South Dakota Soil Health Coalition
10 Years & Growing

Soil Visions

Volume: 11 Issue 2

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Regenerative Ag Offers Hope in a Tough Year

By Stan Wise

Every year has its challenges for farmers, and 2026 is shaping up to have more than its fair share. Between depressed commodity prices, skyrocketing input costs, and the specter of drought, farmers are looking for novel ways to make the bottom line show up in black ink.

Thankfully, there's some good news for producers employing regenerative agriculture practices and maximizing biodiversity on their landscape. Thinking beyond a simple corn and soybean crop sequence allows them to capitalize on additional revenue streams and input cost reductions.



Cattle graze a forage cover crop mix seeded into a switchgrass establishment **at Dakota Lakes Research Farm near Pierre, SD.** Dakota Lakes Research Farm photo

"Extending rotations and including more crops on a more consistent basis can help with challenging years like this," Dakota Lakes Research Farm Manager Natalie Sturm said. "We found that our wheat or our corn in these longer rotations, its yields tend to be a little bit more stable even in the challenging years because we have that good rotation that includes small grains and other broadleaves besides soybeans."

Sturm started as the new manager of the Dakota Lakes Research Farm near Pierre, SD in January. She conducted research for her master's degree at the farm before going on to complete her doctorate in soil science at Washington State University.

Dakota Lakes has been researching conservation land management since the 1980s while prioritizing the farm's enterprise profitability as a goal to fund that research. Sturm said that adding diversity to the operation is one of the keys to reaping the financial benefits of regenerative ag practices.

"The more you can lengthen a rotation and add some additional crops in, we've shown that, over time, that can really help boost yields on those really important crops like corn and soybeans," she said. "We really have to balance having enough high biomass, high residue crops to get all those soil health benefits. That's where we're really seeing improved water infiltration and storage, really good soil structure, good fertility, and things like that. But we can't just grow solely corn or solely wheat even though those

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Saline and sodic soil acres are spreading in South Dakota. Identifying and tracking them can help in management decisions.

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are high residue crops. You need some of that diversity in there for the yield benefit and kind of spreading out labor. So, what I found is having that balance of two-thirds to 75 percent high residue crops in your rotation and then adding in those broadleaves for that diversity. That's what we found here at Dakota Lakes. Those tend to be our best rotations from a soil health and yields perspective."

Consider forage

There's more to biodiversity than adding new crops to a rotation.

"We talk about diversity a lot with crops, but it's always good to have the diversity with the animals, too," Sturm said.

Grazing livestock on cropland or growing a forage cover crop is a way producers can add another revenue stream while improving soil health at the same time.

"Cattle markets are kind of hot right now. So maybe there's some opportunity to grow warm season forage," Sturm said. "And if you've got a neighbor or somebody with cows that need grazing in July and August, having some warm season forage could be kind of a flexible option."

Farmers who would like to grow forage but don't have cattle can make use of the South Dakota Grazing Exchange (www.sdgrazingexchange.com), a free resource that allows landowners with available forage to connect with nearby livestock producers and form private grazing agreements.

Diversity pays

Frankfort, SD, producer Brian Johnson knows the benefits of raising livestock in addition to growing cash crops.

"Diversification is always helpful, and I think it's key to a lot of producers being profitable long term. We're fortunate that we're able to take advantage of the market with the cattle that have been high for over a year or two now. It makes producing cattle, I think, more enjoyable because we're getting paid probably what they're worth," Johnson said. "We're using our grass acres to graze the cattle as well as some cover crop acres. And so, with the cattle market being hot and the grains maybe being closer to normal, we're able to take advantage of that run up in the cattle market and get more for our work."

Johnson and his family have been improving their soil health and profitability through regenerative ag practices for decades. His family reduces fuel costs through no-till farming and reaps the benefits of healthy soil to reduce other input costs.

"We have been fortunate through our use of cover crops that our use of commercial fertilizer is less than probably the average producer," Johnson said. "We have significantly cut back on our application of phosphorus and potash in the last six years to where we are mostly just applying nitrogen and ammonium sulfate in-season for our corn. So, our break evens and our profitability have improved dramatically."

Johnson's cover crops do more than improve his soil fertility. They also provide another revenue stream.

"For us, the cover crops have added an opportunity for some very cheap feed for the cattle. And not only is it cheap, but it's nutritious," Johnson said. "And so, it goes beyond the soil health benefits, and we can get the cattle out on the cropland, where they can spread the manure themselves instead of us having to hire or use our own manure spreaders, if they were confined to a feedlot."

Johnson likes to plant cover crops behind small grains. Including small grains like wheat or oats in his rotation helps break up the weed cycle, he said, and since they are harvested earlier in year, they allow more time for a following cover crop to grow before winter.



Frankfort, SD, producer Brian Johnson aerially seeds rye into his standing corn in August. By mid-October, the rye is green and growing amid his harvested corn stalks. The mixture of rye and corn crop residue is an inexpensive source of forage for Johnson's cattle. Courtesy photo

"Behind a small grain, we'll plant a grazing cover crop mix that has a diverse blend of different species, usually six plus species in that mix. We planted that last year behind our oats. It was good forage value," Johnson said. "We graze our corn crop residue. We just string electric fence around it for borders, and there's a water tank, usually within three-quarters of a mile for them to access. Included in that corn residue is our cereal rye cover crop that we fly on every August."

Building resilience

Johnson's regenerative ag practices have improved his soil which makes it easier for his operation to survive droughts.

We've noticed that we're very good at retaining the moisture that we receive, and we can hold on to it for a long time in a drought year," he said. "We've actually noticed that our farm does better in drought years than it does in years where we receive excessive moisture. It has to be a pretty significant drought for us to start seeing the impacts of that."

Sturm has some advice for farmers who are nervous to try some new practices to improve their operations.

"You don't have to plant your whole section to a new crop or forage. It's okay to start small," she said. "If you're nervous about things, just try it out on a small area that you can commit to, really try to make it work, and see what happens ."

To learn more about assistance for adopting conservation land management practices, visit the local Natural Resources Conservation Service office. To learn more about the benefits of regenerative agriculture, contact the South Dakota Soil Health Coalition at 605-280-4190 or sdsoilhealth@gmail.com or visit www.sdsoilhealthcoalition.org.

Membership Minute: Ryan Beer

Ryan Beer graduated from South Dakota State University with a degree in rangeland science and worked with the Natural Resources Conservation Service for almost 34 years. He mainly worked with producers in wester South Dakota on a variety of conservation and soil health issues. His focus has been on grazing management and how to improve species diversity, utilization, and plant and soil health. He also has experience with cover crops, no-till farming, and reestablishing perennial vegetation.



Ryan Beer. Courtesy photo

Ryan and his wife, Jackie, have raised their five kids in Lemmon, SD. His oldest daughter is living in California. His second oldest and her husband ranch north of Beach, ND, and have 2 children. His youngest daughter (and fourth oldest child) is a math teacher in New England, ND, but would like to get back to Lemmon and loves to help on the ranch. His two sons (the third and fifth oldest children) are around Lemmon, both ranching and working at different jobs in town.

Ryan and his family ranch around the Lemmon area. They practice the five principles of soil health on their operation and continue to look for ways to improve. After years of cash crop farming, they made the decision to concentrate on cattle and forages.

Ryan is very passionate about soil health and conservation and is looking forward to working as a soil health specialist for the South Dakota Soil Health Coalition and bringing information to producers and consumers.

Ryan and his brother bought their first no-till drill in the early 90s, and Ryan has been no-till farming ever since. He started planting cover crops about 20 years ago and still uses them in his operation. He has also done some form of rotational grazing, starting at two or three pastures to around 50 pastures, and he plans to divide them up more. His goal is to do one-day or two-day livestock moves. He implemented bale grazing about 4 years ago and is very happy with it.

Ryan and his family are seeing changes in native species with the higher intensity grazing. They are reducing bluegrass, brome, and crested wheatgrass and have noticed both cool and warm season grasses increasing. He is even seeing species like western wheatgrass, green needle, big bluestem, and even Indian grass, which he says he is not supposed to have in his area.

"The more I learn, the more I realize how soil health is the foundation for everything we do, and my work on improving the soil health on our ranch has helped to reduce input costs and improved the bottom line for our operation," Ryan said. "My goal is to keep pushing what we are doing and see how much we can improve our soils and resources."



Ryan Beer's cattle grazing on bales near Lemmon, SD. Courtesy photo

Ryan said the most important lesson he has learned is that everybody's ranch or farm is different. "I have taken bits and pieces that other people are doing and brought back what I think would work for us," he said, "trying stuff on a small scale then expanding if it works for us and our resources."

"My best day is when a group or someone comes out to our place and I can show them what we are doing," Ryan said. "The questions and conversation usually bring up more ideas about different things to try. It also helps me validate what we are doing when I explain why we are doing things a different way and keeps my passion going."

Upcoming Events

May 6
Central South Dakota Water Festival
Pierre, SD

May 12
Big Sioux Water Festival
Brookings, SD

May 14
SDSHC Board Meeting
Online/Pierre, SD

May 19
Onaka Area Prescribed Fire Training
Onaka, SD

May 21
Virtual Fencing Cattle HQ
Online, SD

May 31
McCrory Gardens Discovery Festival
Brookings, SD

June 3-4
SD Bird Watching Tour
Veblen, SD

June 9-10
2026 Rangeland and Soils Days
Belle Fourche, SD

June 16-18
South Dakota Grazing School
Wall, SD

June 24-25
West River Soil Health School
Caputa, SD

July 7
SE Research Farm Field Day and Family Evening
Beresford, SD

July 8
Eastern SD Soil and Water Research Farm Field Day
Brookings, SD

July 16
Value of Plant Diversity For Land and Livestock
Online

Sept. 9-11
South Dakota Grazing School
Chamberlain, SD

Sept. 15-17
Soil Health School
Twin Brooks, SD

Access Our Events Calendar HERE.

Saline and Sodic Soil Problems Are Growing

By Shauna Kopren
For South Dakota Soil Health Coalition

When you're driving down the road in July and see land covered in a white substance, that's not snow. It's salt.

And it's a growing problem.

Saline and sodic soils impact millions of acres in South Dakota, with current estimates varying from 7 million acres to as high as 11 million acres. These acres see significant reductions in crop yields, profitability and cropland productivity.

A 2012 report by the Natural Resources Conservation Service indicated that, in Beadle, Brown and Spink counties alone, high soil salt concentrations resulted in an annual economic loss exceeding $26 million.

Efforts to identify and monitor saline areas show the problem is growing at an alarming rate.

Source of the problem

According to Shaina Westhoff, lecturer with South Dakota State University, saline and sodic soils are two unique soil conditions.

"Saline soils have high total salts (calcium, magnesium, sodium, etc.), and sodic soils have a disproportionate amount of sodium on cation exchange sites," Westhoff said. "Both are detrimental to plant health because many plants cannot utilize water with such high salt content, and they will die of drought stress, or the seed will fail to germinate at planting."

Regardless of whether soils are saline or sodic, the problem arises the same way.

"This is not solely a geology issue. Rather, management plays a huge role," South Dakota Soil Health Coalition Executive Director Cindy Zenk said. "Our soils in South Dakota are formed from a salty parent material, and a change in weather patterns is pushing our water table closer to the soil surface. We can't do anything about that, but we can recognize it and alter our land management practices to minimize the spread of saline acres and perhaps even remediate them."

Zenk said that certain farming practices like tillage, keeping the soil bare outside of the growing season, and using a monoculture cropping system diminish soil structure. That degradation limits the ability of the soil to infiltrate water. When water stands on the soil surface, it evaporates. That evaporation actually pulls groundwater to the surface through capillary action. As the water rises through the salty parent material, it brings salt to the surface.

"Thankfully there are options to manage these acres, increase your actual production history, and your bottom line," Zenk said. "However, if we don't make some changes, these problem areas just grow larger."

The problems grow on farmers' balance sheets, as well.

"Neither corn nor soybeans are highly tolerant of salinity or sodicity, and yields will drop significantly, or the crop will fail to germinate," Westhoff said.

Monitoring the problem

Caleb Caton, agronomist with Ducks Unlimited, has been working on a pilot project that uses a mapping system that identifies and quantifies saline and sodic soils across South Dakota. Caton has worked with many producers who wanted to remedy the saline/sodic soils on their cropland.

"Throughout those years of interactions, producers would all say the same thing: 'These areas never used to be this big,'" Caton said. "We could compare years of imagery and see the changes visually, but to my knowledge, a tool did not exist that would automatically identify and quantify saline acres."



Native grass seedlings emerge on severely affected saline soils in Spink County. Courtesy photo

That is when Caton thought to utilize ArcPro, a mapping and analysis program, to analyze aerial imagery between 2005 and 2023 to develop an automated process for identifying and quantifying areas affected by salinity/sodicity. These areas stand out easily on color imagery as white areas, and he was able to identify the range of pixel colors in the aerial image color spectrum that are characteristic of the affected saline areas.

"I then created a model within ArcPro that not only identifies and outlines saline acres but quantifies them," Caton said. "This analysis could be run at a state, regional, county, operation, or field level, to show changes in saline affected acres throughout time." Caton works with producers who use this information to show the changes in salinity in their own cropland, helping to inform their production procedures.

Innovative solutions

There are multiple remediation methods regarding saline/sodic soils; however, using perennial grasses to move salts downward to the subsoil is proving successful. The success of planting salt tolerant grasses in sodic and saline soils has been documented in both research and practical results.

Scott Hamilton, a cow-calf producer and feedlot operator from Hitchcock, located in east central South Dakota, has had success planting a grass mix which includes a salt-tolerant variety of alfalfa, Garrison creeping foxtail, fescue, reed canary grass and others.

"We started planting this mix in those areas, and in a three-year period of time, we took the areas that were pure white saline and sodic soil and started producing three tons of feed per acre," Hamilton said. "By seeding those areas, we quit spending money and started harvesting hay, leaving it as a pollinator plot or for cover as hunting, but most importantly, healing the soil and making it more productive."

Hamilton also noted that by seeding those areas he has seen a reduction in the amount of saline/sodic soil in the rest of the fields. Westhoff said that perennial grasses, even annual weeds like foxtail barley and kochia, on salt acres promote and facilitate better drainage and soil biology. This allows water and salt to move deeper into the soil profile through natural processes, complementing what chemical amendments do alone.

"Even just keeping saline soils covered with residues can help them improve," Zenk said. "I know of producers who place hay bales in their saline areas and allow livestock to graze the bales. The animals spread the hay over the surface, and that protects the soil and minimizes evaporation. It adds biology back to the soil, and

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that's the first step in improving the soil structure."

Looking to the future

During the process of developing his protocol, Caton learned that a very similar study was conducted and published in 2016 by Dr. Tulsi P. Kharel. Kharel looked at data from 2008 to 2012 that showed a significant increase in the number of eastern South Dakota acres, 1.4 million acres, roughly the size of Cheyeanne River Reservation, that had increased in soil salts.

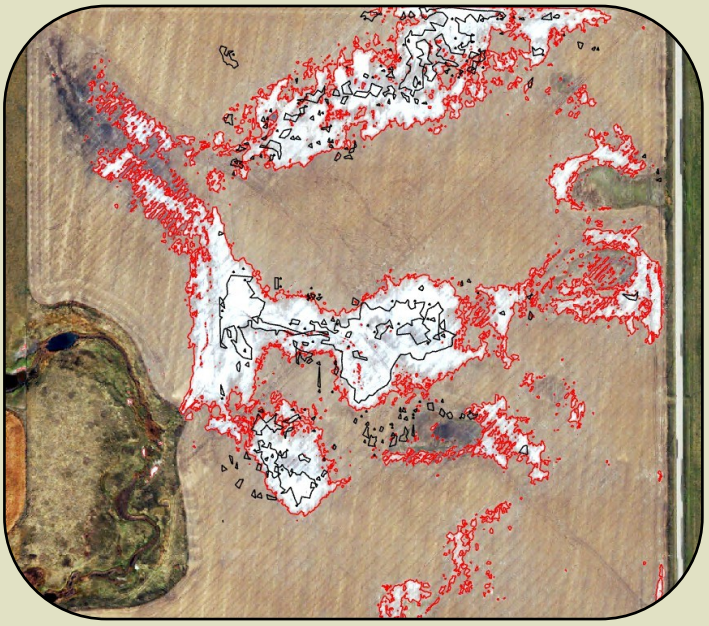
The available data indicates that soil salinity and sodicity issues continue to increase in South Dakota, and unfortunately the total number of affected acres may be underestimated.

"Some of the strongest scientists we have working on this issue are the producers who farm these soils every season," Westhoff said. "They're the people with boots on the ground, seeing how these acres change annually, and are implementing some of the most creative strategies for healing this issue on our landscape."

For producers like Hamilton, finding creative ways to remediate these soils is worth it.

"What we have done is taken a negative, with all the inputs that we put into our crop farming without any benefit, and turned that into a positive with our grass seeding," Hamilton said. "But you must change your outlook, shut the sprayer off, and want to do it. Your field is not going to be totally square, and you may have irregular shapes that you are going to work around, but economically and productively, it is a no brainer."

To learn more about regenerative land management, contact the South Dakota Soil Health Coalition at 605-280-4190 or sdsoilhealth@gmail.com or visit www.sdsoilhealthcoalition.com.



This is a typical quarter of land in eastern South Dakota affected by soil salinity. The outlined areas were generated from Caleb Caton's ArcPro model to identify saline soils. The black lines outline the boundaries of visible salinity in 2005 imagery (6.0 acres), and the red lines outline visible salinity in 2023 imagery (29.6 acres). The black and red lines are both overlayed onto the 2023 imagery. This image shows a 393 percent increase in salinity/sodicity affected acres on this quarter of land from 2005 to 2023. Courtesy image

The Time to Talk About Drought Is Now

By Ben Lardy
For South Dakota Soil Health Coalition

As South Dakotans head into the new growing season, over half our state is currently listed under some form of drought designation. The two southern corners of our state unfortunately hold the status of severe to extreme drought. It is prudent to start talking about how we can get around a tough year if Mother Nature isn't as giving as she can be.

Livestock producers are in the tough spot of balancing business, land, and animal welfare during dry times with little to no safety net. Options tend to be limited as a livestock producer preparing for drought – reduce your herd size or get your hands on more feed. Since optimism is the theme of spring, many livestock owners would rather focus on the latter option. Little discussion is needed for worst case scenarios. Instead, we should start talking about ways producers can get their hands on more forage for this year and the long term.

Conservation acres such as the Conservation Reserve Program and wetland reserve easements offer a huge opportunity for supplemental grazing and haying. To capitalize on these acres; however, there is a need for coordination and communication with the folks you'll be working with. Neighboring landowners need to be asked early on if they would entertain having cattle on their prized habitat. Government agencies need to be contacted and informed about your plans and intentions about using these acres. Paperwork needs to be filed, fence and water lined up. It's a lot of work for a month or two of grazing, so you better start early.

The South Dakota Grazing Exchange (www.sdgrazingexchange.com) is another resource that allows livestock producers and landowners to list their resources and contact each other to form private grazing agreements.

If one doesn't live in a location with abundant CRP acres or alternative forage sources, sometimes making the most of what you have on your own land may be the only option. Grazing rotations are a tool to capture higher utilization rates on rangelands. Higher stock densities and frequent moves can bump up the efficiency of your grazing lands while providing needed rest in hot spots. Cattle are forced to be non-selective about what they eat and leave less on the table.

Planting annual forages on cropland acres such as millets and grazing sorghum can be handy options if one catches a little rain to get them growing. These crops have the flexibility to be chopped, hayed, or grazed depending on what you're set up for. Ordering seed early isn't a bad idea as widescale drought can eat up seed supplies of these less common crops.

Timing is everything when making an ask of someone or making a change to the operation. Have discussions with your neighbors and agency staff early and hold onto an optimistic approach. Most of our CRP and idle land needs active management. Different forage crops on the landscape can help build soil health and provide seasonal wildlife habitat. More time on the land moving animals will make you a better manager in the end.

Waiting until the last minute to have these conversations puts you in a bail-out situation and adds undue pressure on the folks you may need to rely on if things turn south. Do everyone a favor, including yourself, and start knocking on doors early.

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Register for Soil Health School!

The South Dakota Soil Health Coalition will host two separate Soil Health Schools this summer! The West River Soil Health School will be held June 24-25 at Shawn and Kristy Freeland's Dry Creek Farm and Ranch near Caputa, SD. The second Soil Health School will be held September 15-17 at David Kruger's farm and the Abbey of the Hills near Twin Brooks, SD. David Kruger's farm has been managed with no-till practices for over 20 years and offers a side-by-side comparison with land that has long been managed with conventional tillage and a corn-soybean rotation. These educational events will feature classroom discussions and field exercises designed to give participants a working knowledge of how soil functions, the benefits of healthy soil, and how to manage land for improved soil health. Attendees will have the chance to pose their questions to industry experts and experienced producers! This is a great chance to form new connections to help improve your operation! Learn more and register at www.sdsoilhealthcoalition.org/event-calendar/.

