

## Impacting the Future of South Dakota's Soil Health One Bucket at a Time

*By Lura Roti for the South Dakota Soil Health*

Handing large containers of water to two students, Mark Misar asks them to begin pouring water over two, loaf-size soil samples. One sample he collected from a no-till soybean field on his farm. The other sample he collected from a conventionally tilled field nearby. As the water runs onto the soil samples and drains into clear containers below, the class sees a dramatic difference. Water running off conventionally tilled soil is murky and full of soil sediment, while the water infiltrating through the no-till soil sample is clear.

“I can lecture to students that no-till management and other soil health practices help with water infiltration and reduce runoff, but will they remember it? When they see something happening, and do something with their own hands, that is the stuff they remember,” explains Misar, a third-generation farmer who teaches agriculture education classes for Bon Homme High School.

The table-top rainfall simulator Misar used for the hands-on demonstration of the movement of rainfall on fields under different types of land management, along with lesson plans and student worksheets, came from a Soil Health Bucket. A teaching aid he received at no cost from the South Dakota Soil Health Coalition, the Soil Health Bucket is filled with 18 accredited lesson plans and tools valued at more than \$500, including a shovel, soil probe, pH strips, EC meter, nitrate/nitrite test strips and much more.

“Lots of these tools we would not have access to, and to not have to pay for these tools is very helpful. In small schools like ours, budgets are tight. Like most teachers, I already buy a lot of stuff out-of-pocket as it is,” Misar says. Misar is one of more than 95 South Dakota agriculture education instructors, science teachers and other educators to receive a Soil Health Bucket, since



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the S.D. Soil Health Coalition began distributing them in 2017. And like Misar, a recent survey showed 92 percent of teachers who use the Soil Health Bucket curriculum in their classrooms found them to be a helpful teaching tool.

“These buckets are user-friendly. They have everything teachers need to teach about soil health. It gives them the opportunity to start wherever they feel comfortable,” explains Jim Clendenin, who provides Soil Health Bucket orientation to educators across the state in his role as a Soil Health Specialist with the S.D. Soil Health Coalition.



**High school students use the Soil Health Bucket water infiltration kit to learn about how no-till and other soil health practices reduce erosion, runoff and increase water infiltration.**

“Kids respond to the lessons because they are hands-on. These lessons get them asking questions and thinking about what they can do to improve our soil health,” explains Clendenin, who spent 35 years teaching and recently retired after serving as Agriculture Department Head of Lake Area Technical Institute. Getting students to ask questions about soil health and helping them understand how farming practices impact soil health are top priorities for Misar.

“I try to explain to them that our existence is really based on productive soil and rainfall. If either one of those is lacking, we will cease to exist,” Misar says “I like to think that some of what I am sharing with kids is making an impact and changing their farming operations or changing the way they think. Getting them to think about how their actions impact things down the road - that is what I am going for.”

#### *Fund Soil Health Buckets and impact positive change*

Findings from a 2018 soil health knowledge, interest, and awareness survey, conducted by the S.D. Soil Health Coalition

say Misar’s soil health focus is making a difference. The survey of more than 500 high school and college-age youth, currently enrolled in agriculture classes, showed a direct correlation between soil health education and demonstrated knowledge ( review complete survey findings at [www.sdsoilhealthcoalition.org/soil-health-buckets/](http://www.sdsoilhealthcoalition.org/soil-health-buckets/) ).

For example, one foundational principle of soil health management is understanding the negative impact soil tillage has on soil health, structure, biology and function. By a 64 percent to 34 percent margin, students who indicated they had previous “high exposure”

to formal education regarding soil health topics, selected “strongly disagreed” or “disagreed” with the statement, “Overtime, tillage or plowing allows rain to soak more easily into the ground.” “This higher understanding of the adverse impact of tillage is a clear indicator that “high exposure” students retained key soil health education information,” notes Cindy Zenk, Coordinator S.D. Soil Health Coalition.

Misar, who returned to farm fulltime in 2011 after receiving an agronomy degree from South Dakota State University, says his understanding of soil health principles guides him in making changes to farming practices on his family’s farm.

He explains no-till farming and implementing cover crops into his crop rotation cut down on fuel and fertilizer costs. These soil health practices eliminated erosion and runoff, built organic matter and increased water infiltration. “It must be working. You know how wet we were this year? Many fields in my area are sitting idle, but I was able to plant into every acre this year – even the low areas.”

Misar credits his farm’s economic stability to soil health practices. “I had to make changes to the way I was farming, otherwise I would not be able to stay on the land,” says Misar, who together with his wife, Elisa is raising three young children on the farm.

Encouraging other producers to embrace change to positively impact the future of South Dakota’s soils is the reason First Dakota National Bank, other businesses and organizations sponsor Soil Health Buckets, says Nate Franzen, President of the Agri-Business Division of First Dakota National Bank. “Soil health is a key to sustainable food production to nourish our human race. We supported the Soil Health Bucket project to enhance the knowledge level of all youth, whether from a farm or ranch or not. Understanding the science behind feeding the world needs to be of keen interest to us all,” Franzen says.

In addition to First Dakota National Bank, current funding for Soil Health Buckets was provided from the financial support of Farm Credit Services of America, Ducks Unlimited Inc., South Dakota Agricultural Foundation, Inc and Dacotah Bank.



**Exposing youth to soil health education early can have a positive impact, according to the findings from a 2018 survey. The survey of more than 500 high school and college-age youth, currently enrolled in agriculture classes, showed a direct correlation between soil health education and demonstrated knowledge ( review complete survey findings at [www.sdsoilhealthcoalition.org/soil-health-buckets/](http://www.sdsoilhealthcoalition.org/soil-health-buckets/) ).**

To provide more educators with Soil Health Buckets, S.D. Soil Health Coalition seeks additional sponsors. To learn more about the Soil Health Bucket program, visit <https://www.sdsoilhealthcoalition.org/soil-health-buckets/> or contact Cindy Zenk, Coordinator of the S.D. Soil Health Coalition at [sdsoilhealth@gmail.com](mailto:sdsoilhealth@gmail.com) or (605) 280-4190.

### *About The Soil Health Coalition*

The South Dakota Soil Health Coalition is a producer led, non-profit, membership organization that was created in the spring of 2015. The Coalition is governed by a nine-member board of farmers and ranchers from across the state and includes several staff members. Staff and board members strive to carry out the Coalition's mission to "Promote Improved Soil Health" through education and outreach. Major projects and membership benefits include: field walks and workshops, annual Soil Health School, mentoring network, bi-monthly newsletter, informational videos, and the distribution of soil health education kits to school groups. Additional information can be found at [www.sdsoilhealthcoalition.org](http://www.sdsoilhealthcoalition.org).