2023–2024 YEARBOOK

NTAE

New Technologies for AG Extension

Grant projects improve human, environmental, & community *health.*

PUBLISHED BY

EXTENSION FOUNDATION



Welcome.

Discover the power of innovation in the 2023–2024 NTAE Yearbook.

This yearbook is a publication of the New Technologies for Ag Extension (NTAE) program. It showcases the groundbreaking work of Extension professionals across the nation who received funding for their projects from NTAE, a grant program from the United States Department of Agriculture National Institute of Food and Agriculture (USDA NIFA), in partnership with the University of New Hampshire.

From technology-driven solutions to community-focused initiatives, these projects are transforming the way Extension serves its constituents. You'll read about some long-time NTAE grant recipients, such as the team creating an educational cartoon about pollinators—and some new-to-NTAE teams, such as the one developing a curriculum to support kinship caregivers.

All of our Extension colleagues represented in these pages are experts in their fields and passionate about what they do. Join us in celebrating their dedication and innovation as you read inspiring stories, learn from valuable lessons, and explore the future of Extension through the breadth and impact of NTAE-funded projects.

We sincerely thank the dedicated teams whose work made this yearbook possible and USDA NIFA for its continued support of Extension's innovative work.

Beverly Coberly, PhD
Chief Executive Officer

Ashley Griffin, MS
Chief Operating Officer

The New Technologies for Ag Extension initiative gives critical financial support and guidance to Cooperative Extension's groundbreaking work in cities and rural areas across the country.

EXTENSION FOUNDATION

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ABOUT THE EXTENSION FOUNDATION

The Extension Foundation is an expansive network that encompasses over 32,000 Extension educators. Established in 2006 as a 501(c)(3) nonprofit organization, its primary role is to strengthen Cooperative Extension System (CES) Land-grant university initiatives through the delivery of digital and mobile programs, facilitation of professional development opportunities, and cultivation of innovative solutions.

Founded by Extension directors and administrators, the Foundation was established to empower CES by offering technologies that provide information to the public through Extension communities of practice. Today, the Foundation partners with CES in liaison roles and through a formal plan of work with the Extension Committee on Organization and Policy. The partnership increases system capacity while providing programmatic services, helping Extension programs scale and investigate new methods and models for implementing programs.

The Extension Foundation also plays a vital role in promoting technology adoption within Cooperative Extension. With funding from the United States Department of Agriculture National Institute of Food and Agriculture, the Foundation provides leadership in the field of artificial intelligence and administers commercial systems for nationwide use.

PURPOSE

We help Cooperative Extension professionals find innovative ways to generate greater local impact.

VISION

To serve as a critical partner to the Cooperative Extension System and the Extension Committee on Organization and Policy on national issues that result in increased system capacity, scalable programs and initiatives, and greater visibility and impacts

Unlocking *New Possibilities*

The New Technologies for Ag Extension (NTAE) initiative drives innovation in Extension and creates meaningful impact in communities.

NTAE is a cooperative agreement with the United States Department of Agriculture National Institute of Food and Agriculture, in partnership with the University of New Hampshire (UNH) and with services provided by the Extension Foundation.

The goal of NTAE is to incubate, accelerate, expand, and scale promising work that will increase the impact of the Cooperative Extension System (CES) in the communities it serves and provide and promote models that can be adopted or adapted by Extension projects and programs across the nation. NTAE also supports the development and dissemination of technologies that enhance CES's capacity, including artificial intelligence (AI).

From 2019–2023, the Extension Foundation received a subaward from Oklahoma State University to support a diverse range of NTAE work. In that period, 72 teams received funding, augmented with support and resources provided by the Foundation. These teams' high-impact projects ranged from addressing environmental issues to supporting technology adoption to promoting rural and urban economic development.

In 2023–2024, the first year of the UNH NTAE cycle, 21 teams received a total of about $740,000 in grants through a competitive process. These projects were led by CES faculty or staff embedded in local communities.

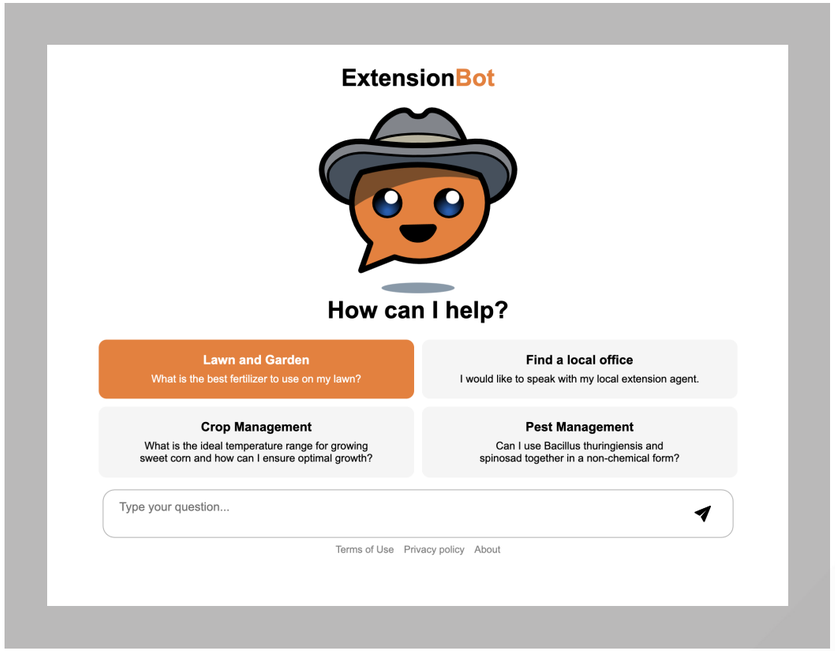
Throughout the year, teams received comprehensive coaching and resources to enhance their work, team dynamics, and overall impact.

Catalysts (many of whom are retired Extension directors) and Key Informants (experienced Extension leaders and subject matter experts) provided tailored guidance and support in eight critical areas:

- emerging technologies
- leadership and team development
- innovation and skill building
- marketing and communications
- evaluation
- digital engagement and publishing
- partnerships and development
- program design and educational technology

"ExtensionBot is Here To Help" highlights how Oklahoma State University is using ExtensionBot—an artificial intelligence tool developed by the Extension Foundation and Eduworks Corporation.

In the six months after ExtensionBot begin beta testing on April 1, 2024, 2,928 people at OSU Extension started conversations with the bot, which answered 5,242 questions and cited 6,535 fact sheets and other works for further reading and potential connection to Extension personnel.



EMERGING TECHNOLOGIES

NTAE support enables the Foundation to ensure that CES has access to cutting-edge technology tools and information and to promote the adoption of these technologies.

This grant year, the Foundation was particularly focused on AI. It organized an AI track that featured 12 workshops for the National Extension Technology Conference.

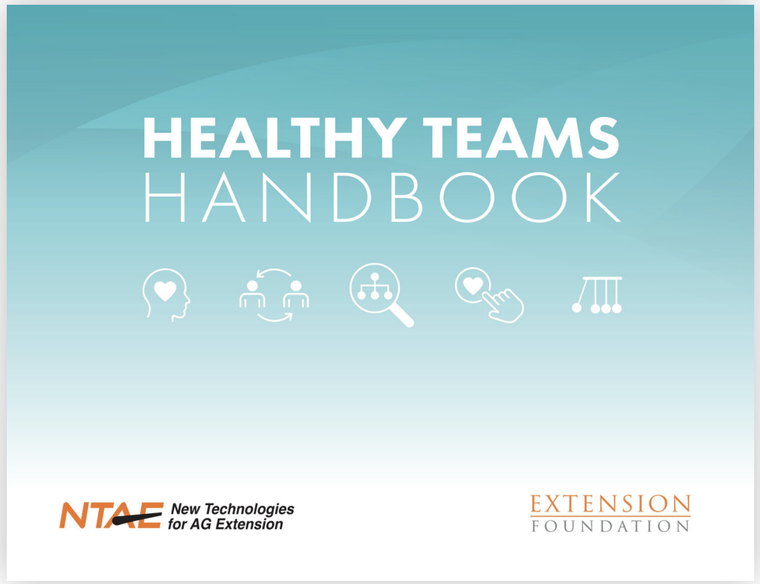
Conference attendees were introduced to **ExtensionBot,** a national initiative that leverages machine learning and AI to amass data from the CES ecosystem and answer questions directly and accurately, including half a million questions asked and answered in Ask Extension (Formerly Ask An Expert).

This AI tool not only has gained widespread attention throughout CES, it is becoming a powerful tool to connect communities with their local Extension professionals and resources.

Workshops also addressed data collection from Land-grant universities, education and training on best practices for AI use, and data governance. The AI keynote attracted over 400 attendees, while individual sessions drew over 350 participants.

The Foundation also hosted professional development events focused on AI, including an overview of the organization's AI work.

Connect—In addition, NTAE teams were encouraged to join Connect Extension, a social media platform that has become a valuable resource for the nearly 8,000 Extension professionals who have joined it. Through the platform, teams can share resources, participate in professional development, and collaborate with their colleagues in various subgroups.



The "Healthy Teams Handbook," published by the Extension Foundation, offers practical strategies for building and maintaining high-performing collaborative teams. The handbook complements the Team Health Dashboard, a research-backed tool created by the Extension Foundation for NTAE teams.

LEADERSHIP AND TEAM DEVELOPMENT

NTAE supports national leadership capacity development, an effort led by the Foundation's leadership development specialist, Karl Bradley. Bradley provided essential support as a speaker and facilitator at national, state, and regional gatherings within the Land-grant system.

A key leadership focus this year was supporting 1994 institutions through collaboration with the First Americans Land-grant Consortium, a nonprofit affiliated with the American Indian Higher Education Consortium. With NTAE support, a four-part virtual educational series was developed, marketed, and delivered. Bradley also worked with the Joint Council of Extension Professionals Extension Leadership Conference planning committee to tailor content and training, and delivered the opening and closing workshops for 400 CES professionals.

NTAE team members also attended workshops on building high-performing teams, leading teams in hybrid and virtual settings, and developing healthy teams.

INNOVATION AND SKILL BUILDING

Each NTAE team participated in one of two Impact Collaborative Summits. These dynamic virtual events were designed to enhance project readiness and foster innovation for current NTAE projects and the Extension Committee on Organization and Policy's Program Action Teams. By providing essential skills, tools, resources, and partnerships, the Impact Collaborative equipped teams to supercharge their work and maximize project impact.



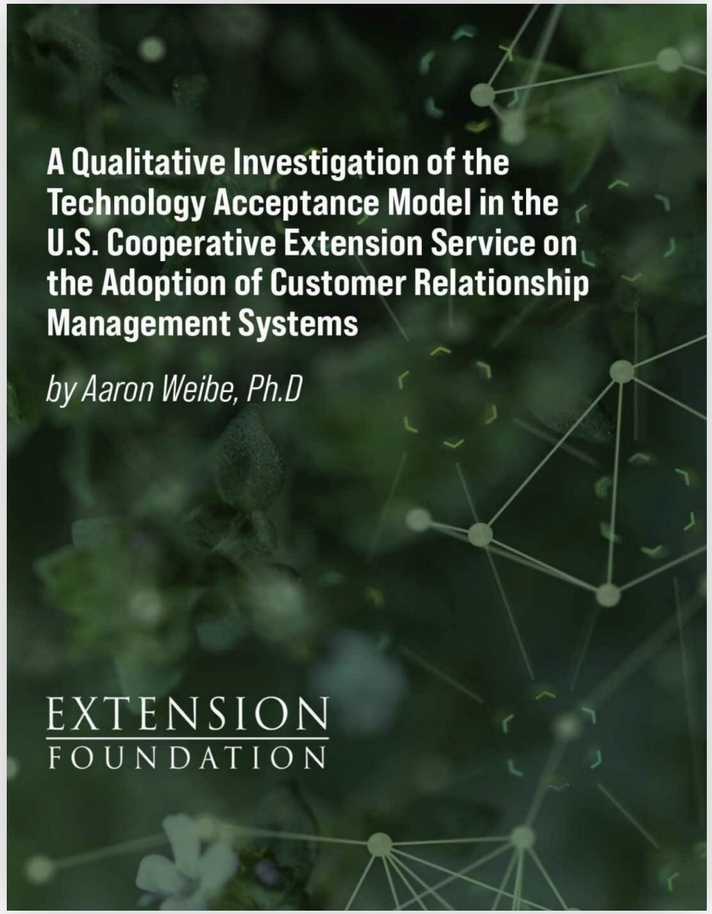
An Innovation Skill Building Experience Workbook is available as a resource for Impact Collaborative participants, and is used by NTAE incubation teams to help in their planning processes.

I enjoy feeling like I'm not the only one encountering obstacles. I also love the positive energy from the Summit. It's like a slingshot for our projects!

—Kara Maddox, Team Lead
"Using Animated Pollinator Video to Educate Underserved Populations,"
University of Georgia/KJM Digital

Our team greatly benefited from the Impact Collaborative Summit in two ways: First, articulating our project to others in a simple and accessible way was an excellent exercise for us to reflect on and refine our ideas and get feedback. Second, hearing about other people's projects, ideas, and strategies was inspiring.

—Matheus Cezarotto, Team Lead
"Night of the Living Debt,"
New Mexico State University
Learning Games Lab



Customer Relationship Management (CRM) systems hold great potential for Extension because they offer a centralized platform for managing interactions with the public, leading to more effective communication, outreach, and engagement. Aaron Weibe, the Extension Foundation's communication and engagement manager, as part of his doctoral research explored the challenges that prevent CES from using CRMs more widely. He discusses how the technology acceptance model can be leveraged to increase CRM success rates within Extension. Dr. Weibe's dissertation, "A Qualitative Investigation of the Technology Acceptance Model in the U.S. Cooperative Extension Service on the Adoption of Customer Relationship Management Systems," was published by the Extension Foundation. It provides specific and actionable insights to improve technology acceptance in Extension organizations.

MARKETING AND COMMUNICATIONS

The Foundation's marketing and communications Key Informants provided essential support for NTAE project success, focusing on market research, creative development, media analysis, audience engagement, and strategic communication. In addition, they offered technical assistance with such tools as Connect Extension, email marketing platforms, and Customer Relationship Management systems.

EVALUATION

Key Informant Julie Halverson supported teams in developing and implementing effective evaluation strategies. This included creating logic models, refining target populations and outreach efforts, and connecting teams with relevant resources. By providing guidance in these areas, Evaluation helped teams measure their progress and make data-driven improvements.

DIGITAL ENGAGEMENT AND PUBLISHING

Subject matter experts in this category provided comprehensive publishing services, such as editing, ghostwriting, and producing digital publications that showcased the impact of NTAE projects—as the 2022–2023 Yearbook did in the previous NTAE Grant year.



PARTNERSHIPS AND DEVELOPMENT

The Foundation played a crucial role in expanding NTAE project reach by supporting teams in forging new partnerships, engaging with key organizations, and cultivating new funding opportunities.

PROGRAM DESIGN AND EDUCATIONAL TECHNOLOGY

Teams had access to expertise in curriculum developmentand digital and online content creation, instructional design, and professional development event planning.

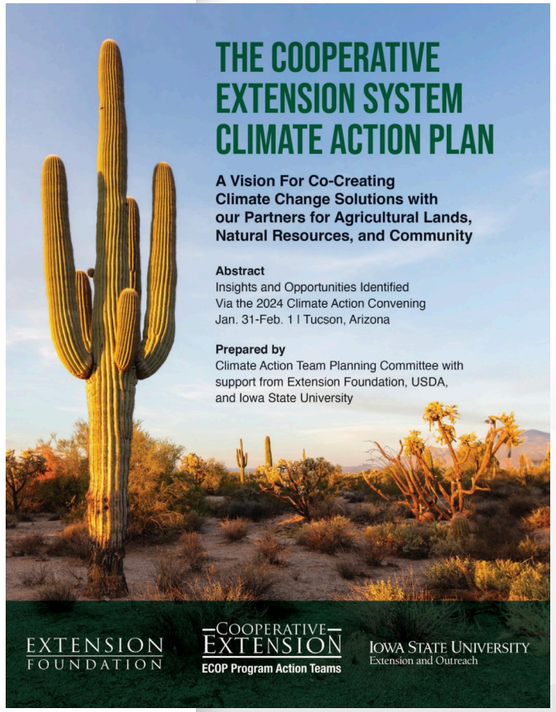
AN HISTORIC SUMMIT

The New Technologies for Ag Extension (NTAE) program this year provided essential support to the Extension Committee on Organization and Policy's (ECOP) Program Action Teams (PATs), including the Climate PAT, which held a groundbreaking event in 2024.

Amidst the intensifying threat of climate change, Cooperative Extension professionals from across the United States gathered in Tucson, Arizona, for a Climate Action Convening, supported by NTAE and additional funding from United States Department of Agriculture National Institute of Food and Agriculture and Iowa State University Extension. They reflected on the question "How can we leverage Extension's expertise to effectively combat climate change?"

The Convening led to the following outcomes:

- **Network building:** Climate-focused Extension leaders strengthened their connections and collaboration.
- **A Climate Action Plan:** Participants developed a comprehensive Climate Action Plan, outlining innovative solutions tailored to address the climate crisis.
- **Model development:** Four climate change models were created to tackle specific challenges and expand Extension's impact.
- **Communications strategy:** A plan was devised to raise awareness about the Climate Action Plan and to forge partnerships.



The Climate Action Plan, rooted in the National Climate Change Roadmap, integrates climate action with Extension's existing priorities, such as broadband access, economic development, food systems, and health equity. By leveraging Extension's embedded network within communities, these models aim to deliver equitable, measurable, and lasting climate solutions.

Learn more about the Convening.

Read the Climate Action Plan.

See page12 for more about how NTAE funding supports ECOP's PATs.

'A *Remarkable Program*'

There is nothing quite like the NTAE initiative in the Cooperative Extension System. And through it, the Foundation is able to play a critical role in supporting and promoting the work of the thousands of Extension professionals around the country.

This is a remarkable program.

It transforms ideas into realities and elevates the professional skills of team members beyond their imaginations.

—Dr. Fred Schlutt, retired Extension director and NTAE Catalyst

Program Action *Teams*

Addressing priority issues across Extension

OVERVIEW

Program Action Teams (PATs) are groups of Extension professionals from across the United States, organized and managed by the Extension Committee on Organization and Policy (ECOP).

The PATs advance crucial issues that are likely to have a system-wide impact by creating and expanding networks, conducting program assessments (activities and resources), facilitating strategic planning, convening conferences, writing white papers, making policy recommendations, and securing funding for work.

CURRENT WORK PRIORITIES

- Health Equity & Well-Being
- Climate Mitigation, Resiliency, & Adaptation
- Workforce & Economic Development
- 4-H Positive Youth Development
- Broadband Access & Digital Skills
- Urban Agriculture & Food Systems
- Pathways, Partnerships, & Engagement
- Food Systems & Food Waste

STRUCTURE & LEADERSHIP

PATs are chaired/co-chaired by director/administrator members and liaisons of the ECOP Program Committee and include Extension Directors, Extension faculty/professionals, internal collaborators (e.g., Extension Foundation, Regional Rural Development Centers, 4-H Council), and external collaborators including National Institute of Food and Agriculture liaisons (e.g., federal government agencies, philanthropic organizations, nongovernmental organizations, private-sector participants). Participation in PATs is open and voluntary.

ORGANIZATION

PATs typically form smaller steering committees (10–20 members) and larger interest groups. They offer opportunities for involvement through various implementation teams, project writing teams, work groups, and more.

ACHIEVEMENTS & IMPACT

NTAE support has resulted in the development of robust networks through the ECOP PATs, comprising nearly 2,000 members and 730 key partners. NTAE's efforts have also supported the submission of applications that support Extension's system-wide programmatic efforts for a staggering $258 million in funding, with $51 million already awarded and more awards pending. The program's proven track record of success exemplifies the tremendous value of NTAE.

Through the NTAE grant program, the Extension Foundation provides comprehensive support to the PATs, giving them access to resources and helping develop technology solutions to move their work forward in the following ways:

- Assisting in applications for funding for national efforts
- Designing and hosting national issues-based convenings
- Developing system-wide strategic planning efforts and resources
- Strengthening online reporting systems
- Creating resource repositories
- Increasing engagement among and building communities of practice using subgroups on Connect Extension, the Foundation's online collaboration space
- Updating and enhancing web resources (e.g., redesigning *pats.extension.org*)
- Conducting national online surveys
- Developing partnerships
- Hiring PAT fellows to move specific projects forward
- Creating marketing materials (e.g., email campaigns, publications)
- Facilitating leadership development activities and meetings

Significant *Impact*

Since the inception of the PATs and their partnership with the Extension Foundation in fiscal year 2020-2021, more than $51 million has been secured to advance national efforts in areas ranging from climate adaptation to workforce development.

Extension Foundation *Team*

CATALYSTS

Rick Klemme, PhD
Former Executive Director, ECOP
Retired Dean & Director
Cooperative Extension
University of Wisconsin

Dyremple Marsh, PhD
Retired College Dean, Research Director, & Extension Administrator
Delaware State University

Dawn Mellion, MBA, PhD
Retired Vice Chancellor
Southern University
Cooperative Extension

Scott Reed, PhD
Emeritus Vice Provost for University Outreach & Engagement
Oregon State University

Chuck Ross, MA
Retired Director of Extension
University of Vermont

Fred Schlutt, PhD
Retired Vice Provost for Extension & Outreach
University of Alaska Fairbanks

KEY INFORMANTS

Karl Bradley, MA
Leadership & Team Development

Julie Halverson, MS
Evaluation

Megan Hirschman, BS
Partnership & Development Lead

Rose Hayden-Smith, PhD
Publishing & Digital Engagement

Molly Immendorf, MS
Professional Development & Impact Collaborative

Ellen P. Krugel, BFA
Graphic Design

Lisa Linfield, BA
Instructional Design

Heather Martin, MSJ
Publishing & Graphic Design

Melanie Pugsley, BA
Professional Development

Aaron Weibe, PhD
Marketing, Communications, & Engagement

PROGRAM ACTION TEAM LIAISONS

Megan Hirschman, BS
Partnership & Development Lead

Nate Birt, MA
NTAE Partnership & Development Specialist

Regan Emmons, MA
Climate Program Action Team Assistant & Extension Disaster Education Network Assistant Project Manager

LEADERSHIP TEAM

Beverly Coberly, PhD
Chief Executive Officer

Ashley Griffin, MS
Chief Operating Officer

Arielle Smith, MBA, CPA
Comptroller

FINANCE & ADMINISTRATION

Tira Adelman, MPA
Program Manager

Barbara Adams, MBA
Senior Accountant

Patty Hight, BS
Grants Specialist

Brenna Kotar, BA
Contracts & Operations Manager

Ann Taecker, MS
Grants Specialist

Sheri Young, BS
Executive Assistant

TECHNOLOGY SOLUTIONS*

Mark Locklear, MS
Technology Solutions
Extension Foundation/
North Carolina State University

David Warren, MBA
Artificial Intelligence
Program Leader
Extension Foundation/
Oklahoma State University

Aaron Weibe, PhD
Marketing, Communications, & Engagement

**Other technologists who contribute to NTAE efforts: Deb Weitzenkamp, PhD (Campus and Catalog Administrator) and Kenny Elston (WordPress Engineer). Eduworks Corporation also is a valued partner in delivering technology solutions for NTAE projects.*

Opportunity *& Obligation*

Extension educators make Pathways, Partnerships, and Engagement program imperatives

The imbalances of power, resources, and opportunities in the United States have become an increasingly bigger and louder part of our cultural conversation during the last several years. We have more work to do, but we are starting to dismantle some of the barriers that keep marginalized communities from having privileges that majority groups often take for granted.



Because of its size and proximity to under-resourced communities, the Cooperative Extension System is in a unique position to help keep this cultural conversation going. And while many projects that received 2023–2024 New Technologies in Ag Extension (NTAE) grants are focusing on this topic, two teams in particular have put it at the center of their work.

A project from Langston University Extension is focused on improving health outcomes among minority populations. And a team from West Virginia University (WVU) is building a template that other Extension educators can adapt to teach people how to minimize the unconscious bias that perpetuates systemic inequalities.

These teams agree that Extension has not only a great opportunity when it comes to partnerships and engagement but an obligation to make it a priority.

"Extension was founded to do this work," says Dr. Denis Scott, a WVU Extension professor and co-creator of "Cultural Competency for Municipalities," a professional development program that will be the basis for their Extension model.

"Before Land-grant universities (LGUs) were founded, education was accessible only to the wealthy elite," Scott says. "LGUs are mandated by civil rights and other legislation to use their federal funds to benefit all communities."

While their projects take a variety of shapes, Scott, his colleague Tony Michael, and the team members from Langston have a common goal: to support under-resourced communities by learning about, valuing, and trying to see the world from the cultural perspectives of the people in those communities.



These team members are developing these projects because they see an objective need for them. But they also are informed by personal experiences and beliefs.

In one way or another, they all see themselves in the communities they serve, and they want to leverage that connection to make meaningful differences in people's lives.

youtu.be/ldOeElX2aDg?si=UowObertXsVcpiuh

CULTURAL RELEVANCE

Because it had already been implemented, "Cultural Competency" came to NTAE with evidence that the program works. (See page 20.)

For example, Huntington is the second largest city in West Virginia and one of the most diverse in the state. "But our fire department does not reflect where we live," Michael says. "On the 100-person crew, there are no women and only one person who identifies as a minority." After participating in "Cultural Competency," the city decided to change its recruitment practices, making a deliberate effort to bring more diverse candidates to its Junior Academy.

"Our community has been very [willing] to have these conversations," says Huntington Mayor Steve Williams. "And what Tony and his team have been able to bring in is absolute brilliance."

Scott and Michael believe their program works in large part because they customize it for each organization they work with, an approach they want to share with other Extension educators. "This is not an 'out of the box' program," they say. "By grounding the content within a local community, the program can help participants connect through similarities, which then helps to promote, appreciate, and acknowledge the value of diverse experiences, backgrounds, and cultures."

When the Langston team applied for NTAE funding, their project was in an earlier stage of development than WVU's program—still gathering input from their intended audiences as they planned their approaches and content.

Langston Extension educators Drs. Carlos Alvarado and Tiffany Williams and their team plan to develop a nutrition education app to help address the

SURVEY SAYS

The Langston University Extension NTAE team surveyed approximately 100 women, most between the ages of 18 and 34, in the summer of 2024 about their experience and interest in using a nutrition app.

67% already use phones or tablets to look up health and food information.

78% had tried at least one nutrition app in the past.

67% said it would be "very important" for a health app to reflect their cultural background.

significant health disparities among minority populations in southeast Oklahoma. (See page 21.)

A huge key to the success of the app will be presenting the information in a culturally relevant way. "It has to recognize and respect users' diverse dietary traditions and health practices, or they won't trust or use it," Alvarado says. "Sometimes the health messages we send to these communities aren't rejected because they're bad messages; they're rejected because they don't respect cultural differences."

OVERCOMING OBSTACLES

Both teams are well aware of the challenges their projects face.

Michael and Scott expect one of their hurdles to be that Extension educators are spread thin when it comes to programming and may not want to give up what they're already doing to make room for something new.

Another may be that educators in a majority group may not believe they're qualified to speak on equity issues because they haven't experienced what it's like to be a minority. But that's not a prerequisite—the only requirement is one we all can meet, Scott say, which is realizing that we all have and can learn to minimize implicit bias, the perspectives that shape how we behave and treat others. As we're learning how, we can potentially teach others how to do it, too.

Alvarado says one of his project's biggest challenges will be to stand out in a sea of often confusing health advice. "Because now everyone in social media purports to be an expert in nutrition," he says. "And while some of it is misinformation, not all of it is wrong—but there are lots of mixed messages. Our challenge will be to help people learn how to sort through that information and make choices that are right for them."

There are also logistical and cultural barriers that may make it difficult for folks to engage in these programs. Michael asks, "What if a single parent is working two jobs? How do they get to one of our sessions? And they might just say, 'No. I'm not going to expend these resources—such as gas money—because I need to go buy food." But also, what if a particular audience isn't even aware of a program to begin with? While Extension educators may have geographic access to minority populations, "people who are not in the majority often don't know about our programs," Williams says. "We need to continue to make a concerted effort to reach everyone."

One way to do this is to partner with local organizations that intended audiences already trust, Williams says, noting that the Langston project is working with the Healthy Oklahomans Nutrition Alliance, which helps Supplemental Nutrition Assistance Program recipients use their benefits to purchase food from farmer's markets.

COMMITMENT TO PATHWAYS, PARTNERSHIPS & ENGAGEMENT

The New Technologies in Ag Extension grant program has funded several similarly focused projects in the last five years.

Una Educación Sobre la Educación

The Juntos Program and Siempre Juntos

Extension's National Framework for Health Equity and Well-Being

Pathways, Partnerships, & Engagement Program Action Team

UNCERTAIN FUTURE?

Programming with this focus is facing more than just the challenges of reaching and resonating with audiences. Public and political support for it has begun to wane. "There's been an increasing reluctance to continue this work in some areas," Michael says, "as well as a perceived threat to funding."

Still, these teams remain optimistic about their projects and they encourage other Extension educators to find ways to make minority populations a bigger part of their focus. Says Scott, "This should be an element of all Extension programs." •

Extension was founded to do this work. LGUs are mandated to benefit all communities.

—Dr. Denis Scott
Professor
West Virginia University Extension



Dr. Denis Scott, professor at West Virginia University Extension, co-facilitating a "Cultural Competencies for Communities" session for city employees in Huntington, West Virginia

Cultural Competency for Communities

TEAM LEADS

Denis Scott, PhD
Extension Specialist
West Virginia University

Tony Michael, MA, JD
Director, Family, & Community Development
West Virginia University

CATALYSTS

Dawn Mellion, MBA, PhD
Scott Reed, PhD

LONG-TERM GOAL

To build understanding and awareness of Pathways, Partnerships, & Engagment and make sustainable changes among individuals and in organizations

PROJECT CONTEXT

The WVU program takes a unique approach to this work, reaching people where they are and leading them to discover the value of inclusivity for themselves and their organizations.

GOALS FOR NTAE GRANT PERIOD

- Develop a virtually accessible how-to guide for Extension professionals who want to create customized cultural competency training.
- Gather qualitative data on professional development gains of Extension professionals who use the guide.

NTAE New Technologies for AG Extension

Enhancing Nutrition Education in Underserved Communities

TEAM LEADS

Carlos Alvarado, PhD
Dairy Product Specialist
Langston University

Tiffany Williams, PhD, RDN, LDN
Extension Specialist
Langston University

CATALYST

Dyremple Marsh, PhD

LONG-TERM GOAL

To increase healthy eating and well-being by reducing chronic diseases among under-resourced communities in southeast Oklahoma

PROJECT CONTEXT

The five counties on which this project is focused have among the highest rates of diabetes in the state, according to the Oklahoma State Department of Health. OSDH research also indicates that, relative to national averages, a large percentage of the population in these counties eats very few fruits and vegetables and does not exercise regularly.

GOALS FOR NTAE GRANT PERIOD

- Develop a mobile and web-based nutrition-education app, which will include videos, quizzes, goal-setting features, behavior-change techniques, and recipes that feature ingredients readily available in local markets and traditional, healthy, and nutritious foods from the communities in which participants live. The content will focus on diet quality and physical activity, food resource management, food safety, and food security.
- Pilot the app among adults (age 18 and older) participating in the Expanded Food and Nutrition Education Program in five southeastern Oklahoma counties: Muskogee, Oklahoma, Haskell, Wagoner, and Okfuskee.
- Use feedback from the pilot to refine the app.

Educational programs support mental health & kinship care group facilitators

Taking care of our CARE GIVERS

Anxiety, depression, and other mental health disorders were already a major global concern before COVID-19, according to the World Health Organization. Within the first year of the pandemic, their levels increased significantly. Adults in the United States alone have one of the highest rates of mental health diagnoses among 11 high-income countries, notes the The Commonwealth Fund. And in 2022, nearly 50 million people aged 12 or older (17% of the U.S. population) reported having had a substance use disorder in the past year.

Extension educators are not mental health professionals, but they may find themselves in a position where someone they're working with asks directly or indirectly for mental health assistance.

The educators and faculty on these projects talk about why Extension settings are conducive to these kinds of interactions, how Extension professionals can respond, and how the system can be even better equipped for this work.

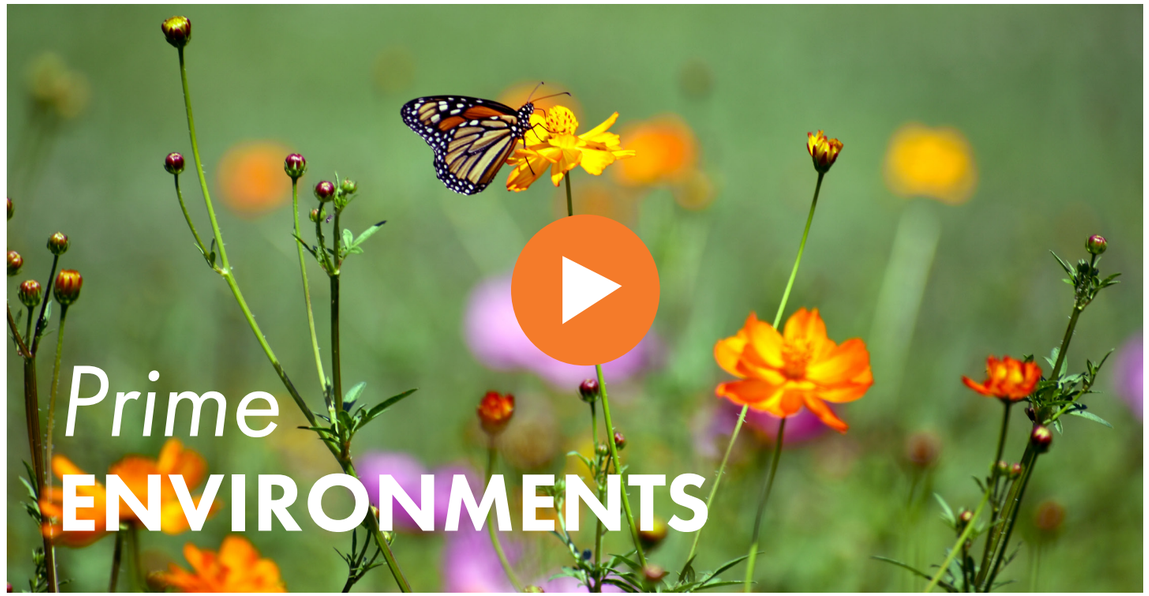
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People are struggling—whether it's because of the isolation and fear brought on by COVID, economic uncertainty and inequality, family dysfunction, social divides and pressures, or any number of other reasons.

Unfortunately, mental health care is not abundant in this country. The Commonwealth Fund reports that the United States has the world's highest suicide rate and the second-highest drug-related death rate—yet, we have "a relatively low supply of mental health workers, particularly psychologists and psychiatrists. Just one-third of U.S. primary care practices have mental health professionals on their team."

Although the Cooperative Extension System (CES) does not license professionals to treat mental illness (with therapy or medicine), it does help fill this care gap with educational resources and programming. Two of the 2023–2024 New Technologies in Ag Extension (NTAE) grant recipients are using their funding to further develop materials that can improve mental health in our communities. (See "Mental Health Matters" page 25, for past NTAE grantees whose projects have addressed similar needs.)

These projects, from Penn State University (PSU) Extension and University of Minnesota (UMN) Extension, have different ultimate beneficiaries. PSU aims to support the emotional and mental well-being of children in kinship care (care by a family member other than a parent) and the caregivers themselves (see page 26), while UMN wants to reach participants in adult community support programs (see page 27). But the materials both teams have created are primarily for the practitioners who interact directly with those audiences.





The University of Minnesota (UMN) team used a method called photovoice to create its mental health conversation guides. The method combines photos and quotes from a particular audience about a certain topic to make the content more relatable to other people in that audience. In the UMN project, they asked participants for pictures and stories about activities (like playing music) that help them feel a sense of calm and well-being.

TEACHING TEACHERS

Dr. Kristina Brant, a PSU assistant professor, has been studying kinship care for several years, drawn to it because of her own family history of mental health and substance use disorders—two primary reasons children can be in the care of a grandparent, an aunt and uncle, or other relative.

"I've seen how these things are experienced by whole family units," she says. "It has shown me how important it is to make sure that kinship caregivers—who are suddenly raising children they didn't expect to raise—are connected to the support they need so that they can care for the children with fewer stressors."

Brant, her PSU colleagues, and faculty from West Virginia University Extension developed "Caring for Our Kin: A Curriculum for Kinship Caregiver Support Groups" as a resource for support groups for kinship caregivers. "Facilitators in the kinship care space told us that they needed educational content to use at their meetings, but the content they could find was either too expensive or not tailored closely enough to the needs of kinship families," Brant says. "Caring for Our Kin" contains research-based educational content and activities for group facilitators to use, addressing such things as using positive discipline, understanding youth development, strengthening family communication, and supporting a child's education. Brant and her team also developed a how-to guide with best practices for creating and sustaining successful support groups.

"Our curriculum has the potential not only to create meaningful experiences for facilitators and kinship caregivers, but also to lessen the negative impact of parental substance use on children by increasing support for families caught in the crossfire of the epidemic," Brant says.

Our curriculum has the potential . . . to lessen the negative impact of parental substance use on children.

—Kristina Brant,
Assistant Professor
Penn State University

MENTAL HEALTH MATTERS

The New Technologies in Ag Extension grant program has funded several mental health-focused projects in the last five years.

- They Can Do Hard Things
- Breaking the Cycle
- Wellness in Tough Times Toolkit
- Building Farm and Farm Family Resilience in Our Communities
- Opioid Response

Similarly, UMN Extension Educator Kelly Kunkel and her colleagues have created content for professionals who work one on one with a key demographic—in her program's case, the staff at community support programs (CSPs), long-term treatment and rehabilitation services for adults with severe and persistent mental illness.

Kunkel's "Nourish and Flourish" team has created a set of conversation guides to help CSP staff have spontaneous, meaningful conversations about the connection between physical and mental well-being. What's unique about the guides, among other things, is that they were created via photovoice, a qualitative method commonly used in community-based research. It combines photos and quotes or stories from a priority group to illustrate a particular topic or point, making the content more authentic and relatable for other people from that group.

The conversation guides aren't prescriptive, says Dr. Abby Gold, a UMN Extension specialist on the project. Rather, they combine "what works for me" content from CSP clients, with open-ended questions that lead to reflections on choices about nutrition, physical activity, and mental well-being.

RESONATING WITH AUDIENCES

Team members from both projects say that creating train-the-trainer content is a complex process, one that has to consider the trainer and the end recipient. "You have to take into consideration the presenter's voice," Gold says, "When we participated in the Extension Foundation's 'Impact Collaborative' we completed an exercise imagining the persona of a typical staff person to build empathy and therefore imagine how they might say something to a client."

The "Caring for Our Kin" curriculum, likewise, has to account not only for how facilitators present the material but how the caregivers they're teaching will translate and implement what they're learning.

"Facilitators are teaching the caregivers skills for their own benefit—like how to care for themselves so that they can be at their best to care for their kids," Brant says. "But the facilitators are also teaching the caregivers how to teach those skills to their children."

"Kinship" and "Nourish" have been tested in the field and have either made or have plans to make changes to subsequent iterations. For example, the UMN team recently created digital versions of the guides so that staff can pull them up on their phones, something many said they prefer to do. The PSU team has piloted its program in primarily rural, white communities, so future pilots will include support groups that serve People of Color in urban settings. Doing so will ensure that the curriculum is culturally relevant to diverse audiences.

"SHINING LIGHT"

The leaders on both of these projects say they are serving constituents whose needs often fall below the radar in the overall health care system.

"Our population is neglected," says Gold, who worked for several years at federally qualified community health centers. "They don't alway get access to dietitians and other professionals who can help them with health needs."

The needs of kinship caregivers also are not well-known, Brant says—in large part because they may not seek support. For those kinship caregivers who are not part of the foster care system, there may be fear of connecting with mental health professionals or a lack of knowledge about how to connect with others caring for kin.

These programs are great examples of Extension's ability to shine light on unmet needs, Gold says. "We are really good at bringing people together to solve complicated problems." •

PennState Extension

"Caring for Our Kin": A Curriculum for Kinship Caregiver Support Groups

TEAM LEAD

Kristina Brant, PhD
Assistant Professor
Pennsylvania State University

CATALYST

Rick Klemme, PhD

LONG-TERM GOAL

To create stability and reduce trauma for children whose parents are unable to care for them, by supporting and educating the family members who have stepped in as guardians and caregivers

PROJECT CONTEXT

Across the nation, approximately 3% of all children—more than 2 million—are in "kinship" care, meaning that they are being raised by relatives when their parents cannot care for them. Research shows that while kinship care can provide stability for children, kinship caregivers experience heightened psychological distress and poorer health compared to their peers.

GOALS FOR NTAE GRANT PERIOD

- Pilot a 12-session "Caring for Our Kin" curriculum with at least 10 kinship caregiver support groups across the country.
- Provide training, technical assistance, guidance, and mentorship to facilitators.
- Collect feedback from facilitators and participants that will inform revisions to the curriculum.
- Increase caregivers' knowledge of topics important to their caregiving roles, help them build relevant skills, improve their confidence and outlooks, and enhance their social support networks.

NTAE New Technologies for AG Extension

UNIVERSITY OF MINNESOTA

"Nourish and Flourish" Conversation Guides

TEAM LEADS

Kelly Kunkel, MS, MCHES
Extension Educator
University of Minnesota

Abby Gold, PhD
Extension Specialist
University of Minnesota

CATALYST

Dyremple Marsh, PhD

LONG-TERM GOAL

To improve mental health among Minnesotans—especially in low-income populations and populations of color

PROJECT CONTEXT

One in five adults in the United States lives with a mental illness, and nearly half of all counties in Minnesota recently identified mental health and well-being as a top priority in their Community Health Improvement Plans, a recurring initiative by the Minnesota Department of Public Health.

GOALS FOR NTAE GRANT PERIOD

- Revise and distribute three conversation guides to help staff in four rural community support programs (CSPs) have conversations with CSP clients about ways to improve their mental health and well-being.
- Develop a protocol to train CSP staff to use the conversation guides.

UNDER PRESSURE

Teams work to alleviate stress on urban and rural economies

Our nation's urban and rural communities are facing significant challenges.

Gentrification has created disparities in wealth and opportunity—and sometimes environmental damage—in city centers and in remote areas popular for their natural attractions (gateway communities). The ongoing shortage of agricultural workers and racial inequity among farmers also are a concern in many areas. Several projects that received 2023–2024 New Technologies in Ag Extension (NTAE) grants are addressing these challenges.

Cooperative Extension System (CES) teams from Washington State University and West Virginia University want to expand or share models they've created to enhance CES's capacity to improve quality of life in their geographic areas of interest. CES professionals from Langston University, Kansas State University, and the University of Maryland are focused on farmer workforce development and prosperity.

Using its Western Center for Metropolitan Extension and Research (WCMER) as a foundation, WSU Extension is developing a plan for a national version of the center. (See page 36.) WCMER applies Extension research to economic and environmental issues that affect urban areas, primarily metropolitan centers in the western United States. The National Urban Research & Extension Center would scale this concept to work nationwide.

WVU Extension wants to help gateway communities across the country address their economic and environmental situations to achieve similar outcomes as in communities that have followed the Mon Forest Towns framework. (See page 34.)

A team from Langston University is teaching under-resourced Oklahoma growers to cultivate baby ginger, a potentially high-profit, easy-to-grow crop. Teams from University of Maryland (UMD) and Kansas State University (KSU) want to deepen the pool of farmers in their communities. (See pages 35, 33, and 32.)

IN THIS Q&A, members of five teams talk about the role that Cooperative Extension and their programs can play in supporting people and places in urban and rural America. We'll hear from the following:



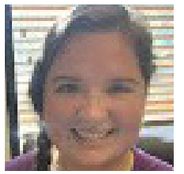
Dr. Doug Arbogast
Extension Specialist
West Virginia University



Dr. Devi Kandel
Assistant Professor
Langston University



Dr. Brad Gaolach
Professor
Washington State University



Kirsten Cowan
4-H Educator
University of Maryland



Dr. Cary Rivard
Associate Professor
Kansas State University

What excites you most about your program?

ARBOGAST: Extension has the potential to help activate a U.S. Department of Agriculture (USDA) plan to expand recreation economies in communities surrounding America's national forests, in partnership with Rural Development, the National Institute of Food and Agriculture, and the U.S. Forest Service.

We've already done this in West Virginia, through the Mon Forest Towns Partnership, which came out of a 2017 USDA publication identifying the outdoor economy as an emerging and priority area of national need. Extension is in an ideal position to facilitate what the USDA plan calls for because we understand the complexities of the plan's partner agencies and their missions.

And unlike private consultants, who often are brought in to create strategic plans in this area but then leave communities to implement them, Extension services aren't constrained to short timeframes and can help create more sustainable plans and see them through.

GAOLACH: Researchers at Land-grant and urban-serving universities, federal agencies, and nongovernmental organizations are excited about what we are trying to create—and their support for the center and how it will improve lives, communities, and the environment is what excites me.

COWAN: Giving youth access to agriculture careers and Maryland's agriculture industry, especially those who wouldn't normally have that opportunity. We focused on removing barriers by providing transportation and offering a stipend upon completion. The hands-on experiences allowed them to gain real insight, and seeing their perspective on agriculture shift throughout the internship will be incredibly rewarding.

Can you share an anecdote that illustrates the need for or impact of the work your team is doing?

GAOLACH: As our planet warms and many communities face extreme heat, urban spaces hold that heat and create heat islands that pose significant threats to health—both the extreme high temperatures during the day and often even more impactful the high overnight lows. One way to combat this challenge is to create urban forests, which can provide shade and through evapotranspiration, cooling microclimates in overburdened communities whose residents often cannot afford air conditioners.

KANDEL: During the field day and educational training program, growers were very interested in baby ginger production in high tunnels—and they seemed interested in adopting the technology. Many of them asked about the market potential of baby ginger production in high tunnel systems, compared to tomato production in high tunnel systems. It seems like the next thing to do would be to conduct an economic analysis of this system.



Team members discuss the need for their programs in rural and urban economies.

youtu.be/rZjnkXvh720?si=WC_rxLcG0n8QIkej

Why is it important for Extension to be involved in communities' economic health, and why is it well-suited to do so?

GAOLACH: With 80% of Americans living in metro areas, it is Extension's obligation to apply the breadth and depth of the Land-grant university (LGU) system to urban issues. It is important for us to help improve lives and communities and to steward our natural environment.

COWAN: Cooperative Extension uses its networking connections and rich knowledge across the state to support communities. This allows Extension to effectively foster the next generation of the workforce, helping strengthen local economies and communities.

KANDEL: Growers have faith in CES people. They listen to and would like to learn from CES more than from other platforms. There is also a positive correlation between the technology disseminated by CES and adoption of that technology by farmers.

ARBOGAST: Because we're trusted, we're valued, and we have connections to university expertise that can be leveraged to support the communities. We're also invested and rooted in the communities themselves.

What challenges are you facing as you implement your project?

RIVARD: "Growing Growers" is very much a grassroots program, and it has always included representatives from nonprofit farming organizations—and oftentimes those organizations have pretty high turnover. Our organizing committee has turned over four or five times since I started at Kansas State, which is great in that you get new energy and new ideas, but it's still challenging.

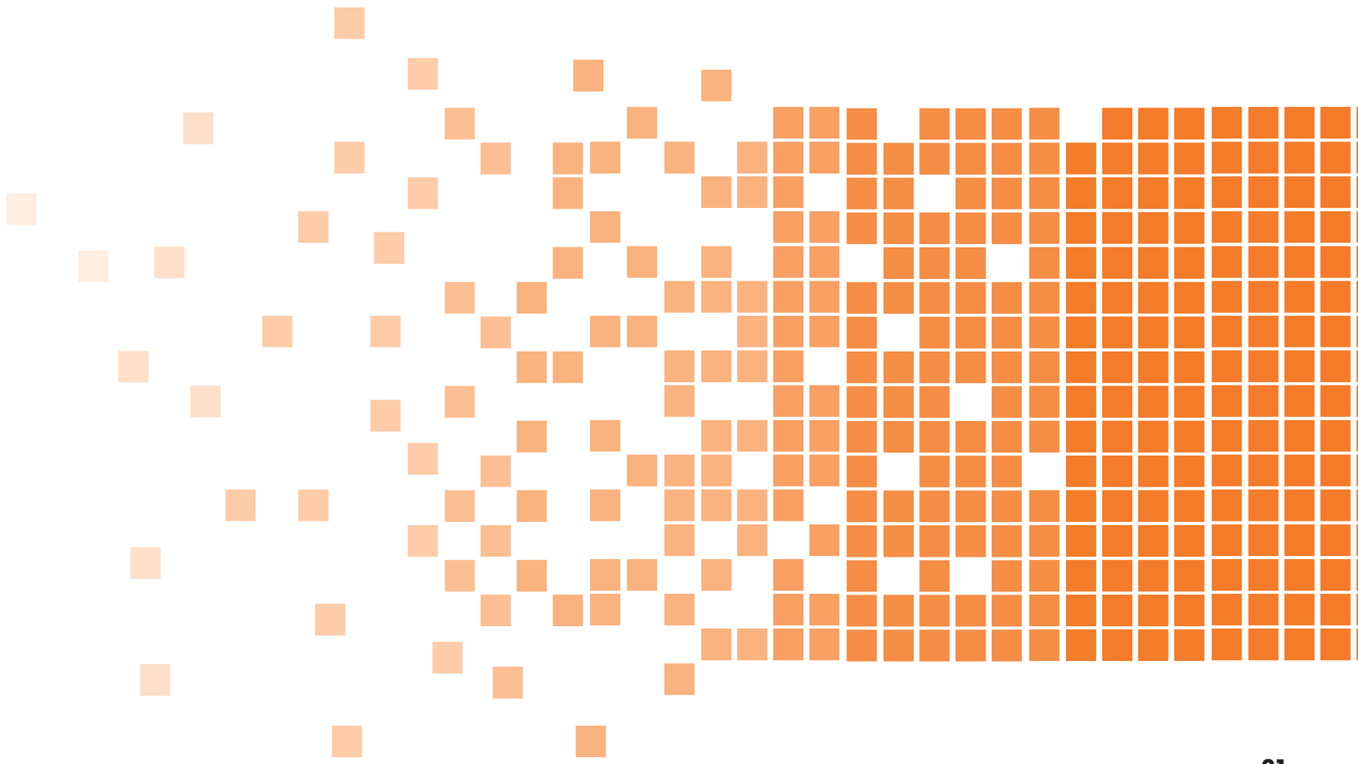
Also, Kansas is a tough place to grow vegetables, because of the climate—we hope our program can provide growers with strategies so that they will stick with farming despite this obstacle.

> **"It is Extension's obligation to apply the breadth and depth of the Land-grant university system to … help improve lives and communities.**
>
> —Dr. Brad Gaolach
> Professor
> Washington State University

ARBOGAST: Although Extension is increasingly being called upon to engage in tourism and outdoor recreation, it's an underserved component of Extension nationally. We think our project can ultimately expand Extension's currently limited capacity to support outdoor economies. We have just completed a survey of community and economic development program leaders at 1862, 1890, and 1994 LGUs, and there is considerable support, at least in theory, for CES to broaden its capacity in this area.

But we're still not seeing Extension making a broad investment in tourism and recreation-related positions; there appears to be interest but not investment.

COWAN: Our goal is to expose youth to agriculture and inspire them to consider it as a career. To achieve this, we had to engage not just the youth but also their parents, as summer schedules and transportation logistics were key factors in ensuring participation. •



KANSAS STATE UNIVERSITY

Expanding the "Growing Growers" Farm Apprenticeship Model Across Kansas and Beyond

TEAM LEAD

Cary Rivard, PhD
Associate Professor
Kansas State University

CATALYSTS

Rick Klemme, PhD
Chuck Ross, MA

LONG-TERM GOAL

To increase the quantity and quality of specialty crop production operations that contribute to food systems in Kansas

PROJECT CONTEXT

The agricultural workforce pipeline in Kansas, as in many other states, is not as full as it needs to be to meet growing demands for local produce and to fight food insecurity. The farm labor pool also isn't as diverse as it should be.

GOALS FOR NTAE GRANT PERIOD

- Expand the "Growing Growers" apprenticeship program into three regions of Kansas—southeast Kansas, Manhattan, and Wichita.
- Develop an "explore farming" track for people who are interested in food production but can't commit to a full- or part-time apprenticeship.
- Provide scholarships that give priority to Black, Indigenous, and People of Color participants.
- Work with stakeholders to facilitate localized and/or digital networking and learning opportunities.

NTAE New Technologies for AG Extension

UNIVERSITY OF MARYLAND

Cultivating Futures: 4-H Youth Internship Experience in Agriscience

TEAM LEADS

Kirsten Cowan, MS
4-H Educator
University of Maryland

Jenna Jones, MS
4-H Educator
University of Maryland

MENTOR

Molly Soeby, MPA
North Dakota State University

LONG-TERM GOAL

To create a competitive agricultural workforce by inspiring more teens to consider and choose careers in agriculture

PROJECT CONTEXT

Agriculture is the largest commercial industry in Maryland, and yet the workforce pipeline for this industry is not full enough—in part because there are not enough apprenticeship opportunities available for young people.

GOALS FOR NTAE GRANT PERIOD

- Pilot a three-week 4-H internship program for teens in Prince George's and Calvert counties in Maryland, focusing on leadership, career readiness, and agricultural technical skills.
- Pay participants a stipend for working in their chosen career fields during the internship.

Activating USDA Partnerships to Advance Recreation Economies

TEAM LEAD

Doug Arbogast, PhD
Extension Specialist
West Virginia University

CATALYSTS

Chuck Ross, MA
Fred Schlutt, PhD

LONG-TERM GOAL

To improve the quality of life for residents and visitors primarily in gateway communities with national forests and grasslands that can be a driver in an outdoor recreation and tourism economy

PROJECT CONTEXT

The economies in many rural areas in the United States struggle, as populations decrease and certain industries, such as coal mining, dwindle. Sustainable tourism and recreational activities that leverage an area's natural landmarks can create new opportunities for growth in these regions.

GOALS FOR NTAE GRANT PERIOD

- Through a needs assessment survey, identify other regions of the country where there are synergies among federal and state agencies (such as the National Forest Service and United States Department of Agriculture Rural Development) that can be nurtured to achieve outcomes similar to those realized by the Mon Forest Towns Partnership. That partnership has enhanced the economy and quality of life for residents and visitors in the Monongahela National Forest region in West Virginia.
- Conduct a series of webinars to introduce the keys to success for the Mon Forest Towns Partnership development process, and allow each agency to discuss their role in developing and coordinating a successful recreation economy partnership.
- Provide leadership to the National Extension Outdoor Recreation Working Group and Regional Rural Development Centers.

NTAE New Technologies for AG Extension

Dissemination of Baby Ginger Production Technology in Oklahoma

TEAM LEAD

Devi Kandel, PhD
Assistant Professor
Langston University

CATALYST

Dawn Mellion, MBA, PhD

LONG-TERM GOAL

To improve the productivity and profitability of small and minority farmers and farm stakeholders in Oklahoma

PROJECT CONTEXT

Growers from under-resourced groups—e.g. African Americans and Native Americans—often own less land and generate less farm-related wealth per person compared to state and national averages. Because of its many health benefits, ginger could be a highly lucrative crop for these farmers. But mature ginger typically requires a long, warm growing season that isn't possible in Oklahoma. Baby ginger, however, can be produced in 5 to 8 months in a protective structure (high tunnel).

GOAL FOR NTAE GRANT PERIOD

- To introduce baby ginger production technology to Oklahoma growers, enabling them to produce high-value baby ginger in a high tunnel system

WASHINGTON STATE UNIVERSITY

Building Collaborative Research and Extension Networks to Advance the Application of Science with Urban Communities

TEAM LEAD

Brad Gaoalch, PhD
Professor
Washington State University

CATALYSTS

Scott Reed, PhD
Fred Schlutt, PhD

LONG-TERM GOAL

To elevate Extension as a partner to national stakeholders by illustrating how the assets of the Land-grant university (LGU) system set it apart from other research universities, and by applying those assets to pressing urban issues

PROJECT CONTEXT

The LGU system was developed when the country was predominantly rural. Now, an overwhelming majority of the population lives in and around metropolitan centers. While rural and urban areas may share some challenges, they manifest differently; therefore, Extension's approach needs to change, as well.

GOAL FOR NTAE GRANT PERIOD

- Create a plan for developing the National Urban Research & Extension Center, whose mission will be to support research on urban-based challenges and connect this research to Extension programming nationwide. (NUREC will be modeled on Washington State University's Western Center for Metropolitan Extension & Research.)



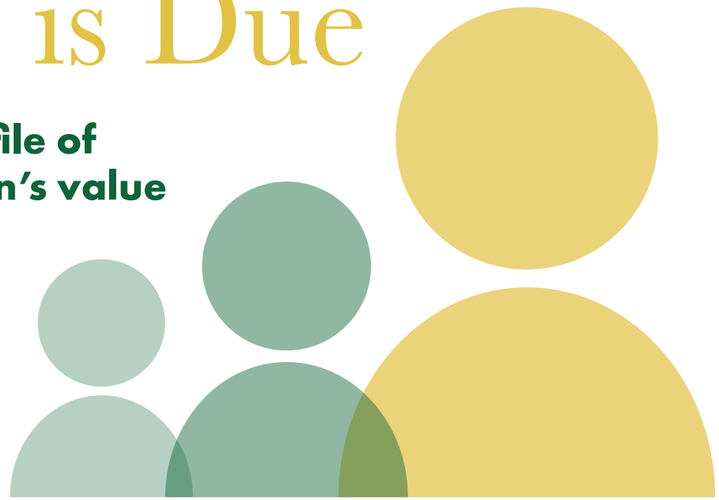
ExtensionBot

Leading National Artificial Intelligence in Partnership with Cooperative Extension

Our goal is to help the public connect with Cooperative Extension resources quickly and efficiently. The Extension Foundation has developed an AI chatbot, known as ExtensionBot, with funding from New Technologies for Ag Extension in partnership with Oklahoma State University. Through an AI Advisory Council of Cooperative Extension professionals, the Extension Foundation has partnered with several institutions, including Oklahoma State University, University of Florida, Oregon State University, University of Georgia, Louisiana State University, and University of Kentucky, to advance this AI effort to be used and branded locally.

Where *Credit* is Due

Projects raise the profile of and expand Extension's value



The Cooperative Extension System (CES) makes a powerful difference in this country.

We know this because Extension is constantly gathering quantitative and qualitative evidence of the outcomes of its programs—on farms and farmers, youth development, public health, the environment, local economies, and more. Extension educators and researchers observe, interview, survey, measure, and analyze. They publish papers, give presentations, develop databases, collect more feedback, crunch more numbers.

But just as CES itself is often referred to as a "best-kept secret," the combined effect of the work CES does is not as well-documented or widely known as it could be.

One reason appears to be that Extension is, by design, a decentralized system—with professionals working at hyperlocal levels in every state and U.S. territory. CES folks are most effective because they tailor their work to suit specific communities. And there are only a few, still-emerging methods and platforms for compiling standardized Extension program data on a large scale.

Also, the system just doesn't talk about its successes enough, says Matt Hanson, a project manager with University of Wisconsin-Madison Extension: "CES is often the humble player at the table, and we don't want to offend our partners by taking credit for the pivotal role we play. We defer."

Hanson leads one of the projects in the 2023–2024 New Technologies in Ag Extension (NTAE) grant year that have the potential not only to increase Extension's impact but to give a higher profile. (Watch the video on page 39 to hear these team leaders talk about the importance of promoting the value Extension creates.)

"CES is often the humble player at the table, and we don't want to offend our partners by taking credit for the pivotal role we play. We defer."

—Matt Hanson
Project Manager
University of Wisconsin-Madison Extension



Team members talk about the importance of spreading the word about the value Extension creates.

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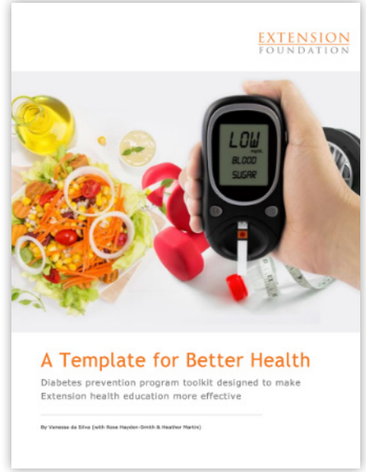
SOFT SKILLS & HARD DATA

Hanson's project (see page 42) approaches this opportunity from a professional development perspective. He and his team want to create a national Extension learning center that will improve educators' effectiveness. It would focus on best practices in program development and educational delivery, bringing key commonalities to educators' work that could lead to even more profound results.

The UW team expects that one of the major effects of their program will be increased job satisfaction among educators, which contributes to staff retention. Investing in retaining talented, committed educators is a key to ensuring that CES can deliver solid programming with measurable benefits.

Another project in the "demonstrating CES's value" category, from the University of Tennessee (UT), couldn't be more aptly named in the context of this discussion. "Measuring Extension Collective Impact," co-led by UT's Dr. Soghra Jarvandi, is about creating a standardized, national system that captures Extension programming's effects on the health of diverse audiences. (See page 43.) It's building on an NTAE-funded project from 2021-2022.

To do this, it will start by piloting a process to create a data management platform for the Centers for Disease Control (CDC) Diabetes Prevention Program (DPP). The pilot will compile data from just three states—Tennessee, Georgia, and Arizona. But Dr. Jarvandi says the hope is that



2021–2022 NATE-funded Diabetes Prevention Program publication (Click thumbnail to read.)

the platform can eventually be expanded to include DPP data from other states and eventually report on other health programs.

Jarvandi's team is starting with the DPP because this program has standardized implementation guidelines and evaluation measures set by the CDC. A common platform "would allow us to aggregate data to demonstrate Extension's impact nationally," Jarvandi says. "Currently, that impact gets lumped in with all CDC-recognized organizations delivering the [DPP] program." She adds that the new platform would benefit Extension by replacing available platforms that are costly, cumbersome, and not tailored to Extension's needs.

You get richer data when you ask 'how' and 'why' questions, because you can understand what causes movement in quantitative data.

—Karin Bump
Project mentor
Extension professional
(formerly of
Cornell University Extension)

NO MORE SECRETS

A typical challenge in communicating the impact that CES has on its communities has been that educators and county Extension agents lean toward different types of measurement. "Some counties love numbers," Hanson says. "Other counties and regions really love a great success story. For many years, I thought quantifiable numbers were more important, but I have come to appreciate the emerging practice of turning qualitative data into measurable content."

Dr. Karin Bump, a former Cornell University Extension professional who mentored Hansen's team, agrees: "You get richer data when you ask 'how' and 'why' questions, because you can understand what causes movement in quantitative data."

This how and why data provide critical direction to the thousands of Land-grant university and county-based Extension employees and over two million volunteers who bring science-based resources to the people and communities who need them most—and to grant programs such as NTAE and organizations like the Extension Foundation that help CES tell a story that deserves to be heard. •

CONNECT *with your colleagues.*

Connect Extension is a closed social media network for Cooperative Extension and other Land-grant university professionals, their community partners, and federal partners.

With **Connect Extension**, you can disseminate information and resources across the system and promote your Extension events to colleagues in other states and to the public.

Join **Connect Extension**

Log in to **Connect Extension**

Professional Development for Mid-Career Extension Educators

TEAM LEAD

Matt Hanson, MS
Project Manager
University of Wisconsin-Madison Extension

MENTOR

Karin Bump, PhD

LONG-TERM GOAL

To improve retention of and career satisfaction among Extension educators, by creating professional development opportunities that build program delivery skills and create strong collegial connections among the educators

PROJECT CONTEXT

Many Extension professional development sessions focus on leadership skills and/or are one-time workshops whose lessons may fade over time. The Cooperative Extension System could benefit from having more options for educators who prefer to hone their programming skills as well as options that give them multiple opportunities to network with and learn from each other, and to apply what they have learned.

GOALS FOR NTAE GRANT PERIOD

- Pilot a professional development program in the North Central Region that gives Extension educators an opportunity to learn new skills and put them into practice.
- Identify the most relevant professional development opportunities for staff development.
- Create a network of Extension specialists who provide eight-session workshops.
- Recruit Extension educators to be part of the first cohort.

NTAE New Technologies for AG Extension

Measuring Extension Collective Impact: A Pilot Program to Create a Data Management Platform

TEAM LEADS

Soghra Jarvandi, PhD
Associate Professor
University of Tennessee

Alison Berg, PhD
Associate Professor
University of Georgia

Vanessa da Silva, PhD
Extension Specialist
University of Arizona

CATALYST

Dawn Mellion, MBA, PhD

LONG-TERM GOAL

To provide a model for developing an online platform that collects and evaluates data from Extension lifestyle change programs, in order to better demonstrate Extension's impact on public health

PROJECT CONTEXT

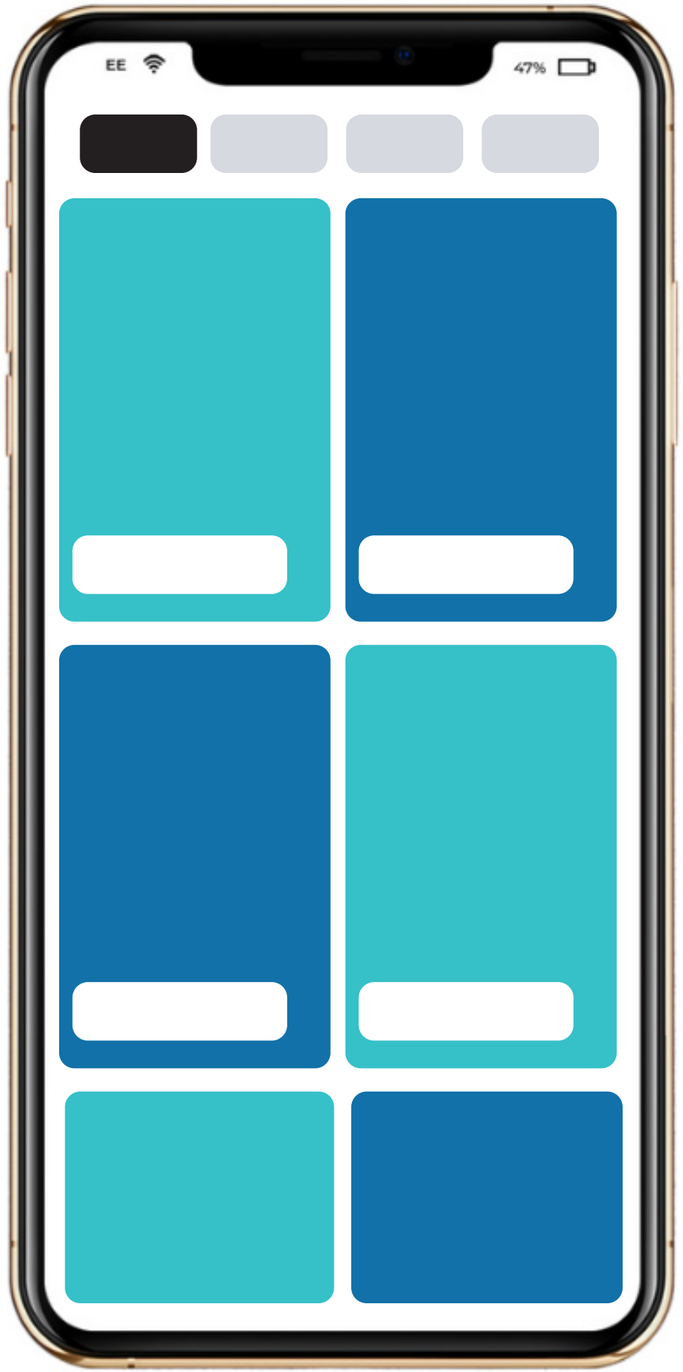
Extension programs reach a large number of people, but there is limited data on the collective impact of the programs nationally—potentially because states do not generally use identical instruments for data collection and in multi-state collaborations, the emphasis is more on the program content than common measures and health impact.

GOALS FOR NTAE GRANT PERIOD

- Create an online platform for collecting data for the Centers for Disease Control Diabetes Prevention Program (DPP).
- Review common measures for the DPP and create an online data collection instrument that would work for different states and in different counties.
- Create an interactive online dashboard showing major program metrics.

MEET THEM WHERE THEY ARE

Two ed-tech projects hang out in young learners' spaces and speak their languages

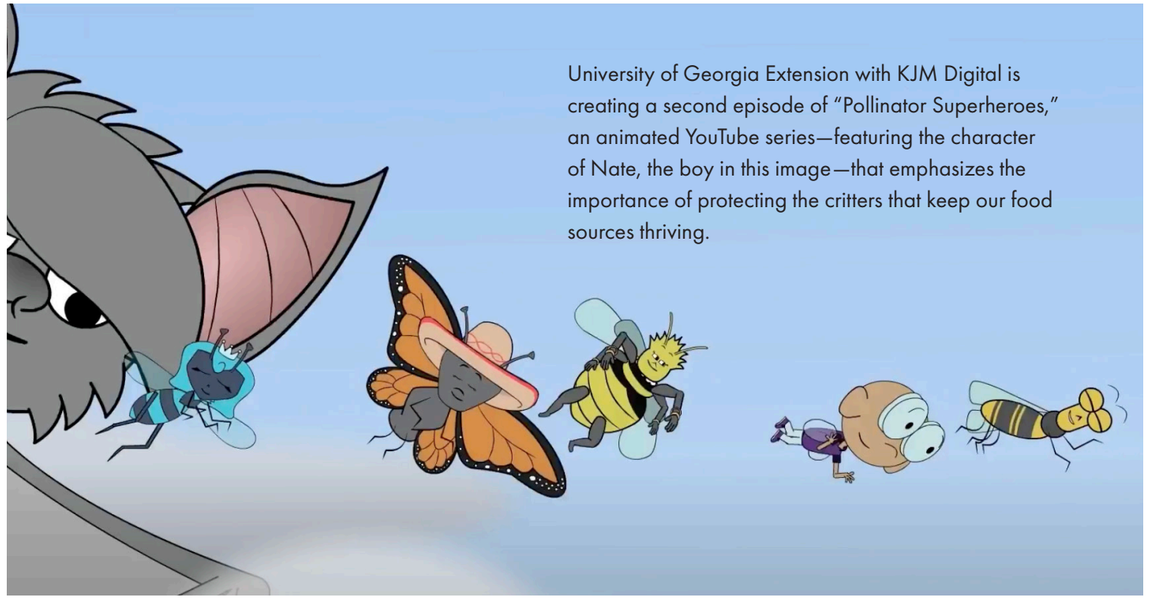


Animation and games are common in classrooms and educational programs—and for good reason. Animation can turn complex, abstract concepts into easily digestible, visually compelling content. In a similar way, games can make learning easier because learners get clear feedback and positive rewards as they explore topics and solve problems, creating positive emotional connections to the game and its lessons.

These tools also can increase accessibility and scalability, allowing educators to reach a wider audience across geographical barriers and overcome limitations of in-person education, which is particularly challenging in Extension work.

In the 2023–2024 cohort of New Technologies in Ag Extension (NTAE) grant recipients, two teams are using these technologies to engage youth and young adults in different but equally critical issues. University of Georgia Extension with KJM Digital is creating a second episode of "Pollinator Superheroes," an animated series that empowers youth to protect pollinators while teaching them about the Dakota language and culture. (See page 49.) New Mexico State University's Learning Games Lab (NMSU LGL) is developing an online version of its game "Night of the Living Debt," which empowers youth and young adults to take control of their financial future. (See page 48.)

These projects exemplify the power of technology to transform Extension education and outreach, enabling the Cooperative Extension System to reach new and larger audiences. They also are prime examples of how to build sustainable educational programs because not only do they meet youth in digital spaces, where they spend a large portion of their time, they involve learners in the program design itself.



University of Georgia Extension with KJM Digital is creating a second episode of "Pollinator Superheroes," an animated YouTube series—featuring the character of Nate, the boy in this image—that emphasizes the importance of protecting the critters that keep our food sources thriving.

ORIGIN STORIES

The "Pollinator Superheroes" project began in late 2019 with a partnership between the National Pesticide Safety Education Center (NPSEC) and Prairie View A&M University (PVAMU) to create a "Prep for Pollinators Campaign" for children and adults. The project expanded in 2020 with seasonal pollinator guides for the PVAMU and Pawnee Nation College (PNC) communities.

In 2021 and 2022, NPSEC—collaborating with Nebraska Indian Community College, PNC, PVAMU, and the St. Louis Zoo—secured an NTAE grant to create episode one of "Pollinator Superheroes: The Beginning." The episode is a 20-minute story about Nate, a fourth grader who enlists the help of pollinators to save his neighborhood from a misguided developer. Through the adventures of their animated friends, youth learn the crucial role they play in protecting pollinators while simultaneously being introduced to the Dakota language.

"Animation was a great way to get into this audience," says team leader Kara Maddox, of KJM Digital. "Kids are already used to going to a digital space for this type of content. I wanted to meet them where they are."

"Night of the Living Debt" is NMSU LGL's third online educational game funded by NTAE. Like its food safety education cousin "Theme Park Kitchen"—a 2022–2023 NTAE-funded project—"Living Debt" started out as a tablet-based game but is being relaunched as a web-based program. It immerses players in a post-apocalyptic world, populated by zombies, where they face perils involving credit, debt, and choices about housing, education, and transportation.

The game is racking up awards and evidence that it works, says team lead Dr. Matheus Cezarotto. A study done on the first version of the game was promising, said Cezarotto. "Pre- and post-surveys are showing us that youth have high levels of engagement, knowledge gain, and intent to change behaviors when it comes to financial literacy issues."

INCLUSIVE DESIGN

Ensuring that the products they produce are culturally relevant to and resonate with the demographic and age groups they are designed to reach is a primary goal of



New Mexico State's Learning Games Lab asks intended players of its games to give the games a test run, taking the players' feedback into consideration as they develop the products.

Maddox and Cezarotto—both of whom involve youth as co-creators in their work.

Cezarotto and the NMSU team use a framework developed by members of the team (Dr. Barbara Chamberlin, Dr. Pamela Martinez, and Cezarotto) to ensure inclusive design. Their process takes into account differences in learning styles, accessibility, and representation.

Cezarotto describes it like this: "Designing for inclusion involves co-creating with our intended audiences and user testing. We conduct needs assessments and research to measure impact. Lots of people see and use our games before they go out. We seek out those with different backgrounds and perspectives, which is essential for creating culturally relevant and accessible games." He adds that research is the base of everything, before they even design a game. The team collaborates with experts on the game's content—and they conduct user testing throughout development on character design, interface, and gameplay. They also conduct post-use research to gauge the game's impact, asking such questions as "Are you getting knowledge?" and "Is it changing your behavior?"



Team members describe how they are using technology to create educational experiences for young learners.

youtu.be/mRUYk1oZtYU?si=FBV-XLMiuCMZT5v9

The team's collaborative approach to design is detailed in a publication they wrote for a previous NTAE grant project, "Collaborative Design in Extension: Using a Modified Game Jam to Explore Game-Based Learning." That project, in partnership with the University of Connecticut, resulted in a prototype for an interactive mobile app to help consumers understand food labels.

Maddox and her team also include youth in their process. "We host pilot viewings for the intended audience and gather feedback," she says. "Youth have also been involved in script reading, helped us with character development, and provided feedback on character animations and episode length." She says the team also has created a video viewer guide so that the audience can answer questions as they watch, about how easy the story is to follow and whether it prompted new thinking about pollinators.

"Design is very powerful," Cezarotto says "It can include (or exclude) people. You need to be intentional in considering diverse audiences and backgrounds, and the different needs of end users. If they are represented by the tool that you've made, they will feel like, 'I see myself there.'"

WORTH THE WORK

Maddox and Cezarotto say that bringing technology developers together with visual and storytelling artists and educational experts isn't always an easy process. But both teams have found ways to blend their talents and visions to create content that is appealing to their audiences.

Cezarotto says, "It takes a lot of different people to create a game—and each person—from artist to user tester—contributes something special. When everyone on the team is committed to the educational goals, there is so much possibility." Maddox agrees, and when she thinks of how her two-year-old son became so quickly engaged after watching episode one of "Superheroes," she knows all of the time and energy are worth it. "I brought him up to the flowers in our yard and watched the bees working, and I had this elevated conversation about pollinators with a two-year-old!" •

NM STATE Learning Games Lab

learninggameslab.org

A New "Night of the Living Debt Game": Scaling Access Nationally to Financial Literacy Learning

TEAM LEAD

Matheus Cezarotto, PhD
Assistant Professor and Extension Specialist-Educational Technology
New Mexico State University

CATALYSTS

Dawn Mellion, MBA, PhD
Chuck Ross, MA

PARTNERS

University of Idaho Extension
CoBANK
Northwest Youth Financial Education

LONG-TERM GOAL

To improve financial literacy among young people

PROJECT CONTEXT

Financial literacy is a crucial life skill, yet many young adults graduate from high school without the knowledge they need to navigate the complexities of personal finance. This can have serious consequences, affecting their ability to secure loans for future goals like buying a car or house as well as their credit score.

GOALS FOR NTAE GRANT PERIOD

- Develop an expanded version of the "Night of the Living Debt" game for web-enabled devices, including phones.
- Update game—including review of diversity, equity, inclusion, and accessibility framework to ensure the game meets standards for inclusive design and character representation and culturally informed learning practices.
- Add accessibility features that support users' visual, hearing, motor, and cognitive needs.
- Develop teaching guides to support educators.
- Develop a promotion plan that prioritizes rural communities.

UNIVERSITY OF GEORGIA

Using Animated Pollinator Video to Educate Underserved Populations: "Pollinator Superheroes" Episode 2

TEAM LEAD

Kara Maddox, MA, M.Ed
CEO, KJM Digital

CATALYSTS

Rick Klemme, PhD
Fred Schlutt, PhD

PARTNERS

Cherokee of Georgia Tribal Council
Georgia Council on American Indian Concerns
Nebraska Indian Community College
Prairie View A&M University
St. Louis Zoo
University of Georgia
National Pesticide Safety Education Program

LONG-TERM GOAL

To inspire fourth graders in native and non-native communities to protect pollinators while becoming acquainted with the Dakota language and culture

PROJECT CONTEXT

Pollinators like bees, bats, and butterflies are vital for human health because they transfer pollen among plants, allowing fruits, vegetables, and nuts to grow and reproduce. Educating youth about the importance of pollinators empowers young people to become stewards of pollinators.

GOALS FOR NTAE GRANT PERIOD

- Create a second episode of "Pollinator Superheroes," using technology advancements—such as Adobe's Character Animator. This technology allows animations to be delivered in real time through Body Tracker, which makes animations smoother and more fluid.
- Provide native seed packets to audiences so that they can plant for pollinators in their communities.
- Develop a video viewer guide and assessment tool to gauge the effectiveness of episode two, as well as measure the results of planting the native seed packets.

Climate CARE

Approaching climate change education with open minds & empathy



Team members are energized by the chance to help spark new thinking about climate change.

youtu.be/a7txUFTF9O0?si=E0f84lzc_7pQ_1l5

Protecting our climate is an issue demanding immediate action. As a trusted messenger with deep community roots, the Cooperative Extension System (CES) is well-suited to help communities take such action. Extension excels at transforming complex scientific knowledge into practical steps, and with a broad reach across rural and urban areas, CES can help people and organizations strengthen resilience, embrace sustainable practices, and lessen the effects of climate change.

Four projects funded by the 2023–2024 New Technologies in Ag Extension (NTAE) program are at the forefront of responding to climate change. Their programs show the diversity of approaches to building climate resilience and sustainability.

A team from the University of Arizona is conducting a scoping review to identify resources, curricula, and programs to teach young children, their parents, and caregivers about climate change. The team aims to create a searchable program directory that allows users to filter results based on program length, target audience, and evidence of effectiveness. (See page 57.)

A team from the University of Rhode Island built a food recovery program that addresses issues of food waste, food insecurity, climate change, and food justice through consumer behavior change. They hope to make their program available as a template for other Extension organizations across the nation. (See page 56.)

An early career Extension specialist from South Dakota State University is developing climate-resilient agriculture programming to help producers in all sectors identify and mitigate climate risks and implement practices to improve their operations' adaptability and resilience. (See page 58.)

A multistate Extension team—the North Central Climate Collaborative—provides professional development and networking opportunities for Extension professionals and others who want to learn to deliver programs about the changing climate, agriculture adaptation, and water quality and conservation. Led by South Dakota State University's Extension state climatologist, the team organized a conference to connect research on climate-smart practices with those who can put it into action, helping producers adapt to and mitigate climate change. (See page 59.)



The North Central Climate Collaborative, a multistate Extension team that provides professional development and networking opportunities, held a conference in late summer 2024 for Extension professionals who want to learn about and deliver educational programming on climate change and water quality in agriculture. Project lead Laura Edwards is pictured here, in the center.

SURVEY SAYS

Attendees at the summer 2024 North Central Climate Collaborative conference were asked about their intentions to use what they learned.

90% indicated they would use the information from the conference for professional development.

74% indicated they'd use the information for educational programming.

Other responses indicated that the information would be used for **community planning, farm management,** and **regulation and policy discussions.**

IN THIS Q&A, members of four NTAE teams talk about the role that Extension and their programs can play in climate change education. We'll hear from the following:



Daniel McDonald
Extension Specialist, Professor/Director Take Charge America Institute University of Arizona



Katherine Speirs
Associate State Specialist & Associate Professor University of Arizona



Amanda Missimer
Clinical Assistant Professor University of Rhode Island



Vanessa Venturini
State Program Leader, Master Gardener Program & Food Recovery for Rhode Island University of Rhode Island



Jimmy Doyle
Diversified Ag Field Specialist South Dakota State University



Laura Edwards
Extension State Climatologist South Dakota State University

Talk about how your project started and what the early work has been or will be.

McDonald: It started for me last summer at our annual Extension conference, when we had a facilitated discussion with family, consumer, and health science professionals about climate change and how it is impacting their programming and the clientele they work with. I got interested in how we can provide resources to better help our colleagues in this area.

Speirs: Dan McDonald and I are partnering on this project. Once we've identified the programs that are out there, we'll do some work to describe them. What ages are they appropriate for? How long do they last? Where are they designed to be taught? We'll also look to see if there's evaluation and evidence for their effectiveness. We're very excited—we've already started to connect with colleagues in Arizona and beyond.

Doyle: I hope to develop a comprehensive risk evaluation and adaptation tool to help producers at all scales adapt to and mitigate the impacts of climate change. Producers will move through a series of phases that assess the current state of their operations and how they are performing in relation to several climate risk metrics, with a goal of creating a customized education plan recommending actions and outcomes. This year we're planning, trying to get our feet under us, getting feedback from producers, our Extension colleagues, and external partners. We're making a lot of progress and hope to have a pilot program ready in early 2025.

Edwards: Our funded project with the Extension Foundation NTAE grant is to hold a North Central Climate and Agriculture Conference. I am on the leadership team of the North Central Climate Collaborative (NC3), which received the grant, and this conference opportunity ties in well with our goals of educating, empowering, and enabling our region's Extension professionals with the hopes that they will go on to pursue and lead climate programming in their local areas (counties, regions, or states.

Missimer: I developed the "Food Recovery for Rhode Island" program, a train-the-trainer model that draws in key concepts from the Master Gardener and Expanded Food and Nutrition Education programs. We've offered the program four times, training a diverse group of participants, including undergraduates, retirees, and the state food strategist. Participants complete a 40-hour internship with our community partners in food recovery efforts across the state. Any state that wants to use this program will have the ability to use our surveys, which means we could aggregate data and see what impacts we're having on food recovery nationwide.

Venturini: The internship has allowed participants to contribute to collective change by volunteering with organizations that are increasing access to food while reducing food waste. In a world where food insecurity and climate change are major concerns, this program can address both. And really, it works in any setting.

> **We need training on how to initiate behavior and thought change when it comes to climate—without shaming people.**
>
> —Amanda Missimer
> Clinical Assistant Professor
> University of Rhode Island

Why are CES educators well-suited to work in the climate space?

Doyle: One strength is that Extension is centrally located in an ecosystem of producers, universities, agencies, and nongovernmental organizations. We serve an important role as a kind of integrator, working on the ground among different interests. We're also perceived as being fairly unbiased.

Speirs: We really reach people throughout their entire lifespan. We're a trusted entity in the communities where we work. We're bringing them unbiased scientific information.

McDonald: I'm not sure that Extension professionals see themselves as being well-positioned to do this work. A climate change needs assessment of some of our family and consumer science colleagues was conducted here at the University of Arizona: 82% of those who responded said they don't do climate change work. I would contend they probably do, but they may not be thinking of it in those terms. So I think part of being well-positioned to do this work within Extension is to really help our colleagues understand they are better positioned than perhaps they thought they were.

Missimer: What's great is that Extension has so many people who view climate through different lenses. I view climate through the nutrition lens. Some of my colleagues think about it through the lens of planting and growing food. And others consider climate through the lenses of environmental or economic impacts. So I can get really nice contributions through these different Extension lenses—the food system from A to Z, and every piece in between.

Edwards: Social science research has shown that in the North Central region, Extension is among the more trusted organizations of agriculture advisors. We also have staff spread out in the communities, either in regional or county offices. We are experts in bridging research to decisions and management or applications on the ground.

What resources or areas of training could help educators become stronger in this area?

Missimer: We need resources to improve education specifically about climate. We need training on how to initiate behavior and thought change when it comes to climate—without shaming people. This can be a controversial topic, and we need to know how to manage these discussions. We're a science-driven organization; having resources and training to communicate information in a neutral way is important.

Edwards: Our model could be adapted in other regions. South Dakota State university has a longstanding webinar series that started in 2015, and all of these are archived on our website and on YouTube. We have also offered mini-grants and helped with publications for individuals or states to start up or augment their own climate programs.

Why are you drawn to a program that focuses on mitigating the impacts of climate change?

Venturini: Households are the biggest contributors of wasted food. I love that this project activates people to help their neighbors, family, and friends do better. We've really built a culture of collaboration in Rhode Island and can't wait to see the impact it'll have in other parts of the country.

Edwards: Tackling the problems in more than one way helps us to reach a broader audience to take into account the 30 percent or so of farmers who are skeptical of climate change in our region. Many of the practices that we advocate are beneficial in other ways, such as increasing productivity, becoming more resilient to weather and climate extremes, increasing economic return to the farm or ranch, and conserving natural resources for the long run.

Missimer: I'm a bench scientist by training. And now I'm in the community space. Food insecurity increased during the pandemic. Not only are we hurting our environment, but people are hungry, even though we're producing enough food. Why are people not able to get it? Food recovery work is a personal and professional mission for me.

Doyle: There are strategies around communicating with people who are resistant to discussions about climate change. We talk about weather versus climate, adaptation versus mitigation, discussing how to deal with volatility in weather. We have to stay away from blaming.

Speirs: In Arizona, you can't ignore the impacts of climate change. Through Extension work in our communities, we see how climate change is impacting people. I want to provide resources to help people think about what they can do to adapt to and mitigate the impacts of climate change in their communities.

Doyle: I live and work in rural South Dakota. I love the landscape and the lifestyle. I want to make sure we can keep these working landscapes functional and ecologically and economically viable. I think that goes along with what others have said: It's about finding the things that you can have an effect on in your local area and making change there.

McDonald: My area is financial education, which is connected with nutrition and other consumer behaviors. I love the idea of reducing food waste in the household, of being a conscientious consumer. I think that's important for people to think about, regardless of climate change. We are agents of change. Given the proper motivation, we can make change in our behaviors and in our communities with the right motivation, tools, and strategies. •

THE UNIVERSITY OF RHODE ISLAND

Food Recovery for Rhode Island Expansion

TEAM LEADS

Amanda Missimer, PhD, RD, LDN
Clinical Assistant Professor
University of Rhode Island

Vanessa Venturini, MESM
State Program Leader Master Gardener Program & Food Recovery for Rhode Island
University of Rhode Island

CATALYSTS

Rick Klemme, PhD
Dyremple Marsh, PhD

LONG-TERM GOAL

To prevent food waste and diversion, reduce greenhouse gas emissions, and enhance food security

PROJECT CONTEXT

Food waste, food insecurity, climate change, and food justice are interconnected challenges that require consumer behavior change and community development.

GOALS FOR NTAE GRANT PERIOD

- Empower communities through education, dialogue, and volunteerism by building on the success of the Food Recovery for Rhode Island program.
- Document, publish, and present a ready-to-duplicate-and-modify consumer education and community development Extension program that any interested state can implement.
- Create a universal evaluation tool to communicate impact nationally.
- Initiate national collaboration among Extension professionals engaged in the food recovery and volunteerism fields.

THE UNIVERSITY OF ARIZONA

Conducting a Systematic Scoping Review to Identify Climate Change Programming for Young Children

TEAM LEADS

Daniel McDonald, PhD
Extension Specialist, Professor/ Director of Take Charge America Institute
University of Arizona

Katherine E. Speirs, PhD
Associate State Specialist & Associate Professor
University of Arizona

MENTOR

Trudy Rice, MS
Kansas State University

LONG-TERM GOAL

To empower Extension professionals with the resources to address climate change through impactful programming for future generations

PROJECT CONTEXT

Long-term climate action requires educating young children—especially in under-resourced communities—shaping their behavior and preparing them to champion solutions as they grow. Educating children also influences parents, creating a ripple effect of awareness within families and communities.

GOALS FOR NTAE GRANT PERIOD

- Conduct a systematic scoping review of existing climate change education programs for young children, their families, and caregivers—including programming developed and/or delivered by Extension educators and non-Extension resources.
- Prepare a peer-reviewed publication to reach a wider audience of Extension faculty and staff, in Arizona and beyond.

South Dakota State University

NTAE New Technologies for AG Extension

Climate Resilient Agriculture in South Dakota—Planning for an Extension Climate Adaptation Program

TEAM LEAD

James Doyle, MS
Diversified Ag Field Specialist
South Dakota State University

MENTOR

Karin Bump, PhD

LONG-TERM GOAL

To help producers identify climate risks, implement proactive practices, and build adaptable operations for a sustainable future

PROJECT CONTEXT

South Dakota's diverse agricultural landscape, from intensive row crops to extensive grazing, faces a spectrum of climate threats. There is no one-size-fits-all approach for all producers. It is critical for producers to be involved in developing individualized plans for climate-smart practices.

GOALS FOR NTAE GRANT PERIOD

- Analyze existing climate programs in other states, and collaborate with South Dakota partners to identify key climate issues and relevant resources.
- Identify Extension staff for program development and assess existing educational offerings (internal and external) to guide curriculum creation.
- Conduct outreach sessions to gather producer needs and preferences for program structure.
- Develop a pilot program and identify potential funding sources for its implementation.

South Dakota State University

NTAE New Technologies for AG Extension

North Central Climate Collaborative: Focus on Agriculture Conference

TEAM LEAD

Laura Edwards, MS
Extension State Climatologist
South Dakota State University

CATALYSTS

Rick Klemme, PhD
Chuck Ross, MA

LONG-TERM GOAL

To help producers adapt to and mitigate climate change, ensuring long-term sustainability in farming

PROJECT CONTEXT

Collaboration among diverse producers and agricultural advisors interested in climate, agriculture, and water is essential to addressing climate change in the agricultural sector. It is critical to connect research on climate-smart practices with those who can put it into action.

GOALS FOR NTAE GRANT PERIOD

- Hold an in-person regional and multi-state conference for Extension professionals and other technical service providers, producers, and landowners in the North Central region who are interested in climate, agriculture, and water.
- Increase connections among Extension and outreach professionals in the North Central region.
- Raise awareness of climate and water issues and solutions in the North Central region's agriculture sector.

Four projects aim to make agricultural technology adoption easier and less expensive

FARMING'S FUTURE



Precision technology in agriculture is not new. Over the last several decades, we've seen the development of sensors that determine soil nutrient and moisture levels, smart weeders that cut the thistle but spare the corn, and self-driving tractor prototypes, to name a few.

But U.S. farmers have sometimes been slow to incorporate emerging technologies, even though in the long run these tools can increase profits and lower overhead expenses. According to a recent report from the General Accounting Office, just one in four farms uses precision tech, with the most adopters in northern states such as the Dakotas and Nebraska and the fewest in southern states such as Texas, South Carolina, and Georgia. The biggest barriers are usually cost (agricultural tech often requires up-front capital that growers may not have), lack of technical expertise, and resistance to change.

With these benefits and barriers in mind, four of the 2023–2024 New Technologies in Ag Extension (NTAE) grant projects are focused on increasing the use of precision technology on farms, from small family operations to large ornamental nurseries. The teams are using a variety of strategies, including providing access to valuable pest outbreak data, developing an artificial intelligence (AI) tool for farm budgets, creating a drone operation training handbook, and demonstrating how drones can protect human, crop, and environmental health. The results of these projects will be low-cost or free, accessible resources in a space that can often feel out of reach for many farmers. This work also demonstrates Cooperative Extension's vital role in supporting the development and adoption of technology in the agricultural sector, empowering farmers, and contributing to a more sustainable and productive food system.

DATA-DRIVEN DECISIONS

Farmers need more than just equipment, seeds, feed, and livestock to run their operations. They need data—about everything from market prices to weather. Two of this year's project teams are expanding existing data tools to put critical farm management information at growers' fingertips.

A team from Oregon State University is expanding something called the Oregon Pest Monitoring Network (OPMN). (See page 65.) Launched in 2021, the OPMN is a geographic information system-based digital dashboard that provides real-time data about agricultural pests. Regional monitoring and reporting help farmers make informed decisions based on pest activity. If pesticides are needed, they can be applied in a more targeted way—which reduces costs and is better for the environment and worker health. The Oregon team is making the OPMN more robust by adding commodities, and new technology features—including notifications, historical trends, data interpretation, and phenological forecasting.

The team also is training farmers to use the dashboard. "Empowering farmers with technology means more than just providing tools," says team co-lead Jessica Green, senior faculty research assistant at Oregon State Extension. "It's about equipping them with the skills to use those tools effectively, so we're focusing on providing training in a variety of formats and making the tool user-friendly."

A team from Oklahoma State University is leveraging data in a different way to help farmers make more informed decisions, developing an AI financial tool to help them with enterprise budgeting. (See page 64.) This BudgetBot will use plain English interactions and includes important features such as connection to commodity price and production data.

"Budgeting can be overwhelming for some farmers—especially if they're too small to afford an accountant or a business manager," says Karly Black, an Extension professional from University of Nebraska-Lincoln who is mentoring the Oklahoma team. "The bot will allow them to ask a few questions without needing to understand the nitty gritty of enterprise budgeting, and they'll still get reliable numbers."

Project leaders are eager to help farmers and other agricultural-sector workers embrace the power of emerging technologies.

youtu.be/pZcLDuVACRo?si=gWK4C_4J_puTmsZk



DRONE-DRIVEN POWER

The other two teams in this group, from the University of Maryland and the University of Nebraska-Lincoln, want to make it easier and more attractive for growers to use drones.

The Nebraska team is creating a free handbook that provides farmers with best practices for using drones for aerial crop scouting, which provides a more holistic view of a field and can do so faster than surveying an area on foot or a four-wheeler. This not only can give farmers a more accurate image of where pests and other problems might be—which allows more targeted agrochemical use—but it spares growers the expense of hiring a pilot. (See page 67.)

"Nebraskans, in particular, are about doing it themselves," says team lead Dr. Dirk Charlson. "I'm hearing from producers, 'I don't want to pay someone to do this, so if this lets me do it myself, I'm in—as long as someone is here to teach me.'"

In the other drone project, the Maryland team is testing and gathering data on the use of unpiloted aerial vehicles for precision horticulture in ornamental nurseries. They intend to demonstrate how drone imaging can monitor nursery plant stress caused by nutrient and water deficiencies. They also are researching the benefits of using drones for agrochemical applications. (See page 66.)

Team leader Dr. Andrew Ristvey says the main advantage is that spraying chemicals via an unmanned aerial vehicle can reduce the volume of pesticide and apply the material more precisely. "Less contact time with pesticides improves worker safety," he says. "Our trials also indicate it saves time, which reduces labor costs. We viewed a video of a comparative study that used a drone to apply fungicide versus a tractor spray rig. The amount of material distributed by the spray rig was much greater than what the drone applied. It was visually noticeable."

OVERCOMING OBJECTIONS

It's reductionist to say that farmers don't trust technology—their perceptions are more nuanced than that. But it's likely a fair statement that many farmers could use reassurance and opportunities to experiment with these tools before they take the plunge.

"There are different levels of acceptance of technology," says Green, from the Oregon State pest dashboard team.

RURAL AMERICA MATTERS

The New Technologies in Ag Extension grant program has funded several projects in recent years that address issues faced by agricultural and rural audiences.

Clearinghouse for Cleaner Water
Digital Dashboards (farmer mental health)
Making Remote Work
Google Earth Pro Pilot
Water Saver

"A big part of Extension's work is to demonstrate the usefulness, the utility, and how it can be easy. Technology doesn't have to be scary. We're looking at growers' bottom lines and ways to make their lives easier."

The BudgetBot team, for example, recognizes that the perception of AI may not always be positive, but they believe that the ease of use and value the tool brings will encourage farmers to adopt it. Once farmers realize that the tool understands everyday language, they may not feel as intimidated by it, says Dr. Jeffrey Vitale, associate professor of agricultural economics at Oklahoma State University (OSU) and the project team leader. "Our natural language chatbot interface will greatly simplify their interactions," he says. "Extension should continue to identify approaches that enable quicker and easier access to the wealth of information produced by Land-grant universities."

David Warren, an information technology expert at the Extension Foundation and OSU and a member of the BudgetBot development team, understands that farmers may be dubious about AI but sees Extension as the perfect entity to ease that doubt. "Producers may be more inclined to work with an AI solution delivered by their trusted local Extension service," he says.

And then there's just humans' general resistance to change. University of Maryland's Ristvey acknowledges, for instance, that drones are still relatively new to the nursery industry. "This is something growers may not have used before," he says, and so they may prefer to stick with more conventional methods.

Green points out that certain technology use can also raise the issue of invasion of privacy: "Geospatial data identifies specifically where the pests are, which could make some growers feel too exposed. Maintaining geographic privacy is critical to helping farmers feel comfortable using the technology."

Another objection or barrier to overcome is cost. Dr. Ebba Peterson, an integrated pest management educator on the Oregon State University team, notes that some of the precision agriculture technologies, while very useful, can be expensive, particularly for smaller and mid-level producers. "I think that cost barriers give the impression that technology is inaccessible to a large part of our audience. One of the things that excites us about the dashboard is that it is completely free to anyone with an internet connection."

A PERFECT BLEND

Technology in farming can't replace human experience, judgment, and skill but it can enhance those things and make the work of managing agricultural enterprises easier.

These four NTAE projects are in a perfect position to find a middle ground between the traditional methods and emerging tools, a space where more farmers might feel comfortable moving more boldly into farming's future. •

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OKLAHOMA STATE UNIVERSITY

BudgetBot: Applying Artificial Intelligence and Natural Language Processing Applications to Agricultural Extension

LONG-TERM GOAL

To make using artificial intelligence for farm budgeting and data-driven decisions easier for and more accessible to producers

PROJECT CONTEXT

Farm and ranch operations increasingly rely on automation to prescribe and perform tasks through remote sensing imagery, "big data," and AI-based machine learning algorithms, so it's critical to bridge digital divides that exist for some farmers and provide valuable farm management tools that farmers are willing and able to use.

GOALS FOR NTAE GRANT PERIOD

- Create a working farm budget chatbot—by enhancing the math capabilities of ExtensionBot—that can answer questions and use mathematical reasoning in response to queries from agricultural producers.
- Use existing farm budget spreadsheets from various Extension services, such as Oklahoma State and New Mexico State, to increase the accessibility and utility of existing Land-grant publications and enterprise budget databases.

TEAM LEAD

Jeffrey Vitale, PhD
Associate Professor
Oklahoma State University

David Warren, MBA
Artificial Intelligence Program Leader
Extension Foundation/
Oklahoma State University

MENTOR

Karly Black, MS
University of Nebraska-Lincoln

Oregon State University

Improving and Expanding the Reach of the Oregon Pest Monitoring Network: A Real-Time Interactive Data Dashboard

LONG-TERM GOAL

To help farms reduce crop loss and exposure to pesticides by making data-informed decisions about pest management in the Pacific Northwest

PROJECT CONTEXT

According to USDA-NIFA and the Food and Agriculture Organization of the United Nations, up to 40% of global crop production is lost to pests every year: "Plant diseases cost the global economy around $220 billion, and invasive insects around $70 billion. Weeds are another significant biotic constraint on global food production."

GOALS FOR NTAE GRANT PERIOD

- Expand the Oregon Pest Monitoring Network (OPMN), a centralized digital dashboard offering real-time pest reports, mapped data visualizations, and a standardized reporting format—adding new crops and integrating new features such as email alerts, historical trends, an improved "submit-a-pest" function, interpretive posts highlighting risks and treatment options for various pests of concern, and predictive phenology models from USpest.org.
- Recruit additional Extension professionals, commodity groups, and growers to submit detections to the OPMN.
- Train Extension professionals and other stakeholders to access and interpret the dashboard.

TEAM LEADS

Jessica Green, MS
Senior Research Assistant
Oregon State University

Seth Dorman, PhD
Research Entomologist
USDA-ARS Forage Seed
and Cereal Research Unit

Ebba Peterson, PhD
Integrated Pest Management Educator
Oregon State University

CATALYSTS

Rick Klemme, PhD
Scott Reed, PhD

UNIVERSITY OF MARYLAND

Precision Horticulture Using Unpiloted Aerial Vehicles as Part of an Integrated Plant Management Approach for Ornamental Nurseries

TEAM LEAD

Andrew Ristvey, PhD
Principal Agent and Extension Specialist
University of Maryland

CATALYSTS

Dyremple Marsh, PhD
Scott Reed, PhD

LONG-TERM GOAL

To reduce pesticide use on and increase efficiency and profitability for plant nurseries

PROJECT CONTEXT

Other agricultural sectors are having considerable success with unpiloted aerial vehicles (UAVs). This project has the potential to demonstrate to smaller production areas—like nurseries—with diverse plant species how drones are a promising solution for pest control, disease monitoring, and resource management.

GOALS FOR NTAE GRANT PERIOD

- Continue UAV field research through in-nursery applications.
- Trial the use of spray-drones to address diseases and pests that adversely impact the ornamental plant industry.
- Develop replicated treatment studies, comparing UAV and conventional agrochemical application on specific plants with pest/disease problems.
- Continue economic analyses for pest and disease management.
- Evaluate the effectiveness of UAV monitoring of water and nutrient stress.

NTAE New Technologies for AG Extension

UNIVERSITY of NEBRASKA LINCOLN

Handbook of Aerial Crop Scouting

TEAM LEAD

Dirk Charlson, PhD
Digital Agriculture Extension Educator
University of Nebraska-Lincoln

MENTOR

Angell Jordan, BS
Southern University Agricultural Research and Extension Center

LONG-TERM GOAL

To equip more growers, advisors, and anyone interested in drone use on farms with the skills to operate drones on their own

PROJECT CONTEXT

The use of drones for aerial crop scouting has grown rapidly, driven by more affordable equipment, easier operation, and relaxed regulations. However, challenges for producers remain, including a lack of awareness or knowledge of Federal Aviation Administration regulations, limited access to practical application resources for agricultural use, difficulty finding image examples, and under-use or improper operation of drones in agricultural settings.

GOALS FOR NTAE GRANT PERIOD

- Collect aerial imagery to provide examples of real life agronomic case studies and examples of drone imagery to provide diagnostic guidance.
- Publish imagery in a "Handbook of Aerial Crop Scouting" and use as a teaching tool in workshops and educational materials.

Passionate Advocacy

Extension professionals are passionate advocates for people and communities. They are always searching for innovative ways to make sure that everyone they serve has access to information, tools, and skills that create opportunities for better health, education, and economic security.

The projects in the 2023–2024 New Technologies for Ag Extension grant year are prime examples of their innovative work, and the Extension Foundation is proud that this yearbook gives that work the recognition it deserves.

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New Technologies for AG Extension