South Dakota Soil Health Coalition

Soil Visions

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Soil Health Gardening

Less weeding, more fun

By Stan Wise

Wouldn't it be nice to have a large summer garden without all the weeding?

By using a few soil health practices, South Dakota gardeners might just be able to pull that off while improving the structure and fertility of their soil.

Jeff Hemenway is a former Natural Resources Conservation Service state agronomist and state soil health specialist, and he farms near Huron, SD, with his wife, Laura. The Hemenways are both master gardeners. They have been using no-till practices on their farm for 20 years, and 10 years ago, they stopped tilling their garden, as well.

Jeff and Laura Hemenway grow a no-till soil health garden on their farm near Huron, SD. Photo courtesy of Jeff and Laura Hemenway.

"I'm into less work," Hemenway said. "I grew up gardening as a kid, and we spent the whole summer either roto-tilling or hoeing the garden. If you don't want to do that – which I don't want to do because it's not fun – do what we do. Put down some mulch, do that in a no-till garden, and stop weeding. Gardening gets a lot more fun at that point."

To control weeds, the Hemenways use a grass hay mulch or landscape fabric on the entire garden. The fabric they use is available for purchase at most conservation district offices.

"We use a fabric mulch on all our vine crops and have for a number of years," Hemenway said. "I have a warm season grass hay I harvest that we use on the rest of our garden – something with a high carbon-to-nitrogen ratio and doesn't break down very readily. We're actually building a lot of soil doing that. We really don't have much weeds at all."

Hemenway's garden practices also include a diverse rotation of crops, cover crops, and pollinator habitat for his bees.

"I have a rye cover crop that I put behind my potatoes once they're harvested, and we have perennials in our system every three years," he said.

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Producers Receive Cost-Share Funding for Soil Health

Producers who wish to enact soil health practices in their operations can receive cost-share funds from various organizations to help pay for them as well as funds for practices they are already using.

Read the article on Page 4 to learn more.

Garden — Continued from page 1

Jeff and Laura Hemenway use a fabric mulch on their vine crops in their no-till garden. Photo courtesy of Jeff and Laura Hemenway.

The perennial the Hemenways use in their rotation is alfalfa, and it really pays off.

"On a good stand of alfalfa, according to South Dakota State University's Fertilizer Recommendation Guide, you can get 150 pounds of nitrogen available that next year – half of that in a no-till situation," Hemenway said. "The bottom line is that half is probably sufficient for that first year. In that second or third year, I put a little additional nitrogen right over the top when I seed it – not the whole garden, just right where I'm seeding. So, my fertilizer rates are really low. I'm really not spending very much on that at all."

Why use cover crops?

Not only do cover crops reduce fertilizer requirements, but they also help raise soil carbon content and improve soil structure. This results in more biological activity in the soil, better nutrient cycling, and better water infiltration rates.

Hemenway said that a mistake he made last year demonstrated the soil structure and water infiltration rate in his garden. He accidently left his sprinkler on overnight. The next morning, he was able to walk through the garden without getting his shoes muddy.

"In a tilled garden, I'd have been up to my ankles in mud," he said.

Diversity

Jeremy Smith and Patricia Jenkins, operate Cycle Farm, a small but highly diversified farm near Spearfish, SD. For them, diversity is the name of the game.

On their three acres (one of which is planted with vegetables), they raise 40 different crop types, laying hens, a flock of ducks, broilers for meat, some perennials, apples, pears, cherries, plums, medicinal and tea herbs, and flowers.

"We try and have a pretty good crop rotation," Jenkins said. "We try and have something growing in our beds for as long as we can throughout the season, whether that's starting with the cover crops early before we plant our harvest crop or having successions of crops."

"On our field we're able to do a lot of intercropping – companion planting – so parsnips with radishes in between the rows," Smith said. "Or other things where there's more diversity."

Smith and Jenkins also pasture chickens and, occasionally, lambs beneath the trees in their orchard to reap the soil health benefits from their manure.

Their farm is completely no-till, so they use mulch to control their weeds. Sometimes they grow their mulch in place as a cover crop.

"We had really good luck for a couple of years kind of growing some of our straw on-site as a cover crop part of the rotation," Smith said. "So, after potatoes, getting in a winter rye crop, and then being able to just mow that in place and plant winter squash the next year, and that worked very well."

For fertilizer, they make compost and compost tea on the farm to add nutrients to their soil.

All these practices have fed their soil biology, and that has proved beneficial.

"I feel like our biggest composting program is worm manure and just having excited soil biology and hoping they're doing a really good job at mobilizing nutrients," Smith said.

South Dakota State University Extension Horticulturist Rhoda Burrows agreed.

"If you've got a garden that has been doing pretty well, and you see a lot of earthworms when you pull crops or turn the soil over, then you don't have to worry so much about incorporating organic matter," Burrows said. "The worms will do it for you."

Rewards

Burrows said soil health practices may look like a bigger investment to get started as opposed to buying some lawn fertilizer and throwing it on. "But over the long term, it's going to decrease inputs and may even require less watering, which is important during drought years," she said. "It's probably going to have better yields and more resistance, probably, to a lot of plant diseases."

For Smith and Jenkins, however, seeing the results of their soil health practices is its own reward.

"When your priority is soil health, and you start paying attention to the soil, suddenly there's so much diversity, and there's so much life in the soil, and you're seeing it," Jenkins said. "It cultivates this love affair, and it builds the affection that you have for all the processes and cycles and these little critters that are doing all this work all the time."

Jeremy Smith and Patricia Jenkins plant buckwheat between their rows of winter squash at Cycle Farm near Spearfish, SD. Photo courtesy of Cycle Farm.

Membership Minute: Lee Kopriva

Lee Kopriva runs an Angus seedstock operation near Raymond, SD, where he also grows hay, small grains, soybeans, cover crops, and corn between stands of alfalfa.

"Soil health is important to me," Kopriva said. "I no-till farm, which has allowed me to keep my soil covered. I have greater water holding capacity and water infiltration to withstand dry periods."

He plants cover crops following his wheat and oats for stubble grazing, and that allows him to cut down on his use of harvested winter feed.

Lee Kopriva's cattle graze on a cover crop near Raymond, SD. Photo courtesy of Lee Kopriva.

Having a diverse crop rotation is important to Kopriva. "I would challenge people who strictly grow corn and soybeans to add more crops to their rotation," he said. "I think that having a crop rotation that includes wheat, rye, or oats not only benefits the soil, it also allows farmers to spread out their risk and harvest seasons."

Saline soils are an area of concern for Kopriva. "I think there are becoming too many salt and saline areas due to heavy tillage and overfertilizing that the soil is quickly becoming less productive," he said. "I would like to plant more waterways and unproductive areas to grass."

Kopriva said that his interest in soil health and cover crops comes from his father, who has long been a proponent of conservation. "As I add acres, I have been able to learn from his experiences," he said.

Soil health is a forward-thinking mindset, Kopriva said. "How can I make this land and water resource better for future generations?" he asked. "With the latest farming technology, we have the ability to grow crops with minimal soil disturbance."

He said he plans to continue building his organic matter and increasing his water infiltration rates so that he can increase his production with fewer inputs.

"I would like to raise a family while instilling in them the importance of our precious resources," Kopriva said.

Dr. Kris Nichols to Headline 2022 Soil Health Conference

The 2022 Soil Health Conference will be held Jan. 18-19, 2022, at the Best Western Ramkota Hotel in Aberdeen, SD. Dr. Kris Nichols will be the keynote speaker for the conference.

Dr. Kris Nichols.

Nichols is the director of research and extension with Canadian Organic Growers in Ottawa, Ontario, and research director at MyLand Company LLC in Phoenix, AZ. She is also the founder and principal scientist of KRIS (Knowledge for Regeneration and Innovation in Soils) Systems Education & Consultation; soil microbiology research advisor with the Food Water Wellness Foundation in Olds, Alberta; and research director with Carbon Sync in Freemantle, Western Australia. She is also working on a project combining regenerative agriculture and renewable energy to reduce the economic risks in transitioning to regenerative agriculture. Her current focus is to address current and future agricultural needs by building upon a soil health foundation to identify biological methods for agricultural production and tools and practices to reduce pest issues, soil erosion, fossil fuel use, and greenhouse gas emissions.

Also speaking at the conference will be Menoken Farm lead educator Jay Fuhrer, SDSU Extension Soils Field Specialist Anthony Bly, and Steve Kenyon, owner of Greener Pastures Ranching Ltd. in Alberta, Canada.

To learn more about the 2022 Soil Health Conference speakers, visit www.sdsoilhealthcoalition.org/soil-health-conference/speakers.

Upcoming Soil Health Events

May 25-26
Landowner Prescribed Fire Workshops
Astoria, SD

June 1-4
Introduction to Holistic Management Seminar
Valentine, NE

June 2
Soil and Rangeland Days
Murdo & Redfield, SD

June 5
Ag Day at Washington Pavilion
Sioux Falls, SD

June 10
SDSHC Board Meeting
Pierre

June 12
Youth Rangeland and Sustainability Day
Nisland, SD

June 30
Neuharth Leopold Conservation Award Tour
Hayes, SD

July 7
Johnson Farm Tour
9:30-2:00
SDSHC Board Meeting
2:30-5:00
Frankfort, SD

July 10
Youth Water Health and Conservation Day
Nisland, SD

August 14
Youth Soil Health and Management Day
Nisland, SD

August 25-27
2021 Soil Health School
Mitchell, SD

Access Our E vents Calendar HERE.

Producers Receive Financial Assistance to Improve Their Land

By Stan Wise

For many producers, knowing that soil health is important just isn't enough. The challenge for them is how to pay for it.

"Conservation is not cheap," Marshall County producer Dennis Fagerland said.

Soil health is gaining recognition as a solution to many problems facing the rural landscape. Improved soil health can help improve producers' incomes, reduce erosion, sequester carbon, improve water quality, increase drought resilience and reduce flooding. However, many producers don't have the resources to change their operations and adopt conservation practices.

Fortunately, they don't have to pay for it all by themselves. Many government agencies have programs to help share the cost of improving the soil.

"When your margins are so tight, it's nice to have some assistance," Fagerland said. "And that's what those programs are there for."

Valorie Dupraz, Natural Resources Conservation Service acting assistant state conservationist – programs, said that producers can get help with "adding additional crop types to rotations, cover crops, adding perennials, better management of nutrient rates and placement on their land. From a grassland management standpoint, rotational grazing, improving plant diversity and deferment would all be activities that fit our soil health practices and are eligible for assistance."

Putting assistance to work

Fagerland runs a cow-calf operation with his wife, Jean, and they also grow corn, soybeans and small grains. The Fagerlands follow their small grains harvest with cover crops which they graze in October. In their pastures, they use rotational grazing, and they have reintroduced native grasses. "That really helps out later in the summer when the cool season grasses stop growing," Fagerland said.

Using NRCS programs like the Conservation Stewardship Program and the Environmental Quality Incentives Program, the Fagerlands have renovated shelterbelts, laid pipelines, planted pollinator plots, and introduced cover crops to their operation. They also used a program through the U.S. Fish and Wildlife Service to set up fencing for their rotational grazing program.

These conservation efforts have paid off for the Fagerlands. When they started, their land had reduced soil organic matter percentages – some fields had less than 2%. Now, Fagerland said, they have increased that to 4.8%.

"The more organic matter you have, the more moisture you retain when it rains," Fagerland said. "We've had a few dry years, and we haven't had to reduce our herd size at all. It really pays off. All these little things make a big difference in the end."

Available funding

There are numerous programs to help producers. In addition to CSP and EQIP, Dupraz said that NRCS offers the Conservation Innovation Grant, Conservation Technical Assistance, the Agricultural Conservation Easement Program, and the Regional Conservation Partnership Program.

There's also a new program that producers might not be familiar with.

"Conservation Implementation Strategy is a new targeted approach to addressing resource concerns within a certain geographical area," Dupraz said.

Marshall County producer Dennis Fagerland took advantage of cost-share programs to install water sources to complement his rotational grazing program. Photo courtesy of USDA-NRCS SD.

Producers can also get financial assistance with soil health practices they are already using. "Producers are eligible for Existing Activity Payments through the CSP program that recognizes good conservation they are currently implementing on their operation," Dupraz said.

There are also funding opportunities available through non-profit organizations. For instance, the Soil Health Planning and Improvement Project, administered by the South Dakota Soil Health Coalition, is designed to help pay for soil health practices that will improve water quality within certain specified watersheds. Producers within these watersheds can apply for assistance in planting cover crops, adding water sources for grazing management, and more.

"This year is a first for the Coalition having cost share dollars available," SDSHC Coordinator Cindy Zenk said. "Cover crops and grassland management are two key practices we are excited to offer through our project."

Producers interested in learning more about the project can contact the South Dakota Soil Health Coalition and find out if their land lies in one of the project area watersheds.

"SDSHC will work with producers in assessing the land, finding the best management options, and selecting the program with the funds to assist in implementing the practices," Zenk said.

Getting started

With so many different types of financial assistance available across different organizations and government agencies, it can be difficult for producers to know where to begin. Fortunately, local NRCS staff are available to help guide producers through the different programs.

It can also be helpful for producers to speak with other farmers or ranchers who are already using cost share programs to help pay for soil health practices. The Mentor Network exists to connect producers and help them learn from each other.

More information on the Mentor Network and the Soil Health Planning and Improvement Project is available at www.sdsoilhealthcoalition.org/technical-resources. To find the contact information for the nearest NRCS office and learn more about available funding, producers can visit www.nrcs.usda.gov/wps/portal/nrcs/site/sd/home.

To read a complete version of this article, visit tinyurl.com/SoilHealthFunding.

Soil Health and Earth Worms

By Sara Bauder
SDSU Extension Agronomy Field Specialist

Soil health has become common terminology in the agronomy scene the last few years. Although trends come and go, I think soil health is here to stay.

According to a 2001 paper (Land degradation: an overview), it is estimated that the total annual cost of erosion from agriculture in the U.S. is about $44 billion or about $100 per acre of cropland and pasture. On a global scale, the annual loss of 75 billion tons of soil costs the world about $400 billion, or approximately $70 per person.

Every producer has their own unique way of operating in a way that is most effective and familiar to them. However, nearly everyone has room for improvement within their business model. One of the changes I challenge growers to strive for is better soil health management and planning.

In South Dakota we have adopted five principles of soil health. These include:

1. Soil cover - keeping plant residue on the soil surface at all times.

2. Limited disturbance - minimize or completely avoid tillage in order to allow soils to build aggregates, pore spaces, organic matter and improve biological activity.

3. Plant diversity - mimic nature by using cool and warm season grasses and broadleaf plants. For example, this includes adding a mixture of cover crops or small grains to a strictly row crop rotation.

4. L**iving roots** - allowing cover crops to grow in the off-season provides carbon to the soil and serves as a food source for microorganisms.

5. Integration of livestock - allowing livestock to graze cash crop and cover crop residue provides more forage options for producers at a time of year when forage quality and supply begins to drop. In turn, livestock grazing increases soil biological activity, improves nutrient cycling and helps improve overall soil health if grazing is properly managed.

Using these principles, how could a focus on improving and retaining soil health be of value to you or the next generation on your operation? The five principles listed above work synonymously with one another, and the more regenerative-type practices that are added to a cropping system, the more benefits your soils will experience. Essentially, the more we can mimic nature, the better our cropping systems should function.

There are many different ways to measure soil health, such as water infiltration, soil compaction, soil biological testing, organic matter, etc. One unique way to get a big picture view of soil health is to look for earthworms (believe it or not)! Healthy soils are full of natural organisms that range from rabbits and insects to microscopic beings.

Earthworms fit into a very special category in reference to soil health. They have the capability to do "tillage" in no-till soils; as they move through the soil searching for food and water, tunnels are created. These tunnels improve soil porosity and ultimately soil health. Their existence above and below ground speed up the breakdown of organic materials in the soil and improve the carbon and nutrient status, making them more available to crops.

Each time a tillage pass runs through a field, soil structure is broken down, but what often isn't noticed is that earthworm populations are significantly affected.

The presence of earthworms is one indicator of healthy soil. Photo courtesy of USDA-NRCS SD.

A recently study conducted by SDSU Extension personnel looked into earthworm populations. They selected sites that were no-till for 15 years or longer and where cover crops were planted in the fall of 2019 after small grain harvest. A control plot was established by spraying out 15x30-foot plots at each site.

In the spring of 2020, project coordinators returned to count earthworm populations using an established protocol that involved pouring mustard-vinegar solution into rings to bring worms to the soil surface.

Earthworm populations varied due to soil conditions from just over 285,000 up to 2 million worms per acre. The study found that on average, cover crops had more than twice as many earthworms as the control plots with no cover crops.

As one might expect, soils won't vastly improve overnight, but by slowly adding the principles of soil health to your operation, a more resilient and healthy cropping system (with increased earthworm activity among other positive soil health indicators) should emerge.

For more information visit https://extension.sdstate.edu and search "earthworms." For further resources on transitioning to no-till and other soil health systems search "soil health" on the SDSU Extension website or visit www.sdsoilhealthcoalition.org or https://sdnotill.com.

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2021 Soil Health School

The 2021 Soil Health School is set for Aug. 25-27 at the Ramada by Wyndham Mitchell Hotel and Conference Center in Mitchell, SD. Field exercises will be held on the Craig and Gene Stehly farm near Mitchell.

This school is a three-day intensive dive into the principles of soil health and ways to implement soil health practices on farms and ranches. Participants will hear instruction from numerous soil health experts and producers, learn to conduct in-field soil health tests, learn to calculate cover crop forage value, tour various plot trials, participate in producer panels, and much more. If you want to learn how to improve your land and your productivity, this is the school for you!

Space is limited, so visit tinyurl.com/2021SoilSchool to learn more and register today!

Help livestock producers weather the drought!
List your cover crops, crop residue, or pasture on the

South Dakota Grazing Exchange

As the growing season progresses and much of South Dakota remains in drought, many producers will need to start planning now for their forage needs later in the season. You can help them out! List any cover crops, crop residue, pastures, or rangeland you will have available for grazing this year on the South Dakota Grazing Exchange. The private grazing agreement you form will benefit your land, and you could be the reason a livestock producer is able to survive this dry year. Learn more at www.sdgrazingexchange.com.

Help us evaluate the impact of our farm stress survey!

We're evaluating the impact of a survey that compared farming practices to stress levels felt by producers. You can help us out by visiting https://forms.gle/xRSi8AqZEBhHvWus6 and answering 5 short questions!