Raising Expectations in the Field

LSP Workshops Focus on Making Soil Pay its Own Way

Our agricultural soils may be starved, naked and just plain exhausted, but that's no excuse for allowing low expectations for this resource to govern how we farm. That general theme emerged repeatedly during a series of soil health meetings sponsored by the Land Stewardship Project in southeastern Minnesota earlier this year.

"Nothing is free in an ecosystem—everything costs," said Dr. Kristine Nichols, a soil microbiologist and the chief scientist at the Rodale Institute. She was the keynote speaker at a Feb. 15 meeting in Caledonia, which, like the other LSP soil health events this winter, was standing-room only. "The difference is you can pay the costs with added chemicals, or you can have plants pay the costs by utilizing the sun's energy. A healthy soil biology is a highly efficient system. It works better than adding chemicals to the system."

Nichols went on to describe research she conducted first as a USDA scientist and later with the Rodale Institute showing how healthy soil can build its own fertility and resilience when a diversity of living roots are present and microorganisms are given the right environment to thrive in. Nichols, who while working for the USDA was part of the groundbreaking Burleigh County Soil Health Team in North Dakota, says farmers have shown that the way to create such a resilient environment is by following a set of principles that involve minimizing soil disturbance, keeping it covered, maximizing the length of time living root systems are present in a field, utilizing a diversity of plants and integrating livestock into the system to help supercharge the nutrient cycle.

During panel discussions at the LSP soil health meetings, farmers described how they are attempting to put such principles into action, with varying results. During the Caledonia meeting, corn and soybean farmer Myron Sylling described his disappointment when he learned that his no-till system was not enough to keep erosion under control. In fact, at one point he noticed he had erosion where the corn residue on top of the ground was the heaviest. In an attempt to build his soil's resilience beneath the surface, he started planting cereal rye in the fall. Since he started cover cropping, Sylling's organic matter has increased and "no soil is moving," he said, adding that his weed control and crop yields have also improved.

"I'd rather build the bugs in the soil than buy them in a jug," said Sylling, who farms near Spring Grove.

Lanesboro, Minn., dairy farmer Brian Hazel suggested that farmers experimenting with cover cropping start out using practices that will give "quick success," and build up from there. For him, that meant starting out six years ago planting cereal rye on corn ground that had been harvested for silage to feed his 280-cow herd. As he's watched the organic matter increase in his fields over the years, Hazel has gained the confidence to increase his cover cropped acres. He cautioned against expecting immediate results, however.

"Organic matter won't jump, but it will rise," said Hazel.

Fellow dairy farmer Olaf Haugen measures the success of his efforts to build soil health by how well his cows are doing in the grazing paddocks—70 percent of his 180-head cow herd's diet comes from

Southeastern Minnesota farmers (*left to right*) **Myron Sylling, Brian Hazel and Olaf Haugen say techniques like cover cropping give their soil the ability to build its own resiliency. "I'd rather build the bugs in the soil than buy them in a jug," said Sylling.** (*LSP Photo*)

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Cover Crops? Grazing? Rotations? Give the Calculator a Try

The Chippewa 10% Project has developed the Cropping Systems Calculator, a tool for estimating the costs and benefits of adopting various cropping and grazing systems, including those involving cover crops. It's at **www.landstewardshipproject.org/chippewa10croppingsystemscalculator**. Give it a test drive—we welcome feedback.

LSP thanks: USDA Sustainable Agriculture Research and Education Program, National Fish and Wildlife Foundation-Conservation Partners, Minnesota Department of Agriculture (MDA) Sustainable Agriculture Demonstration Grant Program and other funders for supporting this work.

Dr. Kristine Nichols: "Nothing is free in an ecosystem—everything costs. The difference is you can pay the costs with added chemicals, or you can have plants pay the costs by utilizing the sun's energy." (*LSP Photo*)

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grazing either pasture of annual cover crops such as grazing corn and rye. Annual cover crops take pressure off Haugen's perennial pastures as well as help him get through the summer slump when hot, dry weather can send cool season grasses into dormancy.

"Some people call them cover crops—I call them forage crops," said Haugen, who farmers near Canton. "What I do with my cows is turn forage into milk and because I have a milk truck coming regularly I have a measuring stick of how my pastures are performing."

Rick Bieber thinks a lot about the relationship between soil and farm financial health. During a January LSP soil health meeting in Elgin, the South Dakota crop and livestock producer talked about the dire economic straits his family's farming operation was in during the 1980s. Part of their problems were due to the financial crisis that was overwhelming all of agriculture at the time. But Bieber said his farm's economic issues could also be traced to the fact that the soil was being abused through too much tillage. To cut his reliance on fuel and other expensive inputs, Bieber began reducing tillage significantly, eventually adopting a no-till system of production. In the late 1990s, he began experimenting with cover crops, and in 2006 South Dakota State University began establishing research plots on his farm because of the impressive advances Bieber was making in building soil health.

Bieber's system of no-till, cover crop cocktails and rotational grazing of cattle has helped some of his fields double their organic matter content over the years. In fact, he said his organic matter ranges from 4 to 5 percent, twice what many neighboring farms have. The result has been in some cases triple the yields for crops like corn, soybeans, sunflowers and flax. Such consistently good yields in all weather conditions have given Bieber the confidence to begin passing his farming operation on to the next generation.

Although they are a nice benefit, high yields don't necessarily always equal financial success, Bieber cautioned. What really excites the farmer is that increasing soil biota has pumped up the efficiency with which his fields utilize moisture. In other words, he's getting more bushels per inch of rainfall because the increased organic matter helps capture and utilize every bit of moisture available.

That is key in the part of north-central South Dakota where Bieber farms, since it averages only around 17 inches of rain annually. Bieber said as a result if integrating no-till and cover cropping, he has gone from producing three bushels of corn per inch of rain to consistently being in the eight bushels per inch range. That means his healthy soil is resilient enough to produce profitable yields even during droughty periods. At one point during his presentation, Bieber flashed a slide showing a stand of his non-GMO corn next to a plot of corn genetically engineered to tolerate drought. Bieber's corn ended up yielding 16 percent more by the end of the season.

"It's not about the best yields, it's about the most efficient yields," said the farmer. "If you take care of the soils and you allow the life below the soils to flourish, the life *above* the soil flourishes." ❐

Join the Soil Builders' Network

If you are a crop or livestock farmer in southeastern Minnesota, the Land Stewardship Project invites you to join the Soil Builders' Network to receive regular updates on workshops, field days and on-farm demonstrations related to the latest in soil health and cover cropping.

The Soil Builders' Network was launched earlier this year to establish an extensive network of farmers interested in building back their soil using innovative crop and livestock systems. To join the free network, sign up at **www.landstewardshipproject.org/stewardshipfood/lspsoilbuilders**, or contact LSP's Shona Snater at 507-523-3366 or SSnater@landstewardshipproject.org.

Give it a Listen

Olaf Haugen talks about the connection between cover crops, soil health and dairy profitability on **episode 192** of the Land Stewardship Project's *Ear to the Ground* podcast: http://landstewardshipproject.org/posts/podcast.

In **episode 190**, Dr. Kristine Nichols describes how we can build agronomic, economic and environmental resiliency in our agricultural soils: http://landstewardshipproject.org/posts/podcast/940.

Episode 189 features Rick Bieber talking about how building soil health saved his farm from financial ruin: http://landstewardshipproject.org/posts/podcast/939.

SARE Cover Crop Survey

The USDA's Sustainable Agriculture Research and Education program is seeking farmers to share their experiences with cover-cropping through a national survey. Your experiences with what works and doesn't work can help shape the future of cover crop initiatives nationwide. The survey is at www.surveymonkey.com/r/2017CoverCropSurvey. ❐

Cropland Grazing Exchange

The Minnesota Department of Agriculture, the USDA Natural Resources Conservation Service and the Sustainable Farming Association of Minnesota have developed a website to match up livestock farmers with crop farmers who have forage that can be harvested via grazing. The Exchange is at www2.mda.state.mn.us/webapp/GrazingExchange/MDAHome.html. ❐

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