



Summer/Fall 2023

## Morton County Soil Conservation District

# Conservation News



## Area IV Farm Research: Carbon Farming

### Area IV Farm Research: Carbon Farming

Carbon farming has received a lot of attention lately. Generally, carbon farming refers to approaches to farming that increase the storage of carbon in plants and soil. These farming approaches are a win-win for agriculture and society: a 'win' for farmers since they are increasing their soil organic matter and overall productivity, and a 'win' for the climate since it reduces carbon dioxide in the air.

I wish it was that simple.

Most cropland soils in the northern Plains have the capacity to store additional carbon. This is because conventional farming practices over time have contributed to more carbon losses (outputs, in **red**) than carbon gains (inputs, in **black**) (Fig. 1). We have, in essence, been farming carbon instead of carbon farming with our conventional practices.

### Carbon Outputs > Carbon Inputs

- Grain, Meat, Milk, etc.
- Residue
- Erosion
- Efflux/Emission ( $\text{CO}_2$ ,  $\text{CH}_4$ )
- Leaching
- Roots/Rhizodeposits
- Residue
- Amendments
- Deposition

Figure 1. Categories of carbon inputs and outputs for agricultural production systems.

Turning the equation around so that carbon gains exceed carbon losses is possible with management. Reducing soil disturbance, maintaining soil cover, increasing the duration of living roots, and adding carbon-rich amendments to the soil are all management strategies that can increase soil carbon.

If you follow soil health principles in your operation, these strategies should be familiar. Over time, they improve the capacity of the soil to take up water and withstand drought, while enhancing soil biology.

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Simply put -- the improvements that lead to carbon farming can prepare soil to handle weather extremes while boosting fertility.

While regenerative practices can increase carbon and improve soil health, what is less clear is whether these practices have a meaningful benefit to the climate. There are many sources of greenhouse gases from agricultural production systems including carbon dioxide, methane, and nitrous oxide.

Carbon dioxide can be taken up by plants and stored in the soil, but it is also emitted during field operations and when inputs like seed, fertilizers, and herbicides are produced.

Because our soils in the northern Plains are frequently dry, cropping systems typically take up a small amount of methane. Nitrous oxide emissions, however, can be significant depending on the amount of available nitrogen in the soil.


When considered together, fluxes of greenhouse gases from cropping systems tell an interesting story.


As shown in the table below, an annually cropped, no-tillage cropping system at the Northern Great Plains Research Laboratory (NGPRL) increased soil carbon but was a net source of greenhouse gases.

## NGPRL Cropping Systems Evaluation

Factor	Annual Cropping, No-tillage lb CO <sub>2</sub> equiv. ac <sup>-1</sup> yr <sup>-1</sup>
Seed production	60
Fertilizer production	124
Pesticide production	54
Field operations	74
Soil carbon change	-1037
Methane flux	-29
Nitrous oxide flux	934
<b>SUM OF FACTORS</b>	<b>179</b>

\* Negative numbers imply CO<sub>2</sub>equiv. gain (black) Positive number imply CO<sub>2</sub>equiv. loss (red).  
From Liebig et al. (2021).

Increasing Soil Carbon 

Net Greenhouse Gas Source 

Other evaluations at NGPRL have found similar results (soil carbon gain, but a net emitter of greenhouse gases). This suggests that carbon farming for our region is still a win by making our soils more fertile and resilient to stress, but we still have a way to go in achieving the second 'win' related to a net reduction in greenhouse gases.

I told you it wasn't simple, but we are working on it.

Research continues at the Area IV SCD Cooperative Research Farm to design cropping systems that are both good for soil health and good for the climate. Cover crops, perennial grass strips, and intercropping are practices currently under evaluation, and are sure to provide interesting stories as the data become available.

Additional information about the greenhouse gas evaluation shared in this article can be found at <https://doi.org/10.1007/s10705-021-10150-9>

-Mark Liebig  
Research Soil Scientist  
USDA Agricultural Research Service (ARS)  
PO Box 459  
1701 10th Ave SW  
Mandan, ND 58554-0459

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Area IV Soil Conservation Districts\*

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Northern Great Plains Research Laboratory

Developing Sustainable Food production Systems

- ✓Long-Term Agro-Ecosystem Research
- ✓Carbon and Nitrogen Cycling
- ✓Dynamic Cropping Systems
- ✓Production Economics
- ✓Water Use Efficiency
- ✓Cover Crops
- ✓Soil Quality

\*McIntosh County SCD, Burleigh County SCD, Oliver County SCD, West McLean County SCD, Stutsman County SCD, Emmons County SCD, Sheridan County SCD, Morton County SCD, Cedar SCD, Kidder County SCD, South McLean County SCD, & Logan County SCD

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# Gather Around the Table

A recipe from our District Clerk, Malissa McKee

*My FAVORITE summer recipes have always included a mixture of fresh berries. Not only are they delicious, but nature gives the best colors! This is just one of these great recipes to showcase these flavors. —Malissa*

## Red White & Blueberry Pie Bars

### *Crust & Topping:*

1 1/2 c All purpose flour  
3/4 c Granulated Sugar  
3/4 Cold Butter, Cubed  
Pinch Salt

### *Filling:*

2 Eggs  
1 c Sugar  
1/2 c Sour Cream  
Pinch Salt  
2 c Fresh Blueberries  
2 c Fresh Raspberries  
White Chocolate melting chocolates



Grease a 9x13 glass baking dish and set aside. Preheat oven to 350 degrees.

Prepare the crust and topping by adding the flour, sugar, butter and salt to a mixing bowl. Beat until combined and crumbly. Take one cup of the mixture and set aside. Take the remaining mixture and firmly press into an even layer in the bottom of the baking dish. Bake for 15 minutes.

While the crust is baking, whisk the eggs in a large bowl. Add the sugar, sour cream, flour and salt. Mix. Gently fold in the berries and then set the mixture aside.

When the crust is ready, remove from oven and gently spoon in the filling over the top of the crust. Sprinkle the remaining crust mixture that was set aside over the top, as crumbs. No need for it all to cover or be spread out.

Bake for 45 minutes to an hour or until the top is lightly browned. If the bottom is getting too brown, you can remove and broil the top for a couple of minutes to brown the top.

Cool on a wire rack before adding the white chocolate.

Once cooled, melt your white chocolate melting chocolates in a microwave safe bowl in the microwave in 30 second intervals until melted. Drizzle over the top of the bars before cutting them. Makes approximately 20 bars.

Enjoy!

Recipe courtesy of Kleinworthco.com



# Tree of the quarter—Common Lilac (*Syringa vulgaris*)

The common lilac is a medium to large hardy shrub with a cold hardiness to USDA zone 2. It is drought tolerant, does not withstand ponding, and requires full sun. This shrub adapts to a wide variety of soils with a soil pH of 5.5 –8.0.

The common lilac is used for farmstead windbreaks, highway beautification, and occasionally in field windbreaks. The shrubs are good for shelter, shrub borders, massing in parks and screen plantings. There is little value for wildlife as no fruit. May be of value for nesting by birds, however.

The flower color is white to purple, with a variety of colors. The crown height is 8-12 feet, crown width of 6-12 feet. The root system is shallow and dense. The bark is green-brown when young and older bark is gray-brown.

-source, NDSU/ND Forest Service  
Tree information Center



**District Technician, Ethan Gress**  
**(reported via Malissa McKee, District Clerk)**

Ethan and our tree crew, Tayte and Kyler, have been busy with tree planting and fabric application! These gentlemen have been routinely working 10-12 hour days, so if you see them in the field, be sure to thank them for the hard work!

The tree crew started with the SCD this season on May 15 and 22nd respectively. Tayte assisted with the hand plant pick up on May 19th, which we greatly appreciated.

Tree planting began on May 22nd and concluded on June 9. The surplus sale was held in Glen Ullin on June 16 with great attendance. Customers came from not only Morton County, but also surrounding counties to purchase trees. Thank you to everyone that attended!

As this was our first year as a staff for a tree season, we are learning processes as we go and where to improve for next year. We sincerely appreciate your patience, as well as constructive criticism this year. We as staff and board members all want to do the best we can in all work that we put forth.

Fabric application began on June 21 and we are hoping to have this completed by the end of July. Mother nature has given us a few curve balls, with some much needed rain at the beginning of July. This did slow down the fabric application process initially, however, full speed ahead as the month rolls on!



***Strange North Dakota laws....***

- \* It is illegal to keep an elk in a sandbox in your backyard.
- \* Operators of underground coal mines in ND must provide an 'adequate supply' of toilet paper for each toilet
- \* It is illegal to swim naked in the Red River between 8 am and 8 pm
- \* It is illegal to go dancing while wearing a hat in Fargo
- \* Beer and pretzels can not be served together in any North Dakota bar or restaurant
- \* It is illegal to lie down and fall asleep with your shoes on in North Dakota

***Interesting tidbits about our state....***

- \* North Dakota grows more sunflowers than any other state
- \* Most of the pasta in America is made from North Dakota durum wheat
- \* Dakota is the Sioux word for 'friend' or 'ally'
- \* With a population of 3, Ruso is the smallest city in North Dakota



## Water quality and Livestock Performance

-Watershed Coordinator, Chance Porsborg

### WATER QUALITY



Howdy everyone! From wearing three layers of Carhartt's and shoveling snow every day to now having haying season, this year seems to be moving as fast as ever. As we are moving so rapidly, it is important to keep in mind the opportunities at hand to continue to improve our water quality, not just for ourselves but also for our livestock. As the watershed coordinator, it is my job to help inform the producers of Morton County about the cost share opportunities available to help improve water quality and implement best management practices on their operation. Through the Morton County Soil Conservation District and the 319-grant program, there are a multitude of possible practices that can address the water quality concerns, as well as any other resource concerns producers have on their operation.

The Big Muddy Watershed, once the Danzig Dam and Hailstone Creek water shed, spans across western Morton County, has a 60%/40% cost share opportunity for any producer within the watershed to help them implement best management practices (BMP's). The BMPs vary from something as simple as cross fencing to help utilize other parts of pastures for a rotational grazing practice, to practices as complex as streambank renovation and manure/ waste management systems. There is also cost share for buffer/ filter strips, cover crop, and native plantings to help reduce sediment and excess nutrient deposit into the watershed. These are just some of the many options available to the producers within the Big Muddy watershed.

But one may ask, "Why does this matter?" Water quality has a large impact on both our lives and our livestock. Our livestock's overall health and nutrition is always on the forefront of our minds and something as simple as water can affect that. Based on a study from Ohio State University, clean drinking water alone can help improve dairy cattle's milk production by an additional two to five pounds per day. In another study that was done in Alberta Canada, it showed that animals that had clean water to drink had an additional ½ a pound a day gain, in comparison to those that had dirty/ muddy water had reduced or negative effects on their gains.

Nutrition is another factor that plays a huge role in rate of gains, milk production, and overall health to our livestock. Cross fencing is a great way to get more nutrition and utilization from the pasture. A study from Missouri shows that keeping livestock within 800 feet of water can increase the carrying capacity of a 160-acre pasture by up to 14%. A similar study from Wyoming was conducted on rangeland. The results showed that 77% of the grazing was done within 1,200 feet from the water source, and approximately 65% of the pasture that was more than 2,400 feet from water but only supported 12% of the grazing in the pasture. The utilization of a combination of cross fencing, a "watering system", and a rotational grazing system can help not just the health and well being of the livestock, but also the water quality and the pasture/ rangeland they are on.

[Water effects on livestock performance – Ohio Ag Net | Ohio's Country Journal \(ocj.com\)](#)



**Sheep Fact:** The heaviest fleece ever recorded after shearing was an astounding 41.1 kilograms or 90.6 pounds! Recorded in 2015 from Australia.





## *Spotlight ~*

*New employee with our partner,  
USDA—ARS Northern Great Plains  
Research Laboratory*

My name is Dr. Claire Friedrichsen. I am the newest scientist hired at USDA-ARS Northern Great Plains Research Laboratory. I am a research social scientist, a relatively new job position within USDA-ARS since there are only three with this title in the agency. I work to bridge the gap between human behavior and soil management.

My areas of research focus are :

- (1) well-being as part of the social sustainability of
- (2) agriculture,
- (3) food agency, and
- (4) increasing access to culturally significant foods.

In general, I research individual behavior changes in the food system. I am grateful to join the team here at NGPRL and push our research toward transdisciplinary.

I am originally from Nebraska. My mother's family owns a corn, soybean, and cattle operation of 1,800 acres in northeast Nebraska, just east of the sandhills. My strong connection to my family farm has propelled my interest to contribute to agriculture. My own agricultural experience has mostly been with small-scale horticulture.

I moved to Mandan last August from Idaho. I bought a small house and adopted a small brindled chihuahua mutt named Isabelle. Before becoming a social scientist, I was briefly a baker in Belgium!

I love to cook, travel, backpack, and eat good food. I have taken advantage of the 70-degree days the last couple of weeks to explore Teddy Roosevelt NP.

This winter, I interviewed producers who are alums of three different agricultural leadership programs that include an international travel component as part of the leadership program. The research aims to understand the impact of foreign travel on adopting sustainable agricultural practices.

**Welcome Dr. Claire to the Mandan/Morton County community!**

**Our community should be exceptionally proud to have one of the three in this research role right here in Mandan, ND!**

Morton County Soil Conservation District  
2540 Overlook Lane  
Mandan, ND 58554-1593  
[www.mcscd.com](http://www.mcscd.com)  
Phone: 701-667-1163 ext. 3

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■ Dakota Community Bank	ND Farm Bureau	

### UPCOMING EVENTS:

MCSCD Board meeting are generally the 2nd Thursday of the month & are open to the public.  
Check Facebook for dates and time.

**July:** 10th—Big Muddy Grazing Show, Glen Ullin Parish Community Center  
15-19th—National NACD Summer meeting, Bismarck Hotel & Conference Center  
20th—Friends & Neighbors Day, Northern Great Plains Research Laboratory, Mandan

**August:** 10th—Crops, Covers, and Cows, Menoken Farm

### SUPERVISORS:

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ROCKY BATEMAN  
RICHARD TOKACH  
STEVE TOMAC  
THOMAS OSTERBAUER  
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### FARM BILL SPECIALIST