

Illinois (University of Illinois)

Plan of Work for 2023-2027

Status: Final (Approved 9/27/2022)

Executive Summary Overview

The ACES Office of Research and Agricultural Experiment Station (AES) enables and encourages faculty creativity and interdisciplinary collaboration to advance the mission of the college in an environment that is inclusive, respectful of diversity, and open and equitable for all. The AES accomplishes this through capacity fund investments in seed funding, equipment, research infrastructure and facilities, training opportunities, and strategic initiatives. University of Illinois Extension serves as the university's statewide network for translational outreach and public engagement. Although it is centrally budgeted, Extension resides in the College of ACES. Capacity funds are directed toward personnel and infrastructure to address critical issues at the state and local level.

COMMUNITY INVOLVEMENT, INCLUSION, AND LEADERSHIP: Research under this critical issue will focus on investigating the views, knowledge, and recommendations of Extension with regard to aging in specific locales, establishing an inclusive conservation approach to engage stakeholders around resource management problems involving wildlife through studying human values, knowledge, and public involvement in decision-making, and learning how to best prepare and measure success of educators teaching from culturally responsive perspectives and studying how rural youth make agricultural/food-related decisions. Extension activities include statewide webinars and consultation with local government officials and community-level decision makers, training and support of 4-H adult club volunteers to maximize access and availability of high-quality club experiences across rural and urban youth populations, 4-H teen leaders/volunteers training and support to develop and refine advocacy, planning, mentoring, advising and leadership skills, and programs targeting community agency and institutional gatekeepers to create and enhance policies that promote inclusion and reduce marginalization of individuals and families.

ECONOMIC AND WORKFORCE DEVELOPMENT: Research under this critical issue will focus on an examination of the specific impacts of financial and digital inclusion on households' economic well-being, combining policy expertise and basic research with modeling and technological capabilities for interactive, effective, and informative public engagement on various legal and policy concepts, the development of an algorithm that can map out areas with high risk for grain entrapment incidents, the identification of causal effects of commodity supply-and-demand shocks on prices, the relationship between price and trading dynamics, the implications of commodity market price discovery for the agricultural and rural economy, and identification of sources of stress, prevalence of anxiety and depression, coping strategies, and opportunities for interventions to improve mental health. Extension planned outreach objectives focus on key contributors to a strong economy including increased economic vitality within Illinois communities, increased workforce preparedness and advancement, and improved financial wellbeing among Illinois residents. Extension outreach activities will include direct education (via in person and online platforms), indirect education via mass media, social media, and digitally delivered channels, expert consultation and community planning support, partnerships and

coalition support, training of volunteer mentors to provide one-to-one assistance with financially vulnerable residents, and decision support tools and analysis to promote data driven economic decision making at all levels. Primary audiences include agricultural producers and their families, small business owners/managers, citizens seeking personal financial management resources, youth learning “soft” and technical skills for workforce entry (especially among underrepresented demographic groups) and professionals needing continuing education credits.

SAFE, HEALTHY ENVIRONMENTS AND BEHAVIORS: Research under this critical Issue will focus on the development of natural therapeutic interventions with translational potential for both humans and agricultural animals to improve health and quality of life, the development of accessible programming for parents and childcare providers to promote positive nutrition and physical activity habits, the articulation of critical insight into the impact of the pandemic on children, building an understanding of the relationship between control of invasive plants and efforts to restore native species, building our knowledge of the factors that govern the formation of methylmercury in agricultural watersheds, and the development and launch of the Illinois United translational research on substance use and family health for Illinois residents. Objectives for Extension outreach include to prevent and manage chronic diseases, support social and emotional health, and promote safe and healthy environments that enable healthy decisions. Target audiences include youth (to build skills for resiliency and decision making for healthy behaviors), professionals/impactors (such as teachers preK-12, school lunchroom personnel, and human service agency representatives) to create and maintain safe and healthy environments conducive to learning and practicing healthy decision making, volunteers (to increase confidence and ability to teach and support others in their communities to adopt healthy behaviors), older adults (to improve physical and mental quality of life for a growing population), farmers (to improve mental health associated with reductions in stress), vulnerable populations (based on race, ethnicity, gender to reduce disparities in morbidity and mortality), and populations at elevated risk for chronic diseases and related conditions to adopt and maintain health protective behaviors to reduce risks and manage conditions.

SAFE, PLENTIFUL, AND ACCESSIBLE FOOD SUPPLY: Research under this critical issue will focus on the development of functional food packaging materials and technologies that can proactively reduce quality loss, improve safety, and reduce waste, the development of rapid, sensitive, and accurate diagnostic technologies that can be used for on-site screening or point-of-care monitoring of food quality and safety, work to reduce the yield loss caused by plant-parasitic nematodes on economically important crops, coordinated agricultural plant sciences research that balances sustained productivity with environmental stewardship, studying the causes and consequences of declining fresh fruit production, ongoing work to identify genotypes with promising potential for crop improvement for commercial release, the continuing promotion of quantitative breeding methods across the wheat community, the utilization of portable near-infrared spectroscopy in tandem with machine learning as a sustainable processing and quality/safety assessment tool in selected grains such as corn, soybean, wheat, and oat, and programming addressing food safety needs of traditionally resource-limited communities. Extension outreach activities will include direct education (via in person and online platforms), indirect education via mass media, social media, and digitally delivered channels, expert consultation to promote best management practices for growers, food handlers, emergency food distribution sites, partnerships and coalition support for enhancing production, safety, and access, conference coordination (including multi-state), applied research and demonstration, site asset

development and support (i.e. food donation gardens), and decision support tools to promote production practices and food access.

THRIVING NATURAL RESOURCES: Research under this critical issue will focus on the development of a spatio-temporal model using land use regression methods targeting agricultural-related air pollution, characterization of the conditioning power of plants to understand which plants can best contribute to the restoration of diverse pollinator habitat, ongoing research on soil health from long-term research sites, the continued development of a theoretical framework for optimal forest harvesting, an investigation into the impact of climate change on crop yields and water requirements for rice production, a project that seeks to educate stakeholders on how to best manage the Great Rivers of North America, impacts of climate-related stressors, stakeholder use patterns, and invasive species on individual fish and fish populations, and an exploration of the impact of precision surface drainage ditching to motivate larger efforts on the topic. Extension activities will seek to improve sustainable engagement with home and community landscapes and to enhance and sustain natural resources. In addition to locally developed programming that will address this critical issue, Master Gardener and Master Naturalist core volunteer training and continuing education will enable expanded outreach to communities throughout the state. Through expert assistance and programming, woodland owners/foresters will have the capacity to make informed woodland management decisions. Certified Livestock Manager training will continue to help owners of livestock operations meet state regulatory requirements. Novice and expert gardeners will be able to access statewide resources including the monthly Four Seasons Gardening webinar series and several related and regularly updated blog series. Residents of all ages will benefit from local and statewide programs focused on actions to protect the environment (such as pollinator support, renewable energy, and citizen science). 4-H statewide programs will provide opportunities to engage in outdoor activities including state 4-H camp, fishing, and shooting sports.

Merit and Scientific Peer Review Processes

Research and outreach projects and programs have always been subjected to a peer review process. Capacity-funded research projects undergo a merit review process at the departmental level to ensure the projects are scientifically sound, relevant to society's needs, and not duplicative of efforts undertaken elsewhere. Departmental reviews may be conducted by the department head, by internal and/or external peers, or by a standing department research committee. The Office of Research then works with investigators to ensure that the NIFA Reporting System project submission is correctly completed. Projects are then submitted to NIFA for final review and approval. Internal research grants are all reviewed internally.

Extension state program leaders, working with staff on their respective teams, have been charged with the responsibility for ensuring that Extension programs are research-based. In most cases, local programs and curriculum will be developed by more than one educator and reviewed by several of their peers who have the same assigned specialized areas of delivery. Curriculum materials are often sent for review directly to peers in other states and 4-H curriculum materials are often sent through a national jury process. In addition, annual staff performance reviews include criteria to assess demonstration of programming quality through evaluation findings. Finally, the merit of all new program efforts and a subset of ongoing programs are evaluated by participants regarding content, delivery, and value.

Stakeholder input: Action Taken to Seek Stakeholder Input

In addition to stakeholder input provided through formal means such as advisory groups and councils, college administrators, educators, partners, students, and alumni all play roles in seeking out stakeholder input. The ACES Office of Marketing Communications disseminates and tracks college promotional materials, including news about novel research, through a curated list of local, regional, and national media outlets, as well as social media platforms, digital ads, email, and print pieces. We are especially excited about our DISCOVER series (started in 2022), which represents a new way to engage with legislators and other stakeholders through a series of “one-pagers” on current issues and the work Illinois researchers are doing to solve real-world problems. Issues to date have focused on Agriculture and the Environment, Data and Technology, Family and Communities, Health and Wellness, and Food and Agriculture. The DISCOVER series can be found at <https://aces.illinois.edu/research/areas>.

Members of the Extension State Advisory Council are recruited to reflect the geographic and programmatic diversity of the Extension organization. In addition, state program leaders, specialists, and faculty seek opportunities to connect to state and regional stakeholders in their specialty areas. Locally, unit directors and staff actively recruit and support local Extension Council members and coordinate volunteer committees who provide advice on educational programming and priorities. Unit leaders submit annual reports that monitor the race, ethnicity and gender of their volunteer leadership to assess the need for more targeted actions to engage underrepresented stakeholders. Additionally, Extension field staff have a deep and broad network of partners who are consulted in efforts to expand offerings, reach new audiences, and maximize impact. By the end of FFY23, each unit will conduct a structured needs assessment process to identify local priorities within each critical issue. One component of this standardized process is to conduct key informant interviews with community partners to assess gaps that Extension has the potential to address. While stakeholder engagement has been a part of some locally developed needs assessments, this standardized approach will ensure that local stakeholders contribute to decisions about programmatic directions.

Stakeholder input: Methods to Identify Individuals and Groups

ACES administrators, researchers, and educators seek to interact with as diverse a population as possible to identify groups and individuals who can provide input to insure that ACES research and outreach remain socially relevant. These groups include students (who represent the next generation of professionals, scientists and educators), fellow researchers and Extension specialists, growers, commodity groups, community organizations, lawmakers, and industry representatives. We seek input in Illinois to identify stakeholders focusing on local issues and beyond the state to identify stakeholders focusing on issues of regional or national concern.

In 2022 we began transitioning back to meeting in person rather than relying primarily on remote communication. While the pandemic forced us to become much more efficient in utilizing distance methods to connect with one another (and it certainly has several advantages), in-person communication is extremely important in identifying and reaching stakeholders. We are hopeful that the trend toward being able to meet more frequently in person continues into 2023 and beyond.

As part of the University of Illinois Extension Affirmative Action plan, county Extension directors and Extension educators identify individuals to serve on formal local multi-county, regional, and state

advisory groups for Extension. These groups play a key role in identifying research and Extension priority activities, as well as suggesting others who should be contacted. In addition, Extension staff members establish relationships with individuals and groups in assigned areas to assess priority needs. Through the structured unit needs assessment process, key informants are identified through existing networks and then expanded using a “snowball” technique. This method will increase the number of perspectives included in the needs assessment. At the regional and state level, Extension leaders capitalize on networks with partner organizations to continually expand stakeholder engagement.

Stakeholder input: Methods for Collecting Stakeholder Input

The Interim Dean of the College of ACES (Dr. Germán Bollero), the Acting Associate Dean of Research (Dr. Alex Winter-Nelson), and the Associate Dean and Director of University of Illinois Extension and Outreach (Dr. Sharon Nickols-Richardson) place a high priority on identifying stakeholders and collecting input. Input was sought from a wide spectrum of stakeholders, including local farmers, commodity groups, corporate partners, regional, state, and national legislators, and leaders and scientists from other academic institutions. The College of ACES Office of Marketing Communications will continue to solicit comments through news releases, publications, and broadcasts. Extension faculty and staff use a variety of formal and informal methods to gather stakeholder input on needs, program content, and methods of delivery. Formal methods include surveys of program participants through end-of-program surveys and of local stakeholders and partners to assess needs, priorities, and opportunities. Other formal methods include discussions with multi-county Extension Advisory Council members and with local and state organization leaders and groups. The structured unit needs assessment includes a series of structured key informant interviews to gather stakeholder input. Efforts at the department level will continue to include one-on-one conversations, surveys, workshops, and extending invitations to specific groups and individuals to serve on advisory committees. Field days, the Explore ACES open house, and events hosted by the Office of Advancement are examples of recurring efforts to collect stakeholder input.

Stakeholder input: A Statement of How the Input Will Be Considered

Continuation, redirection, or initiation of new research and Extension programs draws heavily on stakeholder input from formalized groups and various needs assessment methods. Stakeholders play a critical role in identifying currently unmet needs in research and outreach programs, and their input is used to sharpen the research priorities of college departments and to ensure that publications, Extension programs, and other outreach efforts are focusing on those areas of greatest concern to stakeholders. The State Extension Program leaders will continue to meet with multicounty Extension educators to identify priority programs to be delivered and those programs not addressing high-priority areas will be discontinued. Stakeholder groups including industry partners, farmers, political leaders, investigators and Extension specialists from other universities, students, alumni, local and state Extension Advisory Council members. Extension Partners (a grassroots group formed to support Extension) members will continue to be influential in expressing research and Extension needs to local, state, and federal government officials.

Stakeholder input was an important element of a statewide assessment and planning process, conducted during FFY17 to identify five critical issues and thirteen associated state priority targets for interdisciplinary outreach and engagement. The process included review of Illinois' data trends across a

variety of data sources by internal stakeholders representing a broad range of roles, regions, and subject matter expertise across Extension. The emerging issues were then reviewed by unit staff and local stakeholders to validate that the issues reflected priorities within Illinois. The priorities that emerged through that process were incorporated into the five Critical Issues first proposed in the 2020- 2024 University of Illinois Combined Research and Extension Plan of Work.

Critical Issues

Community Involvement, Inclusion, and Leadership

Initiated on: Nov 26, 2019

State: Illinois

Term Length: Long-term (>5 years)

Illinois' population is diverse in terms of demographics, economics, population density, and cultural norms. Many communities and their leaders need assistance with identifying strategies to address the rapidly changing social and economic landscape. Communities where people feel connected, have a sense of belonging, and appreciate the strengths of diversity are more likely to experience lower rates of violence/conflict and a higher quality of life. Because civically engaged youth are more likely to contribute to their communities as adults, there is an ongoing need to create these opportunities. Research and Extension activities can play a pivotal role in discovering and translating practices to promote strong leadership, volunteer opportunities, and supportive social community networks. Primary overarching goals include preparing youth to thrive, increased connectedness, diversity, equity, and inclusion within communities and systems, and increased engagement and involvement of community members and leaders to create local solutions for local challenges.

Science Emphasis Area

Education and Multicultural Alliances, Family & Consumer Sciences, Youth Development

Economic and Workforce Development

Initiated on: Nov 26, 2019

State: Illinois

Term Length: Long-term (>5 years)

Population projections show that rural Illinois will face serious challenges in the next decade and beyond, with population declines, shrinking young population cohorts, and increasing proportions of elderly that may retire and/or move out of Illinois, closing many small businesses that have provided essential services for many years. Additionally, the per capita personal bankruptcy filing rate in Illinois is ranked the 6th worst in the nation. Enhancing our understanding of the interplay of economic, social, and environmental dynamics (including the impact of economic development initiatives, agricultural markets, and causes and consequences of population decline in rural areas) will help communities and legislators develop and promote effective economic development policies. Overarching goals include enhanced economic vitality of small business and agricultural production operations, increased workforce preparedness and advancement, and increased financial wellbeing among residents (particularly those most vulnerable to poverty).

Science Emphasis Area

Bioeconomy, Bioenergy, and Bioproducts, Family & Consumer Sciences, Sustainable Agricultural Production Systems, Youth Development

Safe, Healthy Environments and Behaviors

Initiated on: Nov 26, 2019

State: Illinois

Term Length: Long-term (>5 years)

Nationally, about 86% of annual health care spending is related to chronic disease and 80% of premature heart disease, stroke, and type two diabetes diagnoses could be prevented through healthy lifestyle choices. Research and Extension activities will target a range of personal, social, economic, and environmental factors that influence health status. Work will also focus on reducing negative health outcomes and health disparities that limit quality of life. In addition to physical health, we will focus on issues important to Illinois families such as substance abuse, social and economic inequalities, and interpersonal challenges. Research and Extension activities will focus on surfacing and addressing trends as they emerge in order to promote health and wellbeing among Illinois citizens. Overarching goals include prevention and management of chronic diseases, promotion of social and emotional health outcomes, and both creation and maintenance of safe and healthy environments that support healthy decisions.

Science Emphasis Area

Education and Multicultural Alliances, Family & Consumer Sciences, Human Nutrition, Youth Development

Safe, Plentiful, and Accessible Food Supply

Initiated on: Nov 26, 2019

State: Illinois

Term Length: Long-term (>5 years)

As the world-wide demand for animal protein is expected to double in the next thirty years, our research will play a critical role in providing animal protein through production systems that are environmentally sustainable and socially acceptable. Research in crop sciences supports food security through four main areas of activity: plant improvement, plant protection, production management and ecology, and data acquisition and analysis. About one of every nine Illinois households experience food insecurity and the rate has been on the rise over the past ten years. We seek to develop and disseminate technologies to improve food production, to create novel processing and handling strategies to control food pathogens, and to develop and promote access to nutritious food for the population. Overarching goals include reductions in food insecurity, increased safety of food across the supply chain, and enhanced food production capacity among residents and growers.

Science Emphasis Area

Environmental Systems, Family & Consumer Sciences, Food Safety, Human Nutrition, Sustainable Agricultural Production Systems, Youth Development

Thriving Natural Resources

Initiated on: Nov 26, 2019

State: Illinois

Term Length: Long-term (>5 years)

Natural resources and functioning ecosystems are essential to the sustainability and growth of human enterprises from agriculture to recreation. Innovative solutions to protect soil and water quality are grounded in research on cropping systems level solutions, such as cover crops, and edge of field technologies such as wood chip bioreactors that scavenge and immobilize excess nutrients from crop production. People of all ages and abilities enjoy higher levels of health and well-being when they have access to nature in the form of parks, gardens, greenways, and natural landscaping. Research and Extension activities will contribute to the identification, promotion, and adoption of policies and practices that support thriving natural resources in Illinois communities and beyond. Overarching goals include promoting engagement with home and community landscapes and enhancing preservation and protection of natural resources in shared, public spaces.

Science Emphasis Area

Agroclimate Science, Bioeconomy, Bioenergy, and Bioproducts, Environmental Systems, Sustainable Agricultural Production Systems, Youth Development