

For the Land and Its People

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It is easy to be discouraged by the current state of the world, but if you look for stories about courage, kindness and people making a difference, you'll find that goodness still exists. The stories in this issue highlight the ways that the College of Agriculture, Food Systems, and Natural Resources (CAFSNR); North Dakota Agricultural Experiment Station (NDAES); and NDSU Extension are continuing to carry out our mission in a world that is always changing. I invite you to read more about the impact made by CAFSNR, NDAES and NDSU Extension.

Enjoy.

Greg Lardy

Vice President for Agricultural Affairs

NDSU NORTH DAKOTA
STATE UNIVERSITY

College of Agriculture, Food Systems, and Natural Resources
North Dakota Agricultural Experiment Station
NDSU Extension

NDSU Extension Helps Farmers and Ranchers Cope With Stress

Steele County producer David Mehus can't plant crops this year because by the time he arranged financing, the land he rented was rented to someone else.

Plus, he has 90,000 bushels of corn to sell, but the price dropped 80 cents a bushel.

"I guess I know what stress is," he says.

NDSU Extension has developed a number of resources to help farmers and ranchers like Mehus cope with the stress resulting from the uncertainties in their profession.

The first step is to recognize the early symptoms of stress, according to Sean Brotherson, Extension family science specialist.

"Before farm and ranch families can do much about managing stress, they have to know when they are experiencing it," he says. "Much of the time, people do not understand or give attention to what is going on in their bodies and in their relationships with others."

Extension resources with tips for recognizing and dealing with stress include fact sheets, podcasts, videos, publications, a PowerPoint presentation, workshops and a videoconference that was recorded for later viewing. These resources are available on

NDSU Extension's Farm and Ranch Stress website, www.ag.ndsu.edu/farmranchstress.

The development of these resources has been a collaborative effort of Extension personnel from different disciplines, including Brotherson and Kim Bushaw, NDSU Extension family science specialist, and David Ripplinger, Extension bioproducts and bioenergy economics specialist.

Extension agents throughout the state also are available to listen to stressed farmers and ranchers and direct them to get the help they need.

"People must understand it is OK not to be OK, and help is available," says Craig Askim, the Extension agriculture and natural resources agent in Mercer County.

Mehus agrees that reaching out for help is vital.

"People need to open up about this stuff," he says. "We sure don't want to see suicides over this."

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www.ag.ndsu.edu/farmranchstress



www.ag.ndsu.edu/farmranchstress

People must understand
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4-H Experience Leads to Lifelong Community Service

My hands to larger service

That line from the 4-H pledge usually stays with members throughout their lives.

For example, Bridget Mattern was a member of the Prairie Schooners 4-H club in Emmons County. As a 4-H'er, she remembers dying Easter eggs and taking them to nursing home residents, among other community service projects.

Today as a busy mom in Strasburg, Mattern still devotes time to community service, including with her two older children's 4-H club.

Mattern provided leadership to start the Clipper Tots child care center in Strasburg. About five years ago, Mattern and others in the area saw the need for a preschool. The school district supported the half-time preschool, but child care was needed for the other half of the day and for full-time care. They created a 501(c)3 nonprofit, repurposed two rooms in the former school, hired staff and received licensing for 18 children. Mattern said child care is so desperately needed in rural North Dakota that one family brings their children nearly 30 miles each way to the center.

"Through 4-H, I learned to step up and help out when needed," Mattern says. "Community service became engrained in me to step up if you can. That's what happened with the day care. It wasn't an easy thing to do because it was a long road to get it up and going. But like with 4-H projects, we didn't give up and we worked until we saw the end result. It's exciting to get to see the fruits of your labor."

Meagan Scott Hoffman, an assistant professor and 4-H youth development specialist in the state Center for 4-H Youth Development, says 4-H encourages serving others.

"In a recent survey, 93% of North Dakota 4-H'ers acknowledged that 4-H has inspired them to volunteer in their communities," Hoffman says. "That mindset of giving back to their communities seems to stay with them through adulthood and provide ongoing positive impacts across our state."

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Testing Grounds:

How NDSU is Helping Bring Productivity Back to Salty Soils

Of the 39 million acres of cropland in North Dakota, nearly 15% has reduced productivity due to soil salinity and sodicity issues, costing North Dakota producers millions of dollars annually as affected areas produce very little to no crops.

Remediation of these issues involves applying soil amendments such as gypsum and establishing salt-tolerant plantings based on site-specific soil testing.

Analyzing soil salinity requires sampling zero to 3 or 4 feet deep, but most soil probes only can sample 2 feet deep.

“Until 2017, NDSU Extension specialists and agents helped producers sample to 4-foot depths with a hand-held auger, but this was time-consuming and required a lot of labor,” says Naeem Kalwar, NDSU Extension soil health specialist at the Langdon Research Extension Center (LREC). “We saw the need for a better system that would expand our soil testing capabilities to more producers at a faster pace.”

In 2018, the LREC purchased a pickup-mounted soil probe for the NDSU Extension soil health team's use. Since that time, Kalwar and other Extension specialists and agents have conducted 197 soil tests for 68 landowners in 11 counties.

“We don't stop at soil testing,” says Kalwar. “We discuss their individual test results, make recommendations and then continue to follow up. Many times, a soil test is the start of a long-term, trusted relationship.”

Alsen, N.D., farmer Mark Cheatley appreciates the soil testing and recommendations Kalwar makes. Eleven site-specific samples were taken at Cheatley Farm.

“Though it takes five to seven years to see remediation efforts work, I'm confident we will see results based on Extension's research and Naeem's experience using gypsum,” says Cheatley. “My father was a believer in Extension and I've continued to utilize their resources to make my operation more profitable.”

Much of the remediation work using gypsum is based on previous North Dakota Agricultural Experiment Station (NDAES) research. Since 2009, Tom DeSutter, a professor of soil science in NDSU's School of Natural Resource Sciences, has studied how the application of flue gas desulfurization gypsum (FGDG), a by-product of the coal industry, can be used to remediate sodic soils. In addition, DeSutter worked with multiple state agencies to obtain the proper permitting for FGDG use.



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In 2014, DeSutter and his team of NDAES scientists continued their research by studying the effect of FGDG on soil chemistry and wheat grain quality. The research confirmed that applying FGDG to sodic soils for remediation had no negative effects on soil chemistry or wheat quality.

Using DeSutter's research, Kalwar, along with North Dakota Rep. David Monson and former U.S. Sen. Heidi Heitkamp, worked with the state's coal industry to turn this coal by-product, FGDG, into agricultural-grade gypsum.

Thanks to their work, this widely used soil amendment was as much as \$300 per ton but now is \$5 per ton plus trucking.

FOR MORE INFORMATION:

www.ag.ndsu.edu/publications/crops/managing-saline-soils-in-north-dakota

www.ag.ndsu.edu/publications/crops/soil-testing-unproductive-areas

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NDAES Scientists Study Effects of Vacuum Steam Treatment on Hard Red Spring Wheat

Wheat flour products such as cookie dough, cake batter and frozen dough are intended to be consumed only after a cooking step, yet some consumers eat raw dough despite warnings on food labels. Recent outbreaks related to the consumption of raw flour, primarily caused by Salmonella and E. coli, have raised concerns about the safety of flour products.

“Current wheat milling practices do not use techniques that actively aim to reduce microbial populations,” says Senay Simsek, Bert L. D’Appolonia Cereal Science and Technology of Wheat Endowed Professor in the NDSU Department of Plant Sciences. “The development of a process that can reduce foodborne pathogens while maintaining wheat quality is of great interest to wheat millers and processors.”

Simsek, along with Teresa Bergholz, former associate professor in NDSU’s Microbiological Sciences department, and a group of NDSU graduate students researched and developed a vacuum steam pasteurization process that has proven effective at decreasing E. coli and Salmonella bacteria on low-moisture crops, such as hard red spring wheat.

Steam is the desired medium for pathogen reduction in the food industry because of the high level of heat transfer. Using heat to pasteurize wheat is challenging because high temperatures can affect the functionality of milled flour. Vacuum steam treatment utilizes steam under subatmospheric pressure, which creates lower temperatures.

“The low temperatures attainable with this method do not negatively affect the quality of the wheat but maintain the effective heat transfer attained with steam, allowing for a greater reduction of pathogens,” Bergholz says. “This technology achieved a 1,000- to 10,000-fold reduction in pathogen numbers on grain with a treatment time of less than 10 minutes.”

Their research showed that steam condensing at 65 degrees Celsius can significantly reduce foodborne pathogens on hard red spring wheat without affecting the quality or functionality of milled flour in bread making.

“These findings illustrate how interdisciplinary collaboration combined with innovative research can create real-world solutions,” says John McEvoy, NDSU Microbiological Sciences professor and department head.

Simsek and Bergholz recently were awarded a U.S. Department of Agriculture grant to continue their research.

FOR MORE INFORMATION:

<https://www.ndsu.edu/microbiology/news/detail/56614/>

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Patch Burn Grazing Shows Benefits

Patch burning has positive impacts on plant communities and soil properties, enhancing the flowering plants that increase pollinator and bird habitat, and increasing livestock performance, research at NDSU's Central Grasslands Research Extension Center (CGREC) shows.

"Fire was, and still is, a natural disturbance to our rangelands, and depending on the timing of the burn, can create both long- and short-term benefits," says Kevin Sedivec, CGREC interim director.

Sedivec and CGREC scientists work collaboratively with North Dakota Agricultural Experiment Station range scientists from the School of Natural Resource Sciences on the NDSU campus, including Torre Hovick, Ryan Limb and Devan McGranahan. 2020 will be the fourth year of an eight-year study.

Among their findings: Cattle's average daily gain was greatest on two patch-burn grazing treatments, compared with modified twice-over rest-rotation grazing. For this study, patch burning is burning one of four approximately 40-acre patches each year. Cattle naturally select the burned patches for grazing because they like to eat the most nutritious and palatable forage found in the most recently burned patch.

In the modified twice-over rest-rotation grazing treatment, the grazing area is divided into four relatively equal patches and fenced. Cattle are rotated through the patches twice and allowed to graze for a certain number of days.

"Fires have been beneficial," confirms Craig Larson, a producer in Sheridan and McLean counties. "We've seen forbs express themselves after a fire. We've set back some Kentucky bluegrass and brome grass. We've also seen some native grasses appear in places we haven't seen for a while."

The scientists also found that flowering plant abundance and diversity were higher in patch-burn grazing treatments, compared with season-long grazing.

"In light of these conclusions, patch-burn grazing appears to be an effective conservation tool for those seeking to increase resource availability for native rangeland pollinators," says Hovick, an assistant professor of range science in NDSU's School of Natural Resource Sciences program.

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<https://tinyurl.com/CGREC-2019>



Visit www.ndsu.edu/vpag/newsletter
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www.ndsu.edu/vpag

Agriculture and Extension at North Dakota State University

The College of Agriculture, Food Systems, and Natural Resources has a tradition of excellence in educating students for real-world careers. Our students learn from and work with world-class scientists in state-of-the-art facilities. These interactions, along with a relatively low student-faculty ratio, provide opportunities for students to develop their critical thinking skills, to work in a team setting, and to capitalize on hands-on learning experiences that will allow them to be competitive in a global economy.

The North Dakota Agricultural Experiment Station consists of seven Research Extension Centers placed strategically throughout the state, the Agronomy Seed Farm in Casselton and the Main Station in Fargo. We work to develop techniques and technologies to enhance the production and use of food, feed, fiber and fuel from crop and livestock enterprises.

NDSU Extension empowers North Dakotans to improve their lives and communities through science-based education. We serve all people of the state through our 52 county and Fort Berthold offices, seven Research Extension Centers and the main campus in Fargo.

If you would like more information on the programs in this publication, contact the faculty and staff listed. If you would like more information about our other programs or have questions, comments or suggestions, please contact me.

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CAFSNR Prepares Students for Vet School and Careers

Vet Tech Colleges recently named NDSU one of the top 10 universities for pre-veterinary work. In the College of Agriculture, Food Systems, and Natural Resources, students can complete their pre-vet coursework in Microbiological Sciences or Animal Sciences.

"NDSU prepared me for veterinary school (at Iowa State) by providing a strong, broad education in both animal science and the typical pre-veterinary course studies," says Beth Carlson, deputy state veterinarian. "It also provided opportunities for involvement and leadership roles in activities such as the Judging Club, Saddle and Sirloin Club, Pre-Veterinary Club and Honor Commission."

Tyrone Klein works with large and small animals at Missouri Valley Vet in Bismarck and Mandan. After completing his Animal Sciences degree, he was an NDSU beef herdsman for four years, then completed additional pre-vet classes and was selected for the program that accepts North Dakota students into the Kansas State vet school at in-state tuition.

"Being on the NDSU livestock judging team helps with my everyday decision making," Klein says. "Now as a vet, I can walk into a situation, make a decision and communicate the reasons why I chose what I did."

Sen. Robert Erbele of Lehr serves on the Western Interstate Commission on Higher Education (WICHE) Veterinary Medicine Advisory Council.

"WICHE and all PSEP (Professional Student Exchange Program) programs are important to our NDSU students because of the very competitive nature of admissions into vet school," Erbele says. "It gives our students a position for acceptance to schools that could probably fill their slots with their own resident students."

"Our students born and raised here are more apt to return to North Dakota and become long-term residents of our communities," he adds. "Plus, our students are great ambassadors for our state and impress the receiving universities with their work ethic and life skills that they bring to the veterinarian profession."

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