

Lincoln University of Missouri and University of Missouri Columbia Combined Research and Extension Plan of Work 2022-2026

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I. Plan Overview

1. Executive Summary

University of Missouri

The Missouri Agricultural Experiment Station (AES) conducts research in agriculture, forestry, animal science 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. We strive to be good stewards of the resources entrusted to us.

University of Missouri Extension strives to better the lives of Missourians through programs focused on achieving impacts in Agriculture and the Environment, Youth and Family, 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's top research and Extension priority areas, Lincoln University's Cooperative Research and Cooperative Extension programs conduct research and extension activities in animal science, plant science, food safety, natural resource, and social economics that address emergent and critical issues facing Missouri small farms. The Extension and research programs especially target underrepresented, underserved, small famers and first-generation students, while also contributing to the diversity of the nation's future agriculture workforce. The Extension and research programs strive to work with the state government and legislators to increase the level of appropriations to reach the amount required for the state match.

Five (5) critical issues of sustainable agriculture, health, social justice and community development, environmental and natural resources, and education and communication with underserved populations in Missouri have been identified as the integrative focuses for research and Extension programming starting in 2020. The research and Extension programs have also launched five initiatives: organic farming, urban agriculture, industrial hemp, food safety training, and forest ecosystem, in an effort to meet the critical, growing needs of the State and stakeholders.

The LU research program continues to conduct cutting-edge, impactful food and agriculture research through multi-institution and multidisciplinary collaboration. 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, 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.

2. FTE Estimates

Year	1862 Extension	1890 Extension	1862 Research	1890 Research
2022	227.0	75.0	60.0	40.0
2023	227.0	100.0	60.0	45.0
2024	227.0	100.0	60.0	50.0
2025	227.0	100.0	60.0	55.0
2026	227.0	125.0	60.0	55.0

II. Merit / Peer Review Process

University of Missouri

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 REEport portal administrator for the MO AES. 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.

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) will implement 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.

III. Stakeholder Input

1. Actions to Seek

University of Missouri

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 1,6000 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 elect regional and state councils which provide regular feedback at all levels of the university.

In addition, each county is served by a County Engagement Specialist extension 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 Agricultural Experiment Station local and state faculty further build connections to the industries, producers, and policy-makers relevant to their disciplines in order 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.

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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

2. Methods to Identify

University of Missouri

County 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.

Lincoln University of Missouri

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

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 Agency Partners

Local and Rural Community Representatives

Social Media

Newspapers

Job Fairs

3. Methods to Collect

University of Missouri

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 were locally advertised and open to the public. Extension, college, and 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); 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 County Engagement Specialists and Regional Directors to better connect with traditional and non-traditional community members and groups in order 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.

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

Interview Field Day Participants

Interview Workshop Participants

Conduct Surveys

Analyze Information Collected from Ask-An-Expert Cards

4. How Considered

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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, adjusted based on feedback and evaluation. 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 are evaluated based on their ability to connect to stakeholders and the positive impact their work has.

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Stakeholders as Job Providers

Stakeholders as Job Seekers from the Underserved Population in Missouri

Community Volunteers

Community Lay Leaders

Community Educators

IV. Critical Issues

1 Economic Opportunity

Description:

University of Missouri

Context: Missouri's economy ranks 22nd in the nation and just 37th for economic growth. Missouri's economy continues to shift from producing goods to offering services. The Healthcare, Information Technology, Education and Professional Services sectors lead in new job creation. Many businesses and agriculture industries find the pool of skilled, in-state workers unprepared for jobs in these sectors. They expect this skill shortage to increase

over the next decade. Approximately 11% of adults and 16% of children in Missouri live below the poverty line. Approximately 30% of Missourians experience housing cost burden (greater than 30% of income).

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

Term: Long

Science Emphasis Areas

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

2 Educational Attainment

Description:

University of Missouri

Context: 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 twenty-eight percent (28%) hold a bachelor's degree or higher. The Missouri Hospital Association's 2016 Annual Workforce Report shows Missouri's shortage of trained health care workers reflects national trends. This report also shows that healthcare is the largest growing workforce sector. Without adequate high-speed internet, portions of Missouri do not have the capacity to participate in on-line or hybrid-methodology educational opportunities.

We seek to increase engagement with pre-K-12 students by providing educational opportunities in agriculture and other sectors, while introducing them to the value of higher education.

Term: Long

Science Emphasis Areas

Education and Multicultural Alliances
Family & Consumer Sciences
Youth Development

3 Healthy Futures

Description:

University of Missouri

Context: Missouri ranks 40th in America's Health Rankings. High rates of smoking, low rates of dental care as well as increases in drug deaths, low birthweight infants and excessive drinking contribute to the low ranking. Missouri ranks 36th for the number of mental health providers and 41st for dentists. Missouri is the 17th most obese state and the rate of obesity continues increase. Opioid overdoses caused one in every 65 deaths (951) in Missouri during 2017. Forty-six percent of Missouri census tracts contain a food dessert. The number in Missouri experiencing hunger has doubled in the past decade, with over 16% of the state considered food insecure.

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

Term: Long

Science Emphasis Areas

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

4 Social Justice

Description:

Lincoln University of Missouri

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 face food deserts, health disparities and unemployment, among other problems.

Lincoln University Cooperative Extension'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 is 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.

Term: Long

Science Emphasis Areas

Education and Multicultural Alliances
Family & Consumer Sciences
Youth Development

5 Environmental and Natural Resources

Description:

Lincoln University of Missouri

Missouri is a state that is rich in natural resources. With population growth and increasing demands for increased food production 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.

The mission of Lincoln University Cooperative Extension and Research Program is to develop best management practices and technologies that are urgently needed for sustaining agricultural production, enhancing ecosystem health, improving water quality and safety, and safeguarding human health for Missouri residents.

Term: Long

Science Emphasis Areas

Environmental Systems

6 Sustainable Agriculture

Description:

Lincoln University of Missouri

Missouri is an agriculture-based state. The continuous increase in food demands and global environmental changes pose a serious risk to agricultural production systems and producers in Missouri. Under these circumstances, the sustainability of the farming and agri-food system is crucial for food security. Developing climate-smart production systems and value-added, specialty crops and livestock is urgently needed. Both statewide and national crop and livestock production is considered to be high-risk due to frequent and more intense climate changes (e.g., heat, cold, drought, salts and floods). Livestock and crops that can grow better under climate-changed environments (e.g., drought, heat and cold tolerance), insect pest resistance, and crop diversification can increase the profitability of small farms.

It is critical to understand the natural genetic variations of germplasm and develop crop and livestock varieties that can tolerate the extremes of climate changes (so as to manage plant and animal stress effectively) as well as to increase disease resistance among crops. Additionally, to have significant impacts, Missouri needs to design molecular breeding and adaptive management strategies, including speed breeding and gene editing, technologies. Incorporating these new technologies, including genomics, nanotechnology, and low-input production systems, will improve food production systems and biosecurity. With certified organic farms, research infrastructure with modern technologies; and skilled scientists, students and staff needed to achieve sustainability in agriculture and food security, Lincoln University Cooperative Extension and Research has the components and skills needed to ensure a nutritious, safe and healthy food supply that will lead to improved human health and quality of life for Missouri residents.

Term: Long

Science Emphasis Areas

Food Safety

Human Nutrition

Sustainable Agricultural Production Systems

7 Health

Description:

Lincoln University of Missouri

Good health is important for the overall physical, emotional, mental and social health status of all Missourians. Today, Missouri ranks 39th in the nation with respect to health. Lincoln University Cooperative Extension and Research (LUCER) seeks to improve food safety and decrease health disparities in underserved communities. These 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.

Term: Long

Science Emphasis Areas

Family & Consumer Sciences

Food Safety

Human Nutrition

Youth Development

8 Education and Communication with Underserved Populations

Description:

Lincoln University of Missouri

Underserved populations often suffer from lack of employment 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, LU is able to increase and improve constituents' skill sets, preparing them for gainful employment.

Term: Long

Science Emphasis Areas

Education and Multicultural Alliances

Family & Consumer Sciences

Youth Development