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NEBRASKA WATER CENTER

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GLOBAL INSTITUTE AT THE
UNIVERSITY OF NEBRASKA

FALL 2023

Core Research, News, and Events from the Nebraska Water Center



**Nebraska
Water Center**

Daugherty Water for Food Global Institute

Mahoney Tower, Eugene T. Mahoney State Park, Nebraska

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And More!



From the Director

Chittaranjan Ray, Ph.D., P.E.
Director, Nebraska Water Center (NWC)

Dear Reader,

Fall has returned, bringing crisp air and full schedules. As the seasons change, the Nebraska Water Center continues our work in research, outreach, and education.

We had the pleasure of holding our Nebraska Water Conference again this fall. On October 3 and 4, we gathered alongside partners and stakeholders to discuss water management in urban Nebraska. This conference brought attendees from across the state and beyond to Omaha, allowing us to foster future collaborations and experience the unique water projects taking place in the Omaha area.

As we look to future research, I am excited to share that we have received funding from the USGS 104G program to consider how PFAS interact with the water and sediment interface in agricultural watersheds. Throughout the country, only 11 proposals were funded. The USGS 104G program is nationally competitive and we are proud that Nebraska has received funding through this program yet again this year.

I have a few staffing announcements to share with you. David Cassada has retired after working as an analytical chemist in the Water Sciences Laboratory for the past 33 years. We appreciate the extensive

contributions to water quality methodologies and data management that David made during his time at the lab and wish him well in retirement.

Research and Extension Communications Specialist Crystal Powers has been asked to take on additional leadership responsibilities through her Extension appointment. This fall, Crystal started as a Program Area Lead for the Water and Cropping Systems Extension team. The lead team coordinates and coaches across this team of over 90 UNL Extension educators and faculty, covering water quality and quantity, soil health, digital agriculture, and integrated cropping systems. Crystal will continue her outreach and communication role with us at the Water Center in addition to her expanded Extension role.

In this newsletter, I am pleased to share with you updates on our research and outreach activities from the past few months. The Nebraska Water Center will be offering workshops on science communication and groundwater modeling (page 8). Our researchers have received funding to continue research in water quality (page 9) and environmental education (page 6).

It won't be long before fall fades into winter. I wish you well during the holiday season and look forward to continuing our work in the new year.

Chittaranjan Ray

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Director

Chittaranjan Ray, Ph.D., P.E.

Director of Laboratory Services

Water Sciences Laboratory
Daniel D. Snow, Ph.D.

Cover Photo Credit

Platte Basin Timelapse

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Dave Cassada retires from the Water Sciences Laboratory after 33 years

By Ann Briggs, Public Relations and Engagement Coordinator



David Cassada

Like many research facilities, the Water Sciences Laboratory has undergone several changes in the past thirty years. But at least one thing has remained the same: you could find Dave Cassada, analytical chemist, working away to create a new method or troubleshoot equipment. This fall brings another change to the Water Sciences Laboratory as Dave Cassada transitions to retirement.

Cassada joined the Water Sciences Laboratory when it opened in 1990. In the past 33 years, he has been an important fixture to keep the lab running and innovating. Cassada's main focus was pesticides and emerging contaminant research. In this capacity, he served as an expert in chemistry, new method development for clients, student theses, and research publications. He also helped review and coauthor comprehensive literature reviews published by the lab.

For example, he researched and published methods for measuring atrazine and its degradation products using isotope dilution, the explosive RDX and its degradation products, and for gasoline oxygenates using a new technique called solid phase microextraction. Cassada used his extensive knowledge in chemistry to characterize, extract, and measure these compounds in a wide variety of samples for multiple projects using the Water Sciences Laboratory's chromatography and mass spectrometry instruments.

Most laboratories and core facilities rely on external staff to service and repair equipment. Through the combination of Dave Cassada and Dan Snow, the current Water Sciences Laboratory Director, the Water Sciences Laboratory has been able to handle most service and repair needs in-house. Most facilities expect to spend about 10-15% of the cost of equipment each year in repair and maintenance fees, so these

skills save the laboratory tens of thousands of dollars each year while also saving time and improving efficiency.

"Dave and I both enjoyed the process of troubleshooting equipment and working with manufacturers to identify and implement solutions," Dan Snow shared. "This is an uncommon personality trait in a chemist and fairly unique in people who would come through a lab setting. These repair skills allowed the lab to function 'cheaper, faster, and better' as one of my colleagues used to say. Our staff understand how things work and can prevent equipment from breaking down in the future".

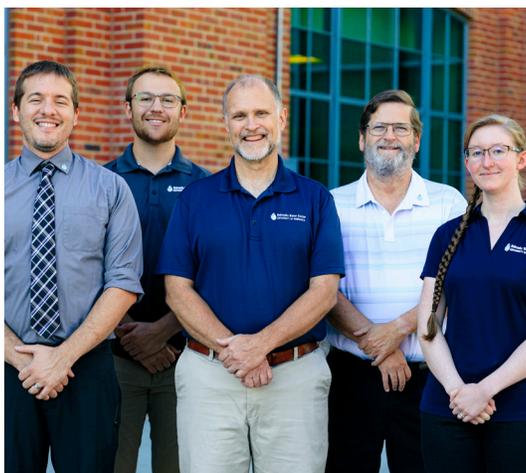
Another priceless contribution Cassada made during his time at the Water Sciences Laboratory is the creation and development of the lab's data management system. The Water Sciences Laboratory Information Management System, or WSLims, keeps track of all samples, results, test types, billing, staff, and more. Any data that comes in and out of the lab interacts with the WSLims system, and a well-built system allows the laboratory to provide accurate data to staff and clients. Cassada wrote the code for the WSLims system multiple times and through several iterations to keep up with the technology available and the laboratory's data needs.

Dave Cassada will continue to assist at the laboratory through retirement in an on-call capacity. This will assist the Water Sciences Laboratory in training staff in his unique skills, as well as providing another set of expert hands when the laboratory is busy.

Dave received a Bachelor of Science in Chemistry from Northeast Missouri State (now called Truman State University) and a Master of Science in Chemistry from the University of Nebraska – Lincoln. Throughout his 36+ year career in science, he spent 33 years at the Water Sciences Laboratory and three years as a chemist at the Epply Cancer Institute at the University of Nebraska Medical Center.



Dave Cassada running a sample in 2003.



Current Water Sciences Laboratory Staff include (from left) Nathan Roddy, Pierce Leef, Daniel Snow, David Cassada, and Victoria Dey.



Dave Cassada preparing laboratory equipment in 2006.

2023 Nebraska Water Conference explores water management in urban Nebraska

By Emma Dostal, Communications Intern

The 2023 Nebraska Water Conference, “Managing water resources in urban Nebraska: learning from the past to prepare for the future,” brought together global researchers, engineers, and water professionals in October to discuss crucial water issues in Nebraska’s cities.

The conference marks the end of the journey following the Platte River since the 2020 conference intended to be held in Scottsbluff and ending in Omaha in 2023. This conference featured expert panelists and speakers that discussed current natural resource challenges faced by Lincoln and Omaha while providing advice on the future of water management in eastern Nebraska.

“Holding the Nebraska Water Conference in a different part of Nebraska each year allows us to focus on topics that are relevant to different parts of the state,” said Ann Briggs, Nebraska Water Center Public Relations and Engagement Coordinator. “After following the Platte River the past few years, it made sense to come to Omaha in 2023 and focus on urban water management. Lincoln and Omaha manage water very differently from the rest of the state, so we were excited to bring in local experts to share their knowledge with attendees.”

Attendees had the opportunity to tailor their conference experience to what best fit their interests by attending a variety of breakout sessions and keynote speakers.

Some conference favorites included Tools for Water Management I and II which discussed well monitoring research, the Nebraska Clearinghouse database, the Eastern Nebraska Water Resources Assessment project and more. Attendees also enjoyed hearing an update about Lincoln’s Water 2.0 Project to find a second reliable water supply from Steve Owen, City of Lincoln.

The University of Nebraska-Lincoln Institute of Agriculture and Natural Resources sponsored a poster competition for students at the conference. Britt Fossum received third place for her poster titled, “Biochar application into existing no-till and cover crop system for enhanced soil nutrient retention and carbon storage.” Her project focused on understanding the effects of biochar application and winter cover crops on soil carbon storage and water and nitrogen retention under field conditions. Sinan Rasiya Koya received second place for his research, “Causal drivers of rain-on-snow events in North America,” which analyzed rain-on-snow events from 1951 to 2022 to determine causal factors. First place was awarded to Yvon Ukwishaka for “Redox-driven transformation of inorganic nitrogen species across the vadose zone: insights from column experiment.” Ukwishaka’s research sought to analyze inorganic nitrogen redox reactions in the vadose zone to “predict and prevent nitrate groundwater contamination in heavily irrigated areas.” Congratulations to all three winners.



The opening panel featured Karina Schoengold, NWC; Steve Owen, City of Lincoln; Jim Theiler, City of Omaha; and Doug Whitfield, MUD.



Yvon Ukwishaka and Britt Fossum pose with the student research poster competition judges.



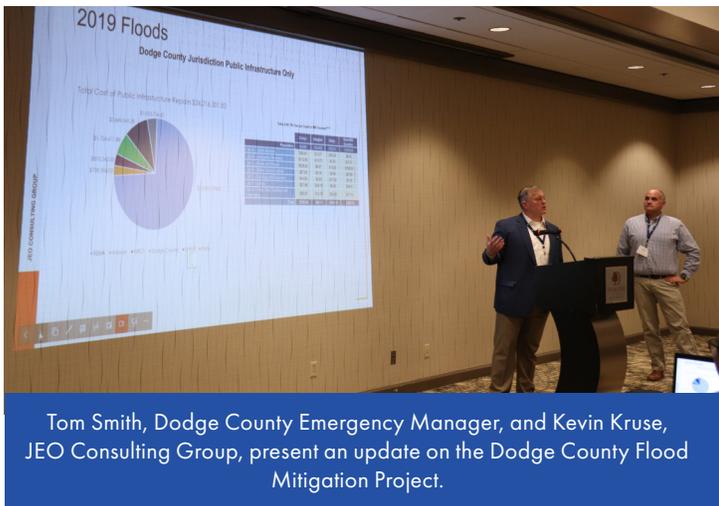
Sinan Rasiya Koya presents his research poster to the judges. Sinan received second place in the student research poster competition.

On the second day of the Water Conference, attendees chose to attend one of four site tours that showed attendees different water projects, research, and management locations around Omaha.

The Urban Water Projects site tour hosted by JEO Consulting Group took attendees to Gretna, NE, where they showed the newly opened Gretna Crossing Park which includes a fishing pond, amphitheater, athletic fields, dog run, water park, and more. This is next to the Papio Missouri River NRD WP-4 Dam project that is projected to finish in late 2024. JEO is building a high-hazard dam in Gretna to help prevent new housing developments in the area from potential floods. This dam will include boat docks and fishing piers and will provide new recreational activities for the area. This tour included an extra stop at Adams Park, a previous creek restoration project by the City of Omaha.



Attendees on the JEO Consulting tour visited the new Gretna Crossings Park.



Tom Smith, Dodge County Emergency Manager, and Kevin Kruse, JEO Consulting Group, present an update on the Dodge County Flood Mitigation Project.

Attendees toured the Platte West Water Treatment Plant and met with managers from the Florence, Platte West, and Platte South Facilities to see the water treatment process. Hosted by the Metropolitan Utilities District, attendees learned about the importance of this plant as a pillar in the “Triangle of Reliability” which provides consistent water to the Omaha metro area and the Papio-Missouri NRD. The plant takes in primarily ground water and can treat over 100 million gallons of water per day. Attendees witnessed the treatment process and saw where the water is brought in, how it is treated, and how it is piped to homes. All water in the plant is treated with some of it softened. The softened and fully treated water is combined before it is sent to homes for a partially softened result.

The University of Nebraska-Omaha research tour visited Glacier Creek Preserve and Elmwood Park. Glacier Creek Preserve is a valuable research site because it includes an entire sub-watershed within its boundaries. The sub-watershed moves through various ecosystems including restored tallgrass prairie and land previously used for agriculture. Dr. David Manning, Assistant Professor of Biology, and Dr. Tom Bragg, Glacier Creek Preserve Director, led a hike through the preserve to experience the ecosystems and see first-hand the research sites that are used to understand different ways water interacts with the sub-watershed. Attendees also visited Elmwood Park. UNO researchers and classes utilize Elmwood Park because of its spring fed creeks and urban characteristics. These two research sites provide vastly different opportunities for both researchers and students at UNO that are focused on water.

The Papio-Missouri River NRD tour visited flood management sites managed by the NRD in Omaha. Amanda Grint, Papio-Missouri River NRD Assistant General Manager, and Ian Ghanavati, Water Resources Engineer, hosted this tour. Amanda and Ian discussed levees, flood control reservoirs, and other Papio programs that help manage urban water while visiting the Missouri River levees at Haworth Prairie Queen Recreation Area and Wehrspann Lake and Chalco Recreation Area.

“The site tours gave attendees the opportunity to get out of a conference room and experience the different research and management methods we had discussed the previous day,” Briggs said. “We couldn’t have organized four separate tours without our partner organizations taking the lead on hosting, and we appreciate their involvement in our conference.”

The Nebraska Water Conference celebrates the continuous ingenuity of water research while fostering a deeper understanding of water and its many beneficial uses for the state. The future of water management in urban Nebraska is bright.

To learn more about future conferences, visit watercenter.unl.edu.

Know Your Well receives \$99,795 in EPA Environmental Education funding

By Shannan Beisser, EPA



Editor's note: This article originally appeared as a press release from the EPA Region 7 office in August 2023

The U.S. Environmental Protection Agency (EPA) is announcing the selection of 33 organizations to receive over \$3.1 million in funding for projects under the Environmental Education Grants program, including \$99,795 to the University of Nebraska-Lincoln.

The University of Nebraska-Lincoln will use the funding to expand the Know Your Well Project and develop a science curriculum that will be rolled out to over 100 rural Nebraska high school students with the goals of increasing science literacy, awareness of agricultural practices, and groundwater stewardship.

“We know that climate change is one of the greatest environmental challenges of our time, and it demands bold and innovative solutions,” said EPA Administrator Michael S. Regan. “This year’s grant recipients represent some of the brightest minds from across the country, and they demonstrate what it means to couple the power of environmental education with a commitment to creating a future with clean air, clean water, and a healthy planet for all.”

“We look forward to adding curriculum to the set of tools currently available to teachers involved in the Know Your Well program,” said Nebraska Water Center Assistant Director Rachael Herpel. “This will help us build capacity and eventually expand the program beyond Nebraska.”

Nationwide, the funding will range from \$50,000 to \$100,000 to organizations that provide environmental education activities and programs. This year’s grantees will conduct project activities in 27 states and the U.S. Virgin Islands. Among the grant recipients are four Minority Serving Institutions.

EPA anticipates providing funding for these projects once all legal and administrative requirements are satisfied.

Background

Since 1992, EPA has distributed between \$2 million and \$3.5 million in Environmental Education Grant funding each year, for a total of over \$91.3 million supporting more than 3,922 projects. The program traditionally provides financial support for projects that design, demonstrate or disseminate environmental education practices, methods or techniques. For more information, visit the [Environmental Education page](#).

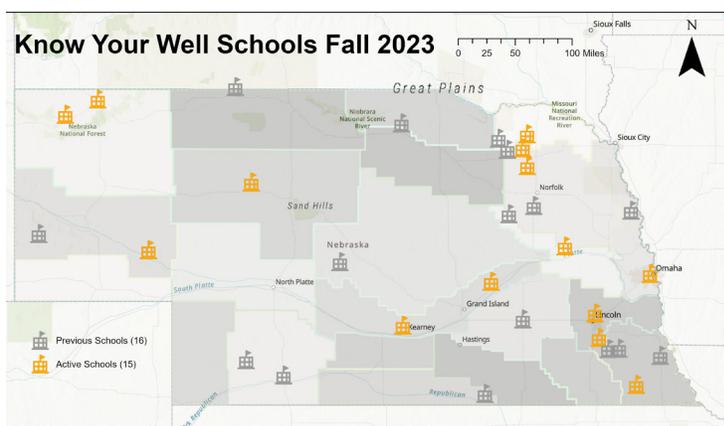
To learn more about current and past award winners, or to apply for future grant competitions, visit the [Environmental Education Grants page](#). This page is updated as future competitions are announced and additional grants are awarded.



Know Your Well provides hands-on opportunities for students to experience water science and research.

Know Your Well

Know Your Well is a youth-driven education and outreach program designed to train high school students to sample and test domestic well water quality, as well as to evaluate factors leading to ground water contamination. Started in 2016 with a grant from the Nebraska Environmental Trust to the University of Nebraska-Lincoln (UNL), Know Your Well emphasizes proper domestic well water sampling and encourages students to compare results from classroom test kits to standard laboratory testing at the UNL Water Sciences Laboratory. Since its inception, the project involved students and teachers from 27 schools across Nebraska who sampled over 250 wells.



In fall of 2023, 15 schools across the state have active Know Your Well programs.

Water Sciences Laboratory supports student water quality research

By Emma Dostal, Communications Intern and Ann Briggs, Public Relations and Engagement Coordinator



Carolyn Billings



**BIRTH OUTCOMES
AND WATER**

Hands-on student training is a hallmark of the Water Sciences Laboratory. Students are trained in laboratory skills and provided a space to work on their research interests while contributing to existing projects. Over the past year, undergraduate student Carolyn Billings gained professional skills while contributing data and a new testing methodology to the Birth Outcomes and Water (BOW) project.

The BOW project analyzes the relationship between maternal exposure to drinking water contaminants and the child's health at birth including if a birth defect is present. It is intended as a pilot project designed to assess the feasibility of conducting a population-based study to evaluate relationships between adverse birth outcomes and maternal exposure to drinking water contaminants.

Billings was co-mentored by Dan Snow, Water Sciences Laboratory Director, and Martha Rhoades, Project Lead and Principal Investigator for the BOW project.

Billings began research with the lab to fulfill her University Honors Program senior thesis requirement. As a forensic science major, Billings "was looking for research in areas similar to [forensic science]." Her previous class knowledge of chemistry and investigative techniques allowed her to better analyze unknown drinking water contaminants: a reason for selecting the BOW project.

"I knew that I wanted my research project to allow me to familiarize myself with some of the instruments used in chemistry," Billings said.

For her thesis, Billings observed different extraction methods of N-nitrosoatrazine, atrazine, and atrazine metabolites from rat tissue to determine if the potency of these herbicides could be transferred from the mother and appear in placental tissues.

Through her research at the Water Sciences Lab, Billings learned real-world chemistry applications and took advantage of networking opportunities which have both helped her as she began career. After graduating in May 2023, Billings became a Forensic Scientist in the Drug Chemistry section at the Nebraska State Patrol Crime Lab.

To learn more about the BOW project and Billings's research, visit bow.unl.edu.

News from the Nebraska Water Center

2024 Spring Water Seminar Series

The Nebraska Water Center will hold the Spring Water Seminar Series again in 2024. The theme is Water, Wildlife, and Livestock. Speakers from across the country will consider how water quality and quantity impact livestock health and production, as well as wildlife habitat and endangered species.

The seminars will be held on January 31, February 14, February 28, March 20, April 3, April 17, and May 1. Each seminar will take place from 3:30 pm to 4:30 pm in the Hardin Hall Auditorium on UNL's East Campus. Seminars are open to the public and will also be streamed online via zoom. More details on the speakers and their seminar titles will be announced soon.

Two Agronomists recruited for next generation crop modeling

The Nebraska Water Center is recruiting two agronomists to work with the Central Platte and Lower Loup NRDs to apply corn and soybean models for management decisions. With funding from the USDA-ARS Adaptive Cropping Systems Laboratory in Beltsville, MD, we are working together to link corn, soybean, potato, rice, and cotton growth models to soil and estimate yield as functions of nutrient, moisture, and temperature stresses. The models are being extended to estimate leaching losses of nutrients and greenhouse emissions as functions of management practices, fertilization, and water application. Field testing for corn, soybean, and potato occurred for the last two growing seasons.

Beyond the Data: Tools for moving conservation agriculture from knowledge to action

By Crystal Powers, Research and Extension Communications Specialist

Are you interested in learning more about how to design programs that have impact? The Nebraska Water Center received a Professional Development grant from USDA North Central Region Sustainable Agriculture Research and Education to expand on a workshop created last winter. Increasing the adoption of sustainable agriculture innovations will require conservation professionals to not only understand and convey the technical aspects, but to understand how to best foster a communication environment that supports behavior change. The project will build participants' confidence and motivation to use social science tools in their programming. The training will increase participants' understanding of the basic social science and practical tools for reducing barriers for adopting sustainable agriculture practices. They can use these skills to co-create more actionable programs alongside farmers, leading to improved trust with farmers and implementation of more conservation on the land.

Crystal Powers and Ann Briggs will be hosting applied and interactive workshops over the next two years to help new conservation professionals and provide new tools for those more experienced. This includes:

Relationship building – talking with farmers

- Conversations & events designed for trust building
- Insights to farmers decision making: context, attitudes, norms
- Fostering a conservation ethic – motivational interviewing

Groundwater Modeling Training for members of the Nebraska Natural Resource Districts

By Ann Briggs, Public Relations and Engagement Coordinator

The Nebraska Water Center is partnering with the Nebraska Department of Natural Resources to provide trainings for Natural Resource District staff who want to learn more about groundwater modeling. Sorab Panday is leading these trainings. Sorab is Research Professor in UNL's Biological Systems Engineering program, a modeling consultant for the Nebraska Department of Natural Resources, and the lead author of on MODFLOW-USG, a groundwater modeling software released by the U.S. Geological Survey. He is a member of the National Academy of Engineering.

The training consists of two parts:

1. Basic modeling overview for those unfamiliar with MODFLOW and groundwater modeling.
2. A more in-depth modeling instruction for those who would like to make small changes to a groundwater model.

Part 1: Basic Modeling Overview

Part 1 was presented in October. The objective of this half-day seminar was to provide a basic understanding of groundwater modeling and of Standards and Guidelines of modeling and model reporting. The intended audiences for this seminar are hydrogeologists, managers, stakeholders, and decision makers who interact with groundwater

Program & Policy Planning

- Stages of change and influencing motivations & abilities
- Analyzing potential actions: benefits and barriers

Communication Design

- EAST: Easy ~ Attractive ~ Social ~ Timely

Farmer focus group

We will help your team facilitate a farmer focus group to help co-create the final products and provide feedback on your communication/program ideas.

The workshops are founded in social science, yet grounded in the experience of those in the field. It is based on three main sciences: **Social Marketing** seeks to develop and integrate marketing concepts with other approaches to influence behaviors that benefit individuals and communities for the greater social good. **Behavioral economics (nudging)**: combines elements of economics and psychology to understand how and why people behave the way they do in the real world. And a synthesis of **Conservation agriculture adoption research**.

If you are interested in participating in these sessions, please contact Crystal at cpowers@nebraska.edu.

flow and/or transport modeling products but may not be directly conducting the modeling studies.

The informal seminar included presentations on hydrogeology basics, groundwater flow modeling, groundwater transport modeling, and other relevant model types.

Part 2: More In-depth Modeling Instruction

Part 2 is scheduled to take place in January. The objective of this 3-day workshop is to provide a basic capability for manipulating a groundwater model and reviewing the results. The intended audiences for this workshop are hydrogeologists and groundwater modelers at all levels of expertise who want to review models, make small changes, and run or process results to evaluate the impact of changes.

The informal workshop will include presentations, discussions, and hands-on exercises on the following topics: understanding numerical groundwater flow model to be manipulated/reviewed, understanding capabilities of the software modules in the numerical model, and approaches to model review, making small changes, and analyzing results.

If you would like to participate in an upcoming workshop, contact Sorab Panday at sorab.panday@unl.edu.

USDA-NIFA Multistate Hatch Project seeks to understand and mitigate the impacts of agrochemicals

By Ann Briggs, Public Relations and Engagement Coordinator

Researchers from the Nebraska Water Center join experts from 20 other Agricultural Experiment Stations across the country to address the impacts of agrochemicals. This project, funded in part by the Multistate Research Fund through the United States Department of Agriculture's National Institute of Food and Agriculture (USDA-NIFA) is providing information and technology to farmers, government agencies, manufacturers, and others, helping them make prudent decisions that minimize the adverse impacts of agrochemicals while maximizing crop production.

Dan Snow, Water Sciences Laboratory Director, and Arindam Malakar, Research Assistant Professor, shed light on how heavy metals make their way from soil and irrigation water into edible plants. Their involvement in the Multistate Hatch Project also led to the development of ferrihydrite soil amendments and other management practices to improve food crop safety and water quality.

Researchers engaged in the Multistate Hatch Project are working together to:

- Monitor and characterize the fate of agrochemicals in agricultural, urban, and natural areas.
- Determine adverse impacts from agrochemical exposure to cells, organisms, and ecosystems.
- Develop tools to mitigate the adverse impacts of agrochemicals.

Learn more about USDA-NIFA's Multistate Research at <https://bit.ly/MRF-Agrochemicals2023>.

Nebraska Corn Board funds nitrate research

By Emma Dostal, Communications Intern

The Nebraska Corn Board granted Nebraska Water Center and Daugherty Water for Food Global Institute researchers funding for research on a new technique for reducing nitrate leaching below the root zone in irrigated cropland.

The study, titled "*Wood carbon subsoil amendment for sustainable corn production on sandy irrigated soils*," demonstrates the effectiveness of adding a subsoil wood carbon layer for improving groundwater quality in areas susceptible to nitrate leaching.

The research team is led by Dr. Daniel Snow, a research professor at the School of Natural Resources and Director of the Water Science Laboratory, part of the Nebraska Water Center. The research team includes Dr. Arindam Malakar, research assistant professor the School of Natural Resources and Nebraska Water Center; Dr. Daran Rudnick, associate professor of Biological Systems Engineering and irrigation management specialist; Dr. Aaron Daigh, associate professor and vadose zone scientist; Dr. Daniel Miller, USDA-ARS research microbiologist; Jeremy Milander, assistant extension educator; and School of Natural Resources graduate student Xiaochen Dong.

The researchers previously completed multiple bench tests and one growing season of demonstration testing in 2021. In that year, the researchers determined that by injecting a layer of locally produced, fine cedar or pine woodchips in the soil using a subsoil plow, soil nitrate leaching losses could be significantly reduced. There was no significant difference in yield between the controls and treatment plots in the preliminary study, indicating that there would be no effect to producer plots.

Dr. Arindam Malakar said, "we want to see if the previous wood chip application is still effective... we saw nitrate levels decrease in 2021 and we want to see it again this year. We also plan to inject additional

wood chips using a modification of the subsoil plow, to extend the effect of the treatment."

The researchers believe that nitrate-reducing microbes are stimulated by addition of woodchip organic carbon, thus preventing nitrates from leaching below the root zone.

Besides considering nitrate leaching, the research team is also considering carbon storage. Dr. Malakar said, "we want to see how much carbon we are locking in which can be used by producers to gain carbon storage credits."

The woodchip presence in the soil contributes to overall carbon capture and storage which is beneficial for reducing carbon emissions to the atmosphere.

The researchers will test different injection methods for placing the woodchips beneath the soil surface in the least amount of time. Researchers predict that this method will be a one-time injection for sandy, irrigated cropland. The estimated cost for adding these woodchips is expected to be similar to current costs for management practices such as cover crops.

The Nebraska Corn Board granted full project funding of \$95,506 to this research. This was the highest project grant from the Corn Board this year.

This two-year study started on July 1, 2023, and will last until June 30, 2025, at the Bazile Nebraska extension site.

For updates on this project visit watercenter.unl.edu or bgma.nebraska.gov/unl-demo-sites.

DWFI to lead new \$19 million USAID Feed the Future Innovation Lab

By Frances Hayes, DWFI Director of Communications and Public Relations

The U.S. Agency for International Development (USAID) has selected the Daugherty Water for Food Global Institute (DWFI) at the University of Nebraska to lead its new Feed the Future Innovation Lab for Irrigation and Mechanization Systems (ILIMS). The award was announced at the World Food Prize Borlaug Dialogue event in Des Moines, Iowa by Dina Esposito, the Assistant to the Administrator for the Bureau for Resilience, Environment, and Food Security (REFS) at USAID.

“Feed the Future Innovation Labs are driving novel solutions to the increasingly complex challenges we face today,” said Dina Esposito, Feed the Future Deputy Coordinator and USAID’s Assistant to the Administrator for Resilience, Environment, and Food Security. “Advancing this research is key to equipping small-scale farmers with the tools they need to boost yields, use resources more efficiently and be more resilient to shocks.”

The Innovation Lab will generate research-based evidence to support the growth of vibrant irrigation and mechanization markets, develop strong institutions and local capacity for their sustainability, and foster opportunities for equitable access in Feed the Future focal countries. The \$19 million core fund is provided over a five-year term with a potential extension to an overall ceiling of \$40 million.

Despite the development of many technologies, irrigation and use of agricultural equipment remains extremely low in most low- and middle-income countries. This is especially true for smallholder producers, including women, youth, and other marginalized groups. To address this, the Innovation Lab will conduct research to catalyze increased irrigated and mechanized production in an economically and environmentally sustainable way. The results will contribute to the U.S. Government’s Global Food Security Strategy’s objectives, which include inclusive and sustainable agriculture-led economic growth, improved resilience and better nutrition.

“Water use in agriculture is a global priority, as well as in Nebraska and the U.S. This Innovation Lab will work to improve global food security through science, technology and innovation by using the expertise and research capacity of DWFI, the University of Nebraska and our research partner consortium,” said Nicole Lefore, director of the

Innovation Lab and DWFI Associate Director of Sustainable Agriculture Water Management.

With more than 13 years of experience in the areas of global food and water security and its extensive international networks, DWFI is well positioned to lead the project. The Innovation Lab will be supported by the University of Nebraska and its deep bench of faculty expertise.

“Throughout its history, the University of Nebraska-Lincoln’s Institute of Agriculture and Natural Resources has focused on meeting producers where they are and collaborating to improve yield, profitability and resilience,” said Mike Boehm, NU vice president and Harlan Vice Chancellor for UNL’s Institute of Agriculture and Natural Resources. “The Daugherty Water for Food Global Institute is the piece of UNL that expands this important work and works with producers far beyond Nebraska. DWFI’s work is global, scalable and incredibly producer-focused. DWFI is a wonderful fit for this project, and I’m eager to see this work benefit producers and bolster food security.”

Research will develop innovations in irrigation and agricultural equipment suitable to developing countries, improved water governance and climate adaptation and mitigation, and strong market and finance systems for agricultural equipment. Learning from Nebraska and the U.S., the project will also strengthen approaches to protect water for improved nutrition and health. Across all activities, DWFI will integrate training and capacity development to support future water and agricultural leaders in science and practice.

The Innovation Lab will accelerate the impact of innovations through close engagement with stakeholder networks including leading research institutions, development organizations and industry. Early focus countries for the project include Nepal, Ethiopia, Rwanda, Ghana, Honduras and Guatemala, as well as the East and Southern Africa regions.

About the Daugherty Water for Food Global Institute

The Daugherty Water for Food Global Institute at the University of Nebraska was founded in 2010 to address the global challenge of achieving food security with less stress on water resources by conducting scientific and policy research, using the results to inform and advise policymakers, and educating future water for food leaders. The Nebraska Water Center is part of the Daugherty Water for Food Global Institute. Learn more at waterforfood.nebraska.edu.

About Feed the Future

Feed the Future is America’s initiative to combat global hunger and poverty. It brings partners together to help some of the world’s poorest countries harness the power of agriculture and entrepreneurship to jumpstart their economies and create new opportunities. For more information, visit feedthefuture.gov.



Derek McLean, dean of UNL Agricultural Research Division; Peter McCormick, DWFI Executive Director; Nicole Lefore, DWFI Associate Director of Sustainable Agriculture and Water Management; and Christopher Neale, DWFI Director of Research, attended the World Food Prize Borlaug Dialogue for the announcement of the Feed the Future Innovation Lab.

Feed the Future investments in global research led by U.S. land-grant universities such as University of Nebraska, bring major returns to U.S. farmers and consumers through scientific innovations in crop and food systems and better coordination of scarce natural resources. The programs also strengthen farmer resilience to shocks and enable countries to mitigate and respond to crises, reducing the need for emergency assistance.

“This is an especially significant investment in securing water and increasing productivity in small-holder agriculture around the world and, along with our partners, delivering on our mission of a water and food secure world,” said DWFI Executive Director Peter McCornick.



New publication examines stress and support for groundwater policies

By Karina Schoengold, NWC Associate Director



Karina Schoengold

The Nebraska Water Center’s Associate Director, Karina Schoengold, is part of a research team that recently published a journal article that examines stress and support for groundwater policies. Titled “Seasons, stress, salience, and support for cooperative groundwater management”, this article is forthcoming in the Journal of the Agricultural and Applied Economics Association (JAAEA).

Common property resources (CPR) are defined as resources where one person’s use affects what is available to others

(either now or in the future). One example of a CPR is a shared aquifer, where multiple users have access to the groundwater. Economic researchers have shown that with a CPR, there are economic benefits to regulating the use of the resource, and that well-designed regulation increases the sustainability of agricultural-based economies that rely on CPRs.

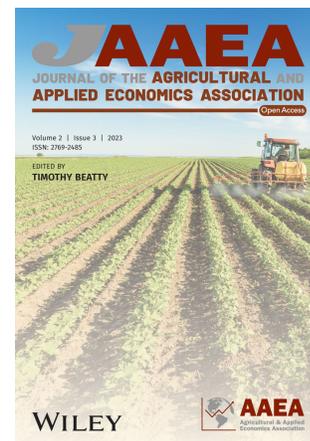
Many such regulations exist, and examples include allocation limits in some of Nebraska’s Natural Resources Districts and Kansas’s Groundwater Management Districts, as well as groundwater fees in Colorado’s San Luis Valley. However, there are a number of reasons that CPR users may not support regulation. These reasons include the associated short-term cost, financial constraints, a lack of trust that there will be long-term benefits, and time pressures that limit the opportunity to carefully consider all outcomes.

The recently published article examines the relationship between season, stress, salience, and support for groundwater management. In groundwater management, cooperation can be realized through policies that incentivize restraint in extraction to extend the life of the aquifer. While collective management is affected by the incentives faced by resource users, there remains incomplete knowledge about how cognitive processes affect collective management.

Existing research on the relationship between stress, salience, and cooperative behavior is limited, and much of it is from a developing country context. One challenge in determining the relationship between these various factors is that it is difficult to isolate individual preferences from stress or salience. For example, preferences for groundwater management may increase (or decrease) during relatively dry periods because water availability is a more immediate concern. Preferences may also change due to other types of stress, such as working long hours or increases in input prices. However, to measure these impacts, it is essential to collect information from the same individuals over time, in order to evaluate the relationship between changes in preferences and changes in stress or salience (issue prominence) that can be separated from other individual characteristics.

The study found that seasonality and changing concerns in variables that measure the salience of prices and weather are associated with preferences for groundwater management that may enhance or detract from collective action. Support for groundwater management is generally found to be lower in the fall compared to the spring. Additionally, increased concerns over output price changes are associated with less support for groundwater management, while concern over weather and groundwater scarcity is associated with greater support for groundwater management. This suggests that the salience of specific factors may determine support for collective action related to groundwater conservation.

The full article is available at <https://doi.org/10.1002/jaa2.78>.



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