# 2012 Oklahoma State University Combined Research and Extension Plan of Work

**Status: Accepted**

**Date Accepted: 08/15/2011**

## 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) and the Oklahoma Cooperative Extension Service (OCES) - entities of the Division of Agricultural Sciences and Natural Resources at Oklahoma State University. 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. 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. 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. 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.

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.

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

| Year | Extension | | Research | |
|---|---|---|---|---|
| | 1862 | 1890 | 1862 | 1890 |
| 2012 | 245.0 | 0.0 | 87.0 | 0.0 |
| 2013 | 240.0 | 0.0 | 85.0 | 0.0 |
| 2014 | 240.0 | 0.0 | 85.0 | 0.0 |
| 2015 | 240.0 | 0.0 | 83.0 | 0.0 |
| 2016 | 230.0 | 0.0 | 83.0 | 0.0 |

## II. Merit Review Process

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

- Internal 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.This includes the Special Grants.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 department in OAES is required to have three reviews for a project (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 (5-year and annual) developed by county, area, district and state program professionals are reviewed in reference to quality and relevance by at least two 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 appropriate assistant director/state program leader. State specialist plans are reviewed by the appropriate department head and the appropriate assistant director/state program leader.

## 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 that 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 roll 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.

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

In general all 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. Some examples of the types of special efforts afforded by planned programs follow.

In 2010, approximately 74.4% of all attendees at OCES events were white not Hispanic audiences. This compares to the U.S. Census Bureau estimate of 70.8% of all Oklahomans as white, not Hispanic. Estimates show that events drew 9.7% Native Americans which is higher than the 8.9% represented in the Oklahoma population, and 12.2% African Americans which is 65% higher than the 7.4% in the general state population. While there are difficulties of estimating Hispanic participants it would appear that the 6% attendees judged Hispanic was below the state mark of 8.9% self 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. In addition, we will hire a Spanish speaking professional as an Hispanic

Community Educator in one of our two most populated counties beginning in FY11.

The Farm and Agribusiness Management program team works closely with the E (Kika) de la Garza 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 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.

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. This program team often works with Langston University (rural development roundtable) to find ways to reach a broader audience. 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 Greenwood District (a traditional African-American district) in Tulsa on numerous development projects and has been asked to do so again in FY2011. In addition, this team worked closely with the city of Guymon on housing, medical facilities and other services with a large population change (Hispanic).

The Oklahoma 4-H Youth Development program typically reaches well over 500,000 participants per year with between 25% and 29% 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 Family Resiliency and Economic Well-Being and Human Nutrition and Health program has a long history of reaching large numbers of low-income, under-served and minority audiences. Through nutrition activities, activities with the courts and prisons, activities with low income populations, welfare and related program participants, etc. this program team reaches tens of thousands of individuals from underserved groups every year. In 2010, this team reached a much higher percentage of Black Females and Native American males, and Native American females than the general population. We expect the program activities will continue to reach these audiences.

The Plant Biological Technologies program and the Structure and Function of Macromolecules program teams both are heavily involved in undergraduate research training and mentoring programs. This program typically has special grants to involve minority students in research. These undergraduate research training programs have typically concentrated on African American students and Native American students.

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

The planned program teams developed 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 hope to also 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.

## 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. In addition, all the DASNR units have one or more advisory committees. 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., Oklahoma-Texas Watermelon Association, Ok Turfgrass Research Foundation, Ok Wheat Research Foundation, 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 Cattlemans Assoc., Beef Industry Conference Advisory Committee, Ok Beef Industry Council; 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, Federal Reserve Bank, Noble Foundation, Kerr Center for Sustainable Agriculture, Consumer Credit Counseling Services, Ok Department of Human Development and Family Services, Ok Agricultural Statistical Services.

This year a special effort was made to identify the most critical issues facing children, youth, families and communities in Oklahoma several methods were used. First, FCS and 4-H county educators submitted their annual Program Advisory Committee [PAC] reports. These were analyzed and consistent themes were identified. A survey was conducted with Oklahoma Home and Community Education [OHCE] board members during their fall leadership training where they were asked to identify the five issues that most critically affect families, youth and communities in Oklahoma. A similar survey was conducted with over 1,000 4-H members during their fall District Leadership conferences. In an effort to better serve Oklahoma's military families, comments made by Lt. General Rick Lynch and his wife in a presentation at the Association of Public Land-Grant Universities [APLU] annual meeting were also taken into consideration. Finally, a newspaper scan was conducted to see if the themes being reported across the state were consistent with those identified by the PACs, youth and other stakeholders.

Following are some other recent examples of other efforts. The Community and Rural Economic Development team was very involved in the statewide Rural Economic Development Initiative (REDI) which asked for county-level input directly from businesses, entrepreneurs and potential entrepreneurs regarding economic and business development needs. In addition, a statewide rural entrepreneurship listening session was held in cooperation with the Southern Rural Development Center.

The new DASNR Water Center has been reaching out to all the agencies, commissions, tribes, and groups with an interest or mission in water. In addition it has played a continuing lead role in organizing input for and developing chapters of the new 50-Year water plan for the

state. OCES has helped reach thousands of Oklahomans willing to provide inoput into the planning process.

**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.**

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. The OAES also initiates communication with under-served and/or under-represented citizens including Oklahoma's Native American nations, the African-American community, and other minority groups. Additionally, there is frequent interaction with commodity-based organizations, the Oklahoma Farmers' Union 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)

**Brief explanation.**

We will continue to collect additional direction and input through the DASNR Iniative Teams' planning and budget request process

This year we will conduct a special planning process aimed at critical issue programming for children, youth, families and communities. In an effort to identify the most critical issues facing children, youth, families and communities in Oklahoma several methods were used. First, Family Consumer Science (FCS) and 4-H Youth county educators submitted their annual Program Advisory Committee [PAC] reports. These were analyzed and consistent themes were identified. A survey was conducted with Oklahoma Home and Community Education [OHCE] board members during their fall leadership training where they were asked to identify the five issues that most critically affect families, youth and communities in Oklahoma. A similar survey was conducted with over 1,000 4-H members during their fall District Leadership conferences. In an effort to better serve Oklahoma's military families, comments made by Lt. General Rick Lynch and his wife in a presentation at the Association of Public Land-Grant Universities [APLU] annual meeting were also taken into consideration. Finally, a newspaper scan was conducted to see if the themes being reported across the state were consistent with those identified by the PACs, youth and other stakeholders.

Related issues were grouped into nine broad issue areas and logic models were developed for each. An in-service training in January 2011 was conducted to formally present the 9 issue areas to the 4-H and FCS county educators. County Educators then presented

the logic models to their PAC's in February 2011 and asked them to rank the issues according to the most critical needs of their county. These rankings will help determine which teams the educators will join. The county staff, along with district and state specialists will identify various curricula that will be used to address the short, medium and long-term outcomes and implement effective evaluation instruments to measure impacts.

**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 for the OCES and OAES.In addition, it plays a strong role in identifying the faculty and other professional position priorites 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 of a new Natural Resources Department 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.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 nutirtion.The Oklahoma extension service and agricultural experiment station have 31 active teams working on issues important to the people of Oklahoma, the region and the nation.Food processing and quality research is oftne strongly influenced by an advisory committee as well as the individual manufactureers and entrepreneurs with whom the Food and Agricultural Product Center works.Federal initiatives and grant opportunities also provider input that helps mold and direct some efforts.

The issues identified as facing children, youth and families were grouped into nine similar broad categories and logic models were developed for each. An in-service training in January 2011 was conducted to formally present the 9 issue areas to the 4-H and FCS county educators. County Educators then presented the logic models to their PAC's in February 2011 and asked them to rank the issues according to the most critical needs of their county. These rankings will help determine which teams the educators will join. The county staff, along with district and state specialists will identify various curricula that will be used to address the short, medium and long-term

outcomes and implement effective evaluation instruments to measure impacts.

## V. Planned Program Table of Content


| S. No. | PROGRAM NAME |
|---|---|
| 1 | Global Food Security and Hunger - Animal Enterprises |
| 2 | Global Food Security and Hunger - Crop Enterprises |
| 3 | Plant Biological Technologies |
| 4 | Commercial and Consumer Horticulture |
| 5 | Climate Change - Ecosystem and Environmental Quality and Management |
| 6 | Food Safety - Food Processing, Product Storage, and Food and Product Safety |
| 7 | Family Resiliency and Economic Well-Being |
| 8 | 4-H Youth Development |
| 9 | Turfgrass Development and Management |
| 10 | Community Resource and Economic Development |
| 11 | Global Food Security and Hunger - Integrated Pest Management |
| 12 | Food Safety - Agricultural Biosecurity |
| 13 | Global Food Security and Hunger - Farm and Agribusiness Systems Economics |
| 14 | Global Food Security and Hunger - Sensor-Based Technologies for Agricultural and Biological |
| 15 | Sustainable Energy - Bio-Based Products Development |
| 16 | Childhood Obesity - Human Nutrition and Health |
| 17 | Structure and Function of Macromolecules |

## V(A). Planned Program (Summary)

**Program # 1**

**1. Name of the Planned Program**

Global Food Security and Hunger - Animal Enterprises

**2. Brief summary about Planned Program**

Beef cattle and forage production and beef cattle receiving and feeding will encompass many of the production processes around the beef production industry in Oklahoma. Animal health, performance, and product quality and the underlying mechanisms influencing growth and development of beef cattle will be high priority. Continue research to help identify the bilogical links that exist between animal morbidity, reduced performance, and meat quality as well as nutrition and physiological issues. The interaction of forages in the cow-calf segmant of the industry will also be a priority. Electronic identification, traceability, and data management will also be a significant program area along with improving management through programs such as MasterCattleman and grazing systems. Beef cattle will remain the most important livestock production and management reserach and Extension animal enterprise in Oklahoma. Meat goat production has grown markedly in Oklahoma with numerous cultural demographic changes and Extension programs helping producers develop better production practices. We plan to continue to support this growing industry as an alternative for many of Oklahoma's smaller producers.

**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 | 20% | | 15% | |
| 302 | Nutrient Utilization in Animals | 12% | | 20% | |
| 303 | Genetic Improvement of Animals | 5% | | 10% | |
| 304 | Animal Genome | 0% | | 10% | |
| 305 | Animal Physiological Processes | 5% | | 10% | |
| 306 | Environmental Stress in Animals | 6% | | 10% | |
| 307 | Animal Management Systems | 30% | | 10% | |
| 308 | Improved Animal Products (Before Harvest) | 7% | | 5% | |
| 311 | Animal Diseases | 10% | | 5% | |
| 315 | Animal Welfare/Well-Being and Protection | 5% | | 5% | |
| | **Total** | 100% | | 100% | |

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

### 1. Situation and priorities

Cattle and forage production represent the largest segment of Oklahoma's rural and agricultural economy. These enterprises face difficulties because of the internal and external changes faced by managers including commodity prices, fuel, fertilizer and input prices, domestic policies, globalization, environmental issues and regulations, labor issues and regulations, intergenerational transfer, tax issues, rural-urban fringe pressures, transportation issues, bio-security and information technology.

With demand for higher quality products and an increase in value-based marketing, beef producers need health management practices that have the potential to increase their profitability and beef product quality for the consumer. In addition, Bovine viral diarrhea virus (BVDV) represents the most economically important disease to U.S. and Oklahoma beef cattle producers. The BVDV causes a variety of diseases including respiratory, digestive, mucosal disease, and fetal diseases/infections (abortions, stillbirths, persistently infected calves [(PI)] and congenital malformations). Economically, bovine respiratory disease (BRD) is the most important disease affecting feedlot cattle, with annual economic losses due to death, decreased feed efficiency, and medicine costs estimated at $1 billion. BRD accounts for approximately 75% of feedlot morbidity and from 50 to 80% of mortality. PI calves or calves exposed to PI calves are more susceptible to BRD. Although the medical costs attributable to the treatment of BRD are substantial, the economic impact of BRD on animal performance, carcass merit, and meat quality are likely even more devastating. "Healthy" steers have greater daily gains and more U.S. Choice carcasses than cattle identified as "sick" at some point during the finishing period. Steers with lung lesions plus active lymph nodes had $73.78 less net return, of which 21% was due to medicine costs and 79% due to lower carcass weight (8.4% less) and lower quality grade (24.7% more U.S. Standards).

Priorities
Beef cattle and forage education and research priorities:

- Electronic identification, traceability, and data management
- Enhancement of demonstrations at university owned facilities
- Master Cattleman program
- Development/refinement of forage management/grazing educational programs

Natural resources and grazing management

- Multi-species grazing
- Controlling/managing invasive species
- Further development of grazing systems
- Development of watering systems for livestock

Beef production systems

- Electronic identification, traceability, and data management
- Heifer development systems
- Comparison of calving seasons and timing of weaning in a beef production system context
- Increasing feeder cattle value
- Reducing labor, fuel and equipment costs of various production systems and components

- Identify the biological links that exist between the animal morbidity, reduced animal performance, and meat quality.
- Improve meat goat health and management practices

**2. Scope of the Program**

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

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

**1. Assumptions made for the Program**

Appropriated and sponsored funding will increase.
Appropriate research-base will continue to be developed to provide relevant information for cattle and forage producers.

**2. Ultimate goal(s) of this Program**

Information is developed that improves decision making and increases efficiency and profitability of Oklahoma farms and ranchers is developed and disseminated.

Management skills of Oklahoma cattle and forage managers are improved allowing them to obtain greater efficiency, higher profitability, reduced risks, and improved quality of life.

Evaluate the effects of animal morbidity on feedlot performance, carcass characteristics and meat quality.

Identify the biological links that exist between the BRD complex, reduced animal performance, and meat quality. Identifying these links will ultimately allow us to provide cattle producers with improved management strategies for receiving high-risk calves, and improve meat quality for consumers of beef.

Strong, profitable and efficient cattle and forage enterprises improve the economic viability of rural Oklahoma communities.

Improve meat goat producers' knowledge and practices

## 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 |
| 2012 | 20.0 | 0.0 | 4.0 | 0.0 |
| 2013 | 20.0 | 0.0 | 4.0 | 0.0 |
| 2014 | 20.0 | 0.0 | 5.0 | 0.0 |
| 2015 | 20.0 | 0.0 | 7.0 | 0.0 |
| 2016 | 20.0 | 0.0 | 7.0 | 0.0 |

## V(F). Planned Program (Activity)

**1. Activity for the Program**

Develop research-based information and disseminate through peer reviewed journal articles, scientific reviews, and abstracts.

Develop decision aids and management programs that assist cattle and forage managers in making better informed decisions.

Conduct educational programs to improve the management skills, profitability and other success factors of people managing cattle and forages. Outputs for these activities will include fact sheets, books, and other extension publications, conference proceedings, web sites and conferences, and cattle enrolled in value-enhancement programs.

Identify BVDV infected beef breeding herds and develop a control program including biosecurity and enhanced vaccination programs.

Demonstrate the economic effects of BVDV and BRD on stocker and feedlot operations.

Develop support for BVDV control within breeding herds to provide increased economic return.

In animals exposed to BVDV, BRD, or both, we will identify biological links that exist between the bacteria and/or virus, reduced animal performance, and meat quality.

Provide meat goat workshops, boot camps, and keep meat goat manual up to date.

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

**Extension**

| Direct Methods | Indirect Methods |
|---|---|
| ● Education Class<br>● Workshop<br>● Group Discussion<br>● One-on-One Intervention<br>● Demonstrations<br>● Other 1 (Scientific Presentations) | ● Public Service Announcement<br>● Newsletters<br>● Web sites other than eXtension<br>● Other 1 (Journal Articles) |

**3. Description of targeted audience**

Managers, owners and employees of farms, ranches and agribusinesses, research scientists, extension personnel, beef cattle producers, meat goat producers, and the general 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**

- Conferences, symposiums, and meetings
- Peered reviewed journal articles
- Extension publications:  fact sheets, proceedings, books, manuals, bulletins

☐ 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 | Total number of producers certified as Master Cattlemen |
| 2 | Number of producers implementing improved management, grazing systems and beef production systems resulting in improved sustainability. |
| 3 | Number of producers implementing management programs to decrease the incidence and economic impact of BVDV and BRD |
| 4 | Number of producers certified in the Beef Quality Assurance program |
| 5 | Number of cattle enrolled in value enhancement programs |

**Outcome #** 1

**1. Outcome Target**

Total number of producers certified as Master Cattlemen

**2. Outcome Type :** Change in Action Outcome Measure

| **2012:**600 | **2013:**650 | **2014:**650 | **2015:**700 | **2016:**750 |
|---|---|---|---|---|

**3. Associated Knowledge Area(s)**

- 121 - Management of Range Resources
- 302 - Nutrient Utilization in Animals
- 303 - Genetic Improvement of Animals
- 306 - Environmental Stress in Animals
- 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 implementing improved management, grazing systems and beef production systems resulting in improved sustainability.

**2. Outcome Type :** Change in Action Outcome Measure

| **2012:**4100 | **2013:**4100 | **2014:**4100 | **2015:**4200 | **2016:**4300 |
|---|---|---|---|---|

**3. Associated Knowledge Area(s)**

- 121 - Management of Range Resources
- 302 - Nutrient Utilization in Animals
- 306 - Environmental Stress in Animals
- 307 - Animal Management Systems
- 308 - Improved Animal Products (Before Harvest)
- 311 - Animal Diseases
- 315 - Animal Welfare/Well-Being and Protection

**4. Associated Institute Type(s)**

- 1862 Extension
- 1862 Research

**Outcome #** 3

**1. Outcome Target**

Number of producers implementing management programs to decrease the incidence and economic impact of BVDV and BRD

**2. Outcome Type :** Change in Condition Outcome Measure

| | | | | |
|---|---|---|---|---|
| **2012:**350 | **2013:**400 | **2014:**450 | **2015:**500 | **2016:**600 |

**3. Associated Knowledge Area(s)**

- 308 - Improved Animal Products (Before Harvest)
- 311 - Animal Diseases

**4. Associated Institute Type(s)**

- 1862 Extension
- 1862 Research

**Outcome #** 4

**1. Outcome Target**

Number of producers certified in the Beef Quality Assurance program

**2. Outcome Type :** Change in Knowledge Outcome Measure

| | | | | |
|---|---|---|---|---|
| **2012:**150 | **2013:**200 | **2014:**250 | **2015:**300 | **2016:**350 |

**3. Associated Knowledge Area(s)**

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

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome #** 5

**1. Outcome Target**

Number of cattle enrolled in value enhancement programs

**2. Outcome Type :** Change in Knowledge Outcome Measure

| **2012:**5000 | **2013:**7000 | **2014:**8000 | **2015:**8000 | **2016:**8500 |
|---|---|---|---|---|

**3. Associated Knowledge Area(s)**

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

**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**

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

Acceptance of research manuscripts in peer reviewed journals and participant evaluations conducted at the conclusion of various educational programs will be used to determine the effectiveness.

Costs of BVDV and BRD can be readily assessed in receiving and finishing yards. Therefore, economic benefits to producers who adopt improved management practices will be assessed.

## V(A). Planned Program (Summary)

**Program # 2**

**1. Name of the Planned Program**

Global Food Security and Hunger - Crop Enterprises

**2. Brief summary about Planned Program**

Improve wheat quality traits and dual-purpose varieties. Expand use of no-till systems in wheat and wheat cropping rotations. Use canola, cotton, sunflowers, teff, and other crops in rotations with wheat to improve weed control and pest management as well as risk and income considerations. Other systems in Oklahoma will be investigated and demonstrated for improved cropping rotation systems. Improve cropping systems generally. Sensor-based fertilizer recommendations will continue to be improved and expanded. Imporve sustainability of cropping systems. Provide information on wheat and other crop markets to improve efficiency and returns. Improve understanding of soil properties and appropriate management.

**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 | 20% | | 5% | |
| 133 | Pollution Prevention and Mitigation | 4% | | 5% | |
| 201 | Plant Genome, Genetics, and Genetic Mechanisms | 3% | | 20% | |
| 204 | Plant Product Quality and Utility (Preharvest) | 10% | | 10% | |
| 205 | Plant Management Systems | 30% | | 20% | |
| 211 | Insects, Mites, and Other Arthropods Affecting Plants | 8% | | 10% | |
| 212 | Pathogens and Nematodes Affecting Plants | 5% | | 10% | |
| 213 | Weeds Affecting Plants | 8% | | 5% | |
| 215 | Biological Control of Pests Affecting Plants | 4% | | 5% | |
| 216 | Integrated Pest Management Systems | 8% | | 10% | |
| | **Total** | 100% | | 100% | |

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

### 1. Situation and priorities

Wheat is the crop with the highest gross receipts in Oklahoma. Over 6.0 million acres are planted annually. Wheat is important for the production of grain as well as for a forage for livestock. Wheat quality has become a significant factor in world sales over the last fifteen years. Breeding and management for a variety of characteristics related to quality has become a very high priority. Emphasis on grain quality has traditionally focused on physical kernel characteristics and breadmaking quality, but the arrival of Hard White Winter wheat to the southern Great Plains has turned our attention to a new set of traits, such as kernel color, sprouting tolerance, and noodle quality.

Wheat is typically a low margin enterprise and cost reduction related to pests, disease, and fertilizer are important factors in its production. Oklahoma wheat farmers have been in a continuous wheat to wheat system for over 20 years. This has resulted in various cultural and pest management problems. Reduced tillage and no-till systems are being developed and extended to improve soil quality and reduce producer input costs.

Diversifying the cropping system will aid in alleviating some of these problems and provide growers with another crop without loss of income. The team is presently working with canola, sunflowers, sorghum, as crops in rotation for wheat. This is to provide improved weed control, pest management, improved yields, and additional income for the grower. The team will also look at other potential diversification systems such as yellow peas in various cropping systems. Only about 72% of hard red winter wheat grain is utilized for human consumption. In-house research and the published literature recognize the potential

benefit that wheat straw and wheat by-products, such as bran, germ, and milling shorts, can offer in the form of biologically active components for nutraceutical development.

Cotton and peanuts remain significant income crops in portions of the state and the crop enterprises teams will continue to improve production and management practices related to these crops.

Priorities

Develop highly-adapted winter wheat cultivars with marketable grain-quality and extending that research to the wheat producers of the State.

Develop integrated research and extension projects to improve the viability of no-till crop production in Oklahoma.

Identify potential crops for diversification and develop and test practical cropping rotation systems.

Identify potential improvements in cotton production including crop rotations, water conservation, scouting.

Reduce weed problems in wheat and other crops and extend the sustainability of cropping systems.

Develop a wheat biorefinery system that will generate value-added products from wheat fractions and enhance the value of wheat produced in Oklahoma.

Improve effectiveness of nitrogen use and application using laser and other technologies.

**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**

Rotation crops can be found to provide for diversification with minumum negative effect on income.
Variety selection, soil fertility and pests are manageble.
There is a viable market for rotation alternative crops.

**2. Ultimate goal(s) of this Program**

To improve wheat quality (grain and forage), production practices, production systems, and broaden uses for products of wheat.
Produce wheat with qualities demanded by relevant markets.

To provide wheat growers in Oklahoma cropping alternatives which provide an economic return without increased inputs.

Increase the knowledge and adoption of reduced tillage practices.

Improve knowledge of crop rotations - including incorporation of oilseed crops..

Improve esteimated needs for optimum fertilization.

## 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 |
| 2012 | 18.0 | 0.0 | 6.0 | 0.0 |
| 2013 | 18.0 | 0.0 | 6.0 | 0.0 |
| 2014 | 18.0 | 0.0 | 7.0 | 0.0 |
| 2015 | 18.0 | 0.0 | 7.0 | 0.0 |
| 2016 | 18.0 | 0.0 | 7.0 | 0.0 |

## V(F). Planned Program (Activity)

### 1. Activity for the Program

Wheat variety development and testing
Develop a no-till production manual
Wheat quality and product development and testing
Wheat management newsletter, website
Develop a Canola production manual.
Test and demonstrate alternative cropping systems and rotations
Improve web-based delivery of cropping systems information
Weekly crop updates during production season
Grower meetings/workshops
Field/demonstration days
Nitrogen strips and use of handheld lasers/sensors

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

**Extension**

| Direct Methods | Indirect Methods |
|---|---|
| ● Education Class<br>● Workshop<br>● Demonstrations | ● Newsletters<br>● 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
- Varieties of wheat released
- Crop production manuals and production newsletters
- Cotton Web Page

☐ 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 dual-purpose wheat acreage where first hollow stem criterion used for decision making |
| 2 | Number of wheat varieties released to address agronomic and end-use quality needs of hard red winter wheat industry |
| 3 | Locally-controlled evaluations and agronomic data for oilseed crops |
| 4 | Percentage of wheat acres sown to varieties with improved pest resistance, yield potential, and end-use quality. |
| 5 | Increase in knowledge and adoption rate of reduced tillage practices and crop rotation - acres effected |
| 6 | Number of crop acres where fertilization decisions include sensor-based fertilization information |
| 7 | Locally-controlled evaluations and agronomic data for small grains crops |

**Outcome #** 1

**1. Outcome Target**

Percentage of dual-purpose wheat acreage where first hollow stem criterion used for decision making

**2. Outcome Type :** Change in Action Outcome Measure

| **2012:**60 | **2013:**60 | **2014:**65 | **2015:**65 | **2016:**65 |
|---|---|---|---|---|

**3. Associated Knowledge Area(s)**

- 205 - Plant Management Systems

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome #** 2

**1. Outcome Target**

Number of wheat varieties released to address agronomic and end-use quality needs of hard red winter wheat industry

**2. Outcome Type :** Change in Condition Outcome Measure

| **2012:**2 | **2013:**2 | **2014:**2 | **2015:**2 | **2016:**2 |
|---|---|---|---|---|

**3. Associated Knowledge Area(s)**

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

**4. Associated Institute Type(s)**

- 1862 Research

**Outcome #** 3

**1. Outcome Target**

Locally-controlled evaluations and agronomic data for oilseed crops

**2. Outcome Type :** Change in Condition Outcome Measure

| **2012:**20 | **2013:**10 | **2014:**10 | **2015:**10 | **2016:**10 |
|---|---|---|---|---|

**3. Associated Knowledge Area(s)**

- 102 - Soil, Plant, Water, Nutrient Relationships
- 204 - Plant Product Quality and Utility (Preharvest)
- 205 - Plant Management Systems

**4. Associated Institute Type(s)**

- 1862 Extension
- 1862 Research

**Outcome #** 4

**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

| **2012:**60 | **2013:**60 | **2014:**60 | **2015:**60 | **2016:**65 |
|---|---|---|---|---|

**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 #** 5

**1. Outcome Target**

Increase in knowledge and adoption rate of reduced tillage practices and crop rotation - acres effected

**2. Outcome Type :** Change in Condition Outcome Measure

| **2012:** | **2013:** | **2014:** | **2015:** | **2016:** |
|---|---|---|---|---|
| 1500000 | 1500000 | 1600000 | 1800000 | 2000000 |

**3. Associated Knowledge Area(s)**

- 102 - Soil, Plant, Water, Nutrient Relationships
- 205 - Plant Management Systems
- 216 - Integrated Pest Management Systems

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome #** 6

**1. Outcome Target**

Number of crop acres where fertilization decisions include sensor-based fertilization information

**2. Outcome Type :** Change in Condition Outcome Measure

| **2012:** | **2013:** | **2014:** | **2015:** | **2016:** |
|---|---|---|---|---|
| 300000 | 350000 | 400000 | 450000 | 500000 |

**3. Associated Knowledge Area(s)**

- 102 - Soil, Plant, Water, Nutrient Relationships
- 205 - Plant Management Systems

**4. Associated Institute Type(s)**

- 1862 Extension
- 1862 Research

**Outcome #** 7

**1. Outcome Target**

Locally-controlled evaluations and agronomic data for small grains crops

**2. Outcome Type :** Change in Knowledge Outcome Measure

| **2012:**50 | **2013:**45 | **2014:**45 | **2015:**40 | **2016:**35 |
|---|---|---|---|---|

**3. Associated Knowledge Area(s)**

- 201 - Plant Genome, Genetics, and Genetic Mechanisms
- 204 - Plant Product Quality and Utility (Preharvest)
- 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
- 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 affect 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, and tolerance to low-pH, A1-toxic soils will be evaluated on an ongoing basis based on characteristic reproducibility and overall characteristic desirability.Selection has long been performed under a grain-only management system, but resources are being re-channeled toward selection in a dual-purpose environment under the **GRAZE**n**GRAIN©** breeding system. Quality trait testing will be conducted in the Oklahoma Food and Agricultural Products Center to measure progress.

For cropping system and reduced tillage programming, base line data will be obtained from wheat

growers on their inputs and rotation systems. Base line data will also be obtained from cotton producers on their inputs. As the programming progresses, growers will be queried as to their inputs at that point in time. At the end of the program comparisons will be made on the base line inputs and the inputs as they were obtained through time. In addition, the number of acres in a diversity cropping system and in cotton will be compared at the end with the beginning acres. In addition, the number of acres in cotton will be compared at the end with the beginning acres.

## V(A). Planned Program (Summary)

**Program # 3**

**1. Name of the Planned Program**

Plant Biological Technologies

**2. Brief summary about Planned Program**

Plant microbe interaction research will stress: Molecular, cellular, anatomic pathways of transmission of microbes from plant to plant: population variation in pathogens and vectors, molecular causes of disease symptoms, interactions of pathogens with other organisms and viruses, microbial movement pathways within the plant, and membrane or cell surface phenomena in interorganismal interactions. Plant stress research will emphasize: plant interactions with: insects, pathogens, temperature extremes, water stress (drought and excess), and oxidative stress. As situations change priorities and inputs will have to change as well. Team direction depends on funding sources as well as changing scientific priorities as garnered from stakeholder input. The fundamental overlying emphasis on this program is to better understand how the ubiquitous microorganisms, environmental factors, and other organisms interact with plant life in our environment and in agricultural settings of importance to human kind.

**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 |
|---|---|---|---|---|---|
| 123 | Management and Sustainability of Forest Resources | 5% | | 5% | |
| 132 | Weather and Climate | 5% | | 5% | |
| 201 | Plant Genome, Genetics, and Genetic Mechanisms | 5% | | 25% | |
| 203 | Plant Biological Efficiency and Abiotic Stresses Affecting Plants | 13% | | 13% | |
| 206 | Basic Plant Biology | 14% | | 14% | |
| 211 | Insects, Mites, and Other Arthropods Affecting Plants | 5% | | 5% | |
| 212 | Pathogens and Nematodes Affecting Plants | 53% | | 33% | |
| | **Total** | 100% | | 100% | |

## 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 Stresses: Abiotic and Biotic Team addresses: insects, pathogens, temperature extremes, water stress (drought and excess), and oxidative stress.

Microorganisms affect the growth and development of plant life upon which we all depend in both positive and negative ways. The Plant Microbe Interaction Team covers a wide spectrum of research relating to plant microbe interactions. The fundamental overlying emphasis on this program is to better understand how the ubiquitous microorganisms interact with plant life in our environment and in agricultural settings of importance to human kind.

Priorities
•Identify plant genotypes with superior stress tolerance from existing germplasm and utilize traditional breeding to improve stress tolerance in crop 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. •Establish and refine capabilities and infrastructure to enable the use of proteomics and metabolomics in plant stress studiesincluding using to study aphid/plant interactions, focusing on both the plant and aphid. •Determine how susceptible and resistant plants respond to aphid feeding to identifyy resistance factors that could be used in crop protection. •Identify low molecular weight and peptide phytotoxins secreted by plant pathogenic fungi and characterize their contribution to plant disease. •Interaction of Pseudomonas syringae with various plant hosts. •Study molecular factors involved in the movement of spiroplasmas through insect cellular barriers. •Assess population diversity among natural communities of phytopathogenic mollicutes. •Develop strategies for controlling insect-transmitted plant pathogens on cucurbit yellow vine disease (CYVD) and other plant diseases. •Biological control of soilborne diseases. •Control of anthracnose disease caused by Colletotrichum gloeosporioides on Euonymus fortunei. •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. •Characterization of Wheat Leaf Proteome and of aphid feeding induced changes in wheat leaf protein expression

### 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

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 |
| 2012 | 0.0 | 0.0 | 7.0 | 0.0 |
| 2013 | 0.0 | 0.0 | 7.0 | 0.0 |
| 2014 | 0.0 | 0.0 | 8.0 | 0.0 |
| 2015 | 0.0 | 0.0 | 8.0 | 0.0 |
| 2016 | 0.0 | 0.0 | 8.0 | 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

**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 |
| ● Other 1 (professional journals) | ● Web sites other than eXtension |
| ● Other 2 (professional meetings) | |

**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

| **2012:**5 | **2013:**5 | **2014:**6 | **2015:**7 | **2016:**7 |
|---|---|---|---|---|

**3. Associated Knowledge Area(s)**

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

**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**

Through strategic planning process, logic models will continually be updated to reflect changes in inputs. The program will be evaluated annually using the above mentioned benchmarks.

## 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, 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 E-Extension. Support consumer horticulture and home gardeners and the related industry.

**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 | 9% | | 10% | |
| 202 | Plant Genetic Resources | 5% | | 10% | |
| 204 | Plant Product Quality and Utility (Preharvest) | 12% | | 15% | |
| 205 | Plant Management Systems | 40% | | 40% | |
| 502 | New and Improved Food Products | 7% | | 20% | |
| 901 | Program and Project Design, and Statistics | 7% | | 5% | |
| 903 | Communication, Education, and Information Delivery | 20% | | 0% | |
| | **Total** | 100% | | 100% | |

## 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. This program plan discusses both horticultural efforts.

The need for science-based, locally-relevant information is greater than ever now that Oklahoma producers are looking to horticultural crops as alternatives to traditional field crops. 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: a) Support for cultivar evaluation; b) Horticultural crops as part of rotation plans with agronomic crops; c) Support for E-Extension; d) "Seed to market" production of high-value alternative horticultural crops; and e) Sustainable and/or organic production of commercial horticultural crops.

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 recent survey by the Garden Writers Association indicates that 4 out 5 households surveyed indicated they had some form of garden or yard. Consumers spent an estimated $36.8 billion on their lawns and gardens (an average of $449 per household) in 2004. 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: a survey of Oklahoma consumers (gardeners), improving consumer horticulture web-based delivery, Master Gardener training, pesticide training and education, 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 increase. 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, 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 outlook 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. 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 |
| 2012 | 13.0 | 0.0 | 2.0 | 0.0 |
| 2013 | 13.0 | 0.0 | 2.0 | 0.0 |
| 2014 | 13.0 | 0.0 | 3.0 | 0.0 |
| 2015 | 13.0 | 0.0 | 3.0 | 0.0 |
| 2016 | 13.0 | 0.0 | 3.0 | 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 into crop cultural systems, particularly the feasibility of horticultural crops in rotation with agronomic crops. Lead CoP for grape production for eXtension. •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. •Survey Oklahoma Consumers (Gardeners) 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 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 •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<br>● Workshop<br>● One-on-One Intervention<br>● Demonstrations | ● Newsletters<br>● TV Media Programs<br>● 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

☐ 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

| **2012:**10 | **2013:**10 | **2014:**10 | **2015:**10 | **2016:**15 |
|---|---|---|---|---|

**3. Associated Knowledge Area(s)**

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

**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

| **2012:**40000 | **2013:**40000 | **2014:**40000 | **2015:**40000 | **2016:**45000 |
|---|---|---|---|---|

**3. Associated Knowledge Area(s)**

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

**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

| **2012:**23000 | **2013:**25000 | **2014:**25000 | **2015:**25000 | **2016:**26000 |
|---|---|---|---|---|

**3. Associated Knowledge Area(s)**

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

**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**

Use of extension publications and websites will be analyzed. Surveys will assess the appropriateness and usefulness of short courses, workshops, and field days. Pre- and post- testing will be conducted on Master Gardener trainees. Contacts completed by Master Gardeners will be recorded and evaluated. Funded grant proposals and peer-reviewed publications will be counted annually.

## V(A). Planned Program (Summary)

**Program # 5**

**1. Name of the Planned Program**

Climate Change - Ecosystem and Environmental Quality and Management

**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 and prediction of weather and climate; 4 provide weather and climate related tools for clientele to use in production decisions; 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. water and air quality management and policy; 9. animal waste management; 10. surface water and watershed issues; 11. waste disposal and management 12. Improve wildlife habitat and managment

**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% | | 10% | |
| 111 | Conservation and Efficient Use of Water | 10% | | 10% | |
| 112 | Watershed Protection and Management | 9% | | 10% | |
| 121 | Management of Range Resources | 10% | | 15% | |
| 123 | Management and Sustainability of Forest Resources | 8% | | 10% | |
| 132 | Weather and Climate | 11% | | 0% | |
| 133 | Pollution Prevention and Mitigation | 7% | | 10% | |
| 134 | Outdoor Recreation | 7% | | 0% | |
| 135 | Aquatic and Terrestrial Wildlife | 5% | | 5% | |
| 136 | Conservation of Biological Diversity | 5% | | 5% | |
| 205 | Plant Management Systems | 9% | | 10% | |
| 403 | Waste Disposal, Recycling, and Reuse | 5% | | 5% | |
| 605 | Natural Resource and Environmental Economics | 9% | | 10% | |
| | **Total** | 100% | | 100% | |

## 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 historic use. This situation presents considerable issues and opportunities. These include: different management approaches on all natural resources of the area and develop 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, and 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 communities.

The Oklahoma Mesonet is a world-class network of environmental monitoring stations. The network was designed and implemented by scientists at the University of Oklahoma (OU) and at Oklahoma State

University (OSU).

The Oklahoma Mesonet consists of 120 automated stations covering Oklahoma. There is at least one Mesonet station in each of Oklahoma's 77 counties.

At each site, the environment is measured by a set of instruments located on or near a 10-meter-tall tower. The measurements are packaged into "observations" every 5 minutes, then the observations are transmitted to a central facility every 5 minutes, 24 hours per day year-round.

Programming priorities include:
Restoration and management of crosstimber and prairie ecosystems for multiple uses.

Reduction of negative effects of invasive species, such as Eastern Redcedar and Sericea lespedeza.

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

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

Use of Mesonet information to improve production and management decisions and better understand weather and climate effects on production, the environment, and landscape.

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 contaminates, and water policy.

Natural resources education for general public including youth.

Air quality and soil quality

### 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. •Presentation of symposia to address environmental and waste management issues of importance to Oklahoma will lead to state-of-the-art research and extension programs addressing the most

relevant issues. •Conservation can be integrated into traditional management and used to develop new economic alternatives •Stakeholders will be active participants in program development and implementation

**2. Ultimate goal(s) of this Program**

•Increased productivity and profitability of forest and rangeland ecosystems •Expanded knowledge base in natural resources •Conservation practices integrated into tradition land management •Approaches to restore degraded ecosystems •Determine and communicate impacts and management approaches for invasive species •Economic alternatives based on natural resources that can be integrated into traditional land management •Understand impacts and develop and communicate approaches to mitigate land fragmentation. Understand weather and climate and communicate startegies to approach related issues •Improved communication of environmental quality and waste management information •Slowed rate of degradation of surface water and watersheds

## 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 |
| 2012 | 7.0 | 0.0 | 6.0 | 0.0 |
| 2013 | 7.0 | 0.0 | 6.0 | 0.0 |
| 2014 | 7.0 | 0.0 | 7.0 | 0.0 |
| 2015 | 8.0 | 0.0 | 7.0 | 0.0 |
| 2016 | 7.0 | 0.0 | 7.0 | 0.0 |

## V(F). Planned Program (Activity)

**1. Activity for the Program**

- Design and conduct research
- Submit grant proposals
- Produce scientific publications
- Specialty conferences to address environmental issues of concern to Oklahoma,
- An Environmental Quality and Waste Management publications series
- A website that expands upon the information presented in the publication series, providing the range of information

- Develop Mesonet weather-related decision tools
- A high-visibility symposium series will share high quality research and extension programs with technical and lay audiences.
- Poultry Waste Management Education
- Water Quality educational programs

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

**Extension**

| Direct Methods | Indirect Methods |
|---|---|
| ● Education Class<br>● Workshop<br>● Group Discussion<br>● Demonstrations | ● Web sites other than eXtension<br>● Other 1 (LISTSERV and newsgroup) |

**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

## 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 and fact sheets

☐ 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 | Peer-reviewed publications |
| 5 | Number of users accessing website designed to deliver information about water policy, conservation and efficient use |
| 6 | Number of web-based weather related decision tools provided through Oklahoma Mesonet to improve crop and livestock production and safety and/or reduce costs |

**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

| **2012:**700 | **2013:**700 | **2014:**650 | **2015:**650 | **2016:**650 |
|---|---|---|---|---|

**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

| **2012:**70 | **2013:**70 | **2014:**80 | **2015:**90 | **2016:**100 |
|---|---|---|---|---|

**3. Associated Knowledge Area(s)**

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

**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

| **2012:**150 | **2013:**200 | **2014:**200 | **2015:**200 | **2016:**200 |
|---|---|---|---|---|

**3. Associated Knowledge Area(s)**

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

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome #** 4

**1. Outcome Target**

Peer-reviewed publications

**2. Outcome Type :** Change in Action Outcome Measure

| **2012:**10 | **2013:**10 | **2014:**10 | **2015:**15 | **2016:**12 |
|---|---|---|---|---|

**3. Associated Knowledge Area(s)**

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

**4. Associated Institute Type(s)**

- 1862 Extension
- 1862 Research

**Outcome #** 5

**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

| **2012:**300 | **2013:**400 | **2014:**500 | **2015:**500 | **2016:**600 |
|---|---|---|---|---|

**3. Associated Knowledge Area(s)**

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

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome #** 6

**1. Outcome Target**

Number of web-based weather related decision tools provided through Oklahoma Mesonet to improve crop and livestock production and safety and/or reduce costs

**2. Outcome Type :** Change in Knowledge Outcome Measure

| **2012:**2 | **2013:**2 | **2014:**2 | **2015:**2 | **2016:**2 |
|---|---|---|---|---|

**3. Associated Knowledge Area(s)**

- 132 - Weather and Climate
- 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; the 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.

## V(A). Planned Program (Summary)

**Program # 6**

**1. Name of the Planned Program**

Food Safety - Food Processing, Product Storage, and Food and Product Safety

**2. Brief summary about Planned Program**

Develop methods to rapidly identify food allergens and bacterial toxins of concern and by introducing microbial, toxin, and allergen intervention and control strategies.

Advance the techniques and strategies that improve food production through process development and operations optimization.

Develop techniques for evaluating new food sources and uses and enhancing nutraceuticals in foods.

Improve food packaging.

Evaluate the role of processed foods in value-added agri-tourism.

Optimize food manufacturing capacity utilization.

Improve the safety of stored food and agricultural products

Improve storage and handling of agricultural products

**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 | 10% | | 5% | |
| 401 | Structures, Facilities, and General Purpose Farm Supplies | 14% | | 5% | |
| 403 | Waste Disposal, Recycling, and Reuse | 5% | | 5% | |
| 501 | New and Improved Food Processing Technologies | 19% | | 10% | |
| 502 | New and Improved Food Products | 6% | | 10% | |
| 503 | Quality Maintenance in Storing and Marketing Food Products | 5% | | 10% | |
| 701 | Nutrient Composition of Food | 12% | | 10% | |
| 711 | Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources | 10% | | 10% | |
| 712 | Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins | 14% | | 25% | |
| 723 | Hazards to Human Health and Safety | 5% | | 10% | |
| | **Total** | 100% | | 100% | |

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

### 1. Situation and priorities

Improve the value, quality, and safety of foods and agricultural products by advancing food processing, safety, and storage technologies. These efforts are primarily conducted through the efforts of the Oklahoma Food and Agricultural Products Research and Technology Center, the Oklahoma Stored Products Research and Education Center, and the National Institute for Microbial Forensics and Ag Biosecutiry and their affiliated faculty and staff.

Priorities

•Advance the techniques and strategies that improve food production through process development and operations optimization. •Develop techniques for evaluating new food sources and uses and enhancing nutraceuticals in foods. •Improve food safety by introducing microbial, toxin, and allergen intervention and control strategies. •Develop methods to rapidly identify food allergens and bacterial toxins of concern. •Improve food packaging. Minimizing waste and enhancing utilization of food processing byproducts. •Evaluate the role of processed foods in value-added agri-tourism. •Optimize food manufacturing capacity utilization. •Development of a systems approach for assessment of plant by-products recovered from food processing for specific functional nutraceuticals, especially antioxidants and antibiotics. •Provide an estimate of lipid by-product (commercial fat, oil, and grease) production in the State. Evaluate feasibility of biodiesel plant and determine optimum location. •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
Bioterrorism prevention and response
Implement organic approaches to pest management

**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. Key research and extension personnel will be replaced in a timely manner.

Agricultural commodities and value-added food products from them will require adequate protection and management techniques for the foreseeable future.

**2. Ultimate goal(s) of this Program**

•Improve the value, quality and safety of processed foods. •Reduce waste in food processing. •Provide effective, economical and safe methods for storing and processing commodities and food products, and to provide useful information about such methods to users. •Develop means and methods for the rapid detection of allergens and foodborne toxins, and help transfer these technologies for routine testing in the food industry and possibly for biosecurity screening of processed foods. Improve effeciency and product quality of stored 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 |
| 2012 | 1.3 | 0.0 | 4.0 | 0.0 |
| 2013 | 1.3 | 0.0 | 4.0 | 0.0 |
| 2014 | 1.3 | 0.0 | 4.0 | 0.0 |

| Year | Extension | | Research | |
|---|---|---|---|---|
| | 1862 | 1890 | 1862 | 1890 |
| 2015 | 1.3 | 0.0 | 5.0 | 0.0 |
| 2016 | 1.3 | 0.0 | 5.0 | 0.0 |

## V(F). Planned Program (Activity)

### 1. Activity for the Program

•Conduct research that evaluates food processing technologies with the aim of improving food value, quality, and safety. Provide technical applications, demonstrations and education for food processors.
•Develop rapid detection methods for one family of allergens and one bacterial toxin. Pecans will serve as our allergen model while *Staphylococcus* enterotoxin will provide our biotoxin model. Our program will use two approaches. Immunomagnetic affinity and recovery will be used to develop a mechanism to bind and recover allergen- and enterotoxin-derived particles directly. Then a combination of oligo-tagged secondary antibodies and PCR amplification will be used to amplify the detection signal and allow for rapid detection methods. •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.

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

**Extension**

| Direct Methods | Indirect Methods |
|---|---|
| ● Education Class | ● Newsletters |
| ● Workshop | ● Web sites other than eXtension |
| ● Group Discussion | ● Other 1 (Journal articles) |
| ● One-on-One Intervention | |
| ● Demonstrations | |
| ● 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**

- Peer-reviewed journal articles
- Number of conferences and other extension outreach presentations

☐ 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 processors and/or regulatory agencies implementing new rapid testing methods |
| 2 | Number of food processors implementing new technologies or technology improvements |
| 3 | New products produced |
| 4 | Grain storage, food or pest control entities adopting new process or product |

**Outcome #** 1

**1. Outcome Target**

Number of processors and/or regulatory agencies implementing new rapid testing methods

**2. Outcome Type :** Change in Condition Outcome Measure

| **2012:**50 | **2013:**50 | **2014:**50 | **2015:**50 | **2016:**50 |
|---|---|---|---|---|

**3. Associated Knowledge Area(s)**

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

**4. Associated Institute Type(s)**

- 1862 Extension
- 1862 Research

**Outcome #** 2

**1. Outcome Target**

Number of food processors implementing new technologies or technology improvements

**2. Outcome Type :** Change in Action Outcome Measure

| **2012:**4 | **2013:**3 | **2014:**4 | **2015:**5 | **2016:**6 |
|---|---|---|---|---|

**3. Associated Knowledge Area(s)**

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

**4. Associated Institute Type(s)**

- 1862 Extension
- 1862 Research

**Outcome #** 3

**1. Outcome Target**

New products produced

**2. Outcome Type :** Change in Condition Outcome Measure

| **2012:**1 | **2013:**1 | **2014:**1 | **2015:**1 | **2016:**1 |
|---|---|---|---|---|

**3. Associated Knowledge Area(s)**

- 502 - New and Improved Food Products
- 701 - Nutrient Composition of Food

**4. Associated Institute Type(s)**

- 1862 Research

**Outcome #** 4

**1. Outcome Target**

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

**2. Outcome Type :** Change in Action Outcome Measure

| **2012:**25 | **2013:**30 | **2014:**30 | **2015:**30 | **2016:**30 |
|---|---|---|---|---|

**3. Associated Knowledge Area(s)**

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

**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**

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 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. Since 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**

Provided nutraceuticals can be identified and utilized from specified waste stream (near-term, wine production waste). Better utilization of the by-product reduces economic impact of waste on processor and improved utilization reduces organic accumulation in local landfills. Evaluate economic impact on processors capturing value. Evaluate economic impact on community's landfill usage from program usage.

Provided biodiesel production is feasible. Compare economic impact in communities where fat, oil, and grease is diverted to biodiesel production and those where it is not.

Research programs are evaluated at the end and prior to requests for additional funds. Extension and outreach programs are evaluated based on before and after assessment of student knowledge.

## V(A). Planned Program (Summary)

**Program # 7**

**1. Name of the Planned Program**

Family Resiliency and Economic Well-Being

**2. Brief summary about Planned Program**

These programs focus on concerns from advisory and agencies across the state and include issues related to: the social, cultural and economic issues and struggles of many Oklahoma families and the opportunities for increasing family resources for coping, income, and stability.

**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 |
|---|---|---|---|---|---|
| 602 | Business Management, Finance, and Taxation | 20% | | 0% | |
| 607 | Consumer Economics | 20% | | 0% | |
| 801 | Individual and Family Resource Management | 15% | | 0% | |
| 802 | Human Development and Family Well-Being | 30% | | 0% | |
| 806 | Youth Development | 15% | | 0% | |
| | **Total** | 100% | | 0% | |

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

**1. Situation and priorities**

Oklahoma lags well below the national average on various measures of income, including per capita income ($17,646 versus $21,587) and median household income ($33,400 versus $41,994). Oklahoma also ranks among the top five states for per capita bankruptcy rates and percentage of population living below the poverty level.

Affordable housing is a major concern for all Americans. Many still lack the requisite skills and information for maintaining homeownership.

Young people have control over considerable amounts of money and will continue to do so

throughout their lives, yet studies continue to suggest that teens lack basic economic and money management skills.

Many Oklahoma citizens have considered starting their own business as a means to generate additional income. Entrepreneurship continues to be a core economic engine throughout the state's history. Yet, many of the businesses fail within the first five years or do not achieve a level of return to match entrepreneurs from other states.

High risk behaviors in children and youth, such as disconnecting from school, alcohol and substance use, premature sexual activity, violence, and delinquency, have been identified as critical issues. The aim is to teach children *how* to think rather than *what* to think by changing thinking styles, enhancing children's social adjustment, promoting pro-social behavior, and decreasing impulsivity and inhibition.

Priorities
Reduce family financial stresses
Homebuyer education
Improve youth consumer and financial skills
Reduce risk behaviors and problems in children and youth
Improve family stability and childhood development

**2. Scope of the Program**

- In-State 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.

- Children and youth's resiliency is enhanced by assets such as support, empowerment, boundaries, expectations, constructive use of time, achievement motivation, positive values, social competencies, and positive identify.

- 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.

**2. Ultimate goal(s) of this Program**

• Oklahoma citizens will have decreased risk factors associated with obesity and overweight

• Oklahoma citizens will be more financially secure today and in the future.

•Increased problem-solving skills will be used by children/youth

•Children/youth will exhibit fewer problem behaviors in schools.

•Decreased risk factors for children/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 |
| 2012 | 20.0 | 0.0 | 0.0 | 0.0 |
| 2013 | 20.0 | 0.0 | 0.0 | 0.0 |
| 2014 | 20.0 | 0.0 | 0.0 | 0.0 |
| 2015 | 20.0 | 0.0 | 0.0 | 0.0 |
| 2016 | 20.0 | 0.0 | 0.0 | 0.0 |

## V(F). Planned Program (Activity)

### 1. Activity for the Program

• Development of new curricula

• Adaptation & supplementation of existing curricula

• Development of marketing plan and materials

• Development of surveys, evaluation tool

• Searching out and applying for appropriate grants

• Delivery through classes, One-on-One, News Releases/TV/Radio, Participation in Events, Displays
•Deliver *I Can Problem Solve and o*ther possible curricula resources to communities including children, youth, parents/caretakers, teachers, agencies and service providers, schools, and out-of-school programs.
•Provide training and other staff development opportunities to county educators •Create public awareness of programs and resources through promotional and educational materials to be distributed to teachers, agency professionals, and other community members.

**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 | ● Web sites other than eXtension |
| ● Demonstrations | ● Other 1 (Social marketing in youth settin) |
| ● Other 1 (Coach/train teachers one-on-one) | ● Other 2 (Radio interviews) |

**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**

- Revised online curriculum
- Promotional materials and marketing campaign

☐ 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 | Participants will utilize recommended financial management practices |
| 2 | Participants will expand their knowledge of recommended financial management practices including a reduction in their debt levels and the use of credit. |
| 3 | Participants will have reduced their debt levels, their use of credit, feel more satisfied with and less stressed about their financial situation, and begin developing an asset base. |
| 4 | Participants in asset building classes (i.e. investments, retirement, home-buyer education, entrepreneurship) will have bought a home, started an investment account, started a retirement account, or started a business or have made a conscientious decision not to do so at the current time because of other financial priorities. |
| 5 | Adults receiving the program will attain increased interpersonal cognitive problem-solving skills |
| 6 | Adults receiving the program reporting increased use of interpersonal cognitive problem-solving skills with children/youth |
| 7 | Children and youth receiving the program will increase use of interpersonal cognitive problem-solving skills |

**Outcome #** 1

**1. Outcome Target**

Participants will utilize recommended financial management practices

**2. Outcome Type :** Change in Condition Outcome Measure

| **2012:**50 | **2013:**50 | **2014:**50 | **2015:**50 | **2016:**50 |
|---|---|---|---|---|

**3. Associated Knowledge Area(s)**

- 602 - Business Management, Finance, and Taxation
- 607 - Consumer Economics
- 801 - Individual and Family Resource Management

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome #** 2

**1. Outcome Target**

Participants will expand their knowledge of recommended financial management practices including a reduction in their debt levels and the use of credit.

**2. Outcome Type :** Change in Knowledge Outcome Measure

| **2012:**500 | **2013:**500 | **2014:**500 | **2015:**500 | **2016:**500 |
|---|---|---|---|---|

**3. Associated Knowledge Area(s)**

- 602 - Business Management, Finance, and Taxation
- 607 - Consumer Economics

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome #** 3

**1. Outcome Target**

Participants will have reduced their debt levels, their use of credit, feel more satisfied with and less stressed about their financial situation, and begin developing an asset base.

**2. Outcome Type :** Change in Condition Outcome Measure

| **2012:**100 | **2013:**100 | **2014:**100 | **2015:**100 | **2016:**150 |
|---|---|---|---|---|

**3. Associated Knowledge Area(s)**

- 602 - Business Management, Finance, and Taxation
- 607 - Consumer Economics
- 801 - Individual and Family Resource Management

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome #** 4

**1. Outcome Target**

Participants in asset building classes (i.e. investments, retirement, home-buyer education, entrepreneurship) will have bought a home, started an investment account, started a retirement account, or started a business or have made a conscientious decision not to do so at the current time because of other financial priorities.

**2. Outcome Type :** Change in Action Outcome Measure

| **2012:**10 | **2013:**10 | **2014:**10 | **2015:**10 | **2016:**10 |
|---|---|---|---|---|

**3. Associated Knowledge Area(s)**

- 602 - Business Management, Finance, and Taxation
- 607 - Consumer Economics
- 801 - Individual and Family Resource Management

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome #** 5

**1. Outcome Target**

Adults receiving the program will attain increased interpersonal cognitive problem-solving skills

**2. Outcome Type :** Change in Knowledge Outcome Measure

| **2012:**50 | **2013:**50 | **2014:**50 | **2015:**50 | **2016:**50 |
|---|---|---|---|---|

**3. Associated Knowledge Area(s)**

- 802 - Human Development and Family Well-Being

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome #** 6

**1. Outcome Target**

Adults receiving the program reporting increased use of interpersonal cognitive problem-solving skills with children/youth

**2. Outcome Type :** Change in Action Outcome Measure

| **2012:**30 | **2013:**30 | **2014:**30 | **2015:**30 | **2016:**30 |
|---|---|---|---|---|

**3. Associated Knowledge Area(s)**

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

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome #** 7

**1. Outcome Target**

Children and youth receiving the program will increase use of interpersonal cognitive problem-solving skills

**2. Outcome Type :** Change in Condition Outcome Measure

| **2012:**700 | **2013:**700 | **2014:**700 | **2015:**700 | **2016:**700 |
|---|---|---|---|---|

**3. Associated Knowledge Area(s)**

- 802 - Human Development and Family Well-Being
- 806 - Youth 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
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges
- Populations changes (immigration, new cultural groupings, etc.)
- Other (community/school support access)

**Description**

## V(K). Planned Program - Planned Evaluation Studies

**Description of Planned Evaluation Studies**

## V(A). Planned Program (Summary)

**Program # 8**

**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 (SET);
2) Citizenship;
3) Healthy Living (HL).

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. Consensus on outcome indicators across diverse programs could produce several benefits: 1) greater focus in program planning, 2) greater richness in program development, as a variety of strategies are logically linked to a shared outcome; at the same time, 3) greater continuity in curriculum and training as they are aimed toward shared outcomes; 4) opportunities to compare delivery methods for specific audiences; and 5) more clear and powerful evidence for 4-H program impact as all efforts contribute to a single, larger impact statement.

**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 |
|---|---|---|---|---|---|
| 608 | Community Resource Planning and Development | 5% | | 0% | |
| 806 | Youth Development | 95% | | 0% | |
| | **Total** | 100% | | 0% | |

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

### 1. Situation and priorities

**Citizenship** - Since its inception, 4-H has placed emphasis on the importance of young people being engaged, well-informed citizens. By connecting to their communities and leaders, youth understand their role in civic affairs and are able to expand their role in decision-making processes. It's clear that civic engagement provides the foundation that helps youth understand the big picture of life and learn the skill sets that will allow them to become wise leaders for the 21st century.

**Healthy Living**- A core belief of 4-H is Health, as evidenced by the four H's in the 4-H clover: Head, Heart, Hands, and Health. 4-H is committed to the physical, mental and emotional health of our nation's youth so they may lead healthy and productive lives into and throughout adulthood. 4-H has become a national leader in health-related educational issues including chemical health, mental and emotional health, foods and nutrition, physical health and safety.

**Science, Engineering, and Technology (SET)**The United States is falling dangerously behind other nations in developing its future workforce of scientists, engineers, and technology experts. To ensure global competitiveness, we must act now to prepare the next generation of science, engineering, and technology leaders. The 4-H Youth Development Program is strategically positioned to strengthen US global competitiveness and leadership. Oklahoma 4-H will join a national movement to address our nation's critical challenge by preparing **young people** to excel in science, technology, engineering, and math.

Priorities:

Support the recruitment, training and retention of a viable volunteer base necessary to support and manage local and county clubs and programming.

Provide a safe and healthy educational environment with caring and qualified adults, resulting in growth of knowledge, attitudes and skills that prepare our youth for successful lives as community leaders and contributing citizens.

Support and growth of 4-H project clubs by training 4-H volunteers and teen leaders.

A web-based project curriculum will be developed for training teens, volunteers and staff in support of Mission Mandates.

Youth will develop an in-depth knowledge of career opportunities through 4-H projects.

Youth will develop a well rounded understanding of mental and emotional health obtained through project work and activities which encourage healthy life style choices - camping, recreation, shooting

sports, fitness, safety, hobbies and creative pursuits through the arts.

Instill a social and civic awareness of community needs and providing adult and youth audiences with the skills for taking a proactive role in their communities through civic engagement, volunteerism and service.

Youth and adults work in partnership to identify and solve/resolve community needs and environmental issues through an organized and executed plan of action.

Use curricula including, Health Rocks, Farm to You, Organwise Guys, Companion Animals, Jr. Master Gardners and Oklahoma Ag in the Classroom program to help youth make healthy life style choices.

Increased collaboration and organization of youth organizations to address youth issues of: substance abuse, teen pregnancy, childhood obesity, nutrition and health, stress management, healthy choices, life skills development and job training by providing young people positive alternatives.

Oklahoma's environmental resources are in need of protection and improved stewardship. Restoration and enhancement of resources requires expanded awareness, knowledge, and appreciation of the environment and a practice of stewardship ethics.

Youth will become good environmental stewards by recognizing how the actions of the individual and/or society affect environmental quality - water, soil, air, entomology, plants, geology, recycling, conservation, etc.

Youth livestock programs will provide youth an opportunity to develop knowledge about animal health, breeding, production, marketing and meat science while being conscientious about product quality assurance, animal welfare/well-being and protection and effects on the environment.

Geospatial technologies such as remote sensing, GPS and Geographical Information Systems have the potential to enhance production agriculture by increasing efficiency and reducing inputs. GPS/GIS is a cutting edge technology which uses satellites to locate precise positions on earth and creates maps. Development and implementation of these technologies will require a professional workforce with skills and knowledge about agriculture, GPS/GIS systems, robotics, and related technology. Youth have the potential to be the scientists and researchers of tomorrow who will research, develop and enhance these future agricultural practices.

Operation: Military Kids will make it a priority to develop the community capacity to reach and support military children affect by deployment in geographically dispersed locations in the state through the development of partnerships between multiple organizations creating a local support network with the capacity to support military children where they are.

**2. Scope of the Program**

- In-State Extension
- Multistate Extension

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

### 1. Assumptions made for the Program

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 along side 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 activitieswill 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 SET 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 |
| 2012 | 65.0 | 0.0 | 0.0 | 0.0 |
| 2013 | 65.0 | 0.0 | 0.0 | 0.0 |
| 2014 | 65.0 | 0.0 | 0.0 | 0.0 |
| 2015 | 61.0 | 0.0 | 0.0 | 0.0 |
| 2016 | 60.0 | 0.0 | 0.0 | 0.0 |

## V(F). Planned Program (Activity)

### 1. Activity for the Program

30 - VMS - Recruit, orient and train adult volunteers to serve as club and project club leaders and to

assume leadership on committees who plan and coordinate local and county activity and events.

30 - CMS - Increase the number of 4-H project clubs or project groups within community clubs.

20 - LCD Impact Team - Recruit and train teams of youth and adults, who work in partnership to identify, organize, conduct and evaluate a service learning project which will benefit the community.

27 - EE Impact Team - Provide training and materials for initiating and maintaining teams of youth and adults committed to sharing and promoting environmental education concepts through service learning.

30 - OMK - Train and recruit educators and volunteers to create public awareness of issues affecting military families.

28 - STEM - Provide training and materials for initiating and maintaining teams of youth and adults committed to sharing and promoting STEM concepts through service learning.

30 - All other - Establish, develop, and maintain new and ongoing youth development programming, events, and support materials.

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

**Extension**

| Direct Methods | Indirect Methods |
|---|---|
| ● Education Class<br>● Workshop<br>● Group Discussion<br>● One-on-One Intervention<br>● Other 1 (Complete action plans) | ● Public Service Announcement<br>● Newsletters<br>● Web sites other than eXtension<br>● 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**

- Web-delivered curriculum - lessons developed and tested
- Educational trainings offered for volunteers and staff

☐ 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 | Certified participants will manage local programming |
| 2 | Caring and qualified adults will prepare youth for successful lives as community leaders and contributing citizens |
| 3 | The number of active 4-H project clubs and project groups. |
| 4 | Project curriculum in support of Mission Mandates |
| 5 | Youth will develop a well rounded understanding of mental and emotional health obtained through project work and activities which encourage healthy life style choices - camping, recreation, shooting sports, fitness, safety, hobbies and creative pursuits through the arts. |
| 6 | Youth and adults work in partnership to identify and solve/resolve community needs and environmental issues through an organized and executed plan of action. |
| 7 | Youth will learn to make healthy lifestyle choices through the use of curricula and educational materials. |
| 8 | Increased number of collaborations with youth organizations |
| 9 | Participant teams will Increase knowledge of Oklahoma natural resources and environmental stewardship. |
| 10 | Participants in livestock programs will focus on acceptable animal husbandry practices, demonstrating knowledge about animal health, breeding, production, marketing and meat science while being conscientious about product quality assurance, animal welfare/well-being and protection and effects on the environment. |
| 11 | Participants will increase knowledge and awareness of STEM technologies and career opportunities. |
| 12 | Participants will increase knowledge and awareness of plants and soil systems. |
| 13 | Increase knowledge and awareness of entomology. |
| 14 | Companion animal programs will focus on animal welfare and human-animal interaction. |
| 15 | Military families receiving support through 4-H partnerships will increase their use of local support networks |

**Outcome #** 1

**1. Outcome Target**

Certified participants will manage local programming

**2. Outcome Type :** Change in Action Outcome Measure

| **2012:**1000 | **2013:**1000 | **2014:**1000 | **2015:**1000 | **2016:**1000 |
|---|---|---|---|---|

**3. Associated Knowledge Area(s)**

- 806 - Youth Development

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome #** 2

**1. Outcome Target**

Caring and qualified adults will prepare youth for successful lives as community leaders and contributing citizens

**2. Outcome Type :** Change in Action Outcome Measure

| **2012:**700 | **2013:**700 | **2014:**700 | **2015:**700 | **2016:**700 |
|---|---|---|---|---|

**3. Associated Knowledge Area(s)**

- 806 - Youth Development

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome #** 3

**1. Outcome Target**

The number of active 4-H project clubs and project groups.

**2. Outcome Type :** Change in Knowledge Outcome Measure

| **2012:**1000 | **2013:**1000 | **2014:**1000 | **2015:**1000 | **2016:**1000 |
|---|---|---|---|---|

**3. Associated Knowledge Area(s)**

- 806 - Youth Development

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome #** 4

**1. Outcome Target**

Project curriculum in support of Mission Mandates

**2. Outcome Type :** Change in Knowledge Outcome Measure

| **2012:**20 | **2013:**20 | **2014:**20 | **2015:**20 | **2016:**20 |
|---|---|---|---|---|

**3. Associated Knowledge Area(s)**

- 806 - Youth Development

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome #** 5

**1. Outcome Target**

Youth will develop a well rounded understanding of mental and emotional health obtained through project work and activities which encourage healthy life style choices - camping, recreation, shooting sports, fitness, safety, hobbies and creative pursuits through the arts.

**2. Outcome Type :** Change in Condition Outcome Measure

| **2012:**4000 | **2013:**4000 | **2014:**4000 | **2015:**5000 | **2016:**5000 |
|---|---|---|---|---|

**3. Associated Knowledge Area(s)**

- 806 - Youth Development

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome #** 6

**1. Outcome Target**

Youth and adults work in partnership to identify and solve/resolve community needs and environmental issues through an organized and executed plan of action.

**2. Outcome Type :** Change in Action Outcome Measure

| **2012:**10 | **2013:**10 | **2014:**10 | **2015:**10 | **2016:**10 |
|---|---|---|---|---|

**3. Associated Knowledge Area(s)**

- 806 - Youth Development

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome #** 7

**1. Outcome Target**

Youth will learn to make healthy lifestyle choices through the use of curricula and educational materials.

**2. Outcome Type :** Change in Knowledge Outcome Measure

| **2012:**5000 | **2013:**5000 | **2014:**5000 | **2015:**5000 | **2016:**5000 |
|---|---|---|---|---|

**3. Associated Knowledge Area(s)**

- 806 - Youth Development

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome #** 8

**1. Outcome Target**

Increased number of collaborations with youth organizations

**2. Outcome Type :** Change in Action Outcome Measure

| **2012:**10 | **2013:**10 | **2014:**10 | **2015:**10 | **2016:**0 |
|---|---|---|---|---|

**3. Associated Knowledge Area(s)**

- 806 - Youth Development

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome #** 9

**1. Outcome Target**

Participant teams will Increase knowledge of Oklahoma natural resources and environmental stewardship.

**2. Outcome Type :** Change in Knowledge Outcome Measure

| **2012:**15 | **2013:**15 | **2014:**10 | **2015:**10 | **2016:**0 |
|---|---|---|---|---|

**3. Associated Knowledge Area(s)**

- 806 - Youth Development

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome #** 10

**1. Outcome Target**

Participants in livestock programs will focus on acceptable animal husbandry practices, demonstrating knowledge about animal health, breeding, production, marketing and meat science while being conscientious about product quality assurance, animal welfare/well-being and protection and effects on the environment.

**2. Outcome Type :** Change in Action Outcome Measure

| **2012:**7000 | **2013:**7000 | **2014:**7000 | **2015:**7000 | **2016:**7000 |
|---|---|---|---|---|

**3. Associated Knowledge Area(s)**

- 806 - Youth Development

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome #** 11

**1. Outcome Target**

Participants will increase knowledge and awareness of STEM technologies and career opportunities.

**2. Outcome Type :** Change in Knowledge Outcome Measure

| **2012:**4000 | **2013:**4000 | **2014:**4000 | **2015:**4000 | **2016:**4000 |
|---|---|---|---|---|

**3. Associated Knowledge Area(s)**

- 806 - Youth Development

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome #** 12

**1. Outcome Target**

Participants will increase knowledge and awareness of plants and soil systems.

**2. Outcome Type :** Change in Knowledge Outcome Measure

| **2012:**500 | **2013:**500 | **2014:**500 | **2015:**500 | **2016:**500 |
|---|---|---|---|---|

**3. Associated Knowledge Area(s)**

- 806 - Youth Development

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome #** 13

**1. Outcome Target**

Increase knowledge and awareness of entomology.

**2. Outcome Type :** Change in Knowledge Outcome Measure

| **2012:**750 | **2013:**750 | **2014:**750 | **2015:**750 | **2016:**750 |
|---|---|---|---|---|

**3. Associated Knowledge Area(s)**

- 806 - Youth Development

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome #** 14

**1. Outcome Target**

Companion animal programs will focus on animal welfare and human-animal interaction.

**2. Outcome Type :** Change in Knowledge Outcome Measure

| **2012:**250 | **2013:**300 | **2014:**400 | **2015:**500 | **2016:**500 |
|---|---|---|---|---|

**3. Associated Knowledge Area(s)**

- 806 - Youth Development

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome #** 15

**1. Outcome Target**

Military families receiving support through 4-H partnerships will increase their use of local support networks

**2. Outcome Type :** Change in Knowledge Outcome Measure

| **2012:**500 | **2013:**500 | **2014:**350 | **2015:**350 | **2016:**350 |
|---|---|---|---|---|

**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**

Geospatial programming will be tracking participation in lesson usage and 4-h club development, throughout the program. At the end of the program cycle we will assess the number of teens participating in the program and their career interest in geospatial fields.

Environmental education programming will be tracking the number of water-wells tested and the test results. It will also be collecting activity reports from educators indicating the status and success of their county program. At the end of the program cycle it will conduct focus groups with teens to determine the impact of the program on the teen participants.

The community leadership programming will pre-and post with evaluation tools to determining the effectiveness of Youth-Adult Partnership and Youth in Governance. In addition, progress during training and community service project will be through written Action Plan and information observation. Finally, a national evaluation tool will be adapted for long-term evaluation.

## V(A). Planned Program (Summary)

**Program # 9**

**1. Name of the Planned Program**

Turfgrass Development and Management

**2. Brief summary about Planned Program**

Improve 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 | 12% | | 10% | |
| 201 | Plant Genome, Genetics, and Genetic Mechanisms | 1% | | 5% | |
| 202 | Plant Genetic Resources | 4% | | 10% | |
| 203 | Plant Biological Efficiency and Abiotic Stresses Affecting Plants | 0% | | 10% | |
| 204 | Plant Product Quality and Utility (Preharvest) | 6% | | 5% | |
| 205 | Plant Management Systems | 51% | | 15% | |
| 206 | Basic Plant Biology | 1% | | 5% | |
| 211 | Insects, Mites, and Other Arthropods Affecting Plants | 5% | | 10% | |
| 212 | Pathogens and Nematodes Affecting Plants | 10% | | 10% | |
| 216 | Integrated Pest Management Systems | 10% | | 20% | |
| | **Total** | 100% | | 100% | |

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

**1. Situation and priorities**

Turfgrass beautifies and stabilizes an estimated 30 million acres of land in the United States.

Turfgrasses are the largest intensively managed plant system in the U.S. Continuous growth in turfgrass acreage is projected since turf usage is directly linked to urbanization. Turfgrasses developed and dominated in ecosystems governed by fire and continuous grazing. To maximize the benefits provided by turfgrasses, humans have replaced fire and animal grazing in urban settings with herbicides and mowing. Uncertainty of turf performance has been reduced with additions of fertilizer and irrigation water. Ever increasing turfgrass visual and functional performance is expected by our affluent society. Meanwhile, pests continue to co-evolve to feed on turfgrass and abiotic environmental stresses continue to provide limitations in turf ecosystems. 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 little to no negative environmental impact. Our team will continue to identify and develop improved turfgrasses as well as necessary responsible management practices that will aid turfgrass managers in meeting their 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 educational programming will continue. Fee-based consultation will be explored when the end-user seeks in-depth time-intensive consultation services that should be offered for purchase by industry cooperators. Laboratories, field facilities and associated equipment will need to be replaced as needed. Key research and extension personnel will be replaced in a timely manner. Research and demonstration land holdings will increase proportional to the number of species/varieties and products that the turf industry is generating and requesting to be tested.

**2. Ultimate goal(s) of this Program**

New turf germplasm/varieties will be generated by our program. These products will have improved abiotic and biotic stress resistance/tolerance. Research will identify the elite performing varieties from both our program and from industry. Research will identify new or refined integrated management practices. Educational materials will be developed featuring improved varieties and how to properly maintain them. Intense and effective educational programming will be conducted to help integrate this information into existing management programs. Reduce water usage for sustainable maintenance of turf grasses. Rational decision making based on the combination of science, perception and sound public policy will be made by the turf industry and the public at large. Resultant adoption of integrated turfgrass management strategies will occur and turfgrass performance can be maintained or improved with reduced potential negative 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 |
| 2012 | 1.5 | 0.0 | 2.0 | 0.0 |
| 2013 | 1.5 | 0.0 | 2.0 | 0.0 |
| 2014 | 1.5 | 0.0 | 2.0 | 0.0 |
| 2015 | 1.5 | 0.0 | 3.0 | 0.0 |
| 2016 | 1.5 | 0.0 | 3.0 | 0.0 |

## V(F). Planned Program (Activity)

### 1. Activity for the Program

New turf germplasm/varieties will be generated by our program. These products will have improved abiotic and biotic stress resistance/tolerance. Research will identify the elite performing varieties from both our program and from industry. Research will identify new or refined integrated management practices. Educational materials will be developed featuring improved varieties and how to properly maintain them. Intense and effective educational programming will be conducted to help integrate this information into existing management programs. Research and extension activities related to improved efficiency of warter application and runoff. Rational decision making based on the combination of science, perception and sound public policy will be made by the turf industry and the public at large. Resultant adoption of integrated turfgrass management strategies will occur and turfgrass performance can be maintained or improved with reduced potential negative environmental impacts.

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

**Extension**

| Direct Methods | Indirect Methods |
|---|---|
| ● Education Class<br>● Workshop<br>● One-on-One Intervention<br>● Demonstrations | ● Newsletters<br>● 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 peer-reviewed journal articles manuscripts submitted
- Number of final stage experimental bermudagrasses sent to national testing phase in the NTEP bermudagrass trial
- Number of turf/roadside vegetaion management workshops conducted
- Number of turfgrass managers trained in improved varieties and integrated turfgrass management systems

☐ 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 | New varieties appearing in the Oklahoma sod trade for the first time |
| 2 | New turf varieties used by the Oklahoma golf course industry |
| 3 | Number of turfgrass manager participants intending to adopt improved turf management practices |

**Outcome #** 1

**1. Outcome Target**

New varieties appearing in the Oklahoma sod trade for the first time

**2. Outcome Type :** Change in Condition Outcome Measure

| **2012:**1 | **2013:**0 | **2014:**1 | **2015:**0 | **2016:**1 |
|---|---|---|---|---|

**3. Associated Knowledge Area(s)**

- 201 - Plant Genome, Genetics, and Genetic Mechanisms
- 202 - Plant Genetic Resources
- 203 - Plant Biological Efficiency and Abiotic Stresses Affecting Plants
- 204 - Plant Product Quality and Utility (Preharvest)
- 205 - Plant Management Systems

**4. Associated Institute Type(s)**

- 1862 Extension
- 1862 Research

**Outcome #** 2

**1. Outcome Target**

New turf varieties used by the Oklahoma golf course industry

**2. Outcome Type :** Change in Condition Outcome Measure

| **2012:**0 | **2013:**1 | **2014:**0 | **2015:**1 | **2016:**0 |
|---|---|---|---|---|

**3. Associated Knowledge Area(s)**

- 111 - Conservation and Efficient Use of Water
- 202 - Plant Genetic Resources
- 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 turfgrass manager participants intending to adopt improved turf management practices

**2. Outcome Type :** Change in Action Outcome Measure

| **2012:**400 | **2013:**400 | **2014:**400 | **2015:**450 | **2016:**450 |
|---|---|---|---|---|

**3. Associated Knowledge Area(s)**

- 111 - Conservation and Efficient Use of Water
- 205 - Plant Management Systems
- 211 - Insects, Mites, and Other Arthropods Affecting Plants
- 212 - Pathogens and Nematodes Affecting Plants
- 216 - Integrated Pest Management Systems

**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

**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 50+ Oklahoma sod producers will continue to be conducted. Survey will confirm availability of new and older varieties in the trade.

Oklahoma Golf course industry is surveyed every 7 to 10 years for adoption of new varieties and acreage of improved varieties.

Conference/Workshop participants will be surveyed to determine their intent to adopt improved varieties and IPM techniques conveyed during workshops. Workshop participants will include those from spring dead spot management workshops, Campus IPM workshops and the Oklahoma/Arkansas Turfgrass Management Short course.

Approximately 2% 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 # 10**

**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 diversity and enhance the local economies and continue to provide a viable quality of life. The planned program will focus on local economic development, infrastructure and community services, local government, and leadership development. All of these focus areas are needed if rural Oklahoma is to prosper.

The Initiative 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;
- 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% | | 100% | |
| | **Total** | 100% | | 100% | |

## 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, local government, leadership development, manufacturing assistance, and entrepreneurship.

### 2. Scope of the Program

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

| Year | Extension | | Research | |
|---|---|---|---|---|
| | 1862 | 1890 | 1862 | 1890 |
| 2012 | 10.0 | 0.0 | 1.0 | 0.0 |
| 2013 | 10.0 | 0.0 | 1.0 | 0.0 |
| 2014 | 10.0 | 0.0 | 1.0 | 0.0 |
| 2015 | 10.0 | 0.0 | 1.0 | 0.0 |
| 2016 | 10.0 | 0.0 | 1.0 | 0.0 |

## V(F). Planned Program (Activity)

### 1. Activity for the Program

Strategic planning training and strategic planning for communiites, infrastructure planning, community service plans, medical facilities and services planning, training of county elected officials, engineering and manufacturing consulting, community economic development studies, community leadership and agricultural leadership development, and entreprenuership training and development.

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

**Extension**

| Direct Methods | Indirect Methods |
|---|---|
| ● Education Class<br>● Workshop<br>● Group Discussion<br>● One-on-One Intervention | ● Newsletters<br>● 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 completed
- Number of county officer training courses conducted
- Number of manufacturing firms receiving applications engineering assistance

☐ 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 |

**Outcome #** 1

**1. Outcome Target**

Number improving business skills

**2. Outcome Type :** Change in Knowledge Outcome Measure

| **2012:**150 | **2013:**150 | **2014:**150 | **2015:**150 | **2016:**150 |
|---|---|---|---|---|

**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

| **2012:**50 | **2013:**50 | **2014:**50 | **2015:**50 | **2016:**50 |
|---|---|---|---|---|

**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

| **2012:**40 | **2013:**40 | **2014:**40 | **2015:**40 | **2016:**40 |
|---|---|---|---|---|

**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

| **2012:**50 | **2013:**50 | **2014:**50 | **2015:**50 | **2016:**50 |
|---|---|---|---|---|

**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

| **2012:**10 | **2013:**10 | **2014:**10 | **2015:**10 | **2016:**10 |
|---|---|---|---|---|

**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

| **2012:**60 | **2013:**70 | **2014:**90 | **2015:**110 | **2016:**120 |
|---|---|---|---|---|

**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. In other cases, social impacts will relate to enhanced quality of life. These evaluation studies are intended to try to capture this information.

## V(A). Planned Program (Summary)

**Program # 11**

**1. Name of the Planned Program**

Global Food Security and Hunger - Integrated Pest Management

**2. Brief summary about Planned Program**

The IPM team will (1) 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.

**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 | 8% | | 10% | |
| 202 | Plant Genetic Resources | 3% | | 5% | |
| 205 | Plant Management Systems | 10% | | 10% | |
| 211 | Insects, Mites, and Other Arthropods Affecting Plants | 11% | | 20% | |
| 212 | Pathogens and Nematodes Affecting Plants | 5% | | 20% | |
| 213 | Weeds Affecting Plants | 11% | | 5% | |
| 215 | Biological Control of Pests Affecting Plants | 5% | | 5% | |
| 216 | Integrated Pest Management Systems | 43% | | 20% | |
| 601 | Economics of Agricultural Production and Farm Management | 3% | | 5% | |
| 901 | Program and Project Design, and Statistics | 1% | | 0% | |
| | **Total** | 100% | | 100% | |

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

**1. Situation and priorities**

Targeted pests and emerging pest problems affect net profitability of agricultural enterprises and the quality of life in non-agricultural systems. Consumers demand a safe supply of food & fiber, and want it produced in an environmentally appropriate way. The availability of conventional pesticide tools continues to decrease, making it essential that IPM programs are effective, safe and sustainable. It remains critical to stakeholders that the IPM team assesses stakeholder priorities, conducts targeted research, and delivers extension and education programs that address safety and sustainability of current and future pest management approaches, and evaluate the impact of short and long-term management recommendations. The IPM team has developed the following priorities: Assess Research and Extension Needs for Oklahoma's "Minor Crops" and Turf Industries; Evaluate IPM strategies in no-till systems; Develop management approaches for aphids in winter canola; expand decision support systems; and continue to develop management approaches for problem weeds.

**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 support for the core group of research and extension faculty will need to be maintained at similar levels. Personnel will need to be replaced. New IPM funding procedures have threatened the level and quality of efforts deliverable.

**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 |
| 2012 | 4.0 | 0.0 | 2.0 | 0.0 |
| 2013 | 4.0 | 0.0 | 2.0 | 0.0 |
| 2014 | 4.0 | 0.0 | 3.0 | 0.0 |
| 2015 | 4.0 | 0.0 | 3.0 | 0.0 |

| Year | Extension | | Research | |
|---|---|---|---|---|
| | 1862 | 1890 | 1862 | 1890 |
| 2016 | 4.0 | 0.0 | 3.0 | 0.0 |

## V(F). Planned Program (Activity)

### 1. Activity for the Program

Conduct targeted research on pest status, suppression and IPM approaches
Develop and deliver IPM programs to stakeholders
Develop pesticide applicator education and pesticide information
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<br>● Workshop<br>● Group Discussion<br>● One-on-One Intervention<br>● Demonstrations | ● Newsletters<br>● TV Media Programs<br>● 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
- IPM schools, conferences and workshops
- Pesticide applicator education schools and workshops

☐ 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 | Peer reviewed research publications and extension publications |
| 2 | Increased use of pest management approaches for targeted cropping system acres |
| 3 | Number of trained certified pesticide applicators |
| 4 | Increase in percent of growers with knowledge of and adoption of Glance n Go aphid sampling procedure in wheat |

**Outcome #** 1

**1. Outcome Target**

Peer reviewed research publications and extension publications

**2. Outcome Type :** Change in Action Outcome Measure

| **2012:**4 | **2013:**4 | **2014:**5 | **2015:**6 | **2016:**7 |
|---|---|---|---|---|

**3. Associated Knowledge Area(s)**

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

**4. Associated Institute Type(s)**

- 1862 Extension
- 1862 Research

**Outcome #** 2

**1. Outcome Target**

Increased use of pest management approaches for targeted cropping system acres

**2. Outcome Type :** Change in Action Outcome Measure

| **2012:**5000 | **2013:**10000 | **2014:**20000 | **2015:**25000 | **2016:**30000 |
|---|---|---|---|---|

**3. Associated Knowledge Area(s)**

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

- 601 - Economics of Agricultural Production and Farm Management

**4. Associated Institute Type(s)**

- 1862 Extension
- 1862 Research

**Outcome #** 3

**1. Outcome Target**

Number of trained certified pesticide applicators

**2. Outcome Type :** Change in Knowledge Outcome Measure

| **2012:**200 | **2013:**200 | **2014:**200 | **2015:**200 | **2016:**200 |
|---|---|---|---|---|

**3. Associated Knowledge Area(s)**

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

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome #** 4

**1. Outcome Target**

Increase in percent of growers with knowledge of and adoption of Glance n Go aphid sampling procedure in wheat

**2. Outcome Type :** Change in Action Outcome Measure

| **2012:**5 | **2013:**5 | **2014:**5 | **2015:**5 | **2016:**5 |
|---|---|---|---|---|

**3. Associated Knowledge Area(s)**

- 133 - Pollution Prevention and Mitigation
- 211 - Insects, Mites, and Other Arthropods Affecting Plants
- 216 - Integrated Pest Management Systems

- 601 - Economics of Agricultural Production and Farm Management

**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**

## V(A). Planned Program (Summary)

**Program # 12**

**1. Name of the Planned Program**

Food Safety - Agricultural Biosecurity

**2. Brief summary about Planned Program**

The Agricultural Biosecurity Team will continue to develop of the National Institute for Microbial Forensics and Agricultural Biosecurity. The Institute is designed as a framework within which communication among Team members is facilitated and initiatives related to research, teaching and outreach are supported.

Initial efforts focus on graduate education and research, to include the development of a multi-disciplinary, multi-OSU-branch core curriculum and targeted research projects.

Training for extension agents and other first detectors, and development of a broad-based undergraduate course in Agricultural Biosecurity will be conducted.

**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 | 20% | | 5% | |
| 212 | Pathogens and Nematodes Affecting Plants | 12% | | 50% | |
| 213 | Weeds Affecting Plants | 15% | | 0% | |
| 712 | Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins | 31% | | 35% | |
| 903 | Communication, Education, and Information Delivery | 22% | | 10% | |
| | **Total** | 100% | | 100% | |

## 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, and preparation for, events of deliberate introduction of a biological agent with the intent to harm U.S. agricultural resources.

**Short term priorities - Established by the Homeland Security Team**

•Develop a cooperative, multi-institutional Oklahoma initiative in agriculturally- and food safety related microbial forensics. Cooperators include OSU (Stillwater, Tulsa, CHS), OAES, OCES, the Oklahoma Bureau of Investigation, the Oklahoma Memorial for the Prevention of Terrorism, the Oklahoma Working Group on Agricultural Biosecurity, OU and possibly other entities.

**C.Establish OSU as a credible and relevant research provider in the area of agricultural microbial forensics.**

1. Support the research project of a graduate student in food safety related forensic diagnostics development (Ma, PI).
2. Support the exploration of microbial variability in global populations of a major phytopathogenic bacterial model, *Pseudomonas syringae,* for forensic discrimination (Fletcher, Bender and Melcher, PIs)
3. Initiate a research project on population diversity among populations of a major plant pathogenic virus model: Tomato spotted wilt virus (Melcher, PI)

•Offer short workshop/training courses on forensic issues.

The purpose of the courses will be to prepare State educators, diagnosticians, researchers, extension agents, students and postdocs, producers and first detectors/responders.

•Sociological impacts of terrorism (preparedness for and sociological/psychological impacts of an agroterrorism incident).

Oklahoma has strong agricultural commodity groups and a strong agricultural economic base. A terrorist attack focused on the agricultural industry in Oklahoma would be devastating. Response during a time of crisis is critical to minimizing the effects of the event. Using the appropriate communication methods is vital to minimizing the effects of an attack. In addition, understanding the sociological and psychological impacts of an agricultural terrorist attack can help in preparation for responding to such an event. (Cartmell, PI)

•Link the activites of the Homeland Security Team with those of the OSU Center for Veterinary Health Sciences (CVHS).

The CVHS has been involved in biodefense initiatives pertinent to biological agents and emerging infectious diseases, with programs supported by NIH/NIAID. Technological platforms and related expertise have been established, and linkage of the CVHS biodefense program to the priorities of the DASNR Homeland Security Team are a priority. Through this multi-college collaboration, the biodefense-related research and training program at OSU can be expanded and strengthened.

**Longer term/associated objectives**

•Develop a graduate program in Microbial Forensics at OSU •Develop an undergraduate course in agricultural biosecurity at OSU

**2. Scope of the Program**

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

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

**1. Assumptions made for the Program**

Agricultural biosecurity issues will receive increasing state and national attention in the near term.
Significant new research, educational and extension initiatives will be needed to respond to agricultural biosecurity-related needs of Oklahoma and the U.S.
Funding opportunities may increase, particularly at the national level, for such efforts.

**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 |
| 2012 | 1.0 | 0.0 | 3.0 | 0.0 |
| 2013 | 1.0 | 0.0 | 3.0 | 0.0 |
| 2014 | 1.0 | 0.0 | 3.0 | 0.0 |
| 2015 | 1.0 | 0.0 | 4.0 | 0.0 |
| 2016 | 1.0 | 0.0 | 4.0 | 0.0 |

## V(F). Planned Program (Activity)

**1. Activity for the Program**

*Establish the **Oklahoma National Institute for Microbial Forensics and Agricultural Biosecurity**, a multi-disciplinary unit to support and address issues of crop and food biosecurity, and their

impacts.

*Conduct **scientific research** targeted specifically towards plant pathogen forensics, sociological impacts of terrorism, and other areas of agricultural biosecurity

***Develop an academic "track"** 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

**Offer a short course on microbial forensics** to prepare State educators, diagnosticians, researchers, extension agents, students and postdocs, producers and first detectors/responders

Develop an **undergraduate course in Agricultural Bbiosecurity**

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

**Extension**

| Direct Methods | Indirect Methods |
|---|---|
| ● Education Class<br>● Workshop<br>● Group Discussion<br>● Demonstrations<br>● Other 1 (Graduate Training) | ● Web sites other than eXtension<br>● Other 1 (State initiatives)<br>● 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 OSU faculty and staff affiliated with the new Oklahoma Center for Agricultural Microbial Forensics Biosecurity
- Number of grant/contract proposals submitted in agricultural microbial forensics and biosecurity
- Number of journal articles submitted with emphasis on agricultural microbial forensics and biosecurity

☐ 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 forensics-relevant journal articles published |
| 3 | Percentage of agricultural producers, handlers and processors employing at least one new (to them)practice to enhance biosecurity |

**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

| **2012:**10 | **2013:**10 | **2014:**10 | **2015:**20 | **2016:**20 |
|---|---|---|---|---|

**3. Associated Knowledge Area(s)**

- 212 - Pathogens 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 #** 2

**1. Outcome Target**

Number of forensics-relevant journal articles published

**2. Outcome Type :** Change in Knowledge Outcome Measure

| **2012:**10 | **2013:**10 | **2014:**12 | **2015:**12 | **2016:**13 |
|---|---|---|---|---|

**3. Associated Knowledge Area(s)**

- 212 - Pathogens 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**

Percentage of agricultural producers, handlers and processors employing at least one new (to them)practice to enhance biosecurity

**2. Outcome Type :** Change in Condition Outcome Measure

| **2012:**5 | **2013:**5 | **2014:**5 | **2015:**5 | **2016:**10 |
|---|---|---|---|---|

**3. Associated Knowledge Area(s)**

- 212 - Pathogens and Nematodes Affecting Plants
- 712 - Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins

**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
- 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**

Evaluation will be done annually by email questionnaire to (1) Team members, to document their activities and products, and (2) to members of the Advisory Committee, composed of members of the national security community.

## V(A). Planned Program (Summary)

**Program # 13**

**1. Name of the Planned Program**

Global Food Security and Hunger - 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 and the region.It includes farm-level decision making, product handling, transprotation, processing, manufacture and retail.

**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 | 40% | | 60% | |
| 602 | Business Management, Finance, and Taxation | 20% | | 10% | |
| 603 | Market Economics | 15% | | 10% | |
| 607 | Consumer Economics | 10% | | 10% | |
| 610 | Domestic Policy Analysis | 15% | | 10% | |
| | **Total** | 100% | | 100% | |

## 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, 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.

Collect, summarize, and disseminate agricultural information required for agricultural decision making

Help farm and agribusiness managers 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

Assist new and existing agribusiness firms in identifying market opportunities and developing new products and marketing systems.

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

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 that improves decision making and increases efficiency and profitability of Oklahoma farms and ranchers is developed and disseminated

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 and reduced risks.

A strong, profitable and efficient production agriculture and agribusiness sector improves the economic viability of rural Oklahoma communities.

## 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 |
| 2012 | 6.0 | 0.0 | 3.0 | 0.0 |
| 2013 | 6.0 | 0.0 | 3.0 | 0.0 |
| 2014 | 6.0 | 0.0 | 3.0 | 0.0 |
| 2015 | 6.0 | 0.0 | 4.0 | 0.0 |
| 2016 | 6.0 | 0.0 | 4.0 | 0.0 |

## V(F). Planned Program (Activity)

### 1. Activity for the Program

Research based information developed

Decision aids developed that assist farm and agribusiness managers in improved decisions

Educational programs conducted that improve the management skills of farm and agribusiness managers

Farm and agribusiness managers are able to better understand economic consequences and make more informed decisions

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

**Extension**

| Direct Methods | Indirect Methods |
|---|---|
| ● Education Class<br>● Workshop<br>● Group Discussion<br>● One-on-One Intervention<br>● Demonstrations | ● Public Service Announcement<br>● Newsletters<br>● Web sites other than eXtension |

### 3. Description of targeted audience

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

## 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 economists trained at other universities to deliver packer-feeder workshops and classes

☐ 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 specialty crop producers and goat producers improving farm management and/or financial management skills |

**Outcome #** 1

**1. Outcome Target**

Number of tax preparers using information from OCES tax schools

**2. Outcome Type :** Change in Knowledge Outcome Measure

| **2012:**500 | **2013:**500 | **2014:**500 | **2015:**500 | **2016:**500 |
|---|---|---|---|---|

**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

| **2012:**200 | **2013:**215 | **2014:**200 | **2015:**200 | **2016:**200 |
|---|---|---|---|---|

**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

| **2012:**100 | **2013:**110 | **2014:**125 | **2015:**150 | **2016:**200 |
|---|---|---|---|---|

**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 specialty crop producers and goat producers improving farm management and/or financial management skills

**2. Outcome Type :** Change in Action Outcome Measure

| **2012:**100 | **2013:**100 | **2014:**100 | **2015:**100 | **2016:**100 |
|---|---|---|---|---|

**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

## 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

Changes in the internal and external business environment facing farm and agribusiness managers and/or changes in the team's resources in assisting these decision makers may influence the team's effectiveness

## 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.

## V(A). Planned Program (Summary)

**Program # 14**

**1. Name of the Planned Program**

Global Food Security and Hunger - Sensor-Based Technologies for Agricultural and Biological Systems

**2. Brief summary about Planned Program**

Development and testing of sensor-based technologies and supporting science to improve production efficiency of plant, animal agriculture productgions systems and related biological systems. Development of technologies to improve plant and animal food safety, processing, and product quality. Development and testing of sensor technologies to optimize inputs into these systems. Conduct education and technology transfer to expedite adoption and application of sensor based technologies in the agricultural industry.

**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 | 45% | | 10% | |
| 205 | Plant Management Systems | 25% | | 25% | |
| 307 | Animal Management Systems | 10% | | 15% | |
| 402 | Engineering Systems and Equipment | 20% | | 50% | |
| | **Total** | 100% | | 100% | |

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

**1. Situation and priorities**

This research initiative began in 1989. Since that time, we have worked closely with groups including the Oklahoma Wheat Commission, Oklahoma Feed and Chemical Dealers Association, Oklahoma Fertilizer Research and Education Foundation, Samuel Roberts Noble Foundation and other agriculture related groups. We have worked closely with individual farmers to conduct on farm research and extension, and conducted numerous field day and demonstrations (both formal and informal). We have worked closely with the agricultural press including the *Farmer Stockman*, *Successful Farming*, and the *Furrow*. In all cases, we intentionally designed our efforts to obtain the participation of stakeholder.

We are working with manufacturers of technologies developed as part of previous research and

regularly seek and receive input. Among those are NTech Industries, Ukiah, CA and Toro, Inc. Minneapolis, MN.

Conduct research to discover the scientific knowledge required to develop sensor and sensor/control systems. Develop sensors and control systems for plant and animal productions systems: to optimize inputs for production, economic return, and environmental impact.

Develop a low cost, hand-held sensor system that can reduce costs and risk for producers in developing nations as well as the U.S. and other developed nations.

**2. Scope of the Program**

- In-State Extension
- In-State Research
- Multistate Research
- 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. Key research and extension personnel will be replaced in a timely manner.

**2. Ultimate goal(s) of this Program**

Through the use of various sensor-based technologies, improve the economic return to agricultural producers, improve overall efficiency and efficacy of agricultural inputs, improve environmental quality, improve value and quality of processed agricultural products, improve fertilizer effectiveness in developing countries, and provide mechanisms to enhanced food safety.

## 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 |
| 2012 | 3.0 | 0.0 | 2.0 | 0.0 |
| 2013 | 3.0 | 0.0 | 2.0 | 0.0 |
| 2014 | 3.0 | 0.0 | 3.0 | 0.0 |
| 2015 | 3.0 | 0.0 | 3.0 | 0.0 |
| 2016 | 3.0 | 0.0 | 3.0 | 0.0 |

## V(F). Planned Program (Activity)

**1. Activity for the Program**

Conduct research into nutritional and pest management needs of wheat, corn, cotton, native, improved pasture, and turf grass in relation to sensed properties. Conduct research into animal grazing system to optimally manage plant and animal subsystems. Conduct research to invent and improve sensors and control systems for agriculture production and processing systems. Conduct research to create decision support systems incorporating sensors into plant and production systems.

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

**Extension**

| Direct Methods | Indirect Methods |
|---|---|
| ● Education Class<br>● Workshop<br>● Group Discussion<br>● One-on-One Intervention<br>● Demonstrations<br>● Other 1 (Extension Publication)<br>● Other 2 (Journal Articles) | ● Newsletters<br>● TV Media Programs<br>● Web sites other than eXtension<br>● Other 1 (Agricultural Press) |

**3. Description of targeted audience**

Crop and livestock producers, food processors, input suppliers, equipment manufacturers, limited resource producers, producers in developing nations..

## 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

- Training sessions and demonstrations for use of new technologies and applications
- New technology applications
- Number of trained extension personnel using hand-held sensors with producers

☐ 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 | Commercialization of hardware/instrumentation |
| 2 | Number of producers adopting and practicing sensor-based technologies |
| 3 | Number of acres where sensor-based technologies are applied |

**Outcome #** 1

**1. Outcome Target**

Commercialization of hardware/instrumentation

**2. Outcome Type :** Change in Condition Outcome Measure

| **2012:** | **2013:** | **2014:** | **2015:** | **2016:** |
|---|---|---|---|---|
| 1 | 1 | 1 | 1 | 1 |

**3. Associated Knowledge Area(s)**

- 102 - Soil, Plant, Water, Nutrient Relationships
- 205 - Plant Management Systems
- 402 - Engineering Systems and Equipment

**4. Associated Institute Type(s)**

- 1862 Extension
- 1862 Research

**Outcome #** 2

**1. Outcome Target**

Number of producers adopting and practicing sensor-based technologies

**2. Outcome Type :** Change in Action Outcome Measure

| **2012:** | **2013:** | **2014:** | **2015:** | **2016:** |
|---|---|---|---|---|
| 1000 | 1000 | 2000 | 2000 | 3000 |

**3. Associated Knowledge Area(s)**

- 102 - Soil, Plant, Water, Nutrient Relationships
- 205 - Plant Management Systems

**4. Associated Institute Type(s)**

- 1862 Extension
- 1862 Research

**Outcome #** 3

**1. Outcome Target**

Number of acres where sensor-based technologies are applied

**2. Outcome Type :** Change in Condition Outcome Measure

| **2012:**300000 | **2013:**400000 | **2014:**500000 | **2015:**600000 | **2016:**700000 |
|---|---|---|---|---|

**3. Associated Knowledge Area(s)**

- 102 - Soil, Plant, Water, Nutrient Relationships
- 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
- Other (commercialization opportunities)

**Description**

The driving forces for development and adoption of these technologies are unlikely to change. These forces include: escalating fuel and fertilizer crops, constant or declining commodity prices, increased pressure to improve environmental stewardship, and limited and expensive labor.

Based on our past experience in conducting research and extension programs on sensor based agricultural technologies, money has always been a limited factor. However, we have always been able to find a source of funding to continue the research and extension programs.

The principal limitation is commercializing the technologies. We were successful with previous technologies because we were able to find a company willing to manufacture the devices and producer organizations willing to support the development and extension of the technologies. Without these groups, this program will not succeed.

## V(K). Planned Program - Planned Evaluation Studies

**Description of Planned Evaluation Studies**

We will work closely with cooperators identified by state specialists and county educators. We will assist them in evaluating technologies and monitor results. On farm tests results will be used to determine benefits of these technologies. Follow up meetings with individual cooperators will be conducted to determine the extent to which they adopt the technologies.

## V(A). Planned Program (Summary)

**Program # 15**

**1. Name of the Planned Program**

Sustainable Energy - Bio-Based Products Development

**2. Brief summary about Planned Program**

Explore the opportunities in biobased product development, from production of raw materials, i.e. feedstocks, to the product proof-of-concept prior to commercialization. A wide range of crops (existing and potentially-viable) and residues will be evaluated and utilized in developing and/or improving the conversion efficiency for the production of biofuels and value-added products.

**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% | | 100% | |
| | **Total** | 100% | | 100% | |

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

**1. Situation and priorities**

Development of a viable bio-based products industry is contingent on sustainable, dependable, and economical feedstock supply systems. Potential feedstocks include seed and/or vegetative parts (including harvesting/processing residues) of plants grown in Oklahoma for food, feed, or livestock herbage. Oklahoma offers an abundance of opportunity for the growth of a variety of crops that can be converted into biofuels. In addition to biofuels, many other valuable products could be produced from Oklahoma crops and agricultural residues. With the increasing energy cost and concerns of environmental quality, bio-based products such as biopesticide and biofertilizer are gaining increasing attention.

Information is needed on species and species cultivars adaptable to selected systems as influenced by: climatic and edaphic differences across the state, cultural requirements, economics of production, and conversion technology requirements.

In biofuels production, the major challenge is overcoming the difficulty in converting lignocellulosic materials, such as grasses and agricultural residues, into ethanol. The two main approaches to accomplish this task are: hydrolysis of polysaccharides into sugars that are fermented to ethanol by microorganisms, and gasification of biomass to carbon monoxide, carbon dioxide, and hydrogen which can be fermented by certain microorganisms to ethanol. Research may also focus on extracting valuable components from

biomass, such as nutraceuticals, and valuable uses of waste products from biofuels production would be beneficial to establishing "biorefineries." 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.

**2. Scope of the Program**

- In-State Research
- Multistate Research

## 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

**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 |
| 2012 | 1.0 | 0.0 | 4.0 | 0.0 |
| 2013 | 2.0 | 0.0 | 4.0 | 0.0 |
| 2014 | 2.0 | 0.0 | 4.0 | 0.0 |
| 2015 | 2.0 | 0.0 | 4.0 | 0.0 |
| 2016 | 2.0 | 0.0 | 4.0 | 0.0 |

## V(F). Planned Program (Activity)

**1. Activity for the Program**

•Project proposals

•Technical presentations

•Technical papers

•Journal articles

•Patents

•Products taken to commercialization by industry

- Educating producers on production and harvesting practices
- Educating producers on contracting crops for use in bioenergy

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

**Extension**

| Direct Methods | Indirect Methods |
|---|---|
| ● Education Class<br>● Workshop<br>● Group Discussion<br>● One-on-One Intervention<br>● Demonstrations | ● Newsletters<br>● TV Media Programs<br>● 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

- Journal Articles
- Technical papers and presentations
- New processes 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 | Products/processes taken to commercialization by industry |

**Outcome #** 1

**1. Outcome Target**

Products/processes taken to commercialization by industry

**2. Outcome Type :** Change in Condition Outcome Measure

| **2012:**0 | **2013:**1 | **2014:**2 | **2015:**2 | **2016:**2 |
|---|---|---|---|---|

**3. Associated Knowledge Area(s)**

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

**4. Associated Institute Type(s)**

- 1862 Extension
- 1862 Research

## V(J). Planned Program (External Factors)

**1. External Factors which may affect Outcomes**

- Appropriations changes

**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 Initiative Team (self-assessment) and the sub-group of the Sun Grant Initiative Advisory Board.

## V(A). Planned Program (Summary)

**Program # 16**

**1. Name of the Planned Program**

Childhood Obesity - Human Nutrition and Health

**2. Brief summary about Planned Program**

These programs focus on concerns from advisory and agencies across the state and include issues related to: overweight youth and adults, health risks, dietary intake, physical activity, attitudes and behaviors concerning food, risky behaviors by youth, and food safety.

**3. Program existence :** New (One year or less)

**4. Program duration :** Short-Term (One year or less)

**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 |
|---|---|---|---|---|---|
| 703 | Nutrition Education and Behavior | 70% | | 0% | |
| 724 | Healthy Lifestyle | 30% | | 0% | |
| | **Total** | 100% | | 0% | |

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

**1. Situation and priorities**

Among children and adolescents, obesity increases the risk of diabetes, hypertension, hypercholesterolemia, cardiovascular disease, gall bladder disease and arthritis. Over the past decade, the percentage of those overweight has steadily increased in Oklahoma. Over half of Oklahoma's adult population has been classified at risk for health problems related to being overweight. The health-related economic cost of overweight to business is substantial and as much as 36 percent of health care costs relate to overweight.

Oklahomans know they need to eat well to be healthy yet a majority fail to meet the minimum recommended number of daily servings from the USDA MyPyramid grains; fruit; vegetable; and milk groups and total fat and simple sugar intake continue to exceed recommendations.

Diabetes is major risk factor of heart disease, which is the leading cause of death in Oklahoma and the nation. Individuals with diabetes are two to five times more likely to die from heart disease and stroke. Oklahoma has over 402,566 cases of diabetes, and about 1,800 annual deaths from diabetes. The cost of Diabetes in Oklahoma is over $180,998,509,000.

Heart and blood vessels, also called cardiovascular diseases (CVD), are the leading cause of deaths in the Oklahoma and the nation. In 2002 cardiovascular diseases cost the nation an estimated $329.2 billion, including health expenditures and lost productivity (AHA, statistical update, 2002). The death rate due to Heart Disease is 15% higher in Oklahoma than the United States rate.

It is estimated that food borne diseases cause 76 million illnesses, 325,000 hospitalizations, and 5,200 deaths in the United States each year. Medical costs and lost wages due to food borne salmonellosis, only 1 of many food borne infections, have been estimated to be more than $1 billion/year. All persons are at risk of food borne illness but pregnant women, infants, the elderly and the immunocompromised at greatest risk of serious illness and death.

Priorities
Childhood Obesity
Reduce the increase in overweight/obesity
Improve dietary intake
Reduce the increase in diabetes
Reduce the increase in heart disease death rates
Improve food safety for consumers

**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.

- The focus issue of Obesity/Overweight is a long-term challenge citizens of Oklahoma will battle.

- 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.

**2. Ultimate goal(s) of this Program**

Oklahoma citizens will have decreased risk factors associated with obesity and overweight

## 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 |
| 2012 | 20.0 | 0.0 | 0.0 | 0.0 |
| 2013 | 20.0 | 0.0 | 0.0 | 0.0 |
| 2014 | 20.0 | 0.0 | 0.0 | 0.0 |
| 2015 | 20.0 | 0.0 | 0.0 | 0.0 |
| 2016 | 18.0 | 0.0 | 0.0 | 0.0 |

## V(F). Planned Program (Activity)

### 1. Activity for the Program

• Development of new curricula

• Adaptation & supplementation of existing curricula

• Outreach to families, schools, child care providers, direct assistance, demonstrations, and educational opportunities relating to food, healthy eating, excercise, diet, etc.

• Development of surveys, evaluation tool

• Searching out and applying for appropriate grants

• Delivery through classes, One-on-One, News Releases/TV/Radio, Participation in Events, Displays

•Provide training and other staff development opportunities to county educators

•Create public awareness of programs and resources through promotional and educational materials to be distributed to teachers, agency professionals, and other community members.

### 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 | ● Web sites other than eXtension |
| ● Demonstrations | |

**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**

- Revised online curriculum

☐ 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 improving food, nutrition, and/or physical activity behaviors through Healthy Oklahoma Youth Program |
| 2 | Number of children and youth exposed to learning leading to improved food, nutrition and physical activity behaviors through Farm to You Program |
| 3 | Number of low-income youth exposed to learning leading to improved food, nutrition and physical activity behaviors through Food and Fun for Everyone program. |
| 4 | Number of individuals graduating from the Fresh Start: Nutrition & You program which leads to improvements in food, nutrition and physical activity behaviors. |

**Outcome #** 1

**1. Outcome Target**

Number of youth improving food, nutrition, and/or physical activity behaviors through Healthy Oklahoma Youth Program

**2. Outcome Type :** Change in Action Outcome Measure

| **2012:**1000 | **2013:**1000 | **2014:**1000 | **2015:**1000 | **2016:**1000 |
|---|---|---|---|---|

**3. Associated Knowledge Area(s)**

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

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome #** 2

**1. Outcome Target**

Number of children and youth exposed to learning leading to improved food, nutrition and physical activity behaviors through Farm to You Program

**2. Outcome Type :** Change in Knowledge Outcome Measure

| **2012:**5000 | **2013:**5000 | **2014:**5000 | **2015:**4500 | **2016:**4000 |
|---|---|---|---|---|

**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**

Number of low-income youth exposed to learning leading to improved food, nutrition and physical activity behaviors through Food and Fun for Everyone program.

**2. Outcome Type :** Change in Knowledge Outcome Measure

| **2012:**3000 | **2013:**3000 | **2014:**3000 | **2015:**3000 | **2016:**3000 |
|---|---|---|---|---|

**3. Associated Knowledge Area(s)**

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

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome #** 4

**1. Outcome Target**

Number of individuals graduating from the Fresh Start: Nutrition & You program which leads to improvements in food, nutrition and physical activity behaviors.

**2. Outcome Type :** Change in Action Outcome Measure

| **2012:**500 | **2013:**500 | **2014:**500 | **2015:**500 | **2016:**500 |
|---|---|---|---|---|

**3. Associated Knowledge Area(s)**

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

**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

{NO DATA ENTERED}

## V(A). Planned Program (Summary)

**Program # 17**

**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.

**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% | | 5% | |
| 203 | Plant Biological Efficiency and Abiotic Stresses Affecting Plants | 0% | | 5% | |
| 206 | Basic Plant Biology | 0% | | 20% | |
| 211 | Insects, Mites, and Other Arthropods Affecting Plants | 0% | | 5% | |
| 212 | Pathogens and Nematodes Affecting Plants | 0% | | 5% | |
| 304 | Animal Genome | 0% | | 5% | |
| 305 | Animal Physiological Processes | 0% | | 45% | |
| 311 | Animal Diseases | 0% | | 5% | |
| 312 | External Parasites and Pests of Animals | 0% | | 5% | |
| | **Total** | 0% | | 100% | |

## 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 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.
Priorities will be to:
a. carry out basic research into the interactions between and 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.
c. obtain funding to acquire and maintain state of the art equipment to enhance the research capabilities relating to protein 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: the need to restore the "Hybridoma Facility (HYCABS)" is specifically noted, particularly to develop intellectual property that is patentable or that can be licensed.
e. attract sufficient extramural support to establish an extramurally funded "Structural Biology" Center at OSU that will stimulate collaborations and research productivity.
f. Long-term goals are to grow knowledge, and to use this knowledge to contribute to the enhancement of the State's agricultural productivity.

collaborations and research productivity.
f. Long-term goals are to grow knowledge, and to use this knowledge to contribute to the enhancement of the State's 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 be continued to be developed that will accelerate solving macromolecular structures, and interaction networks.
- 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 adding 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: the assumed restoration the "HYCABS Core" is specifically noted, particularly its relationship to the development of patentable and licensable intellectual property.
-Faculty and staff with necessary skills can be recruited.

-External funds for the purchase of new instrumentation and technologies will be obtained that will serve as catalyst for stimulating research productivity and collaborations.
-Increased research productivity will lead to new research discoveries that will subsequently translate into increased extramural funding throughout the course of the project.
-Discoveries will have economic impacts.
-The team initiative will lead to increased interactions and collaborations between research groups on and off campus.

**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.
-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 |
| 2012 | 0.0 | 0.0 | 8.0 | 0.0 |
| 2013 | 0.0 | 0.0 | 9.0 | 0.0 |
| 2014 | 0.0 | 0.0 | 9.0 | 0.0 |
| 2015 | 0.0 | 0.0 | 10.0 | 0.0 |
| 2016 | 0.0 | 0.0 | 10.0 | 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 focus 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 applied for/ solicited from national, state and university sources to acquire, maintain and restore support for "Core" facilities that are critical to the research mission of DASNR and Oklahoma State University.
-Proposals will be submitted to attract sufficient extramural support to establish an extramurally funded "Structural Biology" Center at OSU that will stimulate collaborations and research productivity.

- Design and conduct basic research 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 meetings
- 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<br>● Group Discussion<br>● Demonstrations | ● TV Media Programs<br>● 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

- Number of graduate students graduated and post doctoral scientists moving on to full employment.

☐ 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 | Research development knowledge taken to patent or license stage. |

**Outcome #** 1

**1. Outcome Target**

Research development knowledge taken to patent or license stage.

**2. Outcome Type :** Change in Action Outcome Measure

| **2012:**1 | **2013:**1 | **2014:**1 | **2015:**1 | **2016:**1 |
|---|---|---|---|---|

**3. Associated Knowledge Area(s)**

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

**Description**

{NO DATA ENTERED}

## V(K). Planned Program - Planned Evaluation Studies

**Description of Planned Evaluation Studies**

{NO DATA ENTERED}