

Oklahoma (Langston University, Oklahoma State University Combined)

Plan of Work for 2023-2027

Status: Final (Approved 9/30/2022)

Executive Summary Overview

This is a joint plan of work for the Oklahoma Agricultural Experiment Station (OAES) at Oklahoma State University, the Oklahoma Cooperative Extension Service (OCES) at Oklahoma State University, and the Research and Cooperative Extension Programs at Langston University (LU).

Oklahoma contains many natural resources, agricultural production regions, commodities, communities, families, businesses, and industries. The state ranks 5th nationally in the number of farms and 8th in farm acreage. Vast forage production areas, the ability to graze winter wheat, and the sub-climate of the high plains have made cattle production an enormous industry in Oklahoma, ranking 4th nationally in cattle and calves. Wheat, poultry, hay for sale, cotton, nursery crops, forest products, oilseed crops, nuts and vegetables all play an essential role in the broad agricultural economy. The level of value added to raw products in the state is low and needs to improve to continue to help diversify rural economies.

Considerable fluctuations in weather from recurring statewide drought to periodic flooding present challenges for research and Extension and will continue to have significant implications on agriculture and natural resources in the state. Natural resource management is significantly affected by ecosystem degradation and loss of services, land use changes and habitat fragmentation, water availability, and climate change. These challenges summarize a global phenomenon in which human activities directly and indirectly influence the management of natural resources. A considerable untapped opportunity exists for the improved use of natural resources for recreation and the development of bio-based industries with an emphasis on sustainable energy.

Human health issues are significant economic and social concerns. Oklahoma often ranks high in risk factors such as child and adult obesity, heart disease, and diabetes. Rapidly changing communities ranging in population from rural to urban also exist within the state's boundaries. Programs must be adapted for the state's broad and rich ethnic, cultural, and social diversity. Issues, challenges, and opportunities concerning agricultural production, the environment and natural resources, communities and markets, scientific discovery, economic downturn, and technology development exist within Oklahoma, the region, and the nation.

Langston University, as an 1890 Land Grant, focuses explicitly on underserved communities throughout the State. That is our mandate. The goal of Langston University School of Agriculture and Applied Sciences (LU-SAAS) Cooperative Extension and Outreach program (CEOP) is to engage communities across Oklahoma and beyond through vibrant Extension and outreach programs to help individuals and groups identify and meet local needs through a research-based educational program that positively impact economic well-being and community development. Langston University Research and

Cooperative Extension Programs are dedicated to serving all citizens of Oklahoma. However, programs and delivery methods are often designed to address the needs of the state's under-served and under-represented diverse populations, tiny farmers and limited resource consumers. Langston University Cooperative Extension and Outreach efforts are designed to serve as vehicles to take scholarly, peer-reviewed, and stakeholder-driven research findings, demonstrations, and education activities to the citizens of Oklahoma, many of whom still dwell on the other side of the great digital divide.

Partnerships will be built with local communities, producer groups, and other organizations to assist them in finding and applying for development grants and other support means. The partnerships will also create backward and forward linkages that will foster further research, student recruitment, and more effective engagements with the SAAS. Youth, community, and family development will be streamlined to be efficient, impactful and reflect holistic programming that cuts across multiple disciplines.

Extension and outreach programs in the SAAS synergistically link Langston University to communities throughout Oklahoma and beyond. A strong Cooperative Extension program is central to the mission of a Land Grant University. Extension and outreach Programs aim to disseminate research-based educational information in response to the needs of producers and consumers. The school's natural base is the limited resources of household/small-scale beginner farmers/ranchers and small businesses. All available resources will be devoted to ensuring that this base benefits from the work undertaken by the SAAS. Small-scale producers and companies will be empowered to improve their production systems, accounting, record keeping, and marketing systems to increase profitability and economic sustainability.

The SAAS American Institute for Goat Research (AIGR) has grown tremendously and is among the foremost goat research facilities in the world. As AIGR continues to grow, new avenues will seek to diversify its expansion to maintain its competitive edge and increase its economic contribution to local communities. Also, the demand for value-added products from goats has increased; efforts will, therefore, be made to introduce a Product Development Center to complement the AIGR broad research and extension focus. Feasibility analysis will be done, and bold steps will be taken to ensure these activities become a reality. High-technology greenhouses, hoop houses, plasticulture, aquaponics, and other facilities are being introduced into research and extension offerings. The collaboration will also be sought with the USDA and other agencies to reboot plant biotechnology research and extension programs and create a vital link with the forthcoming horticulture program. Understanding the economic rationale and feasibility of all components of production agriculture and consumer decision-making is essential. Efforts are on the way to strengthen agribusiness and economic analyses in research and several areas of extension operations.

LU-SAAS COEP works closely with Oklahoma State University in our concerted effort to meet the needs of underserved communities throughout Oklahoma. Receiving the full state match will allow Langston University to expand research and extension offerings and build the capacity necessary to reach and improve the economic and social well-being of underserved communities, producers, and consumers throughout the State. LU-SAAS also works closely with the 1994 Land Grant institution in Oklahoma. The 1994 Land Grant is from the College of Muscogee Nation in Okmulgee. LU-SAAS COEP focuses on African American, Hispanic, Native American, and Hmong populations, and small land-holding producers and householders throughout the State. This focus helps ensure that through the efforts of all three Land

Grant institutions there is an equitable opportunity for all Oklahomans, no matter their socioeconomic status, ethnicity, financial resources, community location, or scale of production.

The OAES and OCES missions provide direction to address the issues, challenges and opportunities discussed above. As part of the Land Grant System, the OAES and OCES provide a continuum from the generation of knowledge and technologies to the transfer of the knowledge and technologies and their practical applications to the final users. The OAES research problems and needs are identified throughout the agricultural, food and natural resource systems and the scientific community. OCES delivers research-based education, technology, and information for agricultural producers, food and agricultural businesses, families, youth, and communities. Much of the needs assessment occurs at the grassroots level through the OCES and industry, commodity groups, community organizations, advisory boards, professional associations, agencies and governmental entities. The issues and challenges identified are diverse and complex. In recognition of this reality, the OAES and OCES have organized much of their efforts into multi-disciplinary, issue-based teams. In addition, most teams have members representing research and extension programming efforts. The programming presented in this plan of work was primarily developed by many of these teams.

This plan of work represents only a portion of the total effort of the OAES and OCES. However, it does mean the breadth of work to be done and addresses many of the high-priority issues identified by stakeholders. Just as the teams are integrated from a research and extension standpoint and among disciplines, they are combined concerning funding sources. This plan includes more effort than that which could be accomplished by the federal appropriations and the required match alone. Each program likely relies on federal funding, state and local funding, and grant and contract resources.

The goal of this plan developed by the OAES and OCES is to use scientific knowledge and related technologies and information to help Oklahoma, the region, and the nation use its agricultural, natural resource, and human base to foster economic development, improve the environment and its management, and the quality of life of its citizens. The impacts of these efforts include economically successful and competitive agricultural and natural resource producers, an adequate supply of healthy food, a healthy and well-nourished population, a balanced and thriving ecosystem with environmentally-sustainable industries, and enhanced economic opportunity and quality of life for all of Oklahoma's residents. OCES and OAES programs also reach beyond the state, region and nation as programs improving grain and food storage, fertilizer use, horticulture crop production, food processing and many more touching developing countries around the world and helping to improve stability and security.

Merit and Scientific Peer Review Processes

Whether supported by Hatch or McIntire-Stennis funds, Oklahoma Experiment Station projects are peer-reviewed before submission. It should be noted that stakeholder input into the research areas to be pursued by the scientists could be considered the initial step in the review process. This valuable input helps in the merit and relevancy of our projects; it is a continual practice during the decision process to direct research efforts to high-priority needs. Each department in OAES is required to have three reviews for a project, with one of those reviews being external to the department. The external reviewer will be from another department in the Division, another College at OSU, or another state with expertise in the area. The reviews are approved at departmental and OAES Directorate levels before submission to NIFA. The principal investigator is required to respond to the comments provided by the reviewers

before final approval is granted. All individual OCES plans of work are reviewed for quality and relevance by at least two individuals with the program and administrative responsibility pertinent to the individual's program area. The reviewers assess the merit of the program plans of work concerning issues, needs, and problems identified through stakeholder input and the quantity of effort planned for the appointment. They intend to evaluate and report program quality and impact.

Langston University School of Agriculture and Applied Sciences (LU-SAAS) requires an internal review of Research and Extension project proposals for Evans-Allen Research Grants, 1890 Capacity grants and other related grants. This internal review process requires researchers to prepare proposals submitted to the Director of Research for review. The Director of Research reviews the Evans-Allen proposals to ensure that the recommendations follow the strategic research plan and align with the stakeholder input summary. A Scientific Review Committee then assesses methodology, scientific merit, the feasibility of the research, and industry impact. The principal investigators must make any recommended revisions before the committee approves the proposals. Once the proposal is approved it is forwarded to the Director of 1890 Land Grant Programs for final compliance checks and approval. LU-SAAS Extension teams, under the guidance of the Extension Administrator, develop annual work plans to implement the four Extension Focus Areas. Since LU-SAAS Cooperative Extension Programming is community-based, programming is produced in response to the stakeholder input from clusters of both urban and rural communities. Annual work plans are reviewed by the Extension leadership team representing all focus areas. The Extension Administrator reviews the work plans and if revisions are required the Extension teams must make the recommended revisions. These annual work plans are then submitted to the Director of 1890 Land Grant Programs for final compliance checks and approval. This process helps LU-SAAS Administrators guide the research and extension teams in appropriate resource allocation and programming decisions.

Stakeholder input: Action Taken to Seek Stakeholder Input

Use of media to announce public meetings and listening sessions

Targeted invitation to traditional stakeholder groups

Targeted invitation to non-traditional stakeholder groups

Targeted invitation to traditional stakeholder individuals

Targeted invitation to non-traditional stakeholder individuals

Targeted invitation to selected individuals from the general public

Survey of traditional stakeholder groups

Survey of traditional stakeholder individuals

Survey of the general public

Survey specifically with non-traditional individuals

Survey of selected individuals from the general public

Other (Professional journals, meetings, etc.)

Collecting, analyzing, and communicating stakeholder input is a continuous and broad-based process within the Oklahoma Cooperative Extension Service (OCES) and the Oklahoma Agricultural Experiment Station (OAES). The Division of Agricultural Sciences and Natural Resources (DASNR) has a broad-based advisory council representing industry, agencies and communities. A multi-round, consensus-seeking approach, commonly known as the Delphi method, was employed to gather input from stakeholders regarding long term goals. The process collects data utilizing a series of questionnaires administered to a panel of experts. In addition, all the DASNR units have one or more advisory committees. A set of "drivers" and goals helps guide priorities and direction to decisions. In the spring and summer of 2019, OSU Extension hosted community forums at sites across the state of Oklahoma. The forums sought to ensure that a wide range of community members was engaged to represent their opinions and perspectives on important issues in OSU Extension's strategic planning. OAES and OCES use OSU and DASNR media resources to seek input from traditional and new stakeholders. Other strategies include attending meetings with commodity groups, feedback from grantors, advisory committees and boards, feedback at professional conferences, grower contacts, attending regional research and extension committees, feedback on journal manuscript submissions, feedback on grant proposals, RFPs for grants, attending scientific society meetings, and direct contacts with producers, growers, processors, manufacturers, community leaders. Seeking stakeholder input will also include targeting agencies and governmental and non-governmental entities. OCES continues to seek feedback to improve programming for Native American tribes and tribal members. Meetings include numerous tribal leaders and span programming from youth to natural resources. These meetings have resulted in practical programming efforts that we expect to lead to more jointly directed programming and further grass-roots input. LU-SAAS uses a process of engaging leadership from a network of community-based organizations to get stakeholder participation. The process is ongoing throughout the year and includes quarterly meetings with stakeholders and advisory committees. LU-SAAS research and extension teams utilize major events to gather stakeholder input about essential issues and barriers to their continued production. Surveys and focus group discussions will be used.

Stakeholder input: Methods to Identify Individuals and Groups

The OCES has a well-defined program advisory committee system that provides grassroots input for program planning. Once or twice a year, county extension staff seek information from program advisory committee (PAC) members on program needs related to OCES/OAES strategic program priority areas. Advisory committee members are selected to represent various geographic areas of each county. They represent agricultural interests, youth, families, community and government leaders, and the general public. Committee members also represent the ethnic diversity of the county, as well as different socioeconomic groups.

District Extension Program Specialists compile priority issues identified by county PACs. The District Specialists summarize the problems within each strategic program priority and make them available to District Directors and the state office. District priority issues are reviewed and compiled at the state office and provided on the OCES website. These needs are given special attention in the development of individual plans of work. They also provide direction for significant Extension and research programs.

Another formal means of acquiring stakeholder input is developing and revising the Division of Agriculture and Natural Resources strategic plan. In that process, considerable effort is made to create internal and external input to OSU and the Division's research and extension efforts. Drafts of the

strategic plan are widely distributed with information coming directly to the VP of Agricultural Programs.

Input on stakeholders' research directions is solicited in many ways in addition to the traditional communication with departments. Each department prepares its strategic plan in concert with that of the Division. Faculty and staff input is actively sought in standing and ad hoc committees, and faculty teams may jointly prepare "white papers" on specific issues of concern. External stakeholder input is also received from many different sources. Information, review, listening and update sessions are held periodically with user groups to identify needs and share research results. Each organization comprises members spanning the state's ethnic and socioeconomic groups. OAES/OCES also initiate communication with under-served and under-represented citizens including Oklahoma's Native American nations, the African American community, the Oklahoma City Latino community, and other minority groups or underserved groups. Additionally, there is frequent interaction with commodity-based organizations, the American Farmers and Ranchers organization and the Oklahoma Farm Bureau. Other opportunities for face-to-face interactions with our constituents are provided at numerous field days and community programs.

OAES/OCES continues seeking input from agencies and associations representing the state's businesses and communities, such as the Oklahoma Small Business Bureau. State agricultural representatives in the Oklahoma Department of Agriculture are in frequent communication, as is Oklahoma legislative and administrative groups and Federal agencies.

LU-SAAS has a growing network of producers, consumers and other stakeholders seeking interaction with LU-SAAS programming. This is predominately among traditionally underserved populations, including African American, Hispanic, Native American, and Hmong American populations. Small ruminant producers (Goats and Sheep) throughout the State and the region are essential targets because of the prominence of AIGR at LU. Events such as LU Goat Field Day and the LU Annual Small Farm conference among other workshops have been utilized to develop a network of individuals and community-based organizations that help identify additional participants to add to the network. Close coordination and joint projects with OCES allow for mutual sharing of input from new stakeholders.

Stakeholder input: Methods for Collecting Stakeholder Input

Stakeholder input is gathered by meeting with traditional stakeholder groups, individuals, and the general public. When appropriate, widespread surveys gather input from these same groups. Stakeholder information is obtained from surveys and session evaluations during demonstrations, seminars, workshops, and field days.

Additional direction and input are collected through the DASNR Initiative Teams' planning and budget request process. Each year, all DASNR program teams are asked to make a special effort to scan the environment, and revisit their plans of work in light of the "drivers" identified in the DASNR planning process explained in the "Plan Overview" section. Teams revise their situation, goals, activities, outputs, and outcomes. OCES is currently conducting community engagement sessions to gather input from stakeholders regarding priority programs that can impact their communities.

LU-SAAS uses standard methods to collect stakeholder input. These include meetings, surveys, open forums, focus group discussions with traditionally disadvantaged groups, and conferences gathered

from quarterly partnership meetings and agricultural field days. This information is collected by research and extension teams and regularly reviewed to assess the progress of reaching goals and overall objectives of the research and extension programs.

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

Stakeholder input is considered in all of the above situations. Working with our state legislature to secure new recurring and special funding is essential. In addition, it plays a vital role in identifying the faculty and other professional position priorities in the hiring process. In addition to these tactical moves, they can also play a significant role in strategic changes. For example, stakeholder input was critical in developing and hiring a new forage research and Extension cluster within the Division. Grassroots stakeholder input is the driving force in developing county educators' and area specialists' individual 5-year plans of work and annual planning efforts. Stakeholder input and results are part of the extension field staff career ladder criteria. Many of our research and extension programs work closely with commodity groups and their related research/education foundations to develop a standard set of priorities for applied research and extension projects in the state. Food processing and quality research are often strongly influenced by an advisory committee and the individual manufacturers and entrepreneurs with whom the Food and Agricultural Products Center works. Federal initiatives and grant opportunities also provide input that helps mold and direct some efforts. Specific listening opportunities and advisory groups often bring about significant programming changes such as a strong emphasis on research in wheat quality and performance or the need for education in diet and nutrition. Last year's advisory group input resulted in the filling/opening positions in food safety, poultry production and waste management, animal nutrition, climatic impacts on cropping systems, and oilseeds/cutting techniques to strengthen identified high-priority program areas. The Oklahoma extension service and agricultural experiment station have 25 active teams working on issues important to the people of Oklahoma, the region, and the nation.

LU-SAAS utilizes stakeholder input to guide new grant initiatives' development and decide how to increase extension staffing and fill new research positions. With traditionally disadvantaged population segments that LU-SAAS works with, it is vital for community engagement that stakeholders have a strong sense that their contributions are valued and acted upon.

Critical Issues

Animal Production Enterprises

Initiated on: Nov 26, 2019

State: Oklahoma

Term Length: Intermediate (1-5 years)

Animal enterprises, including cattle, sheep, goats, swine, poultry, and aquaculture, represent a large segment of Oklahoma's rural and agricultural economy. Consequently, Oklahoma's economic well-being is directly tied to factors that influence the ability of animal enterprises to remain profitable in a sustainable fashion. Volatility in input prices for items such as fertilizer and feed and the value of animal products have increased economic risk. Variable climate patterns have introduced new production challenges. Land prices continue to increase as well, which may create a barrier to entry for the

increasing number of small acreage producers and affect commodities produced. Consumers are increasingly concerned about the sustainability and ethics of methods used to raise food animals.

Science Emphasis Area

Agroclimate Science, Environmental Systems, Food Safety, Sustainable Agricultural Production Systems

Economic Development and Poverty Alleviation

Initiated on: Nov 26, 2019

State: Oklahoma

Term Length: Intermediate (1-5 years)

Oklahoma has many small towns and rural communities that are declining in population because of lack of opportunity for young people and early to middle age working age people. This outmigration leaves an aging population with diminished municipal revenue to support infrastructure and maintain vibrancy in these communities. There is a similar dynamic occurring in resource poor urban neighborhoods. This is especially true among predominately Native American, African-American, and Hispanic neighborhoods and towns. Traditional social networks and that supported civic engagement, economic well-being, social safety net, and economic productivity have weakened and need strengthening to allow for vibrant economies and communities. Poverty factors limit the strategies families and individuals can utilize. Individuals struggle to increase income that allows for family life and for investing in their communities.

Science Emphasis Area

Family & Consumer Sciences, Youth Development

Environment and Natural Resources

Initiated on: Nov 26, 2019

State: Oklahoma

Term Length: Long-term (>5 years)

Oklahoma contains a vast array of ecosystems due the variability in soil types, climatic conditions, altitude, and land use. Management of natural resources is significantly affected by ecosystem degradation and loss of services, land use changes and habitat fragmentation, and climate variability. Oklahoma has always suffered from weather extremes, resulting in increased risks to human safety, agricultural production, and shifts in natural communities of plants and animals. The recent number and severity of floods, droughts, extreme temperatures, storms and wildfires in Oklahoma will pose a challenge to human health and to native populations of plants and animals, as well as create habitat conditions more conducive to invasive species.

Science Emphasis Area

Agroclimate Science, Environmental Systems, Sustainable Agricultural Production Systems

Family and Child Resilience

Initiated on: Nov 26, 2019

State: Oklahoma

Term Length: Intermediate (1-5 years)

Children in Oklahoma are twice as likely (45%) as the national average (22%) to experience three or more adverse events (e.g., abuse, neglect, violence). Family dysfunction increases these numbers to at least 300,000 children per birth cohort. Not surprisingly, Oklahoma has some of the worst rates of female incarceration, obesity, teen pregnancy, drug use, mental illness, divorce, school dropout, foster children, and premature death. Inadequate elder care means 600,000 Oklahomans look after an aging family member, with 84% requesting information or training. Education and access to services are critical to improving these caregivers' well-being. Improving parenting skills, family breakdown, and youth ability to overcome adversity are critical to Oklahoma's children and adolescents.

Science Emphasis Area

Food Safety and Food Insecurity

Initiated on: Nov 26, 2019

State: Oklahoma

Term Length: Intermediate (1-5 years)

An increasing number of producers are looking to increase production of food items for local and regional markets and see this as the best option to make small acreage crop and animal production viable. They face concerns about producing, packaging and providing a safe product to consumers. Food Nearly 1 in 4 children in Oklahoma and in the United States live in households that do not have access to enough nutritious food to support good health (Feeding America, 2016). Fifty-four of seventy-seven (54/77) counties and 17.5 percent of Oklahoma households experience food insecurity and 1 in 6 people experience hunger (US Census Bureau, 2018). In many Oklahoma counties significant numbers of children and families are at risk for food insecurity and often depend on feeding programs. Poverty in many of these areas exceed 25 percent, and educational attainment in many rural and inner-city areas is below the national average.

Science Emphasis Area

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

Human Health and Hunger

Initiated on: Nov 26, 2019

State: Oklahoma

Term Length: Intermediate (1-5 years)

Poor diet and physical inactivity increase the risk of obesity, which in turn increases the risk of diabetes and cardiovascular disease. In Oklahoma, 15,500 lives could be saved annually through better prevention and treatment of chronic disease. The state's above average poverty rate has led to high levels of hunger and food insecurity, which is associated with chronic disease. Food insecurity is linked to lower reading and math scores, and lower high-school graduation rates for youth. For the adult population, food insecurity decreases educational attainment, increases healthcare costs, and weakens the labor force. Poor food resource management skills and a lack of food preparation and food safety skills are detrimental to the health and welfare of Oklahomans.

Science Emphasis Area

Family & Consumer Sciences, Food Safety, Human Nutrition, Youth Development

Personal Finances and Job Readiness

Initiated on: Nov 26, 2019

State: Oklahoma

Term Length: Intermediate (1-5 years)

Oklahoma is 43rd in the nation in unbanked and 37th in the nation in underbanked households, families without saving accounts, and consumers with subprime credit. The state ranks 48th nationally in number of high cost mortgage loans and 47th in the number of uninsured. Oklahoma has one of the highest student loan default rates in the nation, at 39th. Oklahoma is 33rd in the nation in ID theft. The percentage of Oklahomans in low-wage jobs is 30%, which is 38th nationally. The number of Oklahomans working after the age of 65 has doubled since 2001. Irresponsible use of social media can eliminate a job applicant from consideration for employment. Ten percent of 16-34 year olds are not hired because of inappropriate social media activities.

Science Emphasis Area

Family & Consumer Sciences, Youth Development

Plant Systems

Initiated on: Nov 26, 2019

State: Oklahoma

Term Length: Intermediate (1-5 years)

The resilience of the continuous wheat production system has made it a staple of Oklahoma agriculture, but overreliance on a single production system and a lack of crop diversity have reduced soil health in the region and created weed, insect, and disease problems that must be addressed through systems-based approaches that includes a reduction in tillage and crop rotation. Additionally, biotic and abiotic stresses including viruses, insects, pathogens, and environmental stresses including temperature, water (drought), and oxidative stresses create a challenging environment for crops, gardens, and turf. Turf is the largest intensively managed plant system in the U.S. based on acreage. There is an increasing demand from non-traditional producers technical support for horticultural crops ranging from vegetable to fiber crops. The demand is for an agricultural systems approach.

Science Emphasis Area

Agroclimate Science, Education and Multicultural Alliances, Environmental Systems, Sustainable Agricultural Production Systems

Youth Development

Initiated on: Nov 26, 2019

State: Oklahoma

Term Length: Long-term (>5 years)

4-H uses the principles of positive youth development to create learning experiences, develop relationships between youth and adults, create safe environments; and provide opportunities for positive risk taking.

4-H promotes healthy youth development by helping young people develop the skills necessary to become responsible citizens and drivers of community change. By understanding the complex experiences that youth face and through the promotion of high quality youth leadership development, 4-H helps youth meet the challenges of adolescence and transition to adulthood. Using youth-adult partnerships, 4-H connects youth and adults to their communities, preparing them for work and life. The 4-H program engages youth and adults in intentional, experiential, and inquiry-based learning while providing emerging research to highlight positive youth development.

Science Emphasis Area

Youth Development