

Reaching a Little Higher up the Tree

MOSH Hopes to Take Adoption of Soil Health Practices to the Next Level

By Brian DeVore

Despite her deep devotion to building organic matter on her farm, Dawn Breitreutz is, frankly, not the type of producer soil scientist Anna Cates is focused on reaching out to these days. Breitreutz is what sociologists call an “early adopter” — someone who isn’t afraid to take on the economic and agronomic risks of trying out new ideas and sticking with them through those challenging early years of trial-and-error. How do we know she’s an early adopter? Just listen to how she deals with one of ag innovation’s most powerful deterrents: peer pressure.

“We like to keep our neighbors guessing. Our neighbors still are betting that we’re going to fail. We know they’ve placed bets on it,” Breitreutz said with a laugh during a recent Land Stewardship Project soil health workshop.

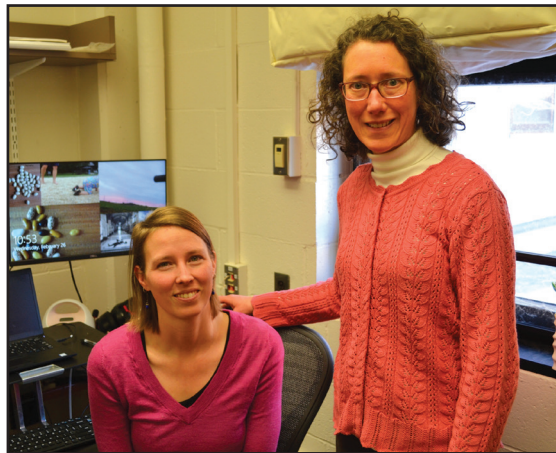
“Early adopters don’t mind being an oddball in their community. They have fun with that, they enjoy that role to a certain extent,” says Cates, who is the state soil health specialist with the Minnesota Office for Soil Health.

Dawn and her husband, Grant, are “oddballs” for stepping out of the typical corn-soybean duo-culture and utilizing multi-species cover cropping, no-till, multiple crop rotations, and managed grazing of cattle to increase the organic matter on their southwestern Minnesota farm. In short, they’ve made a wager on linking overall farm success with the kind of diversity that builds soil health.

According to their own firsthand observations, as well as some impressive financials, it’s paid off in the form of a more resilient farm. And although there have been plenty of missteps along the way, the Breitreutzes say they will never go back to their old way of farming: mining the soil for nutrients utilizing lots of tillage, chemicals, and monocultures. Despite their success, there are still the neighborhood wagers that their biologically-based system will collapse. And then there are those who think the Breitreutzes may be onto something, but aren’t willing to risk too much on their own land. One farmer the Breitreutzes know experimented with

cover crops for seven years before he was comfortable planting them in a place where his neighbors could see them.

Farmers like the Breitreutzes are the low-hanging fruit, the innovators who are committed to sticking with building soil health no matter what the obstacles. If we are to see more land being managed utilizing even basic soil health methods, then outreach is needed that goes beyond the early-adopting true believers to their more risk-adverse neighbors who are hesitant to plant a cover crop in public view. That, says Cates, will require alleviating their concerns around economics, yields, and



The Minnesota Office for Soil Health’s Anna Cates (left) and Ann Lewandowski. “This isn’t just dealing with nitrogen or just dealing with a particular pest or something. This is a systems approach,” says Lewandowski. (LSP Photo)

logistics. That means the kind of land grant research and outreach that goes beyond the inspirational stories pioneering farmers like the Breitreutzes can tell. That’s the role the Minnesota Office for Soil Health hopes it can fulfill.

Good Timing

The Minnesota Office for Soil Health was launched in 2017 as a collaboration of the Minnesota Board of Water and Soil Resources, in partnership with the University of Minnesota Water Resources Center. Called MOSH for short, this U of M-based entity is using a multi-disciplinary approach to help those late adopters with going beyond the

experimental stage and removing a bit of the risk involved with being an innovator.

The creation of the office comes at a critical juncture for the soil health movement. Early adopters like the Breitreutzes have generated a lot of excitement around the power of building biologically active soil. North Dakota’s Gabe Brown has even become a minor celebrity beyond the agricultural community — he’s published a book and is featured in a Netflix film. But recent surveys (*see page 23*) show the vast majority of cropland in the U.S. is not being managed with even that most basic of soil health practices: cover cropping.

The soil health movement is a prime example of a bottom-up approach — many of the innovations have come from farmers on the ground, rather than scientists. Farmer-to-farmer networking has paid major dividends in localized areas. For example, LSP’s Soil Builders’ Network is a group of 750 farmers and others who share information on soil health practices in southeastern Minnesota, northeastern Iowa, and southwestern Wisconsin. And in west-central Minnesota, between 2010 and 2018 the Chippewa 10% Project brought together farmers to share information on cover cropping, no-till, and managed rotational grazing. Both efforts have resulted in a significant growth in soil building practices in those localized regions (*see page 15*).

“Of all the topics in conservation, soil health is definitely one that’s not a top-down sort of thing,” says Ann Lewandowski, research and outreach coordinator for the Water Resources Center and the coordinator of MOSH. “And so the farmers are ahead in many ways in figuring out the management logistics. We want to be one more voice based on research.”

One major area of research that’s needed is around economics. Do farmers have access to livestock that can add value to cover crops? Is the cost and hassle of putting in cover crops made up for financially by the fact that they can generate fertility, reduce compaction, and break up weed cycles? Despite all the anecdotal evidence from farmers that soil health practices boost their bottom line, it’s been frustratingly difficult to come up with hard, research-based data that can be applied across a wide spectrum of farms. Analyses based on university data could help provide that.

Another big question MOSH is trying to address is around what exactly good soil health looks like to farmers, and how that impacts their management. Lewandowski says a lot of excellent data sets have been collected over the years that measure soil

MOSH, *see page 23...*

health. Scientists love those numbers, but it's not clear they serve much of a purpose on the field level. And it's not just farmers who need practical indicators of whether their techniques are taking soil health in the right direction. Food companies like General Mills have shown interest in paying premiums for products raised in a soil-friendly way. Consumer surveys show food produced using soil smart methods is a selling point. But how do we create indicators that are universally recognized and meaningful, and yet useful to individual farmers?

"At this point we are just so far from connecting functions like nutrient release or crop yield to any of the indicators we're using," says Cates.

As a result, MOSH is collecting soil health indicator data from farms across Minnesota. The office and its partners hope to eventually have a database of regional soil health measurements, a suite of case studies highlighting farmers who have adopted soil health practices, and a detailed economic analysis of soil health management systems.

Cates says one key way MOSH is making practical use of this research is to conduct trainings with people who work directly with farmers on soil health techniques: staffers with Soil and Water Conservation Districts and the USDA's Natural Resources Conservation Service, for example. Other "audiences" MOSH would like to build relationships with are input suppliers and crop consultants, two groups that are also extremely influential in farm country. In Indiana, similar outreach to these latter groups has fueled successful efforts to expand cover cropping there.

The 250-Bushel Bugaboo

Cates and Lewandowski say an Upper Midwestern state like Minnesota faces its own particular challenges when it comes to adoption of soil health practices. Besides cold, wet soils and a short growing season that can disrupt efforts to grow cover crops and utilize no-till, there is the issue of, ironically, good soil fertility. In a sense, Minnesota's position represents a Venn diagram encompassing the highly productive Corn Belt to the south, and the climatic limitations of the High Plains and Canada.

"And where those two intersect, you have the pressures of the cold climate growing season on top of the pressures of you could be growing 250-bushel corn on this land," says Cates. "And anything else looks like a waste of time."

Indeed, Minnesota lags behind Iowa, Illinois, Indiana, Wisconsin, and Michigan in the number of cover cropped acres, and is dead last in the country when it comes to how much land is managed under no-till.

But extreme weather conditions brought on by climate change are making it a little less of a sure bet to raise 250-bushel corn consistently in places like southern Minnesota. In a sense, all those non-gamblers are having risk visited upon them in the form of a changing climate. This may make efforts that build soil resiliency more appealing, no matter what the land's corn suitability rating.

And getting more late adopters on board with building soil health has taken on a sense of urgency when it comes to the state of the larger landscape. Namely, it's become evident that many water quality problems can be traced to how the soil is treated on farmland. Healthier soil sheds fewer contaminants, including chemicals and sediment. It also manages water better,

an increasingly important service as climate change spawns intense storm events. Lewandowski says that's why an interdisciplinary approach to building soil health is key. Not just soil scientists need to be involved, but people who know about hydraulics, economics, cropping systems, plant pathology, and engineering. Even specialists who can speak to how policy impacts farming methods or what the food industry is looking for are needed. A place like the U of M is where all those areas of expertise are represented.

"This isn't just dealing with nitrogen or just dealing with a particular pest or something," says Lewandowski. "This is a systems approach."

But she and Cates make it clear that no matter how much scientific clout MOSH can bring to the table, in the end what matters is making sure the true leaders in this movement, farmers, are listened to. After all, they are the ones that have to implement these practices on a daily basis. That means providing them hard evidence to back up what they are seeing take place in their own fields as they take those first steps beyond non-adopters to early adopters. In a sense, the U of M is arriving on the soil health scene at about the same time that an increasing number of conventional farmers are as well.

"The University isn't the fastest moving organization on the block, but we're getting there," says Cates while sitting in her cramped basement office on the U's St. Paul campus. "Now I think we need to get to those people who wouldn't enjoy that role of being an early adopter, but are excited about changing some things." □

For more on the Minnesota Office for Soil Health, see www.wrc.umn.edu/mosh or contact Anna Cates at 612-625-3135.

Soil Health Stats: Good News & Bad News

Since 2012, the USDA's Sustainable Agriculture Research and Education program and the Conservation Technology Information Center have been working together to survey farmers across the country about cover cropping practices. The surveys have unearthed some promising trends in the soil health movement.

For example, the 2019-2020 survey found that around a quarter of the 1,172 respondents had more than 10 years of experience with cover cropping. These are the early adopters and they have become committed to not only building soil health, but adding new twists in the future such as interseeding and planting row crops into living covers. But just as exciting is that just under 12% of the survey respondents had

started planting cover crops sometime between 2015 and 2019, which represents a significant number of later adopters.

They represent a promising future, but that future needs to come a little sooner. Minnesota is a poster child for the potential, as well as the reality, in terms of soil building practices.

The good news is that between 2012 and 2017, cover cropped acreage in Minnesota increased almost 42% to 579,147 acres, according to the U.S. Census of Agriculture. However, that only represents 3% of cropland in the state. Perhaps even more troubling, only 5.8% of Minnesota's crop acres are managed under no-till, which, percentage-wise, puts the state dead last in the U.S., according to the Soil Health Institute.

Nationally, a similar dynamic is at play:

trends are encouraging, but we've got a long ways to go. U.S. cropland planted to cover crops increased 50% between 2012 and 2017, a jump from roughly 10 million acres on 133,500 farms to more than 15 million acres on 153,400 farms. But overall, less than 6% of U.S. cropland is cover cropped.

The good news is that there's little doubt that farmer-to-farmer networks can produce results when it comes to adoption of soil health practices. For example, the Land Stewardship Project has been working in southeastern Minnesota the past few years to bring early adopters and late adopters together through the Soil Builders' Network. According to a Minnesota Department of Agriculture report released in July, all the counties in that region — with the exception of Houston County — are showing cover crop adoption on over 10% of the farms.