. You need the right equipment so that it can get through the wet conditions. This made it harder to get started. However, since the 1990s the equipment has been improving yearly. Scott uses the strip-till machine, a Salford vertical tillage machine and a ridge-till cultivator. Scott also suggests experimenting with the equipment by trying reduced tillage on 40 acres one year to make sure you are happy with it.

Tim Koosmann

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Address: 47970 Fish Haven Rd, Big Stone City, SD 57216

Sources of Income: Corn, soybeans and edible beans

Acres: 3,500

Soil Health Management Practices: Reduced tillage, improved water management, improved nutrient application

Impact: Reduced time and labor costs, reduced machinery and fuel costs, reduced fertilizer and pesticide costs, improved soil structure and water infiltration, less

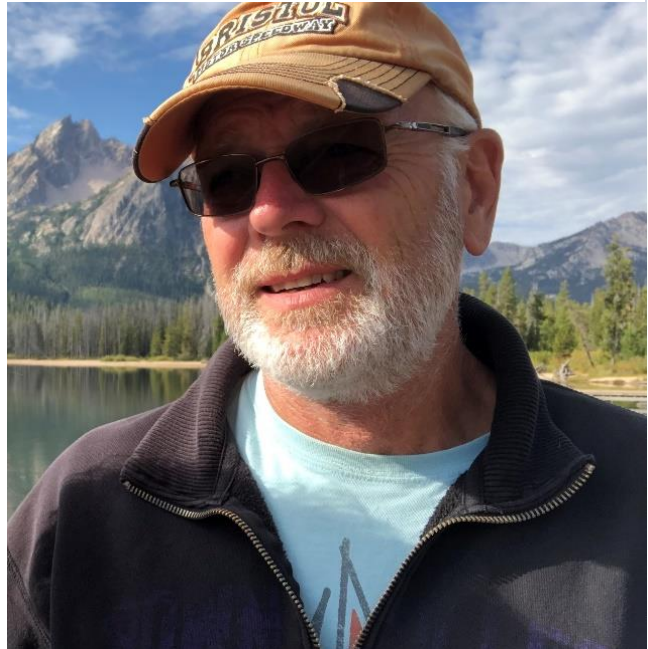


Photo Credit: Tim Koosmann

Background

Koosmann Farms is owned and operated by Tim and Natalie Koosmann. This is Tim's 43rd year farming full-time. Tim and Natalie are the fifth generation to be farming in the area. The Koosmann family farms in Swift, Big Stone, and Stevens Counties in west central Minnesota. Some of the land has been in the family since 1886. The farm produces corn, soybeans and edible dry beans. They have raised different classes of dry beans but are currently raising black beans.

Over the years the Koosmanns have employed practices that keep crop residues on the soil surface to prevent soil erosion. These practices have included no-till, ridge-till, vertical-till and strip-till. They have also installed drainage tile and built drainage ditches to improve water management on their land and they use the latest technologies in nutrient application. While these practices have economic benefits, Tim also explains that his land ethic is also a major reason why he became interested in soil conservation:

"I think we do feel a responsibility for being good stewards for the land. Keeping the soil on the fields where it should be. I had my 43 years. But this area was settled in the 1870s. It has been over 100 years that this ground has been farmed and we have to care for it and leave it in better shape than what we started with by maintaining organic matter levels."

Keep Crop Residue on the Soil

Many of the farm's soil conservation practices emphasize the importance of keeping residue, such as corn roots, in the soil. Reduced tillage helps keep organic matter on the soil and leaving crop residue on the surface helps control erosion. The Koosmann farm uses a strip-till and vertical-till cropping system. For corn, they put down fertilizer and strip-till in the fall. In the spring, they use a rolling cultivator prior to planting to dry and clean the land. For the soybeans and edible beans, they use a vertical-tillage machine in the fall. Soybeans do not require another pass in the spring, but dry beans receive another vertical-tillage pass in the spring to incorporate urea fertilizer. Beans are typically planted on the corn stalks from the previous year using a John Deere 1590 no-till drill.



Photo Credit: Koosmann Farms



Photo Credit: Koosmann Farms

Use the Right Equipment

Tim also emphasizes the importance of equipment. When they began strip-

tilling, they did not have machines with autosteering systems. They switched to autosteering guidance systems because it allowed them to maintain accuracy when planting on strips. They also use section control for turning

the planter on and off at the headlands. This is especially helpful because the farm has irregularly shaped fields. Section control prevents overlaps on the headlands and improves yield. However, the equipment is more

complex, and Tim suggests having a skilled operator.

Improving Soil Drainage and Reducing Erosion

The Koosmanns have put a lot of effort into improving drainage on their land. They have installed drainage tile and surface ditches. Tim has also noticed that reduced tillage has improved soil drainage due to improved aggregation in the soil and better water infiltration compared to conventionally tilled soils. Leaving the corn roots intact improves water retention and reduces soil erosion. It makes the drainage tile more effective if the water can infiltrate. They are trying to hold as much rain where it falls on the field with soil health and structure so that it infiltrates. When the Koosmanns rent land for the first time that has been under conventional tillage, there are sometimes gullies in the soil due to erosion. However, with their water management they are able to correct these problems. Another practical benefit of improved water

management and soil structure is that during wet falls, Tim notices that he is able to get into his fields while his neighbors, using traditional tillage systems, find it much more challenging to get into the fields with a combine.

Cost and Labor Savings

The Koosmann's investments in improving drainage and improving soil structure by reducing tillage has also resulted in cost savings. For example, with strip-tilling, Tim applies fertilizer in a more focused band. This has reduced the amount of potassium and phosphorous they use by about one third compared

to broadcasting fertilizer. Tim also spends less on herbicides compared to most conventional farms. Without tillage the farm gets less annual weed pressure. He does not always use pre-emerge herbicide on corn, but he sometimes sprays a burndown herbicide before or after planting as necessary. Tim has always felt that the biggest cost benefit for reduced tilling is savings on machinery costs. With strip-tilling the farm has avoided the cost of purchasing and operating big tillage equipment. These machines are expensive to purchase and run. Tim has also reduced his labor by using strip-till and vertical-tillage system.



Photo Credit: Koosmann Farms