South Dakota Soil Health Coalition

Soil Visions

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Playing the Course: Farmer Manages Variety and Builds Resilience Through Soil Health

By Stan Wise

South Dakota is known for its variety, and Don Nickelson's operation in Frederick is no exception.

With the help of his wife, Trista, and sons Aiden, Gavin, and Ian, Nickelson raises cattle and also grows corn, soybeans, oats, triticale and alfalfa in addition to some cover crops. His farm also varies in the amount of moisture it receives. His land to the west of U.S. Highway 281 tends to be drier and more suited for cattle while his land to the

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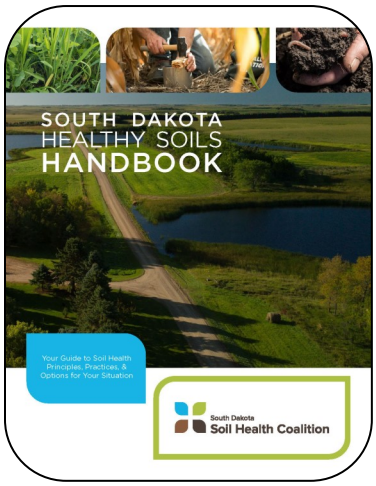
South Dakota Healthy Soils Handbook Now Available



If you want to learn more about soil and find advice on how to implement good soil health practices, the new South Dakota Healthy Soils Handbook is just what you need.

The book covers the five principles of soil health: Soil cover, limited disturbance, diversity, living roots, and integrating livestock. The book dives deep on each principle, explaining concepts and offering details on how to integrate each principle into your operation.

Want to know what's living beneath your soil and how it is affecting your crops and pasture? Want to know how the diversity of life above ground affects life below ground? Want to know how much residue should be left on your fields? Want practical advice for seeding a cover crop mix? This handbook is an excellent resource to get answers to your soil health questions.

To get your copy of the book, contact any South Dakota Soil Health Coalition staff member or director or contact your local NRCS office.

The book is also available for viewing and downloading online at www.sdsoilhealthcoalition.org/sd-healthy-soils-handbook/.

Decades of Erosion Take Their Toll

A recent excavation project through a low hill on Twin Brooks farmer David Kruger's land revealed what decades of erosion had wrought prior to the land being farmed no-till — the topsoil had slumped downhill.

Read the article on Page 4 to learn more.

2020 Soil Health School Was A Success!

A class of 30 participants gathered Aug. 31 - Sept. 2 in Mitchell, SD, for the 2020 Soil Health School. They learned about soil structure and soil health management practices from an array of soil experts, researchers and producers.

Mornings were devoted to presentations at the Highland Conference Center. There were detailed sessions on goal setting, soil basics, soil health concepts, agronomics, salinity, crop diversity, beneficial insects, cover crops, soil microbiology, temporary fencing, carbon management, poly cropping, planting and harvesting equipment, and the economics of soil health.

Afternoon sessions were conducted in the field at nearby Edinger Brothers Farm and Stehly Farm. These sessions covered weed management, cover crop mixes, livestock integration, cover crop grazing, manure management, water infiltration and slump tests, a soil pit examination, mobile soil apps, a rainfall simulator, and the famous "tightey whitey" demonstration.

Presenters included Soil Health Coalition Board members, SDSU Extension specialists, NRCS soil scientists and specialists, crop consultants, independent and university researchers, and producers.

Participants returned to the Highland Conference Center in the evenings for dinner and panel discussions with Soil Health Coalition Board members. These insightful sessions allowed participants to ask questions and get answers from people already working to include soil health management practices in their operations. It was an excellent learning opportunity!

Key takeaways from the school included:

- Set goals – The details of your soil health management practices will be determined by your goals.
- Start small – Conduct tests before implementing a new practice across your entire operation.
- It takes time – The benefits of good soil health management practices aren't going to fully manifest themselves in the first year. As you build the health of your soil over time, you will reap more rewards.

This year's Soil Health School was the culmination of the work and cooperation of the Edinger and Stehly farming families who hosted the school, South Dakota Soil Health Coalition board members and staff, Natural Resources Conservation Service, SDSU Extension, the South Dakota Grassland Coalition, and many speakers and volunteers. A huge thank you goes out to everyone who supported the school!

Membership Minute: Darin and Jessica Michalski

Darin and Jessica Michalski operate Michalski Cattle near Willow Lake. In addition to their Angus and Simmental cross cow-calf operation, they raise corn, soybeans, oats, rye, and millet. They also grow cover crops both season-long and after their cash crops.

The Michalskis use a variety of practices to improve their soil health. In 1996 they started rotating pastures. They went strictly no-till seven years ago, and they have been growing cover crops for eight years. This year they planted about a third of their land to cover crops after prevented planting or after the removal of a cash crop.

The Michalskis' cattle are rotating to a predominantly smooth bromegrass pasture that is being grazed for the first time in 2020. In the background, the deep green can be seen that still exists this time of year on their big bluestem, sideoats grama pasture interseeded with red clover, hairy vetch and birdsfoot trefoil.

Darin offered an example of how these practices are paying off. "Three years ago, I took my oats off and planted a cover crop," he said. "I didn't have a great stand, but I kicked my cows in there. That's been the first field I've been able to get into for the past two years."

Darin said he decided to pursue soil health because he could see it was the way to go for the future of sustainability, and he's intrigued by the idea of being able to cut back on synthetic fertilizers. "It would be good to get the most off every acre we have without having to go rent a bunch more."

"The ultimate goal," Jessica said, "is to improve soil health on both our grazing land and crop land and have our son return to a more profitable operation."

State Merging Agriculture and Environment and Natural Resources Departments

The South Dakota Departments of Agriculture and Environment & Natural Resources will merge to form the streamlined South Dakota Department of Agriculture and Natural Resources.

Hunter Roberts

Hunter Roberts, the current Secretary of Environment and Natural Resources, will be tapped to oversee the new department. Until the merger is complete, Roberts will serve as interim Secretary of Agriculture while continuing to also lead the Department of Environment and Natural Resources.

"Agriculture is our number one industry, and under Secretary Roberts' leadership, this department will serve our producers better than ever before," said Gov. Noem.

Roberts is an owner and operator of the Roberts Ranch in Stanley and Lyman counties. He has worked in the Governor's Office of Economic Development as state energy director and as a policy advisor for Governor Daugaard working on agricultural policy and overseeing the South Dakota Department of Agriculture. It is worth noting that Roberts' grandfather, Clint Roberts, served as SD Secretary of Agriculture from 1979-80 during the first Janklow administration.

"I've worked in agriculture my entire life, and I am excited to lead this department," said Secretary Roberts. "South Dakotans know that farmers and ranchers are the best conservationists, and this department will promote our number one industry while we simultaneously protect our natural resources."

South Dakota Added to Cover Crop Decision Tool

The Midwest Cover Crop Council has added South Dakota and North Dakota to its Cover Crop Decision Tool.

To use the tool producers just need to input their state, county, cash crop planting and harvest date, field drainage conditions and goals for the cover crop, and the tool will give them a range of cover crop species to fit their needs.

Visit http://mccc.msu.edu/covercroptool/ to use the tool.

Upcoming Soil Health Events

September 21
Low Stress Livestock Handling Workshop
Sturgis, SD

September 22
Low Stress Livestock Handling Workshop
Belvidere, SD

September 23
Low Stress Livestock Handling Workshop
Akaska, SD

September 24
Cover Crops: Incorporating Them In Your Operation
White River, SD

September 24
Low Stress Livestock Handling Workshop
Crooks, SD

September 25
Low Stress Livestock Handling Workshop
Yankton, SD

September 29
Tour of Blair Ranch
SD Leopold Conservation Award Winner
Vale, SD

October 5
Rangeland and Soil Health Tour featuring Shawn Freeland and Steve Campbell
Caputa, SD

October 6
Rangeland and Soil Health Tour featuring Jim Faulstich's Daybreak Ranch
Highmore, SD

January 6-7
2021 Soil Health Conference
Pierre, SD

Access Our Events Calendar HERE.

Farmer Discovers Stark Evidence of Past Erosion

By Stan Wise

As a kid, Twin Brooks farmer David Kruger watched his grandfather fight erosion using a very hands-on method.

"I remember him going to the ditch along Highway 12 and hauling the dirt out of the ditch and back onto the field with a loader," Kruger said.

That was a powerful memory, but Kruger wasn't thinking about erosion when he first learned about no-till farming practices years later as a student at Lake Area Technical Institute, now named Lake Area Technical College.

Instead, he was thinking about moisture and long days of picking rocks.

"It kind of caught my attention because we were always on the dry side, always short of moisture and always picking rock," Kruger said. "I thought, if we could keep the moisture in the ground and the rocks in the ground, it might be worth a try."

So Kruger began no-till farming with a small portion of his ground in 1993, and he slowly added more acres to that program over the next five years.

At first, Kruger's grandfather wasn't too impressed with Kruger's no-till efforts, but a few years later while visiting a corn field, the elder farmer told his grandson, "If you can keep doing this, getting this kind of yield while keeping the dirt from blowing, you might be on to something."

Recently, Kruger got a stark visual reminder of the erosion his grandfather was talking about. When a neighboring field that Kruger rents was tiled, he excavated a trench through his own land to run a pipe downhill to remove the water.

Though the hill has a relatively gentle slope of approximately 7%, the trench revealed startling differences between the soil at the top of the hill and the soil at the bottom.

At the top of the hill, there are 3-4 inches of topsoil left. At the bottom of the hill, there are several feet of dark, rich soil beneath the surface. Most of the topsoil from the top of the ridge had eroded down the slope, toward the creek that runs through Kruger's land.

It was a surprising discovery because the field had been farmed using no-till practices since 1997. Since 2004, it has had a three-crop rotation of corn, soybeans and wheat, and it was planted with a cover crop every third year after wheat since 2010. These are all good soil health management practices.

So why had there been so much erosion?

What Kruger saw was part of the legacy of conventional farming over the course of the last century.

For decades prior to 1997, the field had been farmed conventionally, meaning the ground was tilled multiple times each season.

Soil scientists now understand that tillage has a negative effect on soil function, including reducing organic matter and destroying the kind of structure that allows water to infiltrate the soil and remain available to plants. However, it has long been known that tillage also greatly increases the rate of soil erosion.

"The process of tillage erosion is that every time you lift the soil, some of it slumps downhill," said Sharon Schneider, U.S. Department of Agriculture Agricultural Research Service supervisory soil scientist in Brookings, SD.

For much of the last century, some level of tillage erosion was unavoidable. Schneider explained that farmers were feeding the country with the best technology and management practices available to them, but there were consequences to our nation's farmland.

Farmer David Kruger examines some of the topsoil that has eroded from the top of his hill.

The erosion on Kruger's hill is not singular.

"This would be extremely common," Schneider said. "We can see it clearly in this excavated trench, but the effects of erosion are present even where you can't see it as clearly. We're dealing with landscapes that have been farmed for more than a hundred years. This is what happens."

Craig Veldkamp, USDA Natural Resources Conservation Service soil scientist in Brookings, said that Kruger's no-till practices have likely kept the erosion on his hill from becoming much worse. In fact, he has seen more extreme cases of erosion where "you can start seeing lighter soils on the top of hills."

"The soil is this light color at the top of the hill," Schneider explained, "because the high organic material has been removed, and subsoil material is incorporated into the tilled layer. In extreme cases you're farming the subsoil."

With the topsoil gone and the subsoil exposed, farmers will see significant yield losses in those eroded areas.

After seeing the erosion in the trench on his land, Kruger didn't recall any major differences in his crops between the top of the hill and the bottom. However, in the last few years, he had begun using yield maps, so he looked back at the yields for his soybeans last year.

The map showed the hill winding along for half a mile with yields on the ridge 12 to 15 bushels per acre lower than the yields on both sides of the ridge where the topsoil is still in place.

If not for Kruger's good soil conservation practices, the differences would likely have been worse.

"From '97 on, it's been farmed in a manner that's definitely helped," he said. "We could have easily lost another 3-4 inches of topsoil off that ridge."

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Playing the Course — Continued from page 1

east receives more moisture.

How does Nickelson manage all this variety under such diverse conditions?

"Golfers say, 'Play the course, don't let the course play you,'" Nickelson said. "You got to look at how the ground is and what kind of grasses are there and what you can do with it. Each area is managed differently, just like in my crop ground each zone is managed differently."

That kind of focused approach requires efficiency of labor, and Nickelson decided to achieve that when he returned home to the farm after college. It was just him and his stepfather working on the farm, and no-till practices seemed like they would require less work.

"It seemed like an easier avenue to go. You know, less tillage, less work," Nickelson said. "So it started out as labor saving, and then I started seeing benefits to the soil and doing less work and still keeping up yield-wise with the neighbors."

With this success, Nickelson started using modern technology to help him expand his focus on soil management. "I use a lot of precision stuff in my cash crops," he said. "So I started using that to identify the poor-producing areas and then zeroing in on what those spots need and how to do it."

Some of those spots have soils with high salinity.

"In our area there are a lot of potholes," Nickelson said. "So with excessive water, ponding and ditch effect, saline areas start popping up and expanding if they aren't cared for or treated differently than the rest of your crops."

One of the ways Nickelson addresses those areas of concern is with the use of cattle and bale grazing.

Bale grazing involves setting hay bales out in a grid and giving cattle access to only a few bales at a time, concentrating cattle around those few bales. This strategy can reduce the labor needed to feed livestock, and the added nutrients from the cattle's manure and leftover hay can improve the health of the soil.

"After doing it the first year, you get the cover, which I believe the cover helps eliminate some of that evaporation," Nickelson said. "It keeps the soil moisture rather than drying out and bringing all those salts to the top and then wicking moisture from other areas and pulling up more salts. It's part of the healing process."

The Nickelsons also use rotational grazing to improve the health of their pastures.

By integrating crops and livestock and focusing on improving soil health, Nickelson said he has improved the resilience of his operation. "There's challenges every year, and every year is a different challenge," he said. "And what I've found in my soils, in building the organic matter and having better soil health, allows me to weather through whichever weather storm I'm faced with."

Nickelson credits his stepfather for the mindset that encouraged him to implement these sustainable ag practices. "My stepfather gave me a lot of freedom that way, and that's helped me going forward," he said. "I remember him always telling me, 'Do what you think is best.' That's what I hope to pass along to my sons."

Erosion — Continued from page 4

That's a point Schneider stresses about the erosion caused by decades of conventional tillage.

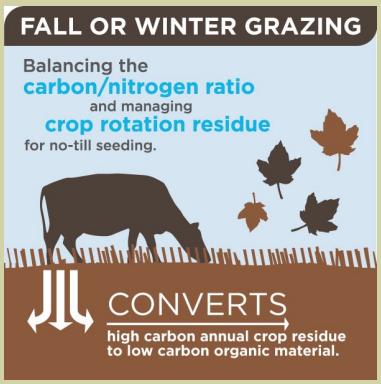
"It's too late to prevent this from happening," she said, "but it's not too late to respond to it."

Good soil conservation practices can drastically reduce the rate of erosion and can help build the resiliency and fertility of soil. Producers who would like help designing a soil health plan for their operations should contact their local NRCS office or the South Dakota Soil Health Coalition.

"Don't wait to see light colored soil or subsoil on top of your hills before you start some erosion control," Veldkamp said. "Just stick a probe in the ground and see where you are."

The side of a trench excavated through Twin Brooks farmer David Kruger's hill reveals the effects of soil erosion. Over decades of conventional tillage, the dark topsoil eroded from the top of the slope on the right and accumulated at the bottom of the slope on the left.

Find and Secure Your Fall and Winter Grazing Resources



Crop residue and cover crop biomass can make for excellent livestock forage, and integrating livestock on your crop ground is a key component of building soil health and operational sustainability.

What if you have cattle but no crop ground on which to graze them? What if you have cover crops to graze but no livestock? What if you're just in search of pasture for your livestock?

The South Dakota Grazing Exchange website could have the solution to your problem. The website was created to connect livestock producers and those with available cropland or forage to graze by using an interactive map while providing important resources.

You can search the website for grazing and livestock resources near you, or you can create an account and list the livestock or forage resources you have available. This website will help you form the relationships and discover the resources you need to improve your soil and your bottom line.

To get started, visit www.sdgrazingexchange.com.

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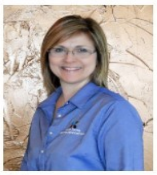
Here To Assist You In Whatever Way Possible

SD Soil Health Coalition staff members are still hard at work advancing the message and application of soil health and we want to hear from you!

Although we may not be able to visit in the normal manner at the moment, contact us to set up a phone call, video meeting, or socially distanced farm or ranch visit. We are eager to answer any questions you may have and to continue to provide you with any technical or educational resources that may assist you in improving your soil health.

Several new programming initiatives we are working to implement, in order to stay connected with you include: Instagram "Story Highlights" to follow each of our experimental plots, live video updates with our Soil Health Technicians out in the field, as well as the promotion of virtual events and educational webinars.

Visit our Calendar of Events or social media accounts regularly to see when these are scheduled to occur!



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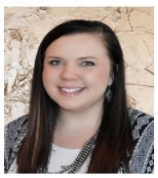

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