Missouri (Lincoln University of Missouri, University of Missouri Columbia Combined)

Plan of Work for 2023-2027

Status: Final (Approved 9/22/2022)

Executive Summary Overview

University of Missouri- Columbia

The Missouri Agricultural Experiment Station (MOAES) conducts research in agriculture, food and nutrition, animal science, economics and policy and natural resources that benefits the citizens of Missouri. This research is geared to making the most effective use possible of the state's natural resource base, including its people resources, in an increasingly global economy. Throughout its history, MOAES has had a major local, national, and global impact in advancing science in agriculture, food, and natural resources. Missouri stakeholders benefit from the basic, applied, and translational research conducted on campus and at the MOAES centers and farms around the state.

University of Missouri Extension strives to better the lives of Missourians through programs focused on achieving impacts in Agriculture and the Environment; 4-H Youth Development; Family, Nutrition and Consumer Sciences; Business and Community; and Health and Safety. We develop and deliver high priority research projects and educational programs to address needs identified by our stakeholders. We reach nearly a million Missourians every year through campus faculty and County Extension offices working throughout the state’s 114 counties and the city of St. Louis.

We incorporate the use of technology into innovative service and product delivery systems, online resources for our stakeholders, and data mapping, visualization, and reporting tools. Funding from competitive grants, gifts, and fee generation exceed the resources appropriated from our state, federal, and county partners. Our goal is to be reliable, responsive and relevant. We accomplish that goal by providing research-based knowledge to Missourians aligned with their priorities of improving community economies, health, and education outcomes.

Lincoln University of Missouri

In alignment with the USDA-NIFA’s top research and Extension priority areas, Lincoln University’s Cooperative Extension and Research Program conduct research and extension activities in animal science, plant science, food safety, natural resource, social economics, human health, and youth areas that address emergent and critical issues facing Missouri farms and agriculture communities. The program especially targets underrepresented, underserved, small famers and community and first-generation students.

The Extension and Research Program is currently focused on five (5) identified critical issues of sustainable agriculture, health, social justice and community development, environmental and natural resources, and education and communication with underserved populations in Missouri through the

integrative, innovative approach for research and Extension programming. The program is launching six initiatives: organic farming, urban agriculture, industrial hemp, food safety training, and forest ecosystem, and small ruminant, in an effort to meet the critical, growing needs of the state and stakeholders. In addition, in 2022, the Extension and research program has also joined the group efforts of the 1890 multistate climate change project and participated in all four project objectives focusing on 1) Soil health and adoptive Ag practices needs assessment and training program for socially-disadvantaged farmers; 2) Water resource and climate change assessment; 3) Environmental justice and equity for low-income communities; and 4) Analysis of climate change policy.

The LU research program continues to conduct cutting-edge, impactful food and agriculture research through multi-institution and multidisciplinary collaborations. These programs seek to effectively address urgent, emergent issues and develop sustainable solutions to the problems facing Missouri's agriculture industry and rural communities as well as to strengthen the university's capacity to provide better service for the needs of Missouri's small farmers, especially underserved farmers. The research program has five research focuses: 1) Animal production; 2) Crop and vegetable production, 3) Food safety, 4) Natural resource management, and 5) Social economics, with an emphasis of small ruminants, aquaculture, soil health, specialty crops, organic production, food safety detection, water quality, forest health, and community development. The faculty members in the program actively pursue extramural funding to support current research and leverage resources provided by federal and state partners.

The LU Extension efforts aim to improve the education and economic opportunities to underrepresented populations in Kansas City, St. Louis, and Central, Southeast and Southwest Missouri. The programs will assist farmers, families, youth and the elderly as well as entire communities with underserved and underrepresented populations through following outreach activities: 1) 4-H and youth development, 2) family development, 3) community development, 4) health and aging, 5) food and nutrition, and 6) urban gardening. The Paula J. Carter Center on Minority Health and Aging will provide programs addressing health literacy, health disparity reduction and chronic disease prevention for underserved audience with ages of fifty and over.

Merit and Scientific Peer Review Processes

University of Missouri- Columbia

When a faculty member writes a new project for the University of Missouri Agriculture Experiment Station proposing to use Hatch, Hatch Multi-State, McIntire-Stennis, or Animal Health funds, the review process has three levels prior to submission to the National Institute of Food and Agriculture for their review and approval of the project. The first step is at the divisional level. The division director for the faculty member submitting the project reviews the project for scientific merit, completeness, and writing quality. Once the faculty member receives division director approval, the project is reviewed for compliance with federal regulations and requirements by the NIFA Reporting System (NRS) administrator for the MOAES. After the administrator approves and confirms that the project is within compliance, there is a final review by the Director of the MO AES, who verifies the scientific merit, completeness, and writing quality of the project. After this final review at the station level, the project is submitted to NIFA via NRS.

University of Missouri Extension faculty understand that peers ensure quality as they work through their core duties to educate (deliver research-based programming), create (develop and improve programs

and services), and connect (ensure programming is responsive and relevant). Critical steps to ensure quality and impact through internal scientific and peer review include peer- and expert stakeholder-reviewed assessments of local need within program areas; peer-developed and reviewed program area plans of work and prioritization; peer-reviewed evaluations of program impacts; peer-observation and coaching of teaching; and peer-review of curricula, online courses, and publications. External peer review is expected for new or significantly revised curricula, online courses, and publications. Further, extension faculty annually develop individual plans of work and reports of accomplishments which are reviewed by their peer-faculty directors (disciplinary and regional). Finally, extension faculty work within an academic three-rank system, and criteria for promotion in rank require external academic peer review; internal faculty peer review; and external stakeholder review.

Lincoln University of Missouri

Lincoln University Cooperative Extension and Research (LUCER) is implementing a Peer Review Team (PRT) for capacity projects and resource allocation that will include both internal and external stakeholders. The review team will be comprised of both Lincoln University faculty/staff and partners with aligned mission, vision, values and background experience. The Peer Review Team will establish the criteria necessary for all proposals and project requests and review proposal/project submissions and determine their feasibility based on an established proposal/project rubric developed by the PRT to ensure alignment with Lincoln University Cooperative Extension and Research's priorities.

The current state of knowledge, along with a literature review, stakeholder's inputs, and preliminary data (using federal and state databases), will form the basis for formulating research objectives and directions. Before capacity projects are submitted to NIFA and implemented, proposed ideas and plan of work will go through an in-house, peer-review process, followed by external peer reviews.

To identify, develop and evaluate new technologies and address solutions to critical issues, new technologies will be reviewed by intra- and inter-institutional scientists, including federal and state funding agencies and end users.

Stakeholder input: Action Taken to Seek Stakeholder Input

University of Missouri- Columbia

MOAES stakeholder input is solicited regularly through advisory board meetings. There are advisory boards at three different levels: (1) individual farms advisory boards, (2) regional Research, Extension and Education Center (REEC) advisory boards, and (3) a statewide AES advisory board. The membership on these advisory boards includes producers, policy makers, commodity groups, industry, state and federal agencies, and faculty and staff. Additional input is solicited through surveys and focus group meetings when necessary.

Extension stakeholder feedback is sought by the University of Missouri Research and Extension. Missouri state statutes establish elected and appointed County Extension Councils in each of the 114 counties, bringing together over 1,600 Missourians from a variety of stakeholder and partner backgrounds, to meet monthly with faculty, providing guidance on university programming, and annually approving local plans of work. The county councils appoint regional council representatives who provide regular feedback at all levels of the university.

In addition, each county is served by an Extension and Engagement Specialist faculty member, whose core duties include establishing connections to farm, business, health, and youth stakeholder groups, policy makers, and interested community members. These groups are solicited to provide feedback on local priorities, needs and opportunities.

Extension Field Specialists, Extension State Specialists, and local and state faculty further build connections to the industries, producers, and policy-makers relevant to their disciplines to regularly solicit feedback and build understanding of needs.

Finally, regular "community conversations," "Mizzou to You," "Mizzou Central" (at the state fair) and other events invite public participation and reflection on the university's role in supporting communities. Licensed tools for surveying (e.g., Qualtrics and Engagement Cloud), are used for feedback following programming and surveying participants about experiences and suggestions for the university extension and research activities.

Lincoln University of Missouri

Partners will be solicited based on previous historical relationships and in conjunction with their alignment in mission, values and philosophy for the betterment of Missourians. We will solicit the stakeholder inputs for our capacity research and extension programming through the following:

Conduct Town Hall Meetings

Conduct Roundtable Discussions

Conduct Online Surveys

Conduct Telephone Surveys

Stakeholder input: Methods to Identify Individuals and Groups

University of Missouri- Columbia

Extension and Engagement Specialists, Regional Directors, members of Extension Councils and a State Extension and Engagement Advisory Committee lead efforts to identify general community groups and individuals for meetings, events, surveys, and other methods of collecting public input. These faculty and partners stay connected to diverse populations within their communities and must actively solicit ideas and feedback related to local annual program plans. In addition, all faculty are expected to identify and connect to key groups within their disciplinary space, such as commodity groups, state/local associations, and leaders. Finally, our online e-Commerce tools for purchasing publications, registering for programs and courses, and other services provide opportunities for participants to create an online profile and opt-into regular communication, surveying, and other methods of input.

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Research and Extension faculty and specialists stay connected with stakeholders and local communities for collecting their inputs and feedback of annual programming or activity planning. In addition, the following groups and tools are also used:

Farmer and Producer Associations

Literature and database search

Trade Schools

Economic Development Committees

State Departments (i.e., Department of Agriculture)

One-on-one Meetings with LUCER Farmers

One-on-one Meetings with LUCER Producers

One-on-one meetings with LUCER Families, Community Representatives and Agencies, Schools will include parents, teachers and students from- private, public, trade); High School Equivalency programs; Campus Partners; Community media (i.e., blogs) Collaborators from private industry

Meetings with Randomly Selected Farmers

Seminars

Workshops

National, Regional and Local Professional Conferences

Staff in the Field

State Specialists and Content Experts

Federal Government Partners

State, City and County Agency Partners

Local and Rural Community Representatives

Social Media

Newspapers

Job Fairs

Stakeholder input: Methods for Collecting Stakeholder Input

University of Missouri- Columbia

Periodic comprehensive statewide needs assessment (including community conversations, quantitative analyses, and external reviewers), are conducted by the university to fulfill its strategic plan related to Extension and research. Senior administrators from Extension and the College of Agriculture, Food, and Natural Resources meet periodically with community members - frequently visiting all counties in county commission meetings and extension council meetings. These meetings are locally advertised and open to the public. Extension, college, university leaders and faculty also regularly meet with state agencies (e.g., Department of Agriculture, Department of Natural Resources, Department of Health and Senior Services, Department of Economic Development, Office of Workforce Development, State Chamber of Commerce); with commodity groups (e.g., soy, corn, dairy, pork, cattle); key agriculture

groups (e.g., Farm Bureau, MFA); and other key partners (e.g., state associations for schools, hospitals, and business).

In addition, new duties have been assigned to Extension and Engagement Specialists and Regional Directors to better connect with traditional and non-traditional community members and groups to ensure the university serves local needs. These individuals meet monthly with public extension councils to collect stakeholder input and receive feedback on needs assessments and program plans.

Periodic statewide needs assessments, including surveys, community conversations, and expert reviews are conducted.

Lincoln University of Missouri

The following methods are used for research and Extension programming assessment and stakeholder inputs:

Interview Field Day Participants

Interview Workshop Participants

Conduct Surveys

Analyze Information Collected from Ask-An-Expert Cards

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

University of Missouri- Columbia

Stakeholder input is considered and applied in all levels of planning for extension and research. Statewide needs assessment informs the university-wide strategic plan, including the compacts for extension/engagement and for research, providing a pathway for addressing critical needs through measurable goals and strategies. Discipline-specific feedback informs annual program area plans of work. Then local feedback informs county and regional program priorities and annual plans approved by county councils. Finally, stakeholder feedback informs individual faculty annual plans of work and adjustments based on participant feedback and surveys. At all levels, extension faculty have been tasked with reaching new audiences and are evaluated based on their ability to connect to a diverse group of stakeholders to ensure equitable and inclusive programming is conducted throughout the state.

Lincoln University of Missouri

The collected inputs will be considered for future planning of programs or activities because of:

Stakeholders as Job Providers

Stakeholders as Job Seekers from the Underserved Population in Missouri

Community Volunteers

Community Lay Leaders

Community Educators

Critical Issues

Education and Communication with Underserved Populations

Initiated on: Nov 26, 2019
State: Missouri

Term Length: Long-term (>5 years)

MU Extension

Missouri has an 87.8% high school graduation rate but only ranks 25th for overall education due to low numbers of graduates seeking post-secondary training. Only 29% hold a bachelor's degree or higher.

Parallel with the nation, Missouri's food and the agricultural industry faces a degreed workforce shortage. The labor force is shrinking as workers age and exit the industry. One of the Missouri Department of Agriculture's initiatives is to develop more leaders in Missouri agriculture. Clearly, a more diverse, innovative, and educated food and agricultural workforce is needed to feed and supply a growing population.

In 2017, 34% of Missouri's 160,715 agricultural producers were 65 years of age or older. Less than 1% of total producers are Black or African American or American Indian/Alaskan Native, and less than .01% of producers are of Latino origin. Also, the number of agricultural operations in the state decreased by 4% between 2012 and 2017.

Missouri 4-H Youth Development understands the need to increase the percentage of high school and post-secondary graduates. 4-H is increasing engagement with pre-K-12 students by providing educational opportunities introducing them to the value of post-secondary education. The educational opportunities are "hands-on opportunities", experiential in nature, so youth develop a cognitive awareness of career opportunities and potential interest in and passion for the field. Missouri 4-H also offers MO 4-H Career Pathways, including two programs: Youth Futures and Juntos, for students in grades 8-12. These programs guide underserved students through successful high school graduation strategies and higher education applications.

Missouri 4-H serves more than 50,000 youth, offering more than 100 projects related to different fields to help them discover their spark and passion in life.

Lincoln University Cooperative Extension and Research

Underserved populations often suffer from lack of employment opportunity because of limited skill sets and limited access to education and service. Lincoln University Cooperative Extension and Research will address this issue by creating customized training and education curricula, adjusted to the specific needs of the population being served and targeted to the skill sets required by employers. Lincoln University is prepared to offer job readiness programs and understands the challenges associated with training and educating underserved populations. Thus, Lincoln University is able to increase and improve constituents' skill sets, preparing them for gainful employment.

Science Emphasis Area

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

Environmental and Natural Resources

Initiated on: Nov 26, 2019

State: Missouri

Term Length: Long-term (>5 years)

MU Research

Missouri enjoys the unique distinction as a conservation leader in the country. We are blessed with a diversity of natural resources like few other states in the nation. These resources are essential to the environmental and economic vitality of our state. The quality of life of every citizen also depends on the health of our state's natural resources and the environment, particularly that of our air, land and soil and water resources. However, these resources are experiencing increased pressure as a result of a number of biotic and abiotic stressors which threaten the sustainable provision of the goods (e.g. food production, food quality) and services (clean air and water) that are dependent on them.

We seek to initiate cutting edge interdisciplinary research related to climate change, ecosystem health and restoration, soil health, water quality and quantity, environmental chemistry, habitat evaluation, nature-based recreation, valuing ecosystem services, green technology including alternative and sustainable energy, sustainable landscapes, environmental informatics among others

MU Extension

Excluding cities and towns, Missouri's 44 million acres are equally divided among croplands, grasslands, pastures, forests, and woodlands. These lands support a wide economic base that Missouri residents depend upon and also support a natural resource base that enhances every Missourian's quality of life. While 94 percent of the state's land base is privately owned, less than ten percent of these private landowners actively manage their property for natural resource benefits. This translates directly into lost, value-added forest products and indirectly into diminished ability of our forest and woodlands in providing valuable ecosystem services, such as clean air and water, and habitat for wildlife. Thus, there is a critical need for expanded educational programs that enable Missouri citizens to make informed decisions regarding the wise stewardship and conservation of the state's forests and woodlands, grasslands, and agricultural landscapes, and the wildlife populations which depend upon these ecological systems.

MU Extension Forestry and Wildlife programs provide Missouri citizens with research-based information that enables individuals and communities to make informed decisions related to natural resource management objectives on their properties. Educational programs include those that enable volunteers to conduct natural resource education and stewardship programs within their communities, expanding the capability of the MU Extension to reach greater numbers of clientele and impact an increasing number of acres for natural resource benefits.

The following MU Forest and Wildlife programs have been developed to achieve identified goals and objectives:

Missouri Woodland Steward

Women Owning Woodlands

White Oak Initiative

Missouri Master Naturalist

Missouri Master Pollinator Steward

Wildlife Ecology and Management Program

Controlling Nuisance Wildlife Program

Missouri Native Grass Extension Project

Missouri Feral Hog Extension Project

Many of these programs are conducted through collaboration and partnerships with state, federal and other conservation organizations within Missouri. Each program utilizes specific delivery and evaluation methods to reach targeted audiences and accomplish goals and objectives.

Lincoln University Cooperative Extension and Research

Missouri is a state that is rich in natural resources. With population growth, demands for increased food production, climate change and economic development, there is a threat of natural resource depletion and ecosystem degradation. This poses a challenge to sustaining the environmental health, future agricultural production and quality of life for Missourians.

Lincoln University Cooperative Extension and Research Program aims to develop best management practices and technologies that are urgently needed for sustaining agricultural production, enhancing ecosystem health, and safeguarding human health for Missouri residents and community. Our efforts are focused on development of climate-smart management practices, improvement of water quality and drinking water safety, monitoring of watershed and ecosystem contamination, assessment of ecosystem or forest health, and enhancement of soil health.

Science Emphasis Area

Agroclimate Science, Bioeconomy, Bioenergy, and Bioproducts, Education and Multicultural Alliances, Environmental Systems, Food Safety, Sustainable Agricultural Production Systems, Youth Development

Health and Healthy Futures

Initiated on: Nov 26, 2019
State: Missouri

Term Length: Long-term (>5 years)

MU Research

Life on planet Earth depends on life supporting goods and ecosystem services provided by the coupled social-ecological systems or ecosystems. The health of Earth's ecosystems has deteriorated so much that the public is concerned about a loss of life support for all organisms, including the human community. Ecosystem health, as an integrative concept, includes both the biophysical and socioecological dimensions. The biophysical realm includes climate, air, the environment, water, energy, wildlife, food, and soil health among others. The socioeconomic aspects include economic

sustainability, social services, recreation and human and animal health and welfare. The latter is particularly at risk in many parts of the world not only from environmental degradation but also from increasing stress and emerging pathogens and diseases.

We seek to revitalize and expand our environmental and natural resources and animal, and human health related programs, strengthen partnerships with the scientific community and stakeholders, and provide a translational platform with focus on environmental sustainability, animal and human welfare and health, economic development and policy reforms.

MU Extension

Missouri remains a state facing many challenges in the areas of health care access and population health. Further, health disparities in Missouri are substantial and intersectional. Missourians experience disparities in access to health care, health and well-being, and quality of life with the latter impacted by the former. In the 2021 America's Health Rankings (AHR) Annual Report published by the United Health Foundation, Missouri ranked 42 of 50 states. Health outcomes for Missourians related to mental/behavioral health, physical health, and the incidence of mortality inform this ranking. The AHR annual report ranked Missouri 39th on its indicator measuring one in six surveyed Missourians reporting being in 'frequent mental distress'. Missouri ranked 32nd among states on the measure of adult obesity, one in three Missouri adults are obese as measured by BMI. Missouri ranked 40th when considering 'premature deaths' as defined by 'years of life lost' before the age of 75. Of the many factors informing these health outcomes, 12 percent – or approximately one in nine – of Missourians reported avoiding health care due to cost, placing Missouri 42nd on this indicator and Missouri also ranks 42nd amongst all states on investment in public health with Missouri averaging $80 of investment per citizen compared to $116 for the U.S.

We seek to improve the health of Missouri communities and increase positive health outcomes through education related to nutrition and other health behaviors.

Lincoln University Cooperative Extension and Research

Good health is important for the overall physical, emotional, mental and social health status and quality of life of all Missourians. Today, Missouri ranks 39th in the nation with respect to health. The heathy lifestyle and the health disparities are one of health issues facing Missouri's underserved community. The disparities in health care are thought to be related to social determinants, such as the health literacy of families, lack of resources, barriers to adequate health care and gaps in services and opportunities. Lincoln University Cooperative Extension and Research (LUCER) seeks to improve food security and safety, promote nutrient, healthy foods, educate heathy behaviors or healthy lifestyle, and decrease health disparities for Missouri's underserved communities through innovative approaches of education and research activities.

Science Emphasis Area

Agroclimate Science, Bioeconomy, Bioenergy, and Bioproducts, Education and Multicultural Alliances, Environmental Systems, Family & Consumer Sciences, Food Safety, Human Nutrition, Sustainable Agricultural Production Systems, Youth Development

Social Justice

Initiated on: Nov 26, 2019
State: Missouri

Term Length: Long-term (>5 years)

Lincoln University Cooperative Extension and Research

In Missouri, minority constituents are in a state of emergency regarding social justice and inequality. There is a lack of civic engagement along with civic responsibility when it comes to equally and consistently providing resources to all. Currently, our constituents must fight to acquire equal access to education, public safety, technology, housing, community development, social justice, judicial equality and community resources. Minority Missourians are facing food deserts, health disparities and unemployment, among other problems.

Lincoln University Cooperative Extension and Research's social justice mission is to bridge the gap in Missouri between privileged and disenfranchised, underserved communities, by improving the lives and well-being of the underserved. This can be accomplished by increasing educational awareness and workforce readiness. In addition, health and wellness is improved by providing social, economic, and legislative awareness as well as computer literacy and education to support upward mobility and holistic community development.

MU Extension

MU Extension works toward social justice by providing researched-based and evidenced-based education, services, and support in leadership development, nutrition, home & families, health and safety, youth development, and workforce readiness. In addition, we are empowering residents of all ages to advocate for changes to address the inequities that plague their lives and communities.

Science Emphasis Area

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

Sustainable and Resilient Agricultural Systems

Initiated on: Nov 26, 2019
State: Missouri

Term Length: Long-term (>5 years)

MU Research

Agricultural production systems are challenged by changing climate and other threats such as increased input costs and invasive pests and diseases. Sustainable, climate-smart, and resource-efficient agricultural practices help farmers adapt to change, remain resilient and economically viable.

We seek to conduct basic and applied research in laboratories, plant growth facilities and farms and ranches that advances sustainable and regenerative agricultural production practices that will improve soil health and water use efficiency, support diverse crops, promote biodiversity and resiliency, improve plant and animal genetics, and promote diverse grazing systems and approaches.

MU Extension

Agriculture remains Missouri's largest economic endeavor. More than 100,000 Missouri farms and hundreds of thousands of processing and supply chain workers depend on a vibrant agricultural industry.

Imagine this:

Empty or lightly stocked grocery store shelves

Food processing plants unable to operate for lack of trained workers

Farmers unable to receive parts for equipment

Soaring input prices due to limited transportation containers

Volatility – both climatic and economic – threatens our food supply. In the last four years, in Missouri, we have had three regional droughts, two floods, a pandemic, a $100/barrel swing in the price of oil, a tripling of fertilizer prices, shortages of herbicides, a dicamba crisis, two new insect pests, no operational packing plants for market-ready animals, a lack of workers, and many other seismic shifts for food producers. We see the impacts of these every day in American agriculture.

MU Extension programs intend to bring sustainability and resiliency to agriculture via education. MU Extension can't change world markets. But it can help Missourians respond to the changes and create innovative ways to feed a hungry world.

New programs, like our Agricultural Innovation Center, intend to bring resiliency to the food system with entrepreneurship. And our long-successful programs like Integrated Pest Management, Grazing Schools, Show-Me-Select Replacement Heifers, Agricultural Lenders School, and so many others will continue to provide best-in-class Extension education. All our programs seek sustainability. All of our programs strive for resiliency through innovation.

Two specific objectives (solution-based) that address food system resiliency issues are 1) developing digital technologies to reduce the labor and number of entities between food producers and consumers 2) training for farmers, farm workers, and others in the food system about how to use those technologies. Those are critical issues we need to solve.

Lincoln University Cooperative Extension and Research

Missouri is an agriculture-based state. The continuous increase in food demands and global climate change pose a serious risk to agricultural production systems and producers in Missouri. Under these circumstances, the sustainability of the climate-smart farming and agri-food system is crucial for food production and security. Developing climate-smart production systems and value-added, specialty crops and livestock is urgently needed. Livestock and crop varieties that can grow and produce better under climate-changed environments (e.g., drought, heat and cold tolerance), insect pest resistance, climate-smart farming, and crop diversification can help small and underserved farmers increase the profitability and mitigate the adverse impacts of climate change.

Application new technologies, including genomics, nanotechnology, and low-input production systems, will improve food production systems and biosecurity. Lincoln University Cooperative Extension and

Research Program strives to develop climate-smart farming strategies and stress-resistant livestock and specialty crops to achieve sustainability of food production and security and ensure a safe, healthy food supply that will mitigate the adverse impacts of climate change and lead to improved human health and quality of life for Missourians.

Science Emphasis Area

Agroclimate Science, Bioeconomy, Bioenergy, and Bioproducts, Education and Multicultural Alliances, Environmental Systems, Food Safety, Human Nutrition, Sustainable Agricultural Production Systems

Workforce Development and Economic Opportunity

Initiated on: Nov 26, 2019
State: Missouri

Term Length: Long-term (>5 years)

MU Research

Missouri is an agrarian state supporting a $93.7 billion agriculture industry. Over the next decade, the agriculture, food and forestry industries in Missouri are projected to generate 13,000 job openings annually. Technological advances, including smart farms and big data and data analytics, have created a number of new job opportunities. However, finding skilled labor continues to be a challenge.

We seek to provide hands-on training through basic and applied research related to agriculture production and processing, food and nutrition, natural resources management, and agribusiness and agricultural policy that will produce a well-trained workforce for the agriculture industry of the present and future and further the economic impact of agriculture.

MU Extension

Missouri has the 22nd largest economy in the nation, ranks 32nd for economic growth, and has a civilian labor force of 3 million people. Missouri's economy and workforce continues to evolve, shifting from focusing on strictly producing goods to newly emerging industries and providing services. Job growth has most recently been highest in healthcare, professional services, and construction, but employers across the spectrum report challenges in finding employees with the requisite qualifications and experience to meet their needs. By 2030, it is projected that employment will increase in Missouri by 215,000 jobs, with over 60% of that growth coming from St. Louis and Kansas City. While nearly 90% of Missourians graduate high school, fewer than 1 in 3 Missourians ages 18 and older have a Bachelor's degree or higher. Additionally, approximately 13% of Missourians live below the federal poverty line, though in some counties that number reaches nearly 30% of the population. There are interconnected issues that are impacting Missouri's economy and workforce, also, including housing costs, availability of childcare, and even broadband access.

We seek to develop innovative partnerships for economic and workforce development that will grow opportunities for Missourians, engage Missourians in attaining skills and credentials, expand the University's economic impact, and will double the agriculture economy by 2030 while sustaining natural resources.

Lincoln University Cooperative Extension and Research

Missouri has an agriculture-based economy, ranking 22nd in the nation and 32nd for economic growth. The state economy is currently facing challenges for new agriculture economic opportunity and shortage of agriculture workforce. Lincoln University Extension and Research Program will continue to strengthen higher education in agriculture and its academic programs, improve the enrollment and graduation of agriculture major students, and provide the support of agriculture students for experiential learning and working opportunity. Our efforts will especially target underrepresented, underserved, small famers and first-generation students, while also contributing to the diversity of the state and nation's future agriculture workforce. In addition, we strive to increase engagement with K-12 students by providing educational opportunities and hand-on experience in agriculture while encouraging and recruiting them to the higher agriculture education.

The LU Extension and Research Program is currently launching the industrial hemp initiative and preparing for small ruminant initiative to promote industrial hemp and sheep/goat industries in Missouri. We seek to develop innovative partnerships and work with the state for economic opportunities and workforce development for Missouri small farms and underserved communities.

Science Emphasis Area

Agroclimate Science, Bioeconomy, Bioenergy, and Bioproducts, Education and Multicultural Alliances, Environmental Systems, Family & Consumer Sciences, Food Safety, Human Nutrition, Sustainable Agricultural Production Systems, Youth Development