

## **WEATHER READY FARMS: CREATING RESILIENT, HEALTHY, And EQUITABLE AGROECOSYSTEMS**

**PI: Craig Allen, Ph.D:** *Director of the Center for Resilience in Agricultural Working Landscapes and Professor, School of Natural Resources at UNL.* Expertise: assessing and fostering resilience in agricultural landscapes

### **MANAGEMENT AND CONVERGENCE TEAM**

Composed of Eric Hunt (Application and Implementation), Craig Allen (Basic Resilience Science), and Stacy Asher (Humanities Integration). See personnel details above and below.

### **PROJECT TEAM**

**Co- PI: Eric Hunt, Ph.D:** *Weather Ready Farms Director; Climate Resilient Agriculture Extension Educator at Nebraska Extension; University of Nebraska.* Expertise: agricultural meteorology, drought, climate change

**Co-PI: Nathan Mueller, Ph.D:** *WRF Assessment & Verification Coordinator; Nebraska Extension Water and Integrated Cropping Systems Educator.* Expertise: agronomy, soil health, diversified cropping systems, and stakeholder engagement

**Candace Hulbert:** *WRF Interim Assistant Coordinator; MPS Graduate Student in the Department of Natural Resources at Cornell University.* Expertise: project management, grant coordination, agriculture systems research, and voluntary participation methods

**Co-PI: Amy Timmerman:** *WRF Education Coordinator; Nebraska Extension Water and Integrated Cropping Systems Educator.* Expertise: plant pathology, diversified cropping systems, water quality, and stakeholder engagement

**Co-PI: Bruno Patias Lena, Ph.D:** *WRF Project Implementation and Designation Coordinator; Nebraska Extension Water and Integrated Cropping Systems Educator.* Expertise: crop water demand, irrigation scheduling, soil moisture sensing technologies, soil-water-plant-atmosphere relations, precision irrigation stakeholder engagement, and voluntary participation methods

**Daniel Hulbert:** *Climate Resilient Agriculture Development AmeriCorps VISTA.* Expertise: grant writing, developing tracking systems, and capacity building

### **ECOLOGICAL RESILIENCE TEAM**

Craig Allen (see contact PI)

**Andrew Little Ph.D:** *Assistant Professor in the School of Natural Resources at UNL. Landscape Habitat Management- Nebraska Extension Specialist.* Expertise: precision agriculture.

**Co-PI: Gwendwr Meredith, Ph.D:** *Professor in the School of Natural Resources at UNL; Social-Ecological Rangeland Scientist.* Expertise: resilience in agricultural landscapes, social learning and collaborative process evaluation

**Daniel R. Uden, Ph.D:** *Assistant Professor in the School of Natural Resources and Department of Agronomy and Horticulture at UNL.* Expertise: range and forage sciences, resilience, spatial science, and landscape ecology

### **SOCIAL RESILIENCE TEAM**

**Co-PI: Tonya Haigh, Ph.D:** *Research Assistant Professor and the Social Science Coordinator for the National Drought Mitigation Center at UNL.* Expertise: adaptive capacity of agricultural producers and others to cope with drought

**Co-PI: Stacy Asher:** *Associate Professor of Art (Typography, Publication, Exhibition, And Social Design) at UNL.* Expertise: art, design, ecology, rural land use, publication design, interactive and traditional print media

**Theresa James:** *Nebraska Extension Associate Extension Educator.* Expertise: horticulture, turf, and landscape systems

**Maegan Ludena Llanos:** *UCARE WRF Graphic Design Intern; Undergraduate student in the College of Architecture at UNL.* Expertise: social design, architecture, graphic design, and social media management

**Co-PI: Stacey Hoffman, Ph.D:** *Senior Research Manager at the University of Nebraska Public Policy Center.* Expertise: disaster behavioral health and program evaluation

**Martha Durr, Ph.D:** *Director of Nebraska State Climate Office and Associate Professor of Applied Climate Science in the School of Natural Resources at UNL.* Expertise: applied climatology,

**Gwendwr Meredith** (see Ecological Resilience Team)

#### **FINANCIAL RESILIENCE AND PROFITABILITY TEAM**

**Co-PI: Cory Walters, Ph.D:** *Associate Professor in the Department of Agricultural Economics at UNL.* Expertise: *Decision making in uncertainty, risk management, and crop insurance*

**Jessica Groskopf:** *Agricultural Economics Nebraska Extension Educator.* Expertise: risk management and crop production

#### **DISASTER PREPAREDNESS AND RECOVERY TEAM**

**Co-PI: Soni Cochran:** *Disaster Education Coordinator and Extension Educator.* Expertise: disasters, disaster preparedness and recovery, and rural mental health

**Aaron Yoder, Ph.D:** *Associate Professor in the Department of Environmental, Agricultural and Occupational Health at the UN Medical Center.* Expertise: occupational safety and health for agricultural workers

#### **CROPPING SYSTEM RESILIENCE TEAM**

Nathan Mueller, Amy Timmerman, Bruno Patias Lena (see project team)

**Co-PI: Carolina Córdova, Ph.D:** *Assistant Professor and Statewide Soil Health Specialist at UNL.* Expertise: soil and water sciences

**Mitiku Mamo:** *Nebraska Extension Cropping Systems & Water Educator.* Expertise: soil health, cropping systems, and soil management

**Todd Whitney:** *Nebraska Extension Cropping Systems & Water Educator.* Expertise: water quality, pesticide application, and water management

**Daren Redfearn, Ph.D:** *Professor in the Department of Agronomy and Horticulture at UNL; Water and Integrated Cropping Systems Hub Coordinator.* Expertise: integrated forage, crop, and beef systems

**Christian Stephenson, Ph.D:** *Assistant Professor of Agronomy and Horticulture at UNL.* Expertise: landscape and regional food systems sustainable management of specialty crops

#### **LIVESTOCK RESILIENCE TEAM**

**Co-PI: Amy Schmidt, Ph.D:** *Associate Professor of Biological Systems Engineering and Animal Science at UNL; Livestock Bioenvironmental Engineer.* Expertise: animal manure and mortality management, contaminant fate and transport, and water quality

**Lindsay Waechter-Mead:** *Livestock Systems Extension Educator.* Expertise: beef cattle, herd health calf and heifer management, cow-calf

**Wayde Pickinpaugh:** *Livestock Systems Extension Educator.* Expertise: Beef cattle nutrition, adult education, and beef.

**Gustavo Castro Garcia:** *Ph.D. student in Biological Systems Engineering at UNL.* Expertise: animal manure management, water quality, and nutrient management

**Galen Erickson, Ph.D:** *Professor of Animal Science at UNL.* Expertise: ruminant nutrition, Nebraska cattle industry, and Extension

**Ryan Benjamin:** *Livestock Systems Extension Educator.* Expertise: rangeland ecology and watershed management

**Rick Stowell, Ph.D:** *Professor of Biological Systems Engineering and Animal Science at UNL.* Expertise: animal housing systems, heat stress abatement, and control of odor and gas emissions

**Ben Beckman:** *Livestock Extension Educator.* Expertise: beef systems, pasture, and forages

**Proposed Project Period:** 5 Years

**Estimated Project Budget:** \$4,390,051

## 2) PROJECT SUMMARY

**Challenge:** Climate change is increasing the frequency and magnitude of extreme weather events, creating compounding risks and vulnerabilities to producers who must also navigate uncertainty with changing market and policy environments. Disasters in the agricultural sector negatively impact ecosystem resilience and biodiversity; crop yields; farm profitability; human health and safety; rural infrastructure; social vulnerability and environmental justice; and livestock production. These disasters are also increasingly frequent and expensive. Global change impacts on agricultural landscapes are highly consequential, but assessing agricultural resilience is in its infancy. To reduce vulnerability and risk, producers must increase both adaptive capacity and resilience in the context of internal and external forces and policy that will drive future changes in agriculture. Institutional support structures, including university extension systems, must therefore be transformed to advance voluntary adoption of climate-smart and resilient agricultural practices and meet future demands for food, energy, and fiber.

**Vision:** Weather Ready Farms (WRF) is a two-year (per producer) climate-smart agricultural education program offering farmers strategies to prepare for and recover from extreme weather events and the effects of climate change and other stressors. WRF reimagines climate resilient agricultural systems and communities by fostering whole-farm adaptation, social-ecological resilience, and circular economy solutions. WRF employs a systems-based approach to addressing climate mitigation strategies. This includes reducing emissions and on-farm waste, protecting natural resources, and empowering producers to address location-specific risks and vulnerabilities exacerbated by climate change and extreme weather events. WRF connects producers to mentorship, education, project funding, disaster and risk management planning resources, and peer-to-peer support networks while advancing theory and knowledge of agricultural resilience.

**Goal:** Foster resilient, healthy, equitable, and profitable agroecosystems using applied agricultural systems research, education, and extension while advancing our basic knowledge of sources of resilience in agriculture.

**Themes:** We primarily address the themes of **climate resilience** and **sustainable food and water security**. Our proposal also addresses science and technology literacy; health equity; and anti-racism and racial equity.

**Objective 1:** Co-produce an adaptive vulnerability and resilience assessment framework and curriculum for enhancing the resilience, health, and equity of enrolled agricultural operations. **Objective 2:** Support 75 operations through each stage of the designation process, over 5 years. **Objective 3:** Test and advance strategies for increasing agricultural systems resilience and encouraging adoption of more resilient and climate-smart practices. **Objective 4:** Coordinate transdisciplinary collaborative projects that increase climate science resilience literacy, resilience of agricultural systems, and strengthen rural prosperity. **Objective 5:** Partner with additional universities, private industry, and the Extension Foundation (existing partnership) to scale impact to national and international levels.

**Novelty:** WRF employs a systems-based approach to addressing agricultural climate mitigation and adaptation strategies, examining the nature of dynamic and resilient agroecosystems that are influenced by environmental, social, economic, political, and institutional factors. WRF blends application and advancement of basic science. WRF presents a novel opportunity to increase whole-farm resilience. WRF is founded on the concept of applied panarchy (cross-scale structure and dynamics posited to underlie resilience), which examines the relationship between human and environmental systems across local, national, and global scales. Social-ecological system dynamics in agriculture are under-studied, but increasingly important for understanding sources of risk and vulnerability and opportunities to increase agroecosystem resilience. Additionally, the WRF designation process is an innovative extension strategy, focused on building interpersonal relationships with participants and their networks of agri-service providers, decreasing knowledge gaps, and increasing technological advancement and literacy.

**Impact:** WRF will foster pathways toward agroecological resilience, improve sustainability and adaptive capacity across environmental, social, economic, and institutional spheres that in turn will increase rural prosperity.

### 3) NARRATIVE

#### 3.1 SIGNIFICANCE AND IMPACT

**Significance:** Weather Ready Farms (WRF) is an innovative, transdisciplinary, and trailblazing program that utilizes collaborative research, education, and outreach to address agricultural systems resilience to climate change. WRF reimagines climate resilient agricultural systems and communities by fostering whole-farm adaptation, social-ecological resilience, and circular economy solutions. The WRF team will co-create agroecological resilient landscapes by addressing both *climate mitigation* and *climate adaptation*. Climate mitigation includes reducing carbon emissions, protecting natural resources, and reducing on-farm waste streams and climate adaptation will be achieved by empowering farmers and ranchers to prepare their operation to address the specific risks and vulnerabilities exacerbated by climate change and extreme weather events. Increasing preparedness and risk management from all spheres of influence will allow a more holistic and complete understanding of on-farm risk, which will lead to increasing financially resilient operations. WRF will become a framework for interpersonal and equitable voluntary participation extension work that caters to the specific needs of stakeholders while encouraging farmer-led innovation and experimentation. Our proposed theory of change in WRF also demonstrates a plan for revolutionizing agricultural production systems and rural communities and the WRF team not only in Nebraska, but throughout the US and internationally.

**Impact:** WRF will foster pathways toward agroecological resilience, improve sustainability and adaptive capacity across environmental, social, economic, and institutional spheres that in turn will increase rural prosperity. WRF will increase ecological resilience, reduce emissions, and increase regenerative approaches. WRF will strengthen the bioeconomy in the context of future demands on agriculture, using agronomic management practices that enhance soil health, and cycle carbon and nutrients more efficiently at the farm and regional level. WRF will grow the adaptive capacity of livestock production systems by improving manure management and increasing livestock disaster preparedness and recovery. Social resilience and equity will increase through professional development and community education projects. Access to food, water, shelter, mental health resources, emergency services, and many other social resources will increase. WRF will create more financially resilient and profitable agricultural operations, helping participants manage risk, increase their financial literacy, and budget for resilient agroecosystems. WRF will increase participants' preparedness for extreme weather, teaching them how to reduce farm risk and vulnerabilities, recover quickly, and build-back-better after disasters.

**Grand Challenge Themes:** **Climate Resilience:** WRF builds resilience in agriculture through both mitigation and adaptation strategies. Efforts toward climate mitigation will include community projects to increase climate resilience and agricultural literacy (including for K-12 students), on-farm projects that reduce greenhouse gas emissions, and community art projects to inspire agricultural climate mitigation strategies. WRF supports climate adaptation by facilitating collaborative learning environments, mentorship, an adaptive vulnerability and resilience assessment and curriculum, project funding, resilience toolkits, and farmer-to-farmer social networks to help participants and community stakeholders prepare for extreme weather and climate change. **Sustainable Food & Water Security:** Participants will learn water management strategies to adapt to drought and flooding, while also protecting surface water and groundwater from agricultural pollution. Additionally, WRF will help build a more climate resilient regional food system. **Science and Technology Literacy for Society:** The WRF team will develop education and outreach materials to teach participants and community stakeholders about the importance of resilience and healthy, and equitable agroecosystems. **Health Equity:** Community projects aimed at enhancing social resilience and disaster preparedness and recovery will help increase rural health equity. Participants will take first aid and CPR training, learn about occupational hazards and how to minimize risks to their health, and receive emergency preparation supplies to create disaster response kits. Disaster mental health resources will also be developed.

#### 3.2 PLAN OF WORK

##### 3.2.1: VISION, GOALS, OBJECTIVES

**Vision:** WRF reimagines climate resilient agricultural systems and communities by fostering whole-farm adaptation, social-ecological resilience, and circular economy solutions. Weather Ready Farms is a two-year climate-smart agricultural education program offering farmers strategies to prepare for and recover from extreme weather events and the effects of climate change and other stressors. WRF employs a systems-based approach to addressing climate mitigation and adaptation. This includes reducing emissions and on-farm waste, protecting natural resources, and empowering producers to address location-specific risks and vulnerabilities exacerbated by climate change and extreme weather events. WRF connects producers to mentorship, education, project funding, disaster and risk management planning resources, and peer-to-peer support networks while advancing theory and knowledge of agricultural resilience.

**Goal:** Foster resilient, healthy, equitable, and profitable agroecosystems using applied agricultural systems research, education, and extension while advancing our basic knowledge of sources of resilience in agriculture.

**Objective 1:** Co-produce an adaptive vulnerability and resilience assessment framework and curriculum for enhancing the resilience, health, and equity of agricultural operations.

**Objective 2:** Support 75 farms (five cohorts of fifteen participants) through each stage of the designation and assessment process.

**Objective 3:** Test and advance strategies for increasing agricultural systems resilience and encouraging adoption of more resilient and climate-smart practices.

**Objective 4:** Over five years, coordinate transdisciplinary collaborative projects that increase CSAF literacy, resilience of agricultural systems, and strengthen rural prosperity.

**Objective 5:** Expand WRF impact to national and global levels to increase agricultural system resilience at greater scales.

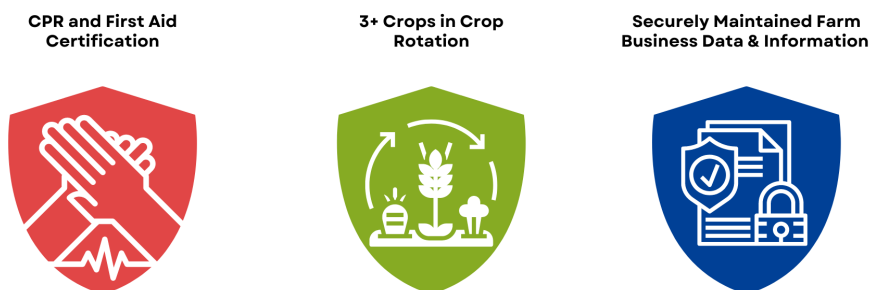
### 3.2.2 APPROACH

**1) Building Capacity (September 1, 2023- June 30, 2024):** The first action item during the capacity building stage is to create a *Vulnerability and Resilience Assessment Framework*. This will establish a comprehensive and holistic framework for examining the resilience, health, and financial equity of an individual farm operation for all participants. This assessment will be informed by and adapted from the following documents: [2020 Resilient Agriculture; Weather Ready Farms Efieldbook](#), the 2021-2023 WRF pilot assessment, the [Resilience Alliance Assessment](#), and the 2023 WRF Vulnerability and Resilience System Mapping project, and peer-reviewed literature. This assessment will be put on Qualtrics to enable project mentors to use tablets to conduct the assessment with program participants. The assessment will review on-farm practices for each resilience focus area (Fig. 1). These focus teams include ecosystem resilience, cropping system resilience, livestock system resilience, social resilience and equity, financial resilience and profitability, and disaster preparedness and recovery.



*Figure 1 - Categories for Vulnerability and Resilience Assessment- The graphic shows potential focuses for assessment categories that will be developed.*

The Vulnerability and Resilience Assessment will have a corresponding badge system to encourage and reward participants for implementing new resilient practices. Each category of the assessment will have a visual icon to symbolize completion of activities in that area. See Figure 2 for example badges. Digital badges will be given on the learning management system of the Extension Foundation Online Campus, and physical prints of the badges will be added to participants' field signs. This badge system will be developed by the art and design team during the first year of the project.



*Figure 2- Weather Ready Farms Badge System. These graphics show a few examples badges that participants could receive for finishing categories in the assessment.*

Additionally, The WRF curriculum will be added to the WRF course on the [Extension Foundation Online Campus](#), a learning management system (LMS) managed by the Extension Foundation. The LMS will help participants easily access education and serve as an important tracking system for the designation program. The *Vulnerability and Resilience Assessment, Badge System*, and *Curriculum* are imperative for supporting farmers through the designation process and serving as a tool for project evaluation.

During the first six months of the project, our team will also update the Weather Ready Farms Strategic Plan. The WRF Strategic Plan offers an intensive literature review explaining the impact of extreme weather events and climate change, socio-economic and environmental vulnerabilities, and exposures that create risk in agricultural systems. This plan will also include a more detailed approach section, full project evaluation plan, collaborators roles and responsibilities, and plans for future expansion.

One of the objectives of WRF is to enable today's students to become leaders. Therefore, WRF will be fifty-percent student run, involving students in every stage from development to implementation. To increase graduate student involvement, WRF will create employment and internship opportunities for graduate students (6 positions/year for 5 years). Graduate students will have the opportunity to co-lead one of the six resilience focus teams. This opportunity will build their professional skills and networks while providing experience with transdisciplinary research, education, and extension projects. Many projects and research will be driven by graduate students with mentorship from their advisors and other professors in the program. To increase undergraduate student involvement, WRF will host 6-10 undergraduate internships throughout the project. Professors from each of the focus teams and the graduate students will mentor the undergraduate interns. Potential internship experiences will be transdisciplinary, ranging from graphic design and community art projects to financial risk management, depending on the interest of the students.

Furthermore, WRF will build internal capacity and increase its leadership capacity by hiring an Assistant Director to assist the director in managing program activities, supporting the designation process, conducting research and outreach efforts, and facilitating collaboration. This person would ideally be in place by the end of 2023. To build additional program capacity, collaboration, and facilitate program sustainability, WRF will recruit and sponsor 3 [AmeriCorps VISTAs](#) per year to build capacity for program management and project sustainability. AmeriCorps VISTAs will complete a service year with WRF and help support farmers and ranchers in Nebraska to create more resilient farms. These service members will generate additional project funding; manage volunteers; build and manage program tracking systems; and assist program staff with research, extension, and outreach. The WRF Director and



Assistant Director will co-supervise these VISTAs and provide mentorship during their service year. For long-term capacity building and professional development opportunities, WRF will offer professional development opportunities for project collaborators related to: 1) diversity, equity, inclusion, and accessibility (DEIA) and trauma-informed extension work; 2) emergency response training; 3) and data management. Additionally, to help build student professional development, WRF will integrate our efforts and projects into 1-2 courses a year at the graduate and undergraduate levels. Collaborating professors will design assignments, host guest lecturers, create projects, and conduct field trips to teach students about agroecology, agricultural systems research, voluntary adoption strategies, climate-smart agriculture initiatives, emergency management and preparedness, diversifying cropping systems, resilience communications, environmental justice, indigenous ways of knowing, financial risk analysis, food security and access, increasing equity for diverse farmers and ranchers, and many other efforts.

**2) Designation Process:** Agricultural producers that participate in the WRF program will complete *five stages* to earn designation as a “Weather Ready Farm”. These stages include assessment, education, project implementation, verification, and designation. Each stage is aimed at building farmers and ranchers understanding of vulnerabilities and resilience opportunities on their operation. WRF emphasizes participant involvement in decision making, creates learning environments for peer-to-peer education, and works to empower producers during high stress events.

**Recruitment (3 months):** Farmers and ranchers are recruited and apply to participate in the WRF program to improve the sustainability and resilience of their operations. To encourage participation and reward farmers for their time and labor, WRF will offer a \$1,000 participation stipend. We plan to recruit two fifteen-person Winter and Summer cohorts each year from July 2024 through July 2026, with each cohort in the program for two years. Participant recruitment will occur through outreach campaigns and advertising at university sponsored events. Participants will also be able to register to participate on the WRF website.



**Stage 1- Assessment (3 months):** When participants enroll in the program, they are assigned two Nebraska Extension project mentors who work with each participant through each stage of the program. Project mentors will be Extension educators from Water and Integrated Cropping Systems (WICS), Livestock Systems, and Nebraska Regional Food Systems Initiative (NRFSI) programs. Project mentors will be assigned based on the specific needs and commodities produced. For example, if the participating operation is a mixed livestock and corn/soybean operation, they will be assigned a livestock system and a WICS educator. If the participating operation is mostly vegetable crops or urban agriculture, they will be assigned horticultural specialists. After project mentors are assigned, *project mentors will conduct an on-farm vulnerability and resilience assessment for program participants.* After the assessment, the WRF team will collaborate to develop individualized educational learning plans for each participant. These individualized learning plans will break down the assessment by each category and recommend practices and education that participants should explore. During the on-farm assessment, WRF field signs will be put in place to indicate program participation and increase program recognition in the community. Project mentors will continue to meet one-on-one monthly with their mentees to guide participants through each stage of the designation process.



**Stage 2-Education (18 months):** Participants will attend a variety of free webinars, field days, and programs from Nebraska Extension and our educational partners. Producers will complete 40 hours of education over 18 months. Curriculum will follow categories identified in the vulnerability and resilience assessment that will be developed in the first nine months of the project. The WRF team will curate existing educational resources (in-person and online) from program partners and coordinate educational opportunities (webinars, meetings, and conferences) for program participants to help them complete categories in the assessment. WRF will share educational opportunities with participants and community stakeholders from the list of educational partners (see figure #). Additionally, each participant will have a \$1000 education stipend they can access to be reimbursed for the cost of attending educational events. This new curriculum will be hosted on the [Extension Foundation Online Campus](#), a learning management system (LMS) managed by the Extension Foundation. Participants will enroll in this online course and earn digital badges for completing assessment categories.



**Stage 3-Project Implementation (3-6 months):** While participants are completing their required education, they will also implement at least one on-farm project to improve their ability to respond and recover from extreme weather events. Participants will receive \$5000 to implement a project of their choosing on their farm related to resilience and reducing vulnerability. Project mentors will offer suggestions, but program participants will be free to select a project most relevant to the location of their operation and specific on-farm risks. This project autonomy is meant to involve participants in the decision-making process, respect cultural practices and diversity, reduce barriers of implementing more climate resilient agriculture practices, and encourage farmer-led innovation and experimentation.

One major barrier to implementation of climate-smart and weather-ready practices is a lack of time or inefficient labor availability and knowledge on how to implement a project that could increase resilience. Bringing on service members to help build and set-up on-farm projects will target this barrier which will increase the likelihood of voluntary adoption of climate-smart and weather-ready practices. WRF will work with UNL to apply to be a host site for direct service members (AmeriCorps NCCC and Civilian Climate Corps) to assist with labor capacity for on-farm project implementation for program participants. WRF will recruit and sponsor 1-3 [AmeriCorps NCCC](#) service members and [Civilian Climate Corps](#) members to assist with on-farm project implementation. AmeriCorps NCCC and Civilian Climate Corps members dedicate a year to direct service in the field. The WRF Director and Assistant Director will co-supervise these service members and provide mentorship during their service year. Additionally, these service members will receive valuable professional development opportunities and networking opportunities to further their future career pursuits.



**Stage 4-Verification (2 months):** When participants have completed their education and projects, an on-farm verification will be scheduled. To limit bias, participants' project mentors will not assess participants' farms during the verification stage. Other members of the WRF team will serve as verifiers to ensure fairness and completion. The reviewers will visit participants' farms to assess the changes the participants have made according to their individualized learning plan and projects. If the reviewer finds there is still work that needs to be done, they will offer recommendations for improvement and a follow-up assessment will be scheduled. If a participating farm does not complete the verification stage during the two-year program due to circumstances outside a participant's control, they will be allowed to apply for an extension for up to two years.



**Stage 5-Designation (1 month):** To earn designation as a "Weather Ready Farms" participants must 1) complete each program stage and 2) complete one element in at least five focus areas (ecological resilience, cropping system resilience livestock resilience, social resilience and equity, financial resilience and profitability, and disaster preparedness and recovery). Completing at least 60% of the elements in the assessment will receive designation as a "Weather Ready Farm." Designation indicates that the participants' farm is adaptive, prepared, and resilient to unprecedented change. We will recognize our participants by hosting an annual awards banquet to honor their completion of the program.

**3) Community Projects:** While the designation process takes place, additional projects to increase agricultural system resilience will be implemented. Over the 5-year project period we will coordinate transdisciplinary collaborative projects to increase agricultural system resilience. **Design Projects:** The WRF art and design team will create graphic design elements and digital campaigns that help increase program recognition as well as engage with stakeholders about the importance of climate-smart agriculture and emergency management. The design team will develop and increase the brand recognition and trust stakeholders have in the program with intentional design theory. **Community Art Projects:** The team will coordinate community programming that allows participants to co-author content through storytelling activities and creative place-making opportunities. **Climate Resilient Agriculture Literacy Projects:** The WRF team will produce education and outreach materials for participants and community stakeholders about the value and need for resilient, healthy, and equitable agroecosystems. **Climate Resilient Food Systems Projects:** The WRF team will partner with the Nebraska Regional Food Systems Initiative (NERFSI) team to increase supply chains toward climate-resilient regional food systems.



Education and outreach materials will be developed to teach program participants and rural communities about the importance of regional food systems in climate mitigation and creating more resilient communities. This partnership will also help to connect WRF participants to local grocery stores and farmers markets if they are interested in connecting with regional food markets. Also, farmers and ranchers involved in NERFSI will also be able to apply and take part in WRF to increase their ability to prepare for and recover from climate change and extreme weather events. **Designing Agro-ecological Landscapes (Landscape Architecture, CRAWL):** Design an agroecological landscape for each program participant. Each participant will receive multiple examples of what they can do to improve their farm resilience. Redesigning farms to include measures that regenerate natural landscapes and conserve native ecosystems. Specific topography, soil type and health, agricultural commodities produced, water availability, culture, and many other factors will contribute to these landscape designs. Program participants will work with the design team during the modeling stage and make the final decision on how they want their farms to look. **Resilient Architecture Projects:** Build on-farm infrastructure projects centered on building-back-better after disasters and creating more resiliently engineered structures. These projects will be designed by UNL faculty members and students and built by AmeriCorps NCCC and Civilian Climate Corps members. **Climate Change Mitigation Projects:** Help program participants and community stakeholders implement on-farm climate mitigation projects that help reduce greenhouse gas emissions related to agriculture. **Climate Resilient Agriculture Literacy Projects for Youth:** We will work with local K-12 school districts and state-level Future Farmers of America (FFA) organizations to develop age and location-specific material to optimize climate resilient agriculture education in our communities.

### 3.2.3 NOVELTY

Although there are agricultural education programs that focus broadly on resilient agriculture, none are as comprehensive, individualized, and transdisciplinary as WRF. Our approach combines the development of basic science with practice, through Nebraska Extension, to address components of resilience science traditionally omitted by others, including the potential for catastrophic regime shifts. Although regime shifts are rare, especially compared to dynamics where recovery is possible, the consequences of a regime shift are large. A well-known example of an agricultural regime shift is the Dust Bowl. Assessment of resilience in agriculture is poorly developed, and generally only focuses on bounce-back dynamics.

***Scaling-Up Impact:*** To test effectiveness of initial concepts, WRF has been running a pilot of eight farmers from southeastern Nebraska and a coordinating pilot of five farms in Indiana through a partnership with Purdue University since November 2021. The pilot will be fully completed by August 2023 with all eight Nebraska farmers earning designation. The pilot demonstrated weaknesses in the initial project concept. We realized that the program focused too narrowly on protecting commodity grain crops from extreme weather events and did not address the root causes of on-farm risks and vulnerabilities. Changing a handful of agronomic practices will not necessarily lead to system level changes in agricultural resilience that are necessary to combat and adapt to climate change. Conversely, a focus on whole-farm resilience allows us to capture the dynamic nature of human-coupled social and environmental systems. Therefore, ***the primary goal of WRF is to create resilient, healthy, and equitable agroecosystems.*** Resilient agroecosystems consider the environmental, social, economic, political, and institutional factors that impact overall resilience and sustainability. To create resilient agroecosystems, we must use place-based approaches to create diverse landscapes and apply concepts of panarchy. Panarchy is a theory of change that describes within and across scale dynamics in systems of people and nature; panarchy underlies resilience and frames systems dynamics as linked across scale, linking cycles that are small and fast to cycles that are large and slow (Gunderson and Holling, 2002). To avoid catastrophic regime shifts that negatively impact agricultural production and rural livelihoods, WRF will implement applied panarchy at the individual, community, and institutional levels. To scale these efforts to the national and international levels, WRF will become adaptive and modular climate resilient agriculture programs that can be implemented at and university nationally and internationally, particularly

those with existing extension systems. See Figure 3 to understand our proposed theory of change for scaling impacts from a pilot project to creating resilient agricultural landscapes.

## Weather Ready Farms Theory of Change

How our proposed goals and objectives will create transformation across human systems, landscapes, institutions, and ecosystems.

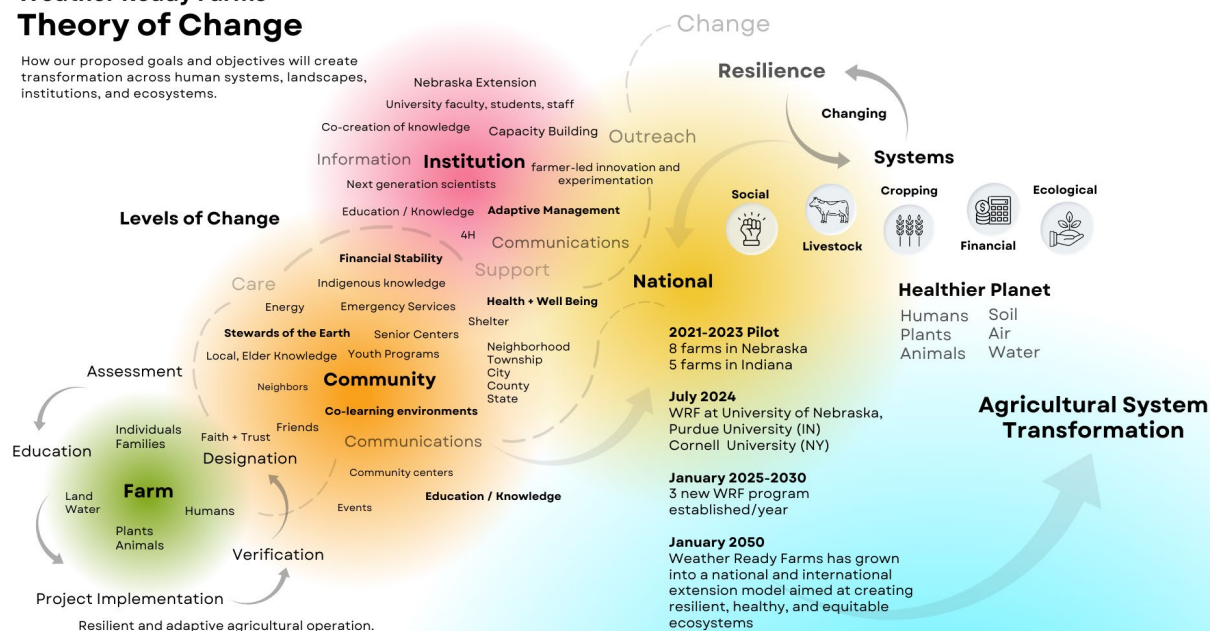


Figure 3- Weather Ready Farms Theory of Change. The theory of change model shows how our proposed goals and objectives will create transformation across human systems, landscapes institutions, and ecosystems.

**Farmers As Cocreators of Knowledge:** WRF is a voluntary participation extension program that uses a bottom-up grassroots approach to learning with the goal of **empowering participants** to make their own resilience decisions and create local resilient agricultural leaders in the community. Instead of the traditional extension model that demonstrates a top-down transfer of technology and knowledge (Chambers and Jiggins, 1987) we aim to create safe, collaborative, diverse, and equitable learning environments to allow a non-hierarchical epistemological structure (co-learning environments) between the WRF team and the communities we serve. Our program participants are valuable sources of local and indigenous knowledge, and the project team has much to learn from our participants as they do from extension experts and researchers in the field. Building trust and interpersonal connection between the WRF team and program participants is meant to encourage the adoption of more climate resilient practices.

**Social Contagion:** Social contagion describes the process by which behavior, emotions, or conditions spread spontaneously through a group or network after groups are exposed to a social stimulus that causes these groups to imitate the new behaviors (Colman, 2022). Transformative change can take several forms, but the most effective approach is small-scale modifications at the individual level, in this case at the farm level, that promote the spread of positive practices via peer-to-peer learning networks and community interactions (Chaffin et al. 2016), and that scale up from farms to landscapes. WRF creates a peer-to-peer learning network of producers and extension educators that support each other and learn together as they collectively respond to extreme weather and climate change. As a result, producers and extension educators will be better able to advocate for change and serve as ambassadors of resilient practices in their communities and extension education systems, respectively. With sufficient peer-to-peer uptake, landscapes will change, and we will assess this shift with social contagion analyses and landscape

resilience assessments at the end of our project. Evaluation of social contagion is described in the evaluation plan.

### **3.2.4 RESEARCH, SCHOLARSHIP, CREATIVE ACTIVITY, EDUCATION & ENGAGEMENT**

***Agricultural Systems Research Overview:*** Over five years the WRF team will be conducting transdisciplinary mixed-methods research (social sciences, natural sciences, and humanities) to: 1) investigate drivers of farmer perceptions and motivation to adopt/implement WRF systems-based management approach and practices and 2) investigate the outcomes of applied WRF practices on participating farms and connected landscapes, including increasing our knowledge of resilience in agricultural landscapes. Research will be carried out by University of Nebraska faculty, professional staff, six graduate students, and six to ten undergraduate students. The agricultural systems research will have six focus areas: ecological system resilience; cropping system resilience; livestock system resilience; social system resilience and equity; financial system resilience and profitability; and disaster preparedness and recovery. These six resilience focus teams will collaborate to understand the interactions of ecological, socio-economic, and political/institutional factors across time and scales that lead to increased agroecological system resilience and adaptive capacity of agricultural communities. The research team will also examine factors that hinder uptake of more resilient and adaptive on-farm practices. The WRT team will examine if and how WRF encourages voluntary participation of more climate-smart and resilient agricultural production will allow for the WRF team to adapt the program to meet the specific needs of the community.

#### **Research Focus 1: Investigate drivers of farmer perceptions and motivation to adopt/implement WRF systems-based management approach and practices**

***Research Questions:*** How do WRF participants perceive agricultural systems resilience-related practices before, during, and after participation in the program and what influences their perceptions? Which practices are more or less likely to be adopted during participation in WRF and what influences those decisions? How do producers perceive tradeoffs made when choosing and adopting WRF practices? Which practices are more or less likely to be sustained for up to two years after WRF participation and what influences those decisions?

***Methods:*** The project evaluation team will gather survey and interview data on participants in WRF cohorts 1 – 5 (described above). Survey and interview instruments will be designed by the research team to address the research questions and resilience focus areas as a whole. Each cohort will be asked to participate in surveys and/or interviews prior to beginning the program (just after recruitment), at the end of years 1 and 2 of their participation, and one year after completing the WRF program. Cohorts 1-3 will also be asked to participate in a survey and/or interview two years after completing the WRF program, contributing additional longitudinal data to address our research questions.

#### **Research Focus 2: Investigate the outcomes of applied WRF practices on participating farms and connected landscapes (six focus areas methods and research questions described below).**

***Methods:*** Qualitative and quantitative data will be collected from seventy-five participating agricultural operations over five years. Data will be collected twice on each participating agricultural operation, once during the assessment stage and once during the verification stage. **Year 1 (Research to Begin July 2024):** After the six resilience teams develop the *Vulnerability and Resilience Assessment* and the first cohort of fifteen participants has been recruited (Cohort 1), the WRF designation process will begin in July 2024. The research team will collect data on each participating agricultural operation to determine the individual risk and resilience of each farm before participating in WRF. This will allow the research team to build profiles on all of the participants. Data will be collected related to ecological system resilience; cropping system resilience; livestock system resilience; social system resilience and equity; financial system resilience and profitability; and disaster preparedness and recovery. See the sections below to understand the research and goals of each resilience focus team. **Year 2:** Two cohorts of fifteen agricultural producers will begin in January 2025 (Cohort 2) and July 2025 (Cohort 3). Assessment data will be collected on these operations. **Year 3:** Two cohorts of fifteen agricultural producers will begin in

January 2026 (Cohort 4) and July 2026 (Cohort 5). Assessment data will be collected on these operations. Cohort 1 will be completing the designation program July 2026. During the verification stage for cohort 1, the research team will collect data to evaluate changes from the start of the designation program to the verification stage. Data from the assessment and verification stage will demonstrate the impact of WRF on creating more resilient agroecological systems. **Year 4:** Cohort 2 and 3 will be completing the designation program in January 2027 and July 2027. During the verification stage for cohorts 2 and 3, the research team will collect data to evaluate changes from the start of the designation program to the verification stage. **Year 5:** Cohort 4 and 5 will be completing the designation program in January 2028 and July 2028. During the verification stage for cohorts 4 and 5, the research team will collect data to evaluate changes from the start of the designation program to the verification stage. After the fifth cohort has completed the verification stage a comprehensive evaluation will occur. Data from each of the seventy-five farms will be compared to answer the driving research questions and identify strategies, barriers, and opportunities to increase agricultural systems resilience and encourage adoption of more resilient and climate-smart agricultural practices. The research team will write and submit journal articles to share results throughout the study.



Figure 4- Timeline of Weather Ready Farms participant cohorts.

**Research Questions:** Does WRF create resilient, healthy, and equitable agroecosystems? **Ecological System Resilience:** How is ecological resilience enhanced with WRF implementation at the farm level? What tradeoffs among ecosystem services are made by producers when implementing WRF practices? Does implementation over time lead to more resilient landscapes – is there large-scale transformative change? **Cropping System Resilience:** How is cropping system resilience enhanced with WRF implementation at the farm level? What agronomic strategies are most effective in reducing on-farm waste and enhancing native ecosystems? How does soil health and water quality change through the modification of agronomic practices? **Livestock System Resilience:** How is livestock system resilience enhanced with WRF implementation at the farm level? What practices are most likely to be adopted? How has manure and landscape management changed because of WRF? Are livestock healthier and more prepared for disaster? **Social System Resilience:** How do WRF participants perceive their own and their communities' human health, food access, environmental justice and equity issues as related to their agricultural system resilience before, during, and after participating in the program? How do WRF participants (before, during, after participation) perceive their own and their communities' adaptive capacity related to weather and climate events/extremes? How do WRF participants perceive their social networks in terms of supporting climate-resilience before, during, and after participation? How do Nebraska community members perceive WRF practices and adaptation to climate change before and after exposure to WRF outreach and community projects? **Financial Resilience:** How is financial system resilience and profitability enhanced with WRF implementation at the farm level? How can crop and livestock producers create risk management plans that are specific to their exposures and allow them to prepare and adapt to unforeseen financial disturbances, extreme weather, and climate change? **Disaster Preparedness and Recovery:** How is disaster preparedness and recovery enhanced with WRF implementation at the farm level? How can Nebraska Extension improve producers' weather-related disaster education, early warning systems, and weather and climate data?

**Barriers:** Research and development of best practices for agricultural system resilience has traditionally occurred in disciplinary silos (cropping systems, livestock, ecology, climate science, economics, sociology, business management, etc.) and in a way that is largely removed from the day-to-day management challenges of producers. The resulting science to management gap is a well-known challenge for climate adaptation. As a result, little is known about the on-the-ground limits and potential of practices supporting agricultural resilience under a changing climate. Without information on the

## Weather Ready Farms Logic Model

### Situation

Climate change is increasing the frequency and magnitude of extreme weather events, creating compounding risks and vulnerabilities to farmers and ranchers who must also navigate uncertainty with changing market and policy environments.

### Inputs

Faculty, staff, students, infrastructure, time, knowledge, stakeholder opinions, and federal, state, and private funds.

### Activities

Coordinate transdisciplinary research and community outreach projects aimed at increasing agricultural system resilience. Provide mentorship, assessment and educational materials, project funding, and peer-to-peer networks to help producers earn designation as a Weather Ready Farm.

### Outputs

Provide information, skills, and technology for individuals, communities, and programs.



### Outcomes

Increase fundamental and applied knowledge of agricultural system resilience. Adopt climate-smart and resilient agricultural practices. Create a diverse, knowledgeable, and equitable agricultural workforce. Improve the health of humans and ecosystem at the individual, community, regional, national, and global scales.

*Figure 5- Weather Ready Farms Logic Model. This logic model shows how the proposed changes will create outputs and outcomes.*

outcomes of WRF's systems-based approach to agricultural climate resilience and the drivers of producer adoptions of this approach, it is unlikely that the approach will be broadly adapted in a way that is necessary to address this grand challenge.

**Scholarship:** The WRF team will build relationships between faculty, extension staff, students, and community members through graduate and undergraduate internships, field work, and service year experiences focused on research, creative activities, capacity building, direct service projects, and curriculum and educational development.

Undergraduates will work with faculty and graduate students to

develop a vulnerability and resilience curriculum; host webinars, conferences, and field-days for program participants; and help create educational content for community stakeholders (including K-12 students). Additionally, one to two courses a year will integrate Weather Ready Farms into their curriculum. For example, in Fall 2022 Graphic Design 421 dedicated a month to creating design materials including logos, field signs, merchandise, and social media posts about WRF. Other possible course integrations could include focuses on 1) diversity, equity, inclusion, and accessibility in agriculture and rural communities; 2) voluntary participation methods in extension 3) applied agroecology, systems thinking, and panarchy; and 3) climate change and extreme weather in agricultural systems. Members of the WRF team will appear as guest lecturers in these courses and field trip opportunities to WRF participant farmers could occur.

**Creative Activity:** There will be several community outreach projects focused on creative activities including: 1) graphic design projects, 2) art projects, 3) landscape architecture projects, 4) architecture projects. Faculty and students will work together on these creative projects all aimed at integrating art and design into all aspects of WRF. Graphic design projects will include creating a cohesive brand identity, designing field signs, visualizing research data into comprehensible deliverables for stakeholders, developing merchandising, and many more projects. Art projects will include on-farm and on-campus murals related to resilient agriculture, circular economy art (art made with on-farm recycled materials), and many other art projects. Landscape architecture projects will be focused on creating aesthetic and intentional agricultural landscapes on program participants' farms. Architecture projects will include circular construction projects (buildings made with recycled materials), designing more resilient and beautiful roads and buildings, and building-back better infrastructure after disasters.

### 3.2.5 ALIGNMENT WITH INSTITUTIONAL PRIORITIES

**Nebraska students co-create their experience:** There will be multiple student opportunities ranging from ecology to sociology to graphic design. Graduate and undergraduate students will be valuable members of the WRF team helping to propel research, educating community stakeholders, and developing creative projects. **Research and creativity will transform lives and learning:** WRF is a transformative process aimed at improving the lives of producers, giving them the knowledge and support to improve their lives



in multiple ways. **Every person and every interaction matters:** The WRF team values the perspectives of crop and livestock producers from all backgrounds and works to provide an equitable opportunity for participants. We strive for workplace inclusivity and amplifying the voices of all our team members to foster a unified and safe working environment. **Engagement builds communities:** WRF is centered around outreach and community engagement and facilitating the development of farmer-to-farmer extension networks. **Focus research, scholarship, creative activity, and student experiences to foster innovative, interdisciplinary endeavors and solve challenges critical to Nebraska and the world:** WRF will conduct transdisciplinary research, conduct multiple creative projects, provide scholarship opportunities to graduate and undergraduates, and empower agricultural producers to adapt and respond to novel changes caused by climate change. WRF will help at local, regional, national, and international scales overtime.

### 3.2.6 PROJECT EVALUATION PLAN

The project evaluation plan examines the efficiency and success of the program at increasing agricultural system resilience at the individual, institutional, and landscape/community scale. WRF is structured using the concepts of panarchy and social-ecological system resilience, which creates a need to track impact across multiple focus areas, scales, and time. Qualitative and quantitative data will be collected to determine the progress toward the proposed goals and objectives. Impacts of the program will be evaluated across physical scales, from the individual farm level to the community level. Temporal scales (time to generate change) will be evaluated as short, mid-term, and long-term impacts with logic models.

At the *individual level*, the evaluation plan will measure farmer enrollment in the WRF program and changes in farmer awareness, perception, and motivation that have been shown to influence adoption of agricultural conservation practices. WRF strategies to influence the adoption of such practices are built upon a theory of change that identifies farmer vulnerability to harm, experience with prior conservation practices, awareness of practices, perceptions of efficacy, and access to resources as key drivers of early adoption of practices (Prokopy et al., 2019). Corresponding strategies to support/increase adoption include a farm-scale assessment of vulnerability, individual learning plan that builds upon prior practices, introduction to new practices targeted to individual needs, financial support for attending relevant training, technical support in trialing new practices, and assistance securing resources needed to trial and adopt practices. WRF evaluation will measure the cumulative effect of these strategies on WRF participant enrollment in the program, interest in continuing the program's modules, adoption (full or partial) of WRF practices, hosting of WRF designation sign on land, self-reported likelihood of recommending WRF to friends, neighbors, other farmers, documentation of participant as WRF advocate in community during/after participating in the program. Data will be collected from cohorts of project participants using short surveys, interviews, and/or focus groups throughout their project participation and for 1 to 2 years after participation. Participation and outcomes of diverse and historically underserved farmers will be documented through this evaluation method.

At the *institutional level*, the evaluation plan measures changes in capacity and interest of Extension Educators in implementing the WRF program locally. The role of Extension Education, generally, is to increase farmer awareness and uptake of research-supported technologies and practices (Norton & Alwang, 2020), so WRF's theory of change at this level is that scarcity of resources is a key limiting factor influencing Extension outreach. WRF's primary strategy is to support and improve the capacity of local Extension Educators to implement the program locally by providing a template and guidance on using the curriculum and providing resources to Extension Educators to attend relevant training and build technical expertise in relevant skills/topics. WRF evaluation will measure uptake of the program by Extension Educators by tracking program downloads, calls, and self-reported use of materials. To gauge social contagion and network building capacities of the WRF program, we will conduct ego-network studies of Extension Educators before and after participation in internal education training. We will also measure Extension Educator perceptions of the curriculum and suggestions for future refinement through interviews and/or focus groups.



At the *community/landscape level*, the evaluation plan measures the potential rate of adoption or social contagion of various practices, as a result (to some degree) of the WRF program and community visibility projects. WRF strategies to influence rate of adoption of WRF practices are built upon a theory of change that identifies the same drivers described above, but also an additional set of factors that affect adoption and diffusion of agricultural conservation practices. Additional factors include the farmer's self-identity and motivations, peer-learning and social pressure, and sense of place (Prokopy et al., 2019). Corresponding WRF strategies to support/increase rate of adoption at a community/landscape level include development of public signage for WRF participant locations, WRF certification and awards ceremony designed to support farmer self-identity and motivation and publicly signal value to others, and community and media projects that increase visibility of participants and practices and generate local pride of place for the practices implemented. WRF evaluation will measure the impact of individual strategies (as well as their cumulative impact) on Nebraskans' awareness of the program, interest in learning more about the program, interest in learning more about specific practices, interest in participating in WRF, and self-reported trialing or adoption of practices. Data will be collected using the Nebraska Annual Social Indicators Survey (NASIS) at four study points – one survey per year in project years 2-5. Each survey will ask similar questions to gauge baseline and longitudinal data on:

- Awareness and interest in Weather Ready Farms
- Awareness and interest in specific agricultural resilience practices
- Knowledge of trialing and/or of agricultural resilience practices in their communities
- Perceptions of climate adaptation and adaptive capacity

Finally, the evaluation plan also measures the impacts those practices have on ecological resilience; cropping system resilience; livestock resilience; financial resilience and profitability; social resilience and equity; and disaster preparedness and recovery. These impacts will be measured as **field-scale or farm-scale impacts that may be scaled up to landscape and community-level impacts** as practices are adopted by more farmers over time. For example, in the social resilience realm, we will collect survey data on individual's social networks (ego-networks) both before year 1 and after year 2 to gauge (1) how their network has potentially expanded as a result of participation in WRF and (2) to what degree they see their peers adopting WRF practices. We will measure the extent of practice adoption on WRF participant farms as suggested by Pannell & Classen (2019).

### 3.3 LEADERSHIP AND MANAGEMENT PLAN



### 3.4 PLAN FOR DIVERSITY, EQUITY, AND INCLUSION

The WRF team will increase diversity, equity, inclusion, and accessibility (DEIA) both to actively prevent racism and racial inequity within the program, which includes program participants and community stakeholders. The WRF team aims to amplify the voices of farmers of color and to encourage the spread of local and indigenous knowledge. Internally, professional development will be provided to all program collaborators related to trauma-informed extension work and strategies to better meet the needs of small-holders and low-income producers in the community. Externally, the social resilience team will lead projects dedicated to improving security and access of resources for underserved and limited-resource farmers and ranchers. These projects will identify sources of environmental injustice and inequity; urban and rural poverty; and lack of security and access to basic resources. The social resilience team will work to increase access to food, clean water, clean air, healthy soil, shelter, emergency and medical services, and mental health services for our participants and community stakeholders. Partnerships and collaboration with [Nebraska Agrability](#), the [Rural Prosperity Nebraska](#) team, the [Nebraska Regional Food Systems](#) team, the [Center for Rural Affairs](#), and [Nebraska Women in Agriculture](#) will work toward the goal of increasing diversity, equity, inclusion, and accessibility in rural communities. Additionally, during the recruitment phase we will recruit a diverse pool of participants to complete the designation process.

### 3.5 COLLABORATION PLAN

The WRF team anticipates having complex and diverse collaboration amongst program collaborators, external partners, and community stakeholders. To facilitate productive transdisciplinary collaboration, we have created a supportive program structure to facilitate teamwork and amplify the unique expertise and knowledge of our team. Leadership at multiple scales will assist with collaborative

efforts, leading to intentional and organized teamwork. The management and convergence team will oversee and support collaboration across all sub-teams. Collaboration will occur amongst and between the management team, project team, resilience focus teams, the art and design team, external public and private partners, and the Participant Advisory Board.

**Management and Convergence Team:** The management team consists of the PI, WRF Director, and our humanities lead and will work with program coordinators and will make all decisions about project implementation and future expansion. The management team will ensure collaboration of all WRF teams, partners, and stakeholders.

**Project Team:** The WRF project team consists of mostly Extension staff and service members. The Assessment and Verification Coordinator, Education Coordinator, Project Implementation and Designation Coordinator will lead each stage of the designation process and coordinate collaborative efforts. The project team coordinators will ensure that the extension project mentors, AmeriCorps VISTAs, AmeriCorps NCCCs, and Civilian Climate Corps members are working as a team at each distinct stage of the designation process. Program participants are also essential collaborators who will work directly with the project team during meetings, educational events, conferences, on-farm projects, etc. (See Participant Advisory Board for more Information)

**Resilience System Focus Teams:** Small-group collaboration will occur among the six resilience focus teams, facilitated, and led by a coordinator. Each resilience team coordinator will be responsible for building trust between team members, supporting a balanced group dialogue, leading small-group projects, supporting the efforts of undergraduate interns and service members. Within each resilience team collaboration on research, education, and extension efforts will occur between university faculty, extension staff, graduate students, undergraduate students, and service members from AmeriCorps VISTA, AmeriCorps NCCC, and the civilian climate corps. Additionally, these resilience focus teams will collaborate with each other on different aspects of research projects and project evaluation, educational development for program participants and community stakeholders, and outreach projects to build the resilience, equity, and health of agroecosystems. For example, the Cropping System Resilience Team and the Social Resilience Team could work together on Climate Resilient Food System Projects.

**Graduate and Undergraduate Student Collaboration:** Regular meetings between all graduate students and undergraduate students on the resilience focus teams will occur as students collaborate on research, extension, and education projects. When all graduate students are hired, the graduate and undergraduate students will vote on a graduate student to serve as the *Graduate and Undergraduate Student Coordinator* who will facilitate dialogue, ensure supportive teamwork, and report to the director and assistant coordinator on the status of all student projects.

**Project Evaluation Team:** The project evaluation team consists of all resilience focus team coordinators. Tonya Haigh and Stacey Hoffman will coordinate the Project Evaluation Team. The project evaluation team will ensure that all research and assessment data is properly and securely maintained and that collaboration on research is organized and completed.

**Art and Design Team:** The Art and Design Coordinator will ensure internal collaboration between artists, graphic designers, and other content creators.

**External Partnerships:** As WRF begins to grow, new partnerships will be established between the public and private sectors. Partnerships outside of the University of Nebraska network will be organized by the director and assistant coordinator. Partnerships include Purdue University, Cornell University, the Extension Foundation, and Farmers Mutual of Nebraska.



Figure 6- Weather Ready Farms Collaboration Plan. This graphic shows how small groups will work together on transdisciplinary projects.

**Collaboration Across Teams:** *Project Team and Resilience Focus Teams:* The project team will collaborate with the resilience teams on collecting data for research and project evaluation, creating the *Vulnerability and Resilience Assessment* and *Curriculum* with accompanying learning management software on the Extension Campus website; developing educational opportunities for participants and community stakeholders, and community outreach projects. The resilience focus teams will generate assessment and educational content and the project team will connect participants and community stakeholders with the resources. *Art and Design Team with All Teams:* The Art and Design team will work with the Project Team and Resilience Focus Teams by creating designation field signs, logos, social media, video content, branded merchandize, designing educational materials, formatting the curriculum and assessment, visualizing research data, collaborating on on-farm projects to increase aesthetics of landscapes, and many other projects. The art and design team will help increase the ease of understanding and collective identity of all WRF content and deliverables.

### 3.6 GRAND CHALLENGE RATIONALE

WRF has spent several years struggling to get funding from traditional sources. We have submitted a handful of letters of intent to submit and full proposals but have not been selected for funding. Our goals and objectives are grand and audacious, perhaps deterring many traditional funding organizations (e.g. USDA) aimed at incremental change, but also has a very applied component, making NSF funding unlikely. Reimagining agricultural systems is a highly transdisciplinary challenge, making it difficult to find funding opportunities that meets the scope of the work that WRF is doing. WRF is both a hands-on project that directly impacts participants as well as a project capable of developing new theory focused on maintaining and enhancing resilient agroecosystems. Our emphasis on creating interpersonal connections and building trust to better serve communities is also challenging to quantify, making traditional funders skeptical as the results are more based on attitudinal shifts and social awareness. WRF also incorporates the idea of panarchy, which examines the interactions between ecological and social systems across scales of influence. Though highly useful, the concept may be confusing to some reviewers. Furthermore, WRF uses social contagion as a means of impacting other farmers through its participants by allowing them to demonstrate the value that sustainability and disaster preparedness offer to farmers. In summary, the proposed combination of applied and theoretical work in WRF falls between the cracks of existing external funders: too applied for NSF and too theoretical for USDA.

### 3.7 SUSTAINABILITY PLAN

In 2023, the WRF team will be applying for a USDA AFRI Sustainable Agricultural Systems grant as a collaboration with Purdue University and Cornell University. This grant will focus on building capacity of WRF by expanding it to other universities and states and to scale up WRF in Nebraska. Additionally, we will work on building on our existing public partnerships and establishing private partnerships that will sustain and grow WRF. We will be particularly focused on private partnerships of ascending Nebraska based companies that have the potential to transform the economy of rural areas. Our current partners include the Extension Foundation and Farmers Mutual of Nebraska. Future partnerships include Nebraska Natural Resource Conservation Service (NRCS), Nebraska's Natural Resources District Boards (NRDs), the Nebraska Forestry Service, Crop Commodity Boards, USDA Climate Hubs, and the Federal Emergency Management Agency (FEMA) regarding funding. Additionally, our transdisciplinary nature and combination of application of theory and practice will allow the WRF team to apply for many different funding opportunities. For instance, the WRF disaster preparedness and recovery team may apply for a FEMA funding opportunity for a project aimed at building back a bridge for a program participant after a disaster. The framework for institutionalization is present at UNL, in the Center for Resilience in Agricultural Landscapes and with Weather Ready Farms. This proposal blends those two institutions to create a unique program of outreach, action, and research.

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## 5) BIOLOGICAL SKETCHES

**Craig R. Allen**

Professor and Director

Center for Resilience in Agricultural Working Landscapes  
School of Natural Resources, University of Nebraska - Lincoln

402 472 0421

[Callen3@unl.edu](mailto:Callen3@unl.edu)

### EDUCATION AND TRAINING

| Institution                         | Area             | Degree   | Year Awarded |
|-------------------------------------|------------------|----------|--------------|
| University of Wisconsin – Green Bay | Biology          | BS       | 1989         |
| Texas Tech University               | Wildlife Science | MS       | 1993         |
| University of Florida               | Wildlife Ecology | Ph.D.    | 1997         |
| University of Florida               | Zoology          | Post-doc | 1998         |

### RESEARCH AND PROFESSIONAL EXPERIENCE

| Years          | Position                                                                                                                                    |
|----------------|---------------------------------------------------------------------------------------------------------------------------------------------|
| 2018 - present | Professor, School of Natural Resources and Director, Center for Resilience in Agricultural Working Landscapes                               |
| 2004-2018      | Leader, USGS Nebraska Cooperative Fish and Wildlife Research Unit and Research Professor, UNL                                               |
| 2012-2017      | August Larson Visiting Professorship, Swedish University of Agricultural Sciences, Uppsala, Sweden                                          |
| 1998-2004      | Assistant Leader (1998-2002) and Leader, USGS South Carolina Cooperative Fish and Wildlife Research Unit, Clemson University, and Professor |

### SYNERGISTIC ACTIVITIES

- Lifetime Fellow (for contributions to resilience theory and application), American Academy for the Advancement of Science (AAAS)
- Co-Editor in Chief, Ecology and Society
- Executive Board, The Resilience Alliance
- Board of Trustees, the Nature Conservancy
- PI, NSF-NRT-INFEWS: Training in theory and application of cross scale resilience in agriculturally dominated social ecological systems

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- Sundstrom, S.M., J. Hodbod and C.R. Allen. 2022. Resilience of Working Agricultural Landscapes. Pages 11-31 in XX, Eds. *Food, Energy, and Water Nexus*.
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- Angeler, D., C.R. Allen, A. Garmestani, L. Gunderson, and R. Johnson. 2021. Panarchy and management of lake ecosystems. *Ecology and Society* 26 (4)
- Detweiler, C., S. Elbaum, J. Higgins, C. Laney, C. Allen, and D Twidwell. 2021. Fire suppression and ignition with unmanned aerial vehicles. *US Patent App.* 17/360,027
- Bielski, C.H., R. Scholtz, V.M. Donovan, C.R. Allen, and D Twidwell. 2021. Overcoming an “irreversible” threshold: a 15-year fire experiment. *Journal of environmental management* 291: 112550
- Donovan, V., C. Roberts, C. Wonkka, D. Uden, D. Angeler, C. Allen, D. Wedin, et al. 2021. Collapse, reorganization, and regime identity: breaking down past management paradigms in a forest-grassland ecotone. *Ecology and Society* 26 (2)
- Roberts, C.P., V.M. Donovan, C.R. Allen, D. Angeler, C. Helzer, D. Wedin, and D. Twidwell. 2021. Monitoring for spatial regimes in rangelands. *Rangeland Ecology and Management* 74: 114-118.

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- Fogarty, D.T., C.P. Roberts, D.R. Uden, V.M. Donovan, Craig R Allen, David E Naugle, Matthew O Jones, Brady W Allred, Dirac Twidwell. 2020. Woody plant encroachment ant the sustainability of priority conservation areas. *Sustainability*: 12, 8321; doi:10.3390/su12208321.
- Chambers, J.C., C.R. Allen, and S.A. Cushman. 2020. Operationalizing the Concepts of Resilience and Resistance for Managing Ecosystems and Species at Risk. *Frontiers in Ecology and Evolution* 8: 168
- Donovan, V.M., D. Twidwell, D.R. Uden, T. Tadesse, B.D. Wardlow, C.H. Bielski, M.O. Jones, B.W. Allred, D.E. Naugle, and C.R. Allen. 2020. Resilience to large, ‘catastrophic’ wildfires in North America’s grassland biome. *Earth's Future*: e2020EF001487
- Angeler, D.G., C.R. Allen and A. Carnaval. 2020. Convergence science in the Anthropocene: Navigating the known and the unknown. *People and Nature*: DOI 10.1002/pan3.10069.
- Allen, C.R., D.G. Angeler, B. Chaffin, D. Twidwell and A. Garmestani. 2019. Resilience reconciled. *Nature Sustainability* 2: 898-900.
- Uden, D.R., D. Twidwell, C.R. Allen, M.O. Jones, D.E. Naugle, J.D. Maestas and B.W. Allred. 2019. Regime shift imaging and screening. *Frontiers in Ecology and the Environment*: <https://doi.org/10.3389/fevo.2019.00407>.
- Garmestani, A.S., B.C. Chaffin, D. Twidwell, D.G. Angeler, L.H. Gunderson, C. Folke, and C.R. Allen. 2019. Untapped capacity for resilience in environmental law. *Proceedings of the National Academy of Sciences* 116: 19899-19904.
- Roberts, C.P., C.R. Allen, D.G. Angeler and D. Twidwell. 2019. Shifting avian spatial regimes in a changing climate. *Nature Climate Change* 9: 562-568.
- Sundstrom, S.M. and C.R. Allen. 2019. The adaptive cycle: More than a metaphor. *Ecological Complexity* 39: 100767.
- Angeler, D.G., H.B. Fried-Petersen, C.R. Allen, A. Garmestani, D. Twidwell, H.E. Birge, W. Chuang, V.M. Donovan, T. Eason, C.P. Roberts, S.M. Sundstrom and C.L. Wonkka. 2019. Adaptive capacity in ecosystems. *Resilience in Complex Socioecological Systems* 60: 1-24.
- Chambers, J.C., C.R. Allen and S.A. Cushman. 2019. Operationalizing ecological resilience concepts for managing species and ecosystems at risk. *Frontiers in Ecology and Evolution* 7: <https://doi.org/10.3389/fevo.2019.00241>.
- Haigh, T.R. W. Schacht, C.L. Knutson, A. Smart, J. Volesky, C. Allen, M. Hayes and M. Burbach. 2019. Socio-ecological determinants of drought impacts and coping strategies for ranching operations in the Great Plains. *Rangeland Ecology and Management* 72: 561-571.

## Eric D. Hunt

Assistant Extension Educator of Agricultural Meteorology and Climate Resilience

School of Natural Resources

Phone: (402) 617-4190; [ehunt2@unl.edu](mailto:ehunt2@unl.edu)

### EDUCATION & TRAINING

| Institution            | Area                       | Degree | Year Awarded |
|------------------------|----------------------------|--------|--------------|
| University of Oklahoma | Meteorology                | BS     | 2005         |
| University of Nebraska | Natural Resources Sciences | MS     | 2007         |
| University of Nebraska | Natural Resources Sciences | Ph.D.  | 2015         |

### RESEARCH & PROFESSIONAL EXPERIENCE

| Years         | Position                                                      |
|---------------|---------------------------------------------------------------|
| 04/23-present | Assistant Extension Educator, University of Nebraska          |
| 01/23-present | Instructor, University of Nebraska                            |
| 03/12- 11/22  | Staff Scientist, Atmospheric and Environmental Research, Inc. |

### SYNERGISTIC ACTIVITIES

- Member of American Meteorological Society, American Geophysical Union, Soil Science Society of America, and American Association of State Climatologists, NIDIS Flash Drought Technical Working Group, Mayor's Environmental Task Force
- 2018-2021: Ph.D. Graduate Committee Outside member, University of Oklahoma, Dr. Ryann Wakefield

### AWARDED GRANTS

*NASA*: Using SMAP observations and the NASA Land Information Systems (LIS) framework to assess the evolution of soil moisture and vegetation conditions during flash drought and flash recovery events; NNH16CT05C. 2016-2019; 4.00 m/y as a PI

*NASA*: Enhancing national security decision-making processes for regions vulnerable to the impacts of flash droughts through greater use of NASA resources; 80NSSC19K1266. 2019-2021; 3.1 m/y as a PI

### PUBLICATIONS (REFEREED JOURNALS, LAST 4 YEARS)

Christian, J., J. Basara, J. Furtado, E. Hunt, J. Otkin X. Xiao, L. Lowman, in press: Global Projections of Flash Drought in a Warming Climate. *Nature Communications Earth and Environment*.

Hunt, E., C. Walters, T. Klemm, I. Eronmwon, and J. Cohen. 2022. "Using Analog-Based Seasonal Weather Forecasts to Improve Grain Marketing Decisions" *Choices*. Quarter 1.

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- Otkin, J.A.; Zhong, Y.; Hunt, E.; Christian, J.I.; Basara, J.B.; Nguyen, H.; Wheeler, M.C.; Ford, T.W.; Hoell, A.; Svoboda, M.; Anderson, M.C. Development of a Flash Drought Intensity Index. *Atmosphere* 2021, *12*, 741. <https://doi.org/10.3390/atmos12060741>
- Christian, J., J. Basara, E. Hunt, J. Otkin, J. Furtado, V. Mishra, X. Xiao, R. Randall, 2021: Global distribution, trends, and drivers of flash drought occurrence. *Nat Commun* 12, 6330 (2021). <https://doi.org/10.1038/s41467-021-26692-z>
- Hunt, E., F. Femia, C. Werrell, J. Christian, J. Otkin, J. Basara, M. Anderson, T. White, C. Hain, R. Randall, K. McGaughey, 2021: Agricultural and food security impacts from the 2010 Russia flash drought. *Weather and Climate Extremes* <https://doi.org/10.1016/j.wace.2021.100383>
- Hunt, E., J. Christian, J.B. Basara, L. Lowman, J. Otkin, J. Bell, K. Jarecke, R.A. Wakefield, R. Randall, 2020: The flash drought of 1936. *Journal of Applied and Service Climatology*, 2020 (4), <http://www.doi.org/10.46275/JOASC.2020.11.001>
- Christian, J., J. B. Basara, E. D. Hunt, J.A. Otkin, X. Xiao, 2020: Flash drought development and cascading impacts associated with the 2010 Russian heatwave. *Environmental Research Letters* 15 094078
- Hunt, E., H. Birge, C. Laingen, M. Licht, J. McMechan, W. Baule, T. Connor, 2020: A perspective on changes in the U.S. Corn Belt. *Environmental Research Letters*, 10.1088/1748-9326/ab9333.
- Basara, J., J. Christian, R. Wakefield, J. Otkin, E. Hunt, D. Brown, 2019: The Evolution, Propagation, and Spread of Flash Drought in the Central United States During 2012. *Environmental Research Letters*, 14(8), 084025.
- Christian, J., J.B. Basara, J. A. Otkin, E. D. Hunt, R. A. Wakefield, P. X. Flanagan, and X. Xiao, 2019: A Methodology for Flash Drought Identification: Application of Flash Drought Frequency Across the United States, *J. Hydrometeor.*, 20, 833-846, doi:10.1175/JHM-D-18-0198.1.
- Otkin, J. A., Y. Zhong, E. D. Hunt, J. Basara, M. Svoboda, M. C. Anderson, and C. Hain, 2019: Assessing the evolution of soil moisture and vegetation conditions during a flash drought – flash recovery sequence over the south-central U.S., *J. Hydrometeor* , doi:10.1175/JHM-D-18-0171.
- Otkin, J., M. Svoboda, E. Hunt, T. Ford, M. Anderson, C. Hain, and J. Basara, 2018: Flash droughts: A review and assessment of the challenges imposed by rapid onset droughts in the United States. *Bull. Am. Meteorol. Soc.*, 99, 911-919, 2018.

#### **PUBLICATIONS (related to project)**

- Hunt, E., M. Svoboda, B. Wardlow, K. Hubbard, M. Hayes, T. Arkebauer, 2014: Monitoring the effects of rapid onset of drought on non-irrigated maize with agronomic data and climate-based drought indices. *Agricultural and Forest Meteorology*, 191, 1-11, 2014
- Hunt, E. D., K. G. Hubbard, D. A. Wilhite, T. J. Arkebauer, and A. L. Dutcher, 2009: The development and evaluation of a soil moisture index. *Int. J. Climatol.*, 29, 747–759.

**Nathan D. Mueller**  
Nebraska Extension  
Phone: (402) 821 2151; [nathan.mueller@unl.edu](mailto:nathan.mueller@unl.edu)  
[croptechcafe.org](http://croptechcafe.org)

## EDUCATION & TRAINING

| Institution                    | Area         | Degree | Year Awarded |
|--------------------------------|--------------|--------|--------------|
| University of Nebraska-Lincoln | Agronomy     | BS     | 2005         |
| University of Nebraska-Lincoln | Soil & Water | MS     | 2007         |
| Kansas State University        | Agronomy     | Ph.D.  | 2012         |

## RESEARCH & PROFESSIONAL EXPERIENCE

| Years        | Title, Organization                                                                                      |
|--------------|----------------------------------------------------------------------------------------------------------|
| 2019-present | Associate Extension Educator, Water & Integrated Cropping Systems, Nebraska Extension                    |
| 2014-2019    | Assistant Extension Educator, Water & Integrated Cropping Systems, Nebraska Extension                    |
| 2012-2014    | Assistant Professor & Extension Agronomist at South Dakota State University                              |
| 2009-2012    | Graduate Research Assistant at Kansas State University                                                   |
| 2007-2009    | Research Specialist Team Leader for Indiana State Department of Agriculture – Soil Conservation Division |
| 2005-2007    | Graduate Research Assistant at University of Nebraska-Lincoln                                            |

## SYNERGISTIC ACTIVITIES

- American Society of Agronomy, Certified Crop Adviser – 2015-current
- American Society of Agronomy, Member – 2005-current
- University of Nebraska-Lincoln (UNL) Center for Grassland Studies – Dalbey Prairie Stakeholder Advisory Committee
- UNL Ag & Natural Resources Extension Educator Promotion Committee
- UNL South Central Ag Lab Advisory Committee

## PUBLICATIONS (refereed journals, last 4 years)

- Ghmire, D., S. Das, N.D. Mueller, C.F. Creech, D. Santra, P.S. Baenziger, A. Easterly, B. Maust, and B. Maharjan. 2021. Effects of cultivars and nitrogen management of wheat grain yield and protein. *Agronomy Journal* <https://doi.org/10.1002/agj2.20836>
- Nleya, T., M. Schutte, D. Clay, G. Reicks, and N.D. Mueller. 2020. Planting date, cultivar, seed treatment, and seeding rate effects on soybean growth and yield. Wiley Periodicals, Inc *Agrosystems, Geosciences, and Environment*. <https://doi.org/10.1002/agg2.20045>
- Byamukama, E., S. Ali, J. Kleinjan, D.N. Yabwalo, C. Graham, M. Caff-Tremi, N.D. Mueller, J. Rickertson, and W.A. Berzonsky. 2019. Winter wheat grain yield response to fungicide application is influence by cultivar and rainfall. *The Plant Pathology Journal* <https://doi.org/10.5423/PPJ.OA.04.2018.0056>

## **PUBLICATIONS (related to project)**

- Elmore, R.W. R. Werle, C. Wortmann, P. Tukamuhabwa, and N.D. Mueller. 2017. Chapter 12: Sustainable soybean production research and practice: contrasting case studies from three soybean production areas, *Achieving Sustainable Cultivation of Soybeans*, Vol. 1, editor H. Nguyen.
- Mourtzinis, S., J. Specht, L. Lindsey, W. Weibold, W. Ross, E. Nafziger, H. Kandel, N.D Mueller, P. Deville, F. Arriaga, and S. Conley. 2015. Climate-induced reduction in US wide soybean yields underpinned by region and in-season specific responses. *Nature Plants*.  
<https://doi.org/10.1038/nplants.2014.26>
- Luck, J., N.D. Mueller, and J.P. Fulton. 2015. EC2005 Improving yield data quality by reducing errors through yield data file post-processing. Institute of Agriculture and Natural Resources  
<https://extensionpublications.unl.edu/assets/pdf/ec2005.pdf>
- Karki, D. J. Hall, N.D Mueller, and P. Sexton. 2014. Evaluation of winter wheat genotypes for weed competitiveness and yield under organic production management. *Crop Management*.  
<https://doi.org/10.2134/CM-2013-0026-RS>
- Wu, J., K. Glover, and N.D. Mueller. 2014. Check based stability analysis method and its application to winter wheat variety trials. *Conference of Applied Statistics in Agriculture Proceedings*.  
<https://newprairiepress.org/agstatconference/2014/proceedings/6/>
- Mueller, N.D., et al., 2013. Chapter 6: Selecting soybean varieties and Chapter 51: Assessing spring frost and hail damage In Clay, D.E., C.G. Carlson, S.A. Clay, L. Wagner, D. Deneke, and C. Hay (eds). *iGrow Soybean: Best Management Practices for Soybean Production*. South Dakota State University, SDSU Extension, Brookings, SD.
- Mueller, N.D., R. Hall, & K. Gustafson. 2013. Chapter 51: Assessing spring frost and hail damage In Clay, D.E., C.G. Carlson, S.A. Clay, L. Wagner, D. Deneke, and C. Hay (eds). *iGrow Soybean: Best Management Practices for Soybean Production*. South Dakota State University, SDSU Extension, Brookings, SD.
- Mueller, N.D. and D.A. Ruiz Diaz. 2013. Looking at improving corn/soybean yields with fluids. *The Fluid Journal*. V.21 No.4 Issue 82.
- Mueller, N.D., D.A. Ruiz Diaz, J.A. Dille, D.E. Shoup, D.B. Mengel, and L.W. Murray. 2013. Winter annual weed management and nitrogen rate effects on corn yield. *Agronomy Journal*  
<https://doi.org/10.2134/agronj2012.0344>



**Amy Timmerman**

Associate Extension Educator 128 N 6<sup>th</sup> Street O'Neill, NE 68763

University of Nebraska 402.336.2760/402.336.1325

[atimmerman2@unl.edu](mailto:atimmerman2@unl.edu)

**EDUCATION & TRAINING**

| Institution                      | Area                                                    | Degree | Year Awarded |
|----------------------------------|---------------------------------------------------------|--------|--------------|
| Nebraska Wesleyan University     | Biology                                                 | BS     | 2000         |
| University of Nebraska - Lincoln | Biological Sciences with an Emphasis in Plant Pathology | MS     | 2006         |

**RESEARCH & PROFESSIONAL EXPERIENCE**

| Years        | Position                                                            |
|--------------|---------------------------------------------------------------------|
| 2011-Present | Associate Extension Educator, Nebraska Extension                    |
| 2007-2010    | on Educator, Nebraska Extension                                     |
| 2006-2007    | Research and Extension Technologist, University of Nebraska-Lincoln |
| 2004-2007    | Research Technologists, University of Nebraska-Lincoln              |

**SYNERGISTIC ACTIVITIES**

- Nebraska Association of County Agricultural Agents (NACAA)
- Nebraska Association of Extension Educators, Member – 2007-current
- Phytopathological Society of America, Member – 2006-current
- University of Nebraska Faculty Senate

**PUBLICATIONS (refereed journals, last 4 years)**

- Sivits, S., Jackson-Ziems, T., Harveson, B., Mangel, D., Wegulo, S., Timmerman, A., and Broderick, K. (2022). Plant Disease Management *2023 Guide for Weed, Disease and Insect Management in Nebraska* (pp. Pages 261-307). Nebraska Extension Publications.
- Bartels, M., Sivits, S., Jackson-Ziems, T., Harveson, B., Wegulo, S., Timmerman, A., and Broderick, K. (2021). Plant Disease Management. *2022 Guide for Weed, Disease and Insect Management in Nebraska* (pp. 261-308). Nebraska Extension Publications.
- Bartels, M., Sivits, S., Jackson-Ziems, T., Harveson, B., Wegulo, S., Timmerman, A., and Broderick, K. (2020). Plant Disease Management. *2021 Guide for Weed, Disease and Insect Management in Nebraska* (pp. 267-312). Nebraska Extension Publications.
- Hougham, J., Lekies, K., Bohrerova, Z., Wood, C., Jaeger, K., Schroeder, B., Timmerman, A., Nardi, A., and Power, R. 2020. Youth water education: Programs and potential in the American Midwest. *Journal of Soil and Water Conservation* 75(5):117A-122A.
- Jackson-Ziems, T., Harveson, R., Wegulo, S., Adesemoye, A. Timmerman, A., Broderick, K., Hartman, T. (2019). Plant Disease Management. *2020 Guide for Weed, Disease and Insect Management in Nebraska* (pp. Pages 263-307). Nebraska Extension Publications.

**Bruno Patias Lena**  
Assistant Extension Educator  
Nebraska Extension – University of Nebraska-Lincoln  
(402) 314-8558 / [bpatiaslena2@unl.edu](mailto:bpatiaslena2@unl.edu)

#### EDUCATION AND TRAINING

| <b>Institution</b>                                                       | <b>Area</b>                     | <b>Degree</b>        | <b>Year Awarded</b> |
|--------------------------------------------------------------------------|---------------------------------|----------------------|---------------------|
| <i>Auburn University</i>                                                 | Crop & Environmental Science    | Post-doctorate       | 2019-2022           |
| <i>University of São Paulo, “Luiz de Queiroz” College of Agriculture</i> | Agricultural System Engineering | Doctor of Philosophy | 2016                |
| <i>University of São Paulo, “Luiz de Queiroz” College of Agriculture</i> | Agricultural System Engineering | Master of Science    | 2013                |
| <i>State University of Londrina</i>                                      | Agronomy                        | Bachelor             | 2010                |

#### RESEARCH AND PROFESSIONAL EXPERIENCE

| <b>Years</b> | <b>Professional experience</b>                                                          |
|--------------|-----------------------------------------------------------------------------------------|
| 2019-2022    | Improving irrigation scheduling with plant canopy temperature sensors                   |
| 2017-2019    | Assistant Professor at Mid-West Parana State University                                 |
| 2015-2016    | International Internship during PhD at University of Nebraska-Lincoln                   |
| 2011-2016    | Graduate Assistant at University of São Paulo, “Luiz de Queiroz” College of Agriculture |
| 2006-2010    | Undergraduate Intern at Agronomic Institute of Parana State                             |

| <b>Years</b> | <b>Research Experience topic</b>                                                                                              |
|--------------|-------------------------------------------------------------------------------------------------------------------------------|
| 2020-2025    | The Future of Farming: Increasing Adoption of Conservation Practices among Alabama Row Crop Farmers                           |
| 2019-2021    | Determination of irrigation tension threshold under common soil types of Alabama State                                        |
| 2017-2020    | Increasing Adoption of Climate and Water Smart Irrigation Practices among Tennessee Valley Farmers in Alabama and Tennessee   |
| 2018-2019    | Comparison between conventional and precision irrigation in a corn field in Southeast Alabama.                                |
| 2016-2018    | Water consumption of oil palm fertigated with vinasse in the formation phase                                                  |
| 2014-2016    | Evapotranspiration and crop coefficient of Jatropha nut from third to fifth growing season under different crop managements   |
| 2014-2016    | Evapotranspiration and crop coefficient of jatropha nut ( <i>Jatropha curcas</i> L.) from third to fourth year                |
| 2012-2013    | Water requirement of jatropha nut ( <i>Jatropha curcas</i> L.) under irrigation and rainfed condition during formation phase. |
| 2007-2010    | Agro-meteorological monitoring crop system (SMA) model.                                                                       |

| <b>Years</b> | <b>Funded grants: Title – Agency</b> |
|--------------|--------------------------------------|
|--------------|--------------------------------------|

|           |                                                                                                                                                                                         |
|-----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2023      | A Comprehensive Plan for Soybean Cyst Nematode Education in Nebraska – Nebraska Soybean Board.                                                                                          |
| 2022      | Increasing Nebraska Growers' Awareness about Proper Center Pivot Uniformity of Water Application – Nebraska Soybean Board                                                               |
| 2020      | Evaluation of canopy temperature sensing for irrigation scheduling – Alabama Weed and Feed Grain Committee                                                                              |
| 2017-2020 | Crop water use of fertigated palm oil trees - National Council for Scientific and Technological Development (Brasília, BR)                                                              |
| 2013-2015 | Evapotranspiration and crop coefficient of Jatropha from third year crop in function of different types of prune - Fundação de Amparo à Pesquisa do Estado de São Paulo (São Paulo, BR) |

### SYNERGISTIC ACTIVITIES

On-farm research to increase irrigation scheduling adoption. Farmer focus group to development needs assessment for program area development. Efforts to increase knowledge and change behavior toward crop water use and irrigation water use efficiency.

### PUBLICATIONS

- Bondesan L, Carneiro FM, Ortiz BV, Morata GT, Duzy L, van Santen E, Lena BP, Vellidis G (2022) A Comparison of precision and conventional irrigation in corn production in Southeast Alabama. Precision Agriculture. <https://doi.org/10.1007/s11119-022-09930-2>.
- Lena BP, Bondesan L, Ortiz BV, Pinheiro EAR, Morata GT, Hemendra K (2022) Determination of irrigation scheduling thresholds based on HYDRUS-1D simulations of field capacity for multilayered agronomic soils in Alabama, USA. *Agricu. Water Manage.* 259(2022):107234.
- Lena BP, Folegatti MV, Flumignan DL, Irmak S, Francisco JP, Diotto AV, Santos, ONA, Andrade IPS, Junior EDF, Marques PAA, Junior CRAB (2021) Water Requirement and Crop Coefficients of Young *Jatropha curcas* L. Trees in a Subtropical Humid Environment. *J. Irrig. Drain. Eng.*, 147(7):04021020.
- Lena BP, Ortiz BV, Jiménez-López AF, Sanz-Sáez, O'Shaughnessy SA, Durstock MK, Pate G (2020) Evaluation of infrared canopy temperature data in relation to soil water-based irrigation scheduling in a humid subtropical climate. *Transaction of the ASABE*, 63(5):1217-1231.
- Lena BP, Jadoski SO, Jadoski CJ, Rigo JF (2020) Coefficients of Angstrom-Prescott's equation for Guarapuava-PR region. *Acta Igrazu*, 9(1),123-136.

### Extension Publication, Blogs, Newsletters

- Lena BP, et al. (2022) DigitalAg@Farms: Efforts to put digital technologies and site-specific crop management practices in the hands of farming community (2020 & 2021 report). New August 2022
- Ortiz BV, Morata GT, Lena BP, Kumar H, Lamba J, Lena BP, et al. (2021) Increasing Adoption of Climate- & Water-Smart Irrigation Practices Among Tennessee Valley Farmers in Alabama & Tennessee: Findings and Lessons Learned. Project founded by a Natural Resources Conservation Service (NRCS) Conservation Innovation Grant. New October 2021, ANR-2776.
- Ortiz BV, Morata GT, Lena BP, Kumar H, Lamba J, Lena BP, et al. (2021) Increasing Adoption of Climate- & Water-Smart Irrigation Practices Among Tennessee Valley Farmers in Alabama &

Tennessee: Findings and Lessons Learned (2017-2021). Project overview. New October 2021, ANR-2777. <https://www.aces.edu/blog/topics/crop-production/digitalagfarms/>

Lena BP, Bondesan L, Ortiz BV, Morata GT, Kumar H (2021) Irrigation Scheduling Using Soil Water Tension Sensors. New July 2021. ANR-2774. <https://www.aces.edu/blog/topics/crop-production/irrigation-scheduling-using-soil-water-tension-sensors/>

Lena BP, Ortiz BV, Morata GT (2021) Installation of Soil Sensors for Irrigation Scheduling. New August 2021. ANR-2775. <https://www.aces.edu/blog/topics/crop-production/installation-of-soil-sensors-for-irrigation-scheduling/>

Ortiz BV (2021) Three weekly report of on-farm irrigation demonstrations in Alabama. <https://us17.campaign-archive.com/home/?u=501131dc3c2706ca87d17d599&id=8eba56b847>

Ortiz BV, Lena BP, et al. (2021) DigitalAg@Farms: Efforts to put digital technologies and site-specific crop management practices in the hands of farmers (2019 report). New January 2021, ANR-2712. <https://www.aces.edu/blog/topics/crop-production/digitalagfarms/>

Ortiz BV (2020) Thirteen weekly report of on-farm irrigation demonstrations in Alabama. <https://us17.campaign-archive.com/home/?u=501131dc3c2706ca87d17d599&id=8eba56b847>

**Gwendŵr R. Meredith**

Assistant Professor

Center for Resilience in Agricultural Working Landscapes  
School of Natural Resources, University of Nebraska – Lincoln  
Agronomy and Horticulture, University of Nebraska – Lincoln  
940 595 7130  
[gmeredith@unl.edu](mailto:gmeredith@unl.edu)

**EDUCATION AND TRAINING**

| <b>Institution</b>               | <b>Area</b>                                          | <b>Degree</b> | <b>Year Awarded</b> |
|----------------------------------|------------------------------------------------------|---------------|---------------------|
| Indiana University - Bloomington | Animal Behavior, Ecology, and Conservation           | BA            | 2013                |
| Utah State University            | Human Dimensions of Ecosystem Science and Management | PhD           | 2019                |
| University of Idaho              | Human Dimensions of LTAR Network                     | Post-doc      | 2021                |

**RESEARCH AND PROFESSIONAL EXPERIENCE**

| <b>Years</b>   | <b>Position</b>                                                                                                                |
|----------------|--------------------------------------------------------------------------------------------------------------------------------|
| 2021 - present | Assistant Professor of Social-Ecological Rangeland Science, University of Nebraska, Lincoln, NE                                |
| 2020-2021      | Postdoctoral Fellow, Transformational Agroecosystems Science Team, Long-Term Agroecosystem Research (LTAR) Network, Moscow, ID |
| 2014-2019      | Ph.D. Student & Researcher, USU Socio-Ecological Systems Lab, Logan, UT                                                        |

**SYNERGISTIC ACTIVITIES**

- Served regularly as reviewer for three peer-reviewed journals: Rangeland Ecology & Management, Rangelands, Society & Natural Resources, 2018-present
- UNL Sustain Club faculty advisor, 2021-present
- Board of Governors, Center for Great Plains Studies
- Graduate Committee, School of Natural Resources
- Teaching
  - University of Nebraska-Lincoln – Instructor of Record, Introduction to Grassland Ecology & Management, 2022-present
  - University of Nebraska-Lincoln – Instructor of Record, Environmental Sociology, 2023-present

**PUBLICATIONS**

Meredith, G.R., Spiegel, S. Kleinman, P.J.A, Harmel, D. (2022). The social networks of manure-shed management, *Journal of Environmental Quality*, <https://doi.org/10.1002/jeq2.20334>  
Spiegel, S., Webb, N.P., Boughton, E.H., Boughton, R.K., Bentley Brymer, A., Clark, P.E., Holifield Collins, C.D., Hoover, D.L., Kaplan, N., McCord, S.E., Meredith, G.R., Porensky, L., Toledo, D.,

- Wilmer, H., Wulforth, J.D., Bestelmeyer, B.T. (2022). Establishing indicators of sustainable intensification for rangelands with long-term collaborative research, *Rangelands*, <https://doi.org/10.1016/j.rala.2021.12.005>
- Brunson, M.W., Huntsinger, L., Meredith, G.R., Sayre, N. (2021). The future of social science integration in rangelands research, *Rangelands*, <https://doi.org/10.1016/j.rala.2021.08.007>
- Meredith, G.R., Bean, A., Bentley Brymer, A., Friedrichsen, C.N., Hurst, Z.M. (2021). Integrating human dimensions within the LTAR network to achieve agroecological system transformation, *Rangelands*, <https://doi.org/10.1016/j.rala.2021.05.002>
- Meredith, G.R., Brunson, M.W. (2021). Effects of wildfire on collaborative governance of rangelands - a case study of the 2015 Soda Fire. *Rangelands*, <https://doi.org/10.1016/j.rala.2021.03.001>
- Meredith, G.R., Brunson, M.W., Hardegree, S.P. (2021). Management innovations for resilient public rangelands: Adoption constraints and considerations. *Rangeland Ecology & Management*, 75, pp. 152-160.
- Sayles, J., Garcia, M. M., Hamilton, M., Alexander, S., Baggio, J., Fischer, A. P., Ingold, K., Meredith, G.R. & Pittman, J. (2019). Social-ecological network analysis for sustainability sciences: a systematic review and innovative research agenda for the future. *Environmental Research Letters*, 14(9), 093003.



**Tonya R. Haigh**  
 Research Assistant Professor and Social Science Coordinator  
 National Drought Mitigation Center  
 School of Natural Resources, University of Nebraska-Lincoln  
 402 472 6781  
[thaigh2@unl.edu](mailto:thaigh2@unl.edu)

## EDUCATION AND TRAINING

| Institution                     | Area                                             | Degree      | Year Awarded |
|---------------------------------|--------------------------------------------------|-------------|--------------|
| University of Nebraska-Lincoln  | Human Dimensions of Natural Resources Management | Ph.D.       | 2019         |
| University of Nebraska-Lincoln  | Survey Research Methods                          | Certificate | 2015         |
| South Dakota State University   | Rural Sociology                                  | MS          | 1998         |
| Hamline University, St. Paul MN | Human and Physical Ecology                       | BS          | 1992         |

## RESEARCH AND PROFESSIONAL EXPERIENCE

| Years        | Position                                                                                                             |
|--------------|----------------------------------------------------------------------------------------------------------------------|
| 2021-present | Research Assistant Professor/Social Science Coordinator/Project Coordinator, National Drought Mitigation Center, UNL |
| 2015-2021    | Rural Sociologist Research Associate/Project Manager, National Drought Mitigation Center, UNL                        |
| 2009-2015    | Rural Sociologist Research Associate, National Drought Mitigation Center, UNL                                        |

## SYNERGISTIC ACTIVITIES

- Qualitative research with Midwestern specialty crop growers led to development of resources on seasonal drought monitoring needs and information, found at <https://drought.unl.edu/Projects/Detail.aspx?id=41>.
- Qualitative and survey research with Great Plains ranchers led to the development of the NDMC's Managing Drought Risk on the Ranch website: <https://drought.unl.edu/ranchplan>.
- Quantitative and qualitative research on the climate information needs of U.S. Corn Belt farmers led to the development of new agricultural decision-support tools developed by the award-winning USDA AFRI-funded Useful to Usable Project (<http://agclimate4u.org>).

## PUBLICATIONS (ORCID <https://orcid.org/0000-0002-5240-685X>)

Haigh, T., Wickham, E., Hamlin, S., Knutson, C. (2022) Planners' perceptions of strategies and barriers to achieving local drought preparedness. *Journal of the American Planning Association*. DOI: 10.1080/01944363.2022.2071324

Haigh, T., Otkin, J., Woloszyn, M., Todey, D., Felkley, C. (2022) Meeting the drought information needs of Midwest perennial specialty crop producers. *Journal of Applied Meteorology and Climatology*. Pp. 839–855 DOI: <https://doi.org/10.1175/JAMC-D-21-0105.1>

Otkin, J. A., Woloszyn, M., Wang, H., Svoboda, M., Skumanich, M., Pulwarty, R., Lisonbee, J., Hoell, A., Hobbins, M., Haigh, T., & Cravens, A. E. (2022). Getting ahead of Flash Drought: From Early

- Warning to Early Action, *Bulletin of the American Meteorological Society*, 103(10), E2188-E2202.  
DOI: <https://doi.org/10.1175/BAMS-D-21-0288.1>
- Ulrich-Schad, J.D., Li, S., Arbuckle, J.G., Avemegah, E., Brasier, K.J., Burnham, M., Kumar Chaudhary, A., Eaton, W.M., Gu, W., Haigh, T. and Jackson-Smith, D., 2022. An Inventory and Assessment of Sample Sources for Survey Research with Agricultural Producers in the US. *Society & Natural Resources*, pp.1-9.
- Cravens, A.E., Henderson, J., Friedman, J., Burkardt, N., Cooper, A.E., Haigh, T., Hayes, M., McEvoy, J., Paladino, S., Wilke, A.K. and Wilmer, H. (2021) A typology of drought decision making: Synthesizing across cases to understand drought preparedness and response actions. *Weather and Climate Extremes*, 33, 100362.
- Ibarra, A.M.S., Hewitt, C., Winarto, Y.T., Walker, S., Keener, V.W., Bayala, J., Christel, I., Bloomfield, H., Halsnæs, K., Haigh, T., Jacob, D. and Brasseur, G.P., 2021. Resilience through climate services. *One Earth*, 4(8), pp.1050-1054.
- Haigh, T., Hayes M., Smyth J., Prokopy L., Francis C., and Burbach, M. (2021) Ranchers' use of drought contingency plans in protective action decision-making. *Rangeland Ecology & Management*, 74, 50-62.
- Lu, J., Singh, A.S., Koundinya, V., Ranjan, P., Haigh, T., Getson, J.M., Klink, J. and Prokopy, L.S., 2021. Explaining the use of online agricultural decision support tools with weather or climate information in the Midwestern United States. *Journal of Environmental Management*, 279, p.111758.
- Liu, T., Krop, R., Haigh, T., Smith, K.H., and Svoboda, M. (2021). Valuation of Drought Information: Understanding the value of the US Drought Monitor in land management. *Water*, 13(2), 112.
- Haigh, T., Schacht, W., Knutson, C., Smart, A., Volesky, J., Hayes, M., and Burbach, M. (2020) Preparing for Drought on the Ranch: Lessons from 2012. *Research Counts* 3(6). Boulder, CO: Natural Hazards Center, University of Colorado Boulder.
- Haigh, T., Otkin, J., Mucia, A., Hayes, M., and Burbach, M. (2019). Drought early warning and the timing of range managers' drought response. *Advances in Meteorology*.
- Haigh, T.R., Schacht, W., Knutson, C.L., Smart, A.J., Volesky, J., Allen, C., ... and Burbach, M. (2019). Socioecological determinants of drought impacts and coping strategies for ranching operations in the Great Plains. *Rangeland Ecology & Management*, 72(3), 561-571.
- Smart, A.J., Harmony, K., Scasta, J.D., Stephenson, M.B., Volesky, J.D., Vermeire, L.T., Mosley, J.C., Sedivec, K., Meehan, M., Haigh, T. and Derner, J.D., (2019). Critical decision dates for drought management in Central and Northern Great Plains rangelands. *Rangeland Ecology & Management*.
- Demisse, G.B., Tadesse, T., Wall, N., Haigh, T., Bayissa, Y., and Shiferaw, A. (2019). Linking seasonal drought product information to decision makers in a data-sparse region: A case study in the Greater Horn of Africa. *Remote Sensing Applications: Society and Environment*, 14, 200-206.
- Haigh, T., Koundinya, V., Hart, C., Klink, J., Lemos, M., Mase, A.S., Prokopy, L., Singh, A., Today, D., and Widhalm, M. (2018). Provision of climate services for agriculture: Public and private pathways to farm decision-making. *Bulletin of the American Meteorological Society*, 99(9):1781-1790.
- Otkin, J.A., Haigh, T., Mucia, A., Anderson, M.C., and Hain, C. (2018). Comparison of agricultural stakeholder survey results and drought monitoring datasets during the 2016 US Northern Plains flash drought. *Weather, Climate, and Society*, 10(4), 867-883.

- Church, S.P., Dunn, M., Babin, N., Mase, A.S., Haigh, T., and Prokopy, L.S. (2018). Do advisors perceive climate change as an agricultural risk? An in-depth examination of Midwestern US Ag advisors' views on drought, climate change, and risk management. *Agriculture and Human Values*, 35(2), 349-365.
- Prokopy, L.S., Carlton, J.S., Haigh, T., Lemos, M.C., Mase, A.S., and Widhalm, M. (2017). Useful to Usable: Developing usable climate science for agriculture. *Climate Risk Management*, 15, 1-7.
- Haigh, T., G. Takle, J. Andresen, M. Widhalm, J.S. Carlton, J. Angel. (2015). Mapping the decision points and climate information use of agricultural producers across the U.S. Corn Belt. *Climate Risk Management*.

### Stacy Asher

School of Art, Art History & Design, Hixson Lied College of Fine and Performing Art

University of Nebraska-Lincoln, 120 Richards Hall, Lincoln, NE 68588

Phone: (415) 312-7810; Email: [stacyasher@unl.edu](mailto:stacyasher@unl.edu)

[stacyasher.com](http://stacyasher.com)

#### EDUCATION AND TRAINING

| Institution                           | Area                                 | Degree        | Year Awarded |
|---------------------------------------|--------------------------------------|---------------|--------------|
| University of Nebraska-Lincoln        | Integrated Studies; Biology, Drawing | BA            | 1989         |
| University of Nebraska Medical Center | Biomedical Communications            | P.B.C         | 1990         |
| University of Colorado-Boulder        | Printmaking, Digital Arts            | Grad. Studies |              |
| California College of the Arts        | Design, Social Practices in Art      | MFA           | 2002         |

#### APPOINTMENTS

| Years        | Position                                                                                        |
|--------------|-------------------------------------------------------------------------------------------------|
| 2013–present | Associate Professor of Art, School of Art, Art History & Design, University of Nebraska-Lincoln |
| 2010– 2013   | Lecturer, Department of Design & Industry, San Francisco State University                       |
| 2009–2013    | Lecturer, Department of Art & Architecture, University of San Francisco                         |
| 2003–2008    | Assistant Professor of Design, School of Art, Ohio University                                   |

Various design for social change projects have promoted democracy; addressed the future of food, fuel, water, and the changing climate; explored social implications of design; developed design pedagogy; critically analyzed identity and branding strategies; employed communication theories about cultural consumption; and examined how knowledge is generated through graphic and social design.

#### PRODUCTS (4 products)

##### *(i) Most closely related:*

1. **“Permaculture Design Certification [PDC] Course: Prospect Rock Permaculture Institute”** July 18-30, 2021 / Johnson, VT *Funded through Hixson Lied Faculty Development Grant*. Centered on design and practice. Joined a diverse group of international students in collaborative community project through hands on learning a diverse permaculture farm, research center, and wildlife sanctuary. Learned how to observe the dynamics of natural ecosystems and apply this knowledge in the designing of constructed systems that serve the needs of human populations without degrading our natural environment. Created experiential learning opportunities for curriculum [SAAHD/HLFPA ] that explores art, ecology, design, and rural land use.

2. **“Cosmological Gardens: Land, Cultivation, and Care”** October-November 2020

Invited to participate in a series of online workshops and projects by the Center for Arts, Design, and Social Research (CAD+SR) in partnership with the Associazione Culturale Matilde Piaciani, Spoleto, Italy. Community initiatives informed by transdisciplinary agricultural thinking, including a wide-range

of Indigenous knowledge and other structures of social cooperation and production, were presented. These conversations redefine gardens, growing, and growth through broadly sustainable processes that involve both human and non-human entities. Racial and environmental justice as ontological and political projects were presented and analyzed.

### **3. Walls Turned Sideways: Artists Confront the Justice System, 2017–2020**

Collaboratively designed this book that was published by non-profit publishers of the Appearance of Black Lives Matter, [NAME] Publications. It presents a catalog of its accompanying visual exhibition but also the documentation of the social practices in art projects that confront the systems and raise awareness of injustice. Printed catalog and exhibition was the first museum presentation and publication to consider the topic, begins to write a history of artist-led activism and activist-inspired art that calls into question the criminal justice system. Contemporary Arts Museum Houston, 2018 Tufts University Art Galleries, at the School of the Museum of Fine Arts at Tufts in Boston, 2020

### **4. Design + Social Justice Symposium, University of Nebraska-Lincoln, 2015**

Examined the role of graphic design or visual communications in creating messaging that promotes well-being, civil and human rights, preservation of the environment, and advocacy of equal opportunity. It was a collaborative project that included the curation of exhibitions, discussions, and presentations that analyzed the role of design as a revolutionary force, and celebrated how the visual arts can communicate about a need for social change.

#### (ii) Other significant products:

#### **Prairie Pines Nature Preserve, 2015**

UNL's College of Agriculture Sciences and Natural Resources, Lincoln, Nebraska, "Eyes Wide Open" was a social practice in art or social design project that allowed participants to create visual artifacts inspired by the surrounding environment found at Prairie Pines. Collaborated with advanced graphic design students to create a pop-up exhibition of design to promote a nature preserve located just outside Lincoln city limits. University of Nebraska-Lincoln, Lincoln, Nebraska

#### **Crafting Stories About Water and the City: Transdisciplinary Design, 2017**

Collaboration for Social Impact, and Pedagogical Methods. Co-authored an article that chronicles the collaboration between graphic design students from disparate cultures and geographies. AIGA Design Educators Community Journal, Collaborative Design Education, Michigan State University, East Lansing, Michigan, 2019

#### **Impetus: Water, Food, Fuel and the Changing Environment, 2017**

Advanced Graphic Design and Typography students displayed works that communicated a particular view, statement, or concept about a changing climate and the relationship to food, fuel, or water. University of Nebraska-Lincoln, Nebraska Innovation Campus.

## **SYNERGISTIC ACTIVITIES**

- **Sovereign Native Youth Leadership Academy, 2015-** Over 80 Native American Youth convened at the Nebraska Innovation Studio, Maker Space to learn how to screenprint materials that promoted STEM [Science, Technology, Engineering, Mathematics] education and art production methodologies. Participants, empowered with the knowledge of the methodology of screen printing, were prepared to produce materials of their own with graphics that they design. Nebraska Innovation Studio, Maker Space

- **Visualizing Wellbeing in Tanzania, Africa**, 2014- Advanced Graphic Design students collaborated with the College of Agriculture Sciences and Natural Resources team led by Dr. Liz Van Wormer to co-research design solutions and then produce educational and informational, publications and visual communications. The design solutions were then used by large animal veterinarians and scientists to promote well-being in Tanzania, Africa. The University of Nebraska-Lincoln, Lincoln, Nebraska
- **Drought**, 40th Annual Center for Great Plains Studies Symposium, 2014. Included in a group exhibition for the symposium was a collaboration with the [National Drought Mitigation Center](#) and the [Robert B. Daugherty Water for Food Institute](#). For the exhibition, I curated a collection of books that related to the possibility of drought and food scarcity. The collection of over 100 books became a relaxed reading space for symposium participants' perusal. Gathered comments and suggestions for additions to the reading list. The University of Nebraska-Lincoln, Lincoln, Nebraska
- **San Francisco Recreation & Park Department**, *Visual & Digital Arts Coordinator*; 2010-2012 Made a critical contribution to the field of visual/digital arts and design through community arts administration and development on a civic level. Participated in the grant writing process to secure funding from *Google* for *Digi-Mobile*, a transportable, digital arts learning environment. Created design and social art practices [After School Art Program, Project Insight: Adaptive Recreation] that generated enriching experiences and introduced programs in the digital and visual arts, training in urban agriculture, and other regenerative systems thinking related projects to citizens of all ages throughout 32 city recreation centers.

**Stacey J. Hoffman**

Public Policy Center

402 472 4673

[shoffman3@unl.edu](mailto:shoffman3@unl.edu)

**EDUCATION & TRAINING**

| <b>Institution</b>                       | <b>Area</b> | <b>Degree</b> | <b>Year Awarded</b> |
|------------------------------------------|-------------|---------------|---------------------|
| <b>Cornell College, Mount Vernon, IA</b> | Psychology  | BA            | 1993                |
| <b>University of Nebraska-Lincoln</b>    | Psychology  | MA            | 1998                |
| <b>University of Nebraska-Lincoln</b>    | Psychology  | PhD           | 2006                |

**RESEARCH & PROFESSIONAL EXPERIENCE**

| <b><i>Years</i></b> | <b><i>Position</i></b>                                      |
|---------------------|-------------------------------------------------------------|
| 8/2006-present      | Senior Research Manager, University of Nebraska-Lincoln     |
| 10/2002-5/2014      | Freelance Statistics Consultant                             |
| 8/1999-8/2006       | Graduate Research Assistant, University of Nebraska-Lincoln |
| 8/1996-8/1999       | Graduate Teaching Assistant, University of Nebraska-Lincoln |
| 6/1993-8/1996       | Data Processor, Frank N. Magid Associates, Marion, IA       |

**SYNERGISTIC ACTIVITIES**

- Nebraska Behavioral Health Emergency Response Team member (N-BHERT; April 2009 – Present)
- Chair, Nebraska Risk Communication Cadre (June 2010 – June 2022)
- 2022 Update Committee, Nebraska Disaster Behavioral Health Response and Recovery Plan (January 2022 – Present)
- 2006 Update Committee, Nebraska Critical Incident Stress Management Program (September 2006 – August 2007)

**PUBLICATIONS (refereed journals, last 4 years)**

Abdel-Monem, T., Sateemae, M., Sateemae, S., Tayongmat, S., Hoffman, S., & DeKraai, M. (2020). Perceptions of human security among Islamic school students, parents and teachers in southern Thailand's subnational conflict zone, *Civil Wars*, DOI: 10.1080/13698249.2020.1765541



## **PUBLICATIONS (related to project)**

- Artikov, I., Hoffman, S. J., Lynne, G., PytlikZillig, L. M., Hu, Q., Tomkins, A. J., et al. (2006). Understanding the Influence of Climate Forecasts on Farmer Decisions as Planned Behavior. *Journal of Applied Meteorology & Climatology*, 45(9), 1202-1214.
- Hu, Q., PytlikZillig, L. M., Lynne, G. D., Tomkins, A. J., Waltman, W. J., Hayes, M. J., Hubbard, K. G., Artikov, I., Hoffman, S. J., & Wilhite, D. (2006). Understanding Farmers' Forecast Use from Their Beliefs, Values, Social Norms, and Perceived Obstacles. *Journal of Applied Meteorology & Climatology*, 45(9), 1190-1201.
- HOFFMAN, S. J. (2006). COPING PROCESSES IN MIDWEST FLOOD SURVIVORS: A COMPARISON OF THOSE WITH AND WITHOUT PRIOR NATURAL DISASTER EXPOSURE (DOCTORAL DISSERTATION, UNIVERSITY OF NEBRASKA-LINCOLN). DISSERTATION ABSTRACTS INTERNATIONAL.

**Cory G. Walters**  
Associate Professor  
University of Nebraska-Lincoln  
304B Filley Hall, Lincoln, NE 68583-0922  
(402) 472-0366 [/cwalters7@unl.edu](mailto:cwalters7@unl.edu)  
ORCID: 0000-0003-1957-8542

## EDUCATION AND TRAINING

| <i>Institution</i>          | <i>Area</i>            | <i>Degree</i> | <i>Year</i> |
|-----------------------------|------------------------|---------------|-------------|
| Montana State University    | Agricultural Business  | B.S.          | 2002        |
| Washington State University | Agricultural Economics | M.A.          | 2003        |
| Washington State University | Economics              | Ph.D.         | 2008        |

## RESEARCH AND PROFESSIONAL EXPERIENCE

| <i>Years</i> | <i>Position</i>                                                                           |
|--------------|-------------------------------------------------------------------------------------------|
| 2019-present | Associate Professor, Department of Agricultural Economics, University of Nebraska-Lincoln |
| 2014-2019    | Assistant Professor, Department of Agricultural Economics, University of Nebraska-Lincoln |
| 2008-2014    | Assistant Professor, Department of Agricultural Economics, University of Kentucky         |

## PERSONAL STATEMENT

My applied research program investigates producer decision making under uncertainty by evaluating the role of risk management tools such as crop insurance and pre-harvest hedging with limited information, highlighting the role of theory and computer decision models to generate a better decision environment. My work on producer decision making focuses on producer location, crop and practice (irrigated or rainfed) as risk exposure changes within this context. At the market level, I have investigated the unintended consequences of crop insurance policy. I am interested in the impacts of hidden information in pricing, economics of integrated pest management, economics of soil health and resilient farms. My work has spanned across departments and into private industry.

## PUBLICATIONS

### *Referred Journal Publications*

- O'Donnell E.\*, L. Nogueira, C. G. Walters, W. Peterson and S. Irmak. Forthcoming "The Economics of Deficit Irrigation" *Agricultural and Resource Economics Review*.
- Roberts, S.\*, L. Nogueira, K. Brooks and C. G. Walters. 2022. "The Role of Quality Characteristics in Pricing Hard Red Winter Wheat" *Food Policy*, 108, 102246  
<https://doi.org/10.1016/j.foodpol.2022.102246>
- Hunt, E., C. G. Walters, T. Klemm and I. Eronmwon\*. 2022. "Using Seasonal Climate Analogs to Improve Grain Marketing Decisions" *Choices* 37(316-2022-284)
- Azzam, A., Walters, C. and T. Kaus\*. 2021. "Does subsidized crop insurance affect farm industry structure? Lessons from the US." *Journal of Policy Modeling*  
<https://doi.org/10.1016/j.jpolmod.2021.06.003>

- Mavroutsikos, C. \*, Giannakas, K. and C. Walters, 2021. "The role of premium subsidies in crop insurance." *Plos one*, 16(4), p.e0250129. <https://doi.org/10.1371/journal.pone.0250129>
- Delay N. D., H. H. Chouinard, C. G. Walters and P. R. Wandschneider. 2020. "The Influence of Crop Insurance Agents on Coverage Choices: The Role of Agent Competition" *Agricultural Economics*. 51(4): 623-638. <https://doi.org/10.1111/agec.12576>
- Sharma, S., and C. G. Walters. 2020. "Influence of Farm Size and Insured Type on Crop Insurance Returns" *Agribusiness: An International Journal* 36(3):440-452. <https://doi.org/10.1002/agr.21636>
- Kotsakou, T., C. G. Walters, J. Groskopf, R. Tigner and S. Banerjee. 2018. "A Unique Marketing Educational Tool: Marking in a New Era Simulation Game" *Journal of Extension*, 56(6), Article 6TOT4 <https://www.joe.org/joe/2018october/tt4.php>
- Mieno, T., C. G. Walters, and L. Fulginiti. 2018. "Input Use Under Crop Insurance: The Role of APH" *American Journal of Agricultural Economics* 100(5): 1469-1485 <https://doi.org/10.1093/ajae/aay040>
- Westerhold A., C.G. Walters, K. Brooks, M. Vandever, J. Volesky and W. Schacht. 2018 "Risk Implications from the Selection of Rainfall Index Insurance Intervals" *Agricultural Finance Review* 78(5):514-531 <https://doi.org/10.1108/AFR-10-2017-0097>
- Saghaian. M., B. Chen, C.G. Walters and M. Nemati. 2018. "Asymmetric Price Volatility Transmission between U.S. Biofuel, Corn and Oil Markets" *Journal of Agriculture and Resource Economics* 43(1):46-60. <https://doi.org/10.22004/ag.econ.267609>
- Brooks, K., C. G. Walters, J. Parsons, A. Ramirez, L. Van Tassell, B. Lubben and J. D. Aiken. 2018. "Characteristics Contributing to Nebraska Farm and Ranch Financial Stress" *Journal of American Society of Farm Managers and Rural Appraisers*. 2018:140-156.
- Walters C.G., and R. Preston. 2018. "Net Income Risk, Crop Insurance and Hedging" *Agricultural Finance Review*, 78(1):135-151. <https://doi.org/10.1108/AFR-05-2017-0036>
- Mason, S., C. G. Walters, T. Galusha, R. Wilson and Z. Kmail. 2017. "Planting Saved Roundup Ready 1 Soybean Seed Implications on Yield and Profit" *Agronomy Journal*, 109(2):1-6. <https://doi.org/10.2134/agronj2016.05.0284>
- Walters, C.G., C.R. Shumway, and D. Huggins. 2017. "Impacts of Terrain Attributes on Economics and the Environment: Costs of Reducing Potential Nitrogen Pollution in Wheat Production" *Agricultural Economics* 48(2):143-152. <https://doi.org/10.1111/agec.12321>

#### **Technical Publications**

- Holley E.R., A. J. Liska, C.G. Walters, G. C. Friesen, M. J. Hayes, M. J. Rudolph and A. Wilhite. 2020. "Climate Change and Market-Based Insurance Feedbacks" Catastrophe & Climate Strategic Research Program. Society of Actuaries. Available at: <https://www.soa.org/globalassets/assets/files/resources/research-report/2020/2020-08-cat-climate-newsletter.pdf>

## **Soni Cochran**

Associate Extension Educator, Nebraska Extension

Phone: (308) 432-3373; [scochran2@unl.edu](mailto:scochran2@unl.edu)

<https://disaster.unl.edu>

### **EDUCATION AND TRAINING**

| <i><b>Institution</b></i>             | <i><b>Area</b></i>                     | <i><b>Degree</b></i> | <i><b>Year</b></i> |
|---------------------------------------|----------------------------------------|----------------------|--------------------|
| <b>University of Nebraska-Lincoln</b> | <b>Education</b>                       | BME                  | 1982               |
| <b>University of Nebraska-Lincoln</b> | <b>Family &amp; Community Services</b> | MS                   | 2019               |

### **RESEARCH & PROFESSIONAL EXPERIENCE**

| <i><b>Years</b></i> | <i><b>Position</b></i>                                                                                  |
|---------------------|---------------------------------------------------------------------------------------------------------|
| 1/23-present        | Disaster Education Coordinator, Nebraska Extension                                                      |
| 9/21-12/22          | Interim Disaster Education Coordinator, Community Engagement and Wellness Associate, Nebraska Extension |
| 1/20-9/21           | Community Engagement and Wellness Associate, Nebraska Extension                                         |
| 9/99-1/20           | Educational Resources Associate, Nebraska Extension in Lancaster County                                 |
| 9/93-9/99           | Educational Resources Assistant, Nebraska Extension in Lancaster County                                 |

### **TRAINING CERTIFICATIONS**

- Community Emergency Response Training CERT (2023)
- Question. Persuade. Refer. QPR Gatekeeper Instructor (4/14/2021 – 4/14/2024)
- Collaborative Institutional Training Initiative (CITI Program). Group 2 Social / Behavioral Research Investigators and Key Personnel. Renewal August 2022 – Expires August 2025. Credential ID 50751720
- Federal Emergency Management Agency: ICS-402, IS-100.C., IS-200.C., IS-300, IS-700.B., IS-800.D., L0363, PER-213

### **RELATED SYNERGISTIC ACTIVITIES**

- Nebraska Extension Disaster Preparedness Challenge – H.O.P.E. Challenge. Nebraska Emergency Management Agency liaison and lead (2022-2023)
- Wellness in Tough Times - New Technologies in Agriculture Extension, Extension Foundation, Project Fellow/Project Lead (2021-2022)
- Nebraska Extension Disaster Education Network, Team Lead (2021-present)
- Heartland Extension Disaster Education Network, Leadership Team, (2020-present)
- Extension Disaster Education Network, Nebraska Point of Contact and Lead (2021-present)
- USDA Region VII ESF#11 Agriculture and Natural Resources, Nebraska Extension Point of Contact (May 2021 – Present)
- Nebraska Voluntary Organizations Active in Disasters, Point of Contact (2019-present)
- Rural Family Stress and Wellness Collaborative Working Group, Lead (2019-present)
- Governor's Long Term Recovery Task Force (August 2019 – 2022). Role: Co-lead, Health and Social Services Recovery Support Function (RSF)

- United State Civil Air Patrol – Nebraska Wing. (2004-present)

## **PUBLICATIONS (REFEREED, RELATED, LAST 4 YEARS)**

Burnham, C., Cochran, S., Lillpop, A., McKillip, C., Medley, R., Torrance, L. (2023). COAD Manual: Community organizations active in disasters. *Extension Disaster Education Network*.

Cochran, S., Fischer, J., Harris, S., Hatton-Bowers, H., Huseman, K., (2022, July). Nebraska Extension Cares Resource Cards. [Wallet Cards]. *Nebraska Extension*.

Cochran, S., Harris, S., Elsen, K., Hinrichs, K., Hoffman, J., Krehbiel, M., VanDeWalle, B., (2021). Wellness in Tough Times Toolkit eFieldbook (1<sup>st</sup> ed). Kansas City, Missouri: *Extension Foundation*. e-pub: 978-1-955687-0702. <https://online.flippingbook.com/view/410896298/>

Governor’s Task Force for Disaster Recovery Collaborative (Nebraska Extension: Cochran, S., Fischer, J., Mantonya, K., McShane-Jewell, B., Rasby, R., Varner, D., Wielenga, V.). State of Nebraska Long-Term Recovery and Resilience Plan (2020, July). *Nebraska Emergency Management Agency*. <https://nema.nebraska.gov/long-term-recovery>

Cochran, S., Behnken, T., Mueller, A. (2019). Flooded with Volunteers: A Guide to Managing 4-H Youth and Adult Volunteers During Disaster Recovery. EC3048. *Nebraska Extension*. <https://extensionpubs.unl.edu/publication/9000023658607/flooded-with-volunteers/>

Cochran, S., Elsen, K., Harris, S., Hoffman, J., Krehbiel, M., Hinrichs, K., VanDeWalle, B. (2020, 2021). Start the Conversation. Issues 1 and 2. [Bulletins]. *Nebraska Extension*.

**S. Carolina Córdova Martínez, Ph.D.**  
 Assistant Professor and Statewide Soil Health Specialist  
 Department of Agronomy and Horticulture  
 University of Nebraska-Lincoln  
[402-472-6292/ccordova4@unl.edu](mailto:402-472-6292/ccordova4@unl.edu)  
 ORCID: 0000-0002-4716-127X

## EDUCATION AND TRAINING

| <i><b>Institution</b></i>              | <i><b>Area</b></i> | <i><b>Degree</b></i> | <i><b>Year</b></i> |
|----------------------------------------|--------------------|----------------------|--------------------|
| Tecnica del Norte University (Ecuador) | Agro-Industry      | B.Eng.               | 2011               |
| Iowa State University (United States)  | Soil Science       | Ph.D.                | 2018               |
|                                        |                    |                      |                    |

## RESEARCH AND PROFESSIONAL EXPERIENCE

| <i><b>Years</b></i> | <i><b>Position</b></i>                                                                                                                              |
|---------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|
| 2022-present        | Assistant Professor and Statewide Soil Health Specialist, Department of Agronomy and Horticulture, University of Nebraska-Lincoln                   |
| 2021-2022           | Academic Collaborator and Guest Lecturer, Department of Agronomy Engineering, Universidad Central del Ecuador (Ecuador)                             |
| 2018-2022           | Field Site Research Coordinator, Great Lakes Bioenergy Research Center, Michigan State University                                                   |
| 2018-2022           | Postdoctoral Research Scientist, Department of Plant, Soil, and Microbial Sciences and 2W. K. Kellogg Biological Station, Michigan State University |
| 2013-2018           | Graduate Research Assistant, Department of Agronomy, Iowa State University                                                                          |
| 2012-2013           | Research Assistant, Research and Certification Unit, Agroenlaces (Ecuador)                                                                          |
| 2011-2012           | Research Assistant, Department of Agronomy, Iowa State University                                                                                   |
| 2010-2011           | Lab Assistant, Department of Agriculture and Natural Resources, Universidad Tecnica del Norte (Ecuador)                                             |
| 2009-2010           | Research Assistant, Graduate College, Universidad Tecnica del Norte (Ecuador)                                                                       |
| 2009                | Visiting Scholar, Department of Chemistry and Biochemistry, Universidad Autonoma de Chiriqui (Panama)                                               |
| 2008                | Visiting Scholar, Department of Sustainability, Leuphana University (Fellowship Deutscher Akademischer Austauschdienst DAAD, Germany)               |

## Number of Undergraduate Students Mentored/Training during the Past Four Years

I have mentored a diverse group of five undergraduate students in the past four years. Four of them conducted independent projects as part of the National Science Foundation (NSF)-funded Research Experiences for Undergraduates (REU) summer programs at Michigan State University. The other student worked with me as a temporary lab and field assistant for a year and a half (2021-2022).

## SYNERGISTIC ACTIVITIES

### ***Research Overview***

### ***Grants and Awards***

I have won research grants totaling \$692,633 as PI and Co-PI (Iowa State University, Environmental Defense, Nebraska Soybean Board, NIFA-UNL) and fellowship support totaling \$190,200 (including prestigious national and international academic fellowships).

### **Teaching**

I am currently the instructor of the PLAS 435/835 Agroecology course, which has 41 students. Before joining UNL, I served as a teaching assistant, instructor, and co-instructor of upper-level undergraduates and graduate-level courses such as Experimental Design for Agronomy (Iowa State University), Applied Statistics and Agronomy lecture series (Universidad Central del Ecuador), and Agricultural Ecology (Michigan State University). I also served as a guest lecturer at the K-12 partnership program (Michigan State University).

### **Leadership**

I co-lead the UNL Soil Health Team, which has 35 members from diverse backgrounds. From 2020-2022 I served as the elected Leader (2022) and Vice leader (2021) of the Bioenergy System Community, part of the American Society of Agronomy (ASA). Additionally, I have organized and moderated symposiums at the Tri-Societies international meetings of the ASA, Crop Science Society of America, and Social Science Society of America and topic sessions at the GLBRC and LTAR-ARS All Scientist Meetings.

### **Outreach**

In the last six months, I have co-organized one Soil Health & Cover Crops conference in Nebraska (165 attendees) and the first Soil Health School in Bridgeport (67 attendees). Served as a guest speaker at UNL extension events such as the Crop Protection Clinics in Hastings and York, Soils School, Lincoln (61 attendees), Conference of Biological Stoichiometry, and events organized by other organizations like City Sprouts, Wellhead Protection Network, Latino Center of the Midlands.

### **Membership**

Active community member of the Long-term Agroecosystem Research (LTAR-ARS), American Society of Agronomy, Soil Science Society of America, and Crop Science Society of America.

### **Collaboration**

Currently, I am involved in projects sponsored by the Nebraska NRCS, Corn Board, and Soybean Board that aim to investigate the potential of cover crops and crop-livestock integration on building healthy soils, as well as to train producers and technical support to adopt new climate-smart practices across the state. Additionally, I have developed ongoing partnerships with agronomists, agro-ecologists, crop physiologists, and soil microbiologists, including members of the GLBRC, LTAR-ARS, and Long-term Ecological Research (LTER) Networks.

## **PUBLICATIONS**

### ***Selected Refereed Journal Publications***

- Eaton, W., Robertson, T., Arbuckle, J., Córdova, S.C., et al., 2022. Advancing the Scholarship and Practice of Stakeholder Engagement in Working Landscapes: A Co-Produced Research Agenda. *Socio-Ecological Practice Research* 4: 283-304.
- Ciampitti, I.A., de Borja Reis, A.F., Córdova, S.C., et al., 2021. Revisiting biological nitrogen fixation dynamics in soybean. *Field Crops Research* 12:727021.
- Mosier, S., Córdova, S.C., Robertson, G.P. 2021. Restoring Soil Fertility on Degraded Lands to Meet Food, Fuel, and Climate Security Needs via Perennialization. *Frontiers in Sustainable Food Systems* 5:706142.
- Córdova, S.C., Licht, M., Castellano, M.J., Archontoulis, S. V. 2020. Soybean profitability and yield component response to nitrogen fertilizer in Iowa. *Agrosystems, Geosciences and Environment* 3(1):1-16.



- Archontoulis, S.V., Castellano, M.J., Licht, M.A., Córdova, S.C., et al., 2020. Predicting Crop Yields and Soil-Plant Nitrogen Dynamics in the US Corn Belt. *Crop Science* 60(2): 721-738.
- Córdova, S.C., Castellano, M.J., Dietzel, R., Licht, M.L., Togliatti, K., Martinez-Feria, R., Archontoulis, S.V. 2019. Soybean nitrogen fixation dynamics in Iowa, USA. *Field Crops* 236: 165-176.
- Córdova, S.C., Olk, D., Dietzel, R., Muller, K., Archontoulis, S.V., Castellano, M.J. 2018. Plant litter quality affects the accumulation rate, composition, and stability of mineral-associated soil organic matter. *Soil Biology and Biochemistry* 125: 115-124.
- Ordonez, R.A., Castellano, M.J., Córdova, S.C., et al., 2017 Maize and soybean root front velocity and maximum depth in Iowa, USA. *Field Crops Research* 15: 122-131.

**Amy Schmidt, Ph.D., P.E.**

Departments of Biological Systems Engineering and Animal Science, University of Nebraska – Lincoln

Phone: (402) 472-0877 · [aschmidt@unl.edu](mailto:aschmidt@unl.edu)

**EDUCATION AND TRAINING**

| <i><b>Institution</b></i>    | <i><b>Area</b></i>       | <i><b>Degree</b></i> | <i><b>Year</b></i> |
|------------------------------|--------------------------|----------------------|--------------------|
| Mississippi State University | Biological Engineering   | Ph D.                | 2010               |
| Iowa State University        | Agricultural Engineering | MS                   | 1999               |
| Iowa State University        | Agricultural Engineering | BS                   | 1997               |

**PROFESSIONAL EXPERIENCE**

| <i><b>Years</b></i>        | <i><b>Position</b></i>                                           |
|----------------------------|------------------------------------------------------------------|
| July 2018 – Present        | Associate Professor, University of Nebraska – Lincoln            |
| August 2012 – June 2018    | Assistant Professor, University of Nebraska – Lincoln            |
| July 2010 – August 2012    | Assistant Extension Professor, Mississippi State University      |
| March 2007 – July 2010     | Extension Instructor, Mississippi State University               |
| March 2007 – March 2007    | Extension Associate Professor, University of Missouri – Columbia |
| February 2001 – March 2007 | Extension Assistant Professor, University of Missouri – Columbia |

**PROFESSIONAL ACTIVITIES**

- *Journal of the ASABE*, Associate Editor 2018 – Present
- USDA-ARS National Program 216, *Review Panel Chair* 2018
- Livestock and Poultry Environmental Learning Center, *Executive Committee Member*; 2012 – Present

**HONORS & AWARDS**

- ASABE Standards Development Award 2022
- ASABE Nebraska Section Engineer of the Year Award 2016
- ASABE Standards Development Award 2016
- Nebraska Pork Producers Association Outstanding Service Award for Producer Outreach 2016

**RELATED GRANTS RECEIVED (Last 2 years)**

1. *AMR Gene Reservoirs and Bacterial Host-AMR Gene Associations in Swine Production Systems*. USDA-NIFA. 04/01/2023 – 03/31/2027. PI: S. Fernando; Co-PIs: A.M. Schmidt. Awarded: \$999,981.

2. *PRRSV Transmission Risk Associated with Exposure to Slurry Manure or Effluent from a PRRSV-positive Swine Herd*. Nebraska Pork Producers Association. 09/01/2022 – 08/31/2024. PI: A.M. Schmidt. Awarded: \$152,781.
3. *Evaluation of Swine Carcass Disposal Benefits and Challenges Using Composting and Shallow Burial with Carbon*. National Pork Board. 09/01/2022 – 08/31/2024. PI: A.M. Schmidt.; Co-PI: B. Mote and H. Vu Awarded: \$62,465.
4. *CAMRADES: Connecting AntiMicrobial Resistance, Agricultural Decisions, and Environmental Systems – A tool for mitigating AMR and assessing risk to human health in agro-ecosystems*. Iowa State University (Prime: USDA-NIFA). 01/01/2022 – 12/31/2026. PI: S. Bartelt-Hunt; Co-PIs: A.M. Schmidt and B. Wang. Awarded: \$309,037.
5. *Demonstrating an Integrated Nutrient Management Approach for Improving Drinking Groundwater Quality in Nebraska*. USDA-NIFA. 02/01/2022 – 01/31/2025. PI: J. Iqbal; Co-PI's: A.M. Schmidt, L. Johnson, A. Malakar, J. Milander, C. Proctor, and D. Snow. Awarded: \$298,631.
6. *Transforming Manure and Cedar Mulch from 'Waste' to 'Worth' – Part II*. Nebraska Environmental Trust. 05/01/2020 – 06/30/2023. PI: A.M. Schmidt; Co-PI: R. Koelsch. Awarded: \$141,762.

#### **PUBLICATIONS (last 4 years)**

- Mware, N., M.C. Hall, S. Rajendran, J.E. Gilley, A. Schmidt, S. Bartelt-Hunt, Y. Zhang, and X. Li. 2022. Resistome and mobilome in surface runoff from manured soil as affected by setback distance. *Journal of Hazardous Materials*. <https://doi.org/10.1016/j.jhazmat.2022.128278> (Contribution: 20%; 0, #)
- Yost, J.L., A.M. Schmidt, R. Koelsch, and L.R. Schott. 2021. Impact of swine manure on soil health properties: A systematic review. *Soil Science Society of America Journal*. <https://doi.org/10.1002/saj2.20359>
- Gilley, J.E., S.L. Bartelt-Hunt, K.M. Eskridge, X. Li, A. M. Schmidt, and D.D. Snow. 2020. Antibiotic resistance genes in swine manure slurry as affected by pit additives and facility disinfectants. *Science of the Total Environment*. <https://doi.org/10.1016/j.scitotenv.2020.143287>
- Meyers, M.A., L.M. Durso, J.E. Gilley, D.N. Miller, X. Li and A.M. Schmidt. 2020. Impact of setback distances on transport and antibiotic resistance phenotypes of fecal indicators from manure-amended fields. *Agrosystems, Geosciences and Environment*. In Press. <https://doi.org/10.1002/agg2.20081>.
- Gilley, J.E., S.L. Bartelt-Hunt, K. Eskridge, X. Li, A.M. Schmidt and D.D. Snow. 2020. Retention of swine slurry constituents in soil and crop residue as affected by setback distance. *Water, Air & Soil Pollution* 231(7). <https://doi.org/10.1007/s11270-020-04697-6>
- Miller, D.M., M.E. Jurgens, L.M. Durso and A.M. Schmidt. 2020. Simulated winter incubation of soil with swine manure differentially affects multiple antimicrobial resistance elements. *Frontiers in Microbiology* 11:611912. <https://doi.org/10.3389/fmicb.2020.611912>
- Hall, M.C., N.A. Mware, J.E. Gilley, S.L. Bartelt-Hunt, D.D. Snow, A.M. Schmidt, K.M. Eskridge and X. Li. 2020. Influence of setback distance on antibiotic resistance genes in runoff and soil following the land application of swine manure slurry. *Environmental Science and Technology* 54(8):4800-4809. <https://doi.org/10.1021/acs.est.9b04834>

- Meyers, M., L. Durso, J. Gilley, L. Castleberry, H. Waldrip and A. Schmidt. 2020. Antibiotic resistance gene profile changes in cropland soil following manure application and rainfall. *Journal of Environmental Quality*. 2020:1-8. <https://doi.org/10.2134/jeq2019.04.0153>
- Gilley, J.E., S.L. Bartelt-Hunt, J. Duerschner, X. Li, K. Eskridge, A.M. Schmidt and D.D. Snow. 2020. Swine slurry characteristics as affected by selected additives and disinfectants. *Environmental Pollution* 260(2020). <https://doi.org/10.1016/j.envpol.2020.114058>
- Staley, Z., X. Li, B. Woodbury, A. Schmidt, L. Durso and K. Eskridge. 2020. Corn stalk residue may add antibiotic resistant bacteria to manure composting piles. *Journal of Environmental Quality* 2020:1-9. <https://doi.org/10.1002/jeq2.20017>
- Barrios, R., H. Khuntia, S. Bartelt-Hunt, J. Gilley, D. Snow, A. Schmidt and X. Li. 2020. Fate and transport of antibiotics and antibiotic resistance genes in runoff and soil as affected by the timing of swine manure slurry application. *Science of the Total Environment* (712):1-10. <https://doi.org/10.1016/j.scitotenv.2020.136505>
- Schmidt, A. 2020. iAMResponsible<sup>TM</sup>: Educating food producers & consumers about antimicrobial resistance. *Scientia*. <https://doi.org/10.33548/SCIENTIA460>.
- Schuster, N., J.A. Peterson, J.E. Gilley, L.R. Schott and A.M. Schmidt. 2019. Soil arthropod abundance and diversity following land application of swine slurry. *Agricultural Sciences* 10(2). DOI:10.4236/as.2019.102013

## 6) CURRENT PENDING

### CURRENT & PENDING SUPPORT

Name: Craig Reece Allen

#### Instructions:

**Who completes this template:** Each project director/principal investigator (PD/PI) and other senior personnel specified in the Request for Applications (RFA). For Agriculture and Food Research Initiative (AFRI) applications, completion of this is only required for PDs/PIs and CoPDs/CoPIs.

#### How this template is completed:

- Record information for active and pending projects, including this proposal.
- All current efforts to which PD/PI(s) and other senior personnel have committed a portion of their time must be listed, whether or not salary for the person involved is included in the budgets of the various projects. For AFRI applications, list only projects for which salary is requested.
- Provide analogous information for all proposed work which is being considered by, or which will be submitted in the near future to, other possible sponsors, including other USDA programs.
- For concurrent projects, the percent of time committed must not exceed 100%.

Note: Concurrent submission of a proposal to other organizations will not prejudice its review by NIFA.

| NAME<br>(List/PD #1<br>first)                                                                  | SUPPORTING<br>AGENCY AND<br>AGENCY ACTIVE<br>AWARD/PENDING<br>PROPOSAL<br>NUMBER | TOTAL \$<br>AMOUNT | EFFECTIVE<br>AND<br>EXPIRATION<br>DATES | % OF TIME<br>COMMITTE<br>D | TITLE OF PROJECT                                                                                                                        |
|------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|--------------------|-----------------------------------------|----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| Active:                                                                                        |                                                                                  |                    |                                         |                            |                                                                                                                                         |
| Allen et al.                                                                                   | UNL Grand Challenge                                                              | \$4,390,051        | 2023-2028                               | 5                          | Weather Ready Farms: Creating Resilient, Healthy, and Equitable Agroecosystems                                                          |
| <b>Allen, CR</b><br>Twidwell, D<br>Chaffin, B<br>Banerjee, S<br>Uden, D                        | National Science<br>Foundation<br>1920938                                        | \$3,053,265        | 2019-2023                               | 8                          | Epscor RII Track-2 FEC Resilience informatics for the convergence of critical capacities to address regional-scale environmental change |
| <b>Allen, CR</b><br>So, L.K.<br>Twidwell, DT<br>PytlíkZillig, L<br>Munoz-<br>Arriola, F        | National Science<br>Foundation<br>DGE-1735362                                    | \$2,999,000        | 2018-2023                               | 8                          | NRT-INFWEWS: Training in theory and application of cross-scale resilience in agriculturally dominated social ecological systems         |
| Allen, C.,<br><b>W.H. Schacht</b> ,<br>D. Uden, M.<br>Stephenson, J.<br>Parsons, J.<br>Volesky | Nebraska<br>Environmental Trust                                                  | \$546,011          | July 2021-June<br>2024                  | 10                         | Initiating Adaptive Management of Sandhills Grasslands                                                                                  |

|                                                                                                                                      |                                                                             |                   |                            |   |                                                                                                                                                                                                                 |
|--------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|-------------------|----------------------------|---|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Allen, CR,<br>Awada, T,<br>Sundstrom, S,<br>Bennett, E,<br>Awono, C.                                                                 | National Science<br>Foundation                                              | ~\$430,000.0<br>0 | 08/2021-<br>07/2025        | 4 | DISES-RCN: Resilience in<br>agricultural socio-environmental<br>systems                                                                                                                                         |
| Allen, C.,<br>W.H. Schacht,<br>D. Uden, M.<br>Stephenson, J.<br>Parsons, J.<br>Volesky                                               | North Central<br>Sustainable Agriculture<br>Research and<br>Education, USDA | \$247,011.00      | 11/1/2021 –<br>10/31/2024  | 5 | Assessing tradeoffs of rangeland<br>management approaches using<br>collaborative adaptive management                                                                                                            |
| Awada, T., C.<br>Allen, C.<br>Cordova, D.<br>Uden, J Iqbal,<br>L. Ameyaw,<br>M. Khorchani,<br>R. Drijber, S.<br>Choudhury, Y.<br>Shi | McEntire-Stennis                                                            | \$375,000.00      | 1/01/2023 –<br>9/30/2027   | 5 | Response of a man-made forest to<br>the catastrophic wildfires of 2022:<br>Recovery of the Sandhills Halsey<br>Nebraska National Forest                                                                         |
| Banerjee, S.,<br>C. Allen, E.<br>Dennis, G.<br>Meredith, M<br>Stephenson                                                             | USDA-FSA                                                                    | \$499,868.00      | 11/07/2022 –<br>09/29/2024 | 5 | Improving the retention and uptake<br>of tillable and non-tillable grazing<br>land in the conservation reserve<br>program: A qualitative and<br>quantitative analysis of economic<br>and environmental factors. |

## CURRENT & PENDING SUPPORT

**Name:** Eric Hunt

**Instructions:**

**Who completes this template:** Each project director/principal investigator (PD/PI) and other senior personnel specified in the Request for Applications (RFA). For Agriculture and Food Research Initiative (AFRI) applications, completion of this is only required for PDs/PIs and CoPDs/CoPIs.

**How this template is completed:**

- Record information for active and pending projects, including this proposal.
- All current efforts to which PD/PI(s) and other senior personnel have committed a portion of their time must be listed, whether or not salary for the person involved is included in the budgets of the various projects. For AFRI applications, list only projects for which salary is requested.
- Provide analogous information for all proposed work which is being considered by, or which will be submitted in the near future to, other possible sponsors, including other USDA programs.
- For concurrent projects, the percent of time committed must not exceed 100%.

Note: Concurrent submission of a proposal to other organizations will not prejudice its review by NIFA.

| NAME<br>(List/PD #1<br>first) | SUPPORTING<br>AGENCY AND<br>AGENCY ACTIVE<br>AWARD/PENDING<br>PROPOSAL<br>NUMBER | TOTAL \$<br>AMOUNT | EFFECTIVE<br>AND<br>EXPIRATION<br>DATES | % OF TIME<br>COMMITTE<br>D | TITLE OF PROJECT                                                               |
|-------------------------------|----------------------------------------------------------------------------------|--------------------|-----------------------------------------|----------------------------|--------------------------------------------------------------------------------|
| Active: None                  |                                                                                  |                    |                                         |                            |                                                                                |
| Allen et al.                  | UNL Grand Challenge                                                              | \$4,390,051        | 2023-2028                               | 5                          | Weather Ready Farms: Creating Resilient, Healthy, and Equitable Agroecosystems |



## CURRENT & PENDING SUPPORT

**Name: Nathan D. Mueller**

**Instructions:**

**Who completes this template:** Each project director/principal investigator (PD/PI) and other senior personnel specified in the Request for Applications (RFA). For Agriculture and Food Research Initiative (AFRI) applications, completion of this is only required for PDs/PIs and CoPDs/CoPIs.

**How this template is completed:**

- Record information for active and pending projects, including this proposal.
- All current efforts to which PD/PI(s) and other senior personnel have committed a portion of their time must be listed, whether or not salary for the person involved is included in the budgets of the various projects. For AFRI applications, list only projects for which salary is requested.
- Provide analogous information for all proposed work which is being considered by, or which will be submitted in the near future to, other possible sponsors, including other USDA programs.
- For concurrent projects, the percent of time committed must not exceed 100%.

Note: Concurrent submission of a proposal to other organizations will not prejudice its review by NIFA.

| NAME<br>(List/PD #1<br>first)                                   | SUPPORTING<br>AGENCY AND<br>AGENCY ACTIVE<br>AWARD/PENDING<br>PROPOSAL<br>NUMBER | TOTAL \$<br>AMOUNT | EFFECTIVE<br>AND<br>EXPIRATION<br>DATES | % OF TIME<br>COMMITTE<br>D | TITLE OF PROJECT                                                               |
|-----------------------------------------------------------------|----------------------------------------------------------------------------------|--------------------|-----------------------------------------|----------------------------|--------------------------------------------------------------------------------|
| Allen et al.                                                    | UNL Grand Challenge                                                              | \$4,390,051        | 2023-2028                               | 5%                         | Weather Ready Farms: Creating Resilient, Healthy, and Equitable Agroecosystems |
| L. Thompson, et al. (N. Mueller)                                | Active:<br>U.S. Dept. of Agriculture-NRCS, 50214                                 | \$1,267,747        | 5-13-2020 to 12-31-2023                 | 2%                         | Promote Adoption of Innovation Precision Ag Nitrogen Management Technologies   |
| L. Thompson, A. Nygren, N. & Mueller                            | NE Soybean Board, 55801                                                          | \$48,200           | 10-1-2022 to 9-30-2023                  | 4%                         | Nebraska Extension On-Farm Research Initiative                                 |
| K Koehler-Cole, C. Cordova, N. Mueller, A. Nygren, & T. Whitney | NE Soybean Board, 55811                                                          | \$7,000            | 10-1-2022 to 9-30-2023                  | 2%                         | Eastern Nebraska Soil Health Conference                                        |

|                                                                                            |                                        |             |                        |    |                                                 |
|--------------------------------------------------------------------------------------------|----------------------------------------|-------------|------------------------|----|-------------------------------------------------|
| K Koehler-Cole, C.<br>Cordova, N.<br>Mueller, R.<br>Seymour, S.<br>Sivits, & T.<br>Whitney | Pending:<br>NE Soybean Board,<br>57936 | \$15,800    | 10-1-2023 to 9-30-2024 | 2% | Nebraska soil health and cover crop conferences |
| C. Allen et al.<br>(N. Mueller)                                                            | UNL Grand Challenge                    | \$4,390,051 | 10-1-2023 to 9-30-2028 | 5% | Weather Ready Farms                             |

## CURRENT & PENDING SUPPORT

**Name: Bruno Lena**

**Instructions:**

**Who completes this template:** Each project director/principal investigator (PD/PI) and other senior personnel specified in the Request for Applications (RFA). For Agriculture and Food Research Initiative (AFRI) applications, completion of this is only required for PDs/PIs and CoPDs/CoPIs.

**How this template is completed:**

- Record information for active and pending projects, including this proposal.
- All current efforts to which PD/PI(s) and other senior personnel have committed a portion of their time must be listed, whether or not salary for the person involved is included in the budgets of the various projects. For AFRI applications, list only projects for which salary is requested.
- Provide analogous information for all proposed work which is being considered by, or which will be submitted in the near future to, other possible sponsors, including other USDA programs.
- For concurrent projects, the percent of time committed must not exceed 100%.

Note: Concurrent submission of a proposal to other organizations will not prejudice its review by NIFA.

| NAME<br>(List/PD #1<br>first)                | SUPPORTING<br>AGENCY AND<br>AGENCY ACTIVE<br>AWARD/PENDING<br>PROPOSAL NUMBER | TOTAL \$<br>AMOUNT | EFFECTIVE<br>AND<br>EXPIRATION<br>DATES | % OF TIME<br>COMMITTE<br>D | TITLE OF PROJECT                                                                                             |
|----------------------------------------------|-------------------------------------------------------------------------------|--------------------|-----------------------------------------|----------------------------|--------------------------------------------------------------------------------------------------------------|
| Allen et al.                                 | UNL Grand Challenge                                                           | \$4,390,051        | 2023-2028                               | 5%                         | Weather Ready Farms: Creating Resilient, Healthy, and Equitable Agroecosystems                               |
| Bruno Lena,<br>Luan Oliveira,<br>Nate Dorsey | NE Soybean Board                                                              | \$ 18,192          | 10/01/2022-<br>09/30/2023               | 5                          | Increasing eastern Nebraska growers' awareness about proper uniformity of water application of center pivots |
| Luan Oliveira,<br>Nate Dorsey,<br>Bruno Lena | NE Soybean Board                                                              | \$ 19,000          | 10/01/2022-<br>09/30/2023               | 5                          | Evaluation of precision planting technologies and digital tools on soybeans production                       |

|                                                |                  |           |                            |     |                                                                                                     |
|------------------------------------------------|------------------|-----------|----------------------------|-----|-----------------------------------------------------------------------------------------------------|
| Laura Thompson,<br>Aaron Nygren,<br>Bruno Lena | NE Soybean Board | \$ 57,400 | 10/01/2023-<br>09/30/2024  | 5   | Nebraska Extension On-Farm<br>Research Initiative                                                   |
| Dylan Mangel,<br>Bruno Lena,<br>Laura Thompson | NE Soybean Board | \$ 33,010 | 10/01/2023-<br>09/30/2024  | 7.5 | A Comprehensive Plan for Soybean<br>Cyst Nematode Education in<br>Nebraska                          |
| Abia Katimbo,<br>Hope Kanabuye,<br>Bruno Lena  | NE Corn Board    | 104,229   | 07/01/2023 -<br>06/30/2024 | 20  | Corn Growers Irrigator App: A<br>Mobile Irrigation Support Tool for<br>Water Management in Nebraska |

## CURRENT & PENDING SUPPORT

**Name:** Gwendwr Meredith

**Instructions:**

**Who completes this template:** Each project director/principal investigator (PD/PI) and other senior personnel specified in the Request for Applications (RFA). For Agriculture and Food Research Initiative (AFRI) applications, completion of this is only required for PDs/PIs and CoPDs/CoPIs.

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|----------------------------|------------------------------------------------------------------------------------------|--------------------|-----------------------------------------|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Active:</b>             |                                                                                          |                    |                                         |                        |                                                                                                                                                         |
| \$4,390,051                |                                                                                          |                    |                                         |                        |                                                                                                                                                         |
| Allen et al.               | UNL Grand Challenge                                                                      | \$4,390,051        | 2023-2028                               |                        | Weather Ready Farms:<br>Creating Resilient, Healthy,<br>and Equitable<br>Agroecosystems                                                                 |
| Allen et al.               | North Central Sustainable<br>Agriculture Research and<br>Education, USDA<br>(H009277416) | \$247,011          | 11/01/2021–<br>10/31/2024               | 5%                     | Assessing tradeoffs of rangeland<br>management approaches using<br>collaborative adaptive<br>management                                                 |
| Allen et al.               | Nebraska Environmental<br>Trust (21-209)                                                 | \$546,011          | 06/01/2021–<br>06/30/2024               | 5%                     | Initiating adaptive management<br>of sandhills grasslands                                                                                               |
| Allen et al.               | National Science<br>Foundation<br>(OIA-1920938)                                          | \$3,053,265        | 08/21/2019–<br>07/31/2023               | 10%                    | EPSCOR RII Track-2 FEC:<br>Resilience informatics for the<br>convergence of<br>critical capacities to address<br>regional-scale environmental<br>change |

|                   |                                                                                                                          |           |                            |     |                                                                                                                                                                                                                                                                   |
|-------------------|--------------------------------------------------------------------------------------------------------------------------|-----------|----------------------------|-----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Banerjee et al.   | Dept of Agriculture –<br>FSA (CFDA# 10.999)                                                                              | \$499,868 | 9/30/2022 –<br>9/29/2024   | 10% | Improving the retention and uptake of tillable and non-tillable grazing land in the Conservation Reserve Program: A qualitative and quantitative analysis of economic and environmental factors.<br><br>Recycling nutrients for robust agricultural supply chains |
| Spiegel et al.    | Foundation for Food & Agriculture (21033)                                                                                | \$712,703 | 10/15/2022 –<br>10/14/2025 | 5%  |                                                                                                                                                                                                                                                                   |
|                   | <b>Pending:</b>                                                                                                          |           |                            |     |                                                                                                                                                                                                                                                                   |
| Stephenson et al. | Texas A&M University                                                                                                     | \$253,295 |                            | 2%  | Promoting climate-smart agricultural practices to reduce risk and impacts of drought, wildfire and woody encroachment on livestock production in Great Plains rangelands                                                                                          |
| Meredith et al.   | North Central Regional Association of State Agricultural Experiment Station Directors - Multistate Grant Program (58072) | \$149,419 |                            | 7%  | Strengthening climate change education, mitigation, and adaptation in the NCRA                                                                                                                                                                                    |

## CURRENT & PENDING SUPPORT

**Name: Tonya Haigh**

**Instructions:**

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|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|--------------------|-----------------------------------------|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|
| Active:                                                                                                                                                                              |                                                                               |                    |                                         |                        |                                                                                                                                              |
| Fuchs, Brian<br><b>Haigh, Tonya</b><br>Bathke, Deb<br>Knutson, Cody<br>Mieno, Taro<br>Rimsaite,<br>Renata<br>Smith, Kelly<br>Svoboda, Mark<br>Tadesse,<br>Tsyegaye<br>Wardlow, Brian | Department of<br>Agriculture - OCE                                            | \$1,325,000        | 09/30/2022-<br>09/30/2023               | 20%                    | USDA Support for Enhancements to<br>the U.S Drought Monitor 2022-2023                                                                        |
| Svoboda, Mark<br><b>Haigh, Tonya</b><br>Bathke, Deb<br>Fuchs, Brian<br>Knutson, Cody<br>Smith, Kelly<br>Tadesse,<br>Tsyegaye                                                         | Department of<br>Agriculture-OCE                                              | \$2,375,000        | 09/30/2020-<br>09/30/2023               | 10%                    | USDA Support of the U.S. Drought<br>Monitor and Hub Activities with the<br>National Drought Mitigation Center for<br>the Period of 2020-2023 |

|                                                                           |                                             |             |                         |     |                                                                                                                                                                           |
|---------------------------------------------------------------------------|---------------------------------------------|-------------|-------------------------|-----|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Haigh, Tonya</b>                                                       |                                             |             |                         | 10% |                                                                                                                                                                           |
|                                                                           | Department of Commerce-NOAA                 | \$68,325    | 09/01/2022-08/31/2024   |     | Connecting Ecological Drought Monitoring Tools with Natural Resource Stakeholders in Montana                                                                              |
| Roy, Tirthanker<br><b>Haigh, Tonya</b><br>Svoboda, Mark                   | NASA                                        | \$1,050,000 | 02/01/2022-01/31/2025   | 10% | Improving Hydrological Drought Monitoring Capability of the U.S. Drought Monitor                                                                                          |
| <b>Haigh, Tonya</b><br>Bathke, Deb<br>Knutson, Cody                       | Department of Agriculture-NRCS              | \$297,800   | 01/01/2022-12/31/2023   | 20% | Climate-Smart Indigenous Agriculture: Drought Planning and Adaptation with New Mexico Pueblos                                                                             |
| <b>Haigh, Tonya</b><br>Bathke, Deb                                        | Purdue University (lead organization)       | \$99,174    | 03/2023-02/2026         | 10% | Integrated Midwest Partnerships for Actionable Climate Tools and Training (IMPACT2): Supporting System Transformation on Working Lands                                    |
| Hayes, Mike<br><b>Haigh, Tonya</b>                                        | UC Santa Barbara (lead organization)        | \$80,898    | 01/2023-12/2023         | 15% | Collaborative Research: NSF Convergence Accelerator Track J: Predicting the Effect of Extremes on the Food System to Improve Resilience of Global and Local Food Security |
| Smith, Kelly<br>Knutson, Cody<br><b>Haigh, Tonya</b><br>Et al.            | State of Oregon                             | \$192,261   | 11/01/2022 - 01/01/2024 | 5%  | Drought Vulnerability Assessment for Oregon                                                                                                                               |
| Pending:                                                                  |                                             |             |                         |     |                                                                                                                                                                           |
| Allen, Craig<br><b>Haigh, Tonya</b><br>Et al.                             | Grand Challenges                            | \$4,390,051 | 2023-2028               | 10% | Weather Ready Farms                                                                                                                                                       |
| Hasan, Mohammed<br><b>Haigh, Tonya</b><br>Et al.                          | Grand Challenges Planning Grant             | \$150,000   |                         | 6%  | Attention to Intention: Combating the Impact of Climate Change on Food Security by Generating Behavioral Change using Artificial Intelligence                             |
| Mahmood, Rezaul<br>Hayes, Mike<br>Schulski, Martha<br><b>Haigh, Tonya</b> | Kansas State University (lead organization) | \$1,000,000 | 06/2023-05/2028         | 10% | Theme 3: Knowledge-Centric AI for Climate Adaptive Agriculture in the Great Plains (Know-CAP AI Institute)                                                                |
| Emory, Mary<br>Bathke, Deb<br><b>Haigh, Tonya</b>                         | NSF EPSCoR                                  | \$1,119,211 | 10/2023-09/2027         | 9%  | Collaborative Research: RII Track-2 FEC: RURAL CONFLUENCE: Communities and Academic Partners Uniting to Drive Discovery and Build Capacity for Climate Resilience         |
| Korus, Jesse<br><b>Haigh, Tonya</b><br>Et al.                             | NSF EPSCoR                                  | \$1,131,664 | 09/2023-08/2027         | 9%  | Collaborative Proposal: RII Track-2 FEC: Understanding, Predicting, and Enhancing Resilience of High Plains Aquifer-Dependent Socio-Environmental Systems                 |



|                                                |                             |           |  |     |                                                                                        |
|------------------------------------------------|-----------------------------|-----------|--|-----|----------------------------------------------------------------------------------------|
| Svoboda, Mark<br><b>Haigh, Tonya</b><br>Et al. | US Department of<br>Defense | \$998,218 |  | 10% | Composite Drought Indicator (GCDI)<br>Hot Spot Early Warning and<br>Information System |
|------------------------------------------------|-----------------------------|-----------|--|-----|----------------------------------------------------------------------------------------|

## CURRENT & PENDING SUPPORT

**Name:** Stacy Asher

**Instructions:**

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|-------------------------------|-------------------------------------------------------------------------------|--------------------|-----------------------------------------|----------------------------|--------------------------------------------------------------------------------|
|                               | Pending                                                                       |                    |                                         |                            |                                                                                |
| Allen et al.                  | UNL Grand Challenge                                                           | \$4,390,051        | 2023-2028                               | 5                          | Weather Ready Farms: Creating Resilient, Healthy, and Equitable Agroecosystems |

## CURRENT & PENDING SUPPORT

**Name: Stacey Hoffman**

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|-----------------------------------------------------|-------------------------------------------------------------------------------|--------------------|-----------------------------------------|----------------------------|----------------------------------------------------------------------------------------------------------|
| Active:                                             |                                                                               |                    |                                         |                            |                                                                                                          |
| Stacey Hoffman                                      | Lincoln Community Foundation                                                  | \$90,000           | 1/2023 - 12/2024                        | 4%                         | Lincoln Vital Signs                                                                                      |
| Stacey Hoffman,<br>Janell Walther                   | Lincoln Community Foundation                                                  | \$90,000           | 1/2023 - 12/2023                        | 5%                         | Lincoln Vital Signs: Race and Equity Special Issue                                                       |
| Stacey Hoffman                                      | Nebraska Dept. of Natural Resources                                           | \$52,313           | 11/2022 – 6/2023                        | 6%                         | Nebraska Floodplain Stakeholder Engagement Planning                                                      |
| Stacey Hoffman                                      | Lancaster County, NE (DOJ BJA prime)                                          | \$135,000          | 10/2022 – 9/2025                        | 5%                         | Lancaster County DUI Court Project                                                                       |
| Denise Bulling,<br>Constance Boehm, Stacey Hoffman  | US DHHS SAMHSA                                                                | \$305,956          | 9/2022 – 9/2025                         | 2%                         | An Evidence-Based Approach to Preventing Student Suicide at the University of Nebraska-Lincoln 2022-2025 |
| Denise Bulling,<br>Stacey Hoffman,<br>Mario Scalora | University of Nebraska at Omaha (US DHS prime)                                | \$581,298          | 9/2022 – 4/2025                         | 12%                        | Evaluation of the Invent to Prevent Student Innovation Lab to Prevent Targeted Violence                  |
| Stacey Hoffman                                      | Nebraska Dept. of Natural Resources                                           | \$150,000          | 7/2022 – 6/2024                         | 6%                         | Nebraska Department of Natural Resources Consultation 2020-22                                            |

|                                                   |                                                                |              |                  |     |                                                                                                              |
|---------------------------------------------------|----------------------------------------------------------------|--------------|------------------|-----|--------------------------------------------------------------------------------------------------------------|
| Stacey Hoffman                                    | Nebraska Dept of Health & Human Svcs (DHHS SAMHSA prime)       | \$94,041     | 4/2022 – 4/2024  | 10% | 9-8-8 Nebraska Suicide Prevention Planning Evaluation                                                        |
| Stacey Hoffman                                    | Nebraska Dept. of Health & Human Services                      | \$150,000    | 4/2022 – 5/2024  | 8%  | Evaluation of Nebraska DHHS Law Enforcement AED Project                                                      |
| Mario Scalora, Denise Bulling, Stacey Hoffman     | US Dept. of Justice, National Institute of Justice             | \$772,955    | 1/2022 – 12/2024 | 12% | Incidence of ideologically influenced threatening and violent activity in rural communities                  |
| Denise Bulling, Stacey Hoffman                    | Nebraska Dept. of Health & Human Services (US DHHS ASPR prime) | \$90,000     | 7/2022 – 6/2023  | 12% | Nebraska Bioterrorism Hospital Preparedness/Disaster Mental Health Nebraska Dept. of Health & Human Services |
| Stacey Hoffman                                    | Lancaster County, NE (DOJ BJA prime)                           | \$180,000    | 1/2020 – 9/2023  | 4%  | Veterans Treatment Court Evaluation                                                                          |
| Denise Bulling, Quinn Lewandowski, Stacey Hoffman | US DHHS SAMHSA                                                 | \$3,610, 121 | 6/2019 – 6/2024  | 10% | Nebraska Youth Suicide Prevention 2019-2024                                                                  |
| Stacey Hoffman                                    | Lancaster County, NE (US DOJ BJA prime)                        | \$180,000    | 1/2019 – 12/2023 | 6%  | Evaluation of Lancaster County Adult Drug Court                                                              |
| <hr/>                                             |                                                                |              |                  |     |                                                                                                              |
| Pending:                                          |                                                                |              |                  |     |                                                                                                              |
| Stacey Hoffman                                    | Lancaster County, NE (US DOJ BJA prime)                        | \$187,500    | 10/2023 – 9/2026 | 4%  | Evaluation of Lancaster County Adult Drug Court                                                              |
| Stacey Hoffman                                    | Nebraska Dept. of Health & Human Services                      | \$155,459    | 4/2023 – 12/2023 | 7%  | Nebraska DHHS HIV Prevention & Ryan White Part B Planning                                                    |
| Stacey Hoffman                                    | Nebraska Dept. of Health & Human Services                      | \$208,114    | 4/2023 – 3/2024  | 14% | Quality Management and Meeting Support for Nebraska Ryan White Part B Program                                |
| Stacey Hoffman                                    | Nebraska Dept. of Health & Human Services                      | \$67,291     | 5/2023 – 4/2024  | 10% | Nebraska Maternal, Infant, and Early Childhood Home Visiting (MIECHV) Program Community Planning 2023-24     |
| Allen et al.                                      | UNL Grand Challenge                                            | \$4,390,051  | 2023-2028        | 5%  | Weather Ready Farms: Creating Resilient, Healthy, and Equitable Agroecosystems                               |

\* The University of Nebraska Public Policy Center does not receive salary support from the University of Nebraska and is required to provide 100% of researcher salaries from grant and contract support.

## CURRENT & PENDING SUPPORT

**Name:** Cory Walters

**Instructions:**

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|-----------------------------------------------------|-------------------------------------------------------------------------------|--------------------|--------------------------------------------|------------------------|-------------------------------------------------------------------------------------------------------------------|
| Cory Walters,<br>and others                         | Active:<br>USDA NIFA                                                          | \$497,000          | September 1,<br>2021 to August<br>31, 2023 | 16.67%                 | Northern Plains Regional Farm<br>Business Management and<br>Benchmarking Partnership                              |
| Cory Walters,<br>and others                         | USDA NIFA                                                                     | \$492,580          | September 1,<br>2022 to August<br>31, 2023 | 16.67%                 | Northern Plains Regional Farm<br>Business Management and<br>Benchmarking Partnership                              |
| Hanna Birge,<br>Florencia<br>Abram, Cory<br>Walters | Pending:<br>Nebraska Corn Board                                               | \$258,897          | January 1, 2022<br>to December 31,<br>2023 | 8%                     | Making Soil Pay: Uncovering the<br>Financial Tradeoffs of Soil Health<br>Practices for Nebraska Corn<br>Producers |
| Cory Walters,<br>and others                         | USDA NIFA                                                                     | \$495,620          | September 1,<br>2023 to August<br>31, 2024 | 16.67%                 | Northern Plains Regional Farm<br>Business Management and<br>Benchmarking Partnership                              |

|              |                     |             |           |   |                                                                                |
|--------------|---------------------|-------------|-----------|---|--------------------------------------------------------------------------------|
| Allen et al. | UNL Grand Challenge | \$4,390,051 | 2023-2028 | 5 | Weather Ready Farms: Creating Resilient, Healthy, and Equitable Agroecosystems |
|--------------|---------------------|-------------|-----------|---|--------------------------------------------------------------------------------|

## CURRENT & PENDING SUPPORT

**Name: Soni Cochran**

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|-------------------------------|-------------------------------------------------------------------------------|--------------------|-----------------------------------------|-------------------------------|------------------------------------|
| Active:                       |                                                                               |                    |                                         |                               |                                    |
| Napoli,<br>Amy                | USDA-NIFA                                                                     | \$35,000           | 3/1/21 -<br>4/30/23                     | .5 Month<br>/Academic<br>Year | Read for Resilience                |
| Yoder,<br>Aaron               | USDA-NIFA                                                                     | \$735,360          | 9/1/21 –<br>8/31/25                     | .25                           | Nebraska AgrAbility: 2022-<br>2026 |

|              |                                |             |           |   |                                                                                      |
|--------------|--------------------------------|-------------|-----------|---|--------------------------------------------------------------------------------------|
| Allen et al. | Pending<br>UNL Grand Challenge | \$4,390,051 | 2023-2028 | 5 | Weather Ready Farms: Creating<br>Resilient, Healthy, and Equitable<br>Agroecosystems |
|--------------|--------------------------------|-------------|-----------|---|--------------------------------------------------------------------------------------|



## CURRENT & PENDING SUPPORT

**Name:** Silvia Carolina Córdova Martínez

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|-------------------------------|------------------------------------------------------------------------------------------|--------------------|-----------------------------------------|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| Sprunger,<br>Christine        | Environmental Defense<br>Fund (IP# 00604037)                                             | \$298,433          | 08/16/2022-<br>09/30/2024               | 5%                     | Assessing a suite of indicators to<br>predict soil carbon trajectories in<br>agricultural systems                                       |
| Koehler-Cole,<br>Katja        | Nebraska Soybean Board                                                                   | \$7000             | 10/01/2022-<br>09/30/2023               | 5%                     | Eastern Nebraska Soil Health<br>Conference                                                                                              |
| Awada, Tala                   | UNL ARD Bridge<br>Funding                                                                | \$375000           |                                         | 5%                     | Response of a Man-Made Forest to the<br>Catastrophic Wildfires of 2022:<br>Recovery of the Sandhills Halsey<br>Nebraska National Forest |
|                               | Pending:                                                                                 |                    |                                         |                        |                                                                                                                                         |
| Koehler-Cole,<br>Katja        | Nebraska Soybean Board                                                                   | \$15800            | 10/01/2023-<br>09/30/2024               | 16%                    | Nebraska Soil health cover crops<br>conference                                                                                          |
| Allen et al.                  | UNL Grand Challenge                                                                      | \$4,390,051        | 2023-2028                               | 5%                     | Weather Ready Farms: Creating<br>Resilient, Healthy, and Equitable<br>Agroecosystems                                                    |
| Córdova, S.<br>Carolina       | Nebraska Corn Board                                                                      | \$95338            | 08/01/2023-<br>07/31/2024               | 30%                    | Soil carbon and nitrogen accrual over<br>two decades in a rainfed, no-till corn-                                                        |

|              |                        |          |                       |     |                                                                      |
|--------------|------------------------|----------|-----------------------|-----|----------------------------------------------------------------------|
|              |                        |          |                       |     | soybean-wheat rotation with legume and grass cover crops             |
| Ge, Yufeng   | Nebraska Soybean Board | \$94689  | 10/01/2023-09/30/2024 | 33  | Soil carbon sequestration for Nebraska soybean producer              |
| Das, Saurav  | Nebraska Corn Board    | \$198000 | 07/01/2023-06/30/2024 | 20% | Mapping baseline carbon for corn production system in Nebraska       |
| Mamo, Martha | NCR-SARE               | 1950     | 07/01/2023-12/31/2023 | 33% | Partnership development with Kansas Black Farmers Association (KBFA) |

## CURRENT & PENDING SUPPORT

**Name: Amy Millmier Schmidt**

| NAME<br>(List PD first)                                                                                                 | SUPPORTING<br>AGENCY AND<br>AGENCY<br>ACTIVE<br>AWARD/PENDING<br>PROPOSAL<br>NUMBER | TOTAL \$<br>AMOUNT | EFFECTIVE<br>AND<br>EXPIRATION<br>DATES | % OF<br>TIME<br>COM-<br>MITTED | TITLE OF PROJECT                                                                                                            |
|-------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--------------------|-----------------------------------------|--------------------------------|-----------------------------------------------------------------------------------------------------------------------------|
| <b>ACTIVE:</b>                                                                                                          |                                                                                     |                    |                                         |                                |                                                                                                                             |
| S. Fernando and <b>A. Schmidt</b>                                                                                       | USDA-NIFA                                                                           | \$999,981          | 04/01/2023 – 03/31/2027                 | 1%                             | AMR gene reservoirs and bacterial host-AMR gene associations in swine production systems                                    |
| <b>A. Schmidt</b> , H. Vu, and B. Mote                                                                                  | Nebraska Pork Producers Association                                                 | \$62,465           | 09/01/2022 – 08/31/2024                 | 2%                             | PRRS transmission risk associated with exposure to slurry manure or effluent from a PRRS-positive swine herd                |
| <b>A. Schmidt</b>                                                                                                       | National Pork Board                                                                 | \$152,781          | 09/01/2022 – 08/31/2024                 | 2%                             | Evaluation of swine carcass disposal benefits and challenges using composting and shallow burial with carbon                |
| <b>Amy Schmidt</b>                                                                                                      | Dougherty Water for Food Institute                                                  | \$17,500           | 07/01/2022 – 06/30/2023                 | 1%                             | Integrated crop nutrient management (ICNM) to support crop-human-environment well-being                                     |
| Shannon Bartelt-Hunt, Bing Wang and <b>Amy Schmidt</b>                                                                  | Iowa State University (Prime: USDA-NIFA)                                            | \$309,037          | 01/01/2022 – 12/31/2026                 | 1%                             | CAMRADES Connecting AntiMicrobial Resistance, Agricultural Decisions, and Environmental Systems                             |
| Javed Iqbal, <b>Amy Schmidt</b> , Daniel Snow, Chris Proctor, Arindam Malakar, Jeremy Milander, and Leslie Johnson      | USDA-NIFA                                                                           | \$298,631          | 02/01/2022 – 01/31/2025                 | 1%                             | Demonstrating an integrated nutrient management approach for improving drinking groundwater quality in Nebraska             |
| <b>Amy Schmidt</b> , Leslie Johnson, Todd Whitney, Michael Sindelar, Brad Schick, Katie Pekarek, and Chryseis Modderman | North American Manure Expo Mini-Grant Program                                       | \$2,500            | 01/01/2022 – 09/01/2023                 | 1%                             | Engaging learners in experiential nutrient management decision-making                                                       |
| <b>Amy Schmidt</b> , Leslie Johnson, Todd Whitney, Michael Sindelar, and Brad Schick                                    | North American Manure Expo Mini-Grant Program                                       | \$2,500            | 01/01/2022 – 09/01/2023                 | 1%                             | Increasing impact of the <i>Merits of Manure</i> content library                                                            |
| <b>Amy Schmidt</b>                                                                                                      | South Dakota State University (Prime: USDA-NIFA)                                    | \$72,624           | 09/01/2021 – 08/31/2026                 | 1%                             | Filling the pipeline – Preparing the next generation of watershed management extension professionals                        |
| Javed Iqbal, <b>Amy Schmidt</b> , Aaron Yoder, and Bijesh Maharjan                                                      | University of Nebraska Collaboration Initiative                                     | \$40,000           | 07/01/2021 – 06/30/2023                 | 2%                             | Assessing integrated nutrient management opportunities to achieve agricultural and environmental sustainability in Nebraska |
| Xu Li, Christopher Tuan and <b>Amy Schmidt</b>                                                                          | Nebraska Environmental Trust                                                        | \$195,866          | 07/01/2020 – 06/30/2023                 | 1%                             | Improving soil health using heat-treated manure                                                                             |

|                                                                |                                                                              |             |                         |    |                                                                                              |
|----------------------------------------------------------------|------------------------------------------------------------------------------|-------------|-------------------------|----|----------------------------------------------------------------------------------------------|
| <b>Amy Schmidt</b> , Rick Koelsch and Jay Parsons              | Nebraska Environmental Trust<br><i>Award: NET 20-165</i>                     | \$141,762   | 07/01/2020 – 06/30/2023 | 3% | Transforming manure and cedar mulch from “waste” to “worth” – Part II                        |
| Samodha Fernando and <b>Amy Schmidt</b>                        | Texas Tech University (Prime: USDA-NIFA)                                     | \$332,437   | 05/01/2020 – 04/30/2025 | 1% | Investigating the emergence and ecology of antimicrobial resistance in high-risk beef cattle |
| William Kranz and <b>Amy Schmidt</b>                           | Nebraska Department of Environmental Quality<br><i>Award: 2018-88109974</i>  | \$89,451    | 01/01/2019 – 12/31/2023 | 1% | Land application training program                                                            |
| Rick Stowell and <b>Amy Schmidt</b>                            | University of Arkansas (Prime sponsor: USDA-NIFA)<br><i>Award: SA1909232</i> | \$148,994   | 08/01/2018 – 07/31/2023 | 1% | Water and nutrient recycling: A decision tool and synergistic innovative technology          |
| Dan Snow, Dan Miller, Chittaranjan Ray, and <b>Amy Schmidt</b> | Nebraska Environmental Trust                                                 | \$164,306   | 04/04/2019 – 06/30/2023 | 1% | Novel approaches for controlling nitrate leaching and protecting Nebraska ground water       |
|                                                                |                                                                              |             |                         |    |                                                                                              |
| <b>PENDING:</b>                                                |                                                                              |             |                         |    |                                                                                              |
| Allen et al.                                                   | UNL Grand Challenge                                                          | \$4,390,051 | 2023-2028               | 5% | Weather Ready Farms: Creating Resilient, Healthy, and Equitable Agroecosystems               |

## 7) BUDGET

Funding Agency: UNL Grand Challenge  
PI Name: Craig Allen  
Project Title: Weather Ready Farms

Project Start Date: 11/1/2023  
Project End Date: 10/31/2028

[illegible]

## 8) BUDGET JUSTIFICATION

Most funding is dedicated to graduate and undergraduate student funding, as well as participant support costs and community outreach projects. We are asking for limited funding for a nine-month faculty and faculty supported through soft money.

### PERSONNEL

- Dr. Craig Allen, PI, (effort = 1 calendar months for Yr. 1-4) will be responsible for managing the ecological resilience team.
- Amy Timmerman, Co-PI, (effort = .5 academic months) will manage the education stage of the designation process and oversee the development curriculum for program participants.
- Dr. Tonya Haigh, Co-PI, (effort = 1.5 academic months) will manage the project evaluation and the social resilience team.
- Dr. Nathan Mueller, Co-PI, (effort = .5 academic months) will manage the assessment and verification stages of the designation process.
- Dr. Bruno Patias Lena, Co-PI, (effort = .5 academic months) will manage the project implementation and designation stages of the designation process.
- Dr. Gwendwr Meredith, Co-PI, (effort = 1 academic month) will help coordinate project evaluation and collaborate on projects in ecological and social resilience teams.
- Dr. Amy Schmidt, Co-PI, (effort = .5 academic month) will coordinate the livestock resilience team.
- Communication Specialist (TBD), collaborator, (effort = .5 academic month) will assist with the development of outreach and education materials.
- Dr. Dan Uden, collaborator, (effort = 1 academic month) will assist research and projects on the ecological resilience team.
- Assistant Director (TBD), (effort = 12 academic months) will assist with coordinating all efforts of the WRF program.
- Ecological resilience GRA (TBD), (30 credit hours with salary, tuition remission, and health costs) and will work with the ecological resilience team on research and education.
- Social resilience GRA (TBD), (30 credit hours with salary, tuition remission, and health costs) and will work with the social resilience team on research and education.
- Disaster preparedness and recovery GRA (TBD), (30 credit hours with salary, tuition remission, and health costs) and will work with the disaster preparedness and recovery team on research and education.
- Financial resilience GRA (TBD) (30 credit hours with salary, tuition remission, and health costs) and will work with the financial resilience and profitability team on research and education.
- 2 cropping system resilience GRAs (TBD), (30 credit hours with salary, tuition remission, and health costs) and will work with the cropping system resilience team on research and education.
- Livestock system resilience GRA, Gustavo Garcia Castro, (30 credit hours with salary, tuition remission, and health costs) and will work with the disaster preparedness and recovery team on research and education.
- 9 undergraduate interns (TBD), (320 hours/yr. per person) and will collaborate on research, developing resources, and assisting with community projects in each of the resilience focus teams. At least one intern for each focus group

A 3% cost of living increase has been applied to all salaries after year 1.

### BENEFITS

Personnel benefits are estimated at the rates shown below. The actual cost of benefits for each person will be charged to the project.

| Fringe Benefit Estimates |     |                    |           |
|--------------------------|-----|--------------------|-----------|
| Base Salary > \$70,000   | 30% | Graduate Students* | See below |

|                                 |     |                                         |    |
|---------------------------------|-----|-----------------------------------------|----|
| Base Salary \$40,000 - \$70,000 | 41% | Part-Time Employees (less than 0.5 FTE) | 8% |
| Base Salary <\$40,000           | 52% | Undergraduate Students (Full Time)      | 0% |

\*GRA benefits include tuition remission, health insurance and workers comp at UNL established rates.

### **TRAVEL-Domestic**

This will be used to travel for *all collaborators* (48- 52 people) including 18 research faculty, 10 extension educators, 6 graduate students, 8 undergraduate students, 6-10 service members to travel to participants, conduct research, participate in conferences, and engage with community stakeholders. (\$35,000/yr. x 5 yrs.) = \$175,000. This includes relevant hotel stay, meal allowances, airfare, and ground transportation.

#### **Travel expenses for management team (Director and Assistant Director) per year estimated at \$800 (\$1,600 total)**

Hotel (2 nights) ..... \$372  
Meal Allowance.....\$228  
Ground Transportation .....\$200

#### **Travel expenses for project mentors per year estimated at \$1,376 per person (\$13,760/yr for 10 Extension educators)**

Hotel (2 nights) .....\$376  
Meal Allowance.....\$400  
Ground Transportation (.30/g x 2000mi) .....\$600

#### **Travel expenses for research faculty per year estimated at \$500 per person (\$9,000/yr for 18 research faculty)**

Meal Allowance..... \$200  
Ground Transportation (.30/g x 1000mi) ..... \$300

#### **Travel expenses for graduate students, undergraduates, and service members per year estimated at \$500 per person (\$11,000- \$13,000 for 20-24 people)**

Meal Allowance..... \$200  
Ground Transportation (.30/g x 1000mi) ..... \$300

### **PARTICIPANT SUPPORT COSTS**

Each participant will receive \$7,000 total in stipends for participating in WRF. The \$1000 participation stipend is meant to encourage and reward farmers and ranchers for participating in the program. The educational stipend is meant to offset any costs associated with attending educational events and conferences. The project implementation stipend is to fund an on-farm project to increase resilience. Year one we will have a cohort of 15 participants which will cost \$105,000. In Year 2-3 there will be two cohorts of 15 farmers and ranchers costing a total of \$210,000 each year. Note: the budget shows an even amount of funding across years for PSC, but some years will have more funding.

Year 1: 1 cohort with 15 participants= \$105,000  
Year 2: 2 cohorts with 15 participants = \$210,000  
Year 3: 2 cohorts with 15 participants = \$210,000

#### **Estimates of the \$7,000 cost per participant are shown below.**

Participation stipend..... \$1,000  
Educational stipend.....\$1,000  
Project implementation stipend .....\$5,000

### **OTHER DIRECT COSTS**

#### **Supplies**

Costs are estimated at \$52,000 for year one and \$50,300 Yr.2-Yr.5 to purchase consumable materials and supplies for the proposed experiments and research, the designation process, community outreach projects, and professional development such as printing, meeting and office supplies, conference supplies,

software (Qualtrics, Canva Pro, and MailChimp, financial risk management software), website updates, design and art materials, t-shirts and other branded clothing items, research instruments (spectrometer, soil moisture gauge, erosion pins, etc.), on-farm soil sampling, costs associated with on-farm data collection, building materials for architecture projects, etc. In year, we will also purchase eight computers (\$2500/computers) for the Assistant Director and our AmeriCorps VISTA. In year 1, we will also purchase ten \$500 tablets which will be used by our 10 Extension project mentors during the on-farm assessment and verification.

### **Publications**

Costs of \$3,000 in year 2 and \$6,000/yr. in years 3-5 is budgeted to cover the cost of publishing project results.

**Rent:** Rent will be paid for the Nebraska Public Policy center while they are working on WRF projects. We will also be dedicating \$2,175 to fund a designation awards banquet for participants that complete the program, and we will be renting the Great Plains Room in the UNL East Union. \$200 will be for the room rental, \$1,875 for 75 attendants (\$25/plate), and \$100 will be included for miscellaneous event costs.

Service C..... \$817/Yr.

Designation Awards Banquet..... \$2,175

**Public Policy Center Costs:** Around \$24,000/yr. will be allocated to support the efforts of the following Nebraska Public Policy Center staff

Dr. Stacey Hoffman, Co-PI, (effort = 120-107 hrs. over 5yrs.) will manage the project evaluation and the social resilience team.

Research Specialist (TBD), (effort = 215-178 hrs. over 5yrs.) will assist with project evaluation.

**Project Funding:** \$25,000/yr. will be allocated to all community resilience projects including climate resilience food systems projects, designing agroecological landscapes, design and community art project, resilient architecture projects, climate change adaption and mitigation projects, and climate resilient agriculture literacy projects for adults and youth.

Project funding.....\$25,000/yr.

**Project Mentor Support:** \$12, 000/ yr. will be used to support the ten Extension project mentors to encourage and reward efforts for serving as a mentor.

Project mentor stipend.....\$1,200 per person

**Designations Signs & Development:** Each participant will receive a WRF field sign for participating in WRF. Each sign will cost approximately \$667 to design and build. For 75 participants this will be approximately \$50,000. The exact timing of participant timing will vary.

Year 1: 1 cohort with 15 participant.....\$10,000

Year 2: 2 cohorts with 15 participants.....\$20,000

Year 3: 2 cohorts with 15 participants.....\$20,000

**Survey, Social and Evaluation (Project Evaluation):** The project evaluation team will need \$1000 in year 1 and 18,000/yr. Yr, 2-5. This will be used for data collection, surveys, and other project evaluation.



## 9) DATA MANAGEMENT PLAN

**Expected Data:** This project will produce three primary streams of data: participant data (data generated through participant engagement in the program), research data (data generated through research activities), and outreach data (outputs generated by the team to conduct outreach projects). Data will be produced and analyzed through a variety of applications, including Qualtrics, Google Drive, SharePoint, Adobe Creative Cloud, and the WRF Extension Foundation Campus course. Data formats include DOC, GDOC, PPT, GRD, GSLIDES, EXCEL, CSV, GSHEET, PDF, JPEG, PNG, SHP, TIFF, INDD, and AI.

- *Participant Data:* Fifteen participants will participate in a cohort with five active cohorts at a time- 75 participants to track at a given time. WRF assessment data is created in Qualtrics, analyzed in Google Sheets, and stored in Google Drive. WRF education data is created on Microsoft Office, Google Suite, and Adobe Creative Cloud and then stored in the WRF Extension Foundation Campus course. At the end of each producer's participation in the WRF project, the verification process ensures that they have finished the necessary tasks to earn designation of a Weather-Ready Farm. The verification assessment is stored in Google Drive and Microsoft SharePoint. After participants complete the program, their data will be archived on Google Drive and Microsoft SharePoint. All personal identifiable information (PII) from participants will be safeguarded in accordance with all university, state, and federal regulations. No data from the participants will be made public without prior written consent.
- *Research Data:* Six research integrated projects will be conducted during this collaboration from each of the research and education teams: ecological resilience, crop resilience, livestock resilience, social resilience, financial resilience, disaster preparedness). Research data from these projects will be created on Qualtrics and other data collection platforms and stored on Google Drive and Microsoft SharePoint. Data will be generated through interviews, surveys, downloading and analysis of remotely sensed imagery and other spatial data, and on-farm trials through different WRF research projects. Social science data will include notes taken from interviews and focus groups and survey results. The data is not expected to be of a sensitive nature; however, participants will be informed that their personally identifying information will be separated from qualitative and quantitative data so that the resulting data itself does not directly identify participants. The survey data will be collected 16 using Qualtrics survey software; a copy of the data will be stored within the University of Nebraska license at Qualtrics.com. The data controller of [www.qualtrics.com](http://www.qualtrics.com) Qualtrics LLC, 333 W. River Park Drive, Provo, UT 84604, USA ("Qualtrics"). Qualtrics' data protection officer can be reached at [privacy@qualtrics.com](mailto:privacy@qualtrics.com). Qualitative (interview and focus group transcripts) and quantitative data (survey results in excel spreadsheet) will be stored in the University of Nebraska SharePoint system.
- *Outreach Data:* Four outreach projects during this collaboration include a design and communications project, climate science literacy project, youth education project, and climate-resilient food systems project. These projects may generate educational materials that will be stored on Google Drive and Microsoft Teams/SharePoint.

**Documentation and Metadata:** Documentation for participant and outreach data will follow standards set in the Data Documentation Initiative (DDI) and will consist of program materials generated to implement those portions of the project. Research data and documentation will vary depending on the specific project, but will include survey instruments, codebooks, and any other materials required for the data to be understood and reanalyzed by external reviewers, including for peer-review and deposit into appropriate data repositories.

**Data Storage and Preservation:**

*Storage and Backup During Project:* All program data will be stored on cloud services (Google Drive and SharePoint) and will be updated regularly. Data will be duplicated on Google Drive and SharePoint and all team members will have full access to all data.

*Data Capacity & Volume:* During the program, the project team will use Google Drive, SharePoint, and Qualtrics which will offer enough data capacity during the program.

*Security:* All data will only be accessible via an invitation link from the project team and password protected when applicable to ensure program participant's privacy.

*Long Term Preservation:* Participant data will be archived on Google Drive and Microsoft Office after each participant earns their designation status and completes the program. An archive copy of the research data will be maintained at the end of the project. Where appropriate, research data will be deposited in a trustworthy data repository.

*Roles & Responsibilities:* Data on Google Drive and Microsoft SharePoint/Teams will be managed by all WRF project teams, research and education teams, and outreach teams. The director is ultimately responsible for the implementation of this DMP and will designate one member of the project team to coordinate DMP activities. Research teams will be responsible for documenting and depositing research data as needed to support publishing and sharing requirements.

**Data Retention:**

*Participant and Outreach Data:* This data will be retained for a minimum of 10 years after the conclusion of the Weather Ready Farms program. The director and assistant director will be responsible for ensuring all team members are aware of how to properly store data.

*Research Data:* This data will be retained for a minimum of 15 years after the conclusion of the project. The WRF director and assistant director will ensure that all project team members understand procedures long-term archiving.

**Data Sharing and Dissemination**

*Participant and Program Data:* Synthesized, voluntary, and anonymous participant data and program evaluation data will be shared with community stakeholders through reports and newsletters.

*Educational materials:* Some educational materials will be shared broadly via the UNL Extension website.

*Privacy and Confidentiality:* No identifying information will be shared. *Re-use:*

- *Participant Data:* The WRF team will pursue opportunities to share education materials with partner organizations pursuing similar goals.
- *Research Data:* Research Data deposited in data repositories will be available for reuse with attribution, under a CC-BY or similar license. Data will be deposited with necessary documentation and metadata to facilitate re-use.
- *Outreach Data:* Branded outreach and education materials can be re-used without prior consent with proper attribution, under a [aCC-BY or similar license](#)

*Ethical Requirements:* Only data that has been properly de-identified will be shared, and only with prior consent of participants.

## 10) LETTERS OF COMMITMENT and SUPPORT

April 12, 2023  
Weather Ready Farms Team  
Nebraska Extension  
210 Mussehl Hall  
East Campus, PO Box 830719,  
Lincoln NE 68583-0719.



Institute of Agriculture and Natural Resources | Agricultural Economics

**CENTER FOR AGRICULTURAL PROFITABILITY**

### Center for Agricultural Profitability Letter of Support

To the UNL Grand Challenge 2023 grant reviewers,

This letter is meant to show that the Center for Agricultural Profitability supports the Weather Ready Farms program and is planning to collaborate on the project in the event the Weather Ready Farms program is selected to receive Grand Challenge funding. Cory Walters and Jessica Groskopf will be representing the Center for Ag Profitability in this collaboration and will be working with members of the Weather Ready Farms team and other project collaborators to develop the programs' assessment and education to include financial resiliency and risk management. A fully integrated and resilient farm should include a plan to prepare and recover financially for extreme weather events and disasters. The risk management assessment that we will incorporate into the Weather Ready Farms program will give farmers and ranchers the financial security they need to adapt financially to extreme weather and climate change and respond after disaster events occur. Having a plan for their farm finances in the case of extreme weather will allow farmers flexibility to take losses to crop yields, livestock, property, and equipment, but be able to absorb these losses by properly accounting for these risks in their budget. The Center for Ag Profitability believes that with the impending threat of climate change and the higher rates of extreme weather will increase the need for proper financial preparedness is needed to ensure farmers can create a more resilient and sustainable farming operation. We are happy to collaborate with the Weather Ready Farms team and their other program collaborators to create more resilient farms in Nebraska.

Sincerely,

Jessica Groskopf

Center for Agricultural Profitability;  
Nebraska Extension Agricultural  
Economics Educator; Director of  
Women in Agriculture

April 6, 2023  
Weather Ready Farms Team  
Nebraska Extension  
210 Mussehl Hall  
East Campus, PO Box 830719,  
Lincoln NE 68583-0719.

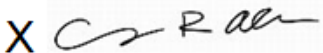
Center for Resilience in Agricultural Working Landscapes Support Letter

To the UNL Grand Challenge 2023 grant reviewers,

The Center for Resilience in Agricultural Working Landscapes (CRAWL) is writing to acknowledge our support for the Weather Ready Farms program and to state that we will collaborate with their team if they are selected to receive Grand Challenge funding. Craig Allen, Gwendwr Meredith, and Dan Uden from the Center for Resilience in Agricultural Working Landscapes will collaborate with the Weather Ready Farms project team to modify the Weather Ready Farms assessment, create educational materials, and conduct research related to ecological resilience. Craig Allen will serve as the main point of contact between the Center for Resilience for Agricultural Working Landscapes and the Weather Ready Farms program, creating a clear line of dialogue between collaborators and leading the ecological resilience team. This collaboration will help the Center for Resilience in Agricultural Working Landscapes develop their "resilience in practice" goal for the center, helping farmers and ranchers across Nebraska implement practices that create integrated resilient farms. Additionally, CRAWL team believes that the Weather Ready Farms program will help connect farmers and ranchers more directly with the research and projects that the Center for Resilience in Agricultural Working Landscapes is currently working on and have previously developed. We believe in the mission of the Weather Ready Farms program and are excited to work with their team in the future.

Sincerely,

 Invalid signature



Craig Allen

Signed by: Craig Allen

Craig Allen

Professor and Director  
Center for Resilience in  
Agricultural Working Landscapes  
School of Natural Resources,  
University of Nebraska - Lincoln  
402 472 0421  
Callen3@unl.edu



Extension Foundation  
c/o Bryan Cave, LLP  
One Kansas City Place  
1200 Main Street, Suite 3800  
Kansas City, MO  
64105-2122  
[www.extension.org](http://www.extension.org)

April 20, 2023

Weather Ready Farms Team  
Nebraska Extension  
210 Mussehl Hall  
East Campus, PO Box 830719  
Lincoln NE 68583-0719

Dear UNL Grand Challenge grant reviewers,

I am pleased to offer this letter of support for the Weather Ready Farms (WRF) program from the University of Nebraska-Lincoln.

The mission of the Extension Foundation is to increase Cooperative Extension professionals' effectiveness in addressing issues of importance to the nation by providing up-to-date science, evidence-based information, and education. The Extension Foundation supports more than 32,000 Extension professionals at 112 Land Grant Universities. Learning opportunities to collaborate, co-learn, and co-create are generated through our virtual network of more than 15,000 users system wide.

As Interim CEO, I design and implement strategies for external and internal partnerships, drive innovation agendas and oversee the alignment of the Extension Foundation vision with the evolving needs of the U.S. Cooperative Extension System. I have had the opportunity to work with the WRF ) team on developing different aspects of the Weather Ready Farms designation program. Together, we have produced Extension Foundation sponsored market research to gauge the need of a program like WRF for crop producers in eastern Nebraska, marketing recommendations from a highly respected agency, and an interactive publication to outline how WRF would operate. WRF was one of four projects selected from a national competitive pool for the first year of New Technologies in Agricultural Extension (NTAE) funding from USDA-NIFA in partnership with Oklahoma State University

Providing WRF with funding will create momentum around the project, encouraging sustainable solutions and demonstrating how a designation program like Weather Ready Farms could be transplanted into other regions. A continued commitment to conservation and sustainability is a priority of the Extension Foundation, and WRF is an example of how these priorities can be integrated to on-farm practice. The Extension Foundation stands ready to provide additional support to the WRF through our USDA-NIFA funded tools and services, and through services available to our members like the University of Nebraska-Lincoln.

Sincerely,

*Beverly Coberly*

Beverly Coberly, PhD  
Interim Chief Executive Officer  
Extension Foundation  
573-239-9409  
[beverlycoberly@extension.org](mailto:beverlycoberly@extension.org)



24 April 2023

Weather Ready Farms Team  
Nebraska Extension  
210 Mussehl Hall  
East Campus, PO Box 830719,  
Lincoln NE 68583-0719.



We are the Weather Ready Farms 2021-2023 pilot cohort and we have voluntarily chosen to participate in the Weather Ready Farms program from November 1, 2021, to October 31, 2023. We will complete the four stages of the program to earn Weather Ready Farms designation and prepare our farms for extreme weather events and climate change. As representatives of a larger community of farmers and ranchers interested in creating more climate-smart and weather ready farms, we believe in the program's mission and want to voice our support for the program. We are working directly with the Weather Ready Farms team to discuss strategies that improve the accessibility and structure of the program to better serve the farmers and ranchers in the future cohorts. The funding from the Grand Challenge will be a catalyst for the growth of the program and will help connect us with more resources and project funding that will help us earn designation status. We are happy to help with the research efforts that the research and education team will be conducting. Weather Ready Farm's success is important to us, and we hope that the program is selected to receive project funding.

| Participant Name            | Participant Email                       | Date      |
|-----------------------------|-----------------------------------------|-----------|
| Bohling, Ashton and Trenton | trenton.bohling@frontiercooperative.com | 4/11/2022 |
| Corman, Will                | cormanwilld@gmail.com                   | 4/12/2022 |
| Kennedy, Kellie, and Steve  | kkennedy@sentco.net                     | 4/5/2022  |
| McDonald, Mike              | mcdonald1.mike@gmail.com                | 3/22/2022 |
| Oerlking, John              | oehlerkingfarm@gmail.com                | 4/11/2022 |
| Peters, Greg                | gmpeters@diodecom.net                   | 4/11/2022 |
| Travis, Runge               | harold__99@hotmail.com                  | 4/4/2022  |
| Spatz, Danielle and Dylan   | dndspatz@gmail.com                      | 4/14/2022 |



April 6, 2023

Weather Ready Farms Team  
Nebraska Extension  
210 Mussehl Hall  
East Campus, PO Box 830719,  
Lincoln NE 68583-0719.

Dear UNL Grand Challenge Reviewers,

The National Drought Mitigation Center will be partnering with the Weather Ready Farms program for the UNL Grand Challenge. We at the Drought Mitigation Center want to express our support for the project. Dr. Tonya Haigh from the Drought Mitigation Center will be our main point of contact for this partnership and will facilitate the growth of the collaboration between the two programs. The National Drought Mitigation Center will use the Weather Ready Farms program as a vehicle to share resources and education with farmers and ranchers vulnerable to the effects of climate change and extreme weather events, with a focus on drought. With drought being such a critical issue for Nebraskan farmers and ranchers, the relationship between the National Drought Mitigation Center and the Weather Ready Farms program will provide natural synergy for assisting farms as they adapt and recover from drought. This partnership will increase the outreach of the National Drought Mitigation Center and allow for the development of social support systems to combat the climate crisis and to prepare farmers and ranchers for disasters. Moreover, this collaboration will help create the social resilience research and education team for the Weather Ready Farms program that will map the social and psychological impact of participating in the program for Weather Ready Farms participants. Social resilience is crucial to the success of farmers and ranchers seeing the importance of mitigation and adaptation, as well as offering these producers the necessary community and institutional support to overcome disasters and combat climate change. Again, we would like to state our support for the Weather Ready Farms program and hope that you select the project to receive funding.

Sincerely,

Dr. Kelly Helm Smith  
Assistant Director  
National Drought Mitigation Center  
(402) 472-3373  
Ksmith2@unl.edu



National Drought Mitigation Center, School of Natural Resources  
3310 Holdrege St., 818 Hardin Hall | Lincoln, NE 68583-0988 | 402-472-6707 | ndmc@unl.edu  
drought.unl.edu

24 April 2023

Weather Ready Farms Team  
Nebraska Extension  
210 Mussehl Hall  
East Campus, PO Box 830719,  
Lincoln NE 68583-0719



Weather Ready Farms Project Mentor Support Letter

To the UNL Grand Challenge 2023 grant reviewers,

We represent the ten new Nebraska Extension educators that will serve as project mentors for the Weather Ready Farms program. We agree to serve as project mentors for the Weather Ready Farms program. As a WRF project mentors, we will engage with one to three mentees per year, and we will work with these participants to help implement the climate-smart and weather ready practices described in the WRF assessment. We will conduct a two-hour on-farm assessment, meet with the WRF team for three hours to develop participants individualized learning plan, attend one-hour monthly WRF community meetings, conduct a one-hour participant check-in meetings every three months with each of my mentees, help with a one- hour on-farm verifications, and attend the yearly awards banquet to give participants their WRF designation. As WRF project mentors we will advise participants and help connect them with the resources they may need. This letter is meant to show our agreement to join the Weather Ready Farms team and show our overall support for the Weather Ready Farm program.

| Mentor Name           | Extension Focus Area                  | Email                         |
|-----------------------|---------------------------------------|-------------------------------|
| Mitiku Mamo           | Water and Integrated Cropping Systems | mmamo2@unl.edu                |
| Nathan Mueller        | Water and Integrated Cropping Systems | nathan.mueller@unl.edu        |
| Bruno Lena            | Water and Integrated Cropping Systems | bpatiaslena2@unl.edu          |
| Todd Whitney          | Water and Integrated Cropping Systems | todd.whitney@unl.edu          |
| Amy Timmerman         | Water and Integrated Cropping Systems | atimmerman2@unl.edu           |
| John Nelson           | Water and Integrated Cropping Systems | jnelson158@unl.edu            |
| Ben Beckman           | Beef Systems                          | ben.beckman@unl.edu           |
| Ryan Benjamin         | Beef Systems                          | ryan.benjamin@unl.edu         |
| Wayde Pickinpaugh     | Beef Systems                          | wayde.pickinpaugh@unl.edu     |
| Lindsay Waechter-Mead | Beef System                           | lindsay.waechter-mead@unl.edu |





05 April 2023

Weather Ready Farms Team  
Nebraska Extension  
211 Agricultural Hall  
East Campus, PO Box 830703,  
Lincoln NE 68583-0703

To the UNL Grand Challenge 2023 grant reviewers,

The University of Nebraska Public Policy Center is enthusiastic about collaborating with the Weather Ready Farms program if they receive a UNL Grand Challenge grant. Dr. Stacey Hoffman, Senior Research Manager at the University of Nebraska Public Policy Center, will serve as the main point of contact for this collaboration and will work with the Weather Ready Farms project team and other program collaborators as needed.

The aim of the Public Policy Center's collaboration with Weather Ready Farms is to co-lead the program evaluation, with Tonya Haigh of the National Drought Mitigation Center (NDMC) and contribute to the work of the project's social resilience team. Through our work over the last twenty years in disaster behavioral health planning/response with the Nebraska Department of Health and Human Services and producer experiences in 2019 with livestock and crop loss due to a blizzard and flooding, we know that disaster related farm stress can be overwhelming and isolating to producers; having resources related to psychological and emotional coping and community support after disaster is imperative to social resilience.

The Nebraska Public Policy Center is looking forward to working with the Weather Ready Farms program to assist farmers and ranchers on their path to create resilient farms.

Best,

A handwritten signature in black ink, appearing to read "Mario Scalora".

Mario Scalora  
Director  
University of Nebraska Public Policy Center  
402.472.5602  
mscalora1@nebraska.edu



University of Nebraska Public Policy Center  
215 Centennial Mall South, Suite 401 | Lincoln, NE 68588 | 402.472.5678 | [ppc@nebraska.edu](mailto:ppc@nebraska.edu)  
[ppc.nebraska.edu](http://ppc.nebraska.edu)



April 27, 2023

Weather Ready Farms Team  
Nebraska Extension  
210 Mussehl Hall  
East Campus, PO Box 830719  
Lincoln NE 68583-0719

To the UNL Grand Challenge reviewers,

My name is Tim Schlegelmilch, and I am the Senior Vice President – Business Strategy at Farmers Mutual. By way of background, I am a 6<sup>th</sup> generation Nebraskan and a descendant of homesteaders in the eastern part of the state. I am also a proud alumnus of the University of Nebraska College of Business (1998). In my role at Farmers Mutual, I provide leadership to key portions of our operation, including Underwriting, Agency Relations, Investments and Reinsurance. As such, the topic of weather plays a key role in my daily activities.

Farmers Mutual of Nebraska delivers dependable, affordable insurance coverage for autos, farms, and homes. What began as 22 Nebraska farmers coming together in 1891 to insure one another's farms has since grown to become one of the most successful and well-respected mutual insurance companies in the Midwest. As the leading insurer of farms in Nebraska and South Dakota, our long history of success reflects the trust and loyalty we have earned from policyholders and local, independent agents.

The Weather Ready Farms program at the University of Nebraska is an excellent program that assists farmers in learning about numerous topics including conservation, financial management, and disaster preparedness. As the 9th largest insurer of farm in the United States, these topics align well with what Farmers Mutual believes is important to agriculture producers. It is our mission to provide security and peace of mind to our policyholders by delivering insurance products that are responsive to their needs and supported by exceptional service and financial strength. Weather Ready Farms plays a crucial role in educating farmers and assisting them in assessing, educating, and putting actionable plans in place.

**Tim Schlegelmilch, CPCU, CTP**  
Senior Vice President –  
Business Strategy

501 S 13<sup>th</sup> St  
Lincoln, NE 68508  
402.473.5841

tschlegelmilch@fmne.com  
fmne.com

As a representative of Farmers Mutual of Nebraska, I would like to state our intent to collaborate as well as show our support for the Weather Ready Farms program at the University of Nebraska. I believe that if the Weather Ready Farms program receives this funding, they will positively impact the lives of Nebraskans. We would like to collaborate with their team on insurance and disaster education, infrastructure projects to build more resilient buildings, and sponsoring events for the Weather Ready Farms team. I am looking forward to collaborating with the Weather Ready Farms team and highly recommend them for funding.

Sincerely,

A handwritten signature in blue ink that reads "Tim Schlegelmilch". The signature is written in a cursive, flowing style.