2017 Oklahoma State University and Langston University Combined Research and Extension Plan of Work

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I. Plan Overview

1. Brief Summary about Plan Of Work

This plan of work is a joint plan 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 a broad array of natural resources, agricultural production regions, commodities produced, communities, families, businesses, and industries. 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. Wheat, poultry, hay for sale, cotton, nursery crops, forest products, oilseed crops, nuts and vegetables all play an important role in the broad agricultural economy. Statewide drought in 2011-2013 and a continued persistent drought in the western half of the state present challenges for both research and extension and have and will continue to have significant implications for at least the intermediate term on agriculture and natural resources in the state. Management of natural resources 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, both directly and indirectly, influence the management of natural resources. Rapidly changing communities ranging in population from those defined as frontier-like to thriving cities also exist within the state's boundaries. High levels of unemployment and low incomes plague portions of the state. Falling oil and gas prices will continue to have negative effects on employment and state funding of programs. Human health issues are major economic and social concerns as Oklahoma often ranks high in risk factors such as child and adult obesity and diseases such as heart disease and diabetes. The level of value added to raw products in the state is low and needs to improve to continue to help diversify rural economies. The state has a broad and rich ethnic, cultural and social diversity. 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. Oklahoma does not sit in a vacuum. Issues, challenges, and opportunities with respect to agricultural production, the environment and natural resources, communities and markets, scientific discovery, economic downturn, and technology development exist with Oklahoma's neighbor states, within the region and nation.

Langston University Research and Cooperative Extension Program Goals

Langston University Research and Cooperative Extension Programs are dedicated to serving all citizens of Oklahoma. However, programs and methods of delivery are often designed to address the needs of under-served and under-represented diverse populations of the state; especially small farmers. 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. This Plan of Work (POW) includes goals and expected outcomes and impacts. Projected outcomes and impacts will include providing deliverables that contribute to enhancing the economic status,

health and quality of life for the citizens of Oklahoma; and to make them more competitive as viable producers in niche markets and in the greater global agricultural arena.

OAES and OCES Planning Process

OAES and OCES identified a set of **"drivers"** as highly influential in shaping many of the issues expected to be important to Oklahoma citizens, agriculture, natural resources, families, businesses, and communities, as well as, scientific inquiry in the future. These drivers continue to influence planning by OAES and OCES.

- **Climate Variability**
- **Consumer and Public Preferences and Expectations**
- **Energy**
- **Land Use and Natural Resources**
- **Market Volatility**
- **Pests and Invasive Species**
- **Population and Demographics**
- **Public Policy & Government Regulation**
- **Quality of Life**
- **Water**
- **Technology**

Goals are reviewed annually based on the drivers and the input from the broad-based advisory groups accessed by the Division. However, during the spring of 2016, OSU Division of Agricultural Sciences and Natural Resources (DASNR) will undertake a process to identify future priorities for the Division. A multi-round, consensus seeking approach, commonly known as the Delphi method, will be employed to gather input from stakeholders. The process collects data utilizing a series of questionnaires administered to a panel of experts. For the purposes of this study, the panel will be identified by DASNR administrators with a goal to include persons representing the diversity of the Division and its clientele. The first round of the process is open-ended, calling for panelists to list what they believe to be future priorities for the Division, from their perspective. Those responses are used to create items used in the second round. Here, panelists rate each item using closed-ended, scaled responses. As consensus is formed around particular items, additional rounds are used to reach and affirm agreement about priorities.

OAES GOALS

Develop systems that add value to and increase efficiency, safety and sustainability of animal and plant production systems.

Research efforts will seek to: 1) increase nutritive value, improve food safety, and reduce risk associated with climate variability and increased competition for water; 2) develop systems capable of maintaining economically sustainable levels of production, and identify economically and environmentally sustainable methods of control for pests and invasive species that threaten Oklahoma's agriculture, environment, economy and population to include pests affecting agricultural production (animal and plant), turf, ornamentals, human health, food safety, conservation and natural resources (e.g. forests, lakes, streams, rangeland, wildlife); and 3) develop new products that are derived from agricultural products grown in Oklahoma.

Develop renewable sources of energy.

Researchers will develop knowledge and technology and integrate into systems that can provide new potential sources of income for Oklahoma. Research efforts will seek to identify agricultural production systems and best management practices to help conserve energy (renewable or nonrenewable) and reduce the cost of production.

Evaluate existing and new marketing and economic development systems and public policies.

Research programs will be developed to evaluate marketing systems and government policies that affect the lives of Oklahoma's agricultural producers and consumers. Researchers will provide recommendations to producers and government officials to aid in their decision making process to help ensure marketing and policy systems are economically sustainable.

Develop best management practices to help conserve Oklahoma's vast natural resources.

Oklahoma's land, air and water resources and wildlife (i.e. forests, wild animal and plant populations, rangeland, soils, lakes and streams) provide benefits for all Oklahomans. Research will be conducted to design and develop management methods to use natural resources in a sustainable, economically and environmentally sound manner.

Develop effective management practices and efficient systems that sustain and conserve water resources.

Oklahoma's water resources provide benefits for all Oklahomans. Research will be conducted to develop the best management practices to sustain water resources and to use water in the most efficient, effective, environmentally sound and equitable manner for all citizens and segments of the economy and in support of our other natural resources.

OCES GOALS

Provide educational opportunities to help improve the quality of life for all Oklahomans.

Achieving this goal will require expanding the diversity of the audiences we serve and the delivery of educational and service programs that improve the vitality and sustainability of Oklahoma's families, businesses, and rural and urban communities. Through these programs, OCES will address identified issues and needs such as those related to health, family resiliency, understanding of food and fiber production, personal finances, nutrition, food safety and security, housing, economic development, recreation, land and resource use, human capital, and youth competencies in science, life skills and critical thinking.

Educate and inform crop and livestock producers and landowners of appropriate new technologies, changing production methods and economic conditions that impact their businesses.

Examples include changes resulting from higher energy costs and the potential use of forages for energy production. Both will lead to changes in cropping systems and livestock feed sources. The drivers identified indicate there will be increased competition for water that will call for less irrigation and/or more efficiency in plant water use (drought-resistant plants, etc.). Other factors include climate variability, rising input costs, evolving markets, food safety issues, and changing government policies and regulations.

Increase natural resource conservation and environmental educational programming.

Chief among these educational programs will be programs on best management practices for the conservation of energy and water resources. Other conservation education efforts include (but are not limited to) soil and wildlife conservation, management of pests and invasive species, and environmental protection. These efforts will include programming for many audiences in the general population, as well as agricultural producers.

Develop and conduct enhanced risk management educational programs.

Agricultural and natural resource managers have always faced substantial risks from weather and changing markets. But recent events (drought, record-level commodity and input prices) and a number of leading drivers identified as influencing Oklahoma's agriculture (climate variability, energy, market

variability, water, pests and invasive species, and government policies and regulations), indicate higher levels of risk in the future. These programs should help managers design organization, production, marketing and management systems that improve sustainability in the face of increased risk levels.

Make a positive difference in the lives of more Oklahoma 4-H members with emphasis on 4-H programs to attract more minority and urban youth.

The goal of 4-H is to provide youth with life skills that contribute to them being better citizens and more resilient individuals. National research has shown the advantages of 4-H participation include higher educational accomplishment and higher motivation for future education. In addition, youth in 4-H are more civically active and make more community and civic contributions than youth in other out-of-school activities. These accomplishments and impacts are because of the positive youth development provided by state Extension specialists and the supportive families, caring volunteers and dedicated county educators who work with youth.

Summary

The OAES and OCES missions provide direction to address all of the issues, challenges and opportunities related to the areas 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 deals with research problems and needs that are identified throughout the agricultural, food and natural resource systems and within the scientific community. OCES concentrates on the delivery of research-based education, technology, and information for agricultural producers, food and agricultural businesses, families and youth, and communities. Much of the needs assessment occurs at the grassroots level through the OCES, as well as, through industry, commodity groups, community organizations, advisory boards, professional associations, agencies and governmental entities. Most of 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, issued-based teams. In addition, most teams have members representing research and extension programming efforts. The programming presented in this plan of work was largely 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 represent 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 integrated with respect to funding sources. This plan includes more effort than that which could be accomplished by the federal appropriations and the required match alone. Each program is likely to employ federal funding, state and/or local funding as well as grant and contract resources.

The overall goal of this plan developed by the OAES and OCES is to use scientific knowledge and related technologies and information to help Oklahoma (as well as the region and 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.

Estimated Number of Professional FTEs/SYs total in the State.

Year	Extension		Research	
	1862	1890	1862	1890
2017	240.0	21.0	83.0	22.0
2018	230.0	21.0	83.0	22.0
2019	220.0	21.0	80.0	22.0
2020	220.0	21.0	80.0	22.0
2021	220.0	21.0	80.0	22.0

II. Merit Review Process

1. The Merit Review Process that will be Employed during the 5-Year POW Cycle

- Internal University Panel
- External University Panel
- Combined External and Internal University Panel
- Expert Peer Review
- Other (Administrative Review)

2. Brief Explanation

All Experiment Station projects, whether supported by Hatch or McIntire-Stennis funds, are peer reviewed prior to submission. It should be noted that stakeholder input into the planning process, position priorities, and research areas to be pursued by the scientists could be considered as 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 fill new positions, and direct research efforts and approaches to high priority needs.

Each project in OAES is required to have three reviews (selected by the appropriate Department Head), with one of those reviews being external to the department. In those cases, this will be from another department in the Division, from another College at OSU, or another state with expertise in the area. These reviews are approved at both the 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. Most departments utilize the attached checklist.

All OAES/OCES teams are required to have a team plan of work which is reviewed by team members, the administrative leaders, and the appropriate OAES/OCES assistant and associate directors. All team plans of work are reviewed with respect to relevance, the Division Strategic Plan, stakeholder input, and team competitive advantage. All individual OCES plans of work developed by county, area, district and state program professionals are reviewed in

reference to quality and relevance by at least one or more individuals with program and/or administrative responsibility pertinent to the individual's program area. The reviewers assess the merit of the program plans of work with respect to issues, needs, and problems identified through stakeholder input, quantity of effort planned in relation to appointment, and plans to evaluate and report program quality and impact. County Educator plans are reviewed by the appropriate district subject matter specialist, district director, and state program leader (when appropriate). Area and district specialist plans are reviewed by the district director, the subject matter department head, and/or appropriate assistant director/state program leader. State specialist plans are reviewed by the appropriate department head.

Currently, all new Langston University Extension and Research programs are reviewed by respective panels composed of colleagues and managers.This process was in place during the last 5-Year Plan of Work. All approved programs are reviewed to determine how inputs will lead to outputs, outcomes and impacts.

III. Evaluation of Multis & Joint Activities

1. How will the planned programs address the critical issues of strategic importance, including those identified by the stakeholders?

The planned programs are based on input from stakeholder groups (see stakeholder sections), staff, and scientists who identified high priority issues. Some are programs are long-term and enduring in nature and others may be relatively new and directed at recently identified priorities. NIFA and Oklahoma State University strategic plans as well as state and federal legislative initiatives play a role in which priority issues can and will be addressed. In many cases, stakeholders are involved in the implementation of applied research efforts and educational/demonstration activities. Numerous stakeholder groups provide funding to help undertake high priority programming on issues deemed to have strategic importance to those stakeholders.

Often surveys, questionnaires and in-person feedback from stakeholders have provided valuable information that has been used in planning programs and in determining which direction programs will proceed.

2. How will the planned programs address the needs of under-served and under-represented populations of the State(s)?

In general,all Langston University programs reach under-served and under-represented groups.The following are examples of the work being performed.

Program 2. Many minority children in rural and inner city areas have been reached and become involved in 4-H. The 4-H SET Program also reaches minority youth.

Program 3. Minority children have been enrolled in this program and had their reading skills enriched both during the summer months and after school during the regular school year.

Program 4. This program has reached elderly minorities, presented them with tips for good nutrition and taught them age-appropriate exercise techniques.

Program 8. Small fish producers are seeing the value of working with alternative fish species such as the buffalo.

Program 11. Goat producers are able to go on line and access valuable instructional modules.

Program 13. Many small to medium-sized goat producers have received information and/or hands-on instructions to enhance their operations and improve the quality of their herds.

Program 14. Small fish producers have benefited from selling their fish directly to the public.

In general all OAES research programs serve to train a multicultural group of graduate students. The Division diversity plan encourages all teams and units to seek means and methods to be more inclusive of diverse personnel and audiences. OAES actively participates in the Bridge to Doctorate Program for undergraduate students from the Louis Stokes Alliance for Minority Participation (LSAMP).

The Oklahoma Cooperative Extension Service will continue to support multicultural and community engagement efforts through a project called Build an Intercultural Competent Community. The objective of this project is to contribute and develop new skills, knowledge and abilities for Extension educators and specialists, to better reach and serve people from different cultures in the state of Oklahoma. This effort includes five strategies to prepare Extension educators/specialists to serve a growing multicultural population. These are:

1. Assessment; 2. Coaching; 3. Training; 4. Development of written materials; 5.Intercultural Exchange program

Five trainings were conducted to help OCES personnel improve intercultural competencies. The two new factsheet, "Learning about My Culture" and "Values, Stereotypes, Prejudice, and Discrimination", were distributed to educators and Extension audiences and "Intercultural Competence online training for Extension Educators continued to be used. In addition a cultural learning experience was planned for a group of educators and specialists to spend a week with Mexican families and attend special tours and seminars in Mexico.

In 2015, approximately 13.7% of all attendees at OCES events were Native American origin. This is about 50% above the U.S. Census Bureau estimate of 9.0% of all Oklahomans as Native American. We continue to make special efforts to reach the Native American community including a special set of talks with leaders of some of the tribes sponsored by our university president and through pursuit of special grants to direct youth programming toward tribal youth. Estimates show that events drew 4.1% African Americans compared to 7.7% in the general population - however, only 1.6% of the farm operators are African American and 4.9% of OCES agricultural program audiences were identified to be African American. While there are difficulties of estimating Hispanic participants it would appear that about 5.1% attendees could be identified as Hispanic. We continue to try new means to improve Hispanic participation including cultural awareness training, translation and purchase of Spanish language materials, and special training opportunities for high percentage Hispanic labor forces. A 4-H Mentoring program is underway in Oklahoma City where 4-H is partnering with the Latino Agency and OKC public schools with a goal of reducing risky behaviors and increasing school retention.

The Farm and Agribusiness Management program team works closely with the E (Kika) de la Garza American Institute for Goat Research at Langston University (1890 Institution) which permits both entities to better reach a significant underserved populations of agricultural producers (including African American and Hispanics) in the goat production and marketing arena. This team also has a longstanding effort to improve the education opportunities specifically directed at women involved and interested in agriculture.

The Agricultural Biosecurity program involves numerous non-traditional stakeholder groups. Through these efforts many underserved audiences will be contacted and provided an opportunity to participate in program activities.

The Integrated Pest Management program team often works closely with many of the tribal (Native American) environmental specialists in conducting program activities and providing input on tribal land usage and pest programs. This team also has opportunity to reach many Hispanics through some of its work with applicator training. This team also has several joint efforts with Langston University.

For the past four summers, Camp TURF (Tomorrow's Undergraduates Realizing the Future) has been conducted on the OSU campus reaching 25 first-generation and minority students each summer.

The Community Resource and Economic Development program has the opportunity to reach underserved populations on a regular basis. For example the rural service and infrastructure activities often provide the most help for underserved populations. Rural medical and health facilities retention and expansion is a primary example of this. Most of the rural economic development programs have a positive effect on income levels in otherwise lower-income areas. This program worked closely with the Chickasaw Nation through its SET program to improve economic opportunities for tribal members.

The Oklahoma 4-H Youth Development program typically reaches well over 500,000 participants per year with between 23% and 29% (26% in 2015) of the participants comprised of non-white audiences. We expect the youth program activities outlined in this plan of work will have similar success in reaching underserved populations in the state.

The OCES 4-H Youth program through grants from the Office of Juvenile Justice and Delinquency Prevention and National 4-H Council targeting at-risk Native American youth.

3. How will the planned programs describe the expected outcomes and impacts?

The planned program teams develop outcomes that they project to occur in relation to the program activities. It is projected that many of these outcomes will occur during the plan period, however it is very likely that many of the programs will have resultant outcomes that occur beyond the plan period, often well beyond. In addition, it is likely that many other outcomes will occur because of the planned programs. The teams will try to capture a measure of some of these outcomes as well. Teams will be careful to try to establish base levels to do a better job in estimating the outcomes and impacts of programs. Most outcomes will have impacts of some nature. When feasible and reasonable, the teams will attempt to capture meaningful measures of the impact of the outcomes. Teams are expected to document progress relative to projected outcomes, and impact when appropriate.

4. How will the planned programs result in improved program effectiveness and/or

In the Division of Agricultural Sciences and Natural Resources at Oklahoma State University, planning (strategic and program) is critical in the development of faculty and staff and the direction of their efforts. Because these programs are strongly guided by the input from stakeholders and the publics served by the Division, historically the programs of the Oklahoma Agricultural Experiment Station (OAES) and the Oklahoma Cooperative Extension Service (OCES) have proven very effective in serving the state, region and nation. The planned programs outlined in this plan of work are expected to continue that success in meeting the recognized needs of producers, families, communities, entrepreneurs, businesses, governments, and science and technology. The OAES and OCES believe strongly in the need to develop and support multidisciplinary teams to provide the knowledge discovery, technology development and education and information delivery necessary to meet the issues facing Oklahoma and the nation. Most of the teams have members with responsibilities in research and team members with responsibilities in extension, as well as many with joint appointments. In addition, most of the teams have members with state-level responsibilities as well as those with area and county responsibilities. This team concept will allow OAES and OCES to continue to serve the publics and identified stakeholders in an efficient and effective manner into the future.

Research and Extension Programs at Langston University have worked in union for many years to make the overall program more efficient and cost-effective. The planned programs included in this Plan of Work will reflect the ongoing commitment of joint efforts

between research and extension programs and the leveraging of funds to ensure efficient and effective programs.

IV. Stakeholder Input

1. Actions taken to seek stakeholder input that encourages their participation

- 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 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.)

Brief explanation.

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). In this process, a variety of strategies and techniques are used to seek stakeholder input and encourage participation. The Division of Agricultural Sciences and Natural Resources (DASNR) has a broad-based advisory council representing industry, agencies and communities. As noted in the Executive Summary, a multi-round, consensus seeking approach, commonly known as the Delphi method, will be employed to gather input from stakeholders. The process collects data utilizing a series of questionnaires administered to a panel of experts. For the purposes of this study, the panel will be identified by DASNR administrators with a goal to include persons representing the diversity of the Division and its clientele. This is a new method of eliciting input for us and will be employed this year to help refine the strategic directions of OAES and OCES. 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. OAES and OCES use OSU and DASNR media resources to seek input from traditional and new stakeholders. Other strategies may include: attending meetings with commodity groups such as Ok Wheat Growers Assoc., Ok Wheat Commission, Ok Peanut Commission, Ok Hay and Seed Assoc., Ok Greenhouse Growers, Ok Nursery and Landscape Assoc., Texas-Oklahoma Cotton Working Group, Ok Vegetable Assoc., Ok Turfgrass Research Foundation, Ok Wheat Research Foundation, Ok Forestry Association, Ok Golf Course Superintendents Assoc., Ok Crop Improvement Assoc., Turfgrass Producers International, Ok Home and Community Education Assoc., Ok Grain and Feed Assoc., Grain Elevators and Processors Society, Ok Grape Growers and Winemakers Assoc., Ok Pecan Growers Assoc., Ok Cattlemen's Assoc., Beef Industry Conference Advisory Committee, Ok Beef Industry Council; Oklahoma Oilseed Commission, Woodland Owners Association; feedback from grantors; advisory committees and boards, feedback at professional meetings; grower contacts; meeting with food industry HACCP roundtable; 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, governmental

and non-governmental entities such as: Ok Department of Agriculture, Food and Forestry; Ok Council on Economic Education; Ok Bankers Association; OK Department of Wildlife Conservation; Federal Reserve Bank; FSA; Farm Credit System Associations; Noble Foundation; Kerr Center for Sustainable Agriculture; Consumer Credit Counseling Services; NRCS; Ok Department of Human Development and Family Services; and Ok Agricultural Statistical Services.

In addition, Langston University Research and Cooperative Extension send surveys to targeted stakeholder groups, contacts stakeholders via email and have participants complete surveys during field days workshops and on-farm visits. The general public also has opportunity to offer input through the website.

OCES continues to seek input 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 programming efforts and we expect them to lead to more jointly directed programming and further grass-roots input.

2(A). A brief statement of the process that will be used by the recipient institution to identify individuals and groups stakeholders and to collect input from them

1. Method to identify individuals and groups

- Use Advisory Committees
- Use Internal Focus Groups
- Use External Focus Groups
- Open Listening Sessions
- Needs Assessments
- Use Surveys

Brief explanation.

Langston University Research and Cooperative Extension conduct annual Goat and Aquaculture Field Days to educate producers, highlight and disseminate research findings. Attendees are requested to complete surveys to be used in planning future research projects and workshops. Telephone surveys are also used to gather stakeholder input.

The OCES has a well-defined program advisory committee system that provides grass roots input for program planning. Once or twice a year, county extension staff seek input 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 are representative of 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.

Priority issues identified by county PACs are compiled by District Extension Program Specialists. The District Specialists summarize the issues 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 major extension and research programs.

Another formal means of acquiring stakeholder input comes through the development and revision of the Division of Agriculture and Natural Resources strategic plan. In that process considerable effort is made to acquire input both internal and external to OSU and the Division's research and extension efforts. Drafts of the strategic plan are widely distributed with input coming directly to the VP Agricultural Programs.

Input on research directions from stakeholders is solicited through many ways in addition to the traditional communication with departments. Each department prepares its own 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 results of research. Each of these organizations is composed of members spanning the state's ethnic and socioeconomic groups. OAES/OCES also initiate communication with under-served and/or under-represented citizens including Oklahoma's Native American nations, the African-American community, 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 continue to seek input from agencies and associations that represent 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 are Oklahoma legislative and administrative groups and Federal agencies.

2(B). A brief statement of the process that will be used by the recipient institution to identify individuals and groups who are stakeholders and to collect input from them

1. Methods for collecting Stakeholder Input

- Meeting with traditional Stakeholder groups
- Survey of traditional Stakeholder groups
- Meeting with traditional Stakeholder individuals
- Survey of traditional Stakeholder individuals
- Meeting with the general public (open meeting advertised to all)
- Survey of the general public
- Meeting specifically with non-traditional groups
- Survey specifically with non-traditional groups
- Meeting specifically with non-traditional individuals
- Meeting with invited selected individuals from the general public
- Other (Peer reviews, grant proposal reviews, telephone surveys)

Brief explanation.

Stakeholder information is obtained from surveys and session evaluations during demonstrations, seminars, workshops and field days.

Additional direction and input is 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, 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, as well as, outputs and outcomes.

As noted in the Executive Summary, a multi-round, consensus seeking approach, commonly known as the Delphi method, will be employed to gather input from stakeholders. The process collects data utilizing a series of questionnaires administered to a panel of experts. For the purposes of this study, the panel will be identified by DASNR administrators with a goal to include persons representing the diversity of the Division and its clientele. This is a new method of eliciting input for us and will be employed this year to help refine the strategic directions of OAES and OCES.

3. A statement of how the input will be considered

- In the Budget Process
- To Identify Emerging Issues
- Redirect Extension Programs
- Redirect Research Programs
- In the Staff Hiring Process
- In the Action Plans
- To Set Priorities
- Other (In team planning and budget requests)

Brief explanation.

Stakeholder input is considered in all of the above situations. It is very important in working with our state legislature in securing new recurring and special funding. In addition, it plays a strong role in identifying the faculty and other professional position priorities in the hiring process. In addition to these tactical moves, it also can play a very large role in strategic changes. For example, stakeholder input was important in the development and hiring of a new forage research and Extension cluster within the Division. Grassroots stakeholder input is the driving force in development of county educator and area specialist individual 5-year plans of work and annual planning efforts. Stakeholder input and the development of it is part of the extension field staff career ladder criteria. Many of our research programs and extension programs work closely with commodity groups and their related research/education foundations to develop a joint set of priorities for applied research and extension projects in the state. Food processing and quality research is often strongly influenced by an advisory committee as well as 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 need for education in diet and nutrition. Last year advisory group input resulted in the filling/opening of positions Food Safety, poultry production and waste management, animal nutrition, climatic impacts on cropping systems, and oilseeds/cropping systems 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.

In general, Langston University's research and extension efforts are stakeholder-driven. 4-H programs and activities are tailored to meet the needs of stakeholders. Aquaculture projects, fact sheets and field days are designed to meet the needs and concerns of stakeholders. Suggestions from stakeholders via surveys and verbal comments during goat field days are reviewed and some are incorporated into future selected field day topics and field day events. At the requests of stakeholders, a youth program component was incorporated into the Annual Goat Field Day.

V. Planned Program Table of Content

25	Water Gardens (Aquaculture) (Langston University)
26	Alternative Species (Aquaculture) (Langston University)
27	Fishery Management (Aquaculture) (Langston University)
28	Sustainable Internal Parasite Control for Small Ruminants (Langston University)
29	Goat Internet Website (Langston University)
30	Development of New Dairy Goat Products (Langston University)
31	Demonstration Clinic: Artificial Insemination for Goats (Langston University)
32	Fish Marketing (Aquaculture) (Langston University)
33	Meat Buck Performance Test (Langston University)
34	Goat Dairy Herd Improvement (DHI) Laboratory (Langston University)
35	Water, Weather, and Climate

V(A). Planned Program (Summary)

Program # 1

1. Name of the Planned Program

Animal Enterprises

2. Brief summary about Planned Program

The Animal Enterprises team will conduct research and educational programming targeted to enhance efficiency of forage and feed use, increase beef, dairy and swine enterprise profitability, sustain renewable resources, and to improve animal health, well-being, and meat quality. In doing so, stakeholders will be supplied with information and decision making tools to assist them in increasing profitability, increasing consumer demand for animal products, and sustaining and improving the renewable resources on their operations. This effort will help meet the NIFA goal of boosting U.S. agricultural production and improve global capacity to meet growing food demand. We plan to identify the biological links that exist between animal morbidity, reduced performance, and meat quality, as well as nutrition, physiological, genetic, and behavioral issues. The interaction of forage use, grazing management and recovery, and adaptation to climate change in the cow-calf and stocker segments of the industry will be addressed. Programs such as Master Cattleman, Beef Quality Assurance, Oklahoma Quality Beef Network, meat goat enterprise management, pork quality assurance and numerous educational conferences will be conducted to accomplish these goals.

3. Program existence : Mature (More then five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
121	Management of Range Resources	15%	0%	21%	0%
302	Nutrient Utilization in Animals	12%	0%	20%	0%
303	Genetic Improvement of Animals	7%	0%	8%	0%
304	Animal Genome	0%	0%	8%	0%
305	Animal Physiological Processes	6%	0%	8%	0%
306	Environmental Stress in Animals	9%	0%	10%	0%
307	Animal Management Systems	30%	0%	10%	0%
308	Improved Animal Products (Before Harvest)	6%	0%	5%	0%
311	Animal Diseases	10%	0%	5%	0%
315	Animal Welfare/Well-Being and Protection	5%	0%	5%	0%
	Total	100%	0%	100%	0%

V(C). Planned Program (Situation and Scope)

1. Situation and priorities

Livestock and forage production represent the largest segment of Oklahoma's rural and agricultural economy. Consequently, Oklahoma's economic well-being is directly tied to factors that influence the ability of livestock and forage producers to remain profitable in a sustainable fashion. For example, in the cow/calf and stocker sectors, volatility in input prices for items such as fertilizer and feed, and value of cattle, have resulted in an increased economic risk. Variable climate patterns introduce new production risk. Pasture land prices continue to increase as well, which may create a barrier to entry for new producers. Land rental prices are expected to increase as land owners realize the increased value of forage in adding weight to cattle when grain prices are high, and as other non-ag uses compete with cattle for land. Consumers are increasingly concerned about the sustainability and ethics of methods used to raise food animals.
Nevertheless, opportunities exist in this new business environment. For example, the value of forage as livestock feed, and the resulting weight gain of livestock while grazing forage can increase dramatically when feed grain prices are high. This should represent a major opportunity for Oklahoma Animal Enterprises because the state's agricultural economy is based largely on forage and wheat production. Wheat is used on many farms as a dual purpose crop for both grazing and grain.

Results and knowledge developed as part of the OAES/OCES program efforts are directly and/or indirectly applicable to animal production systems within the south central region, the nation and throughout the world. Mechanistic research results will be applicable to work internationally, as presentations by scientists are made at international meetings and through scientific journals to an international audience. Results of the described research and extension programs will provide for increases in production efficiencies and conservation of natural resources.

Pasture and rangeland recovery from past droughts will require several years and unquestionably, a substantial investment by the Animal Enterprises initiative teams will be required. As with any major challenge, it highlights many opportunities for improvement of livestock, forage and water resources. For example, improving the efficiency of forage and water utilization, selection of appropriate animals and animal systems to utilize that forage, and developing efficient, sustainable grazing management and recovery practices will be critical to maintaining and improving the Animal Enterprise's contribution to Oklahoma's economy.

Other broad issues representing major challenges and opportunities to livestock and forage production enterprises include: animal and plant health and biosecurity, animal well-being, underutilization of genetic selection and management tools, invasive plant species, domestic policies, maintaining and increasing market share for grazing livestock products, globalization, environmental issues and mitigation; such as sustained drought, intergenerational transfer of assets, and tax issues.

2. Scope of the Program

- In-State Extension
- In-State Research
- Multistate Research
- Multistate Extension
- Integrated Research and Extension

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

- Relevant fundamental and applied research will be generated and disseminated to stakeholders in a timely fashion
- Appropriated and sponsored funding will increase

2. Ultimate goal(s) of this Program

Information that improves decision making and increases efficiency and profitability of Oklahoma, regional, statewide and national farmers and ranchers will be developed and disseminated.

Management skills of cattle and forage producers will be improved, allowing them to obtain greater efficiency, higher profitability, reduced risks, and improved quality of life (for both animals and workers).

Effects of animal morbidity, behavior, environmental conditions (i.e., heat stress), biotechnologies and growth-enhancing technologies and different management systems on animal performance, carcass characteristics and meat quality will be evaluated.

The biological links between the Bovine Respiratory Disease (BRD) complex, reduced animal performance, and meat quality will be identified. Identifying these links will allow us to provide cattle producers with new and improved management strategies for receiving high-risk calves, and improve meat quality for beef consumers.

Strong, profitable and efficient cattle and forage enterprises will improve the economic viability of rural

communities.

Assessment of enteric methane emissions from beef and dairy cattle in different production systems and fed different diets will be evaluated. From the environmental stewardship point of view, this work will aid in the improvement of the sustainability and also improve the efficiency of beef and dairy cattle production systems.

New knowledge and tools to aid in the management of cattle with limited water resources, especially as competition for high-quality water resources is increased due to additional demands of an ever-growing human population will be obtained. Drought conditions may exacerbate the competition between humans, crops, and livestock for their basic water needs and the generation and dissemination of new water management resources will be critical to long-term food security.

Improve meat goat producers' knowledge and management practices.

Identification and functional characterization of genes that are involved in biological processes that are linked to reduced reproductive efficiency.

Assessment of current practices and alternative tools for the swine industry to improve producers' knowledge of animal handling and proper swine care to optimize animal well-being, improve the standards of food production, and gain consumer trust.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2017	21.0	0.0	15.0	0.0
2018	20.0	0.0	15.0	0.0
2019	20.0	0.0	15.0	0.0
2020	19.0	0.0	0.0	0.0
2021	19.0	0.0	0.0	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

- Conduct fundamental and applied research
- Construct research facilities
- Write extramural and intramural grant proposals
- Conduct workshops and organize other educational and scientific meetings and conferences
- Provide in-service trainings
- Provide one-on-one consultation
- Develop and maintain numerous newsletters, web sites, press releases, Sun Up programs, and other mass/social media resources

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension

Direct Methods	Indirect Methods
● Education Class	● Public Service Announcement
● Workshop	● Newsletters
● Group Discussion	● TV Media Programs
● One-on-One Intervention	● eXtension web sites
● Demonstrations	● Web sites other than eXtension
● Other 1 (Scientific Presentations)	● Other 1 (Journal Articles)
● Other 2 (Research)	

3. Description of targeted audience

Managers, owners and employees of farms, ranches and agribusinesses, research scientists, extension personnel, beef cattle producers, meat goat producers, consumers, and policy makers.

V(G). Planned Program (Outputs)

NIFA no longer requires you to report target numbers for standard output measures in the Plan of Work. However, all institutions will report actual numbers for standard output measures in the Annual Report of Accomplishments and Results. The standard outputs for which you must continue to collect data are:

- Number of contacts
  - Direct Adult Contacts
  - Indirect Adult Contacts
  - Direct Youth Contacts
  - Indirect Youth Contact
- Number of patents submitted
- Number of peer reviewed publications

☑ Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(H). State Defined Outputs

1. Output Measure

- Number of educational meetings, class guest lectures, conferences organized, in-service trainings held, state and local educational presentations
- Number of fact sheets, proceedings publications, newsletters, popular press articles and other non-peer reviewed extension publications produced
- Number of Animal Enterprise television and radio spots or segments produced
- Number of web sites maintained
- Number of decision making tools developed
- Number of peer reviewed manuscripts published
- Number of beef and pork quality assurance program participants
- Number of blog and/or social media posts

☑ Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(I). State Defined Outcome

O. No	Outcome Name
1	Number of cattle enrolled in value enhancement programs
2	Number of producers participating in beef cattle value enhancement programs
3	Number of participants gaining knowledge in methods to decrease the incidence and severity of bovine viral diarrhea virus and bovine respiratory disease
4	Number of producers gaining knowledge in pasture and rangeland management, forage use efficiency and pasture and rangeland recovery
5	Number of producers and educators with access to resources regarding adaptation solutions for climate change
6	Number of 'followers' or 'likes' on social media systems.

Outcome # 1

1. Outcome Target

Number of cattle enrolled in value enhancement programs

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 308 - Improved Animal Products (Before Harvest)
- 307 - Animal Management Systems
- 315 - Animal Welfare/Well-Being and Protection

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 2

1. Outcome Target

Number of producers participating in beef cattle value enhancement programs

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 311 - Animal Diseases
- 315 - Animal Welfare/Well-Being and Protection
- 307 - Animal Management Systems
- 308 - Improved Animal Products (Before Harvest)

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 3

1. Outcome Target

Number of participants gaining knowledge in methods to decrease the incidence and severity of bovine viral diarrhea virus and bovine respiratory disease

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 315 - Animal Welfare/Well-Being and Protection
- 305 - Animal Physiological Processes
- 307 - Animal Management Systems
- 311 - Animal Diseases
- 306 - Environmental Stress in Animals

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 4

1. Outcome Target

Number of producers gaining knowledge in pasture and rangeland management, forage use efficiency and pasture and rangeland recovery

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 307 - Animal Management Systems
- 302 - Nutrient Utilization in Animals
- 306 - Environmental Stress in Animals
- 121 - Management of Range Resources

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 5

1. Outcome Target

Number of producers and educators with access to resources regarding adaptation solutions for climate change

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 302 - Nutrient Utilization in Animals
- 315 - Animal Welfare/Well-Being and Protection
- 121 - Management of Range Resources

- 307 - Animal Management Systems
- 306 - Environmental Stress in Animals

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 6

1. Outcome Target

Number of 'followers' or 'likes' on social media systems.

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 302 - Nutrient Utilization in Animals
- 315 - Animal Welfare/Well-Being and Protection
- 307 - Animal Management Systems
- 121 - Management of Range Resources
- 306 - Environmental Stress in Animals
- 303 - Genetic Improvement of Animals

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges
- Populations changes (immigration, new cultural groupings, etc.)

Description

Weather related events - particularly drought and post drought recovery

Changes in the internal and external business environment facing farm and ranch managers

The ability of internal and external agencies to continue funding this research.
Appropriations changes

Public policy changes - A change in emphasis on the importance of animal growth and animal diseases

Competing public priorities - significant change in beef consumption for example

Policy change relating to National Animal ID

V(K). Planned Program - Planned Evaluation Studies

Description of Planned Evaluation Studies

Evaluation will be performed by tracking participation in the various programs mentioned above and the economic impact related to their participation (premium price associated with OQBN certified cattle, for example). In addition, written surveys will be distributed among program participants prior to and immediately following the educational events held for the purpose of documenting the percent of participants that gain knowledge in specific areas (such as an increase in the knowledge of sustainable grazing management practices and methods to reduce bovine respiratory disease).

V(A). Planned Program (Summary)

Program # 2

1. Name of the Planned Program

Crop Enterprises

2. Brief summary about Planned Program

The overarching goal of the Oklahoma State University Crop Management and Wheat Multiple Uses Teams is to improve the livelihood of agricultural producers in the southern Great Plains through integrated agronomic research, demonstration, and Extension programs. Specific areas of concentration include, but are not limited to, variety development and testing, system-based cropping research, advanced nutrient management technologies, integrated crop-livestock systems, and end-use quality of harvested crops. Extension and outreach efforts combine traditional face-to-face efforts and web-based tools and technologies that are intended to make more efficient use of limited resources. Research and outreach to developing countries in areas such as low-cost, sensor-based determination of fertilizer needs in growing plants will help develop food security and sustainability worldwide. All the efforts in this planned program will help meet the NIFA goal of boosting U.S. agricultural production and improve global capacity to meet growing food demand.

3. Program existence : Mature (More then five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
102	Soil, Plant, Water, Nutrient Relationships	18%	0%	5%	0%
133	Pollution Prevention and Mitigation	4%	0%	5%	0%
201	Plant Genome, Genetics, and Genetic Mechanisms	3%	0%	20%	0%
204	Plant Product Quality and Utility (Preharvest)	10%	0%	10%	0%
205	Plant Management Systems	25%	0%	20%	0%
211	Insects, Mites, and Other Arthropods Affecting Plants	8%	0%	10%	0%
212	Diseases and Nematodes Affecting Plants	5%	0%	10%	0%
213	Weeds Affecting Plants	10%	0%	5%	0%
215	Biological Control of Pests Affecting Plants	4%	0%	5%	0%
216	Integrated Pest Management Systems	8%	0%	10%	0%
405	Drainage and Irrigation Systems and Facilities	5%	0%	0%	0%
	Total	100%	0%	100%	0%

V(C). Planned Program (Situation and Scope)

1. Situation and priorities

Continuous monocrop wheat is the dominant cropping system in Oklahoma with over five million acres sown annually. Approximately one half of these acres are also used as a source for winter grazing by the 1.5 million stocker cattle that cycle through Oklahoma farms and ranches on an annual basis. This makes the Oklahoma wheat crop not only a critical cash enterprise for rural Oklahoma, but a key component of the US beef cattle industry, as it serves as the necessary buffer between cow-calf operations in the East and feedlot operations in the West. Given the size, scope, and unique nature of wheat production in the southern Great Plains, a dynamic research, Extension, and demonstration program is critical to ensuring long-term success of stakeholders. The unique management and demands of the system also require development and distribution of well-adapted wheat cultivars that meet both farmer and end-user needs.

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.

Priorities

1. Supply farmers and ranchers with timely, accurate information on best management practices

to increase agronomic performance, economic viability, and long-term sustainability of cropping systems in the region

2. Provide independent verification of cultivar performance and end-use quality of harvested grain

3. Provide farmers and ranchers with well-adapted wheat cultivars that simultaneously meet agronomic and end-use performance standards identified as critical by relevant stakeholders

4. Evaluate and demonstrate methods for increasing the efficiency of system inputs and resources such as nitrogen fertilizer and water.

5. Respond to changing demographics, tastes, and preferences by incorporating new technologies into Extension outreach efforts whenever appropriate

6. Provide effective, non-classroom educational opportunities for industry professionals, Extension educators, farmers, and ranchers.

2. Scope of the Program

- In-State Extension
- In-State Research
- Multistate Research
- Multistate Extension
- Integrated Research and Extension
- Multistate Integrated Research and Extension

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

1. State and federal funding mechanisms will allow maintenance of a critical mass of qualified professionals to address issues and we will be able to recruit qualified team members to fill vacancies

2. Sources of funding for applied research in conventional cropping systems will remain steady or increase to reflect increased cost of agronomic research and Extension

3. Private investment in wheat breeding and/or the introduction of biotech traits into wheat will not change farmer demand for publicly-released wheat cultivars

4. Stakeholders will continue to identify Oklahoma State University Cooperative Extension as their primary source for information regarding variety performance

5. Industry partners will continue to support crop diversification efforts by providing the necessary crop input and market outlets to make smaller acreage crops viable

6. OK-NASS will continue to provide wheat variety survey data for the state of Oklahoma

2. Ultimate goal(s) of this Program

1. Evaluate the impacts of climate change on cropping systems in Oklahoma and serve as a resource for stakeholders wishing to explore mitigation opportunities

2. Provide a comprehensive wheat variety-testing program that is utilized by stakeholders locally, nationally, and internationally.

3. Increase adoption of improved wheat cultivars by Oklahoma wheat producers

4. Operate a comprehensive wheat breeding program that includes variety development and introgression of new traits into elite germplasm

5. Publish a variety of web sites, web-based updates, video presentations, and printed extension materials that address current and emerging issues in Oklahoma and regional agriculture

6. Provide effective, non-classroom educational opportunities for industry professionals, Extension educators, farmers, and ranchers.
7. Increase the adoption of economically viable soil health promoting such as no-till and reduced tillage systems that include diverse crop rotations, integrated with beef cattle production.
8. Increase irrigation water use efficiency through the adoption of irrigation scheduling support tools, high efficiency irrigation systems and appropriate crop selection as a function of water resource availability and changing climate condition.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2017	18.0	0.0	10.0	0.0
2018	16.0	0.0	10.0	0.0
2019	15.0	0.0	10.0	0.0
2020	14.0	0.0	9.0	0.0
2021	14.0	0.0	9.0	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

1. Wheat cultivar performance testing and demonstration throughout Oklahoma
2. Wheat breeding, variety development, and introgression of new traits into elite germplasm
3. Publication of web sites, web-based updates, video presentations, and printed extension materials that disseminate research findings and address current and emerging issues in Oklahoma agriculture
4. Provide effective, non-classroom educational opportunities for industry professionals,

Extension educators, farmers, and ranchers.

5. Conduct on-farm research and demonstration of nitrogen rich strips and use of hand-held sensors

6. Evaluate alternative irrigation methods and strategies that increase sustainability of irrigated cropping systems in the presence of changing climatic conditions and decreasing water resources.

7. Conduct on farm research and demonstration of soil health promoting practices such as no-till and reduced tillage systems that include diverse crop rotations, integrated with beef cattle production.

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension

Direct Methods	Indirect Methods
● Education Class ● Workshop ● One-on-One Intervention ● Demonstrations ● Other 1 (twitter)	● Newsletters ● eXtension web sites ● Web sites other than eXtension

3. Description of targeted audience

Wheat growers, dual-purpose wheat producers, millers, bakers, wheat importers, seed growers and dealers, wheat breeders, crop producers, canola, peanut, sunflower and other crop producers and nutraceutical producers.

V(G). Planned Program (Outputs)

NIFA no longer requires you to report target numbers for standard output measures in the Plan of Work. However, all institutions will report actual numbers for standard output measures in the Annual Report of Accomplishments and Results. The standard outputs for which you must continue to collect data are:

- Number of contacts
  - Direct Adult Contacts
  - Indirect Adult Contacts
  - Direct Youth Contacts
  - Indirect Youth Contact
- Number of patents submitted
- Number of peer reviewed publications

☑ Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(H). State Defined Outputs

1. Output Measure

- Field Demonstrations, field days, and conferences
- Regionally adapted wheat cultivars
- Educational materials developed
- Web-based educational materials such as web sites, videos, and social media applications
- Locally-controlled evaluations and agronomic data for small grains crops

☑ Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(I). State Defined Outcome

O. No	Outcome Name
1	Number of wheat varieties released to address agronomic and end-use quality needs of the hard red and hard white winter wheat industries.
2	Percentage of wheat acres sown to varieties with improved pest resistance, yield potential, and end-use quality.
3	Number of on-farm demonstrations of nitrogen rich strips and of hand-held sensors

Outcome # 1

1. Outcome Target

Number of wheat varieties released to address agronomic and end-use quality needs of the hard red and hard white winter wheat industries.

2. Outcome Type : Change in Condition Outcome Measure

3. Associated Knowledge Area(s)

- 204 - Plant Product Quality and Utility (Preharvest)
- 205 - Plant Management Systems

4. Associated Institute Type(s)

- 1862 Research

Outcome # 2

1. Outcome Target

Percentage of wheat acres sown to varieties with improved pest resistance, yield potential, and end-use quality.

2. Outcome Type : Change in Condition Outcome Measure

3. Associated Knowledge Area(s)

- 204 - Plant Product Quality and Utility (Preharvest)
- 205 - Plant Management Systems

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 3

1. Outcome Target

Number of on-farm demonstrations of nitrogen rich strips and of hand-held sensors

2. Outcome Type : Change in Condition Outcome Measure

3. Associated Knowledge Area(s)

- 205 - Plant Management Systems

- 102 - Soil, Plant, Water, Nutrient Relationships

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Public Policy changes
- Government Regulations

Description

Extreme weather conditions would affect wheat production, cotton production, and the diversity crops and cropping systems. Weather could also affect the progress of breeding programs. Government regulations and policies could change practical applications of systems by either mandating requirements or prohibiting critical inputs. Progress of chemists could affect the rate of adoption of biorefining processes. Changes in countries purchasing Oklahoma wheat and the requirements of millers and bakers will play a role in the rate of progress. High grain prices will have some effect on research and acceptance.

V(K). Planned Program - Planned Evaluation Studies

Description of Planned Evaluation Studies

Progress in development of wheat varieties with respect to improvement of resistance to leaf rust, stripe rust, soil-borne mosaic virus, aphids, adaptability to dual-purpose production, and tolerance to low-pH, Al-toxic soils will be evaluated on an ongoing basis based on characteristic reproducibility and overall characteristic desirability.

The adoption of improved wheat cultivars will occur on an annual basis using NASS-provided wheat variety statistics.

Extension and outreach activities will be evaluated approximately every two years using data such as number of demonstration sites, participation in learning opportunities, and number of publications. In addition, we will collect data from web-based activities such as number of stakeholders reached, time spent on web sites, and site activity.

V(A). Planned Program (Summary)

Program # 3

1. Name of the Planned Program

Plant Biological Technologies

2. Brief summary about Planned Program

Plant Biological Technology Team is composed of individual investigators with a diverse set of targeted areas of inquiry. Overall, the team approach rests on the molecular, cellular, biochemical and genetic aspects of basic plant sciences. The goal of team investigators is to obtain a better understanding of ways in which plants interact with their physical and biotic environment. A better understanding of the molecular and biochemical processes leads to advances in applied aspects of plant and agricultural sciences. Particular areas of interest are indicated below:

Randy Allen: Epigenetic, transcriptional and post transcriptional regulation of plant genes.
Michael Anderson: Productivity associated microorganisms in grasses
Patricia Canaan: Gene expression patterns in plants and fungi and enzymatic bioconversion of lignocelluloses
Jiang Haobo: Molecular analysis of arthropod immune response
Maria Li: Microbial ecology, methods of detection and control of food borne pathogens
Yu Mao: Nano biosensors for pathogen detection
Stephen Marek: Biology and functional genomics of plant pathogenic fungi
Ramanjulu Sunkar: Epigenetics, micro RNAs, and plant stress responses
Million Tadege: Molecular mechanism of leaf blade development
Jeanmarie Verchot-Lubicz: Plant viruses and virus movement mechanisms in plants
Yanqi Wu: Genetics and breeding of turf and bioenergy crops
Luling Yan: Molecular mechanism of flowering time in wheat

3. Program existence : Mature (More then five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
132	Weather and Climate	0%	0%	5%	0%
201	Plant Genome, Genetics, and Genetic Mechanisms	0%	0%	25%	0%
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants	0%	0%	18%	0%
206	Basic Plant Biology	0%	0%	14%	0%
211	Insects, Mites, and Other Arthropods Affecting Plants	0%	0%	5%	0%
212	Diseases and Nematodes Affecting Plants	0%	0%	33%	0%
	Total	0%	0%	100%	0%

V(C). Planned Program (Situation and Scope)

1. Situation and priorities

Plant losses to environmental stresses are enormous. Estimates of crop losses due to drought run over $1 billion per year in the U.S. Losses to the citrus industry from freeze damage topped $700 million in just three California counties in 1998. Heat stress causes both chronic and acute damage that contributes to average yields being three- to seven-fold lower than record yields. Average crop losses to insects have been estimated at 13%. The need for increased resistance to biotic and abiotic stresses has been recognized as a national research priority. The Plant Biological Technologies addresses a number of biotic and abiotic stresses including: viruses, insects, pathogens, and environmental stresses including temperature, water (drought), and oxidative stresses.

The Plant Biological Technologies Team is dedicated a better understanding of plant development and plant response to abiotic and biotic stresses. Increased knowledge resulting from individual investigator and team efforts will result in improvements in agricultural stress response, increased productivity and improved agricultural sustainability.

Microorganisms have both positive and negative effects on plant growth and development. In fact the microbial component is sustained by anywhere from 20 to 40% of the plants photosynthetic output. This large expenditure is indicative of the relative importance of the microbial community to plant and agricultural productivity. Agricultural scientists have spent limited efforts in developing a positive understanding towards plant microbe interactions and plant productivity. Members of the Plant Biological Technology Team are on the forefront to better understand this important interaction and to develop ways to exploit the microbial community for greater agricultural productivity.

Priorities of the Plant Biological Technology Team

- Identify productivity associated bacteria in wheat and grass model systems.
- Identify plant genotypes with superior stress tolerance from existing germplasm and utilize traditional breeding to improve stress tolerance in crop and bioenergy species.
- Identify and isolate and identify targets for marker-assisted selection and gene transfer for improved

stress tolerance.
• Discover physiological and biochemical mechanisms of injury and acclimation in plant stress responses.
• Identify low molecular weight and peptide phytotoxins secreted by plant pathogenic fungi and characterize their contribution to plant disease.
• Identify genes whose induction is necessary for an effective hypersensitive disease resistance response in cotton.
• Clone and sequence the Gossypium hirsutum genes for the second step in gossypol biosynthesis, preparatory to blocking that step via gene silencing.
• Enhance resistance to spring dead spot in seeded bermudagrass varieties.
• Isolate and identify bacteria that promote growth or disease resistance in wheat.
• Explore the biodiversity of viruses and plant bacterial pathogens found in natural environments.
• Molecular and cellular mechanisms of leaf blade development: regulatory factors and their interaction in regulating plant growth and development.
• Identify regulatory transcription factors that modulate leaf blade development and plant growth.
• Identify protein interacting partners and targets for the regulatory factors.
• Identify genetic networks that modify growth and plant productivity.
• Identification of QTLs/genes conferring developmental adaptation to winter wheat grown in the southern Great Plains.
• Identification of QTLs/genes conferring the resistance to Hessian fly in winter wheat.
• Develop high throughput molecular markers based on genotyping by sequencing.
• Identify QTLs for important agronomic traits in bermudagrass and switchgrass.

2. Scope of the Program

- In-State Research
- Multistate Research

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

• Plant stress injury and mechanisms of acclimation have identifiable bases.
• Plants and/or production practices can be modified to reduce losses to stress.
• Continued availability of funding, facilities and talented and trained personnel.

2. Ultimate goal(s) of this Program

• Increase productivity by reducing crop losses to environmental stress
• Increase our understanding of specific plant microbe interactions of significance to agriculture and the environment in which we live
• Harness the knowledge and resources of plant microbe interaction for the protection of agricultural or ecologically important plant species
• Expand knowledge base
• Train students who will increase research capability in the subject areas

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2017	0.0	0.0	10.0	0.0
2018	0.0	0.0	10.0	0.0
2019	0.0	0.0	11.0	0.0
2020	0.0	0.0	11.0	0.0
2021	0.0	0.0	11.0	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

- Design and conduct research, including the development of methods and procedures
- Write and submit grant proposals to private, state and federal agencies
- Generate scientific publications - communicating scientific results to a wide range of scientists
- Training of professional scientists - graduate and undergraduate students, technicians and post docs in the scientific discipline
- File patents
- Provide research opportunities for students at OSU. Maintain a diverse environment in the lab and continue to support group members in their career development

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension

Direct Methods	Indirect Methods
● Education Class ● Workshop ● Other 1 (professional journals) ● Other 2 (professional meetings)	● Newsletters ● TV Media Programs ● Web sites other than eXtension

3. Description of targeted audience

- Scientists and scientific societies
- Governmental science organizations
- Educational institutions
- Applied researchers and extension specialists
- Students
- Private, federal, state, and industrial funding agencies
- Other stakeholders (producers, consumers, educators, public)

V(G). Planned Program (Outputs)

NIFA no longer requires you to report target numbers for standard output measures in the Plan of Work. However, all institutions will report actual numbers for standard output measures in the Annual Report of Accomplishments and Results. The standard outputs for which you must continue to collect data are:

- Number of contacts
  - Direct Adult Contacts
  - Indirect Adult Contacts
  - Direct Youth Contacts
  - Indirect Youth Contact
- Number of patents submitted
- Number of peer reviewed publications

☑ Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(H). State Defined Outputs

1. Output Measure

- Grant proposals written and submitted
- Peer-reviewed publications including journal articles

☑ Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(I). State Defined Outcome

O. No	Outcome Name
1	Graduate students graduated

Outcome # 1

1. Outcome Target

Graduate students graduated

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 212 - Diseases and Nematodes Affecting Plants
- 206 - Basic Plant Biology
- 203 - Plant Biological Efficiency and Abiotic Stresses Affecting Plants
- 201 - Plant Genome, Genetics, and Genetic Mechanisms

4. Associated Institute Type(s)

- 1862 Research

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges

Description

Any natural disasters, economic downturns, policy changes or government changes that negatively affect appropriations or change research directives will adversely affect outcomes. Funding levels are affected by public priorities and governmental priorities which are tied to national and local economic performance to a certain degree as perceived by decision makers.

V(K). Planned Program - Planned Evaluation Studies

Description of Planned Evaluation Studies

Individual evaluation will be conducted by scientists on programs periodically and reported.

V(A). Planned Program (Summary)

Program # 4

1. Name of the Planned Program

Commercial and Consumer Horticulture

2. Brief summary about Planned Program

Overall objective is to support the commercial horticulture industry, home and community based gardeners, and youth horticulture projects in Oklahoma through mission-oriented fundamental and applied research and extension outreach activities. Research goals include identification of adapted cultivars; determine feasibility of horticultural crops in rotation with agronomic crops; develop integrated production and processing systems for high-value alternative horticultural crops; proven varieties and cultivars; food safety procedures; and develop sustainable and/or organic production systems for commercial horticultural crops. Support education and technology transfer in these areas and others related to commercial horticulture, with emphasis on supporting consumer horticulture and home gardeners and the commercial producers in Oklahoma.

Issues connected to horticultural field crops research will include cultural aspects of production including improving existing systems and developing systems for high-value alternative horticultural crops. These could include identification of appropriate cultivars, crop populations, crop cycles, fertility, irrigation, pest management, and how to mechanize the production and harvesting of these crops.

Issues connected to ornamental horticultural crops will include cultural aspects of production including improving production efficiency and alternatives to existing ornamental plants. These could include increasing water efficiency during production, producing during previously less used seasons, etc.

3. Program existence : Mature (More then five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
124	Urban Forestry	7%	0%	10%	0%
202	Plant Genetic Resources	5%	0%	10%	0%
204	Plant Product Quality and Utility (Preharvest)	14%	0%	15%	0%
205	Plant Management Systems	40%	0%	40%	0%
502	New and Improved Food Products	7%	0%	20%	0%
901	Program and Project Design, and Statistics	7%	0%	5%	0%
903	Communication, Education, and Information Delivery	20%	0%	0%	0%
	Total	100%	0%	100%	0%

V(C). Planned Program (Situation and Scope)

1. Situation and priorities

Both commercial and consumer horticulture research and extension are important to the citizens of Oklahoma and the south central region of the U.S. This program plan discusses both horticultural efforts.

The need for science-based, locally-relevant information is great as that Oklahoma producers are looking to horticultural crops as alternatives to traditional field crops. Weather extremes have become the norm within the state i.e. drought, extreme cold and heat occurring during the past four to five years. The ornamental horticultural industry also is experiencing growth as more people approach retirement and disposable incomes provide the time and money to increase demand. Commercial horticulture program priorities are:

- Support for cultivar evaluation
- Horticultural crops as part of rotation plans with agronomic crops
- Support for eXtension
- "Seed to market" production of high-value alternative horticultural crops
- Sustainable and/or organic production of commercial horticultural crops.
- Support for expanded pecan markets and increasing demand.

Gardening continues to be ranked one of the top leisurely activities (three out of four households, an estimated 82 million households, participated in one or more indoor and outdoor lawn and garden activities in 2004). A survey by the Garden Writers Association in 2014 indicates that two-thirds of American consumers surveyed (66%) have a lawn or garden, or grow plants in containers or pots. The study also indicated that since 2009, more than three-quarters of consumers (83%) have grown edible plants. In 2014, more than two in five consumers (44%) said that they grew edible plants in the ground, while 15% used containers. Almost one-third (32%) grew plants both in the ground and in containers. According to consumers, insect and disease control (39%) and time (38%) are the greatest challenges to edible gardening.
Studies also indicate that a great deal of satisfaction and benefits come from gardening including a

healthier body and mind and increased property value. Rapid urban growth and population aging coupled with increased interest in the environment and home gardening has prompted an ever-increasing number of garden and landscape inquiries. County offices report that over 50% of the phone calls received are consumer horticulture related.
Consumer horticulture and urban forestry priorities relevant are: water quality and usage in the urban and suburban environment (with particular concern of nutrient loading from urban landscapes), surveying of Oklahoma consumers (gardeners) at the county level, improving consumer horticulture web-based delivery, Master Gardener training, pesticide training and education, and home food production and youth at risk-obesity/school vegetable gardens.

2. Scope of the Program

- In-State Extension
- In-State Research
- Multistate Research
- Multistate Extension
- Integrated Research and Extension
- Multistate Integrated Research and Extension

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

Appropriated funding will remain at present levels, while sponsored funding will need to increase to continue to address the challenges that Oklahoma producers face. Financial support from horticultural industries will increase. Key research and extension personnel will be replaced in a timely manner. OAES branch stations where program research is conducted will have sufficient personnel and funding through the Field & Research Services Unit to sustain research infrastructure. Publishable results will be obtained from research (Vegetable trial reports MP-162, MP-164, etc.), and recommendations can be given based on these results. Oklahoma educational TV will continue to broadcast Oklahoma Gardening. eXtension will grow and become a viable outlet for information.

2. Ultimate goal(s) of this Program

Develop and communicate science-based, locally-relevant information to support the commercial horticulture industry in Oklahoma and the region. Improve the economic return to horticultural producers while protecting the environment and ensuring food safety and quality.

Increase, support, and strengthen statewide Master Gardener Program to assist existing and new county participants and increase contacts made through Master Gardener activities and programs.

Provide gardening information/education to the homeowners and gardening enthusiasts in environmentally responsible best management garden, lawn, and landscape practices- including continued adaptation of IPM principles through programming by counties and Master Gardener programs.

Increase awareness of benefits of gardening activities on the health of youth and adults. Increased information on the health related benefits of the consumption of fruits, vegetables and nuts; more school vegetable gardens.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2017	12.0	0.0	2.0	0.0
2018	10.0	0.0	2.0	0.0
2019	9.0	0.0	1.0	0.0
2020	9.0	0.0	2.0	0.0
2021	11.0	0.0	2.0	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

•Conduct research to evaluate cultivars of traditional and nontraditional horticultural crops and ornamental plants. •Conduct research to improve crop production in controlled environments. •Conduct research into crop cultural systems, particularly the feasibility of horticultural crops in rotation with agronomic crops. •Conduct research to develop "seed to market" production systems for high-value alternative horticultural crops like cilantro and herbs. •Conduct research to develop sustainable and/or organic production systems for commercial horticultural crops. •Provide demonstrations and education and disseminate information to support Oklahoma's commercial horticulture industry, with emphasis on electronic resources. •Develop cultural practices to reduce pecan alternate bearing and provide consistent nut quality. of research based information for clientele •Conduct "New Farmer" workshops and short courses for edible horticultural crops •Survey Oklahoma Consumers (Gardeners) at the county level to assess the needs and wants of the gardening public •Upgrade the web-based delivery •Review and revise annually or as needed Fact Sheets and other publications •Educational programs focused on Consumer Best Management Practices (BMP) for the conservation of energy, water resources, water pollution prevention, Integrated Pest Management (IPM), and urban landscape wildlife conservation •Educational programs are conducted based on public interest and County Educator requests •Participate and support eXtension Consumer Horticulture/Master Gardener Community of Practice •Conduct Master Gardener/Junior Master Gardener Training •Conduct pesticide training and education •Provide Education on Backyard Food Production •Assist in Youth at Risk - Obesity/School Gardens

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension

Direct Methods	Indirect Methods

● Education Class ● Workshop ● One-on-One Intervention ● Demonstrations ● Other 1 (Youth Programs)	● Newsletters ● TV Media Programs ● eXtension web sites ● Web sites other than eXtension

3. Description of targeted audience

Horticultural crop producers, commodity groups, food processors, landscape professionals, input suppliers such as seed and chemical companies, peer scientists, extension specialists and county professionals, horticultural dealers and merchants, greenhouses, Master Gardeners, home owners, communities, and youth.

V(G). Planned Program (Outputs)

NIFA no longer requires you to report target numbers for standard output measures in the Plan of Work. However, all institutions will report actual numbers for standard output measures in the Annual Report of Accomplishments and Results. The standard outputs for which you must continue to collect data are:

- Number of contacts
  - Direct Adult Contacts
  - Indirect Adult Contacts
  - Direct Youth Contacts
  - Indirect Youth Contact
- Number of patents submitted
- Number of peer reviewed publications

☑ Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(H). State Defined Outputs

1. Output Measure

- New Master Gardeners trained
- Manuscripts submitted for consideration of publication in peer-reviewed journals
- Number of Extension publications completed - fact sheets, newsletters, trial reports, web-based materials
- Number of statewide "Oklahoma Gardening" shows produced
- Number of Funded Grant Proposals
- Number of potential fresh market growers of horticulture crops trained

☑ Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(I). State Defined Outcome

O. No	Outcome Name
1	Number of horticultural crop producers newly certified as organic
2	Number of volunteer hours provided to community horticulture programs statewide
3	Number of home gardeners experiencing increased awareness and knowledge about environmental issues and IPM principles

Outcome # 1

1. Outcome Target

Number of horticultural crop producers newly certified as organic

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 502 - New and Improved Food Products
- 205 - Plant Management Systems
- 204 - Plant Product Quality and Utility (Preharvest)

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 2

1. Outcome Target

Number of volunteer hours provided to community horticulture programs statewide

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 205 - Plant Management Systems
- 903 - Communication, Education, and Information Delivery
- 124 - Urban Forestry

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 3

1. Outcome Target

Number of home gardeners experiencing increased awareness and knowledge about environmental issues and IPM principles

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 205 - Plant Management Systems
- 903 - Communication, Education, and Information Delivery
- 124 - Urban Forestry

4. Associated Institute Type(s)

- 1862 Extension

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Appropriations changes
- Competing Public priorities
- Competing Programmatic Challenges
- Populations changes (immigration, new cultural groupings, etc.)

Description

Natural disasters can destroy experiments and, if broad in scale, may lead to economic downturns. Decreases in appropriated funding will adversely affect outcomes.

Detailed, reliable statistics are not available for Oklahoma horticultural crop production. Figures from the Census of Agriculture underreport actual production and are not updated yearly. It will take a public policy change to be able to track changes in horticultural crop acreage and production in Oklahoma. Stakeholders must be willing to accept change.

V(K). Planned Program - Planned Evaluation Studies

Description of Planned Evaluation Studies

Number of "hits" to extension websites will be recorded. Web sites analyzed will include Oklahoma Gardening You Tube and Facebook sites, OSU horticulture extension publications web site, and other appropriate departmental web sites.

Conference/Workshop participants (commercial and consumer horticulture) will be surveyed post workshop survey via either hard copy survey or on-line survey in order to determine their intent to adopt recommended management practices and IPM techniques conveyed during workshops. Workshop participants will include those from county sponsored programs and state and departmental sponsored programs.

Surveys will assess the appropriateness and usefulness of short courses, workshops, and field days. Funded grant proposals and peer-reviewed publications will be counted annually. Testing will be conducted for the Master Gardener trainees in regard to their understanding and adoption of best practices for home landscape and garden. Participants of the annual master gardener continuing education conference will be surveyed to determine the knowledge gained and likelihood of adoption of improved management practices learned at the conference.

Yearly reports will be collected from Master Gardener Volunteer programs indicating number of new Master Gardener Volunteers trained; total hours volunteered (including); number of contacts made with Oklahoma residents; number of educational activities and programs offered; and number of pounds of produce donated to local food banks and non-profit agencies.

V(A). Planned Program (Summary)

Program # 5

1. Name of the Planned Program

Ecosystem and Environmental Quality and Management including Weather and Climate

2. Brief summary about Planned Program

1. Develop approaches to integrate conservation into traditional land management; 2. Develop approaches to restore degraded ecosystems; 3. Improve understanding of weather and climate variability and impact on crop and livestock production systems, ecosystem management, and wildland fire management; 4. Provide weather and climate data and decision support tools for clientele; 5. Determine impacts and management approaches for invasive species; 6. Develop economic alternatives based on natural resources that can be integrated into traditional land management; 7. Understand impacts and develop approaches to mitigate land fragmentation; 8. Improve wildlife habitat and management; 9. Understand impact and develop approaches to improve air quality management and policy; 10. Improve efficiency and environmental impact of animal waste management; 11. Understand impact and develop approaches to improve surface water and watershed issues; 12. Develop modeling tools to reduce phosphorus runoff on a watershed and field level; 13. Increase recycling and reuse effort to reduce amount of domestic waste entering landfills; 14. Improve understanding of Life Cycle Analysis as a tool to measure economic impact of environmental decisions.

3. Program existence : Mature (More then five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
104	Protect Soil from Harmful Effects of Natural Elements	5%	0%	8%	0%
111	Conservation and Efficient Use of Water	8%	0%	9%	0%
112	Watershed Protection and Management	8%	0%	10%	0%
121	Management of Range Resources	8%	0%	13%	0%
123	Management and Sustainability of Forest Resources	5%	0%	10%	0%
132	Weather and Climate	15%	0%	5%	0%
133	Pollution Prevention and Mitigation	8%	0%	5%	0%
134	Outdoor Recreation	5%	0%	0%	0%
135	Aquatic and Terrestrial Wildlife	5%	0%	5%	0%
136	Conservation of Biological Diversity	5%	0%	5%	0%
141	Air Resource Protection and Management	4%	0%	5%	0%
205	Plant Management Systems	8%	0%	10%	0%
403	Waste Disposal, Recycling, and Reuse	4%	0%	5%	0%
605	Natural Resource and Environmental Economics	12%	0%	10%	0%
	Total	100%	0%	100%	0%

V(C). Planned Program (Situation and Scope)

1. Situation and priorities

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 change. These challenges summarize a global phenomenon in which human activities, both directly and indirectly, influence the management of natural resources. Human activities present considerable issues and opportunities in natural resource management. These include: different management approaches applied to natural resources; development of approaches to manage landscapes for multiple uses; invasive species threat to all ecosystems of Oklahoma and the major negative economic impacts on agricultural enterprises; the effects of land use and management decisions on our natural resources and the conservation of natural resource combined with sustainable systems for rural development; the social and ecological importance of managing large-scale processes and patterns across multiple land ownerships; nonpoint source pollution control; riparian management, stream channel management and restoration; water quality and other environmental standards; biocriteria for aquatic systems; fishery protection and management; confined animal waste systems; water management and water policy; solid waste

management; improved public natural resource education and information; the development of sustainable multiple-use ecosystems; and the restoration and management of native plant and animal communities.

Oklahoma is unique in having the Oklahoma Mesonet, one of the most data rich, large-scale weather networks in the US and worldwide. Data from its 120 stations are used directly to monitor Oklahoma's highly variable environment and provide the foundation for decision support models and model output. The Oklahoma Mesonet's statewide network of soil moisture sensors has been used to create new drought monitoring tools. This has created a unique opportunity to monitor and contrast conditions across Oklahoma's highly variable ecosystems and crop environments.

Programming priorities include:

Restoration and management of forest, cross timbers, and prairie ecosystems for multiple uses, including use of prescribed fire.

Reduction of negative effects from encroaching and invasive species, such as eastern redcedar, sericea lespedeza, and zebra mussel.

Improved understanding and application of government programs for conservation of natural resources (CRP, WHIP, WRP, CSP, etc.).

Promote the appreciation of a landscape perspective in ecosystem management that is dependent on broad scale patterns in a private land state and considers the importance of ecological and social consequences of land management practices.

Conduct research and continue development of weather-based decision support tools for wildland fire management: including wildfire, prescribed fire, and smoke dispersion.

Increase crop and livestock input efficiency and improve agricultural risk management through increased use of weather and climate data and information in management decision making.

Enhance ecosystem management through a better understanding of weather and climate impacts on the environment, landscape, and organisms.

Increase agrometeorology and agroclimatology educational opportunities on campus and through extension programs for youth and adults.

Research and extension programming related to water quality and quantity and the interface of terrestrial and aquatic ecosystems, as well as, animal waste, stream erosion, emerging contaminants, and water policy.

Increase the understanding of Life Cycle Analysis as an analytical tool.

Development of anaerobic digestion systems to improve the environmental performance of swine and dairy production.

Extension programming related to handling of agricultural byproduct materials.

Research and extension programming related to soil treatment, management, and reuse of domestic sewage, septage, grey water, and treated effluent.

Extension programming to aid in delivery of state mandated educational programs for poultry and swine farmers.

Research and extension programming related to monitoring and modeling of air emissions related to agricultural production.

Research and extension programming on energy issues with an emphasis on impacts to farmers and ranchers, including negotiating energy development agreements, land and wildlife impacts from energy development, and legal risks associated with energy operations on agricultural lands.

Increase the understanding of carbon sequestration in agricultural and natural systems and the policy necessary to reduce impact of carbon on climate variability.

Research and Extension programming aimed at increasing efficiency of inputs and forest resilience in southern pine ecosystems.

Research and Extension programming related to use of compost and improved sedimentation to reduce runoff from construct sites.

Development of low impact development and biologically active retention structures to reduce the effect of urban runoff on water quality.

Increase the amount of glass, plastic, paper, metals recycled, and increase use of composting and

vermicomposting to reduce amount of domestic waste entering landfills.
Improve understanding of wildlife responses to anthropogenic influences.
Provide education programming on natural resources management to the general public, including youth.

2. Scope of the Program

- In-State Extension
- In-State Research
- Multistate Research
- Multistate Extension
- Integrated Research and Extension
- Multistate Integrated Research and Extension

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

Increased communication among researchers, teachers, and extension workers involved in environmental and waste management efforts will lead to increases in productivity and effectiveness of programs; Conservation can be integrated into traditional management and used to develop new management prescriptions; Stakeholders will be active participants in program development and implementation; Successful extramural funding will allow our faculty to continue to recruit graduate students and post-doctoral researchers to play critical roles in carrying out individual research projects; Federal and state agencies will continue to fund conservation-related landowner incentive programs, and landowners will continue to enroll in those programs; Fragmentation of native landscapes, especially from energy development, will accelerate; Increasing exurban development will expand areas in which prescribed fire is not practical or untenable, and place an increasing proportion of our land area in danger of wildfire during drought conditions; Attrition in the faculty ranks through retirements may impact the ability of this team to achieve all of these goals unless faculty are replaced in a timely fashion.

2. Ultimate goal(s) of this Program

To be the premier source of cutting-edge information on fisheries, forestry, rangelands, wildlife, weather and climate, air and water quality, waste management, watershed management, and fire ecology for students, landowners, agricultural producers, communities, and land managers and to promote the sustainable and ecological management of natural resources and to improve production and economic response to weather and climate.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890

2017	8.0	0.0	11.0	0.0
2018	7.0	0.0	10.0	0.0
2019	7.0	0.0	9.0	0.0
2020	5.0	0.0	9.0	0.0
2021	6.0	0.0	9.0	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

Submit grant proposals and conduct research that addresses priorities

Forge collaborative relationships that build on current strengths in research in management.

Partner with state and federal agencies to address pressing needs in conservation.

Produce scientific publications; disseminate information through other print and online media outlets.

Conduct workshops, field days, and other personal information exchanges to promote issues and alternatives in natural resource management.

Conduct Poultry Waste Management Education

Conduct research and develop weather-based plant biomass models as a tool in ecosystem, rangeland and pasture management adaptation to climate changes.

Conduct multi-disciplinary research on grassland fuel modeling as part of an awarded Joint Fire Science Program grant.

Provide agriculture and natural resource management technical expertise for weather and climate data and models maintained and operated by the Oklahoma Mesonet.

Create and deliver weather and climate education for the general public, agriculture and natural resource sectors through OSU SUNUP TV, online video/audio tutorials, fact sheets, email newsletters, educational programs, seminars and workshops.

Create factsheets, videos and webcontent to explain anaerobic digestion of animal manure to the layman and provide practicing engineers material to aid in design and operation.

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension

Direct Methods	Indirect Methods

● Education Class ● Workshop ● Group Discussion ● One-on-One Intervention ● Demonstrations ● Other 1 (Certifications) ● Other 2 (Landowner Associations)	● Newsletters ● eXtension web sites ● Web sites other than eXtension ● Other 1 (LISTSERV and newsgroup) ● Other 2 (Television)

3. Description of targeted audience

Scientists, students, related agencies (Federal, State, private), land owners, farmers, ranchers, communities, consumers, land developers, state legislators, commodity groups, community leaders, homeowners,

V(G). Planned Program (Outputs)

NIFA no longer requires you to report target numbers for standard output measures in the Plan of Work. However, all institutions will report actual numbers for standard output measures in the Annual Report of Accomplishments and Results. The standard outputs for which you must continue to collect data are:

- Number of contacts
  - Direct Adult Contacts
  - Indirect Adult Contacts
  - Direct Youth Contacts
  - Indirect Youth Contact
- Number of patents submitted
- Number of peer reviewed publications

☐ Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(H). State Defined Outputs

1. Output Measure

- Grant proposals written and submitted
- Manuscripts submitted for consideration of peer-reviewed publication
- Extension conferences, workshops and training sessions
- Research and Extension reports, fact sheets, and other media presentations
- Number of weather-based agricultural decision support tools

☐ Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(I). State Defined Outcome

O. No	Outcome Name
1	Number of poultry producers and poultry litter applicators acquiring initial waste managment certification and number maintaining certification
2	Number of animal waste analyses conducted for land application of beef, dairy or swine waste.
3	Number of animal waste analyses conducted for poultry litter application
4	Number of users accessing website designed to deliver information about water policy, conservation and efficient use
5	Number of downloads of Extension fact sheets and related education materials
6	Number of enrollments in conservation-related land management programs
7	Land area restored in Oklahoma through invasive/encroaching species removal
8	Land area restored in Oklahoma through prescribed fire or other practices
9	Access by users of Oklahoma Mesonet computer and mobile device weather and climate data and tools

Outcome # 1

1. Outcome Target

Number of poultry producers and poultry litter applicators acquiring initial waste managment certification and number maintaining certification

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 112 - Watershed Protection and Management
- 133 - Pollution Prevention and Mitigation
- 403 - Waste Disposal, Recycling, and Reuse

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 2

1. Outcome Target

Number of animal waste analyses conducted for land application of beef, dairy or swine waste.

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 205 - Plant Management Systems
- 403 - Waste Disposal, Recycling, and Reuse
- 133 - Pollution Prevention and Mitigation
- 112 - Watershed Protection and Management

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 3

1. Outcome Target

Number of animal waste analyses conducted for poultry litter application

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 205 - Plant Management Systems
- 403 - Waste Disposal, Recycling, and Reuse
- 112 - Watershed Protection and Management
- 133 - Pollution Prevention and Mitigation

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 4

1. Outcome Target

Number of users accessing website designed to deliver information about water policy, conservation and efficient use

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 605 - Natural Resource and Environmental Economics
- 111 - Conservation and Efficient Use of Water

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 5

1. Outcome Target

Number of downloads of Extension fact sheets and related education materials

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 205 - Plant Management Systems
- 135 - Aquatic and Terrestrial Wildlife
- 121 - Management of Range Resources
- 123 - Management and Sustainability of Forest Resources
- 112 - Watershed Protection and Management
- 605 - Natural Resource and Environmental Economics
- 132 - Weather and Climate
- 111 - Conservation and Efficient Use of Water
- 136 - Conservation of Biological Diversity

- 134 - Outdoor Recreation
- 403 - Waste Disposal, Recycling, and Reuse
- 133 - Pollution Prevention and Mitigation

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 6

1. Outcome Target

Number of enrollments in conservation-related land management programs

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 121 - Management of Range Resources
- 104 - Protect Soil from Harmful Effects of Natural Elements
- 133 - Pollution Prevention and Mitigation
- 112 - Watershed Protection and Management
- 205 - Plant Management Systems
- 136 - Conservation of Biological Diversity

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 7

1. Outcome Target

Land area restored in Oklahoma through invasive/encroaching species removal

2. Outcome Type : Change in Condition Outcome Measure

3. Associated Knowledge Area(s)

- 135 - Aquatic and Terrestrial Wildlife
- 121 - Management of Range Resources
- 134 - Outdoor Recreation
- 104 - Protect Soil from Harmful Effects of Natural Elements
- 123 - Management and Sustainability of Forest Resources
- 605 - Natural Resource and Environmental Economics

- 136 - Conservation of Biological Diversity
- 111 - Conservation and Efficient Use of Water
- 112 - Watershed Protection and Management

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 8

1. Outcome Target

Land area restored in Oklahoma through prescribed fire or other practices

2. Outcome Type : Change in Condition Outcome Measure

3. Associated Knowledge Area(s)

- 123 - Management and Sustainability of Forest Resources
- 112 - Watershed Protection and Management
- 134 - Outdoor Recreation
- 205 - Plant Management Systems
- 135 - Aquatic and Terrestrial Wildlife
- 121 - Management of Range Resources
- 605 - Natural Resource and Environmental Economics
- 111 - Conservation and Efficient Use of Water
- 136 - Conservation of Biological Diversity

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 9

1. Outcome Target

Access by users of Oklahoma Mesonet computer and mobile device weather and climate data and tools

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 132 - Weather and Climate
- 121 - Management of Range Resources
- 111 - Conservation and Efficient Use of Water
- 134 - Outdoor Recreation
- 123 - Management and Sustainability of Forest Resources
- 205 - Plant Management Systems

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges

Description

Changes in policy and laws, the interest of the public in environmental issues, economic development opportunities, changes in agricultural commodity prices.

V(K). Planned Program - Planned Evaluation Studies

Description of Planned Evaluation Studies

Pre- and Post- testing related to changes in attitude and knowledge; Changes in level of funding for research and extension efforts; Adoption of BMPs and certification of waste management training; Change in practices related to waste management and application of prescribed burning. We will conduct before-and-after written surveys of participants in Extension and outreach programming to demonstrate changes in knowledge. For land management changes, we will contact participants following instruction and demonstration to estimate the percentage of land area actually improved through dissemination of information. In addition, an "Agriculture Weather and Climate" advisory committee will be assembled to provide in-depth evaluation and direction for the agriculture sector. A new advisory committee for "OK-Fire" will be assembled to provide in-depth evaluation and direction from natural resource managers. Finally, user surveys will be employed to assess weather and climate information and decision support impact in agricultural production and ecosystem management.

V(A). Planned Program (Summary)

Program # 6

1. Name of the Planned Program

Food Processing, Product Storage, and Food and Product Safety

2. Brief summary about Planned Program

Support and stimulate safe food production and food processing as well as food and product storage and safety with an emphasis on value-added food product production and processing. This support is provided through focused fundamental and applied research activities and extension outreach efforts. Support is primarily targeted toward Oklahoma commercial food product producers and commercial food product processors. Results of research and education programs are directly applicable to food safety needs regionally, nationally and internationally. The scope of commercial activities supported ranges from entrepreneurs and start-up ventures to large, commercial enterprises throughout the south central region of the U.S.

In connection with food safety, research goals include evaluation of methods to prevent food contamination by microbial pathogens during production and/or processing, methods to detect contamination by microbial pathogens if it has occurred, methods to eliminate microbial pathogens from foods, methods to identify and/or control microbial toxins, and methods for detecting and controlling allergens in foods.

In connection with food processing, research goals include new product development, new process technology development, product and process improvement, and the development of best practices designed to enhance food production and food processing profitability and sustainability.

Extension outreach goals are designed to support education and technology transfer to improve food safety and food processing industry viability and profitability via the research initiatives described above. A particular emphasis will be placed on assisting producers and processors to comply with overarching food safety programs designed to satisfy regulatory and/or customer requirements. Outreach goals are fulfilled using factsheets, workshops, web-based tools, and direct support in the form of technical assistance projects.

Product storage goals include: Improve the safety of stored food and agricultural products and improve storage and handling of agricultural products. A special effort is continuing in storage facility safety and a growing effort in facility air quality. New equipment and process design is a focus with particular attention to logistics, human safety and the training of both on-farm and elevator workers in English and Spanish.

3. Program existence : Mature (More then five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
216	Integrated Pest Management Systems	2%	0%	5%	0%
401	Structures, Facilities, and General Purpose Farm Supplies	16%	0%	5%	0%
403	Waste Disposal, Recycling, and Reuse	6%	0%	5%	0%
501	New and Improved Food Processing Technologies	19%	0%	10%	0%
502	New and Improved Food Products	10%	0%	10%	0%
503	Quality Maintenance in Storing and Marketing Food Products	6%	0%	10%	0%
701	Nutrient Composition of Food	11%	0%	10%	0%
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources	10%	0%	10%	0%
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins	13%	0%	25%	0%
723	Hazards to Human Health and Safety	7%	0%	10%	0%
	Total	100%	0%	100%	0%

V(C). Planned Program (Situation and Scope)

1. Situation and priorities

Food Safety:

In 2013, the U.S. Centers for Disease Control (CDC) reported that 818 confirmed foodborne disease outbreaks took place in the U.S., resulting in 13,360 illnesses, 1,062 hospitalizations, 16 deaths, and 14 food recalls. The CDC estimates that about 48 million U.S. citizens fall ill, around 128,000 are hospitalized, and approximately 3,000 die of foodborne diseases each year. The total annual cost of all foodborne illnesses has been estimated to be approximately 152 billion dollars. Major, multi-state recalls and/or foodborne illness outbreaks reported in 2015 included: Salmonella Paratyphi B variant L in raw sprouted nut butter spreads; E. coli O157:H7 in Costco Rotisserie Chicken Salad; E. coli O26 in food served at Chipotle Mexican Grill; Listeria monocytogenes in soft cheeses; Salmonella Poona in cucumbers; Salmonella Infantis in pork; Salmonella Enteritidis in raw, frozen, stuffed chicken entrees produced by Aspen Foods; and Listeria monocytogenes in Blue Bell Ice Cream. A significant recall of whole cantaloupe contaminated with Listeria occurred in 2011; 147 cases of illness in 28 states were associated with this outbreak by the CDC, including 33 deaths. In 2007 and 2009, outbreaks of salmonellosis were linked to peanut butter and peanut products - foods that were previously regarded as extremely low risk. Also in 2007, botulism toxin was detected in cans of commercially-processed chili sauce - the first such case in over 30 years. Major outbreaks and/or recalls linked to E. coli O157:H7 have occurred in products as diverse as bagged spinach, ground beef, and refrigerated cookie dough since 2006.

In addition to foodborne pathogens, undeclared allergens have become a major concern for regulatory agencies. Indeed, from January to March 2013, more class I recalls were instituted for undeclared allergens in foods than for contamination by microbial pathogens.

Clearly the need for research and outreach in the area of food safety is only growing. Improvements in methods to prevent contamination of food with microbial pathogens or undeclared allergens, to detect undeclared allergens or pathogens that may be present in food, and to reduce the numbers of microbial pathogens that may be present in a food or in a production or processing environment will pay huge dividends in health, wellbeing, business profitability, and economic growth.

Food Processing:

The World Bank estimated that value-added agricultural processing added about 146 billion dollars to the gross domestic product of the United States in 2010. Thus, the economic impact and potential of value-added processing of agricultural products is well recognized. This is certainly true for Oklahoma. Based on a 2002 study by K. Piewthongngam, agricultural processing (food and nonfood) impacted the state's economy by contributing nearly $3.3 billion to Oklahoma's Gross State Product (GSP) in the year 2000. Agricultural processing industries were reported to have added $1.7 billion to Oklahoma's income while supporting industries generated $1.6 billion. In addition, agricultural processing accounted for a total of 73,688 jobs; 39,609 directly in agricultural industries and 34,079 generated in supporting industries.

The Robert M. Kerr Food and Agricultural Products Center (FAPC) plays a role in this impact: a 10-year economic study conducted by FAPC in 2007 demonstrated that companies assisted by the FAPC created a total of an additional 180 jobs on average per year and saw an average total annual revenue increase of $217 million. A 2010 study of forty-four small entrepreneurial companies run by graduates of the FAPC's entrepreneurial food business training workshop revealed that these companies were directly or indirectly responsible for creating 314 jobs and generating approximately $1,611,434 in payroll while their total impact on product sales in Oklahoma amounted to $11,413,364 for the surveyed year.

Building on past successes, considerable opportunity remains to grow Oklahoma's value-added food processing industry. New product and new processing technology development have particular potential to create new industry and boost the state's economy in both rural and urban areas. In addition, product and process improvements and the development of best practices designed to enhance food production and food processing profitability and sustainability will make Oklahoma's food processing businesses more competitive. All of this will improve the quality of life for the citizens of Oklahoma and beyond.

Product Storage

Conduct research and outreach on management and protection of durable post harvest agricultural commodities and all value-added food products produced from such commodities in relation to:

Commercial storage management
Quality management in food processing, warehouse storage, and retail outlets
On-farm storage management
Management of multiple grains and oilseeds in small storages
Quality-Oriented Storage and Handling
Equipment required for safety and handling

2. Scope of the Program

- In-State Extension
- In-State Research
- Multistate Research
- Multistate Extension
- Integrated Research and Extension
- Multistate Integrated Research and Extension

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

We anticipate that sponsored, extramural funding for both research and outreach activities will increase as a percentage of total funding while appropriated funding will remain essentially at present levels or will decline. Support from commercial clientele will increase in the form of grants and specific project funding. We also assume that team personnel will be replaced as needed due to retirement or departure. Publishable results, including outreach materials and peer-reviewed articles, will be obtained from fundamental research and in some cases from technical assistance work. Generalizable recommendations stemming from these efforts will be included in outreach activities. Web-based outreach venues, including social media, applications for specialized devices such as smart phones, and eXtension will grow as a means of disseminating information.

2. Ultimate goal(s) of this Program

In connection with food safety, research goals include evaluation of methods to prevent food contamination by microbial pathogens during production and/or processing, methods to detect contamination by microbial pathogens if it has occurred, methods to eliminate microbial pathogens from foods, methods to identify and/or control microbial toxins, and methods for detecting and controlling allergens in foods.

In connection with food processing, research goals include new product development, new process technology development, product and process improvement, and the development of best practices designed to enhance food production and food processing profitability and sustainability.

Extension outreach goals are designed to support education and technology transfer to improve food safety and food processing industry viability and profitability via the research initiatives described above. A particular emphasis will be placed on assisting producers and processors to comply with overarching food safety programs designed to meet regulatory and/or customer food safety requirements. These include Good Agricultural Practices (GAPs), Global Food Safety Initiative (GFSI) programs, and others. Outreach goals are fulfilled using factsheets, workshops, web-based tools, and direct support in the form of technical assistance projects.

Product storage goals include: Improve the safety of stored food and agricultural products and improve storage and handling of agricultural products.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2017	2.0	0.0	4.0	0.0
2018	2.0	0.0	4.0	0.0
2019	2.5	0.0	4.0	0.0
2020	2.5	0.0	4.0	0.0
2021	2.5	0.0	4.0	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

Food Safety:

- Conduct research on preventing contamination of foods with pathogenic microorganism during production, processing, storage, distribution, and/or consumer use.
- Conduct research on eliminating or reducing the numbers of potential pathogenic microorganisms in foods during production, processing, storage, distribution, and/or consumer use.
- Conduct research on detecting contamination of foods with pathogenic microorganisms.
- Conduct research on detecting microbial toxins in foods.
- Conduct research on detecting undeclared allergens in foods.
- Provide technical information and assistance to food industry and/or consumers to determine safe food production, food processing, and/or food handling procedures.
- Conduct food safety workshops designed to provide certification in recognized food safety systems such as Hazard Analysis Critical Control Points (HACCP).
- Conduct technical assistance projects designed to assist food production / food processing enterprises in developing comprehensive, written food safety programs and to pass third-party audits of comprehensive food safety programs.
- Disseminate food safety recommendations to industry and consumers via popular press, fact sheets, eXtension publications, web-based outreach, workshops, and/or peer-reviewed journal articles.

Food Processing:

- Conduct research on improving or maintaining the quality of processed foods.
- Conduct research on developing profitable new food products and food processing technology.
- Conduct research on maximizing the efficiency and sustainability of food processing operations.
- Conduct research on improving the healthfulness and nutritional value of processed food products.
- Conduct research on evaluating the economic feasibility of food processing activities.
- Provide technical information and assistance related to processing, analyzing the chemical and physical properties, and improving or maintaining the quality of processed food products.
- Provide technical information and assistance related to food product formulation and new food product development.
- Provide technical information and assistance related to selection and evaluation of processing technology
- Provide technical information and assistance related to food process evaluation.
- Provide technical information and assistance related to processed-food business economic planning

and product marketing.

• Serve as a resource to help commercial food processors recognize and comply with applicable food product processing and labeling regulations.

• Disseminate recommendations for food processing industry best practices via popular press, fact sheets, eXtension publications, web-based outreach, workshops, and/or peer-reviewed journal articles.

Product Storage:

• Conduct research that evaluates agricultural product storage and handling technologies with the aim of improving quality, safety, and costs.

• Provide technical applications, demonstrations and education for grain and food storage providers and handlers.

• Provide continuing educational opportunities for professionals with fumigation certification

• Provide base level education for people desiring to take the fumigation certification test for Oklahoma, Missouri, and Texas.

• Conduct research in entomological challenges in the grain and ag product storage industry

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension

Direct Methods	Indirect Methods
● Education Class	● Newsletters
● Workshop	● TV Media Programs
● Group Discussion	● eXtension web sites
● One-on-One Intervention	● Web sites other than eXtension
● Demonstrations	● Other 1 (Journal articles)
● Other 1 (Scientific presentations)	

3. Description of targeted audience

Food processors; handlers, manufacturers, and marketers of grain, feed and food; food safety regulators

V(G). Planned Program (Outputs)

NIFA no longer requires you to report target numbers for standard output measures in the Plan of Work. However, all institutions will report actual numbers for standard output measures in the Annual Report of Accomplishments and Results. The standard outputs for which you must continue to collect data are:

- Number of contacts
  - Direct Adult Contacts
  - Indirect Adult Contacts
  - Direct Youth Contacts
  - Indirect Youth Contact
- Number of patents submitted
- Number of peer reviewed publications

☑ Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(H). State Defined Outputs

1. Output Measure

- Number of conferences and other extension outreach presentations
- External funding obtained
- Workshops, symposia, short courses, and round tables conducted
- Technical assistance projects completed
- Manuscripts submitted for publication in peer-reviewed journals
- Extension publications completed
- Number of air quality monitors tested

☑ Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(I). State Defined Outcome

O. No	Outcome Name
1	Grain storage, food or pest control entities adopting new process or product
2	Number of food industry personnel newly certified as HAACP trained
3	Number of food industry personnel newly certified as having attended food safety and processing workshops
4	Number of food industry jobs created
5	Number of new food businesses started
6	New or improved food processing, food safety and/or product storage adopted by industry
7	Number of emergency response teams available in Oklahoma
8	Number of food producing/food processing enterprises that implemented a comprehensive food safety plan with team assistance
9	Number of food producing/food processing enterprises that passed a third-party food safety program audit with team assistance

Outcome # 1

1. Outcome Target

Grain storage, food or pest control entities adopting new process or product

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 216 - Integrated Pest Management Systems
- 723 - Hazards to Human Health and Safety
- 401 - Structures, Facilities, and General Purpose Farm Supplies
- 503 - Quality Maintenance in Storing and Marketing Food Products

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 2

1. Outcome Target

Number of food industry personnel newly certified as HAACP trained

2. Outcome Type : Change in Condition Outcome Measure

3. Associated Knowledge Area(s)

- 712 - Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins
- 503 - Quality Maintenance in Storing and Marketing Food Products
- 723 - Hazards to Human Health and Safety
- 711 - Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 3

1. Outcome Target

Number of food industry personnel newly certified as having attended food safety and processing workshops

2. Outcome Type : Change in Condition Outcome Measure

3. Associated Knowledge Area(s)

- 712 - Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins
- 216 - Integrated Pest Management Systems
- 711 - Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources
- 503 - Quality Maintenance in Storing and Marketing Food Products
- 723 - Hazards to Human Health and Safety
- 502 - New and Improved Food Products

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 4

1. Outcome Target

Number of food industry jobs created

2. Outcome Type : Change in Condition Outcome Measure

3. Associated Knowledge Area(s)

- 502 - New and Improved Food Products
- 501 - New and Improved Food Processing Technologies

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 5

1. Outcome Target

Number of new food businesses started

2. Outcome Type : Change in Condition Outcome Measure

3. Associated Knowledge Area(s)

- 501 - New and Improved Food Processing Technologies

- 503 - Quality Maintenance in Storing and Marketing Food Products
- 502 - New and Improved Food Products

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 6

1. Outcome Target

New or improved food processing, food safety and/or product storage adopted by industry

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 723 - Hazards to Human Health and Safety
- 403 - Waste Disposal, Recycling, and Reuse
- 502 - New and Improved Food Products
- 712 - Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins
- 701 - Nutrient Composition of Food
- 501 - New and Improved Food Processing Technologies
- 503 - Quality Maintenance in Storing and Marketing Food Products
- 401 - Structures, Facilities, and General Purpose Farm Supplies
- 711 - Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources
- 216 - Integrated Pest Management Systems

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 7

1. Outcome Target

Number of emergency response teams available in Oklahoma

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 723 - Hazards to Human Health and Safety

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 8

1. Outcome Target

Number of food producing/food processing enterprises that implemented a comprehensive food safety plan with team assistance

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 723 - Hazards to Human Health and Safety

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 9

1. Outcome Target

Number of food producing/food processing enterprises that passed a third-party food safety program audit with team assistance

2. Outcome Type : Change in Condition Outcome Measure

3. Associated Knowledge Area(s)

- 503 - Quality Maintenance in Storing and Marketing Food Products
- 723 - Hazards to Human Health and Safety

4. Associated Institute Type(s)

- 1862 Extension

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges
- Populations changes (immigration, new cultural groupings, etc.)

Description

Appropriations from government and the industry. Changes in the economy, natural disasters, public policy changes, competing public priorities, competing programmatic challenges, and population changes all have a profound effect on the food industry and each can either promote or inhibit the food industry's willingness or in some cases ability to support progress in this area. Government support provides an unbiased avenue of funding that allows researchers to affect changes in processing that in the long-term benefits the safety, value, and quality of this nations food supply.

Government regulations and public policy changes effect how industry conducts its business and plays a critical role in the focus of research efforts.

Economic and regulatory influences seem the strongest external factors on stored product protection. Pesticide and food safety regulations affect how commodities will be managed. Because all the products ultimately come from crops, natural disaster can have a significant impact on the economy of stored products.

V(K). Planned Program - Planned Evaluation Studies

Description of Planned Evaluation Studies

Annually:

• Survey instruments will be used to assess the appropriateness and usefulness of workshops, symposia, short courses, and roundtables. Workshop and short course attendees will receive pre- and post-tests to assess program effectiveness as appropriate. Results will be summarized and disseminated to instructors.
• FAPC industry Advisory Committee input will be summarized and disseminated among team members.
• Public access of extension publications and websites will be analyzed.
• Funded grant proposals, peer-reviewed publications, extension publications, and intellectual property patents/licenses will be tallied.

Ongoing:

Research projects will be subjected to regular evaluation of results and progress on a frequent and regular basis. Careful records will be kept on all the data collected. Data from experiments will be immediately recorded, then summarized, analyzed and incorporated into manuscripts to ultimately be published. Regular laboratory meetings will be used to share information and make suggestions for changes in methods or approach. When data sets on an entire objective are completed then a manuscript will be prepared. Final draft manuscripts will be submitted to peer-reviewed scientific journals, which will provide the ultimate evaluation for work of this nature.

Along with summarizing of data, sharing within the research group, and ultimate publication for

broad dissemination, we anticipate several opportunities to present results of this work at both scientific conferences and at regional or local extension meetings or fumigation training sessions. At all of these venues, public comments and evaluation of our work will be obtained from those in attendance and we will draw conclusions about the impact of our work on others.

V(A). Planned Program (Summary)

Program # 7

1. Name of the Planned Program

4-H Youth Development

2. Brief summary about Planned Program

Youth in the 21st century face new challenges in preparing for the enduring tasks of work, community and family life. 4-H professionals nationwide organized three national mission mandates to develop strategies that address the challenges facing youth:

1) Science, Engineering, and Technology
2) Citizenship
3) Healthy Living

Oklahoma communities face diverse needs in these initiative areas. Each county 4-H program brings unique resources and priorities to this work. In a cooperative spirit, state staff in collaboration with county 4-H programs develop curriculum, conduct training, and evaluate programming to strengthen educational programs and enhance the outcomes of initiatives.

For the 2017-2021 POW, Oklahoma State University will further focus its efforts as four targeted initiatives designed to enhance positive youth development efforts under the banner of the 4-H Youth Development Program of the Cooperative Extension Service as follows:

1. Leadership and Citizenship
2. Agricultural & Natural Science
3. Science and Technology
4. Healthy Living

3. Program existence : Mature (More then five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
806	Youth Development	100%	0%	0%	0%
	Total	100%	0%	0%	0%

V(C). Planned Program (Situation and Scope)

1. Situation and priorities

For most of the last century, serious studies of youth development focused on a "deficit perspective", believing that those involved in youth development should be more concerned with risk factors than with ways to foster positive youth development. More and more programs evolved to be more about what youth should avoid than about what youth should strive for. In 2002 the National 4-H Council, with encouragement from the Cooperative Extension System, contracted with Tufts University to conduct a new study called The 4-H Study of Positive Youth Development. In practical terms, the study found what so many Extension educators have known for years, that there is intrinsic value in the things we do in the 4-H Youth Development program.

Today we find there are more researchers and practitioners who subscribe to the idea that "problem free is not fully prepared". Thus we have seen a re-birth of the idea of positive youth development as being more desirable than the deficit model for programming. The Oklahoma 4-H Youth Development Program is focused on ways to implement positive youth development strategies that will enhance the attainment of life skills, technical skills and leadership skills that will lead to useful and productive lives. Positive youth development has been described as those programs that achieve the outcomes known as the Five C's: competence, confidence, connection, character and caring. Rich Learner, the lead researcher for the Tufts study of positive youth development adds a sixth C for contribution.

Oklahoma 4-H seeks to provide youth with opportunities to develop the Six C's described above by providing hands on, real world experiences in the four targeted initiatives listed above. This will be done through all program delivery modes with traditional as well as non-traditional audiences through appropriate volunteer and staff training, partnerships and collaborations.

Priorities:
1. Maintain and expand the delivery of 4-H Club programs as the most viable and valuable delivery method for positive youth development programs.
2. Increase school enrichment, camps, special interest and military family programs to expand the impact of the 4-H Youth Development Programs.
3. Support the recruitment, training and retention of a viable volunteer base necessary to support and manage local and county clubs and programming where positive youth development is a priority.
4. Increase youth awareness of career opportunities through 4-H programs.
5. Instill a social and civic awareness of community needs by providing adult and youth audiences with the skills for taking a proactive role in their communities through civic engagement, volunteerism and service.
6. Improve the science and technology literacy of 4-H youth through their participation in science based programs in all curriculum areas.
7. Increase youth knowledge of the benefits of a healthy lifestyle and give them opportunities to strengthen the skills necessary to lead a healthy and productive life.

8. Increase youth involvement in the stewardship of Oklahoma's environmental resources through the understanding and application of science as related to our natural resources.
9. Increase youth knowledge of agricultural science and its contribution to the economy.

2. Scope of the Program

- In-State Extension
- Multistate Extension

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

We believe that each individual youth is a resource to be developed rather than a problem to be corrected. It is not through mere coincidence but through deliberate planning and action that we empower youth to become positive contributors to society. Oklahoma 4-H will deliberately provide:

- opportunities for adult volunteer leaders and Extension educators to develop the skills to lead 4-H programs to achieve the desired outcomes.
- an emotionally and physically safe environment where caring adults ensure an inclusive environment, allowing youth to develop a sense of belonging and lasting relationships with both caring adults and other youth.
- experience-based learning so youth will develop important life, technical and leadership skills and build their self-worth through demonstrating the competent application of those skills.
- opportunities for youth to be recognized as a viable resource who can work alongside adults to make a significant difference in their community.

2. Ultimate goal(s) of this Program

Well-trained extension personnel support the recruitment, training and retention of a volunteer base necessary to sustain and manage local and county clubs and programming.
Youth involved in 4-H project work, project/community clubs and educational programs and activities will develop an in-depth knowledge of career opportunities in through project work and educational activities and events.
Youth engaged in the Citizenship, Healthy Living and STEM programming will understand how social and physical sciences, technology, and culture all play an integral role in our personal lives, family life and society - school, community, country and world.
Youth, volunteers and educators will become good stewards of their personal and environmental resources by recognizing how the sound practices and actions of both the individual and society affect finances, energy, housing, food, and the environment.
Collaborate with other youth serving organizations and community leaders, sharing existing resources and training opportunities for youth and adult volunteers.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2017	84.0	0.0	0.0	0.0

2018	80.0	0.0	0.0	0.0
2019	75.0	0.0	0.0	0.0
2020	74.0	0.0	0.0	0.0
2021	73.0	0.0	0.0	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

Well-trained extension personnel support the recruitment, training and retention of a volunteer base necessary to sustain and manage local and county clubs and programming.
Youth involved in 4-H project work, project/community clubs and educational programs and activities will develop an in-depth knowledge of career opportunities in through project work and educational activities and events.
Youth engaged in the Citizenship, Healthy Living and STEM programming will understand how social and physical sciences, technology, and culture all play an integral role in our personal lives, family life and society - school, community, country and world.
Youth, volunteers and educators will become good stewards of their personal and environmental resources by recognizing how the sound practices and actions of both the individual and society affect finances, energy, housing, food, and the environment.
Collaborate with other youth serving organizations and community leaders, sharing existing resources and training opportunities for youth and adult volunteers.

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension

Direct Methods	Indirect Methods
● Education Class ● Workshop ● Group Discussion ● One-on-One Intervention ● Demonstrations ● Other 1 (Complete action plans)	● Public Service Announcement ● Newsletters ● eXtension web sites ● Web sites other than eXtension ● Other 1 (Social Marketing)

3. Description of targeted audience

Youth, children, parents, teachers, youth and adult volunteers, middle to low income families; race and ethnicity will also be recognized as an identifier of audiences; caretakers, agencies and service providers, schools, policy makers

V(G). Planned Program (Outputs)

NIFA no longer requires you to report target numbers for standard output measures in the Plan of Work. However, all institutions will report actual numbers for standard output measures in the Annual Report of Accomplishments and Results. The standard outputs for which you must continue to collect data are:

- Number of contacts
  - Direct Adult Contacts
  - Indirect Adult Contacts
  - Direct Youth Contacts
  - Indirect Youth Contact
- Number of patents submitted
- Number of peer reviewed publications

☑ Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(H). State Defined Outputs

1. Output Measure

- Number of in-service training sessions for Extension educators
- Number of educational trainings offered for volunteers, teen leaders and ambassadors
- Number of educational events and contests conducted
- Number of partnerships and collaborative efforts engaged in to accomplish 4-H Goals

☑ Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(I). State Defined Outcome

O. No	Outcome Name
1	Adult volunteers will maintain or improve the skills necessary to provide appropriate leadership for 4-H club, camp, after-school and special interest programs.
2	Teen volunteers, officers and ambassadors will learn the leadership skills to become contributing partners with adult volunteers and Extension educators in the design and delivery of 4-H programs.
3	4-H youth will practice "contribution and caring" through citizenship and community service activities.
4	Youth will utilize agricultural and natural science programs to: improve the profitability of agricultural resources; enhance the sustainability of natural resources and improve their understanding of career and leisure activities related to these programs.
5	Youth will increase their ability to use STEM technologies and their awareness of career opportunities in science and technology.
6	Youth will develop an understanding of the relationship between diet/nutrition/exercise and physical, mental and emotional health and will demonstrate an increase in healthy lifestyle choices.

Outcome # 1

1. Outcome Target

Adult volunteers will maintain or improve the skills necessary to provide appropriate leadership for 4-H club, camp, after-school and special interest programs.

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 806 - Youth Development

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 2

1. Outcome Target

Teen volunteers, officers and ambassadors will learn the leadership skills to become contributing partners with adult volunteers and Extension educators in the design and delivery of 4-H programs.

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 806 - Youth Development

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 3

1. Outcome Target

4-H youth will practice "contribution and caring" through citizenship and community service activities.

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 806 - Youth Development

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 4

1. Outcome Target

Youth will utilize agricultural and natural science programs to: improve the profitability of agricultural resources; enhance the sustainability of natural resources and improve their understanding of career and leisure activities related to these programs.

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 806 - Youth Development

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 5

1. Outcome Target

Youth will increase their ability to use STEM technologies and their awareness of career opportunities in science and technology.

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 806 - Youth Development

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 6

1. Outcome Target

Youth will develop an understanding of the relationship between diet/nutrition/exercise and physical, mental and emotional health and will demonstrate an increase in healthy lifestyle choices.

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 806 - Youth Development

4. Associated Institute Type(s)

- 1862 Extension

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

- Competing Programmatic Challenges
- Populations changes (immigration, new cultural groupings, etc.)

Description

V(K). Planned Program - Planned Evaluation Studies

Description of Planned Evaluation Studies

Positive youth development will continue to be evaluated through a variety of evaluation instruments as required by specific funding sources and as designed by initiative teams working in each of the four targeted initiative areas.

During each of the four years from 2017 through 2021, there will be at least one comprehensive evaluation, with those evaluations being rotated between the four targeted initiative areas. By the end of the four year cycle, each of the four targeted initiative areas will complete an evaluation.

V(A). Planned Program (Summary)

Program # 8

1. Name of the Planned Program

Turfgrass Development and Management

2. Brief summary about Planned Program

Improve turfgrass varieties, management and applications of turfgrasses including positive impacts on the economy, the environment and society.

3. Program existence : Mature (More then five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
111	Conservation and Efficient Use of Water	15%	0%	10%	0%
201	Plant Genome, Genetics, and Genetic Mechanisms	1%	0%	5%	0%
202	Plant Genetic Resources	4%	0%	10%	0%
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants	0%	0%	10%	0%
204	Plant Product Quality and Utility (Preharvest)	6%	0%	5%	0%
205	Plant Management Systems	49%	0%	15%	0%
206	Basic Plant Biology	1%	0%	5%	0%
211	Insects, Mites, and Other Arthropods Affecting Plants	5%	0%	10%	0%
212	Diseases and Nematodes Affecting Plants	9%	0%	10%	0%
216	Integrated Pest Management Systems	10%	0%	20%	0%
	Total	100%	0%	100%	0%

V(C). Planned Program (Situation and Scope)

1. Situation and priorities

Turfgrass beautifies and stabilizes an estimated 40 million acres of land in the United States. Turf is the largest intensively managed plant system in the U.S. based on acreage. Growth in turfgrass production, sales, installation and maintenance is tied directly to urbanization (lawns, parks, grounds, cemeteries),

installation of roadside rights-of-way and recreation (sports fields and golf courses). Turfgrasses historically developed in ecosystems governed by fire and continuous grazing. To maximize the performance and benefits provided by turfgrasses, humans have replaced fire and animal grazing in urban settings with herbicides and mowing. Uncertainty in turf performance has been reduced with additions of fertilizer and irrigation water. High visual and functional performance is expected while pests continue to co-evolve to feed on turfgrasses. Extremes of climate have led to environmental stresses, limiting turfgrass performance. Turfgrass managers are expected to maintain turfgrass in a manner that provides the ultimate in visual and functional benefits to human-kind in a cost-effective manner with no negative environmental impact. Our team will continue to 1) develop and identify improved turfgrasses as well as 2) discover responsible cultural practices that will aid professional turfgrass managers and consumers in meeting their goals. We will 3) continue to educate end users on the best varieties and management practices to achieve their stated goals.

2. Scope of the Program

- In-State Extension
- In-State Research
- Multistate Research
- Multistate Extension
- Integrated Research and Extension
- Multistate Integrated Research and Extension

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

Appropriated and sponsored funding will continue at similar levels with consumer price-indexed increases. Fee-based Turfgrass Diagnostic Lab services will be continued due to the Lab's ability to provide highly technical consultation with rapid response time. Laboratories, field facilities and associated equipment will need to be replaced as needed. Key research and extension turfgrass faculty and staff will be replaced in a timely manner upon their departure. The necessary research and demonstration land/facilities required for testing will increase proportional to the number of species/varieties, products and techniques that our program is engaged in testing. We will generate improved bermudagrass cultivars, identify superior species/cultivars offered by private industry, and develop improved management practices (BMPs and IPM). We will either recruit highly qualified seed or sod producers to produce OSU turfgrasses or we will utilize licensing companies to recruit qualified producers of our products. We will demonstrate and convey information on our improved products and management techniques to thousands of citizens and industry practitioners. Rational decision making based on the combination of science, perception and sound public policy will be made by the turf industry, government and the public at large. Resultant adoption of integrated turfgrass management strategies will occur and turfgrass performance can be maintained or improved with positive environmental impacts.

2. Ultimate goal(s) of this Program

1. We will generate new and improved turf bermudagrass varieties and germplasm.
2. Interdisciplinary researchers on our team will identify superior material developed by private industry as well as from our program that have improved abiotic and biotic stress resistance/tolerance.
3. Mechanisms associated with improved or reduced stress resistance will be elucidated.
4. Research will identify new or improved integrated management practices.
5. Educational materials will be developed featuring improved varieties and how to properly maintain them.

6. Effective educational programming will be conducted to integrate this information into existing management programs.
7. Efficient water usage for sustainable production and maintenance of turfgrasses will be promoted.
8. Individuals will be educated concerning use of personal protective equipment in turf and landscape maintenance, facilitating sound decision making in the future.
9. High percentage adoption of improved integrated turfgrass management strategies will occur and turfgrass performance will be maintained or improved with increased positive environmental impacts.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2017	2.0	0.0	3.0	0.0
2018	2.0	0.0	3.0	0.0
2019	2.0	0.0	2.5	0.0
2020	2.0	0.0	3.0	0.0
2021	2.0	0.0	3.0	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

New turf germplasm/varieties having improved abiotic and biotic stress resistance/tolerance will be generated by our program.
Research will identify the elite performing species and varieties from both our program and from industry.
We will identify and/or develop new or refined integrated management practices to achieve goals.
Research and extension activities will be conducted to improved efficiency of water application and to reduce runoff.
Educational materials will be developed featuring improved varieties and how to properly install and maintain them.
Highly effective educational programming and consultations will be conducted for professionals and consumers to help integrate this information into existing management programs.

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension

Direct Methods	Indirect Methods
● Education Class ● Workshop ● One-on-One Intervention ● Demonstrations	● Newsletters ● TV Media Programs ● Web sites other than eXtension

3. Description of targeted audience

Audiences include governmental, private industry and multiple end-user areas. Research audiences: basic and applied plant science/turf science researchers, including those from the CSSA, and ASHS. Funding agency audiences: USGA, GCSAA, USDA, OTRF and many private corporations. New cultivars developed as well as products such as trade articles, fact sheets, and educational programming will be provided to the target audiences characterized as the turfgrass production sector (sod and seed producers), service sector (landscape/lawncare and pest control operators) and turf managers (which include the golf course, parks & grounds, right of way managers and home consumers).

V(G). Planned Program (Outputs)

NIFA no longer requires you to report target numbers for standard output measures in the Plan of Work. However, all institutions will report actual numbers for standard output measures in the Annual Report of Accomplishments and Results. The standard outputs for which you must continue to collect data are:

- Number of contacts
  - Direct Adult Contacts
  - Indirect Adult Contacts
  - Direct Youth Contacts
  - Indirect Youth Contact
- Number of patents submitted
- Number of peer reviewed publications

☑ Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(H). State Defined Outputs

1. Output Measure

- Number of final stage experimental bermudagrasses sent to national testing phase in the NTEP bermudagrass trial once every 5 years
- Number of fine turf program and roadside vegetation management workshops conducted and trade presentations presented each year.
- Number of new bermudagrasses developed by our program that are commercially released to the trade for production.
- Number of cultivar evaluation trials; weed control trials; management factor trials; and physiological, morphological or other investigations conducted on turfgrass.
- Number of scientific abstracts, posters or oral presentations presented to scientific audiences.
- Number of turfgrass managers trained in recognition and selection of improved varieties and implementation of integrated turfgrass management systems
- Number of email and news releases generated
- Number of consultation phone calls and emails completed
- Number of Extension reports and fact sheets generated
- Number of extension field days, workshops, short courses and conferences conducted
- Number of pesticide applicators receiving continuing education training (CEU workshops).
- Number of initial pesticide applicator certification schools conducted.

☑ Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(I). State Defined Outcome

O. No	Outcome Name
1	Percentage of ODOT employees achieving certified pesticide applicator status following initial certification training.
2	Percentage of professional fine turf managers continuing adoption of improved BMPs and IPM practices when surveyed following educational events.
3	Percentage of ODOT roadside vegetation managers continuing adoption of improved BMPs and IPM practices
4	Number of licensed or sublicensed sod producers and seed producers producing OSU developed turfgrasses. Both new and retained production licenses each year.
5	Number of Oklahoma sod producers producing improved turfgrasses suggested for use by OSU Turfgrass Extension Program.

Outcome # 1

1. Outcome Target

Percentage of ODOT employees achieving certified pesticide applicator status following initial certification training.

2. Outcome Type : Change in Condition Outcome Measure

3. Associated Knowledge Area(s)

- 205 - Plant Management Systems
- 216 - Integrated Pest Management Systems

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 2

1. Outcome Target

Percentage of professional fine turf managers continuing adoption of improved BMPs and IPM practices when surveyed following educational events.

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 205 - Plant Management Systems
- 216 - Integrated Pest Management Systems

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 3

1. Outcome Target

Percentage of ODOT roadside vegetation managers continuing adoption of improved BMPs and IPM practices

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 216 - Integrated Pest Management Systems

- 205 - Plant Management Systems

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 4

1. Outcome Target

Number of licensed or sublicensed sod producers and seed producers producing OSU developed turfgrasses. Both new and retained production licenses each year.

2. Outcome Type : Change in Condition Outcome Measure

3. Associated Knowledge Area(s)

- 201 - Plant Genome, Genetics, and Genetic Mechanisms
- 204 - Plant Product Quality and Utility (Preharvest)
- 202 - Plant Genetic Resources

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 5

1. Outcome Target

Number of Oklahoma sod producers producing improved turfgrasses suggested for use by OSU Turfgrass Extension Program.

2. Outcome Type : Change in Condition Outcome Measure

3. Associated Knowledge Area(s)

- 205 - Plant Management Systems
- 202 - Plant Genetic Resources
- 201 - Plant Genome, Genetics, and Genetic Mechanisms
- 204 - Plant Product Quality and Utility (Preharvest)

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges

Description

Natural disasters, funding by governmental, NGO's and private industry partners as well as changing public/governmental policy are projected to contribute to the greatest amount of uncertainty in achieving program goals.

V(K). Planned Program - Planned Evaluation Studies

Description of Planned Evaluation Studies

Yearly survey of 40+ Oklahoma sod producers will be conducted for the Oklahoma Turfgrass Sod Source Directory. Survey will confirm availability of new and older varieties in the trade.
Direct consultation with members of the Oklahoma seed production industry, Oklahoma Golf Course Superintendents Association (OGCSA), Oklahoma Sod Producers Association (OSPA) and the Oklahoma Sports Turf Managers Association (OKSTMA) allows the surveyor direct knowledge of adoption of new seeded and vegetative grasses being used in each specific industry.
Direct consultation with members of each professional organization listed above allows our team members to assess new industry research and information needs and adoption of improved varieties and refined management practices.
Logging of phone call, email, and US mail questions received as well as subject matter content will be performed.
Logging of website hits on OSU turf website will be conducted.
Following conferences or workshops, participants will be surveyed via paper or on-line survey to determine their intent to adopt improved varieties, water conservation practices, nutrient management practices and IPM techniques conveyed. Workshop participants will include those from spring dead spot management workshops, water conservation workshops, campus IPM workshops, pesticide applicator continuing education workshops, turfgrass field days, area turf & landscape workshops, Annual Oklahoma Turfgrass Conference & Trade Show and the Oklahoma/Arkansas Turfgrass Management Short Course.
Approximately 0.5% of all turf management consultation clients from the previous year are surveyed each year informally by phone to determine the clients' success in problems solving, need for further information and customer satisfaction with the recommendations that were provided by the turfgrass specialist.

V(A). Planned Program (Summary)

Program # 9

1. Name of the Planned Program

Community Resource and Economic Development

2. Brief summary about Planned Program

Rural Oklahoma faces many challenges including a need to diversify and enhance the local economies and continue to provide a viable quality of life. The planned program will focus on local economic development, infrastructure (e.g.., broadband) and community services (e.g.., solid waste management), local government, and leadership development. All of these focus areas are needed if rural Oklahoma is to prosper.

The Community Resource and Economic Development team has a strong history of cooperative efforts. The "healthy communities" workgroup includes many team members. We have organized and delivered in-service training programs and developed training materials that cut across program lines and geographic boundaries. We anticipate these cooperative efforts will continue.

There are several sub-categories or areas of specialization within the team. These areas include:

- Economic Development;
- Infrastructure and Community Services;
- Local Government Training;
- Leadership Development;
- Manufacturing Assistance;
- Entrepreneurship.

3. Program existence : Mature (More then five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
608	Community Resource Planning and Development	100%	0%	100%	0%
	Total	100%	0%	100%	0%

V(C). Planned Program (Situation and Scope)

1. Situation and priorities

Rural Oklahoma is diverse. Some counties have severe declining population. Other rural counties are experiencing growth and urban sprawl. Priorities will focus on providing educational programs and applied research results that assist rural leaders in dealing with specific local issues. The program will focus on efforts in economic development, infrastructure and community services (including broadband and solid waste management), local government, leadership development, manufacturing assistance, and entrepreneurship.

2. Scope of the Program

- In-State Extension
- In-State Research
- Multistate Research
- Multistate Extension
- Integrated Research and Extension

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

1. There is a need for research and technical assistance in rural Oklahoma;
2. OSU has capabilities to respond;
3. Funding and staffing will be at least constant and perhaps increase.

2. Ultimate goal(s) of this Program

1. Assist in efforts to diversify the local economy in rural areas of Oklahoma.
2. Improve well-being of community residents and aid in enhancing quality of life.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2017	11.0	0.0	1.0	0.0
2018	11.0	0.0	1.0	0.0
2019	9.0	0.0	1.0	0.0
2020	8.5	0.0	1.0	0.0
2021	8.0	0.0	1.0	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

Strategic planning training and strategic planning for communities, infrastructure planning, community service plans, training of county elected officials, engineering and manufacturing consulting, solid waste management training and education, community economic development studies, community leadership and agricultural leadership development, and entrepreneurship training and development.

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension

Direct Methods	Indirect Methods
● Education Class ● Workshop ● Group Discussion ● One-on-One Intervention ● Other 1 (tecnical assistance)	● Newsletters ● eXtension web sites ● Web sites other than eXtension

3. Description of targeted audience

The target audience includes community leaders (volunteer and elected), agricultural leadership participants and alums, and business owners/prospective owners, hospitals, schools, chambers of commerce, entrepreneurs, other agencies

V(G). Planned Program (Outputs)

NIFA no longer requires you to report target numbers for standard output measures in the Plan of Work. However, all institutions will report actual numbers for standard output measures in the Annual Report of Accomplishments and Results. The standard outputs for which you must continue to collect data are:

- Number of contacts
  - Direct Adult Contacts
  - Indirect Adult Contacts
  - Direct Youth Contacts
  - Indirect Youth Contact
- Number of patents submitted
- Number of peer reviewed publications

☑ Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(H). State Defined Outputs

1. Output Measure

- Number of community services plans completed
- Number of education modules (written curricula) completed
- Number of county officer training courses conducted
- Number of manufacturing firms receiving applications engineering assistance
- Number of county officials completing an educational certificate of achievement
- Number of solid waste-related trainings completed

☑ Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(I). State Defined Outcome

O. No	Outcome Name
1	Number improving business skills
2	Number of manufacturing jobs created or retained
3	Number of communities where capacity was increased
4	Number of participants that plan to open/expand a business
5	Number of communities that build plans for growth and/or improvement
6	Number of leadership class graduates actively participating in community or industry
7	Number improving public infrastructure management skills

Outcome # 1

1. Outcome Target

Number improving business skills

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 608 - Community Resource Planning and Development

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 2

1. Outcome Target

Number of manufacturing jobs created or retained

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 608 - Community Resource Planning and Development

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 3

1. Outcome Target

Number of communities where capacity was increased

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 608 - Community Resource Planning and Development

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 4

1. Outcome Target

Number of participants that plan to open/expand a business

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 608 - Community Resource Planning and Development

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 5

1. Outcome Target

Number of communities that build plans for growth and/or improvement

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 608 - Community Resource Planning and Development

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 6

1. Outcome Target

Number of leadership class graduates actively participating in community or industry

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 608 - Community Resource Planning and Development

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 7

1. Outcome Target

Number improving public infrastructure management skills

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 608 - Community Resource Planning and Development

4. Associated Institute Type(s)

- 1862 Extension

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Appropriations changes
- Competing Public priorities

Description

Resources and priorities are impacted by unexpected events. A down turn in the economy may mean fewer resources are available to do this work. Some events are beyond our control.

V(K). Planned Program - Planned Evaluation Studies

Description of Planned Evaluation Studies

Programs will be evaluated after delivery. Most will have immediate post-evaluation. Selected programs will have medium term and long term post-evaluations. Some case studies will be conducted to enhance evaluation and feedback.
In all cases, outcomes are expected to lead to economic or societal impacts. In some cases, there will be economic outcomes such as jobs created or retained, or increased levels of income for rural families. These will be quantified using surveys and best-available data when assumptions must be made. In other cases, social impacts will relate to enhanced quality of life. These evaluation studies are

intended to try to capture this information.
Each program that is part of the Community Resource and Economic Development team will report at least some state defined outputs and outcomes on an annual basis. Programs that have demonstrated long-term viability and have dependable participant contact information can be expected to perform medium or long term evaluations at various points during the 2017 - 2021 timeframe. For example, the e-commerce program (as part of the general economic development sub-specialty) has been going strong since 2008. Evaluation of this program involves taking two surveys following each short course, with a period of about 3 months between the two surveys. The goal will be to gage impact of programming and see if the length of time between surveys indicated change in impact. Similarly, the Solid Materials Management program follows up with participants of conferences it sponsors 6 months after the conference to identify if the participants have implemented new practices or changed behaviors based upon knowledge gained at the conferences; the Organic Conference, a statewide compositing conference and a conference for environmental law and regulatory enforcement personnel will be sponsored by the Solid Materials Management program for which these evaluation practices will be used.
The Applications Engineering program uses an on-going evaluation and impact measurement model which will continue in the future as the program continues.
For the County Training Program, a retrospective evaluation survey is planned for those participating in programming each year.
For the Stronger Economies Together (SET) program, at the completion of the program, participants will be asked to take a survey regarding their experiences, the relationships they have formed, and the accomplishments of the group.

V(A). Planned Program (Summary)

Program # 10

1. Name of the Planned Program

Integrated Pest Management

2. Brief summary about Planned Program

The IPM team will (1) re-examine stakeholder needs relative to pest management, (2) develop education and research programs to address pest management issues, (3) deliver findings and IPM recommendations to stakeholders through appropriate delivery systems, and (4) evaluate short and long-term impact of IPM recommendations. Efforts are directed at achieving the goals set forth in the National Roadmap for Integrated Pest Management (revised 2012). The goals are:

- improving cost benefit analyses when adopting IPM practices;
- reducing potential human health risks from pests and related management strategies;
- minimizing adverse environmental effects from pests and related management strategies

3. Program existence : Mature (More then five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
133	Pollution Prevention and Mitigation	10%	0%	10%	0%
202	Plant Genetic Resources	3%	0%	5%	0%
205	Plant Management Systems	10%	0%	10%	0%
211	Insects, Mites, and Other Arthropods Affecting Plants	11%	0%	15%	0%
212	Diseases and Nematodes Affecting Plants	5%	0%	15%	0%
213	Weeds Affecting Plants	11%	0%	10%	0%
215	Biological Control of Pests Affecting Plants	5%	0%	5%	0%
216	Integrated Pest Management Systems	41%	0%	20%	0%
601	Economics of Agricultural Production and Farm Management	3%	0%	5%	0%
901	Program and Project Design, and Statistics	1%	0%	5%	0%
	Total	100%	0%	100%	0%

V(C). Planned Program (Situation and Scope)

1. Situation and priorities

Oklahoma's economy is often portrayed as "agriculture and oil", and the description of Oklahoma's agriculture economy is condensed to "cattle and wheat". There is some truth to that description because Oklahoma is the nation's second largest producer of natural gas and fifth largest producer of crude oil. Oklahoma's agriculture economy is the nation's 27th largest, worth $6.1 billion and Oklahoma is the nation's fifth largest producer of cattle and wheat. However, Oklahoma also has vibrant pork, poultry and dairy industries, and few small grains and row crops are "not" grown in Oklahoma. Greenhouse/nursery/turf products rank second behind wheat, with hay, corn, soybean, cotton, grain sorghum, peanuts, pecan, rye and watermelons following (NASS 2009). The activities generated by the IPM Team and IPM Oklahoma! provide program support for IPM in alfalfa, corn, cotton, peanut, rangeland/pasture, sorghum small grains and soybean and has consistently supported a strong stored grains IPM program. Pest complexes in these crops constantly change and require unrelenting efforts at developing and refining IPM programs. Opportunities exist to develop new, innovative IPM programs that support Oklahoma's livestock industries. Invasive weeds infest significant areas of Oklahoma's 26 million acres of rangeland and pastures. Our agriculture industries face challenges from regulated invasive pests, such as Japanese beetle, musk thistle and red imported fire ant. Resident and emerging pest problems affect net profitability of agricultural enterprises and the quality of life in agricultural and non-agricultural systems.

Consumers demand a safe supply of food & fiber that is produced in an environmentally responsible way. The nature and availability of conventional pesticide tools continues to change, making it essential that IPM programs are effective, safe and sustainable. Stakeholders rely on OSU's IPM team to: assesses their pest management needs; prioritize those needs into a coherent research and extension plan of

action; conduct relevant research directed at those priorities, deliver products that result from that research through extension education and outreach programs, assess the products for both safety and sustainability, and evaluate the impact of short and long-term management recommendations.
The IPM team, in conjunction with IPM Oklahoma! have developed the following priorities: address previously identified pest management Research and Extension Needs for Oklahoma's "Minor Crops" (Franke et al. 2009 a-f) and Turf Industries; address, develop and expand pest management approaches for pests of agronomic crops (cotton, sorghum, corn, peanut, sunflower), horticultural (pecans, grapes, ornamentals), livestock and urban (public housing) ecosystems; develop management approaches for problem weeds, including herbicide resistant weeds; address potential invasive pest problems, such as potential damage from pests such as the sugar cane aphid and the old world bollworm Helicoverpa armigera and evaluate impact and adoption of IPM systems.

2. Scope of the Program

- In-State Extension
- In-State Research
- Multistate Research
- Multistate Extension
- Integrated Research and Extension
- Multistate Integrated Research and Extension

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

The attainment of these objectives relies on the following assumptions: appropriated and sponsored support for the core group of research and extension faculty will need to be increased or maintained at similar levels. Personnel will need to be maintained at a viable level to meet the priorities. Continually changing IPM funding procedures have potentially threatened the level and quality of deliverable efforts.

2. Ultimate goal(s) of this Program

The IPM team will address identified stakeholder priorities for management of pests by developing research, extension, and evaluation programs that ensure the safety and viability of pest management approaches, while increasing net profitability and improving the quality of life in agricultural and non-agricultural systems.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2017	4.0	0.0	4.0	0.0

2018	4.0	0.0	4.0	0.0
2019	4.0	0.0	3.5	0.0
2020	4.0	0.0	3.5	0.0
2021	4.0	0.0	3.0	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

Fulfill the specific Inputs and Activities outlined in the "Oklahoma State University Coordination Program for IPM Oklahoma!" (as made to USDA-NIFA "Extension Integrated Pest Management Coordination and Support Program (EIPM-CS)") , including the identification of new program priorities for future funding.

Provide information on IPM upon request to stakeholder groups, and attend stakeholder sponsored meetings as invited.

Conduct targeted research on pest status, suppression and IPM approaches for crop, animal, and urban systems in Oklahoma.

Develop and deliver extension IPM programs to stakeholders, in the form of workshops, field demonstrations and meetings.

Develop pesticide applicator education and pesticide information through printed media, fact sheets and current reports.

Assess impact of educational activities on stakeholder IPM

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension

Direct Methods	Indirect Methods
● Education Class ● Workshop ● Group Discussion ● One-on-One Intervention ● Demonstrations ● Other 1 (Research)	● Newsletters ● TV Media Programs ● Web sites other than eXtension

3. Description of targeted audience

Agricultural Producers, Agricultural Groups, Commercial Growers, Retailers, Agricultural Professionals (private, commercial and non-commercial), and landowners, nurseries, individual stakeholders, storers and handlers of grain

V(G). Planned Program (Outputs)

NIFA no longer requires you to report target numbers for standard output measures in the Plan of Work. However, all institutions will report actual numbers for standard output measures in the Annual Report of Accomplishments and Results. The standard outputs for which you must continue to collect data are:

- Number of contacts
  - Direct Adult Contacts
  - Indirect Adult Contacts
  - Direct Youth Contacts
  - Indirect Youth Contact
- Number of patents submitted
- Number of peer reviewed publications

☑ Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(H). State Defined Outputs

1. Output Measure

- Stakeholder assessment
- Pesticide applicator education schools and workshops
- County-based variety field tours of row-crops and small grains for Oklahoma growers
- Extension publications will be created or revised
- News releases on the subject of IPM horticulture crops, livestock, agronomic crops and urban systems (Public Housing).
- A summarized annual report will be developed for distribution to involved stakeholders demonstrating the impact of IPM programs to Oklahoma citizens.

☑ Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(I). State Defined Outcome

O. No	Outcome Name
1	Increased use of pest management approaches for targeted cropping system acres
2	Number of trained certified pesticide applicators
3	Increase in percent of growers with knowledge and adoption of iWheat program for winter wheat.
4	Home gardeners will gain knowledge about IPM practices for their home gardens.
5	People will gain knowledge about IPM programs by visiting the IPM Oklahoma! booth at various meetings, including the Oklahoma Ag Expo and the Oklahoma School Plant Managers Association.
6	Participants will understand connections between pest management of bed bugs, the near environment, housing, health, and well-being resulting in an increase in the number of Oklahoman's practicing bed bug risk reduction.
7	Stakeholders will increase awareness of invasive species in Oklahoma (such as saltcedar, brown marmorated stink bug, emerald ash borer, etc) and how they might be managed.

Outcome # 1

1. Outcome Target

Increased use of pest management approaches for targeted cropping system acres

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 133 - Pollution Prevention and Mitigation
- 212 - Diseases and Nematodes Affecting Plants
- 216 - Integrated Pest Management Systems
- 215 - Biological Control of Pests Affecting Plants
- 211 - Insects, Mites, and Other Arthropods Affecting Plants
- 213 - Weeds Affecting Plants
- 205 - Plant Management Systems
- 601 - Economics of Agricultural Production and Farm Management

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 2

1. Outcome Target

Number of trained certified pesticide applicators

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 901 - Program and Project Design, and Statistics
- 212 - Diseases and Nematodes Affecting Plants
- 211 - Insects, Mites, and Other Arthropods Affecting Plants
- 205 - Plant Management Systems
- 216 - Integrated Pest Management Systems
- 213 - Weeds Affecting Plants
- 133 - Pollution Prevention and Mitigation

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 3

1. Outcome Target

Increase in percent of growers with knowledge and adoption of iWheat program for winter wheat.

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 213 - Weeds Affecting Plants
- 216 - Integrated Pest Management Systems
- 601 - Economics of Agricultural Production and Farm Management
- 211 - Insects, Mites, and Other Arthropods Affecting Plants
- 205 - Plant Management Systems
- 212 - Diseases and Nematodes Affecting Plants

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 4

1. Outcome Target

Home gardeners will gain knowledge about IPM practices for their home gardens.

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 215 - Biological Control of Pests Affecting Plants
- 216 - Integrated Pest Management Systems
- 205 - Plant Management Systems
- 133 - Pollution Prevention and Mitigation
- 213 - Weeds Affecting Plants
- 211 - Insects, Mites, and Other Arthropods Affecting Plants
- 212 - Diseases and Nematodes Affecting Plants

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 5

1. Outcome Target

People will gain knowledge about IPM programs by visiting the IPM Oklahoma! booth at various meetings, including the Oklahoma Ag Expo and the Oklahoma School Plant Managers Association.

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 216 - Integrated Pest Management Systems

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 6

1. Outcome Target

Participants will understand connections between pest management of bed bugs, the near environment, housing, health, and well-being resulting in an increase in the number of Oklahoman's practicing bed bug risk reduction.

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 216 - Integrated Pest Management Systems

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 7

1. Outcome Target

Stakeholders will increase awareness of invasive species in Oklahoma (such as saltcedar, brown marmorated stink bug, emerald ash borer, etc) and how they might be managed.

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 216 - Integrated Pest Management Systems
- 211 - Insects, Mites, and Other Arthropods Affecting Plants
- 213 - Weeds Affecting Plants
- 215 - Biological Control of Pests Affecting Plants

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Populations changes (immigration, new cultural groupings, etc.)

Description

Any factors that affect production systems and IPM (research and extension) will affect outcomes.

V(K). Planned Program - Planned Evaluation Studies

Description of Planned Evaluation Studies

At least 3 programs will be evaluated using an evaluation tool designed to measure short, medium and long-term outcomes through tools made available the Extension IPM Coordination and Support program. Other IPM members will assess stakeholder priorities and effectiveness of IPM programs by using on-site survey methodologies and/or mail surveys to address larger populations.

V(A). Planned Program (Summary)

Program # 11

1. Name of the Planned Program

Food Safety - Agricultural Biosecurity

2. Brief summary about Planned Program

The OSU DASNR Agricultural Biosecurity Team consists of faculty appointed to, or affiliated with, the OSU National Institute for Microbial Forensics and Agricultural Biosecurity (NIMFFAB), other OSU faculty members on the Stillwater campus and at the OSU Center for Health Sciences in Tulsa, collaborators, and several OCES County Educators. NIMFFAB is designed as a framework within which communication among Team members is facilitated and initiatives related to research, teaching and outreach are supported.

Efforts focus on targeted research projects, graduate education (including the development of multi-disciplinary coursework), and outreach consisting of linkages with sponsor agencies and stakeholders, and training for extension agents, plant disease diagnosticians, and others.

3. Program existence : Intermediate (One to five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
211	Insects, Mites, and Other Arthropods Affecting Plants	19%	0%	5%	0%
212	Diseases and Nematodes Affecting Plants	12%	0%	50%	0%
213	Weeds Affecting Plants	12%	0%	0%	0%
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins	35%	0%	35%	0%
903	Communication, Education, and Information Delivery	22%	0%	10%	0%
	Total	100%	0%	100%	0%

V(C). Planned Program (Situation and Scope)

1. Situation and priorities

Through history, threats of biological weapons and bioterrorism have been directed against agricultural targets including plant and animal resources. If strategically deployed, such agents could cause significant economic losses through commodity losses, trade restrictions, embargoes, and economic detriment to the rural communities whose infrastructure is dependent upon the agricultural infrastructure. It is a priority for OSU to respond to state and national needs related to the prevention of, preparation for, and responses to events of deliberate introduction of a biological agent with the intent to harm U.S. agricultural resources, or to emerging issues related to human pathogen contamination of plant based foods.

To address needs for increased agricultural biosecurity infrastructure, NIMFFAB was established at Oklahoma State University in 2007. NIMFFAB now has a core group of five faculty from the Department of Entomology and Plant Pathology and approximately 15 affiliated faculty from within DASNR and nationally. We successfully established biosecurity- and food safety-relevant working groups and research collaborations at local, national and international levels. Since NIMFFAB's inception, 18 graduate students have received advanced degrees in Plant Pathology, Entomology, or Biochemistry & Molecular Biology, many of whom have since moved into biosecurity positions, postdoctoral appointments or graduate school. NIMFFAB faculty members have obtained over 2.5 million dollars in extramural funds resulting in over 70 refereed journal publications. More importantly, NIMFFAB researchers have had a significant impact on food safety practices, training of personnel in emergency responses, development of protocols for improved detection and characterization of high incidence plant pathogens and vectors, and the development of microbial forensic technologies and tools for application in planta. The recent hiring of Dr. Kitty Cardwell (former NIFA NPL) paves the way for strengthening plant pathogen forensics and inclusion of animal pathogens as part of the mission to expand microbial forensics applications. As we move into the next five year period, we will build upon our past accomplishments and new opportunities to assure that NIMFFAB and other OSU agricultural biosecurity and food safety efforts continue to contribute significantly to state and national needs in these areas.

Short Term Priorities of the Agricultural Biosecurity Team

1. Continue a strong, cooperative, multi-institutional and multi-disciplinary initiative in agriculturally- and food safety related microbial forensics.

a. Oklahoma cooperators include OSU (Stillwater, Tulsa, CHS, OAES, OCES, and the OSU Multispectral Laboratory, Ponca City), the Oklahoma Bureau of Investigation, the Oklahoma Working Group on Agricultural Biosecurity, OU and possibly other entities.

b. National cooperators include the USDA (APHIS, ARS, National Plant Diagnostic Network, National Plant Disease Recovery System), the National Bioforensic Analysis Center, the FBI, the Department of Defense and others.

c. International cooperators include crop and food biosecurity researchers in the United Kingdom, France, Germany, Italy, Hungary, Turkey, Israel, Ecuador, New Zealand, China, Uzbekistan, Puerto Rico, Australia, Chile, Colombia, and India.

2. Maintain OSU's national and international reputation as a credible and relevant research provider in the area of agricultural microbial forensics and produce safety.

a. Conduct research in support of the emerging discipline of microbial forensics, as related to plant-based agricultural systems, including:

i. Develop improved technologies for plant and animal disease diagnostics and pathogen detection and strain discrimination

ii. Validate plant pathology related technologies for forensic applications

iii. Adapt and validate technologies, developed originally for human pathogen forensics, for use with plant pathogens

iv. Evaluate the nature and extent of plant pathogen phylogeny and evolution, and the impacts of these processes on the application and interpretation of microbial forensic technologies and investigations

v. Characterize background microbial communities in natural and agricultural habitats

vi. Develop bioinformatics tools and models in support of microbial forensic and biosecurity initiatives

vii. Assess risk of foodborne contaminants and investigate routes of transmission farm to fork

b. Conduct research in support of critical new national needs in the area of human enteric pathogen contamination of fresh produce
i. Investigate the nature, genetic determinants and specificity of plant-human pathogen interactions
ii. Evaluate the risk and nature of insect dissemination of human pathogens to produce in the production field or at other points in the food distribution system
iii. Identify and evaluate new approaches for prevention and mediation of contamination
iv. Identify and evaluate new approaches for pathogen/contamination traceback
v. Apply new technologies for pathogen analysis to genetic typing of food borne human pathogen strains and compare with the "gold standard" of pulsed field gel electrophoresis (PFGE).

c. Investigate the sociological impacts of threats to food safety and security (preparedness for and sociological/psychological impacts of manmade and natural incidents)
Oklahoma has strong agricultural commodity groups and a strong agricultural economic base. Threats to food safety and security focused on the agricultural industry in Oklahoma would have devastating effects on the industry. Preparation for and response during a time of crisis is critical to minimizing the effects of a disastrous event. Using the appropriate communication methods is vital to mitigating threats. In addition, understanding the sociological and psychological impacts of disastrous events that affect agriculture can help in preparation for responding to such events (Cartmell and Naile, PIs).

3. Offer or co-sponsor coursework as well as short workshop/training courses on microbial forensics and food safety issues. These activities will prepare state educators, diagnosticians, researchers, extension agents, students and postdocs, producers and first detectors/responders to recognize and respond appropriately to intentional, targeted challenges to our agricultural enterprise.

a. Forensic Microbiology - Graduate course, Forensic Sciences
b. Agricultural Biosecurity - Undergraduate course, Plant Pathology
c. Human Pathogens on Plants - Graduate course, Plant Pathology and Food Science
d. Forensic Entomology- Role of Microbial Forensics - Undergraduate course

2. Scope of the Program

- In-State Extension
- In-State Research
- Multistate Research

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

1. Agricultural biosecurity and food safety and security issues will remain an important component of state and national initiatives in the near term.
2. Significant new research, educational and extension initiatives will be needed to respond to agricultural biosecurity- and food safety-related needs of Oklahoma and the U.S.
3. Invasive species (arthropod vectors and phytopathogens) will continue to enter the country, posing future threats to US agriculture or commerce.
4. Funding opportunities are likely to continue for such efforts, although funding levels for biosecurity agencies have dropped in the face of national budget constraints particularly at the national level.

2. Ultimate goal(s) of this Program

To bring the overall Oklahoma agricultural enterprise to an optimal state of biosecurity prevention and preparedness and to serve as a significant contributor to the National agricultural biosecurity system, particularly in the emerging discipline of plant pathogen forensics.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2017	1.0	0.0	3.0	0.0
2018	1.0	0.0	3.0	0.0
2019	1.0	0.0	3.0	0.0
2020	1.0	0.0	4.0	0.0
2021	1.0	0.0	4.0	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

1. Maintain and expand, as appropriate, the OSU National Institute for Microbial Forensics & Food and Agricultural Biosecurity, a multi-disciplinary unit to support and address issues of crop and food safety and biosecurity, and their impacts.
2. Conduct scientific research targeted specifically towards plant pathogen forensics, produce safety, sociological impacts of terrorism and other areas of agricultural biosecurity.
3. Continue to offer targeted coursework for students seeking M.S. or Ph.D. degrees in established programs such as Plant Pathology, Biochemistry, Plant Sciences or Forensic Sciences, who seek plant pathogen forensics. Consider establishing an academic "track"leading to a certificate or Minor in this area.
4. Work with other members of the Entomology & Plant Pathology Department to revise and enhance the Bioforensics Option within the undergraduate Entomology Degree Program.
5. Increase visibility and impact of NIMFFAB through education and outreach (an interactive website, student internships, field exercises, hosting meetings).
6. Participate on/in local and national grant panels, advisory boards, review committees, expert bodies and other activities, as appropriate, to maintain visibility of OSU and NIMFFAB in the national biosecurity, homeland security, microbial forensics, and food safety communities.

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension

Direct Methods	Indirect Methods

● Education Class ● Workshop ● Group Discussion ● Demonstrations ● Other 1 (Graduate Training)	● Web sites other than eXtension ● Other 1 (State initiatives) ● Other 2 (Federal initiatives)

3. Description of targeted audience

Key members of National and Oklahoma homeland security community (DHS, FBI, CIA, etc)
Key members of National and Oklahoma agricultural leaders and representatives
Oklahoma extension personnel
Master gardeners
Oklahoma producers and crop consultants
OSU students and faculty
Professional/scientific societies
Key industries
The public

V(G). Planned Program (Outputs)

NIFA no longer requires you to report target numbers for standard output measures in the Plan of Work. However, all institutions will report actual numbers for standard output measures in the Annual Report of Accomplishments and Results. The standard outputs for which you must continue to collect data are:

- Number of contacts
  - Direct Adult Contacts
  - Indirect Adult Contacts
  - Direct Youth Contacts
  - Indirect Youth Contact
- Number of patents submitted
- Number of peer reviewed publications

☑ Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(H). State Defined Outputs

1. Output Measure

- Number of peer reviewed publications
- Number of outside-OSU researchers, agencies and entities sponsoring, collaborating with or benefiting from NIMFFAB activities.
- Number of grant/contract proposals submitted in agricultural microbial forensics and biosecurity, and food safety.
- Number of grants/contracts awarded in those areas.
- Number of journal articles submitted with emphasis on agricultural microbial forensics and biosecurity.
- Number of students taking classes or seminars developed as part of the OSU Agricultural Biosecurity initiative.

☑ Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(I). State Defined Outcome

O. No	Outcome Name
1	Number of invitations to agricultural biosecurity team members for participation in initiatives, programs, presentations, and consultations related to agricultural biosecurity and microbial forensics
2	Number of team-associated individuals who a.Performed a project related internship b.Were hired into a professional position in the biosecurity or food safety field c.Served on agricultural biosecurity or food safety review committees or panels
3	Graduate students who will populate laboratories whose testing is related to the protection of human, animal, and plant health from infection by pathogenic organisms
4	Number of students enrolled in courses that contain a significant portion of material on agro-terrorism, bio-terrorism, or food safety

Outcome # 1

1. Outcome Target

Number of invitations to agricultural biosecurity team members for participation in initiatives, programs, presentations, and consultations related to agricultural biosecurity and microbial forensics

2. Outcome Type : Change in Condition Outcome Measure

3. Associated Knowledge Area(s)

- 212 - Diseases and Nematodes Affecting Plants
- 903 - Communication, Education, and Information Delivery
- 712 - Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins

4. Associated Institute Type(s)

- 1862 Research

Outcome # 2

1. Outcome Target

Number of team-associated individuals who
a.Performed a project related internship
b.Were hired into a professional position in the biosecurity or food safety field
c.Served on agricultural biosecurity or food safety review committees or panels

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 212 - Diseases and Nematodes Affecting Plants
- 712 - Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins
- 903 - Communication, Education, and Information Delivery

4. Associated Institute Type(s)

- 1862 Research

Outcome # 3

1. Outcome Target

Graduate students who will populate laboratories whose testing is related to the protection of human, animal, and plant health from infection by pathogenic organisms

2. Outcome Type : Change in Condition Outcome Measure

3. Associated Knowledge Area(s)

- 903 - Communication, Education, and Information Delivery
- 712 - Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins
- 211 - Insects, Mites, and Other Arthropods Affecting Plants
- 212 - Diseases and Nematodes Affecting Plants

4. Associated Institute Type(s)

- 1862 Research

Outcome # 4

1. Outcome Target

Number of students enrolled in courses that contain a significant portion of material on agro-terrorism, bio-terrorism, or food safety

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 211 - Insects, Mites, and Other Arthropods Affecting Plants
- 212 - Diseases and Nematodes Affecting Plants
- 712 - Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins

4. Associated Institute Type(s)

- 1862 Research

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Other (exotic pathogens, terrorism)

Description

National initiatives in agricultural biosecurity are likely to increase if there are new terrorist or biological attacks on or within the U.S. Funding for such initiatives will rise or fall depending on financial demands caused by national disasters, the economy (gas prices, war in Iraq, etc), as well as on appropriations changes. Changes in the Federal government, and in public policy, will affect the nature and strength of security programs. International cooperation in the area of agricultural biosecurity is likely to increase, as cross-border cooperation is necessary for effective management of pathogens that ignore borders.

V(K). Planned Program - Planned Evaluation Studies

Description of Planned Evaluation Studies

1. Annual email questionnaire, to be completed by:

a. Agricultural Biosecurity Team members, to document their activities and products and to measure their satisfaction.

b. Graduate and undergraduate students in Ag Biosecurity classes, research or activities, evaluating program quality and satisfaction.

2. Survey employers and terminal degree mentors on the preparedness of our graduates for a career in forensic microbiology related fields.

V(A). Planned Program (Summary)

Program # 12

1. Name of the Planned Program

Farm and Agribusiness Systems Economics

2. Brief summary about Planned Program

This program is a broad spectrum of farm management, economics, marketing, policy and business management programming applied to the agricultural sector of Oklahoma, south central region and global issues. It includes farm-level decision making, product handling, transportation, processing, manufacture and retail. These efforts are directed at a sustainable production and marketing system to help meet the National Institute of Food and Agriculture (NIFA) goal of boosting U.S. agricultural production and improve global capacity to meet growing food demand.

3. Program existence : Mature (More then five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
601	Economics of Agricultural Production and Farm Management	35%	0%	60%	0%
602	Business Management, Finance, and Taxation	21%	0%	10%	0%
603	Market Economics	15%	0%	10%	0%
607	Consumer Economics	12%	0%	10%	0%
610	Domestic Policy Analysis	17%	0%	10%	0%
	Total	100%	0%	100%	0%

V(C). Planned Program (Situation and Scope)

1. Situation and priorities

Production agriculture and agribusiness firms are a vital part of Oklahoma's rural economy. These firms face difficulties because of the internal and external changes faced by managers including commodity prices, fuel, fertilizer and input prices, domestic policies, globalization, food safety issues, environmental issues and regulations, labor issues and regulations, intergenerational transfer, tax issues, rural-urban fringe pressures, transportation issues, bio-security and information technology. The team's priorities

include:

• Improved understanding of the economic systems involving Oklahoma farms and agribusinesses

• Development of enterprise budgets, decision aids and other tools to improve and enable improved decision making and improve efficiency and profitability.

• Development of educational programs to improve and enable improved decision making and improve efficiency and profitability of Oklahoma farms and ranches both individually and through agricultural cooperatives which are extensions of the farm operations.

• Collect, summarize, and disseminate agricultural information required for agricultural decision making by producers, cooperative leaders and agribusiness managers.

• Help farm and agribusiness managers (including farmer owned cooperatives) to identify and use technology to manage and effectively use information.

• Conduct research and develop, maintain, and deliver educational programs and materials to assist producers and agribusiness mangers in identifying and managing risks, and managing agricultural business transitions

• Assist new and existing agribusiness firms (including farmer owned cooperatives) in identifying market opportunities and developing new products and marketing systems.

• Prepare and educate producers for decisions relating to government programs and policy changes

• Research energy issues and provide programming on impacts to farmers and ranchers, including negotiating energy development agreements, land impacts from energy development, and legal risks associated with energy operations on agricultural lands

• Assist producers and agribusinesses (including farmer owned cooperatives) in understanding and responding to natural resource related issues including the Oklahoma Comprehensive Water Plan and climate and weather issues

• Assist state and national producers and agribusinesses (including farmer owned cooperatives) in responding to changes in industry standards and federal regulations in the areas of food safety and animal disease regulations

• Better understand consumer preferences and choices and relate these to improved product development and production and marketing systems

2. Scope of the Program

- In-State Extension
- In-State Research
- Multistate Research
- Multistate Extension
- Integrated Research and Extension

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

Oklahoma State University will continue to develop relevant research-based information that can be provided to farm and agribusiness decision makers.

Oklahoma State University and its county, state and national partners will provide adequate resources to support this vital team effort.

2. Ultimate goal(s) of this Program

• Information is developed and disseminated that improves decision making and increases efficiency and profitability of Oklahoma farms, ranches and investor-owned and farmer owned agribusinesses.
• Through the efforts of the Farm and Agribusiness Management Team the management skills of Oklahoma farm and agribusiness managers are improved allowing them to obtain better efficiency, higher profitability, reduced risks, and overall improved standards of living.
• A strong, profitable and efficient production agriculture and agribusiness sector improves the economic viability of rural Oklahoma communities.
• Farm and agribusiness managers are able to better understand economic consequences and make more informed decisions.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2017	7.0	0.0	4.0	0.0
2018	7.0	0.0	4.0	0.0
2019	6.0	0.0	4.0	0.0
2020	5.0	0.0	3.5	0.0
2021	5.0	0.0	3.0	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

Develop and communicate research based information that farm and agribusiness managers can use to improve decisions.
Develop decision aids developed that assist farm and agribusiness managers in improved decisions.
Conduct educational programs that improve the management skills of farm and agribusiness managers.
Develop and support innovative information delivery and education systems including Communities of Practice on eXtension, webinars and social media.

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension

Direct Methods	Indirect Methods

● Education Class ● Workshop ● Group Discussion ● One-on-One Intervention ● Demonstrations ● Other 1 (Research) ● Other 2 (Social Media)	● Public Service Announcement ● Newsletters ● eXtension web sites ● Web sites other than eXtension

3. Description of targeted audience

Managers, owners, and employees of farms and agribusinesses; policy makers; agency leadership, lenders, cooperative boards

V(G). Planned Program (Outputs)

NIFA no longer requires you to report target numbers for standard output measures in the Plan of Work. However, all institutions will report actual numbers for standard output measures in the Annual Report of Accomplishments and Results. The standard outputs for which you must continue to collect data are:

- Number of contacts
  - Direct Adult Contacts
  - Indirect Adult Contacts
  - Direct Youth Contacts
  - Indirect Youth Contact
- Number of patents submitted
- Number of peer reviewed publications

☑ Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(H). State Defined Outputs

1. Output Measure

- Number of board members of farmer-owned cooperatives receiving credentialed director training for board goverence
- Number of software decision analysis aids developed
- Number of manuscripts submitted to refereed journals
- Number of farm income tax managment schools conducted
- Number of participatory experiential learning workshops conducted
- Number of extension fact sheets, current reports, department staff papers, newsletter articles and other reports developed.
- Number of Extension educational meetings and workshops conducted
- Number of website posts and other electronic media deliveries

☑ Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(I). State Defined Outcome

O. No	Outcome Name
1	Number of tax preparers using information from OCES tax schools
2	Number of credentialed board members serving on agricultural cooperative boards (cumulative)
3	Number of beef producers applying some level of financial management decision skills learned through Master Cattleman certification
4	Number of producers and agribusiness managers using OSU developed decision aids
5	Number of producers, agribusiness managers, or lenders gaining an improved understanding of risk management through participatory experiential learning experiences
6	Number of stakeholder downloads of information from websites and other electronic media

Outcome # 1

1. Outcome Target

Number of tax preparers using information from OCES tax schools

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 602 - Business Management, Finance, and Taxation

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 2

1. Outcome Target

Number of credentialed board members serving on agricultural cooperative boards (cumulative)

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 602 - Business Management, Finance, and Taxation

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 3

1. Outcome Target

Number of beef producers applying some level of financial management decision skills learned through Master Cattleman certification

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 601 - Economics of Agricultural Production and Farm Management
- 602 - Business Management, Finance, and Taxation

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 4

1. Outcome Target

Number of producers and agribusiness managers using OSU developed decision aids

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 601 - Economics of Agricultural Production and Farm Management
- 610 - Domestic Policy Analysis
- 603 - Market Economics
- 602 - Business Management, Finance, and Taxation

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 5

1. Outcome Target

Number of producers, agribusiness managers, or lenders gaining an improved understanding of risk management through participatory experiential learning experiences

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 602 - Business Management, Finance, and Taxation
- 601 - Economics of Agricultural Production and Farm Management
- 603 - Market Economics

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 6

1. Outcome Target

Number of stakeholder downloads of information from websites and other electronic media

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 603 - Market Economics
- 607 - Consumer Economics
- 601 - Economics of Agricultural Production and Farm Management
- 610 - Domestic Policy Analysis
- 602 - Business Management, Finance, and Taxation

4. Associated Institute Type(s)

- 1862 Extension

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges
- Populations changes (immigration, new cultural groupings, etc.)

Description

V(K). Planned Program - Planned Evaluation Studies

Description of Planned Evaluation Studies

Participant evaluations conducted at the conclusion of various educational programs will be used to determine the team's effectiveness. Post surveys will determine application of new knowledge and skills. Changes in business performance will be reviewed at least on a case basis. Downloads of educational material and decision aids will be monitored and usage will be estimated.

V(A). Planned Program (Summary)

Program # 13

1. Name of the Planned Program

Integrated Bioenergy and BioBased Products Development

2. Brief summary about Planned Program

A holistic, integrated approach will be used to determine the sustainability of developing and converting selected feedstocks into bioenergy and biobased products. Fundamental and applied research in feedstock development will focus on understanding the molecular basis of biomass production and stress tolerance, and on developing superior cultivars and best management practices in selected bioenergy plant species. Additionally, a wide range of crops (existing and potentially-viable) and residues will be evaluated at multiple locations for research activities and extension demonstrations. Bioenergy crop models will be developed and improved to assess production potential. All aspects of supply logistics for selected feedstocks; i.e. procurement, harvesting, packaging, transportation, pre-processing, distribution, and storage; will be evaluated in terms of the economic feasibility of delivering feedstocks to the biorefinery. Selected feedstocks will be used in developing and/or improving conversion efficiencies using biochemical, thermochemical, hybrid biochemical-thermochemical, and other pathways for product proof-of-concept prior to commercialization. This effort closely reflects the NIFA goal of energy independence through science to develop biomass used for biofuels, design optimum forest products and crops for bioenergy production, and produce value-added biobased industrial products. Life cycle assessment (LCA) will be employed to evaluate system performance and sustainability.

3. Program existence : Mature (More then five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
511	New and Improved Non-Food Products and Processes	100%	0%	100%	0%
	Total	100%	0%	100%	0%

V(C). Planned Program (Situation and Scope)

1. Situation and priorities

The world's economy has become increasingly dependent on fossil fuels. These non-renewable resources are used in producing fuels, chemicals, and many other products that consumers use on a daily basis. The U.S. has vast renewable biomass feedstocks resources that could potentially be converted into transportation fuels, chemicals, power, and other consumer products. Utilizing these renewable resources will not only reduce our dependence on foreign oil, but also provide job opportunities and new revenue for rural communities and improve the quality of the environment through carbon sequestration.

Sustainability is the key to developing a viable bioindustry. Potential feedstocks include grains and/or vegetative parts of plants grown in Oklahoma for food, feed, or livestock hay and forage. Further, Oklahoma has an enormous potential to produce a variety of crops that could be converted into bioenergy and biofuels. For example, switchgrass has been identified as a potential dedicated perennial cellulosic bioenergy crop. Eastern redcedar, an invasive evergreen tree, is another potential feedstock.

Determination and classification of feedstock species adaptability and integration is needed relative to holistic systems as influenced by: climatic and edaphic differences across the state; cultural requirements; economic variables of production, harvesting, packaging, pre-processing, and storage; conversion technology requirements; and environmental and safety conditions. Variations in establishment success and biomass production potential of perennial grasses (switchgrass, Indian grass, and big bluestem) and annual crops (high biomass and sweet sorghum) have been observed in past research. Enhancing crop genetics for biofuels production provides a tremendous opportunity to exploit new genomics tools and accelerate the pace of developing new high yielding biomass varieties. Using molecular markers to identify and develop economically viable genotypes will accelerate the plant breeding research in two ways. First, new varieties can be developed to specifically address issues related to local environmental factors such as marginal soils, drought, heat, and diseases. Secondly, new varieties that have targeted characteristics to improve conversion technology performance, e.g. modifying cell wall composition to enhance conversion efficiency will be developed. In addition, genetics and agronomics data will be used to improve bioenergy crop models to identify potential locations within the state to sustainably establish and grow bioenergy crops.

Logistics is a critical issue and can make or break a sustainable bioenergy and/or biobased products system. The holistic and integrated logistics research and extension program will determine the economics of alternative harvesting, packaging, storage, transportation, and pre-processing systems. Each of the logistics topic areas are highly interdependent based on the type of material being harvested and the biorefinery or biobased products industry material specifications. Currently one of the major logistics issues is the lack of industry material specifications. This issue has forced the logistics research to be extremely broad. The primary opportunity created by a lack of industry specifications is that

it allows the research team to explore concepts outside the traditional hay and forage methodologies. For example, if a feedstock is packaged at a relatively high moisture content to decrease the time required for field dry-down, how does this type of non-traditional material affect the holistic system? Some of the effects are obvious while others are not because of the complexity of the system. The logistics program will produce results that can be used by researchers, feedstock producers, pre-processors, equipment manufacturers, transport companies and biorefineries.

In biofuels production, the major challenge is overcoming the difficulty in converting lignocellulosic materials, such as grasses, woody biomass, and agricultural residues, into alcohol and hydrocarbon fuels. Two approaches in addressing this challenge are: hydrolysis of polysaccharides into sugars that are fermented to ethanol, higher alcohols, and advance biofuels by microorganisms; and gasification of biomass to synthesis gas consisting primarily of carbon monoxide, carbon dioxide, and hydrogen which can be fermented by certain microorganisms to ethanol, butanol, hexanol, and organic acids. Biological production of renewable hydrocarbons can be achieved using genetically engineered microorganisms, in which their metabolic pathways are designed to produce hydrocarbons from sugars and/or synthesis gas. Research will focus on strain and process development to increase productivity, toxicity resistance, and process robustness using biological and/or chemical routes to make higher alcohols, hydrocarbon fuels and bioproducts. In addition, research will focus on the production and upgrading of pyrolysis oil for next generation hydrocarbon biorefineries. Research may also focus on extracting valuable components from biomass, such as nutraceuticals, and valuable uses of waste products from biofuels production that would be beneficial to establishing sustainable biorefineries.

Life Cycle Assessment and Life Cycle Inventory analyses will be performed on selected processes. Energy and materials streams both in and out of soil preparation, feedstock growth, harvesting, transportation, conversion, and end-use processes will be tracked. The sustainability metrics of various bioproducts and processes will be documented. Analysis of potential bioprocesses for both economic feasibility and environmental impact is necessary to assess their commercial viability and to identify potential areas of improvement.
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2. Scope of the Program

- In-State Extension
- In-State Research
- Multistate Research
- Integrated Research and Extension
- Multistate Integrated Research and Extension

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

· Maintaining an adequate level of funding
· Maintaining existing and hiring of new faculty and support personnel
· Maintaining sufficient research facilities and equipment
· Availability of land for large-scale field trials and on-farm demonstrations
· Maintaining existing and developing new collaborations with external scientists and engineers

2. Ultimate goal(s) of this Program

To answer the critical questions and issues that must be addressed prior to industry taking the results of this research to commercialization.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2017	2.0	0.0	4.0	0.0
2018	2.0	0.0	3.0	0.0
2019	1.5	0.0	3.0	0.0
2020	1.0	0.0	3.0	0.0
2021	1.0	0.0	3.0	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

- Developing partnerships with universities, industry, and federal laboratories.
- Developing project proposals
- Preparing and presenting technical papers
- Submitting papers for journal articles
- Developing licenses and patents
- Taking new and/or improved products to pre-commercialization
- Developing educational materials
- Disseminate research findings through meetings and workshops

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension

Direct Methods	Indirect Methods
● Education Class ● Workshop ● Group Discussion ● One-on-One Intervention ● Demonstrations ● Other 1 (Research) ● Other 2 (Symposia and Conferences)	● Newsletters ● TV Media Programs ● Web sites other than eXtension

3. Description of targeted audience

Other scientists, industry, agricultural producers, commercial developers

V(G). Planned Program (Outputs)

NIFA no longer requires you to report target numbers for standard output measures in the Plan of Work. However, all institutions will report actual numbers for standard output measures in the Annual Report of Accomplishments and Results. The standard outputs for which you must continue to collect data are:

- Number of contacts
  - Direct Adult Contacts
  - Indirect Adult Contacts
  - Direct Youth Contacts
  - Indirect Youth Contact
- Number of patents submitted
- Number of peer reviewed publications

☑ Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(H). State Defined Outputs

1. Output Measure

- Technical papers and presentations
- New processes or products developed
- Technology demonstrations conducted
- Educational Publications
- Extension programs developed

☑ Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(I). State Defined Outcome

O. No	Outcome Name
1	Release and commercialization of new feedstocks varieties
2	Best management practices identified for sustainable feedstock production
3	Fundamental knowledge of engineering or science gained in developing biobased products
4	Number of students graduated (masters and doctoral)
5	New processes or products developed
6	Products/processes taken to pre-commercialization

Outcome # 1

1. Outcome Target

Release and commercialization of new feedstocks varieties

2. Outcome Type : Change in Condition Outcome Measure

3. Associated Knowledge Area(s)

- 511 - New and Improved Non-Food Products and Processes

4. Associated Institute Type(s)

- 1862 Research

Outcome # 2

1. Outcome Target

Best management practices identified for sustainable feedstock production

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 511 - New and Improved Non-Food Products and Processes

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 3

1. Outcome Target

Fundamental knowledge of engineering or science gained in developing biobased products

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 511 - New and Improved Non-Food Products and Processes

4. Associated Institute Type(s)

- 1862 Research

Outcome # 4

1. Outcome Target

Number of students graduated (masters and doctoral)

2. Outcome Type : Change in Condition Outcome Measure

3. Associated Knowledge Area(s)

- 511 - New and Improved Non-Food Products and Processes

4. Associated Institute Type(s)

- 1862 Research

Outcome # 5

1. Outcome Target

New processes or products developed

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 511 - New and Improved Non-Food Products and Processes

4. Associated Institute Type(s)

- 1862 Research

Outcome # 6

1. Outcome Target

Products/processes taken to pre-commercialization

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 511 - New and Improved Non-Food Products and Processes

4. Associated Institute Type(s)

- 1862 Research

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges

Description

Significant support has been received through Special Grant via Federal Initiative process.

V(K). Planned Program - Planned Evaluation Studies

Description of Planned Evaluation Studies

Progress will be evaluated annually by the Initiative Team (self-assessment) primarily through increases in defined outputs and outcomes. Assessments will also be made on improvements in biomass production and conversion, e.g. increases in biomass productivity; decreases in inputs for enhanced biomass production; increases in storage of soil carbon; decreases in greenhouse gases; and increases in process sustainability.

V(A). Planned Program (Summary)

Program # 14

1. Name of the Planned Program

Childhood Obesity - Hunger / Health / Risky Behaviors / Resilience Issue Teams

2. Brief summary about Planned Program

This program focuses on concerns from advisory committees and agencies across the state and includes issues related to: poor food and physical activity choices, and youth engaged in high risk behaviors.

3. Program existence : Intermediate (One to five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
134	Outdoor Recreation	13%	0%	0%	0%
703	Nutrition Education and Behavior	27%	0%	0%	0%
724	Healthy Lifestyle	20%	0%	0%	0%
802	Human Development and Family Well-Being	20%	0%	0%	0%
806	Youth Development	20%	0%	0%	0%
	Total	100%	0%	0%	0%

V(C). Planned Program (Situation and Scope)

1. Situation and priorities

It is critical to address not only the prevention of childhood obesity but also the social and emotional impacts obesity can have on youth who are already obese.
Oklahoma has the 6th highest rate of obesity in the nation, with 27% of Oklahoma youth considered overweight or obese. Contributing to this health outcome are Oklahomans' poor nutrition and physical activity behaviors. Half of all adults reported eating no fruit and 1 in 4 adults report eating no vegetables on a daily basis. Likewise 48% of Oklahoma adolescents reported they did not eat at least one piece of fruit each day. Oklahoma ranks 44th for vegetable consumption nationally with 44% of Oklahoma adolescents reporting they did not eat at least one vegetable every day. One in 3 adults reported no

leisure time activity; 62% of Oklahoma high school students reported not meeting daily physical activity recommendations in the previous week and only 32% reported attending physical education classes in the previous week.
The prevalence of low fruit and vegetable consumption and inactivity reflects that only 51% of Oklahoma census tracks have a healthy food retailer. Further, 33% of adults and 41% of adolescents reported not having access to parks, recreation centers and sidewalks in neighborhoods. While obese teens engage in high-risk behaviors at the same rate as their healthy weight peers, they do so in more dangerous ways, such as earlier onset of smoking, and engaging in sexual activity while under the influence of drugs or alcohol before the age of 13. Obese girls are also at increased risk of earlier onset of sex, having more sexual partners, and less consistent use of contraception. These increased risks compound their already elevated health risks due to obesity with recent publications by the Centers for Disease Control and Prevention suggesting that overweight and obesity may be indicators of increased risk for sexually transmitted diseases including HIV. In Oklahoma, every year on average: close to 6,400 babies are born to school-age teens, the second highest teen birth rate in the nation for 15-to-19-year-olds; and more teens engage in smoking, sexual activity than the national average.
While all teens are vulnerable during adolescence, obese teens are more likely to drop out of school due to health problems, bullying, and social withdrawal related to poor body image, and poor self-esteem. For the previous year in Oklahoma, 4,003 youth statewide dropped out of high school; 16,357 arrests were made for violent crimes where the victim was a child or adolescent between 10-17 years, and 488 adolescents between 10-17 years were arrested for perpetrating violent crimes. In terms of other risky behaviors, Oklahoma youth rank fourth in the nation (26.8%) in reports of current use of tobacco, in being sexually active (36.2%), and are tied for fourth place in texting or emailing while driving (50.7%).
Oklahoma Cooperative Extension Service Family & Consumer Sciences programs are committed to the physical, mental and emotional health of our state's youth so they may lead healthy and productive lives into and throughout adulthood.
Our priority is to effect long-term change to:

- Maintain or improve health through healthy food and physical activity choices
- Reduce likelihood to engage in high-risk behaviors which lead to negative life outcomes
- Youth will learn to make healthy lifestyle choices through the use of curricula and educational materials
- Increase resilience in children, youth, and adults through parent education and other programs.

2. Scope of the Program

- In-State Extension
- Multistate Extension

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

Program will experience "customer acceptance" --schools, after school programs, community youth groups will allow the program to be taught.
Quality programming efficiently uses resources, is research-based, policy-relevant, and effective in bringing about desired change.
Approaches must be multi-faceted, fit local needs, and integrated in family, school, and community contexts.
Both universal and targeted approaches are necessary, valuing efforts to engage diverse audiences.
Programming will have a positive economic and social impact.
These focus issues are long-term challenges to the citizens of Oklahoma.
Appropriate and sponsored funding will continue at similar levels. Key personnel will be replaced in a

timely manner.
Youth will be recognized as a viable resource who can work alongside adults to make a significant difference in their community.

2. Ultimate goal(s) of this Program

Oklahoma citizens (particularly children and youth) will have improved dietary and physical activity behaviors associated with obesity and being overweight

Oklahoma Children and youth will reduce their likelihood to engage in high-risk behaviors which lead to negative life outcomes.

Oklahoma citizens (particularly children and youth) will be successful and resilient.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2017	24.0	0.0	0.8	0.0
2018	24.0	0.0	0.8	0.0
2019	24.0	0.0	0.7	0.0
2020	22.0	0.0	0.7	0.0
2021	22.5	0.0	0.7	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

- Establish advisory board of FCS educators, youth, and relevant stakeholders and partners
- Conduct FCS education through 4-H youth development projects and activities
- Conduct research that addresses chronic issues in Oklahoma
- Evaluate programs to determine effectiveness and impacts
- Leverage resources via grant writing and development activities
- Student internships and service learning
- Mentoring program
- Community service projects

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension

Direct Methods	Indirect Methods

● Education Class ● Workshop ● Group Discussion ● One-on-One Intervention ● Demonstrations ● Other 1 (mentoring) ● Other 2 (student internships)	● Public Service Announcement ● Newsletters ● TV Media Programs ● eXtension web sites ● Web sites other than eXtension

3. Description of targeted audience

Youth, children; parents; teachers; adult volunteers; middle to low income families; race and ethnicity will also be recognized as an identifier of audiences; caretakers, agencies & service providers, schools, policy makers.

V(G). Planned Program (Outputs)

NIFA no longer requires you to report target numbers for standard output measures in the Plan of Work. However, all institutions will report actual numbers for standard output measures in the Annual Report of Accomplishments and Results. The standard outputs for which you must continue to collect data are:

- Number of contacts
  - Direct Adult Contacts
  - Indirect Adult Contacts
  - Direct Youth Contacts
  - Indirect Youth Contact
- Number of patents submitted
- Number of peer reviewed publications

☑ Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(H). State Defined Outputs

1. Output Measure

- Number of OSU Facts published
- Number of other publications including but not limited to Bulletins, Technical Manuals, Reports as well as PowerPoint presentations and curricula, and core competency modules distributed for use by others.
- Number of in-service training sessions
- Number of certification training sessions
- Number of other training sessions, workshops, etc. conducted
- Number of presentations at Extension organized meetings
- Number of presentations at other meetings and events (professional meetings, invitations to speak to community groups, stakeholder groups, etc.)
- Number of workshops, conferences, etc. organized
- Number of posters, displays, exhibits, or models
- Number of demonstrations
- Number of newsletters
- Number of web pages created or updated
- Number of radio and television presentations
- Number of newspaper, and magazine articles written
- Average number of phone calls and/or email requests responded to on a weekly basis
- Number of webcasts or guest appearances on webinars
- Number of OSU Fact Sheets revised

☑ Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(I). State Defined Outcome

O. No	Outcome Name
1	Percentage of participants increasing consumption of fruits
2	Percentage of participants increasing consumption of vegetables
3	Percentage of participants increasing consumption of whole grains
4	Percentage of participants increasing consumption of low-fat dairy and other calcium-rich foods
5	Percentage of participants decreasing consumption of foods high in fat, sugar and salt
6	Percentage of participants decreasing consumption of sugar-sweetened beverages
7	Percentage of participants increasing physical activity
8	Percentage of participants increasing safe food handling practices
9	Percentage of participants increasing positive parenting skills
10	Percentage of participants increasing positive youth peer involvement
11	Percentage of participants increasing parenting competence
12	Percentage of participants increasing child competent behaviors
13	Percentage of participants with increased access to affordable, healthy foods
14	Percentage of participants decreasing child problematic behaviors
15	Percentage of participants decreasing disengaged or hostile parenting

Outcome # 1

1. Outcome Target

Percentage of participants increasing consumption of fruits

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 724 - Healthy Lifestyle
- 703 - Nutrition Education and Behavior

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 2

1. Outcome Target

Percentage of participants increasing consumption of vegetables

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 703 - Nutrition Education and Behavior
- 724 - Healthy Lifestyle

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 3

1. Outcome Target

Percentage of participants increasing consumption of whole grains

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 724 - Healthy Lifestyle
- 703 - Nutrition Education and Behavior

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 4

1. Outcome Target

Percentage of participants increasing consumption of low-fat dairy and other calcium-rich foods

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 724 - Healthy Lifestyle
- 703 - Nutrition Education and Behavior

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 5

1. Outcome Target

Percentage of participants decreasing consumption of foods high in fat, sugar and salt

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 703 - Nutrition Education and Behavior
- 724 - Healthy Lifestyle

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 6

1. Outcome Target

Percentage of participants decreasing consumption of sugar-sweetened beverages

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 703 - Nutrition Education and Behavior
- 724 - Healthy Lifestyle

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 7

1. Outcome Target

Percentage of participants increasing physical activity

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 134 - Outdoor Recreation
- 724 - Healthy Lifestyle

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 8

1. Outcome Target

Percentage of participants increasing safe food handling practices

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 703 - Nutrition Education and Behavior
- 724 - Healthy Lifestyle

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 9

1. Outcome Target

Percentage of participants increasing positive parenting skills

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 802 - Human Development and Family Well-Being

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 10

1. Outcome Target

Percentage of participants increasing positive youth peer involvement

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 802 - Human Development and Family Well-Being
- 806 - Youth Development

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 11

1. Outcome Target

Percentage of participants increasing parenting competence

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 802 - Human Development and Family Well-Being

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 12

1. Outcome Target

Percentage of participants increasing child competent behaviors

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 802 - Human Development and Family Well-Being
- 806 - Youth Development

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 13

1. Outcome Target

Percentage of participants with increased access to affordable, healthy foods

2. Outcome Type : Change in Condition Outcome Measure

3. Associated Knowledge Area(s)

- 724 - Healthy Lifestyle
- 703 - Nutrition Education and Behavior

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 14

1. Outcome Target

Percentage of participants decreasing child problematic behaviors

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 802 - Human Development and Family Well-Being
- 806 - Youth Development

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 15

1. Outcome Target

Percentage of participants decreasing disengaged or hostile parenting

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 724 - Healthy Lifestyle
- 802 - Human Development and Family Well-Being

4. Associated Institute Type(s)

- 1862 Extension

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

- Economy
- Appropriations changes
- Public Policy changes

Description

Changes in economy may affect participants' consumption of fruits and vegetables in addition to diary and whole grain products

Public policy changes in schools, such as school wellness policies, may affect participants' healthy food choices and participation in physical activity

V(K). Planned Program - Planned Evaluation Studies

Description of Planned Evaluation Studies

For the Issue Teams included in this Planned Program, evaluation will be performed by distributing written surveys to all program participants. The surveys will be done post program and retrospectively measure behaviors pre-program and behavior change/intent to change behavior. The surveys will ask questions focused primarily on the State Defined Outcomes (see above). We will evaluate percentage change in behavior of those participating as stated in the State Defined Outcomes. The results of the surveys will be used to improve curricula and education activities and demonstrate the impact of Family & Consumer Sciences Cooperative Extension education on the lives of Oklahomans.

V(A). Planned Program (Summary)

Program # 15

1. Name of the Planned Program

Structure and Function of Macromolecules

2. Brief summary about Planned Program

Basic scientific inquiry aimed at the identification of macromolecules and macromolecular interactions, and characterization of structural and functional features of these molecules and their interactions that modulate growth, development, health and pathophysiological processes in plant and animal systems. Development of an understanding of critical biological and physiological processes and interactions at a molecular level leading to new insights that can be exploited for the improvement of plant and animal health, and agricultural productivity.

3. Program existence : Mature (More then five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
201	Plant Genome, Genetics, and Genetic Mechanisms	0%	0%	5%	0%
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants	0%	0%	5%	0%
206	Basic Plant Biology	0%	0%	20%	0%
211	Insects, Mites, and Other Arthropods Affecting Plants	0%	0%	5%	0%
212	Diseases and Nematodes Affecting Plants	0%	0%	5%	0%
304	Animal Genome	0%	0%	5%	0%
305	Animal Physiological Processes	0%	0%	45%	0%
311	Animal Diseases	0%	0%	5%	0%
312	External Parasites and Pests of Animals	0%	0%	5%	0%
	Total	0%	0%	100%	0%

V(C). Planned Program (Situation and Scope)

1. Situation and priorities

-In the post-genomic era, the ability to predict protein structure, function and interactions from genomic data holds huge potential for making advances in public health and agriculture.

-Macromolecules govern plant and animal physiology and pathophysiology, hence an understanding of their structure-function relationships can be used to attack or improve agriculturally relevant physiological processes.

-Sophisticated instrumentation, computer algorithms, and highly trained staff are needed to carry out the experiments that will generate a knowledge base, which would make such predictions feasible

-Interactions between faculty and staff with a common interest in structural biology, and a breadth of expertise are required to fully exploit the current knowledge base to solve current and future problems.

-Methods for solving and predicting the structure of complex oligo/polysaccharides are woefully inadequate.

-The polysaccharides present in plant cell walls represent a large source of fermentable sugars: a biomass that represents a renewable energy source that there is currently no economic way to exploit.

Priorities will be to:

A. Carry out basic research into the interactions that control the structure and function of macromolecules occurring in plant and animal systems.

B. Build, foster and maintain a cohesive critical mass of research faculty with a diverse set of expertise that focus on the study of structural biology, bioinformatics and proteomics.

C. Obtain funding to acquire and maintain state of the art equipment to enhance the research capabilities relating to macromolecular structure/ function/ interactions on the OSU campus.

D. Acquire and maintain support for "Core" facilities that are critical to the research mission of DASNR and Oklahoma State University: particularly to develop intellectual property that is patentable or that can be licensed.

E. Long-term goals are to grow knowledge, and to use this knowledge to contribute to the enhancement of the State's public health and agricultural productivity.

2. Scope of the Program

- In-State Research
- Multistate Research

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

New and improved technologies will continue to be developed that will accelerate solving macromolecular structures, and interaction networks, and funding will be available for the acquisition of these new technologies.

Patentable or licensable discoveries or technologies will be generated by researchers.

Appropriated and sponsored funding will continue at a similar or enhanced level.

Funding levels will allow the addition of key faculty, and vacated positions to be replaced in a timely fashion.

Funding levels will allow key technical and "core" facility personnel to be added and/or replaced in a timely manner.

Faculty and staff with necessary skills can be recruited.

2. Ultimate goal(s) of this Program

To make fundamental scientific discoveries that will enhance our understanding of molecular mechanisms involved in the regulation of macromolecular interactions, and determination of macromolecular structures, and the relationships of macromolecular structure to function that can be exploited for the improvement of plant and animal health, and agricultural production.

To assemble a critical mass of researchers in structural biology who will work together to generate a continuous stream of extramural funding and allow the establishment of a "Structural Biology" Center at OSU.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2017	0.0	0.0	9.0	0.0
2018	0.0	0.0	8.0	0.0
2019	0.0	0.0	7.0	0.0
2020	0.0	0.0	7.0	0.0
2021	0.0	0.0	7.0	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

Basic research will be conducted that will make fundamental discoveries which will enhance our understanding of molecular mechanisms involved in the regulation of physiological processes in plant and animal systems.

New faculty and staff will be recruited to build, foster and maintain a cohesive critical mass of research faculty with a diverse set of expertise that focuses on the study of structural biology.

Grant proposals will be written to acquire and maintain state of the art equipment to enhance the research capabilities relating to protein structure/ function/ interactions on the OSU campus.

Funds will be solicited from national, state and university sources to acquire, and maintain support for "Core" facilities that are critical to the research mission of DASNR and Oklahoma State University.

Experimental paradigms will be designed and basic research will be conducted to fill critical gaps in scientific knowledge that will address needs, issues and problems that ultimately can be translated into an improvement in plant and animal health.

Develop new research methods and procedures.

Train undergraduate and graduate students, and postdoctoral associates.

Publish scientific articles.

Write and submit grant proposals.

Attend and present scientific findings at professional conferences.

File patents for protection of intellectual property and negotiate licensing agreements for technology

transfer.

Interact with other researchers both on and off the OSU campus.

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension

Direct Methods	Indirect Methods
● Workshop ● Group Discussion ● Demonstrations	● TV Media Programs ● Web sites other than eXtension

3. Description of targeted audience

Departments and department heads
OSU administrators
Other faculty and other scientific researchers in DASNR, at OSU & the scientific community
Students and post-docs
Federal, state, and private funding agencies
Scientific journal editors, readers & the scientific community
Candidates for open faculty and staff positions.
Patent officers
Agricultural, environmental, life, and human science industries
General public and elected officials

V(G). Planned Program (Outputs)

NIFA no longer requires you to report target numbers for standard output measures in the Plan of Work. However, all institutions will report actual numbers for standard output measures in the Annual Report of Accomplishments and Results. The standard outputs for which you must continue to collect data are:

- Number of contacts
  - Direct Adult Contacts
  - Indirect Adult Contacts
  - Direct Youth Contacts
  - Indirect Youth Contact
- Number of patents submitted
- Number of peer reviewed publications

☑ Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(H). State Defined Outputs

1. Output Measure

- Research discoveries, procedural and technological advances, and dissemination of results of research efforts.
- Filing patents for protection of intellectual property and negotiation of licensing agreements for technology transfer.
- Training of students and post-docs.

- Research discoveries, procedural and technological advances, and solicitation of support for research efforts.

☑ Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(I). State Defined Outcome

O. No	Outcome Name
1	Number of manuscripts published from research efforts.
2	Number of licensing agreements negotiated for transfer patented technology to industry.
3	Numbers of graduate students graduated and postdoctoral associates mentored with training in structural biology and placed/hired into appropriate professional level positions.
4	Number of new extramural grants funded.
5	Number of invitations that faculty members received to present research findings at universities and colleges, and to national and international meetings.
6	Number of trainees attending workshops designed to train individuals in aspects of structural biology, proteomics, and bioinformatics.
7	Number of Instrumentation Grants Funded

Outcome # 1

1. Outcome Target

Number of manuscripts published from research efforts.

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 206 - Basic Plant Biology
- 203 - Plant Biological Efficiency and Abiotic Stresses Affecting Plants
- 304 - Animal Genome
- 305 - Animal Physiological Processes
- 201 - Plant Genome, Genetics, and Genetic Mechanisms

4. Associated Institute Type(s)

- 1862 Research

Outcome # 2

1. Outcome Target

Number of licensing agreements negotiated for transfer patented technology to industry.

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 206 - Basic Plant Biology
- 203 - Plant Biological Efficiency and Abiotic Stresses Affecting Plants
- 304 - Animal Genome
- 201 - Plant Genome, Genetics, and Genetic Mechanisms
- 305 - Animal Physiological Processes

4. Associated Institute Type(s)

- 1862 Research

Outcome # 3

1. Outcome Target

Numbers of graduate students graduated and postdoctoral associates mentored with training in structural biology and placed/hired into appropriate professional level positions.

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 305 - Animal Physiological Processes
- 304 - Animal Genome
- 206 - Basic Plant Biology
- 203 - Plant Biological Efficiency and Abiotic Stresses Affecting Plants
- 201 - Plant Genome, Genetics, and Genetic Mechanisms

4. Associated Institute Type(s)

- 1862 Research

Outcome # 4

1. Outcome Target

Number of new extramural grants funded.

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 305 - Animal Physiological Processes
- 203 - Plant Biological Efficiency and Abiotic Stresses Affecting Plants
- 206 - Basic Plant Biology
- 201 - Plant Genome, Genetics, and Genetic Mechanisms
- 304 - Animal Genome

4. Associated Institute Type(s)

- 1862 Research

Outcome # 5

1. Outcome Target

Number of invitations that faculty members received to present research findings at universities and colleges, and to national and international meetings.

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 206 - Basic Plant Biology

- 305 - Animal Physiological Processes
- 201 - Plant Genome, Genetics, and Genetic Mechanisms
- 304 - Animal Genome
- 203 - Plant Biological Efficiency and Abiotic Stresses Affecting Plants

4. Associated Institute Type(s)

- 1862 Research

Outcome # 6

1. Outcome Target

Number of trainees attending workshops designed to train individuals in aspects of structural biology, proteomics, and bioinformatics.

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 206 - Basic Plant Biology
- 305 - Animal Physiological Processes
- 304 - Animal Genome
- 201 - Plant Genome, Genetics, and Genetic Mechanisms
- 203 - Plant Biological Efficiency and Abiotic Stresses Affecting Plants

4. Associated Institute Type(s)

- 1862 Research

Outcome # 7

1. Outcome Target

Number of Instrumentation Grants Funded

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 305 - Animal Physiological Processes
- 206 - Basic Plant Biology
- 201 - Plant Genome, Genetics, and Genetic Mechanisms
- 304 - Animal Genome
- 203 - Plant Biological Efficiency and Abiotic Stresses Affecting Plants
- 311 - Animal Diseases

4. Associated Institute Type(s)

- 1862 Research

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges

Description

{NO DATA ENTERED}

V(K). Planned Program - Planned Evaluation Studies

Description of Planned Evaluation Studies

1. We will evaluate percentage increases in number of manuscripts published as stated in Outcome #1.

2. We will evaluate percentage increases in number of licensing agreements negotiated for transfer patented technology to industry as stated in Outcome #2.

3. We will evaluate percentage increases in numbers of graduate students graduated and postdoctoral associates mentored with training in structural biology and placed/ hired into appropriate professional level positions as stated in Outcome #3.

4. We will evaluate percentage increases in numbers of new extramural grants funded as stated in Outcome #4.

5. We will evaluate percentage increases in numbers of instrumentation proposals funded and new instruments obtained as stated in Outcome #5.

6. We will evaluate percentage increases in numbers of invitations that faculty members received to present research findings at universities and colleges, and to national and international meetings as stated in Outcome #6.

7. We will evaluate the percentage increases in workshop attendance as stated in Outcome #7.

V(A). Planned Program (Summary)

Program # 16

1. Name of the Planned Program

Environmental and Safety Issues: Family and Youth

2. Brief summary about Planned Program

This program focuses on concerns from advisory committees and agencies across the state and includes issues related to environmental degradation and restoration and the prevention of injury and trauma.

3. Program existence : Mature (More then five years)

4. Program duration : Medium Term (One to five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
102	Soil, Plant, Water, Nutrient Relationships	9%	0%	0%	0%
111	Conservation and Efficient Use of Water	14%	0%	0%	0%
121	Management of Range Resources	12%	0%	0%	0%
133	Pollution Prevention and Mitigation	14%	0%	0%	0%
134	Outdoor Recreation	11%	0%	0%	0%
141	Air Resource Protection and Management	13%	0%	0%	0%
723	Hazards to Human Health and Safety	13%	0%	0%	0%
805	Community Institutions and Social Services	14%	0%	0%	0%
	Total	100%	0%	0%	0%

V(C). Planned Program (Situation and Scope)

1. Situation and priorities

Oklahoma ranks 11th in the nation in total energy consumption per capita. The typical family spends about $1,900 annually on utility bills. About half of Oklahomans' utility bills are spent on heating and cooling; a large portion of that energy is wasted.
Recently, 23% of Oklahomans were potentially exposed to water exceeding a violation limit. Violations

include maximum contaminant levels, maximum residual disinfectant levels or treatment technique violations. Possible physical effects of exposure to this water include nausea, lung and skin irritation, cancer, kidney, liver and nervous system damage. Children are inherently vulnerable to contaminants in the home and near environment because their bodies are still developing, they eat, drink, and breathe more in proportion to their body size, and they behave in ways that increase possibility of exposure.
In the United States, food waste is estimated at between 30-40 percent of the food supply. This estimate, based on the USDA's Economic Research Service estimate of 31 percent food loss at the retail and consumer levels, corresponded to approximately 133 billion pounds and $161 billion worth of food in 2010. This amount of waste has far-reaching impacts on food security, resource conservation and climate change.
Oklahoma ranks in the top few states for federally declared disasters. Families who have developed emergency kits and family emergency plans will be less fearful and can mitigate loss.
In Oklahoma, falls, fires/burns, and poisonings account for the majority of unintentional home injury deaths among all age groups. Among all age groups, older adults are most likely to die due to home injury. Over 14% of Oklahoma's population is age 65 years and older, and of those, 9.6% live alone.
Our priority is to effect long-term change to:

- Prevent/decrease the degradation of the environment
- Reduce risks that could harm health, well-being, and safety in homes, homesteads and communities
- Improve disaster preparedness within Oklahoma families and their capacity to recover.

2. Scope of the Program

- In-State Extension

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

Program will experience "customer acceptance" --schools, after school programs, community youth groups will allow the program to be taught.
Quality programming efficiently uses resources, is research-based, policy-relevant, and effective in bringing about desired change.
Approaches must be multi-faceted, fit local needs, and integrated in family, school, and community contexts.
Both universal and targeted approaches are necessary, valuing efforts to engage diverse audiences.
Programming will have a positive economic and social impact.
These focus issues are long-term challenges to the citizens of Oklahoma.
Appropriate and sponsored funding will continue at similar levels. Key personnel will be replaced in a timely manner.
Youth will be recognized as a viable resource who can work alongside adults to make a significant difference in their community.

2. Ultimate goal(s) of this Program

Prevent/decrease the degradation of the environment.
Improve safety of Oklahomans by reducing the risk of injury and trauma and improving the readiness for and ability to recover from disaster.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2017	12.0	0.0	0.0	0.0
2018	12.0	0.0	0.0	0.0
2019	12.0	0.0	0.0	0.0
2020	11.0	0.0	0.0	0.0
2021	11.0	0.0	0.0	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

- Conduct research that addresses chronic issues in Oklahoma
- Evaluate programs to determine effectiveness and impacts
- Leverage resources via grant writing and development activities
- Develop relevant partnerships
- Conduct FCS education through 4-H youth development projects and activities
- Develop, test and use evaluation tools to determine effectiveness and impacts

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension

Direct Methods	Indirect Methods
● Education Class	● Public Service Announcement
● Workshop	● Newsletters
● Group Discussion	● TV Media Programs
● One-on-One Intervention	● eXtension web sites
● Demonstrations	● Web sites other than eXtension
● Other 1 (research)	
● Other 2 (Projects)	

3. Description of targeted audience

Youth, homeowners, families, children, teachers, communities, community leaders

V(G). Planned Program (Outputs)

NIFA no longer requires you to report target numbers for standard output measures in the Plan of Work. However, all institutions will report actual numbers for standard output measures in the Annual Report of Accomplishments and Results. The standard outputs for which you must continue to collect data are:

- Number of contacts
  - Direct Adult Contacts
  - Indirect Adult Contacts
  - Direct Youth Contacts
  - Indirect Youth Contact
- Number of patents submitted
- Number of peer reviewed publications

☑ Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(H). State Defined Outputs

1. Output Measure

- Number of OSU Fact s published
- Number of other publications including but not limited to Bulletins, Technical Manuals, Reports as well as digital resources such as PowerPoint presentations, curricula, and core competency modules distributed for use by others
- Number of in-service training sessions
- Number of certification training sessions
- Number of other training sessions, workshops, etc. conducted
- Number of presentations at Extension organized meetings
- Number of presentations at other meetings and events (professional meetings, invitations to speak to community and stakeholder groups, etc.)
- Number of workshops, conferences, etc. organized
- Number of demonstrations
- Number of displays, exhibits, and models
- Number of newsletters
- Number of radio and television presentations
- Number of newspaper, and magazine articles written
- Number of OSU Fact Sheets revised
- Number of webpages created or updated
- Average number of phone calls and/or email requests responded to on a weekly basis
- Number of webcasts or guest appearances on webinars

☑ Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(I). State Defined Outcome

O. No	Outcome Name
1	Percentage of participants increasing selection and home preservation of home, locally and regionally produced foods
2	Percentage of participants increasing composting, donation of goods for others to use, repurposing, and recycling of items
3	Percentage of participants increasing maintenance, conservation, and protection of natural resources (air, land, water)
4	Number of participants who are prepared for emergencies
5	Percentage of participants increasing proper home thermostat management
6	Percentage of participants managing safety hazards in the home
7	Number of participants who are using assistive technology as necessary
8	Number of participants using available assistance for injury/disability
9	Number of participants increasing practice of safety and injury/secondary injury prevention.
10	Percentage of participants increasing participation in maintaining, conserving and protecting natural resources (air, land, water)

Outcome # 1

1. Outcome Target

Percentage of participants increasing selection and home preservation of home, locally and regionally produced foods

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 805 - Community Institutions and Social Services

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 2

1. Outcome Target

Percentage of participants increasing composting, donation of goods for others to use, repurposing, and recycling of items

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 102 - Soil, Plant, Water, Nutrient Relationships

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 3

1. Outcome Target

Percentage of participants increasing maintenance, conservation, and protection of natural resources (air, land, water)

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 102 - Soil, Plant, Water, Nutrient Relationships
- 111 - Conservation and Efficient Use of Water
- 141 - Air Resource Protection and Management

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 4

1. Outcome Target

Number of participants who are prepared for emergencies

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 723 - Hazards to Human Health and Safety
- 805 - Community Institutions and Social Services

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 5

1. Outcome Target

Percentage of participants increasing proper home thermostat management

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 133 - Pollution Prevention and Mitigation

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 6

1. Outcome Target

Percentage of participants managing safety hazards in the home

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 723 - Hazards to Human Health and Safety

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 7

1. Outcome Target

Number of participants who are using assistive technology as necessary

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 805 - Community Institutions and Social Services
- 723 - Hazards to Human Health and Safety

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 8

1. Outcome Target

Number of participants using available assistance for injury/disability

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 805 - Community Institutions and Social Services
- 723 - Hazards to Human Health and Safety

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 9

1. Outcome Target

Number of participants increasing practice of safety and injury/secondary injury prevention.

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 723 - Hazards to Human Health and Safety

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 10

1. Outcome Target

Percentage of participants increasing participation in maintaining, conserving and protecting natural resources (air, land, water)

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 141 - Air Resource Protection and Management
- 133 - Pollution Prevention and Mitigation
- 111 - Conservation and Efficient Use of Water
- 805 - Community Institutions and Social Services

4. Associated Institute Type(s)

- 1862 Extension

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Programmatic Challenges

Description

{NO DATA ENTERED}

V(K). Planned Program - Planned Evaluation Studies

Description of Planned Evaluation Studies

For the Issue Teams included in this Planned Program, evaluation will be performed by distributing written surveys to all program participants. The surveys will be done post program and retrospectively measure behaviors pre-program and behavior change/intent to change behavior. The surveys will ask questions focused primarily on the State Defined Outcomes (see above). We will evaluate percentage change in behavior of those participating as stated in the State Defined Outcomes. The results of the surveys will be used to improve curricula and education activities and demonstrate the impact of Family & Consumer Sciences Cooperative Extension education on the lives of Oklahomans.

V(A). Planned Program (Summary)

Program # 17

1. Name of the Planned Program

Food Safety - Hunger, Health and Safety

2. Brief summary about Planned Program

This program focuses on concerns from advisory committees and agencies across the state and includes issues related to: food safety, and the prevalence of injury and trauma.

3. Program existence : Intermediate (One to five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
134	Outdoor Recreation	8%	0%	0%	0%
315	Animal Welfare/Well-Being and Protection	4%	0%	0%	0%
703	Nutrition Education and Behavior	32%	0%	0%	0%
723	Hazards to Human Health and Safety	18%	0%	0%	0%
804	Human Environmental Issues Concerning Apparel, Textiles, and Residential and Commercial Structures	21%	0%	0%	0%
805	Community Institutions and Social Services	17%	0%	0%	0%
	Total	100%	0%	0%	0%

V(C). Planned Program (Situation and Scope)

1. Situation and priorities

Total annual health-related costs of food borne illness in the United States, including associated outpatient and inpatient medical expenses and lost income, totals more than $15.6 billion.
In Oklahoma, falls, fires/burns, and poisonings account for the majority of unintentional home injury deaths among all age groups. Among all age groups, older adults are most likely to die due to home injury. Over 14% of Oklahoma's population is age 65 years and older, and of those, 9.6% live alone.
Our priority is to effect long-term change to:

- Maintain or improve health through safe food handling and storage practices

• Reduce risks that could harm health, well-being, and safety in homes, homesteads and communities

2. Scope of the Program

- In-State Extension
- Multistate Extension

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

Program will experience "customer acceptance" --schools, after school programs, community youth groups will allow the program to be taught.
Quality programming efficiently uses resources, is research-based, policy-relevant, and effective in bringing about desired change.
Approaches must be multi-faceted, fit local needs, and integrated in family, school, and community contexts.
Both universal and targeted approaches are necessary, valuing efforts to engage diverse audiences.
Programming will have a positive economic and social impact.
These focus issues are long-term challenges to the citizens of Oklahoma.
Appropriate and sponsored funding will continue at similar levels. Key personnel will be replaced in a timely manner.
Youth will be recognized as a viable resource who can work alongside adults to make a significant difference in their community.
.

2. Ultimate goal(s) of this Program

Improve food safety for families, youth and communities and reduce the prevalence of injury and trauma.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2017	12.0	0.0	0.0	0.0
2018	12.0	0.0	0.0	0.0
2019	12.0	0.0	0.0	0.0
2020	11.0	0.0	0.0	0.0
2021	11.0	0.0	0.0	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

- Establish appropriate partnerships
- Conduct FCS education through 4-H youth development projects and activities.
- Evaluate programs to determine effectiveness and impacts.
- Conduct research that addresses chronic issues in Oklahoma.
- Leverage resources via grant writing and development activities
- Student internships and service learning

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension

Direct Methods	Indirect Methods
● Education Class	● Public Service Announcement
● Workshop	● Newsletters
● Group Discussion	● TV Media Programs
● One-on-One Intervention	● eXtension web sites
● Demonstrations	● Web sites other than eXtension
● Other 1 (Projects)	

3. Description of targeted audience

Families, youth, restaurant employees, food handlers, children, communities, community leaders

V(G). Planned Program (Outputs)

NIFA no longer requires you to report target numbers for standard output measures in the Plan of Work. However, all institutions will report actual numbers for standard output measures in the Annual Report of Accomplishments and Results. The standard outputs for which you must continue to collect data are:

- Number of contacts
  - Direct Adult Contacts
  - Indirect Adult Contacts
  - Direct Youth Contacts
  - Indirect Youth Contact
- Number of patents submitted
- Number of peer reviewed publications

☑ Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(H). State Defined Outputs

1. Output Measure

- Number of OSU Fact Sheets Newly Developed
- Number of other publications including but not limited to Bulletins, Technical Manuals, Reports as well as digital resources such as PowerPoint presentations, curricula, core competency modules, etc. distributed for use by others
- Number of in-service training sessions
- Number of certification Training sessions
- Number of other training sessions, workshops, etc. conducted
- Number of presentations at Extension organized meetings
- Number of presentations at other meetings and events (professional meetings, invitations to speak to community groups, stakeholder groups, etc.)
- Number of workshops, conferences, etc. organized
- Number of posters or displays, exhibits, and models
- Number of other demonstrations
- Number of newsletters
- Number of radio and television presentations
- Number of newspaper, and magazine articles written
- Number of OSU Fact Sheets revised
- Number of webpages created or updated
- Number of website hits
- Average number of phone calls and/or email requests responded to on a weekly basis
- Number of webcasts or guest appearances on webinars

☑ Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(I). State Defined Outcome

O. No	Outcome Name
1	Percentage of participants increasing meal preparation at home
2	Percentage of participants increasing food cooking skills
3	Percentage of participants increasing safe food handling practices
4	Percentage participants increasing safe and effective food preservation practices
5	Percentage of participants increasing practice of safety and injury/secondary injury prevention

Outcome # 1

1. Outcome Target

Percentage of participants increasing meal preparation at home

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 703 - Nutrition Education and Behavior

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 2

1. Outcome Target

Percentage of participants increasing food cooking skills

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 703 - Nutrition Education and Behavior

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 3

1. Outcome Target

Percentage of participants increasing safe food handling practices

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 723 - Hazards to Human Health and Safety
- 703 - Nutrition Education and Behavior

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 4

1. Outcome Target

Percentage participants increasing safe and effective food preservation practices

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 723 - Hazards to Human Health and Safety
- 703 - Nutrition Education and Behavior

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 5

1. Outcome Target

Percentage of participants increasing practice of safety and injury/secondary injury prevention

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 723 - Hazards to Human Health and Safety

4. Associated Institute Type(s)

- 1862 Extension

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations

- Competing Programmatic Challenges

Description

{NO DATA ENTERED}

V(K). Planned Program - Planned Evaluation Studies

Description of Planned Evaluation Studies

For the Issue Teams included in this Planned Program, evaluation will be performed by distributing written surveys to all program participants. The surveys will be done post program and retrospectively measure behaviors pre-program and behavior change/intent to change behavior. The surveys will ask questions focused primarily on the State Defined Outcomes (see above). We will evaluate percentage change in behavior of those participating, as stated in the State Defined Outcomes. The results of the surveys will be used to improve curricula and education activities and demonstrate the impact of Family & Consumer Sciences Cooperative Extension education on the lives of Oklahomans.

V(A). Planned Program (Summary)

Program # 18

1. Name of the Planned Program

Global Food Security and Hunger - Families and Youth

2. Brief summary about Planned Program

These programs focus on concerns from advisory committees and agencies across the state and include issues related to: inadequate food supply and/or food management, high-risk negative financial practices and lack of financial planning, unemployed Oklahoma veterans and civilians, family breakdown, the lack of resilience and skills to ensure success in family life, school, and society.

3. Program existence : Mature (More then five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
604	Marketing and Distribution Practices	5%	0%	0%	0%
607	Consumer Economics	11%	0%	0%	0%
608	Community Resource Planning and Development	3%	0%	0%	0%
701	Nutrient Composition of Food	2%	0%	0%	0%
703	Nutrition Education and Behavior	13%	0%	0%	0%
704	Nutrition and Hunger in the Population	5%	0%	0%	0%
724	Healthy Lifestyle	14%	0%	0%	0%
801	Individual and Family Resource Management	12%	0%	0%	0%
802	Human Development and Family Well-Being	18%	0%	0%	0%
805	Community Institutions and Social Services	7%	0%	0%	0%
806	Youth Development	10%	0%	0%	0%
	Total	100%	0%	0%	0%

V(C). Planned Program (Situation and Scope)

1. Situation and priorities

According to a recent USDA report, for the three year period of 2012-2014, Oklahoma ranked higher than the national average for food insecurity. Seventeen percent of Oklahomans are classified as food insecure; with one in four children, and one in six adults struggling with hunger daily. Sixty-two percent of Oklahoma public school students are enrolled in the national free or reduced-price school lunch, 50% of all infants born in Oklahoma are enrolled in WIC, and 25% of Oklahomans currently receive Supplemental Nutrition Assistance Program (SNAP). The Regional Food Bank in Oklahoma provides 57.2 million meals a year, while the Community Food Bank of Eastern Oklahoma provides 17.9 million meals a year.
Oklahoma has some of the nation's highest populations of unbanked (10.9%, ranked 43rd nationally) and underbanked households (22.2%, ranked 37th nationally), families without savings accounts, and consumers with subprime credit. Oklahoma ranks 47th nationally on an index ranking the ability of citizens in the state to build and nurture financial savings and retirement assets. The state ranks 43rd nationally in unbanked households and 44th in consumers with prime credit (42.8%).
Nearly 16% of Oklahomans have an annual income below the federal poverty threshold and 12.9% of Oklahoma households live in extreme asset poverty. The state ranks 38th in average annual pay. Oklahoma ranks 38th in residents with low-wage jobs (30% of Oklahoma jobs). Unemployed Oklahomans may have more than a bad economy working against them; irresponsible use of social media such as Facebook, YouTube, and Twitter can eliminate a job applicant from consideration for employment. A lack of business etiquette can cost not only job applicants but also employers, who can lose profits due to a decrease in business and eventual increase in employee turnover.
Oklahoma ranks among the top 5 in all states for number of divorces. Oklahomans marry an average of 2.5 years younger than the national median age at first marriage, and those marrying under the age of 20 are the most likely to have gotten a divorce. Oklahoma families with children and headed by single mothers are 4.5 times more likely to be in poverty than families headed by married couples. Divorce has negative impacts on parents and youth and increases the risk of negative outcomes in youth. Youth whose parents divorce have a 25-30% increased risk of suffering a mental health condition.
During times of adversity, the ability to effectively respond to life's challenges is critical. Financial struggles to make ends meet, job loss, and family separation or divorce are just a few of the events that can negatively impact all Oklahomans from infants to adults. Unemployment and income loss can reduce educational achievement by increasing harsh or uninvolved parenting, threatening early childhood nutrition; reducing families' abilities to provide a supportive learning environment, and by forcing a delay or abandonment of youth's post-secondary plans. Someone with only a high school degree is over four times more likely to be poor than a college graduate, and those who did not graduate from high school are seven times more likely to be poor than college graduates.
Our priority is to effect long-term change to:

- Decrease number of Oklahomans experiencing hunger
- Increase financial readiness for life events
- Increase personal and community readiness for employment and economic opportunities
- Reduce risk of separation or divorce and strengthen relationships
- Reduce the negative consequences of divorce on children
- Promote resilience in children, youth, and adults

2. Scope of the Program

- In-State Extension
- In-State Research

- Multistate Extension
- Integrated Research and Extension

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

Program will experience "customer acceptance" --schools, after school programs, community youth groups will allow the program to be taught.
Quality programming efficiently uses resources, is research-based, policy-relevant, and effective in bringing about desired change.
Approaches must be multi-faceted, fit local needs, and integrated in family, school, and community contexts.
Both universal and targeted approaches are necessary, valuing efforts to engage diverse audiences.
Programming will have a positive economic and social impact.
These focus issues are long-term challenges to the citizens of Oklahoma.
Appropriate and sponsored funding will continue at similar levels. Key personnel will be replaced in a timely manner.
Youth will be recognized as a viable resource who can work alongside adults to make a significant difference in their community.

2. Ultimate goal(s) of this Program

Decrease number of Oklahomans experiencing hunger
Increase financial readiness for life events
Increase personal and community readiness for employment and economic opportunities
Reduce risk of separation or divorce and strengthen relationships
Increase non-residential parental involvement
Increase collaborative co-parenting relationship between divorced parents
Increase resilience in children, youth, and adults
Increase critical life skills of Oklahoma youth

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2017	15.0	0.0	0.0	0.0
2018	14.0	0.0	0.0	0.0
2019	14.0	0.0	0.0	0.0
2020	14.0	0.0	0.0	0.0

2021	14.0	0.0	0.0	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

- Conduct research that addresses chronic issues in Oklahoma
- Leverage resources via grant writing and development activities
- Student internships and service learning
- Establish appropriate partnerships with other youth serving agencies and commodity groups
- Develop, test and use evaluation tools to determine effectiveness and impacts
- Conduct FCS education through 4-H youth development projects and activities
- Establish community and school gardens

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension

Direct Methods	Indirect Methods
● Education Class	● Public Service Announcement
● Workshop	● Newsletters
● Group Discussion	● TV Media Programs
● One-on-One Intervention	● eXtension web sites
● Demonstrations	● Web sites other than eXtension
● Other 1 (research)	● Other 1 (train volunteers)
● Other 2 (projects)	

3. Description of targeted audience

Families, communities, youth, children, parents, community leaders, teachers, job seekers, businesses

V(G). Planned Program (Outputs)

NIFA no longer requires you to report target numbers for standard output measures in the Plan of Work. However, all institutions will report actual numbers for standard output measures in the Annual Report of Accomplishments and Results. The standard outputs for which you must continue to collect data are:

- Number of contacts
  - Direct Adult Contacts
  - Indirect Adult Contacts
  - Direct Youth Contacts
  - Indirect Youth Contact
- Number of patents submitted
- Number of peer reviewed publications

☑ Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(H). State Defined Outputs

1. Output Measure

- Number of OSU Fact sheets revised
- Number of other publications including but not limited to Bulletins, Technical Manuals, Reports as well as digital resources such as PowerPoint presentations, curricula, core competency modules, etc. distributed for use by others
- Number of in-service training sessions
- Number of certification training sessions
- Number of other training sessions, workshops, etc. conducted
- Number of presentations at Extension organized meetings
- Number of presentations at other meetings and events (professional meetings, invitations to speak to community groups, stakeholder groups, etc.)
- Number of workshops, conferences, etc. organized
- Number of posters or displays, exhibits, and models
- Number of other demonstrations
- Number of newsletters
- Number of radio and television presentations
- Number of newspaper, and magazine articles written
- Number of OSU Fact Sheets revised
- Number of webpages created or updated
- Number of webcasts or guest appearances on webinars

- Average number of phone calls and/or email requests responded to on a weekly basis
- Number of website hits

☑ Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(I). State Defined Outcome

O. No	Outcome Name
1	Percentage of participants increasing money saving meal planning or food shopping practices
2	Percentage of participants increasing food money management practices
3	Percentage of participants increasing growth, production, hunting, or fishing for some food
4	Percentage of participants decreasing likelihood of using high-risk negative financial practices such as overusing credit, failing to save money or planning for the future
5	Percentage of participants decreasing risk of default on loans, credit card debt, unpaid bills, mortgage foreclosure, and identity theft
6	Percentage of participants increasing financial planning practices across the life cycle and skills to manage financial risk
7	Percentage of participants increasing readiness for employment opportunities
8	Percentage of participants increasing readiness for life changes
9	Percentage of participants increasing life skills for personal competence
10	Percentage of participants increasing ability to manage personal and family finances
11	Percentage of participants increasing child competent behaviors
12	Percentage of participants decreasing child problematic behaviors
13	Percentage of participants increasing positive parenting attitudes and behaviors
14	Percentage of participants decreasing disengaged or hostile parenting

Outcome # 1

1. Outcome Target

Percentage of participants increasing money saving meal planning or food shopping practices

2. Outcome Type : Change in Condition Outcome Measure

3. Associated Knowledge Area(s)

- 704 - Nutrition and Hunger in the Population
- 607 - Consumer Economics
- 801 - Individual and Family Resource Management

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 2

1. Outcome Target

Percentage of participants increasing food money management practices

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 703 - Nutrition Education and Behavior
- 607 - Consumer Economics
- 704 - Nutrition and Hunger in the Population
- 801 - Individual and Family Resource Management

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 3

1. Outcome Target

Percentage of participants increasing growth, production, hunting, or fishing for some food

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 801 - Individual and Family Resource Management
- 704 - Nutrition and Hunger in the Population
- 703 - Nutrition Education and Behavior
- 607 - Consumer Economics

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 4

1. Outcome Target

Percentage of participants decreasing likelihood of using high-risk negative financial practices such as overusing credit, failing to save money or planning for the future

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 607 - Consumer Economics
- 806 - Youth Development
- 801 - Individual and Family Resource Management

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 5

1. Outcome Target

Percentage of participants decreasing risk of default on loans, credit card debt, unpaid bills, mortgage foreclosure, and identity theft

2. Outcome Type : Change in Condition Outcome Measure

3. Associated Knowledge Area(s)

- 801 - Individual and Family Resource Management
- 607 - Consumer Economics
- 806 - Youth Development

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 6

1. Outcome Target

Percentage of participants increasing financial planning practices across the life cycle and skills to manage financial risk

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 801 - Individual and Family Resource Management
- 806 - Youth Development
- 607 - Consumer Economics

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 7

1. Outcome Target

Percentage of participants increasing readiness for employment opportunities

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 801 - Individual and Family Resource Management
- 802 - Human Development and Family Well-Being
- 806 - Youth Development

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 8

1. Outcome Target

Percentage of participants increasing readiness for life changes

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 802 - Human Development and Family Well-Being

- 724 - Healthy Lifestyle
- 801 - Individual and Family Resource Management
- 806 - Youth Development

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 9

1. Outcome Target

Percentage of participants increasing life skills for personal competence

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 724 - Healthy Lifestyle
- 806 - Youth Development
- 802 - Human Development and Family Well-Being
- 801 - Individual and Family Resource Management
- 607 - Consumer Economics

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 10

1. Outcome Target

Percentage of participants increasing ability to manage personal and family finances

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 806 - Youth Development
- 801 - Individual and Family Resource Management
- 607 - Consumer Economics

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 11

1. Outcome Target

Percentage of participants increasing child competent behaviors

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 801 - Individual and Family Resource Management
- 802 - Human Development and Family Well-Being

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 12

1. Outcome Target

Percentage of participants decreasing child problematic behaviors

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 802 - Human Development and Family Well-Being
- 801 - Individual and Family Resource Management
- 806 - Youth Development

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 13

1. Outcome Target

Percentage of participants increasing positive parenting attitudes and behaviors

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 802 - Human Development and Family Well-Being

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 14

1. Outcome Target

Percentage of participants decreasing disengaged or hostile parenting

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 802 - Human Development and Family Well-Being

4. Associated Institute Type(s)

- 1862 Extension

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities

Description

{NO DATA ENTERED}

V(K). Planned Program - Planned Evaluation Studies

Description of Planned Evaluation Studies

For the Issue Teams included in this Planned Program, evaluation will be performed by distributing written surveys to all program participants. The surveys will be done post program and retrospectively

measure behaviors pre-program and behavior change/intent to change behavior. The surveys will ask questions focused primarily on the State Defined Outcomes (see above). We will evaluate percentage change in behavior of those participating as stated in the State Defined Outcomes. The results of the surveys will be used to improve curricula and education activities and demonstrate the impact of Family & Consumer Sciences Cooperative Extension education on the lives of Oklahomans.

V(A). Planned Program (Summary)

Program # 19

1. Name of the Planned Program

Enhanced Goat Production in the South - Central United States (Langston University)

2. Brief summary about Planned Program

This program will address factors impacting the level of goat production and the efficiency of goat production systems. Areas to be addressed will include nutrition, management, health and product utilization (including meat and milk). This program is expected to produce discoveries with positive impacts for goat producers and consumers.

3. Program existence : Intermediate (One to five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
302	Nutrient Utilization in Animals	0%	30%	0%	30%
307	Animal Management Systems	0%	30%	0%	30%
313	Internal Parasites in Animals	0%	20%	0%	20%
502	New and Improved Food Products	0%	20%	0%	20%
	Total	0%	100%	0%	100%

V(C). Planned Program (Situation and Scope)

1. Situation and priorities

The rapidly increasing number of goats in the United States has led to a growing importance of goat production and goat products in the United States economy. Goat production is becoming an evermore important component of the production system of many small and/or limited resources producers.

2. Scope of the Program

- In-State Extension
- In-State Research

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

Funding will remain constant or increase. Enhanced goat production methods will be discovered.

2. Ultimate goal(s) of this Program

To develop more efficient production systems for goat production.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2017	0.0	0.5	0.0	1.3
2018	0.0	0.5	0.0	1.3
2019	0.0	0.5	0.0	1.3
2020	0.0	0.5	0.0	1.3
2021	0.0	0.5	0.0	1.3

V(F). Planned Program (Activity)

1. Activity for the Program

We will publish scientific articles, present research papers at scientific meetings, write newsletters and present workshops and demonstrations.

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension

Direct Methods	Indirect Methods
● Education Class ● Workshop ● Demonstrations ● Other 1 ((Field Days)	● Newsletters ● Web sites other than eXtension ● Other 1 ((Proceedings))

3. Description of targeted audience

All present/potential goat producers in Oklahoma and surrounding states.

V(G). Planned Program (Outputs)

NIFA no longer requires you to report target numbers for standard output measures in the Plan of Work. However, all institutions will report actual numbers for standard output measures in the Annual Report of Accomplishments and Results. The standard outputs for which you must continue to collect data are:

- Number of contacts
  - Direct Adult Contacts
  - Indirect Adult Contacts
  - Direct Youth Contacts
  - Indirect Youth Contact
- Number of patents submitted
- Number of peer reviewed publications

☑ Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(H). State Defined Outputs

1. Output Measure

- Number of Research projects completed on Enhanced Goat Products

☑ Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(I). State Defined Outcome

O. No	Outcome Name
1	Number of goat producers learning new goat production techniques.
2	Number of goat producers using new goat production techniques.
3	Goat producers who have improved production efficiency by using the learned control techniques.

Outcome # 1

1. Outcome Target

Number of goat producers learning new goat production techniques.

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 307 - Animal Management Systems

4. Associated Institute Type(s)

- 1890 Extension
- 1890 Research

Outcome # 2

1. Outcome Target

Number of goat producers using new goat production techniques.

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 313 - Internal Parasites in Animals

4. Associated Institute Type(s)

- 1890 Extension
- 1890 Research

Outcome # 3

1. Outcome Target

Goat producers who have improved production efficiency by using the learned control techniques.

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 313 - Internal Parasites in Animals

4. Associated Institute Type(s)

- 1890 Extension
- 1890 Research

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Other ((Disease))

Description

Drought would affect the ability of goat producers to raise their own forages and increase production costs. Disease or serious parasite infestations could devastate the herds of producers and our research efforts.

V(K). Planned Program - Planned Evaluation Studies

Description of Planned Evaluation Studies

Each year, the program will be evaluated for its merit and contributions to stakeholders.

V(A). Planned Program (Summary)

Program # 20

1. Name of the Planned Program

4-H Clubs (Langston University)

2. Brief summary about Planned Program

This program will engage youth as active partners and leaders who can help move their communities forward.

3. Program existence : Mature (More then five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
806	Youth Development	0%	100%	0%	0%
	Total	0%	100%	0%	0%

V(C). Planned Program (Situation and Scope)

1. Situation and priorities

Youth, especially in rural areas, need safe, wholesome programs that teach positive values and help youth develop positive lifelong skills such as leadership and public speaking.

2. Scope of the Program

- In-State Extension

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

Funding will remain constant.

2. Ultimate goal(s) of this Program

To develop positive attributes in youth such as healthy lifestyles, good citizenship, leadership and other life skills.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2017	0.0	2.0	0.0	0.0
2018	0.0	2.0	0.0	0.0
2019	0.0	2.0	0.0	0.0
2020	0.0	2.0	0.0	0.0
2021	0.0	2.0	0.0	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

The 4-H program will conduct meetings, training sessions, classes and use other learning vehicles to help youth develop life skills.

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension

Direct Methods	Indirect Methods
● Education Class ● Demonstrations ● Other 1 ((Meetings))	● Newsletters ● Web sites other than eXtension

3. Description of targeted audience

Youth in Oklahoma who qualify for the program.

V(G). Planned Program (Outputs)

NIFA no longer requires you to report target numbers for standard output measures in the Plan of Work. However, all institutions will report actual numbers for standard output measures in the Annual Report of Accomplishments and Results. The standard outputs for which you must continue to collect data are:

- Number of contacts
  - Direct Adult Contacts
  - Indirect Adult Contacts
  - Direct Youth Contacts
  - Indirect Youth Contact
- Number of patents submitted
- Number of peer reviewed publications

☑ Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(H). State Defined Outputs

1. Output Measure

- Number of of Research Projects completed in the 4-H Club Program.

☑ Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(I). State Defined Outcome

O. No	Outcome Name
1	Number of youth learning new information from the 4-H Club Program.
2	Number of youth using information learned in the 4-H Club program.
3	Youth who develop life skill.

Outcome # 1

1. Outcome Target

Number of youth learning new information from the 4-H Club Program.

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 806 - Youth Development

4. Associated Institute Type(s)

- 1890 Extension

Outcome # 2

1. Outcome Target

Number of youth using information learned in the 4-H Club program.

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 806 - Youth Development

4. Associated Institute Type(s)

- 1890 Extension

Outcome # 3

1. Outcome Target

Youth who develop life skill.

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 806 - Youth Development

4. Associated Institute Type(s)

- 1890 Extension

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

- Appropriations changes
- Competing Public priorities

Description

If appropriations for 4-H are reduced, it will affect efforts.

V(K). Planned Program - Planned Evaluation Studies

Description of Planned Evaluation Studies

A projected number of 4-H Clubs has been targeted for selected counties. We will compare actual numbers with projections.

V(A). Planned Program (Summary)

Program # 21

1. Name of the Planned Program

Extended Education (Langston University)

2. Brief summary about Planned Program

The Extended Education Program is designed to help students who need extra assistance in reading, writing, math and science. This program supplements knowledge learned in the regular public school classroom. A 4-H SET component has been added to strengthen and inspire students in the areas of science, engineering and technology.

3. Program existence : Mature (More then five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
806	Youth Development	0%	100%	0%	0%
	Total	0%	100%	0%	0%

V(C). Planned Program (Situation and Scope)

1. Situation and priorities

Many Oklahoma students in grades K through five are unable to keep up with the progression of reading and math classes taught in the regular school classroom. Consequently, these students are falling further behind academicaly. The extended education program offers help ad hope for these students.

2. Scope of the Program

- In-State Extension

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

Funding will be constant.

2. Ultimate goal(s) of this Program

To help program participants develop learning skills in reading, writing, math and science that help them to excel in these areas.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2017	0.0	2.0	0.0	0.0
2018	0.0	2.0	0.0	0.0
2019	0.0	2.0	0.0	0.0
2020	0.0	2.0	0.0	0.0
2021	0.0	2.0	0.0	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

Extension personnel will conduct classes and mini camps in reading, math and science for youth in Oklahoma.

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension

Direct Methods	Indirect Methods
● Education Class ● Other 1 ((Mini camps))	● Other 1 ((Flyers)) ● Other 2 ((Worksheets))

3. Description of targeted audience

Youth in Oklahoma

V(G). Planned Program (Outputs)

NIFA no longer requires you to report target numbers for standard output measures in the Plan of Work. However, all institutions will report actual numbers for standard output measures in the Annual Report of Accomplishments and Results. The standard outputs for which you must continue to collect data are:

- Number of contacts
  - Direct Adult Contacts
  - Indirect Adult Contacts
  - Direct Youth Contacts
  - Indirect Youth Contact
- Number of patents submitted
- Number of peer reviewed publications

☑ Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(H). State Defined Outputs

1. Output Measure

- Number of Research Projects competed on Extended Education.

☑ Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(I). State Defined Outcome

O. No	Outcome Name
1	Number of youth taught extended education techniques.
2	Number of youth grasping and using extended education techniques.
3	Number of youth who improve their academic performance and catch up in the classroom.

Outcome # 1

1. Outcome Target

Number of youth taught extended education techniques.

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 806 - Youth Development

4. Associated Institute Type(s)

- 1890 Extension

Outcome # 2

1. Outcome Target

Number of youth grasping and using extended education techniques.

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 806 - Youth Development

4. Associated Institute Type(s)

- 1890 Extension

Outcome # 3

1. Outcome Target

Number of youth who improve their academic performance and catch up in the classroom.

2. Outcome Type : Change in Condition Outcome Measure

3. Associated Knowledge Area(s)

- 806 - Youth Development

4. Associated Institute Type(s)

- 1890 Extension

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

- Competing Public priorities

Description

If school systems implement longer school days and longer school years, it could affect outcomes.

V(K). Planned Program - Planned Evaluation Studies

Description of Planned Evaluation Studies

Pre-and post-tests will be conducted to evaluate levels of learning.

V(A). Planned Program (Summary)

Program # 22

1. Name of the Planned Program

Family and Consumer Sciences (Langston University)

2. Brief summary about Planned Program

The Family and Consumer Sciences Program recognizes the family as being the cornerstone of a healthy society and it is committed to improving the quality of life and well-being of families. This program assists families in the areas of food and nutrition, parenting, clothing, money management, personal development and other family-related areas.

3. Program existence : Mature (More then five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
801	Individual and Family Resource Management	0%	100%	0%	0%
	Total	0%	100%	0%	0%

V(C). Planned Program (Situation and Scope)

1. Situation and priorities

Many of the challenges we now face as a society have roots in the family. Approximately half of all marriages today end in divorce. Single parent homes have become the norm rather than the exception. Oklahoma is among the leader in states where grandparents are raising their grandchildren. Family and Consumer Sciences resources and involvement are needed and in demand.

2. Scope of the Program

- In-State Extension

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

Funding will remain constant.

2. Ultimate goal(s) of this Program

To help participating families in Oklahoma strengthen their marital bonds, develop better money management skills and make more informed consumer decisions.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2017	0.0	0.3	0.0	0.0
2018	0.0	0.3	0.0	0.0
2019	0.0	0.3	0.0	0.0
2020	0.0	0.3	0.0	0.0
2021	0.0	0.3	0.0	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

Extension personnel will conduct classes, seminars, workshops and forums to share Family and Consumer Sciences resources.

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension

Direct Methods	Indirect Methods
● Education Class ● Workshop ● Other 1 ((Forums))	● Other 1 ((Flyers)) ● Other 2 ((Handouts))

3. Description of targeted audience

Citizens of Oklahoma.

V(G). Planned Program (Outputs)

NIFA no longer requires you to report target numbers for standard output measures in the Plan of Work. However, all institutions will report actual numbers for standard output measures in the Annual Report of Accomplishments and Results. The standard outputs for which you must continue to collect data are:

- Number of contacts
  - Direct Adult Contacts
  - Indirect Adult Contacts
  - Direct Youth Contacts
  - Indirect Youth Contact
- Number of patents submitted
- Number of peer reviewed publications

☑ Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(H). State Defined Outputs

1. Output Measure

- Number of Research Projects completed on Family and Consumer Sciences

☑ Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(I). State Defined Outcome

O. No	Outcome Name
1	Number of participants who learned about Family and Consumer Sciences.
2	Number of participants who used Family and Consumer Sciences resources.
3	Number of families that improved their quality of life at least in part from this program.

Outcome # 1

1. Outcome Target

Number of participants who learned about Family and Consumer Sciences.

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 801 - Individual and Family Resource Management

4. Associated Institute Type(s)

- 1890 Extension

Outcome # 2

1. Outcome Target

Number of participants who used Family and Consumer Sciences resources.

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 801 - Individual and Family Resource Management

4. Associated Institute Type(s)

- 1890 Extension

Outcome # 3

1. Outcome Target

Number of families that improved their quality of life at least in part from this program.

2. Outcome Type : Change in Condition Outcome Measure

3. Associated Knowledge Area(s)

- 801 - Individual and Family Resource Management

4. Associated Institute Type(s)

- 1890 Extension

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

- Competing Public priorities

Description

Society's view and definitions of a family could affect outcomes.

V(K). Planned Program - Planned Evaluation Studies

Description of Planned Evaluation Studies

Selected families will be observed and data collected to evaluate the effectiveness of this program.

V(A). Planned Program (Summary)

Program # 23

1. Name of the Planned Program

Food and Nutrition (Langston University)

2. Brief summary about Planned Program

The Food and Nutrition Program will join efforts with our newly acquired EFNEP Program to provide healthy nutrition education to needy citizens of Oklahoma. Elderly citizens in rural areas will receive special focus.

3. Program existence : Mature (More then five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
504	Home and Commercial Food Service	0%	100%	0%	0%
	Total	0%	100%	0%	0%

V(C). Planned Program (Situation and Scope)

1. Situation and priorities

Proper nutrition is an important component of a healthy lifestyle. Oklahoma rates are high compared to other states in obesity. Food and nutrition training are needed to reduce the obesity numbers and the diseases that ofen accompany this condition.

2. Scope of the Program

- In-State Extension

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

Funding will remain constant.

2. Ultimate goal(s) of this Program

To help participants develop healthy nutrition and exercise regiments that result in healthier lives.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2017	0.0	0.3	0.0	0.0
2018	0.0	0.3	0.0	0.0
2019	0.0	0.3	0.0	0.0
2020	0.0	0.3	0.0	0.0
2021	0.0	0.3	0.0	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

Extension personnel will conduct classes, seminars, workshops and hold community forums to teach healthy food and nutrition concepts.

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension

Direct Methods	Indirect Methods
● Education Class ● Workshop ● Other 1 ((Seminars)) ● Other 2 ((Forums))	● Other 1 ((Flyers)) ● Other 2 ((Handouts))

3. Description of targeted audience

Citizens of Oklahoma

V(G). Planned Program (Outputs)

NIFA no longer requires you to report target numbers for standard output measures in the Plan of Work. However, all institutions will report actual numbers for standard output measures in the Annual Report of Accomplishments and Results. The standard outputs for which you must continue to collect data are:

- Number of contacts
  - Direct Adult Contacts
  - Indirect Adult Contacts
  - Direct Youth Contacts
  - Indirect Youth Contact
- Number of patents submitted
- Number of peer reviewed publications

☑ Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(H). State Defined Outputs

1. Output Measure

- Number of Research Projects competed on Food and Nutrition.

☑ Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(I). State Defined Outcome

O. No	Outcome Name
1	Number of participants who learned about food and nutrition.
2	Number of participants who used knowledge/guidelines presented during food and nutrition sessions.
3	Number of participants who improve their lifestyles by following food and nutrition guidelines.

Outcome # 1

1. Outcome Target

Number of participants who learned about food and nutrition.

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 504 - Home and Commercial Food Service

4. Associated Institute Type(s)

- 1890 Extension

Outcome # 2

1. Outcome Target

Number of participants who used knowledge/guidelines presented during food and nutrition sessions.

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 504 - Home and Commercial Food Service

4. Associated Institute Type(s)

- 1890 Extension

Outcome # 3

1. Outcome Target

Number of participants who improve their lifestyles by following food and nutrition guidelines.

2. Outcome Type : Change in Condition Outcome Measure

3. Associated Knowledge Area(s)

- 504 - Home and Commercial Food Service

4. Associated Institute Type(s)

- 1890 Extension

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

- Government Regulations
- Competing Public priorities

Description

Updated government regulations could affect the nutritional guidelines and parameters set for this program.

V(K). Planned Program - Planned Evaluation Studies

Description of Planned Evaluation Studies

Participants will be tested for weight loss/gain and body mass index.

V(A). Planned Program (Summary)

Program # 24

1. Name of the Planned Program

Biotechnology (Langston University)

2. Brief summary about Planned Program

The genomic research component of this program is targeting peanut plant organs and seed genes for yield and nutritional quality improvement. The program is seeking to use biotechnology to produce edible peanuts that are high in nutritional quality and possibly void of the allergens that prevent many people from consuming peanuts or foods cooked in peanut oil.

3. Program existence : Intermediate (One to five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
201	Plant Genome, Genetics, and Genetic Mechanisms	0%	100%	0%	100%
	Total	0%	100%	0%	100%

V(C). Planned Program (Situation and Scope)

1. Situation and priorities

Peanuts are the most popular legume in the United States for human consumption. However, peanuts contain substances that are allergens for many people. These allergens can cause illness and in some cases are lethal.

2. Scope of the Program

- In-State Extension
- In-State Research

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

Fundng will remain constant or increase.

2. Ultimate goal(s) of this Program

To identify and separate plant genes that can be used to produce genetically superior peanuts and other cash crops.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2017	0.0	0.0	0.0	1.0
2018	0.0	0.0	0.0	1.0
2019	0.0	0.0	0.0	1.0
2020	0.0	0.0	0.0	1.0
2021	0.0	0.0	0.0	1.0

V(F). Planned Program (Activity)

1. Activity for the Program

Researchers will develop a local peanut nucleotide database and build a bioinformatics pipeline for peanut gene discovery.

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension

Direct Methods	Indirect Methods
● Education Class ● Workshop	● Web sites other than eXtension ● Other 1 ((Research papers))

3. Description of targeted audience

All peanut producers in Oklahoma

V(G). Planned Program (Outputs)

NIFA no longer requires you to report target numbers for standard output measures in the Plan of Work. However, all institutions will report actual numbers for standard output measures in the Annual Report of Accomplishments and Results. The standard outputs for which you must continue to collect data are:

- Number of contacts
  - Direct Adult Contacts
  - Indirect Adult Contacts
  - Direct Youth Contacts
  - Indirect Youth Contact
- Number of patents submitted
- Number of peer reviewed publications

☑ Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(H). State Defined Outputs

1. Output Measure

- Number of Research Projects completed on Biotechnology.

☑ Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(I). State Defined Outcome

O. No	Outcome Name
1	Number of farmers learning about the peanut nucelotide database.
2	Number of farmers using the peanut nucleotide database.
3	Farmers who use the peanut nucleotide database or new peanut gene discoveries to improve their peanut production system.

Outcome # 1

1. Outcome Target

Number of farmers learning about the peanut nucelotide database.

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 201 - Plant Genome, Genetics, and Genetic Mechanisms

4. Associated Institute Type(s)

- 1890 Extension
- 1890 Research

Outcome # 2

1. Outcome Target

Number of farmers using the peanut nucleotide database.

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 201 - Plant Genome, Genetics, and Genetic Mechanisms

4. Associated Institute Type(s)

- 1890 Extension
- 1890 Research

Outcome # 3

1. Outcome Target

Farmers who use the peanut nucleotide database or new peanut gene discoveries to improve their peanut production system.

2. Outcome Type : Change in Condition Outcome Measure

3. Associated Knowledge Area(s)

- 201 - Plant Genome, Genetics, and Genetic Mechanisms

4. Associated Institute Type(s)

- 1890 Extension
- 1890 Research

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

- Competing Public priorities

Description

If the public's view on biotechnology changes, funding levels may be affected.

V(K). Planned Program - Planned Evaluation Studies

Description of Planned Evaluation Studies

Developed peanut genetic lines will be monitored and tested for stability.

V(A). Planned Program (Summary)

Program # 25

1. Name of the Planned Program

Water Gardens (Aquaculture) (Langston University)

2. Brief summary about Planned Program

Some Oklahoma fish farmers are beginning to produce fish for the growing water garden industry. The activities occurring in this program will assist home water gardeners with management practices and also assist fish farmers in production and marketing of ornamental aquatic species.

3. Program existence : Mature (More then five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
401	Structures, Facilities, and General Purpose Farm Supplies	0%	100%	0%	100%
	Total	0%	100%	0%	100%

V(C). Planned Program (Situation and Scope)

1. Situation and priorities

Water gardens are rapidly increasing in popularity in Oklahoma. Homeowners have expressed frustration with their inability to solve water garden problems induced by system locations in combination with poor husbandry and poor hygiene.

2. Scope of the Program

- In-State Extension
- In-State Research

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

Funding will remain constant.

2. Ultimate goal(s) of this Program

Assist clientele in decreasing the operational costs of their water gardens.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2017	0.0	1.0	0.0	0.6
2018	0.0	1.0	0.0	0.5
2019	0.0	1.0	0.0	0.6
2020	0.0	1.0	0.0	0.6
2021	0.0	1.0	0.0	0.6

V(F). Planned Program (Activity)

1. Activity for the Program

Fish loading testing will be performed and fish loading modeling will be conducted. Nutrient uptake experiments will be conducted.

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension

Direct Methods	Indirect Methods
● Demonstrations ● Other 1 ((Field Days)	● Other 1 ((Fact Sheets)) ● Other 2 ((User Models))

3. Description of targeted audience

All aquaculture farmers in Oklahoma.

V(G). Planned Program (Outputs)

NIFA no longer requires you to report target numbers for standard output measures in the Plan of Work. However, all institutions will report actual numbers for standard output measures in the Annual Report of Accomplishments and Results. The standard outputs for which you must continue to collect data are:

- Number of contacts
  - Direct Adult Contacts
  - Indirect Adult Contacts
  - Direct Youth Contacts
  - Indirect Youth Contact
- Number of patents submitted
- Number of peer reviewed publications

☑ Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(H). State Defined Outputs

1. Output Measure

- Number of Research Projects completed on Water Gardens

☑ Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(I). State Defined Outcome

O. No	Outcome Name
1	Number of farmers learning water garden techniques.
2	Number of farmers using water garden techniques.
3	Farmers who improve the water quality of their water gardens and reduce operational costs.

Outcome # 1

1. Outcome Target

Number of farmers learning water garden techniques.

2. Outcome Type : Change in Condition Outcome Measure

3. Associated Knowledge Area(s)

- 401 - Structures, Facilities, and General Purpose Farm Supplies

4. Associated Institute Type(s)

- 1890 Extension
- 1890 Research

Outcome # 2

1. Outcome Target

Number of farmers using water garden techniques.

2. Outcome Type : Change in Condition Outcome Measure

3. Associated Knowledge Area(s)

- 401 - Structures, Facilities, and General Purpose Farm Supplies

4. Associated Institute Type(s)

- 1890 Extension
- 1890 Research

Outcome # 3

1. Outcome Target

Farmers who improve the water quality of their water gardens and reduce operational costs.

2. Outcome Type : Change in Condition Outcome Measure

3. Associated Knowledge Area(s)

- 401 - Structures, Facilities, and General Purpose Farm Supplies

4. Associated Institute Type(s)

- 1890 Extension
- 1890 Research

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

- Natural Disasters (drought, weather extremes, etc.)

Description

A prolonged drought may slow down the present growth in water garden construction in Oklahoma.

V(K). Planned Program - Planned Evaluation Studies

Description of Planned Evaluation Studies

A cost analysis will be performed to see if fish farmers have made profits with the sales of ornamental fish species.

V(A). Planned Program (Summary)

Program # 26

1. Name of the Planned Program

Alternative Species (Aquaculture) (Langston University)

2. Brief summary about Planned Program

Research with buffalo fish species under polyculture conditions will allow us to determine if we can sustainably and economically use buffalo fish to diversify fish operations. This research will benefit aquaculture producers in Oklahoma and the surrounding region.

3. Program existence : Mature (More then five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
307	Animal Management Systems	0%	100%	0%	100%
	Total	0%	100%	0%	100%

V(C). Planned Program (Situation and Scope)

1. Situation and priorities

Pressure on domestic fish markets by foreign imports and high fuel prices are forcing catfish farmers to curtail production or diversify with alternative fish species.

2. Scope of the Program

- In-State Extension
- In-State Research

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

Funding will remain constant.

2. Ultimate goal(s) of this Program

To establish sustainable alternative fish species for Oklahoma aquaculture producers.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2017	0.0	0.6	0.0	0.2
2018	0.0	0.6	0.0	0.2
2019	0.0	0.6	0.0	0.2
2020	0.0	0.6	0.0	0.2
2021	0.0	0.6	0.0	0.2

V(F). Planned Program (Activity)

1. Activity for the Program

Buffalo fish species will be tested for sustainability and profitability in Oklahoma.

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension

Direct Methods	Indirect Methods
• Other 1 ((Field Days)	• Other 1 ((Proceedings)) • Other 2 ((Fact Sheets))

3. Description of targeted audience

All aquaculture farmers in Oklahoma.

V(G). Planned Program (Outputs)

NIFA no longer requires you to report target numbers for standard output measures in the Plan of Work. However, all institutions will report actual numbers for standard output measures in the Annual Report of Accomplishments and Results. The standard outputs for which you must continue to collect data are:

- Number of contacts
  - Direct Adult Contacts
  - Indirect Adult Contacts
  - Direct Youth Contacts
  - Indirect Youth Contact
- Number of patents submitted
- Number of peer reviewed publications

☑ Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(H). State Defined Outputs

1. Output Measure

- Number of Research Projects completed on Alternative Species.

☑ Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(I). State Defined Outcome

O. No	Outcome Name
1	Number of farmers learning alternative fish species techniques.
2	Number of farmers using alternative fish species techniques.
3	Farmers who improved their yearly income by using alternative fish species.

Outcome # 1

1. Outcome Target

Number of farmers learning alternative fish species techniques.

2. Outcome Type : Change in Condition Outcome Measure

3. Associated Knowledge Area(s)

- 307 - Animal Management Systems

4. Associated Institute Type(s)

- 1890 Extension
- 1890 Research

Outcome # 2

1. Outcome Target

Number of farmers using alternative fish species techniques.

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 307 - Animal Management Systems

4. Associated Institute Type(s)

- 1890 Extension
- 1890 Research

Outcome # 3

1. Outcome Target

Farmers who improved their yearly income by using alternative fish species.

2. Outcome Type : Change in Condition Outcome Measure

3. Associated Knowledge Area(s)

- 307 - Animal Management Systems

4. Associated Institute Type(s)

- 1890 Extension
- 1890 Research

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

- Natural Disasters (drought, weather extremes, etc.)

Description

A prolonged drought may adversely affect fish production by producers.

V(K). Planned Program - Planned Evaluation Studies

Description of Planned Evaluation Studies

A cost analysis will be performed to see if diversifying fish production with alternative species is financially feasible.

V(A). Planned Program (Summary)

Program # 27

1. Name of the Planned Program

Fishery Management (Aquaculture) (Langston University)

2. Brief summary about Planned Program

Fishery management methods will be researched for ways to increase efficiency of fishery operations. This research will include efficiency management practices under such conditions as droughts, leaks and aquatic vegetation control.

3. Program existence : Mature (More then five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
307	Animal Management Systems	0%	100%	0%	100%
	Total	0%	100%	0%	100%

V(C). Planned Program (Situation and Scope)

1. Situation and priorities

Fishery management methods can add to or reduce production costs and affect the profitability of an operation. Proven, efficient management methods would help Oklahoma Fisheries operate more cost effectively.

2. Scope of the Program

- In-State Extension
- In-State Research

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

Funding will remain constant.

2. Ultimate goal(s) of this Program

To assist fish farmers in developing fishery management techniques that will reduce production costs,

sustain operations and increase profits.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2017	0.0	0.4	0.0	0.3
2018	0.0	0.4	0.0	0.3
2019	0.0	0.4	0.0	0.3
2020	0.0	0.4	0.0	0.3
2021	0.0	0.4	0.0	0.3

V(F). Planned Program (Activity)

1. Activity for the Program

Work will be performed in fishery management under such conditions as drought, aquatic vegetation infestation and pond leaks.

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension

Direct Methods	Indirect Methods
● Education Class ● Workshop ● Demonstrations ● Other 1 ((Field Days))	● Web sites other than eXtension ● Other 1 ((Fact Sheets)) ● Other 2 ((Proceedings and CD's))

3. Description of targeted audience

All aquaculture farmers in Oklahoma.

V(G). Planned Program (Outputs)

NIFA no longer requires you to report target numbers for standard output measures in the Plan of Work. However, all institutions will report actual numbers for standard output measures in the Annual Report of Accomplishments and Results. The standard outputs for which you must continue to collect data are:

- Number of contacts
  - Direct Adult Contacts
  - Indirect Adult Contacts
  - Direct Youth Contacts
  - Indirect Youth Contact
- Number of patents submitted
- Number of peer reviewed publications

☑ Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(H). State Defined Outputs

1. Output Measure

- Number of Research Projects completed on Fishery Management.

☑ Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(I). State Defined Outcome

O. No	Outcome Name
1	Number of farmers learning new fishery management techniques.
2	Number of farmers using new fishery management techniques.
3	Farmers who have improved their production efficiency and raised their profits with the new fishery management techniques.

Outcome # 1

1. Outcome Target

Number of farmers learning new fishery management techniques.

2. Outcome Type : Change in Condition Outcome Measure

3. Associated Knowledge Area(s)

- 307 - Animal Management Systems

4. Associated Institute Type(s)

- 1890 Extension

Outcome # 2

1. Outcome Target

Number of farmers using new fishery management techniques.

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 307 - Animal Management Systems

4. Associated Institute Type(s)

- 1890 Extension

Outcome # 3

1. Outcome Target

Farmers who have improved their production efficiency and raised their profits with the new fishery management techniques.

2. Outcome Type : Change in Condition Outcome Measure

3. Associated Knowledge Area(s)

- 307 - Animal Management Systems

4. Associated Institute Type(s)

- 1890 Extension

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

- Natural Disasters (drought, weather extremes, etc.)

Description

Prolonged drought may adversely affect fish production.

V(K). Planned Program - Planned Evaluation Studies

Description of Planned Evaluation Studies

Cost analyses will be used to determine if fish management techniques resulted in increased income for producers.

V(A). Planned Program (Summary)

Program # 28

1. Name of the Planned Program

Sustainable Internal Parasite Control for Small Ruminants (Langston University)

2. Brief summary about Planned Program

The rapidly increasing number of goats in the United State has led to a growing importance of goat production and goat products to United States agriculture. Goat production is an important component of the farming systems of many small farms , resource-poor farmers and farm families. The main objectives of this program are: (1) To develop enhanced goat production technologies that allow goat farmers to produce wholesome products in demand by the consumer through increased productivity and cost efficiency; and (2) To transfer those technologies to farmers through a variety of extension avenues.

3. Program existence : Intermediate (One to five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
313	Internal Parasites in Animals	0%	100%	0%	100%
	Total	0%	100%	0%	100%

V(C). Planned Program (Situation and Scope)

1. Situation and priorities

This program is needed to address factors impacting the level of goat production and efficiency of goat production systems, nutrition, management, health, and product utilization including meat and milk. This program is expected to make discoveries that will positively impact producers and consumers.

2. Scope of the Program

- In-State Extension
- In-State Research

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

Funding will remain constant.

2. Ultimate goal(s) of this Program

To contain or eradicate internal parasites in goats.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2017	0.0	0.2	0.0	0.1
2018	0.0	0.2	0.0	0.1
2019	0.0	0.2	0.0	0.1
2020	0.0	0.2	0.0	0.1
2021	0.0	0.2	0.0	0.1

V(F). Planned Program (Activity)

1. Activity for the Program

Work will be performed to discover effective internal parasite control methods for goats.

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension

Direct Methods	Indirect Methods
● Education Class ● Workshop ● Demonstrations ● Other 1 ((Field Days))	● Newsletters ● Web sites other than eXtension ● Other 1 ((Proceedings))

3. Description of targeted audience

All goat producers in Oklahoma.

V(G). Planned Program (Outputs)

NIFA no longer requires you to report target numbers for standard output measures in the Plan of Work. However, all institutions will report actual numbers for standard output measures in the Annual Report of Accomplishments and Results. The standard outputs for which you must continue to collect data are:

- Number of contacts
  - Direct Adult Contacts
  - Indirect Adult Contacts
  - Direct Youth Contacts
  - Indirect Youth Contact
- Number of patents submitted
- Number of peer reviewed publications

☑ Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(H). State Defined Outputs

1. Output Measure

- Number of Research Projects completed on sustainable internal parasite control.

☑ Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(I). State Defined Outcome

O. No	Outcome Name
1	Number of goat producers learning internal parasite control techniques.
2	Number of goat producers using internal parasite control techniques.
3	Goat producers who have gotten internal parasites under control by using the learned control techniques.

Outcome # 1

1. Outcome Target

Number of goat producers learning internal parasite control techniques.

2. Outcome Type : Change in Condition Outcome Measure

3. Associated Knowledge Area(s)

- 313 - Internal Parasites in Animals

4. Associated Institute Type(s)

- 1890 Extension
- 1890 Research

Outcome # 2

1. Outcome Target

Number of goat producers using internal parasite control techniques.

2. Outcome Type : Change in Condition Outcome Measure

3. Associated Knowledge Area(s)

- 313 - Internal Parasites in Animals

4. Associated Institute Type(s)

- 1890 Extension
- 1890 Research

Outcome # 3

1. Outcome Target

Goat producers who have gotten internal parasites under control by using the learned control techniques.

2. Outcome Type : Change in Condition Outcome Measure

3. Associated Knowledge Area(s)

- 313 - Internal Parasites in Animals

4. Associated Institute Type(s)

- 1890 Extension
- 1890 Research

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

- Natural Disasters (drought, weather extremes, etc.)

Description

Unforeseen disease or insect infestations could adversely affect goat production and outcomes.

V(K). Planned Program - Planned Evaluation Studies

Description of Planned Evaluation Studies

Use of proposed internal parasite control method will be compared to methods presently in use by goat producers. Effectiveness of methods will be compared.

V(A). Planned Program (Summary)

Program # 29

1. Name of the Planned Program

Goat Internet Website (Langston University)

2. Brief summary about Planned Program

The rapidly increasing number of goats in the United States has led to a growing importance of goat production and goat products to United States agriculture. Goat production is an important component of the farming systems of many small, resource-poor farmers and farm families. The main objectives of this program are: (1) To develop enhanced goat production technologies that allow goat farmers to produce wholesome products in demand by the consumer through increased productivity and cost efficiency; and (2) To transfer those technologies to farmers through a variety of extension avenues.

3. Program existence : Intermediate (One to five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
903	Communication, Education, and Information Delivery	0%	100%	0%	100%
	Total	0%	100%	0%	100%

V(C). Planned Program (Situation and Scope)

1. Situation and priorities

This program is needed to address factors impacting the level of goat production and efficiency of goat production systems, nutrition, management, health, and product utilization including meat and milk. This program is expected to provide online training that will positively impact producers and consumers.

2. Scope of the Program

- In-State Extension
- In-State Research

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

Funding will remain constant.

2. Ultimate goal(s) of this Program

To make our website a one-stop shop for goat information and ordering goat foods and products.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2017	0.0	0.2	0.0	0.1
2018	0.0	0.2	0.0	0.1
2019	0.0	0.2	0.0	0.1
2020	0.0	0.2	0.0	0.1
2021	0.0	0.2	0.0	0.1

V(F). Planned Program (Activity)

1. Activity for the Program

The Langston University goat internet website provides quality information for goat producers. This website will continue to be updated with viable information and expanded.

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension

Direct Methods	Indirect Methods
● Workshop ● Demonstrations ● Other 1 ((Field Days)	● Web sites other than eXtension

3. Description of targeted audience

All goat producers in Oklahoma.

V(G). Planned Program (Outputs)

NIFA no longer requires you to report target numbers for standard output measures in the Plan of Work. However, all institutions will report actual numbers for standard output measures in the Annual Report of Accomplishments and Results. The standard outputs for which you must continue to collect data are:

- Number of contacts
  - Direct Adult Contacts
  - Indirect Adult Contacts
  - Direct Youth Contacts
  - Indirect Youth Contact
- Number of patents submitted
- Number of peer reviewed publications

☐ Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(H). State Defined Outputs

1. Output Measure

- Number of Research Projects completed on Goat Internet Website.

☐ Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(I). State Defined Outcome

O. No	Outcome Name
1	Number of goat producers learning about information found on the goat internet website.
2	Number of goat producers using the goat internet website.
3	Goat producers who improved their operations with information from the goat internet website.

Outcome # 1

1. Outcome Target

Number of goat producers learning about information found on the goat internet website.

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 903 - Communication, Education, and Information Delivery

4. Associated Institute Type(s)

- 1890 Extension
- 1890 Research

Outcome # 2

1. Outcome Target

Number of goat producers using the goat internet website.

2. Outcome Type : Change in Condition Outcome Measure

3. Associated Knowledge Area(s)

- 903 - Communication, Education, and Information Delivery

4. Associated Institute Type(s)

- 1890 Extension
- 1890 Research

Outcome # 3

1. Outcome Target

Goat producers who improved their operations with information from the goat internet website.

2. Outcome Type : Change in Condition Outcome Measure

3. Associated Knowledge Area(s)

- 903 - Communication, Education, and Information Delivery

4. Associated Institute Type(s)

- 1890 Extension
- 1890 Research

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

- Natural Disasters (drought, weather extremes, etc.)

Description

Unforeseen disease or insect infestations could adversely affect outcomes.

V(K). Planned Program - Planned Evaluation Studies

Description of Planned Evaluation Studies

Number of hits on the web site will be noted for usage of website. Surveys will be used to determine effectiveness of the website.

V(A). Planned Program (Summary)

Program # 30

1. Name of the Planned Program

Development of New Dairy Goat Products (Langston University)

2. Brief summary about Planned Program

The rapidly increasing number of goats in the United States has led to a growing importance of goat production and goat products to United States agriculture. Goat production is an important component of the farming systems of many small, resource-poor farmers and farm families. The main objectives of this program are: (1) To develop enhanced goat production technologies that allow goat farmers to produce wholesome products in demand by the consumer through increased productivity and cost efficiency; and (2) To transfer those technologies to farmers through a variety of extension avenues.

3. Program existence : Mature (More then five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
502	New and Improved Food Products	0%	100%	0%	100%
	Total	0%	100%	0%	100%

V(C). Planned Program (Situation and Scope)

1. Situation and priorities

This program is needed to address factors impacting the level of goat production and efficiency of goat production systems, nutrition, management, health, and product utilization including meat and milk. This program is expected to make discoveries that will positively impact producers and consumers.

2. Scope of the Program

- In-State Extension
- In-State Research

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

Funding will remain constant.

2. Ultimate goal(s) of this Program

Assisting goat producers in becoming successful entrepreneurs of food and non-food goat products.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2017	0.0	0.3	0.0	0.3
2018	0.0	0.3	0.0	0.3
2019	0.0	0.3	0.0	0.3
2020	0.0	0.3	0.0	0.3
2021	0.0	0.3	0.0	0.3

V(F). Planned Program (Activity)

1. Activity for the Program

Work will be performed to develop new dairy goat products and create new opportunities for goat producers.

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension

Direct Methods	Indirect Methods
● Education Class ● Workshop ● Demonstrations ● Other 1 ((Field Days)	● Newsletters ● Web sites other than eXtension ● Other 1 ((Proceedings))

3. Description of targeted audience

All goat producers in Oklahoma.

V(G). Planned Program (Outputs)

NIFA no longer requires you to report target numbers for standard output measures in the Plan of Work. However, all institutions will report actual numbers for standard output measures in the Annual Report of Accomplishments and Results. The standard outputs for which you must continue to collect data are:

- Number of contacts
  - Direct Adult Contacts
  - Indirect Adult Contacts
  - Direct Youth Contacts
  - Indirect Youth Contact
- Number of patents submitted
- Number of peer reviewed publications

☑ Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(H). State Defined Outputs

1. Output Measure

- Number of Research projects completed on Development of New Dairy Goat Products

☑ Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(I). State Defined Outcome

O. No	Outcome Name
1	Number of goat producers learning about techniques for developing new dairy goat products.
2	Number of goat producers using techniques for developing new dairy goat products.
3	Goat producers developing increasing yearly income from new dairy goat products.

Outcome # 1

1. Outcome Target

Number of goat producers learning about techniques for developing new dairy goat products.

2. Outcome Type : Change in Condition Outcome Measure

3. Associated Knowledge Area(s)

- 502 - New and Improved Food Products

4. Associated Institute Type(s)

- 1890 Extension

Outcome # 2

1. Outcome Target

Number of goat producers using techniques for developing new dairy goat products.

2. Outcome Type : Change in Condition Outcome Measure

3. Associated Knowledge Area(s)

- 502 - New and Improved Food Products

4. Associated Institute Type(s)

- 1890 Extension

Outcome # 3

1. Outcome Target

Goat producers developing increasing yearly income from new dairy goat products.

2. Outcome Type : Change in Condition Outcome Measure

3. Associated Knowledge Area(s)

- 502 - New and Improved Food Products

4. Associated Institute Type(s)

- 1890 Extension

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

- Natural Disasters (drought, weather extremes, etc.)

Description

Unforeseen disease or insect infestations could adversely affect goat production.

V(K). Planned Program - Planned Evaluation Studies

Description of Planned Evaluation Studies

A cost analysis will be performed to see if new goat products have led to increased income for producers.

V(A). Planned Program (Summary)

Program # 31

1. Name of the Planned Program

Demonstration Clinic: Artificial Insemination for Goats (Langston University)

2. Brief summary about Planned Program

The rapidly increasing number of goats in the United States has led to a growing importance of goat production and goat products to United States agriculture. Goat production is an important component of the farming systems of many small, resource-poor farmers and farm families. The main objectives of this program are: (1) To develop enhanced goat production technologies that allow goat farmers to produce wholesome products in demand by the consumer through increased productivity and cost efficiency;and (2) To transfer those technologies to farmers through a variety of extension avenues.

3. Program existence : Mature (More then five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : No

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
301	Reproductive Performance of Animals	0%	100%	0%	100%
	Total	0%	100%	0%	100%

V(C). Planned Program (Situation and Scope)

1. Situation and priorities

This program is needed to address factors impacting the level of goat production and efficiency of goat production systems, nutrition, management, health, and product utilization including meat and milk. This program is expected to make discoveries that will positively impact producers and consumers.

2. Scope of the Program

- In-State Extension
- In-State Research

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

Funding will remain constant.

2. Ultimate goal(s) of this Program

Goat producers (regardless of farm size) will have ready access to genetically superior sires for herd improvement.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2017	0.0	0.1	0.0	0.0
2018	0.0	0.1	0.0	0.0
2019	0.0	0.1	0.0	0.0
2020	0.0	0.1	0.0	0.0
2021	0.0	0.1	0.0	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

Hands-on artifical insemination (AI) workshops will be conducted to teach AI techniques to goat producers. These AI skills will allow goat producers to gain access to genetically superior sires for herd improvement.

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension

Direct Methods	Indirect Methods
● Education Class ● Workshop ● Demonstrations ● Other 1 ((Field Days))	● Newsletters ● Web sites other than eXtension ● Other 1 ((Fact Sheets))

3. Description of targeted audience

All goat producers in Oklahoma.

V(G). Planned Program (Outputs)

NIFA no longer requires you to report target numbers for standard output measures in the Plan of Work. However, all institutions will report actual numbers for standard output measures in the Annual Report of Accomplishments and Results. The standard outputs for which you must continue to collect data are:

- Number of contacts
  - Direct Adult Contacts
  - Indirect Adult Contacts
  - Direct Youth Contacts
  - Indirect Youth Contact
- Number of patents submitted
- Number of peer reviewed publications

☑ Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(H). State Defined Outputs

1. Output Measure

- Number of Research projects completed on Demonstration Clinic: Artificial Insemination for Goats

☑ Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(I). State Defined Outcome

O. No	Outcome Name
1	Number of goat producers learning about artificial insemination techniques.
2	Number of goat producers using artificial insemination techniques.
3	Goat producers who improved their herds by using artificial insemination techniques.

Outcome # 1

1. Outcome Target

Number of goat producers learning about artificial insemination techniques.

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 301 - Reproductive Performance of Animals

4. Associated Institute Type(s)

- 1890 Extension
- 1890 Research

Outcome # 2

1. Outcome Target

Number of goat producers using artificial insemination techniques.

2. Outcome Type : Change in Condition Outcome Measure

3. Associated Knowledge Area(s)

- 301 - Reproductive Performance of Animals

4. Associated Institute Type(s)

- 1890 Extension
- 1890 Research

Outcome # 3

1. Outcome Target

Goat producers who improved their herds by using artificial insemination techniques.

2. Outcome Type : Change in Condition Outcome Measure

3. Associated Knowledge Area(s)

- 301 - Reproductive Performance of Animals

4. Associated Institute Type(s)

- 1890 Extension
- 1890 Research

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

- Natural Disasters (drought, weather extremes, etc.)

Description

Unforeseen disease/insect infestations could affect outcomes.

V(K). Planned Program - Planned Evaluation Studies

Description of Planned Evaluation Studies

Surveys will be used to determine satisfaction of producers who use techniques learned in the demonstration clinics.

V(A). Planned Program (Summary)

Program # 32

1. Name of the Planned Program

Fish Marketing (Aquaculture) (Langston University)

2. Brief summary about Planned Program

This program will explore the development of additional aquaculture fishery products and markets based upon using normally underused native fishes. This research will benefit aquaculture product consumers and provide additional income stability for aquaculture producers.

3. Program existence : Intermediate (One to five years)

4. Program duration : Medium Term (One to five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
601	Economics of Agricultural Production and Farm Management	0%	100%	0%	100%
	Total	0%	100%	0%	100%

V(C). Planned Program (Situation and Scope)

1. Situation and priorities

FDA/EPA has issued advisories regarding frequency and amount of seafood consumption due to high methyl mercury concentration in wild freshwater and marine fish species. This may provide an opportunity for aquaculture producers to develop and market domestic alternative products.

2. Scope of the Program

- In-State Extension
- In-State Research

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

Funding will remain constant.

2. Ultimate goal(s) of this Program

To help aquaculture producers establish more profitable fish marketing methods with alternative fish species

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2017	0.0	0.4	0.0	0.2
2018	0.0	0.4	0.0	0.2
2019	0.0	0.4	0.0	0.2
2020	0.0	0.4	0.0	0.2
2021	0.0	0.4	0.0	0.2

V(F). Planned Program (Activity)

1. Activity for the Program

Methods of marketing alternative fish species will be explored to increase fish producers' profits.

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension

Direct Methods	Indirect Methods
● Education Class ● Workshop ● Other 1 ((Field Days)	● Newsletters ● Other 1 ((Fact Sheets))

3. Description of targeted audience

All aquaculture producers in Oklahoma

V(G). Planned Program (Outputs)

NIFA no longer requires you to report target numbers for standard output measures in the Plan of Work. However, all institutions will report actual numbers for standard output measures in the Annual Report of Accomplishments and Results. The standard outputs for which you must continue to collect data are:

- Number of contacts
  - Direct Adult Contacts
  - Indirect Adult Contacts
  - Direct Youth Contacts
  - Indirect Youth Contact
- Number of patents submitted
- Number of peer reviewed publications

☑ Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(H). State Defined Outputs

1. Output Measure

- Number of Research Projects completed on Fish Marketing.

☑ Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(I). State Defined Outcome

O. No	Outcome Name
1	Number of farmers learning new fish marketing techniques.
2	Number of farmers using new fish marketing techniques.
3	Farmers who use new fish marketing techniques to increase their profits.

Outcome # 1

1. Outcome Target

Number of farmers learning new fish marketing techniques.

2. Outcome Type : Change in Condition Outcome Measure

3. Associated Knowledge Area(s)

- 601 - Economics of Agricultural Production and Farm Management

4. Associated Institute Type(s)

- 1890 Extension
- 1890 Research

Outcome # 2

1. Outcome Target

Number of farmers using new fish marketing techniques.

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 601 - Economics of Agricultural Production and Farm Management

4. Associated Institute Type(s)

- 1890 Extension
- 1890 Research

Outcome # 3

1. Outcome Target

Farmers who use new fish marketing techniques to increase their profits.

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 601 - Economics of Agricultural Production and Farm Management

4. Associated Institute Type(s)

- 1890 Extension
- 1890 Research

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

- Natural Disasters (drought, weather extremes, etc.)

Description

A prolonged drought may adversely affect fish production by producers.

V(K). Planned Program - Planned Evaluation Studies

Description of Planned Evaluation Studies

Production and sales of buffalo fishes will be monitored at multiple points during the project.

V(A). Planned Program (Summary)

Program # 33

1. Name of the Planned Program

Meat Buck Performance Test (Langston University)

2. Brief summary about Planned Program

The rapidly increasing number of goats in the United States has led to a growing importance of goat production and goat products to United States agriculture. Goat production is an important component of the farming systems of many small, resource-poor farmers and farm families. The main objectives of this program are: (1) To develop enhanced goat production technologies that allow goat farmers to produce wholesome products in demand by the consumer through increased productivity and cost efficiency; and (2) To transfer those technologies to farmers through a variety of extension avenues.

3. Program existence : Mature (More then five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : No

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
303	Genetic Improvement of Animals	0%	100%	0%	100%
	Total	0%	100%	0%	100%

V(C). Planned Program (Situation and Scope)

1. Situation and priorities

This program is needed to address factors impacting the level of goat production and efficiency of goat production systems, nutrition, management, health and product utilization including meat.This program is expected to make discoveries that will positively impact producers and consumers.

2. Scope of the Program

- In-State Extension
- In-State Research

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

Funding will remain constant.

2. Ultimate goal(s) of this Program

Goat producers' herds will produce such high quality animals until meat buck performance testing is no longer needed.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2017	0.0	0.2	0.0	0.1
2018	0.0	0.2	0.0	0.1
2019	0.0	0.2	0.0	0.1
2020	0.0	0.2	0.0	0.1
2021	0.0	0.2	0.0	0.1

V(F). Planned Program (Activity)

1. Activity for the Program

Extension personnel will conduct the annual meat goat performance test for young, growing meat bucks to evaluate growth and feed efficiency.

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension

Direct Methods	Indirect Methods
● Workshop ● Other 1 ((Seminars)) ● Other 2 ((Field Days))	● Newsletters ● Web sites other than eXtension

3. Description of targeted audience

All goat producers in Oklahoma.

V(G). Planned Program (Outputs)

NIFA no longer requires you to report target numbers for standard output measures in the Plan of Work. However, all institutions will report actual numbers for standard output measures in the Annual Report of Accomplishments and Results. The standard outputs for which you must continue to collect data are:

- Number of contacts
  - Direct Adult Contacts
  - Indirect Adult Contacts
  - Direct Youth Contacts
  - Indirect Youth Contact
- Number of patents submitted
- Number of peer reviewed publications

☑ Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(H). State Defined Outputs

1. Output Measure

- Number of Research Projects completed on Meat Buck Performance Test.

☑ Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(I). State Defined Outcome

O. No	Outcome Name
1	Number of goat producers learning about the meat buck performance test.
2	Number of goat producers using the meat goat performance test.
3	Goat producers who improve their herds via the meat buck performance test.

Outcome # 1

1. Outcome Target

Number of goat producers learning about the meat buck performance test.

2. Outcome Type : Change in Condition Outcome Measure

3. Associated Knowledge Area(s)

- 303 - Genetic Improvement of Animals

4. Associated Institute Type(s)

- 1890 Extension

Outcome # 2

1. Outcome Target

Number of goat producers using the meat goat performance test.

2. Outcome Type : Change in Condition Outcome Measure

3. Associated Knowledge Area(s)

- 303 - Genetic Improvement of Animals

4. Associated Institute Type(s)

- 1890 Extension

Outcome # 3

1. Outcome Target

Goat producers who improve their herds via the meat buck performance test.

2. Outcome Type : Change in Condition Outcome Measure

3. Associated Knowledge Area(s)

- 303 - Genetic Improvement of Animals

4. Associated Institute Type(s)

- 1890 Extension

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

- Natural Disasters (drought, weather extremes, etc.)

Description

Unforeseen disease/insect infestation could affect outcomes.

V(K). Planned Program - Planned Evaluation Studies

Description of Planned Evaluation Studies

Surveys will be used to determine satisfaction of producers who enroll animals in the meat buck performance test.

V(A). Planned Program (Summary)

Program # 34

1. Name of the Planned Program

Goat Dairy Herd Improvement (DHI) Laboratory (Langston University)

2. Brief summary about Planned Program

The rapidly increasing number of goats in the United States has led to a growing importance of goat production and goat products to United States agriculture. Goat production is an important component of the farming systems of many small, resource-poor farmers and farm families. The main objectives of this program are: (1) To develop enhanced goat production technologies that allow goat farmers to produce wholesome products in demand by the consumer through increased productivity and cost efficiency; and (2) To transfer those technologies to farmers through a variety of extension avenues.

3. Program existence : Mature (More then five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
308	Improved Animal Products (Before Harvest)	0%	100%	0%	100%
	Total	0%	100%	0%	100%

V(C). Planned Program (Situation and Scope)

1. Situation and priorities

This program is needed to address factors impacting the level of goat production and efficiency of goat production systems, nutrition, management, health, and product utilization including meat and milk. This program is expected to make discoveries that will positively impact producers and consumers.

2. Scope of the Program

- In-State Extension
- In-State Research

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

Funding will remain constant.

2. Ultimate goal(s) of this Program

Goat producers' herds will produce such high quality milk until goat dairy herd improvement milk testing is no longer needed.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2017	0.0	0.2	0.0	1.3
2018	0.0	0.2	0.0	1.3
2019	0.0	0.2	0.0	1.3
2020	0.0	0.2	0.0	1.3
2021	0.0	0.2	0.0	1.3

V(F). Planned Program (Activity)

1. Activity for the Program

Extension personnel will conduct goat milk quality tests in the Langston University Goat Dairy Herd Improvement Laboratory.

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension

Direct Methods	Indirect Methods
● Workshop ● Other 1 ((Field Days) ● Other 2 ((Seminars))	● Newsletters ● Web sites other than eXtension

3. Description of targeted audience

All goat producers in Oklahoma.

V(G). Planned Program (Outputs)

NIFA no longer requires you to report target numbers for standard output measures in the Plan of Work. However, all institutions will report actual numbers for standard output measures in the Annual Report of Accomplishments and Results. The standard outputs for which you must continue to collect data are:

- Number of contacts
  - Direct Adult Contacts
  - Indirect Adult Contacts
  - Direct Youth Contacts
  - Indirect Youth Contact
- Number of patents submitted
- Number of peer reviewed publications

☑ Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(H). State Defined Outputs

1. Output Measure

- Number of Research Projects completed on Goat Dairy Herd Improvement (DHI) Laboratory.

☑ Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(I). State Defined Outcome

O. No	Outcome Name
1	Number of goat producers who learned about the Goat Dairy Herd Improvement Laboratory.
2	Number of goat producers who are using the Goat Dairy Herd Improvement Laboratory.
3	Goat producers who have increased their production profits by utilizing the Goat Dairy Herd Improvement Laboratory.

Outcome # 1

1. Outcome Target

Number of goat producers who learned about the Goat Dairy Herd Improvement Laboratory.

2. Outcome Type : Change in Condition Outcome Measure

3. Associated Knowledge Area(s)

- 308 - Improved Animal Products (Before Harvest)

4. Associated Institute Type(s)

- 1890 Extension
- 1890 Research

Outcome # 2

1. Outcome Target

Number of goat producers who are using the Goat Dairy Herd Improvement Laboratory.

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 308 - Improved Animal Products (Before Harvest)

4. Associated Institute Type(s)

- 1890 Extension
- 1890 Research

Outcome # 3

1. Outcome Target

Goat producers who have increased their production profits by utilizing the Goat Dairy Herd Improvement Laboratory.

2. Outcome Type : Change in Condition Outcome Measure

3. Associated Knowledge Area(s)

- 308 - Improved Animal Products (Before Harvest)

4. Associated Institute Type(s)

- 1890 Extension
- 1890 Research

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

- Natural Disasters (drought, weather extremes, etc.)

Description

Unforeseen disease/insect infestation could affect outcomes.

V(K). Planned Program - Planned Evaluation Studies

Description of Planned Evaluation Studies

Surveys will be used to determine the satisfaction of producers who use our Goat Dairy Herd Improvement Laboratory.

V(A). Planned Program (Summary)

Program # 35

1. Name of the Planned Program

Water, Weather, and Climate

2. Brief summary about Planned Program

An ever-widening imbalance in the supply and demand of water will dramatically impact the future of agricultural production and community development in Oklahoma. While water demands rise statewide, water supply will increasingly come under pressure, particularly in areas of high demand such as the Oklahoma Panhandle and urban residential areas. Surface and groundwater level declines, resulting from withdrawals for irrigation that cannot be recharged through precipitation, are a growing concern. Innovative approaches are needed to develop and deploy efficient and sustainable livestock and crop production systems under the projected limited-water environments of the future. A shift to more reliance on rain-fed systems, coupled with new and improved technologies to maximize production per inch of precipitation, will shape research, Extension and teaching efforts of the future.
Capturing, conserving and recycling water from a variety of sources for use in livestock and crop production will supplement rainfall, where appropriate. The quality of water moving through Oklahoma agricultural systems and urban developments will be impacted. Creative technologies developed to enhance water quality in agriculture and natural resource settings will be adaptable for many industrial and municipal water system uses.
Oklahoma has always suffered from extremes in weather, resulting in increased risks to human safety, agricultural production, and shifts in natural communities of plants and animals. The recent increased number and severity of floods, droughts, extreme high and low temperatures, storms and wildfires in Oklahoma are similar to recent increased variability in climatic conditions worldwide. These changing conditions 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.
Current management strategies for agricultural production, natural resources and human shelter will have to be modified to meet the challenges of the increased variability and extremes in weather. Research, Extension and teaching efforts will likely impact plant and animal breeding, new crops, irrigation management and technology, cropping systems, animal and human housing design and technology, long and short-term weather forecasting, pest management, restoration practices and natural resource sustainability.

3. Program existence : Mature (More then five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : No

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
102	Soil, Plant, Water, Nutrient Relationships	5%	0%	0%	0%
111	Conservation and Efficient Use of Water	20%	0%	0%	0%
112	Watershed Protection and Management	20%	0%	0%	0%
132	Weather and Climate	30%	0%	0%	0%
403	Waste Disposal, Recycling, and Reuse	5%	0%	0%	0%
405	Drainage and Irrigation Systems and Facilities	20%	0%	0%	0%
	Total	100%	0%	0%	0%

V(C). Planned Program (Situation and Scope)

1. Situation and priorities

The Water, Weather and Climate team will provide research based information to fulfill the needs of Oklahoma agricultural producers, policy makers, and the general public as the demand for water increases from multiple users and interest groups. Water shortages in Oklahoma and the Southern Great Plains have become a major limitation for crop production and other water uses, which will have a major impact on local economies. Rising input costs for crop and animal production has stimulated new interest in water conservation measures that include improved soil management practices, irrigation methods and efficiency on farm water storage, transport of water, and overall economic assessment of agricultural enterprises to manage existing water supplies more prudently. Development of management practices to use municipal wastewater effluent and other alternative water supplies in agricultural production and urban water systems is underway.
Oklahoma is unique in having the Oklahoma Mesonet, one of the most data rich, large-scale weather networks in the US and worldwide. Data from its 120 stations are used directly to monitor Oklahoma's highly variable environment and provide the foundation for decision support models. The Oklahoma Mesonet's statewide network of soil moisture sensors has been used to create new drought monitoring tools. This has created a unique opportunity to monitor and contrast conditions across Oklahoma's highly variable ecosystems and crop environments.

2. Scope of the Program

- In-State Extension
- In-State Research
- Integrated Research and Extension

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

• Increased communication among researchers, educators, and Extension educators involved in water, weather and climate will lead to increases in productivity and effectiveness of programs
• Stakeholders will be active participants in program development and implementation
• Successful extramural funding will allow our faculty to continue to recruit graduate students and post-doctoral researchers to play critical roles in carrying out research projects
• Federal and state agencies will continue to fund conservation-related landowner incentive programs, and landowners will continue to enroll in those programs

2. Ultimate goal(s) of this Program

The team will foster, facilitate, and conduct programs to sustain and enhance water resources for agriculture's beneficial use in Oklahoma and the Southern Great Plains region. The team will enhance development, delivery, and accessibility of science-based information related to water management issues associated with increasing cost of water, management practices to use municipal wastewater and wastewater effluent, extreme weather--drought and flood, production and economic response to weather and climate, relationship between land use and water quality, economic assessment of agricultural enterprises, and water reuse of alternative water supplies.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2017	4.0	0.0	2.0	0.0
2018	4.0	0.0	2.0	0.0
2019	4.0	0.0	2.0	0.0
2020	4.0	0.0	2.0	0.0
2021	4.0	0.0	2.0	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

• Submit grant proposals and conduct research that addresses priorities
• Forge collaborative relationships that build on current strengths in research and management.
• Partner with state and federal agencies to address pressing needs in water, weather, and climate.
• Produce scientific publications and disseminate information through print and on-line media outlets.
• Conduct workshops, field days, and other personal information exchanges to promote issues and alternatives in water, weather, and climate.
• Understand water use and quantify available water supplies in both surface water and groundwater resources throughout the state.
• Conduct research and extension programming on efficient use of water for agricultural and urban irrigation and water conservation practices;
• Understand mechanisms and best practices for controlling the fate and transport of sediment, nutrients, pesticides, and bacteria/viruses, and emerging contaminants in surface water and groundwater systems.

• Develop water use/demand, management, and water policy strategies to address the competing interests of rural and urban sectors, surface water and groundwater use and ownership, conservation, pollution control, and water supply development.

• Enhance ecosystem management through a better understanding of weather and climate impacts on the environment, landscape, and organisms.

• Provide agriculture and natural resource management technical expertise for weather and climate data and models maintained and operated by the Oklahoma Mesonet

• Conduct and deliver weather and climate information for the general public, agriculture, and natural resource sectors through OSU SUNUP TV, online video/audio tutorials, fact sheets, e-mail newsletters, educational programs, seminars and workshops

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension

Direct Methods	Indirect Methods
● Education Class ● Workshop ● One-on-One Intervention ● Demonstrations	● Newsletters ● TV Media Programs ● Web sites other than eXtension

3. Description of targeted audience

Water managers, state water agencies, federal water agencies, irrigation districts and irrigators, policy makers, urban homeowners, and K-12 students

V(G). Planned Program (Outputs)

NIFA no longer requires you to report target numbers for standard output measures in the Plan of Work. However, all institutions will report actual numbers for standard output measures in the Annual Report of Accomplishments and Results. The standard outputs for which you must continue to collect data are:

- Number of contacts
  - Direct Adult Contacts
  - Indirect Adult Contacts
  - Direct Youth Contacts
  - Indirect Youth Contact
- Number of patents submitted
- Number of peer reviewed publications

☑ Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(H). State Defined Outputs

1. Output Measure

- Grant proposals written and submitted
- Conferences, workshops, and training sessions
- Research reports
- Extension fact sheets and other media
- Water, climate, and weather-based agricultural decision support tools

☑ Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(I). State Defined Outcome

O. No	Outcome Name
1	Number of users assessing websites and social media designed to deliver information about water quantity, water quality, education, policy, conservation, and efficient use
2	Number of downloads of videos, Extension fact sheets, Extension highlights, and related educational materials
3	Access by users of the Oklahoma Mesonet computer and mobile device weather and climate data and tools
4	Determination of the energy and water efficiency of current irrigation systems in western Oklahoma
5	Determination of groundwater recharge rates throughout the state of Oklahoma using data from the Oklahoma Mesonet
6	Comparison of grain sorghum and corn productivity under limited irrigation with subsurface drip irrigation
7	Quantification and development of modeling tools for simulating sediment and phosphorus loading rates from streambanks to sensitive streams in Oklahoma and quantification of the benefit of riparian conservation practices
8	Development and pilot-testing of an onsite wastewater training curriculum and establishment of an onsite wastewater training and demonstration facility

Outcome # 1

1. Outcome Target

Number of users assessing websites and social media designed to deliver information about water quantity, water quality, education, policy, conservation, and efficient use

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 405 - Drainage and Irrigation Systems and Facilities
- 112 - Watershed Protection and Management
- 132 - Weather and Climate
- 111 - Conservation and Efficient Use of Water

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 2

1. Outcome Target

Number of downloads of videos, Extension fact sheets, Extension highlights, and related educational materials

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 112 - Watershed Protection and Management
- 405 - Drainage and Irrigation Systems and Facilities
- 132 - Weather and Climate
- 111 - Conservation and Efficient Use of Water

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 3

1. Outcome Target

Access by users of the Oklahoma Mesonet computer and mobile device weather and climate data and tools

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 111 - Conservation and Efficient Use of Water
- 405 - Drainage and Irrigation Systems and Facilities
- 132 - Weather and Climate

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 4

1. Outcome Target

Determination of the energy and water efficiency of current irrigation systems in western Oklahoma

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 111 - Conservation and Efficient Use of Water
- 405 - Drainage and Irrigation Systems and Facilities

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 5

1. Outcome Target

Determination of groundwater recharge rates throughout the state of Oklahoma using data from the Oklahoma Mesonet

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 112 - Watershed Protection and Management
- 405 - Drainage and Irrigation Systems and Facilities
- 111 - Conservation and Efficient Use of Water
- 132 - Weather and Climate

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 6

1. Outcome Target

Comparison of grain sorghum and corn productivity under limited irrigation with subsurface drip irrigation

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 111 - Conservation and Efficient Use of Water
- 405 - Drainage and Irrigation Systems and Facilities
- 102 - Soil, Plant, Water, Nutrient Relationships

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 7

1. Outcome Target

Quantification and development of modeling tools for simulating sediment and phosphorus loading rates from streambanks to sensitive streams in Oklahoma and quantification of the benefit of riparian conservation practices

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 112 - Watershed Protection and Management
- 132 - Weather and Climate

4. Associated Institute Type(s)

- 1862 Research

Outcome # 8

1. Outcome Target

Development and pilot-testing of an onsite wastewater training curriculum and establishment of an onsite wastewater training and demonstration facility

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 403 - Waste Disposal, Recycling, and Reuse
- 111 - Conservation and Efficient Use of Water

4. Associated Institute Type(s)

- 1862 Extension

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Public Policy changes
- Government Regulations

Description

Extreme weather conditions and events can alter the demand and availability of water. These events could also impact research locations along streambanks. Changes in public policy and/or government regulations could create different demands for water and impact water use by various user groups.

V(K). Planned Program - Planned Evaluation Studies

Description of Planned Evaluation Studies

Extension and outreach activities will be evaluated approximately every two years using data such as number of demonstration sites, participation in learning opportunities, and number of publications. In addition, we will collect data from web-based activities such as number of stakeholders reached, time spent on web sites, and site activity.