



# SOIL HEALTH CASE STUDIES

VOL. III

By Jared Luhman, Sustainable Farming Association



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farming  
association  
[www.sfa-mn.org](http://www.sfa-mn.org)



Southeast Regional Sustainable  
Development Partnerships

UNIVERSITY OF MINNESOTA  
**EXTENSION**

## About This Project

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 soil health practices.

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 developed an additional set of case studies.

Because of the popularity of the case studies, Southeast RSDP, CINRAM and SFA 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

Several people and organizations were involved in preparing this report. Theresa Keaveny, SFA's Executive Director, Dean Current, CINRAM Director, and Anne Dybsetter, interim SERSDP Executive Director were the primary supervisors for this project. Student researchers Lauren Budenski, Kathy Dooley and Aidan Reed conducted prior interviews in 2016, 2018 and

2020 respectively. We are grateful for the help of our advisory team, Carmen Fernholz, Kent Solberg, Dorian Gatchell, Jerry Ackerman, Don Reicosky, Alex Romano, and Myron Sylling and who offered feedback, advice and support. 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.

## **Who are the farmers?**

This series of case studies features farmers in Southeast Minnesota, a prime location for the implementation of soil health practices due to the unique geological landscape found there. The Driftless region is known for rolling hills, bluffs, and many waterways which lead into the Mississippi River. Soil health



## **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

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 SFA and the advisory committee 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 on each farm in summer of 2020 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](http://farmmaps.umn.edu).

Past case studies can be found at [sfa-mn.org/soil](http://sfa-mn.org/soil) or [z.umn.edu/soilhealthcasestudies](http://z.umn.edu/soilhealthcasestudies)



# Kaleb Anderson

651.334.3366  
anderson.kaleb@gmail.com  
12535 335th St  
Goodhue, MN 55027

**Sources of Income:** Corn, soybeans, rye seed, direct-market beef, Kernza®.

**Economic Impact:** Reduced herbicide costs, fuel, labor and machinery costs. Diverse revenue streams. Increased premium value from pasture-based operation. Reduced fertility expense from livestock manure.

**Acres:** 100 cropland, 200 pasture and hay.

**Soil Health Management Practices:** No-till corn and soybeans, perennial pasture, cover crops, rotational grazing.

## Background

Kaleb grew up watching heavy rains wash away soil in both the cropland and pastureland on his family's steep rolling farm.

He now farms with his father and together they have transitioned their farm into a regenerative operation, mimicking nature and applying many of the soil health principles on all of their acres.

## Grazing Management

When Kaleb came home to be part of the farm in 2008, his dad was managing the cropland. This left Kaleb in charge of the cattle enterprise, which is ironic because Kaleb grew up despising the livestock. He saw the cows as being responsible for the gulleys and land degradation, but has since realized that it is the management of those cows that

was responsible. He recognized early that they can be a tool if managed properly, and he has been improving his livestock management ever since.

He implemented rotational grazing to improve the grazing land and divided the 75 acres of pasture on the home farm into 12 paddocks, which he rotated through every few days. In 2012, a dry year, he found himself out of grass earlier than expected. This led him to further



intensify his grazing management to where he is now moving the cattle every day to improve pasture utilization and increase plant rest period.

Cover crops play an important role in the livestock enterprise as well. Kaleb likes to give his pasture adequate rest before the fall freeze, and so he plants a variety of full season annual cover crops which he grazes in the fall while his perennials stockpile. The cover crops also provide a sacrifice area in the spring during the mud season. He has also experimented with planting warm season cover crops into his cool season pastures to increase diversity and production during the summer slump where his cool season grasses slow down. His management of the pasture and utilization of cover crops has allowed him to extend his grazing season and save significantly on winter feed costs, increase plant diversity, increase water infiltration and improve pasture quality and productivity.

## Regenerative Cropping

Kaleb fully believes that diversity in the cropland is just as important as diversity in the pasture. The norm in



his area is a corn and soybean rotation, yet he includes alfalfa which is fed to his cattle through the winter, rye which is sold as seed, and has recently experimented with both hemp and Kernza®.

Kernza®, the grain of intermediate wheatgrass, is still experimental but is garnering interest as an emerging perennial grain crop that can also be grazed both in spring and again in the fall following a grain harvest in late summer. In addition to being able to capture value off this land by grazing and harvesting grain, Kaleb is able to save money due to the fact that he doesn't need to plant this crop every year. He is also able to keep the ground covered early in the spring and well into the fall without needing a

cover crop, which further reduces planting and seed costs. Across the rest of his cropland acres, Kaleb has shifted to 100 percent no-till, and has prioritized getting cover crops on every acre every year.

## Creating Sanctuary for All Life

Kaleb currently works two jobs in addition to the farm, so he is no stranger to working hard. This lifestyle has allowed him to improve and invest in the farm, but can be stressful and exhausting. For this reason, he has a dream of making his entire farm a sanctuary, a place to build his spirit. He also wants his farm to be a sanctuary for his family, his customers, his livestock and all the

wildlife and soil biology that call his farm home.

Creating this sanctuary benefits the wildlife on his farm by improving the habitat and providing a diverse population of plant species to feed and house them. It improves the land by reducing erosion and increasing soil health. Increased soil health provides more nutrient dense forage for his cattle and more nutrient dense beef for his customers. His customers who visit the farm can enjoy the beautiful landscape and increase their connection to the food they purchase and consume from Kaleb and his family. It can also add another potential revenue source through agritourism. It does all this while reducing stress on Kaleb and his family as they work on the land.

Kaleb plants a variety of full-season annual cover crops which he grazes in the fall while his perennials stockpile. The cover crops also provide a sacrifice area in the spring during the mud season.





# Dayna Burtness

612.812.1923

dayna.burtness@gmail.com

23970 County 19

Spring Grove, MN 55974

**Sources of Income:** Pastured pigs.

**Economic Impact:** Reduced pig health issues save money on vet costs. High-value compost fertilizer as a byproduct. High value premium due to pasture access and naturally raised. Clearing of brush and woods through goat and sheep grazing makes use of otherwise less useful or valuable land.

**Acres:** 7 tillable, 75 pastured.

**Soil Health Management**

**Practices:** Cover Crops, Perennial Pasture, Adaptive Multi Paddock Grazing, No-till, composting.

## Background

Dayna did not grow up on a farm, in fact, she didn't even grow up in a farming community. She grew up in a suburb of the Twin Cities with no exposure to farming. At 19 years old, she was unsure of what direction to go. When a friend recommended she try farming, she gave it a shot and fell in love! Her career in agriculture started off as a vegetable

producer but in 2015 she and her husband purchased a farm in Houston County and began raising pastured hogs. Today they raise and direct market over 70 pastured hogs per year, and house two incubator farmers who raise pastured chickens, ducks, sheep and goats.

## Overcoming Challenges

Farming is a unique industry; it is affected by so many factors that

can make even the most experienced farmer's head spin. Challenges such as uncontrollable weather, animal health, machinery operation, marketing and the list goes on. Yet after speaking to Dayna for nearly two hours, I would never have guessed that she hadn't grown up on a farm. In fact, her livestock enterprise has only been in operation since 2015. She started by working on a vegetable farm, and eventually building her own six-acre



wholesale produce operation with several accounts in the Twin Cities. While she was raising vegetables, she was diagnosed with chronic Lyme disease which made the very labor-intensive work of vegetable farming nearly impossible. But this didn't stop her from pursuing farming.

It was at this same time when she was exposed to regenerative agriculture. Dayna began to learn how regenerative based livestock farming, where animals are allowed to do the work themselves, would reduce the physical burden of farming, and provide her adequate time for the rest and recovery that she needed. Additionally, it would allow her to build her soils in ways she didn't think possible on her vegetable operation. Her pigs build soil through her rotational grazing system. She moves them often, giving adequate time for the pigs to trample or consume the forage available, and then leaving for long enough to allow ample recovery period on the land. Since hogs can be more destructive than cattle or sheep at times, she adjusts the recovery period accordingly, often only grazing a specific area once per year.



Dayna moves her pigs often, giving adequate time for them to trample or consume the forage available and then leaving ample recovery time on the land.

## Paying it Forward

Having grown up in the suburbs without farming or livestock experience, Dayna relied heavily on the knowledge of other farmers. Early on she began her career working on an incubator farm where she was able to use the equipment, land, and the knowledge of the farm owner to get started. She also places a high value on her time in the MOSES mentorship program which offered her two years of mentorship with another pastured hog farmer. Having had the opportunity to learn from these individuals, she now feels it is her obligation and privilege to share what she has learned with others. For this reason,

she has opened her farm up as an incubator farm, where individuals can come and live and begin a farming enterprise of their own. The incubatees help Dayna with her pigs, and in return, get use of her land, equipment, and tapping into her extensive network of potential customers.

While Dayna could raise other livestock species herself to market to her customers, she is content making a good living on pigs and helping other individuals pursue their dreams of farming. Her commitment to this incubator system is very generous. She leaves potential profit on the table; however, it's not without benefits. Both of the incubatees on the farm have small

ruminants, one with goats and the other with sheep. These animals are currently being used to graze and clear woodlands on her pasture acres that were previously overgrown with brush, restoring a more natural balanced habitat with open grasslands interspersed with trees. Many individuals would hire goat farmers, or have to buy and manage the livestock themselves. But through this incubator system, Dayna is able to regenerate and restore her woodlands without needing to spend any of her own time or money. Diversity in plant species, livestock species and farmers all contribute heavily to the success of her farm.





# Olaf Haugen

507.459.3264

olafhaugen@yahoo.com

12620 Deer Rd.

Canton, MN 55922

**Sources of Income:** Grazing dairy.

**Economic Impact:** Reduced machinery needs. Elimination of fertilizer expense. Lower labor requirements. Minimal facility expenses. Minimal annual planting/seeding expense. Reduced winter feed expenses from seasonal milking.

**Acres:** 270 pastured acres.

**Soil Health Management Practices:** Adaptive Multi Paddock Grazing. Winter bale grazing. Perennial pasture and annual cover crops.

## Background

Olaf's parents purchased the farm in 1994 and immediately began as a grazing dairy. This method of farming has been carried on by Olaf since he took over in 2011. They are currently milking 160 cows and rotationally grazing them on 270 acres of perennial pasture. He outsources much of the heifer development and brings in most of the winter feed, allowing him

to fully utilize his summer grazing lands for productive milk cows.

## Labor Efficiencies

Olaf's farm is not your typical dairy. You won't find dozens of employees feeding cows, feeding calves, milking cows and mixing feed. You won't find large barns filled with cows or massive feed piles being hauled to the cows. You won't find a large manure pit which must be hauled out in the

spring and fall. Olaf believes that working in sync with nature and letting cows do the work is best for his lifestyle and his land.

The Haugen farm is a seasonal dairy, calving in March and April and drying off in January, which allows him to capture many of the efficiencies of a large farm with fewer cows. Jobs like calving, vaccinations, and breeding that are typically done year round on a dairy farm are now seasonal. It also aligns



milk production with the time when his land has the most quality forage available and allows him to quit milking when forage is not available. This reduces the quantity and quality of the feed required to bring the cows through winter.

Through rotational grazing, he is letting his cattle do the feeding and manure spreading themselves. He has managed to run this dairy operation with one full time farmhand, and himself working only half time on the farm and running a custom haying business on the side. This puts their cows per FTE (full time equivalent) at over 100, whereas the average farm this size is closer to 50 cows per FTE. Additionally, while Olaf does own haying equipment for his custom business, the farm does not require a fleet of forage harvesting equipment, feeding, and manure spreading equipment, reducing the overhead required to operate his farm by tens if not hundreds of thousands of dollars.

## Year-Round Soil Building

Olaf manages his grass and cattle in a rotational grazing system. This means that he moves the cattle daily and leaves much of the



Olaf moves the cattle daily and leaves much of the plant matter in the field. He will not return to that pasture for several weeks, allowing his grass to get adequate recovery time.

plant matter in the field. He will not return to that pasture for several weeks which allows his grass to get adequate recovery time. Recovery time is important because it allows the plant to regrow fully and improve his soils by capturing more sunlight energy and sequestering more carbon through photosynthesis.

Olaf has seen soil organic matters on his farm rise from the low 3 percent range to as high as 5 percent. Water infiltration has also risen significantly. His grazing management easily allows him to improve his soil health from early thaw in the spring until the ground freezes in the fall. However, his management also allows him to build soil throughout the winter as well.

Olaf learned early in his farming career that when all costs are truly accounted for, most of the time you can buy feed for the same price or close to the same price that you can produce it. This mindset shift led him to maximize the stocking rate on his farm for summer grazing and bring in feed from off the farm for winter. In winter he is able to outwinter his cattle since he is not milking, eliminating the costs for winter shelter, as well as manure hauling and allowing the cow to spread all those imported nutrients across areas in need of fertility.

## Beginning Dairy Farmers

Olaf says that if your goal is to get into dairy farming, running a

grazing dairy is a “no-brainer,” but there are some things to consider. First, you should determine if you have a market for the milk before you ever start to buy cows. Once you have a market, he recommends investing in the right cow genetics, a decent milking parlor and a tractor that is reliable and will allow you to feed in the pasture all winter. Additionally, if you are going to make feed yourself, have somebody custom do it; it’s not necessary to own the equipment yourself. Their family has been heavily involved with the Dairy Grazing Apprenticeship which connects experienced dairy graziers with those seeking to get into the business and would be a great starting point for anybody interested.



# Ed McNamara

651.380.8183

edmcnamara@sleepyeyetel.com

Goodhue, MN 55027

**Sources of Income:** Non-organic corn/soybeans, beef cattle.

**Economic Impact:** Reduced herbicide costs. Reduced fuel, labor and machinery costs on the no-till land. Adding a valuable forage crop. Reduced nutrient loss.

**Acres:** 360 acres tillable.

**Soil Health Management Practices:** No-till soybeans into corn ground. Interseeding cover crops. Variety of crop spacing trials.

## Background

Ed's family has been farming for well over a century in the Goodhue area. His parents gave him the opportunity to farm as a young man and he milked cows until the late 1990's. Since then he has focused on row crops. 2013 provided an opportunity on prevent plant acres to try cover crops. Ed took advantage of that opportunity and has continued to experiment with

new soil health practices ever since.

## That CAN Be Done Here Mindset

When Ed planted cover crops in 2013, he was amazed by the results he saw in his crop the following year. Corn and soybeans planted on cover cropped acres leapt out of the ground the following spring. The cover crops had assisted in

drying out the soil and making a wonderful seedbed for crops.

This experience is what first caused him to seriously consider soil health and shifted his mindset towards improving his soils. Ed's mindset is one of his greatest assets in farming. He does not allow himself to say or think, "that can't be done here!" Rather, when faced with an idea that offers significant rewards if successful, he finds ways to make it happen.



After seeing poor results with aerial seeding cover crops, Ed began to look into other ways to get cover crops planted before harvesting the cash crop. This led him to build his own interseeder which he built from scratch for under \$10,000 using an old side-dress toolbar. With his interseeder he plants a mix of cover crops into standing corn and is able to ensure seed to soil contact which is not possible with aerial or other broadcasting options. His interseeder greatly improved the success of interseeded covers, but not to the levels he was looking for. The limiting factor with interseeding cover crops into 30-inch row corn is getting sunlight down through the canopy to the cover crop, which led him to experiment further with row spacing of his corn.

## Experimentation

The challenge of getting adequate sunlight to an interseeded cover crop has perplexed many before Ed; however, not many before Ed have experimented with as many solutions to this problem. On his farm he is currently running a three year trial comparing 30" row corn, 60" row corn and four rows of 30" corn



With his interseeder, Ed McNamara plants a mix of cover crops into standing corn and is able to ensure seed to soil contact which is not possible with aerial or other broadcasting options.



with a 90" gap, all with the goal of getting sunlight down to the cover crop. The goal is to improve cover crop growth while still maintaining crop yield.

However, the advantages of cover crops can be quite valuable and should be considered even with a

slight decrease in crop yield. For Ed, he sees the value of the cover crops and corn residue harvested together as a fantastic, high quality feed for his beef cows. For individuals with fence and water infrastructure, the value as grazed forage could be \$100 per acre or higher and

require no harvest or manure management expenses.

In addition to their feed value, these cover crops will tie up extra nutrients in the soil left from the cash crop and store them until spring. They can break up compaction left from the crop machinery. They protect the soil from heat that can kill soil biology as well as from wind and water erosion. An additional, extremely valuable, benefit is all the carbon they are able to sequester through photosynthesis in the fall and spring. Combine the soil health benefits with the feed value and you can see why attempting to design a system that increases cover crop growth in corn is so important to Ed.

In addition to his row spacing experimentation, in fall 2020 Ed experimented with a highboy spreader with drop tubes for better seed placement, a roller crimper rented from the county SWCD for rye termination and weed control, and a drone for seed application.

This mindset of constant experimentation is what has allowed Ed – and will allow any farmer – to constantly improve and advance their operations from both a financial and soil health perspective.





# Bob & Greta Mierau

507.259.3616

Mierau@rocketmail.com

13598 Heinz Rd.

Caledonia, MN 55921

**Sources of Income:** Non-organic corn/soybeans, organic soybeans, vetch & rye seed, custom grazing stockers, hay.

**Economic Impact:** Reduced herbicide costs, fuel, labor and machinery costs on the no-till land. Extremely diverse revenue stream. Potential carbon credits.

**Acres:** 550 tillable, 150+ in pasture/woods.

**Soil Health Practices:** Diverse crop rotations, cover crops, livestock integration, no-till on non-organic, minimal till and some no-till on organic acres.

## Background

Bob did not grow up on a family farm, but took every opportunity he could to work on them. In the 90s he married Greta, a farm girl from Caledonia, and in the early 2000s they had the opportunity to buy a farm of their own. In 2016, Greta's parents, Leroy and Phyllis, were ready to step back from management and so Bob and Greta took over the

family farm and have been implementing numerous soil health management practices ever since.

## Diversity and Experimentation

Bob credits his first consideration of managing soil health to his father-in-law, Leroy, who researched, experimented with, and shifted entirely to no-till farming early in his career. This

taught Bob to not be afraid of doing things differently. In 2015, Greta experienced some health issues which caused them to really consider their farming practices and the food they were putting in their bodies. So in 2016, when Bob began to work more into the management of the family farm, they started to make changes. On the 135 tillable acres on their home farm, Bob and Greta made a commitment to never again spray chemicals.



This decision led them to certify their home farm as organic.

As an organic farmer, Bob is forced to think about alternative ways to address the challenges that every farmer faces. Many of the solutions to address these issues all come back to the five principles of soil health. Rather than deal with insect or disease pressure with a pesticide or fungicide, Bob chooses to reduce the pressure by implementing diverse crop rotations, which breaks the pest and disease cycles.

While Bob still must utilize tillage, he has worked to minimize this form of disturbance, and has experimented with both no-till soybeans and corn. His no-till corn was not as successful as he had hoped, and when asked if he felt it was possible to no-till corn organically Bob said, "Not with my current understanding." This response speaks to his mindset and character. He has not eliminated the possibility, but recognizes that he has more learning to do in order to make it successful.

He keeps a living root in the soil as much as possible by planting cover crops and having a combination of cool and warm season crops growing on his farm at all



The Mieraus' focus on soil health has opened up new doors. The diverse plant species found on their farm create a wonderful habitat for bees, so they work with a beekeeper to produce honey on their farm.

times. He has for the past two years incorporated livestock onto his farm by custom grazing and feeding dairy heifers for a local dairy farmer.

## No-till Needs Cover Crops

They also manage Greta's family land where they have been practicing no-till as well as introducing cover crops into the rotation. Bob noted that done by itself, he is not convinced that no-till farming is a tremendous success. It may reduce passes over the field, and save some fuel, labor, and machinery costs, but after 20 years of no-tilling, when he tested the land with a penetrometer, he was not happy. "Why is that?" he asked, then answered, "because we

didn't have a living root all the time."

Bob recognizes that no-till by itself is not enough. Plants and roots are essential for breaking up soil compaction, pumping carbon into the soil, feeding biology and forming soil aggregates. Additionally, cover crops have played an important role in weed suppression. This year, the Mieraus reduced herbicide use by 30 percent. The soil health principles highlighted at the beginning of this publication can each provide benefits by themselves, but when applied together, the results can be astounding.

## New Markets

The Mieraus' focus on soil health has

opened up new doors for their operation by creating new markets. The diverse plant species found on their farm create a wonderful habitat for bees, so they work with a beekeeper to produce honey on their farm. Their focus on diversity led Bob to planting both rye and vetch together and harvesting them for seed, which they sell through a local seed company.

The no-till and cover crop acres they farm have allowed them to sell carbon credits.

Bob and Greta's focus on following the principles of soil health as seen in nature have allowed them to build a farm operation that is resilient both to financial and weather-related storms.





# Rob Miller

507.208.6078  
25924 County Rd 25  
Lewiston, MN 55952

**Sources of Income:** Milk, soybeans

**Economic Impact:** Reduced fuel, machinery, and labor expense on no-till soybeans. Additional forage crop. Manure reduces fertilizer needs.

**Acres:** 1,800

**Soil Health Management Practices:** Cover cropping, no-till soybeans

## Background

Rob's family has been farming for several generations. Their family purchased what is now their current farm in 1936. It began as a very diversified farm with chickens, hogs and dairy cows. In the 1970's after building a new milking parlor they chose to focus on the dairy and have expanded the dairy to milking 700 cows. With every decision the Millers make, cow

comfort, employee comfort, and soil health have been top priorities.

## Triticale and No-till Beans

Rob and his family understand that erosion comes at a cost. He has made it a priority to limit this on his farm. He sees no-till and cover crops as an essential part of regenerative agriculture and has been seeking

options to implement these practices on his farm. The biggest challenge for them currently that restricts their ability to no-till is the incorporation of their manure. However, this has not stopped Rob from implementing soil health practices on his farm.

Harvesting corn silage leaves the soil in a very vulnerable state, completely bare without even stalk residue to protect the soil. However, silage also



provides an opportunity with an early harvest window to plant a cover crop and utilize this extra growing season after corn silage by planting triticale. Triticale germinates right away and begins to capture sunlight and grow for the remainder of the fall and resume growth early in the spring.

By planting cover crops, Rob armors what otherwise would be bare soil, shielding it from wind, rain, and the sun. Additionally, the cover crops will continue to pump carbon into the soil through photosynthesis building soil health for an additional two or more months in the fall and two or more months in the spring. Triticale provides more than just a soil health benefit to Rob; it also offers significant financial value! Rob harvests the triticale in the spring as a forage crop to feed his dairy cows. Then he will no-till soybeans into the triticale stubble. By doing this, he enables himself to harvest three crops in two years while minimizing tillage.

## Understanding Your Context

The soil health principles are all about context, and discovering how you can implement them into your operation



In 2018, the Millers built a new parlor, which features a 32-cow rotary milking system allowing them to milk more cows in less time with fewer employees.

given the unique challenges and features of your farm. Operating a dairy farm offers Rob and his family the ability to diversify their crop rotation. Without livestock, it can be difficult to find profitable markets for anything other than corn and soybeans in the Midwest. However, because Rob has cows on his farm, he has a market for a variety of forage crops in addition to the corn and soybeans they produce.

An important piece of his rotation is alfalfa. Alfalfa is a perennial plant that grows for the entire growing season capturing free sunlight energy and also fixing nitrogen from the atmosphere. Corn silage offers an earlier planting date for cover crops. Additionally, having cows on the farm allows the Millers to feed most of what they produce to

the livestock. This keeps more of the nutrients on their land rather than shipping all those nutrients off the farm and potentially out of the country and offers big savings on fertilizer.

Rob is currently unable to go 100 percent no-till, but he and his brother are in the process of developing a manure management system that will allow them to apply manure with minimal disturbance to the soil. He hopes that when this is complete they will be able to be 100 percent no-till and plant cover crops on every acre every year.

## Whole-Farm Sustainability

Rob and his family recognize that true sustainability and regeneration can only take place when all aspects of the farm are

improved. Profitability cannot come at the expense of the land, cows, employees, or consumers. For this reason they have prioritized cow and employee comfort while focusing on building soil health and producing high quality milk. In 2018, they built a new parlor, which features a 32 cow rotary milking system allowing them to milk more cows in less time with fewer employees. The new parlor has two large doors that open to keep temperatures comfortable for cows and employees and has an attached break room for employees between milking shifts. The cows being milked in this parlor are extremely calm, and the Millers have also been investing in poly stall dividers in the barn which improves the cow comfort as well.



# Tom Pyferroen

507-254-9490 | [tpyffero@bevcomm.net](mailto:tpyffero@bevcomm.net)  
53249 275th Ave, Pine Island, MN 55963

**Sources of Income:** Beef cattle, corn, soybeans, small grains, hay

**Economic Impact:** Elimination of labor, fuel and equipment costs related to tillage. Improved retention of nutrients from manure and fertilizer in cover crops. Reduced equipment costs. Reduced health issues on stocker cattle from grazing. Reduced nutrient expense from manure.

**Acres:** 1,800

**Soil Health Management Practices:** No-till, cover crops, interseeding, livestock integration.

## Background

Tom farms with his son Aaron just south of Pine Island, Minn. They operate a diverse farming operation purchasing stocker cattle from the Southeast and backgrounding them on pasture and cover crops before moving them into their own feedlot to finish. Aaron has recently begun direct marketing meat off the farm and hopes to expand that market in the future. They also raise corn

and soybeans and over the last seven years have rapidly adopted soil health management practices. They are never afraid to experiment with new things.

## Steady, Intentional Growth

Tom grew up on a farm, but since his father was still farming he began farming on his own. The operation originally consisted of milking cows and

feeding cattle in 1975. He always said he would milk for 20 years and so, in 1995, he quit milking and chose to concentrate his efforts on the beef and crops enterprise. Growth was slow and conservative, building improvements with cash and doing as much of the repair and construction work as possible on their own to reduce expenses. This method of intentional growth over a long period has built a



financially resilient operation that he is now transitioning to his son. This resilience has allowed him to get through tough times in the past and will be crucial to surviving tough times in the future.

## Soil, Water and Financial Improvements

Tom's beginning in soil health management practices was over 25 years ago when he began no-tilling corn into soybean ground. In 2013, when he was faced with heavy rains and several prevent plant acres, Tom took advantage of the opportunity by trying his hand at raising cover crops. Since then he switched to 100 percent no-till and built a new planter which has allowed him to successfully plant both corn and soybeans into green standing rye. Tom also uses this planter to plant cover crops and small grains, allowing him to plant all his crops with one piece of equipment. The only exception is interseeding, which he is trying for the first time in 2020 because the local NRCS built an interseeder.

His experience with cover crops has been great, and Tom has seen



For the Pyferroens, cover crops are a fantastic forage that can be grazed or harvested mechanically and reduce feed expenses for the cattle.

reduced weed pressure, improved nutrient cycling, and improved soil structure. In addition to seeing improvements to his soil health, Tom has also improved water quality through his practices. One of his farms has had tile water tested for nitrates for several years, and is consistently well below neighboring farms.

The soil and water health benefits from no-till and cover crops have been immense; however, they also offer significant

benefit to the cattle enterprise. Cover crops are a fantastic forage that can be grazed or harvested mechanically and reduce feed expenses for the cattle.

Yield is important to Tom, but he recognizes that more important than yield is profit. He used to religiously use pesticides and fungicides every year. Now however, due in part to his management, he does not see the need for these applications. Although he doesn't feel he has seen

a yield loss, Tom is confident that if there was, his savings in chemical expenses and reduced equipment costs, as well as fuel and labor savings have more than made up for it.

## Words of Wisdom

When asked about his advice to other farmers, Tom said, "Get that area between the ears cleared out and devote a 20 or a 40 to the practice and stick with it. It's not gonna break you unless you're only farming 40 acres or 20 acres." He said, "If you dedicate yourself to reducing the tillage, planting the covers, managing in that type of manner, and if it doesn't outperform any of your other stuff on a profitability index in five years, then you better go back to what you were doing. But I don't know anybody who has gone back."

This is great advice to anybody who is wanting to improve their land and farm profitability. It doesn't have to be all or nothing, and it doesn't have to break the bank. There are custom operators out there who are able to do the work for farmers who don't have the proper equipment to experiment. The most important thing to do is start.





# Mike & Jennifer Rupprecht

507.526.2564

ebgfarm@hbc.com

18828 County Rd 20

Altura, MN 55910

**Sources of Income:** Organic corn, soybeans, and oats. Direct-market grass-fed beef and pastured chicken.

**Economic Impact:** Reduced fertility expense. Eliminated chemical expenses. Premium markets for grass-fed beef and organic crops. Increased pasture production.

**Acres:** 150 acres in cropland, 100 acres in pasture

**Soil Health Practices:** Perennial pasture, rotational grazing, diverse crop rotation, organic.

## Background

Mike's father purchased the current family farm in 1967 and Mike started farming right after graduating from high school. In the beginning, nearly all the acres were in crops, as they felt the land was "too good to be in pasture." However, in the late 1980s and early 1990s they began grazing and, after seeing how the animals responded to grazing, they continued to

expand the grazing lands and pasture to feed the cows throughout the growing season. The remainder of the land is in a five-year rotation of organic corn, soybeans, and oats with underseeded hay, followed by two years of hay.

## Pasture Management

Proper pasture management is key. Mike will never overgraze, and will never come

back to a pasture too soon. Research done by the Noble Research Institute shows that when less than 40% of plant material is grazed, root growth is not affected at all. More information about their research can be found at noble.org. A higher percentage of roots stop growing as more of the plant is grazed as well as an increase in the amount of time after grazing before root growth resumes. Mike believes that root and plant



growth are essential to soil building. A growing plant in his pasture is constantly pumping carbon into his soils through root exudates and these root exudates feed soil biology, create soil structure, and improve water infiltration. In addition to the soil health benefits, Mike has seen an improvement to overall forage production as well as better growth during dry seasons.

## Fine-Tuned Operation

Over his career, Mike has really dialed in his operation. He knows how many cows, calves, and grass fats he can support on his pasture acres. The rotation on his 150 acres of cropland aligns perfectly with the livestock operation as well. His cattle produce enough manure over winter to spread on his 30 acres of corn. Those 30 acres of corn along with his 30 acres of soybeans in year two of the rotation are a manageable amount of acres to maintain exceptional weed control with just his wife, Jennifer, and himself. Thirty acres of a small grain are a perfect nurse crop for the alfalfa that he will keep for an additional two years. This alfalfa provides just enough high-quality feed



The Rupprechts know how many cows, calves, and grass fats they can support on their pasture acres. The rotation on their 150 acres of cropland aligns perfectly with the livestock operation.



for his cows and grass fats for the winter months. The small grain and alfalfa in the rotation are important for breaking the pest cycle and reducing weed pressure in his corn and soybean years. Alfalfa is a nitrogen fixer, which along with the manure, provides adequate nutrition for the corn. Organic farming, particularly crop farming,

comes with countless challenges. Mike and Jennifer have created a system that addresses nearly all of those challenges while building their soils.

## Regenerative Farming, Premium Markets

Regenerative farming offers several

advantages. Obvious benefits include: increased water infiltration, reduced input costs, healthier soils, diversified revenue streams, and reduced labor, fuel and equipment costs.

Most of these lower the cost of production, however, Mike and Jennifer have also managed to create a market that pays them a premium for their method of farming. Through years of developing relationships and attending farmers markets, they have built a network of customers who purchase nearly all of the grass-finished beef they raise on their farm as well as the 1,000 pastured chickens. The beef they cannot sell directly to consumers, they market for a premium through wholesale grass-fed beef markets allowing them to still receive a premium for the meat they produce.

Additionally, the cash crops raised on the farm are certified organic which also offer a significant premium. Mike and Jennifer demonstrate that you can farm sustainably, and produce enough income to provide a comfortable standard of living without the need for thousands of acres or expensive equipment.



# Travis Schullo

563.419.1848

schullofamilyfarms@gmail.com

515 Orchid Dr.

Dorchester, IA 52140

**Sources of Income:** Organic corn/soybeans, non-organic corn/soybeans, hay

**Economic Impact:** Reduced fertilizer expenses with livestock manure. Reduced fuel, labor and machinery expenses on no-till acres. Reduction in lost fertility that is captured and stored by cover crops. Diversification in income streams.

**Acres:** 1,000 organic, 800 non-organic

**Soil Health Practices:** No-till, minimal tillage, cover crops, interseeding, livestock integration.

## Background

Travis grew up working on his family's dairy farm in Wisconsin, helping build it to 900 cows and nearly 2000 acres of cropland. Then he had the opportunity to begin managing the cropping side of Dutch Charley Company, a diversified farm raising cattle as well as both organic and non-organic crops. Travis, encouraged by his boss, has

spent years experimenting with and trying new soil health management practices.

## Challenges Force Innovation

Faced with the intense slopes of Southeast Minnesota, Travis is forced to think critically about his farming practices. Poor management can and will result in extreme erosion, and this is unacceptable to him. For this

reason, he has focused on reducing tillage on his acres whenever possible. Many of their acres are harvested for cattle feed and have manure spread on them, so controlling compaction is a concern for Travis. However, he would love to get to a point where 100 percent of their acres can be no-tilled every year.

While compaction is a challenge associated with the livestock enterprise, the livestock



also provide significant opportunities. Because he has livestock on the farm, he is able to diversify his cropping rotation, adding both perennial and annual forage crops to the farm. Travis is then able to recycle those nutrients through an animal back on to the land in the form of manure.

In addition to the soil benefits the forage crops offer in carbon sequestration and reduced erosion, he is also able to be flexible in times like 2020, when neither organic nor non-organic crops look very profitable. In recent years with crop production profitability at historically low levels, they have shifted more and more acres to hay and other forages. This flexibility has made their farm more financially stable.

## Cover Crops and Minimal Tillage

Travis is a big believer in the benefits of cover crops. Although at times it can be a challenge to get a cover crop in before a freeze in the fall, he believes that even late-planted covers are valuable. They start early in the spring, building soil aggregates, sequestering carbon, covering the soil and stimulating life in the soil.



An additional benefit of the cover crops is nutrient storage. With all the manure put on the land from the livestock enterprise, Travis sees cover crops playing a vital role in capturing and holding nutrients in place over the winter.



In 2019 Travis tried a split trial where half the field had a cover crop and half did not. He said, "You literally could watch that corn on the cover crop grow ahead of the other stuff planted the same day. Same amount of nutrients, nothing else done differently."

An additional benefit of the cover crops is nutrient storage. With all

the manure put on the land from the livestock enterprise, Travis wants to make sure it stays there. Travis sees the cover crops playing a vital role in capturing and holding those nutrients in place over the winter and making them available for the cash crop the following year.

In 2020 Travis tried no-till for the first time and is already optimistic

about it. On the organic acres, he is focused on minimizing tillage as much as possible. He has experimented with harvesting rye and following with no-till corn, which is cultivated once during the summer. He has also tried a vertical tillage tool after rye harvest before corn.

## Observation and Analysis

Two of the most important tools in Travis's toolbox are observation and analysis. First, observing the challenges that his operation presents, such as compaction, steep slopes, and land base spread over four counties, and then analyzing how he can implement as many of the soil health principles as possible on as much of the land as possible given those specific challenges.

His goal over the next couple years is to begin to really understand each farm better. With a land base spread over such a vast area, the soil types, landscapes, and resources available on each of the farms are extremely different. He hopes that in the near future he can identify what each farm needs to operate most profitably while building maximum soil health.



# Myron Sylling

13845 Duck Creek Dr  
Spring Grove, MN 55974  
507.459.7792  
msylling@springgrove.coop

**Sources of Income:** Corn, soybeans, custom farming

**Economic Impact:** Elimination of labor, fuel and equipment costs related to tillage. Yields 20-25 percent higher than county average. Elimination of fungicide and pesticides. Reduced herbicides. Reduced fertility costs.

**Acres:** 1,300

**Soil Health Management Practices:** No-till, cover crops

## Background

Myron farms 1,300 acres with his brother Mikal near Spring Grove, Minn. Myron and his family have been farming for generations. He grew up milking cows but in 1987 when Myron graduated, his father, Karl, sold the dairy cows. His family continued raising small grains and hay for another ten years but in the late 90s they focused all their efforts on corn and

soybean production. Being located in the steep hill country of southeast Minnesota, Myron searched out ways to reduce erosion and that has led him to no-till, cover crops, and a focus on soil health.

## Focus on Technology

In 2012, Karl was ready to step back from management on the farming operation, and the farm was in good hands. The

experience and knowledge that Myron and Mikal brought into managing the operation complimented each other perfectly. Mikal was trained as a John Deere tech and had worked as a mechanic for them for years. Myron went to school for computer programming and had worked in this field for 12 years. In an industry so heavily dependent mechanical and computer based technology, their experience set them up to take



full advantage of these resources. On their first year running the farm, they did a full equipment line makeover, replacing the planter, combine, corn and bean head, as well as the sprayer. The new planter configuration allowed them to change how they applied products and also moved them from 38" to 30" rows. Prior to 2012 the Syllings best overall corn yield was 170 bushels. In 2012, with the new equipment and technology, they had an overall corn yield of 200 bushels.

## Soil Health Focus

The yield increase they saw as they learned how to utilize technology was significant, but not enough for them to stop trying to improve. That same year they signed up for a 3 year EQIP (Environmental Quality Incentives Program) contract to try cover crops. Year 1 was a dry fall and their attempt to ariel seed the cover crops was unsuccessful. However, on year 2 they began direct seeding and had so much success that by the end of the 3 year contract they were already planting covers on several hundred acres on their own. And by 2017, they were planting covers on 100% of their acres. Over 15 years of no-tilling they



Myron's early efforts at cover crops were so successful that by 2017 he had covers on 100 percent of his acres.

saw organic matter levels rise 0.5%, but in just three years of cover cropping they saw an increase of a full percent. After their 2012 yield jump, yields remained steady for another 2 years. But after creating the opportunity for the soil to heal itself through eliminating tillage, soil armor, and keeping living plants and roots on the soil surface for

longer, their yields have continued to improve. Today, Myron is seeing yields 20-25% higher than the county average for both corn and soybeans.

## Production vs. Profit

For Myron, it's not about chasing yield, although, his yields are well above average. It's about focusing on profit

per acre. Too often farmers chase the next product that will give them an extra bushel. Myron's software programs allow him to track all costs on a per acre, per product basis.

He isn't interested in a product that doesn't return him at least one dollar, or ideally two dollars per dollar invested. He also doesn't focus on getting bigger, when asked about expansion he said, "We have really focused on maximizing the profit on the land we have, so that if something else becomes available, we can quickly turn the yields around or raise the yields and maintain profitability on that."

The success they have seen cannot be attributed to one thing. Having a father open to new ideas and willing to share in the decision making with his sons prepared them for management. Mikal and Myron's work experience set them up well to take advantage of the technology the industry has to offer. Myron's search for information has gained him a better understanding of soil health. Close attention to detail and data has allowed them to test and try new things and quickly expand practices that they experience success with.





## Project Partners



**Southeast Regional Sustainable Development Partnership** works toward region-wide sustainability in southeast Minnesota. U. of M. 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. SERSDP is committed to bringing together people with diverse backgrounds and perspectives to jointly work on sustainability issues.

[extension.umn.edu/regional-partnerships/southeast](http://extension.umn.edu/regional-partnerships/southeast)



**The Sustainable Farming Association of Minnesota (SFA)** advances the sustainable agriculture principles of environmental stewardship, economic resilience and strong communities through farmer-to-farmer networking, education, innovation, research and outreach. For nearly a decade, SFA has led soil health education efforts through workshops, field days, webinars and farmer networking. "Agriculture, done well, heals" reflects the group's belief in the power of regenerative agriculture.

[www.sfa-mn.org](http://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 the University with the experience and insights of people and organizations who work with and have understanding of opportunities and issues across the landscape.

[cinram.umn.edu](http://cinram.umn.edu)