2010 Oklahoma State University Combined Research and Extension Annual Report of Accomplishments and Results

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I. Report Overview

1. Executive Summary

The Division of Agricultural Sciences and Natural Resources (DASNR) at Oklahoma State University has an integrated approach to research and extension programs. Over the past years the Oklahoma Agricultural Experiment Station (OAES) and the Oklahoma Cooperative Extension Service (OCES) have developed multidisciplinary TEAMS of research and extension faculty members working on priority research and extension program needs. The TEAMS are based on priorities identified by stakeholders and faculty and specialists. Our Planned Program areas as identified in our Plan of Work serve as overarching guides for the priority areas of research and extension. Each of the TEAM activities is thus covered under one of the Planned Program areas. Each of the faculty members and specialists remains administratively connected to a disciplinary department or geographic region unit. However, each also plans and conducts research and/or extension program efforts in close collaboration with other individuals within at least one multidisciplinary TEAM. Some significant research and/or extension efforts and developments during 2010 are presented following under the NIFA goal to which they most contribute:

Global Food Security and Hunger

10 Years of Education on First Hollow Stem - A little over ten years ago Oklahoma Agricultural Experiment Station (OAES) and Oklahoma Cooperative Extension Service (OCES) scientists first brought to Oklahoma farmers research they developed to improve the timing of the grazing termination decision on wheat fields grazed by cattle. Wheat fields utilized for livestock grazing during the fall/winter and then harvested for grain by early summer are termed 'dual-purpose' wheat fields. Proper timing of livestock grazing termination at the ¼ inch First Hollow Stem (FHS) stage of growth is critical in avoiding large grain yield losses caused by overgrazing wheat pastures (based on OSU reserach in the late 1990s). Because grazing termination dates can vary greatly on a field-by-field basis due to planting date and the particular variety planted, FHS is the single best way for stocker cattle producers to determine exact times for grazing termination. Oklahoma has about 5.7 million acres of wheat planted annually, of which, about 2.5 million acres are utilized by farmers as 'dual-purpose' wheat acres. Through extensive educational efforts conducted by OCES, it is estimated that at least 75% of dual-purpose wheat producers in Oklahoma use first hollow stem as a criterion for removal of cattle from wheat pasture. This research and extension program saved producers in Oklahoma approximately $275,000,000 in 2010 due to application of this research-based BMP as opposed to typical practices followed previously.

Oklahoma Quality Beef Network - Cattle sickness costs the cattle industry millions of dollars each year. These losses negatively impact producer profitability and they impact each and every level of the beef production chain. In order to facilitate the adoption of best management practices that should result in reduced sickness and associated adverse effects, the Oklahoma Quality Beef Network (OQBN) was initially developed in 2001 and redefined in 2009. This is a joint program between the Oklahoma Cooperative Extension Service and Oklahoma cattle producers. The objective is to add value to Oklahoma's calf crop and capture at least part of the added value. In 2010, 181 Oklahoma beef producers enrolled 9,262 calves in the OQBN program. Ten regional OQBN Vac-45 calf sales were conducted in seven livestock markets.

OQBN cattle received a premium of $7.84/cwt, based on the weighted average price of all lots, over non-preconditioned cattle. The average price premium is an additional $47.04 per head, while the added value of weight gain during the preconditioning period averaged $64 per head for a gross increase in revenue of $111 per calf. Average cost to participate in the program was $47.60 per head, resulting in a net increase in income of $63.40 per head or total net increase in income of $587,211 for the calves enrolled in the program in 2010. However, the educational program and example given by the OQBN is stimulating growth in adoption of these management, certification and marketing practices throughout the state. Therefore, the impact is much higher than can be measured by direct participation in the program.

Hand-Held Sensors Earn Oklahoma Producers Important Returns and a Bright Future for Developing Countries - Current global nitrogen use efficiency for cereals production is estimated to be3%. Environmental concerns and increasing fertilizer prices have necessitated improved precision in determining crop nitrogen requirements. Oklahoma State University has developed hand-held sensors and corresponding web-based decision aids that can be used to develop in-season nitrogen recommendations based on yield potential. This is accomplished by using optical sensors to compare crop growth and nitrogen content in small nitrogen-rich strips to that of the larger field and then using a research-based algorithm to generate a yield estimate and corresponding nitrogen recommendation. This method is much more accurate than yield-goal-based systems in predicting high or low-yielding years where nitrogen fertilizer application rates should be adjusted accordingly. Oklahoma State University Cooperative Extension conducted large-scale, on-farm sensor-based nitrogen recommendation system validation trials across Oklahoma. Results showed that sensor-based recommendations were on average 30 pounds per acre less than standard farmer practice, yet the sensor-based recommendations produced equivalent grain yield to farmer practice and maintained protein levels above 11%. Using 2010 fertilizer prices, this equates to an average farmer savings of $13.50 per acre with no yield reduction. Adoption of the technology has grown from a few hundred nitrogen-rich strips in 2005 to an estimated 5,000 nitrogen-rich strips in Oklahoma wheat fields in 2010. These strips are used to make decisions on at least 400,000 acres resulting in an estimated minimum savings of $5.4 million to Oklahoma producers. An Optical Pocket Sensor developed at OSU and tested in Oklahoma, Mexico, and India by OSU Extension specialists and researchers will ultimately cost only $200, versus $4000 for the current hand-held sensor. This will permit all U.S. farmers and many developing country producers access to this resource and environment saving technology.

Meat Goat Boot Camps Continue to Draw Producers - The meat goat industry has been rapidly expanding in Oklahoma and the United States. Meat goat numbers in Oklahoma have gone from not even being counted by USDA to 94,000 in 2007, ranking 5th in the U.S goat numbers. Many goat producers are relatively new to livestock production. These producers not only need education on goat production practices but also education on how to do the simple management techniques such as ear tagging, castrating, and body scoring that many livestock producers take for granted. The Oklahoma Meat Goat Boot Camp was created to meet the educational needs of these goat producers. The Oklahoma Meat Goat Boot Camp is a three day workshop that combines hands-on demonstration and activities with classroom presentations and exercises. Camps size was limited to 50 participants. Cost to the participants was $100. During the three days each participant gain information and skills on animal identification, hoof care, fencing, forage management, business management, nutrition, parasite control, herd health management, predator control, kidding and neonatal care and reproduction and pregnancy diagnosis. All particiapants were asked to evaluate the program and determine the impact to their operation. Their average perceived value of the information presented was $20.89 per goat for a total value perecived for the 2010 programs of over $93,000. All

Plant Biological Technologies - Researchers collected soil samples from the Oklahoma Tallgrass Prairie Preserve and analyzed the samples to determine virus sequences present in the soil. Results indicate that there are many more unrecognized viruses than known viruses in the world, that viruses are

not necessarily pathogenic and that they have coexisted with plants for a long time. These revelations are reshaping current hypotheses regarding viruses and their roles in ecosystems. Results also indicate that there exists a significant potential for future outbreaks of viral disease in crop systems. These results and methods developed in the research project serve to improve our application of biotechnology in biosecurity at our borders.

Climate Change

Mesonet Weather-Based Decision Aids - Oklahoma agricultural producers and natural resource managers have the opportunity to move from calendar-based to weather-based farm management. Weather-based farm management can reduce farm inputs, increase crop yield and quality, improve farm sustainability, provide new integrated pest management (IPM) opportunities, improve environmental protection and expand crop marketing information. The Oklahoma Mesonet through its Mesonet and Agweather websites (http://mesonet.org and http://agweather.mesonet.org) gives farmers and ranchers weather-based risk management tools and information. Weather-based management has been made possible because of the Oklahoma Mesonet, one of the most data-rich weather networks in the world. New weather data are transmitted every 5 minutes from a statewide system of 120 automated weather-monitoring towers. This constant flow of quality assured, research-quality weather data are used to maintain a wide spectrum of weather and agricultural decision support products made available via the Web. The challenge in implementing weather-based agricultural management includes increasing producer comfort with computer operation, expanding grower weather knowledge, simplifying weather data display, shaping decision support products to meet day-to-day farm management needs and providing out-of-office data access.

Oklahoma State University, the University of Oklahoma and the Oklahoma Climatological Survey (OCS) through the Oklahoma Mesonet have created multi-faceted agricultural and natural resource extension outreach and research programs. Mesonet Agweather (http://agweather.mesonet.org) provides access to weather data and products at no cost to Oklahoma farmers and ranchers. Ongoing extension and outreach efforts inform growers about the Mesonet Agweather website and introduce weather-based farm management tools via farm show exhibits, educational programs and printed materials. In 2010, efforts focused on promotion of the new Mesonet (Chemical Spray) Drift Risk Advisor, revised Mesonet.org website and new Mesonet Mobile smartphone website. The Drift Risk Advisor was made operational in January 2010 on the Agweather website. It allows applicators to enter lower and upper weather parameters for the materials they are applying and wind directions they need to avoid. The Drift Risk Advisor compares the entered weather parameters to an hour-by-hour National Weather Service forecast for the next 84 hours and shows times of high and low drift risk. The revised Mesonet website acts as a single web portal to all Mesonet program websites. Data selection has been moved to a visual format, with small updated thumbnails of data products. The new Mesonet Mobile website allows smartphone cellphone users with cellphone Internet access to view Mesonet data on the go.

An economic survey completed by OU using recognized economic analysis techniques, estimated that the 10% of Oklahoma crop land being managed with Oklahoma Mesonet data saved $8 million in production costs in 2008. This estimated value does not include the Mesonet value to livestock producers.

Mesonet Agweather has been shown to serve agricultural and horticultural enterprises on several levels. Dennis Brigham of Bentley Turf Farms told how he typically turns to Mesonet Agweather for weather information to help him schedule sod installation by his company's installation crews. One day north of Mustang, a Bentley Turf Farms' crew was busy laying sod, while to the southwest a severe storm cell spawned a tornado. Dennis used the radar on the Mesonet Agweather website to track the storm. He determined that there was a high probability the tornado would track over the location where the crew was laying sod. Mesonet Agweather gave him enough lead-time to contact the crew leader and get the crew to travel south out of the tornado's track. On this day, Mesonet Agweather quickly transitioned from being a day-to-day scheduling tool to a life and death safety tool.

Food Safety

Fresh produce safety - Fresh produce has been and will likely continue to be associated with foodborne illness outbreaks. Several critical knowledge gaps have to be filled before a fundamental effort

can be made in control of contamination of fresh produce by foodborne pathogens. One such gap is the knowledge of microbial communities on and around fresh produce through its production chain, from farm to fork. These issues are critical for the consumer, as well as to Federal agencies charged to ensure a safe and secure food supply. Researchers A. Wayadande and colleagues compared plant structural parameters of spinach grown under fast- and slow-growth conditions. Cell walls and thickness of leaves was higher in the slow-growth spinach. This difference may explain the lower incidence of spinach breakage in spinach grown during the winter and spring months in the Salinas Valley of California and may be correlated with fewer human pathogen outbreaks in this crop. These results provide growers and regulatory agencies the ability to focus monitoring strategies based on seasonablity of production.

Agriculture biosecurity and bioterriosm - A biological attack on United States crops, rangelands or forests could have severe impacts. Biocrimes, perpetrated for economic gain, are even more likely. Preparedness requires a strong national security plan that encompasses microbial forensics and criminal attribution. However, U.S. crop producers, consultants and agricultural scientists, unaccustomed to the possibility of intentional pathogen introduction, traditionally focus disease management strategies on prevention, rapid eradication or long-term management. New information, technologies and resources in microbial forensics (human, livestock and plant) are needed to enhance the nation's preparedness and responsiveness to plant health emergencies. NIMFFAB (J. Fletcher and students) developed a questionnaire framework and assessment module to assist law enforcement and security investigators to determine whether a plant disease outbreak was naturally or intentionally incited. The tool was developed using information collected from field studies on Wheat streak mosaic virus that was gathered by our group. Validation of the tool was completed via application of the tool by researchers and by Extension agents, law enforcement personnel, and Oklahoma producers, to a naturally occurring and an intentionally inoculated disease event. A manuscript is in preparation. The tool is now available for use by regulatory and law enforcement agencies.

Childhood Obesity

Healthy Oklahoma Youth - Over the past decade, the percentage of those overweight has steadily increased in Oklahoma. As many as one in five Oklahoma children are at-risk of overweight or overweight; and two-thirds of adults are overweight or obese. Among children and adolescents, overweight increases the risk of type 2 diabetes, high blood pressure, and cardiovascular disease. The health of Oklahoma youth can be improved by increasing knowledge, skills, attitudes and behaviors related to food and physical activity. Overweight, obesity and associated health problems have a significant economic impact. The estimated annual cost of overweight and obesity in the United States is $117 billion. Just a 10% sustained weight loss has been estimated to reduce an overweight person?s lifetime medical costs by $2,200 to $5,300. Healthy Oklahoma Youth program is delivered primarily by OCES FCS educators in school settings. The curriculum was found to result in important improvements in food, nutrition and physical activity behaviors were observed among participating Oklahoman youth which can have a role in reducing overweight and risk of related chronic diseases. This program was provided to 15,840 children and youth. The statistically significant observed improvements in food, nutrition and physical activity behaviors include:

34% increase in eating whole grain breads and cereals.
27% increase in eating fruits and vegetables.
26% increase in drinking milk or eating cheese or yogurt
32% increase in eating low-fat meats
33% increase in eating foods from 2 or 3 MyPyramid food groups for breakfast.
30% increase in snacking only when hungry.
39% increase in using nutrition facts labels to make food and beverage choices.
34% increase each in eating small amounts of high fat foods and sugar-sweetened beverages.
22% increase in time spent in physical activity.

"Farm to You" - is the 2010 Champion of Children's Health and recipient of the Dr. Rodney Huey

Memorial Champion of Oklahoma Health award, the highest honor of the Champions of Health awards.

Coordinated by the Oklahoma Cooperative Extension Service (OCES), Farm to You is an exemplary demonstration of collaboration between state agencies and community partners with the common mission of delivering research-based information and programs to help Oklahoma youth address major health concerns that affect their quality of life. These concerns include increased rates of obesity, limited physical activity, low consumption of fruits and vegetables, high prevalence of tooth decay and a high rate of tobacco use among adolescents and teens. The educational initiative is designed to increase awareness of the relationships between agriculture, food and health.

The Farm to You program consists of a distinctive 40-foot-by-40-foot enclosed walkthrough exhibit that travels throughout the state to scheduled community sites. The exhibit is quickly assembled with the help of school and community volunteers. At each of nine stations, students spend about six minutes participating in activities demonstrating where food grows, how food is used by the body to grow and develop, and how health habits keep the body healthy. Students meet Farmer Pete at the Cheeseburger Farm where MyPyramid foods are grown. They follow that food to the market to investigate Nutrition Facts labels, and then go on to the Healthy Cool Café where they take responsibility for choosing a variety of healthy foods. The adventure continues through an oversized mouth where they practice flossing, then travel through the digestive system, muscles, bones and skin where they engage in activities to reinforce desired health behaviors. The project has reached more than 31,000 schoolchildren statewide.

Farm to You partners include the Nutritional Sciences Department and Community Nutrition Education Programs in the College of Human Environmental Sciences at Oklahoma State University, the Oklahoma Department of Health WIC Service, Oklahoma 4-H Youth Leadership, and Development and Southwest Dairy Farmers.

Sustainable Energy

Most of the energy needs in the U.S., especially for transportation, are derived from fossil fuel resources. As the demand for fossil fuel resources is dramatically increasing, finding alternative sources of energy is becoming extremely critical. Use of chemicals derived from fossil resources has also increased tremendously. Furthermore, these resources have caused environmental concerns. One of the best renewable and environmental-friendly resources is biomass. Biomass recycles carbon dioxide and can be available in large quantities on a renewable basis in the U.S. including Oklahoma.

Syngas Fermentation - It was discovered that cotton seed extract (CSE) can be used to replace the defined media components typically added. Clostridium strain P11, our main ethanol producing bacterium, actually produces more ethanol when CSE is used than when the traditional media is used. Use of CSE would greatly reduce the cost and complexity of media formulation. Also, reducing concentrations of vitamin B_{12}, cobalt, and calcium pantothenate resulted in increased ethanol production. It is suspected that this occurs due to increased concentrations of reduced cofactors. Reduced cofactors are necessary for ethanol production. In addition to CSE as media replacement, it was found that corn steep liquor (CSL) can replace also replace yeast extract (YE) and many other expensive minerals and vitamins in the used in the defined medium. An addition of 57% more ethanol was produced with media contained CSL. In addition, the use of CSL as a nutrient enhanced butanol production. At least sevenfold more butanol was produced in CSL media compared to YE medium.

Structure and Function of Macromolecules - Research scientists determined that the natural product siybin, an extract from milk thistle, is an inhibitor of Hsp90 and thus may block maturation of proteins active in oncogeneis in liver cancers. These results identifying the mechanism of activity may lead to development of more potent derivatives useful in the treatment of cancer and neurodegenerative diseases.

Total Actual Amount of professional FTEs/SYs for this State

Year: 2010	Extension		Research	
	1862	1890	1862	1890
Plan	204.0	0.0	85.0	0.0
Actual	259.0	0.0	85.0	0.0

II. Merit Review Process

1. The Merit Review Process that was Employed for this year

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

2. Brief Explanation

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 (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 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. Stakeholder Input

1. Actions taken to seek stakeholder input that encouraged 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 groups
- ☑ Survey specifically with non-traditional individuals
- ☑ Survey of selected individuals from the general public
- ☑ Other (Professional journals, meetings, etc.)

Brief explanation.

A broad array of actions were used to encourage stakeholder input. Personal invitation and public notice are regularly used in Extension Program Advisory Committees as well as when we seek input to experiment station projects. Most all statewide and unit advisory groups are notified through direct contact. Several programs have targeted nontraditional stakeholder participation including sustainable agriculture, agribiosecurity, water, wildlife, youth, etc. Farm commodity groups regularly are invited to campus and we attend most of their meetings in order to hear input. A few of our advisory groups are statutory in nature.

2(A). A brief statement of the process that was 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
- ☐ Other

Brief explanation.

Every County CES office holds 2-4 program advisory meetings annually. OCES and OAES also meet with numerous boards, commissions, associations, public agencies, departmental advisroy committees, special needs groups, individuals, businesses, etc each year.

In FY11 we established and filled an educator position specializing in Hispanic Community outreach in the Oklahoma City area. This position will be officed in the Hispanic Community Center as well as the Oklahoma County Extension Center. It will help identify needs of this community as well as provide needed programming.

2(B). A brief statement of the process that was 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
- ☐ Survey specifically with non-traditional individuals
- ☑ Meeting with invited selected individuals from the general public
- ☐ Survey of selected individuals from the general public
- ☑ Other (Peer reviews, grant proposal reviews)

Brief explanation.

Following are some examples of stakeholder input- this list is in no way exhaustive. Representatives from OAES and/or OCES met with the following stakeholder groups:

Division of Agricultural Sciences and Natural Resources Advisory Council (twice per year)

Oklahoma Wheat Commission (ten times per year)

Oklahoma Peanut Commission (twice per year)

Oklahoma Sorghum Commission (twice per year)

Oklahoma Wheat Growers Association Board (twice per year)

Oklahoma Crop Improvement Association Board (three times per year)

Soil Fertility Research and Education Advisory Board (three times per year)

Canola Advisory Board (twice per year)

Oklahoma Grain and Feed Association

Oklahoma Seed Trade Association

Oklahoma Genetics Inc. Board

Oklahoma Home and Community Education

Oklahoma Ag in the Classroom Advisory Committee (Quarterly)

4-H Shooting Sports Committee

Land Judging Committee

Health Rocks Advisory Team

4-H Centennial Gardens Committee (twice per year)

Ok Youth Forestry and Wildlife Camp Committee (six times)

Northeast Oklahoma Beekeepers Association

USGA Advisory Committee

Oklahoma Pecan Growers Association

Rural Health Works Committee

Rural Health Works National Advisory Committee

Stormwater Advisory Committee

Tribal On-Site Waste Project Advisory Committee

Oklahoma State Water Plan

Integrated Environmental Research and Education Site Advisory Committee

Oklahoma Sustainable Agriculture Research and Extension Advisory Committee

Oklahoma Food and Agricultural Advisory Center Advisory Committee (twice per year)

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.

Input was used in decision as to filling vacant positions in a difficult budget time. These decisions resulted in filling a State Cotton Extension and Research Specialist, a Bioenergy Machinery Research and Extension Specialist, and an Assistant Director for FCS.

Input from stakeholders regarding stricter standards regarding dockage and/or foreign material in wheat resulted in a previously unplanned effort in which members of the Oklahoma State University Wheat Multi-Use Team met with a group of leading grain merchandisers in August of 2010 to learn about their needs regarding grain quality programs. In addition, newsletters and a special field day were provided to help educate producers on the issue and possible remedies.

Brief Explanation of what you learned from your Stakeholders

Crop producers, agriculture business leaders and homeowners providing input for research programs in general request additional research emphasis for problems that have occurred in the previous year. Based on these sensitivities our research and education team leaders can generally predict areas of concern and determine emphasis areas for directed short term research and education programs.

Water quality and quantity, human and animal waste, obesity and diabetes, managing production costs, improved plant materials and genetics, disease resistence, drought resistence, value-added opportunities, small business development, maintenance of services in rural areas, plant and animal pest issues, nutrution, youth math and science skills, urban waste water, youth opportunities for positive activities, improved markets, and many more.

IV. Expenditure Summary

1. Total Actual Formula dollars Allocated (prepopulated from C-REEMS)			
Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
5505154	0	3596554	0

2. Totaled Actual dollars from Planned Programs Inputs				
	Extension		Research	
	Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
Actual Formula	3483413	0	3549232	0
Actual Matching	3483413	0	3549232	0
Actual All Other	31618456	0	23356245	0
Total Actual Expended	38585282	0	30454709	0

3. Amount of Above Actual Formula Dollars Expended which comes from Carryover funds from previous				
Carryover	3483413	0	0	0

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	Structure and Function of Macromolecules
14	Glodal Food Security and Hunger - Farm and Agribusiness Management
15	Global Food Security and Hunger - Sensor-Based Technologies for Agricultural and
16	Sustainable Energy - Bio-Based Products Development
17	Childhood Obesity - Human Nutrition and Health

Add previously unplanned program

V(A). Planned Program (Summary)

Program # 1

1. Name of the Planned Program

Global Food Security and Hunger - Animal Enterprises

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	22%		5%	
302	Nutrient Utilization in Animals	12%		20%	
303	Genetic Improvement of Animals	5%		10%	
304	Animal Genome	0%		10%	
305	Animal Physiological Processes	0%		10%	
306	Environmental Stress in Animals	5%		10%	
307	Animal Management Systems	38%		20%	
308	Improved Animal Products (Before Harvest)	4%		5%	
311	Animal Diseases	10%		5%	
315	Animal Welfare/Well-Being and Protection	4%		5%	
	Total	100%		100%	

Add knowledge area

V(C). Planned Program (Inputs)

1. Actual amount of professional FTE/SYs expended this Program

Year: 2010	Extension		Research	
	1862	1890	1862	1890
Plan	23.0	0.0	5.0	0.0
Actual	24.0	0.0	7.6	0.0

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	**1890 Extension**	**Hatch**	**Evans-Allen**
300000	0	320969	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
300000	0	320969	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
3033000	0	2696072	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Develop research-based information such as peer reviewed journal articles, scientific reviews, and abstracts.

Developed decision aids and management programs developed that assist cattle and forage managers in improved, better informed decisions.

Conducted educational programs to improve the management skills, profitability and other success factors of people managing cattle and forages. Outputs for these activities would include fact sheets, books, and other extension publications, conference proceedings, web sites and conferences.

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

Demonstrated the economic effects of BVDV and BRD to the stocker and feedlot operations.

Addressed BVDV control at the breeding herd for increased economic return.

Worked to identify biological links that exist between the bacteria and/or virus, reduced animal performance, and meat quality in cattle with BVDV, BRD, or both.

2. Brief description of the target audience

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

V(E). Planned Program (Outputs)

1. Standard output measures

2010	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Plan	10000	50000	1000	200
Actual	155057	7895227	26394	550000

2. Number of Patent Applications Submitted (Standard Research Output)

Patent Applications Submitted

Year: 2010
Plan: 1
Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2010	Extension	Research	Total
Plan	10	10	
Actual	13	43	56

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Conferences, symposiums, and meetings

☐ Not reporting on this Output for this Annual Report

Year	Target	Actual
2010	14	114

Output #2

Output Measure

- Peered reviewed journal articles

☐ Not reporting on this Output for this Annual Report

Year	Target	Actual
2010	14	43

Output #3

Output Measure

- Extension publications: fact sheets, proceedings, books, manuals, bulletins

☐ Not reporting on this Output for this Annual Report

Year	Target	Actual
2010	20	226

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Number of producers registered with a premise ID
2	Total number of producers certified as Master Cattlemen
3	Number of producers implementing improved management, grazing systems and beef production systems resulting in improved sustainability.
4	Number of producers implementing management programs to decrease the incidence and economic impact of BVDV and BRD
5	Number of producers certified in the Beef Quality Assurance program
6	Number of cattle enrolled in value enhancement programs
7	Alternate Cattle Concentrate Adaptation Programs
8	Youth EID - Electronic Cattle Identification
9	Cow retention study

Add Cross-cutting Outcome/Impact Statement or Unintended or Previously Unknown Outcome Measure

Outcome #1

1. Outcome Measures

☑ Not Reporting on this Outcome Measure

Number of producers registered with a premise ID

2. Associated Institution Types

☑ 1862 Extension
☐ 1862 Research

3a. Outcome Type:

◯ Change in Knowledge Outcome Measure
◉ Change in Action Outcome Measure
◯ Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	7500	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

☐ 121 - Management of Range Resources
☐ 302 - Nutrient Utilization in Animals
☐ 303 - Genetic Improvement of Animals
☐ 304 - Animal Genome
☐ 305 - Animal Physiological Processes
☐ 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

Outcome #2

1. Outcome Measures

☐ Not Reporting on this Outcome Measure

Total number of producers certified as Master Cattlemen

2. Associated Institution Types

☑ 1862 Extension
☐ 1862 Research

3a. Outcome Type:

◯ Change in Knowledge Outcome Measure
◉ Change in Action Outcome Measure
◯ Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	500	584

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Beef production accounts for approximately one-third of Oklahoma?s agricultural production in most years. Moreover, seventy percent of the state?s 86,000 farms have some cattle and over fifty percent of the land area in Oklahoma is pasture or rangeland. Most of the cattle operations are small in size, with seventy-eight percent of the beef cow inventory in herds of fifty head or less. Smaller cattle operations have higher cost of production and are less likely to incorporate best management practices.

What has been done
The Master Cattleman Program is conducted by an interdisciplinary team resulting in a variety of educational products and programs, including the Beef Cattle Manual, benchmarking of cow/calf and stocker producer practices, Master Cattleman programs delivered at the local level and in-service training for Extension educators. An interdisciplinary Beef Cattle Manual was updated and published. The manual contains 41 chapters addressing various business, production, and natural resource topics. Approximately 8,700 manuals have been distributed through local Extension offices, area and state meetings and from the Master Cattleman website. Requests have been filled to 25 states and 5 foreign countries. The manual is being used as a textbook in 8 universities and community colleges. To become a Master Cattleman, a producer completes twenty eight hours of instruction from the Beef Cattle Manual and associated quizzes. The program has enjoyed wide adoption in the state and it continues to be a popular staple in educational programming.

Results

Approximately 834 students have enrolled in the Master Cattleman program and 584 have graduated with 41 having graduated during 2010. Currently, 130 students are enrolled and actively participating in the program. Graduates average response to their estimate of annual improvement in their cattle operation?s profitability is $3,500 for a total annual impact of $2 million. On average, graduates indicate that they use the Beef Cattle Manual at least once monthly and that they have referred 5 additional people to the Beef Cattle Manual and three people to the Master Cattleman program.

4. Associated Knowledge Areas

- ☑ 121 - Management of Range Resources
- ☑ 302 - Nutrient Utilization in Animals
- ☑ 303 - Genetic Improvement of Animals
- ☐ 304 - Animal Genome
- ☐ 305 - Animal Physiological Processes
- ☑ 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

Outcome #3

1. Outcome Measures

☐ Not Reporting on this Outcome Measure

Number of producers implementing improved management, grazing systems and beef production systems resulting in improved sustainability.

2. Associated Institution Types

- ☑ 1862 Extension
- ☑ 1862 Research

3a. Outcome Type:

- ○ Change in Knowledge Outcome Measure
- ◉ Change in Action Outcome Measure
- ○ Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	4000	6270

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Hay ranks as the second largest crop grown and harvested in Oklahoma. Tremendous effort and expense goes into growing, cutting, baling, storing, transporting, and feeding hay in cow/calf enterprises across the state. In fact, recent data surveying 729 Oklahoma producers (Vestal et al., 2007) indicates that only 10% of cow/calf operations have a hay feeding season of 60 days or less. Most rely on harvested forages as the primary source of dietary nutrients for the majority of the winter (90 to 150 days).

What has been done
Our preliminary work showed that 12% of the hay offered was actually wasted when a high quality hay feeder was used. Therefore, the group designed an experiment to determine the effects of a range of hay feeder design on hay feeding waste. We discovered an incredible range of waste due to feeder type, with the lowest cost, economy feeder (most popular feeder style in OK) wasting 21% of the hay fed, and a higher cost modified cone feeder generating only 6% waste.

Results
Assuming a 5 year life of service for both feeder types, we calculate that the modified cone feeder type would generate a savings of approximately $1,000 over the economy feeder. If only 5% of cattle producers adopt the use of a more efficient bale feeder design, the economic impact to the state is $1.5 million dollars per year.

4. Associated Knowledge Areas

- ☑ 121 - Management of Range Resources
- ☑ 302 - Nutrient Utilization in Animals
- ☐ 303 - Genetic Improvement of Animals
- ☐ 304 - Animal Genome
- ☐ 305 - Animal Physiological Processes
- ☑ 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

Outcome #4

1. Outcome Measures

☐ Not Reporting on this Outcome Measure

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

2. Associated Institution Types

- ☑ 1862 Extension
- ☑ 1862 Research

3a. Outcome Type:

- ○ Change in Knowledge Outcome Measure
- ○ Change in Action Outcome Measure
- ◉ Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	50	125

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Bovine respiratory disease is the most common disease among feedlot cattle in the United States, accounting for approximately 75 percent of feedlot morbidity and 50 percent to 70 percent of all feedlot deaths. BRD causes 1 billion dollars annually in economic losses from death, decreased performance, and antimicrobial treatment costs. With increasing scrutiny related to animal welfare and antimicrobial utilization in livestock, methods to more accurately detect BRD in cattle are warranted.

What has been done
Initial work has been conducted using remote monitored rumen temperature boluses to identify naturally occurring BRD. We determined that providing therapeutic antimicrobial treatments based on rumen temperature monitoring resulted in calves gaining 11.5 lb more during a 56 day receiving period than visually evaluating newly received calves. In fact, rumen temperature monitoring was as effective at maintaining performance of newly received calves as providing metaphylactic treatment at arrival.

Results
Assuming a rumen bolus cost of $6 per use, rumen temperature monitoring is resulting in improved animal welfare, efficacious therapeutic use of antimicrobials, and a 2:1 return on investment when used in high-risk, newly-received calves. Use of the rumen temperature monitoring system in 10% of the cattle finished in Oklahoma would result in an economic benefit of $900,000 annually.

4. Associated Knowledge Areas

- ☐ 121 - Management of Range Resources
- ☐ 302 - Nutrient Utilization in Animals
- ☐ 303 - Genetic Improvement of Animals
- ☐ 304 - Animal Genome
- ☐ 305 - Animal Physiological Processes
- ☐ 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

Outcome #5

1. Outcome Measures

☐ Not Reporting on this Outcome Measure

Number of producers certified in the Beef Quality Assurance program

2. Associated Institution Types

- ☑ 1862 Extension
- ☐ 1862 Research

3a. Outcome Type:

- ◉ Change in Knowledge Outcome Measure
- ◯ Change in Action Outcome Measure
- ◯ Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	50	251

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

- ☐ 121 - Management of Range Resources
- ☐ 302 - Nutrient Utilization in Animals
- ☐ 303 - Genetic Improvement of Animals
- ☐ 304 - Animal Genome
- ☐ 305 - Animal Physiological Processes
- ☐ 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

Outcome #6

1. Outcome Measures

☐ Not Reporting on this Outcome Measure

Number of cattle enrolled in value enhancement programs

2. Associated Institution Types

- ☑ 1862 Extension
- ☐ 1862 Research

3a. Outcome Type:

- ◉ Change in Knowledge Outcome Measure
- ◯ Change in Action Outcome Measure
- ◯ Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	2500	9262

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Cattle sickness costs the cattle industry millions of dollars each year. These losses negatively impact producer profitability and they impact each and every level of the beef production chain.

What has been done
In order to facilitate the adoption of best management practices that should result in reduced sickness and associated adverse effects, the Oklahoma Quality Beef Network (OQBN) was initially developed in 2001 and redefined in 2009. This is a joint program between the Oklahoma Cooperative Extension Service and Oklahoma cattle producers. The objective is to add value to Oklahoma?s calf crop and capture at least part of the added value. In 2010, 181 Oklahoma beef producers enrolled 9,262 calves in the OQBN program. Ten regional OQBN Vac-45 calf sales were conducted in seven livestock markets.

Results
OQBN cattle received a premium of $7.84/cwt, based on the weighted average price of all lots, over non-preconditioned cattle. The average price premium is an additional $47.04 per head, while the added value of weight gain during the preconditioning period averaged $64 per head for a gross increase in revenue of $111 per calf. Average cost to participate in the program was $47.60 per head, resulting in a net increase in income of $63.40 per head or total net increase in

income of $587,211 for the calves enrolled in the program in 2010. However, the educational program and example given by the OQBN is stimulating growth in adoption of these management, certification and marketing practices throughout the state. Therefore, the impact is much higher than can be measured by direct participation in the program.

4. Associated Knowledge Areas

- ☐ 121 - Management of Range Resources
- ☐ 302 - Nutrient Utilization in Animals
- ☐ 303 - Genetic Improvement of Animals
- ☐ 304 - Animal Genome
- ☐ 305 - Animal Physiological Processes
- ☐ 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

Outcome #7

1. Outcome Measures

☐ Not Reporting on this Outcome Measure

Alternate Cattle Concentrate Adaptation Programs

2. Associated Institution Types

- ☐ 1862 Extension
- ☑ 1862 Research

3a. Outcome Type:

- ◉ Change in Knowledge Outcome Measure
- ◯ Change in Action Outcome Measure
- ◯ Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	{No Data Entered}	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Feedlot cattle have traditionally been adapted to high-concentrate finishing diets using sequential step-up diets (increasing concentrate level, decreasing roughage level) over a period of 14 to 28

days. In order to successfully adapt cattle to high concentrate finishing diets while optimizing operational efficiencies in feedlot mills, compromises are made in respect to the number of rations fed during the adaptation period. Current industry surveys indicate that the mode number of adaptation diets used by feedlots is 4 rations.

What has been done
We evaluated a concentrate adaptation program that used only a starter ration (high roughage) and a finisher ration (high concentrate). With only two rations needing to be milled and fed, operational efficiency of cattle feeding operations would be improved. Our research indicated that modifying feeding management to use only two rations to adapt cattle to high concentrate diets does not impact cattle performance or carcass characteristics.

Results
Depending upon previous grain adaptation programs, implementing a 2 ration adaptation program can result in a 15% increase in milling and feeding.

4. Associated Knowledge Areas

- ☐ 121 - Management of Range Resources
- ☑ 302 - Nutrient Utilization in Animals
- ☐ 303 - Genetic Improvement of Animals
- ☐ 304 - Animal Genome
- ☐ 305 - Animal Physiological Processes
- ☐ 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

Outcome #8

1. Outcome Measures

☐ Not Reporting on this Outcome Measure

Youth EID - Electronic Cattle Identification

2. Associated Institution Types

- ☑ 1862 Extension
- ☐ 1862 Research

3a. Outcome Type:

- ○ Change in Knowledge Outcome Measure
- ○ Change in Action Outcome Measure
- ◉ Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	{No Data Entered}	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
One of the largest threats to the livestock industry is the natural or intentional disease outbreak that affects the marketing of livestock products. The regular comingling and dispersion of livestock that occurs with youth livestock projects creates a risk not only to the youth projects, but to the family and neighboring livestock enterprises.

What has been done
We have developed computer program that is capable of managing youth livestock show data from entries to show ring placing and sale orders. The unique component of this program is that the program has been developed to operate with wireless electronic identification tag readers. This combination provides for paperless show management that eliminates duplicate hand entry of data and results in an electronic file that provides accurate and easily accessible information in the event that a disease outbreak would be associated with a youth livestock event.

Results
Both major Oklahoma livestock shows have participated in adoption of this program through utilizing electronic identification tags for their market livestock programs. The Oklahoma Department of Agriculture, Food, and Forestry has recognize the high value of the program and participation of the livestock shows by allowing the show tags to substitute for scrapie program tags in the sheep youth projects. To date over 140,000 youth market livestock project have been tagged with electronic tags and entered into the program over a 5 year period. In addition to the increased show management efficiency and biological security that has evolved, the visibility of these programs being run by county educators is providing for practical demonstration of electronic identification use for managing livestock information to current and future livestock producers.

4. Associated Knowledge Areas

- ☐ 121 - Management of Range Resources
- ☐ 302 - Nutrient Utilization in Animals
- ☐ 303 - Genetic Improvement of Animals
- ☐ 304 - Animal Genome
- ☐ 305 - Animal Physiological Processes
- ☐ 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

Outcome #9

1. Outcome Measures

☐ Not Reporting on this Outcome Measure

Cow retention study

2. Associated Institution Types

☐ 1862 Extension
☑ 1862 Research

3a. Outcome Type:

◉ Change in Knowledge Outcome Measure
◯ Change in Action Outcome Measure
◯ Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	{No Data Entered}	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done
A three year study of cull cow retention and feeding indicates that cows with lower beginning body condition scores (BBCS) at culling (less than 4.5) generated higher net returns in a retention setting than did cows with higher BBCS. Cows with low BBCS averaged returns of $69 per head across when held 90 to 120 days past culling in a pasture/forage system, while cows with BBCS between 4.5 and 6 averaged $39 when held for the same time period. Cows with body condition scores of 6 or greater had the highest net return if marketed at culling time rather than retaining and feeding them.

Results
On average, it is estimated that Oklahoma cow-calf producers could have collectively added roughly $777,400 to their bottom line by retaining only 10% of their culled cows on pasture or forage for 90 to 120 days before marketing.

4. Associated Knowledge Areas

☐ 121 - Management of Range Resources
☐ 302 - Nutrient Utilization in Animals
☐ 303 - Genetic Improvement of Animals
☐ 304 - Animal Genome

- ☐ 305 - Animal Physiological Processes
- ☐ 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

V(H). Planned Program (External Factors)

External factors which affected 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

Brief Explanation

V(I). Planned Program (Evaluation Studies and Data Collection)

(OPTIONAL SECTION)

1. Evaluation Studies Planned

- ☑ After Only (post program)
- ☑ Retrospective (post program)
- ☑ Before-After (before and after program)
- ☑ During (during program)
- ☐ Time series (multiple points before and after program)
- ☐ Case Study
- ☐ Comparisons between program participants (individuals, group, organizations) and non-participants
- ☐ Comparisons between different groups of individuals or program participants experiencing different levels of program intensity.
- ☐ Comparison between locales where the program operates and sites without program intervention
- ☐ Other

Evaluation Results

Key Items of Evaluation

V(A). Planned Program (Summary)

Program # 2

1. Name of the Planned Program

Global Food Security and Hunger - Crop Enterprises

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	24%		20%	
133	Pollution Prevention and Mitigation	3%		5%	
201	Plant Genome, Genetics, and Genetic Mechanisms	5%		20%	
204	Plant Product Quality and Utility (Preharvest)	10%		10%	
205	Plant Management Systems	35%		20%	
211	Insects, Mites, and Other Arthropods Affecting Plants	5%		5%	
212	Pathogens and Nematodes Affecting Plants	3%		5%	
213	Weeds Affecting Plants	5%		5%	
215	Biological Control of Pests Affecting Plants	2%		5%	
216	Integrated Pest Management Systems	8%		5%	
	Total	100%		100%	

Add knowledge area

V(C). Planned Program (Inputs)

1. Actual amount of professional FTE/SYs expended this Program

Year: 2010	Extension		Research	
	1862	1890	1862	1890
Plan	20.0	0.0	6.5	0.0
Actual	20.0	0.0	11.3	0.0

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	**1890 Extension**	**Hatch**	**Evans-Allen**
295000	0	480128	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
295000	0	480128	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
3100000	0	3072713	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Wheat variety development and testing
No-till production research and support
IPM control of insects and weeds
Wheat quality and product development and testing
Wheat management newsletter, website
Sensor-based fertilizer decision and application
Canola production support
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

2. Brief description of the target audience

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

V(E). Planned Program (Outputs)

1. Standard output measures

2010	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Plan	6000	50000	0	0
Actual	52625	7895227	456	0

2. Number of Patent Applications Submitted (Standard Research Output)

Patent Applications Submitted

Year: 2010
Plan: 1

Actual: 3

Patents listed
"Billings" a wheat cultivar
PVP-Latitude 36 burmudagrass
PVP-Northbridge burmudagrass

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2010	Extension	Research	Total
Plan	10	10	
Actual	16	63	79

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Field Demonstrations

☐ Not reporting on this Output for this Annual Report

Year	Target	Actual
2010	30	140

Output #2

Output Measure

- Varieties of wheat released

☐ Not reporting on this Output for this Annual Report

Year	Target	Actual
2010	2	1

Output #3

Output Measure

- Crop production manuals and production newsletters

☐ Not reporting on this Output for this Annual Report

Year	Target	Actual
2010	18	45

Output #4

Output Measure

- Cotton Web Page

☐ Not reporting on this Output for this Annual Report

Year	Target	Actual
2010	1	1

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Percentage of dual-purpose wheat acreage where first hollow stem criterion used for decision making
2	Number of varieties accepted by seed producers and producers to address end-use quality issues
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
8	Response to changing market requirements regarding wheat dockage and foreign material

Add Cross-cutting Outcome/Impact Statement or Unintended or Previously Unknown Outcome Measure

Outcome #1

1. Outcome Measures

☐ Not Reporting on this Outcome Measure

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

2. Associated Institution Types

☑ 1862 Extension
☑ 1862 Research

3a. Outcome Type:

○ Change in Knowledge Outcome Measure
○ Change in Action Outcome Measure
◉ Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	60	75

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Wheat fields utilized for livestock grazing during the fall/winter and then harvested for grain by early summer are termed ?dual-purpose? wheat fields. Proper timing of livestock grazing termination at the ¼ inch First Hollow Stem (FHS) stage of growth is critical in avoiding large grain yield losses caused by overgrazing wheat pastures. Because grazing termination dates can vary greatly on a field-by-field basis due to planting date and the particular variety planted, FHS is the single best way for stocker cattle producers to determine exact times for grazing termination. Oklahoma has about 5.7 million acres of wheat planted annually, of which, about 2.5 million acres are utilized by farmers as ?dual-purpose? wheat acres.

What has been done
It is estimated that at least 75% of dual-purpose wheat producers in Oklahoma use first hollow stem as a criterion for removal of cattle from wheat pasture. This criterion was developed through research conducted at Oklahoma State University. First hollow stem was monitored at two locations (Stillwater and El Reno, OK) and data were distributed to extension educators and stakeholders via electronic newsletter. To help prevent these losses, we monitor first hollow stem, conduct in-service trainings, and hold grower workshops on methodology and benefits of scouting for first hollow stem. It is estimated that at least 80% of dual-purpose wheat producers follow these numbers and use them as a ?rule of thumb? estimator for removal of cattle from wheat pasture.

Results

It is estimated that at least 75% of dual-purpose wheat producers in Oklahoma use first hollow stem as a criterion for removal of cattle from wheat pasture. First hollow stem was monitored at two locations (Stillwater and El Reno, OK) and data were distributed to extension educators and stakeholders via electronic newsletter. It is estimated that at least 75% of dual-purpose wheat producers follow these numbers and use them as a "rule of thumb" estimator for removal of cattle from wheat pasture. Thus this research and extension program saved producers in Oklahoma approximately $275,000,000 in 2010 due to application of this research-based BMP as opposed to typical practices followed previously.
Several producers have commented on the usefulness of this information. A prominent rancher in southern Oklahoma, for example, recently commented "I appreciate you guys distributing the first hollow stem data from the El Reno site. It matches what I have been finding in my field and lets me know that I am making the right decision".

4. Associated Knowledge Areas

- ☐ 102 - Soil, Plant, Water, Nutrient Relationships
- ☐ 133 - Pollution Prevention and Mitigation
- ☐ 201 - Plant Genome, Genetics, and Genetic Mechanisms
- ☐ 204 - Plant Product Quality and Utility (Preharvest)
- ☑ 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

Outcome #2

1. Outcome Measures

☐ Not Reporting on this Outcome Measure

Number of varieties accepted by seed producers and producers to address end-use quality issues

2. Associated Institution Types

- ☐ 1862 Extension
- ☑ 1862 Research

3a. Outcome Type:

- ○ Change in Knowledge Outcome Measure
- ○ Change in Action Outcome Measure
- ◉ Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual

2010	1	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
In the winter-wheat market, farmer profitability is yield-driven while end-user value is quality driven. While yield potential and end-use quality are not mutually exclusive traits, developing and marketing cultivars that satisfy both requirements is extremely difficult. The fact that there are relatively few scientists and even fewer private companies working in the area of wheat improvement exacerbates the problem.

What has been done
The Oklahoma State University Wheat Improvement Team was developed as a cross-cutting collection of scientists who work collaboratively to develop, test, and distribute improved wheat cultivars for the Southern Great Plains. As part of this effort over 900 individual crosses are made on a yearly basis. In addition approximately 25 cultivars are evaluated in replicated small grain performance trials at 24 sites throughout Oklahoma. Farmers are involved in both of the processes through advisory organizations and direct participation in research trials.

Results
Breeder seed of two experimental cultivars "OK05526" and "OK05212" were increased in 2010 in anticipation of probable public release in 2011. These cultivars will improve the economic well-being of Oklahoma farmers through improved disease resistance, greater yield potential, and genetic resistance to the Hessian fly.

4. Associated Knowledge Areas

- ☐ 102 - Soil, Plant, Water, Nutrient Relationships
- ☐ 133 - Pollution Prevention and Mitigation
- ☑ 201 - Plant Genome, Genetics, and Genetic Mechanisms
- ☑ 204 - Plant Product Quality and Utility (Preharvest)
- ☑ 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

Outcome #3

1. Outcome Measures

☐ Not Reporting on this Outcome Measure

Locally-controlled evaluations and agronomic data for oilseed crops

2. Associated Institution Types

- ☑ 1862 Extension
- ☑ 1862 Research

3a. Outcome Type:

- ○ Change in Knowledge Outcome Measure
- ◉ Change in Action Outcome Measure
- ○ Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	20	30

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Genotype by environment interaction is the overriding factor determining yield and many end-use quality parameters. Therefore, stakeholders require locally-controlled, research-based quantitative comparisons of crop cultivars commonly grown in the southern Great Plains. Many of these oilseed crops have not been grown in Oklahoma and lack of production knowledge has been cited as a reason for not planting some of these crops. In addition stakeholders need the opportunity to evaluate new cultivars and advanced experimental lines in ?real world? settings.

What has been done
Replicated performance trials have been established across Oklahoma to evaluate peanut, winter canola, sunflower, sesame, and soybean cultivars. In addition to cultivar performance trials, trials have been initiated to develop basic agronomic recommendations for several oilseed crops. Scientists will use the information collected from all of these trials to develop agronomic recommendations. In turn, these recommendations will be used to educate producers on profitable crop production practices. Thirty locations around Oklahoma were utilized to evaluate cultivars for the major oilseeds produced in Oklahoma.

Results
Grain yield and other agronomic data for each variety of each crop were collected and distributed to stakeholders throughout the southern Great Plains. Over 1,500 stakeholders directly participated in field day activities at these research locations. Five extension publications were published and distributed to a minimum of 600 people via email list serve. Another 500 individuals received hard copies at meeting functions.

Performance test data is among the most frequently requested and most highly valued data requested by stakeholders each year. In addition to Performance trials, data was collected from research plots to develop basic agronomic recommendations (Nitrogen management, seeding rate, and planting date) for sunflower and sesame production in Oklahoma. This information is critical and helped to increase acreage for ?new? crops, such as, sesame and canola. Since 2004, winter canola acreage has increased dramatically on the southern plains when 25,000 acres were planted, compared to 2010 when planted acres topped 125,000. Similarly, sesame production in the southern Plains has increased from 6,000 ac in 2007 to nearly 120,000 ac anticipated for 2011.

4. Associated Knowledge Areas

- ☑ 102 - Soil, Plant, Water, Nutrient Relationships
- ☐ 133 - Pollution Prevention and Mitigation
- ☐ 201 - Plant Genome, Genetics, and Genetic Mechanisms
- ☑ 204 - Plant Product Quality and Utility (Preharvest)
- ☑ 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

Outcome #4

1. Outcome Measures

☐ Not Reporting on this Outcome Measure

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

2. Associated Institution Types

- ☑ 1862 Extension
- ☑ 1862 Research

3a. Outcome Type:

- ○ Change in Knowledge Outcome Measure
- ○ Change in Action Outcome Measure
- ◉ Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	55	55

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
In 2006 over half (54%) of all wheat acres were sown to the cultivar ?Jagger? or the Jagger-by-Abilene cross Jagalene. Having approximately 3 million acres of wheat sown to two cultivars with similar genetic backgrounds and disease resistance portfolios presents unnecessary production risk for farmers and grain merchandisers.

What has been done
Since 2006, the Oklahoma State University Wheat Improvement Team has developed and released eight wheat cultivars with disease resistance and agronomic performance superior to

that of Jagger and Jagalene in targeted environments. A comprehensive educational campaign has made farmers and ranchers aware of improved cultivars released by land-grant institutions in the region and private breeding companies.

Results
In 2010 cultivars with improved resistance to foliar disease relative to that of Jagger and Jagalene were sown on 57% of Oklahoma wheat acres and Jagger and Jagelene acres were reduced to 18% of sown acreage.

Greater use of improved cultivars has reduced the need for pesticides and increased grain yield. The disease and Hessian-fly resistant cultivar "Duster", for example, displaced older cultivars on 8% of Oklahoma wheat acres in 2010 and provided a 10 bushel/acre yield increase over Jagger in statewide trials. This equates to roughly 4.2 million bushels of wheat statewide with a current market value of approximately $33 million.

4. Associated Knowledge Areas

- ☐ 102 - Soil, Plant, Water, Nutrient Relationships
- ☐ 133 - Pollution Prevention and Mitigation
- ☐ 201 - Plant Genome, Genetics, and Genetic Mechanisms
- ☑ 204 - Plant Product Quality and Utility (Preharvest)
- ☑ 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

Outcome #5

1. Outcome Measures

☐ Not Reporting on this Outcome Measure

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

2. Associated Institution Types

- ☑ 1862 Extension
- ☑ 1862 Research

3a. Outcome Type:

- ○ Change in Knowledge Outcome Measure
- ○ Change in Action Outcome Measure
- ◉ Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	1100000	1600000

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Intensive tillage has historically been used in Oklahoma to bury wheat residue following harvest. The lack of crop diversity in cropping systems in the past has not been conducive to reducing or eliminating tillage in monoculture wheat systems. In 2004, no-till acreage in Oklahoma was estimated to be 8% by CTIC, approximately 20% behind the national average. In addition, alternative crops were grown on only 1.1 M acres of cropland in Oklahoma.

What has been done
The ?No-till Oklahoma? effort was initiated to better educate producers and the public on sustainable production practices. Since 2006, several trials have been initiated to identify profitable crop rotations for no-tillage cropping systems. The No-till Oklahoma effort has used research trials, demonstration, field days, media, and publications to provide Oklahoma producers with a deeper understanding of crop rotation and no-till cropping systems. This increased knowledge will hopefully lead to the increase adoption of no-till practices and crop rotation.

Results
Production of alternative crops has increased to greater than 1.6 M acres since 2004, according to Oklahoma NASS. This is an increase of 38% since 2004! Soybean acres have increased 56% since 2004. This indicates an intensification of cropping systems, since the majority of the soybean crop is double-cropped after winter wheat harvest. This substantial increase in acres being rotated is no doubt associated with the increased no-till acres, which has increased 25% since 2004 in the state. The ecosystems services from an increase in no-till and crop rotation in Oklahoma are immense.

4. Associated Knowledge Areas

- ☑ 102 - Soil, Plant, Water, Nutrient Relationships
- ☐ 133 - Pollution Prevention and Mitigation
- ☐ 201 - Plant Genome, Genetics, and Genetic Mechanisms
- ☐ 204 - Plant Product Quality and Utility (Preharvest)
- ☑ 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

Outcome #6

1. Outcome Measures

☐ Not Reporting on this Outcome Measure

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

2. Associated Institution Types

☑ 1862 Extension
☑ 1862 Research

3a. Outcome Type:

○ Change in Knowledge Outcome Measure
○ Change in Action Outcome Measure
◉ Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	100000	400000

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Current global nitrogen use efficiency for cereals production is estimated to be 33%. Environmental concerns and increasing fertilizer prices have necessitated improved precision in determining crop nitrogen requirements.

What has been done
Oklahoma State University has developed hand-held sensors and corresponding web-based decision aids that can be used to develop in-season nitrogen recommendations based on yield potential. This is accomplished by using optical sensors to compare crop growth and nitrogen content in small nitrogen-rich strips to that of the larger field and then using a research-based algorithm to generate a yield estimate and corresponding nitrogen recommendation. This method is much more accurate than yield-goal-based systems in predicting high or low-yielding years where nitrogen fertilizer application rates should be adjusted accordingly.

Results
Oklahoma State University Cooperative Extension conducted large-scale, on-farm sensor-based nitrogen recommendation system validation trials across Oklahoma. Results showed that sensor-based recommendations were on average 30 pounds per acre less than standard farmer practice, yet the sensor-based recommendations produced equivalent grain yield to farmer practice and maintained protein levels above 11%. Using 2010 fertilizer prices, this equates to an average farmer savings of $13.50 per acre with no yield reduction. Adoption of the technology has grown from a few hundred nitrogen-rich strips in 2005 to an estimated 5,000 nitrogen-rich strips in Oklahoma wheat fields in 2010. These strips are used to make decisions on at least 400,000 acres resulting in an estimated savings of over $5.4 million to Oklahoma producers. An Optical

Pocket Sensor developed at OSU and tested in Oklahoma, Mexico, and India by OSU Extension specialists and researchers will ultimately cost only $200, versus $4000 for the current hand-held sensor. This will permit all U.S. farmers and many developing country producers access to this resource and environment saving technology.

4. Associated Knowledge Areas

- ☑ 102 - Soil, Plant, Water, Nutrient Relationships
- ☐ 133 - Pollution Prevention and Mitigation
- ☐ 201 - Plant Genome, Genetics, and Genetic Mechanisms
- ☐ 204 - Plant Product Quality and Utility (Preharvest)
- ☑ 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

Outcome #7

1. Outcome Measures

☐ Not Reporting on this Outcome Measure

Locally-controlled evaluations and agronomic data for small grains crops

2. Associated Institution Types

- ☑ 1862 Extension
- ☐ 1862 Research

3a. Outcome Type:

- ○ Change in Knowledge Outcome Measure
- ○ Change in Action Outcome Measure
- ◉ Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	{No Data Entered}	65

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Choosing the right cultivar is essential to ensuring economic profitability of any production system. Wheat yield data collected in 2010, for example, show that cultivar choice can easily increase gross income by more than $120 per acre and dramatically reduce pesticide use.

What has been done
The Oklahoma State University small grains variety testing program tests 25 to 30 released wheat cultivars and advanced experimental lines in replicated test plots at 25 to 30 sites throughout Oklahoma on an annual basis. The wheat multi-use team sows 40 to 45 additional non-replicated wheat variety demonstration tests at sites throughout Oklahoma. All but three of these sites are located on-farm and are conducted with the assistance of farmer-cooperators.

Results
Field day attendees in 2010 represented over 1.7 million acres of wheat and 100% of attendees indicated the information received at field day events would affect their wheat variety choice the following season. Attendees reported an average perceived value of the information received at field day events to be $21.46 per acre for a total impact of over $37 million annually.

Wheat phenological data, forage yield, grain yield, test weight, and protein content data were collected and posted near real time on the Oklahoma small grains variety testing site at www.wheat.okstate.edu. Findings were directly distributed to over 8,000 stakeholders in the state of Oklahoma via direct mailing and to over 600 producers via electronic copy.

4. Associated Knowledge Areas

- ☐ 102 - Soil, Plant, Water, Nutrient Relationships
- ☐ 133 - Pollution Prevention and Mitigation
- ☐ 201 - Plant Genome, Genetics, and Genetic Mechanisms
- ☑ 204 - Plant Product Quality and Utility (Preharvest)
- ☑ 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

Outcome #8

1. Outcome Measures

☐ Not Reporting on this Outcome Measure

Response to changing market requirements regarding wheat dockage and foreign material

2. Associated Institution Types

- ☑ 1862 Extension
- ☐ 1862 Research

3a. Outcome Type:

- ○ Change in Knowledge Outcome Measure
- ○ Change in Action Outcome Measure
- ◉ Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	{No Data Entered}	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Larger than normal world ending wheat stocks created a buyer?s market during harvest of 2010 and more stringent export standards were adopted by international buyers. Specifically, end users were no longer willing to accept grain that was contaminated with weed seed, commonly referred to as ?dockage? and/or ?foreign material?. As a result of the stricter standards and the failure of some Oklahoma-sourced wheat to meet these tougher standards, many grain merchandisers in southwestern Oklahoma were unable to market wheat at harvest. The effects of this backlog were ultimately passed along to the producer in the form of lower cash prices.

What has been done
Members of the Oklahoma State University Wheat Multi-Use Team met with a group of leading grain merchandisers in August of 2010 to learn about their needs regarding grain quality programs. It was agreed that OSU could be of greatest assistance by providing the educational support and technical expertise needed to properly educate stakeholders.

Results
Educational efforts included newsletter articles, articles in popular press, radio interviews and television segments regarding wheat dockage and foreign material.

A weed-control demonstration was established in a grower field that produced wheat with 45% dockage (44.4% above the marketable limit) near El Reno, OK. Two field days and meetings will be conducted during this particular project. The first plot tour and meeting was held pm December 7th with 130 central Oklahoma wheat producers in attendance. Another tour and meeting will be conducted on May 6th, 2011 to observe/discuss various herbicide treatment efficacies just prior to wheat harvest.

4. Associated Knowledge Areas

- ☐ 102 - Soil, Plant, Water, Nutrient Relationships
- ☐ 133 - Pollution Prevention and Mitigation
- ☐ 201 - Plant Genome, Genetics, and Genetic Mechanisms

- ☑ 204 - Plant Product Quality and Utility (Preharvest)
- ☑ 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

V(H). Planned Program (External Factors)

External factors which affected 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

Brief Explanation

V(I). Planned Program (Evaluation Studies and Data Collection)

(OPTIONAL SECTION)

1. Evaluation Studies Planned

- ☐ After Only (post program)
- ☐ Retrospective (post program)
- ☑ Before-After (before and after program)
- ☑ During (during program)
- ☐ Time series (multiple points before and after program)
- ☐ Case Study
- ☐ Comparisons between program participants (individuals, group, organizations) and non-participants
- ☐ Comparisons between different groups of individuals or program participants experiencing different levels of program intensity.
- ☐ Comparison between locales where the program operates and sites without program intervention

☐ Other

Evaluation Results

{No Data Entered}

Key Items of Evaluation

{No Data Entered}

V(A). Planned Program (Summary)

Program # 3

1. Name of the Planned Program

Plant Biological Technologies

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	0%		5%	
132	Weather and Climate	0%		5%	
201	Plant Genome, Genetics, and Genetic Mechanisms	0%		25%	
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants	0%		15%	
206	Basic Plant Biology	0%		15%	
211	Insects, Mites, and Other Arthropods Affecting Plants	0%		5%	
212	Pathogens and Nematodes Affecting Plants	0%		30%	
	Total	0%		100%	

Add knowledge area

V(C). Planned Program (Inputs)

1. Actual amount of professional FTE/SYs expended this Program

Year: 2010	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	0.0	8.0	0.0
Actual	0.0	0.0	11.0	0.0

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	**1890 Extension**	**Hatch**	**Evans-Allen**
0	0	466864	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
0	0	466864	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
0	0	2987831	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

•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. Brief description of the target 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(E). Planned Program (Outputs)

1. Standard output measures

2010	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Plan	75	150	50	0
Actual	500	1000	30	0

2. Number of Patent Applications Submitted (Standard Research Output)

Patent Applications Submitted

Year: 2010
Plan: 1
Actual: 3

Patents listed
2 burmudagrass PVP
1 wheat PVP

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2010	Extension	Research	Total
Plan	0	10	
Actual	0	9	9

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Grant proposals written and submitted

☐ Not reporting on this Output for this Annual Report

Year	Target	Actual
2010	20	14

Output #2

Output Measure

- Peer-reviewed publications including journal articles

☐ Not reporting on this Output for this Annual Report

Year	Target	Actual
2010	10	9

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Graduate students graduated

Add Cross-cutting Outcome/Impact Statement or Unintended or Previously Unknown Outcome Measure

Outcome #1

1. Outcome Measures

☐ Not Reporting on this Outcome Measure

Graduate students graduated

2. Associated Institution Types

☐ 1862 Extension
☑ 1862 Research

3a. Outcome Type:

○ Change in Knowledge Outcome Measure
◉ Change in Action Outcome Measure
○ Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	5	5

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

☐ 123 - Management and Sustainability of Forest Resources
☐ 132 - Weather and Climate
☑ 201 - Plant Genome, Genetics, and Genetic Mechanisms
☑ 203 - Plant Biological Efficiency and Abiotic Stresses Affecting Plants
☑ 206 - Basic Plant Biology
☐ 211 - Insects, Mites, and Other Arthropods Affecting Plants
☑ 212 - Pathogens and Nematodes Affecting Plants

V(H). Planned Program (External Factors)

External factors which affected 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

Brief Explanation

V(I). Planned Program (Evaluation Studies and Data Collection)

(OPTIONAL SECTION)

1. Evaluation Studies Planned

- ☐ After Only (post program)
- ☐ Retrospective (post program)
- ☐ Before-After (before and after program)
- ☑ During (during program)
- ☐ Time series (multiple points before and after program)
- ☐ Case Study
- ☐ Comparisons between program participants (individuals, group, organizations) and non-participants
- ☐ Comparisons between different groups of individuals or program participants experiencing different levels of program intensity.
- ☐ Comparison between locales where the program operates and sites without program intervention
- ☐ Other

Evaluation Results

Key Items of Evaluation

V(A). Planned Program (Summary)

Program # 4

1. Name of the Planned Program

Commercial and Consumer Horticulture

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	6%		10%	
202	Plant Genetic Resources	9%		10%	
204	Plant Product Quality and Utility (Preharvest)	10%		15%	
205	Plant Management Systems	50%		35%	
502	New and Improved Food Products	6%		20%	
901	Program and Project Design, and Statistics	4%		5%	
903	Communication, Education, and Information Delivery	15%		5%	
	Total	100%		100%	

Add knowledge area

V(C). Planned Program (Inputs)

1. Actual amount of professional FTE/SYs expended this Program

Year: 2010	Extension		Research	
	1862	1890	1862	1890
Plan	14.0	0.0	3.0	0.0
Actual	18.0	0.0	3.2	0.0

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	**1890 Extension**	**Hatch**	**Evans-Allen**
250000	0	135285	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
250000	0	135285	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
2300158	0	865792	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

*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. *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. Brief description of the target 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(E). Planned Program (Outputs)

1. Standard output measures

2010	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Plan	15000	1200000	3000	0
Actual	117100	12100000	9081	0

2. Number of Patent Applications Submitted (Standard Research Output)

Patent Applications Submitted

Year:	2010
Plan:	0
Actual:	2

Patents listed
PVP - 2 burmudagrass cultivars for turf

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2010	Extension	Research	Total
Plan	5	5	
Actual	16	9	25

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- New Master Gardeners trained

☐ Not reporting on this Output for this Annual Report

Year	Target	Actual
2010	100	302

Output #2

Output Measure

- Manuscripts submitted for consideration of publication in peer-reviewed journals

☐ Not reporting on this Output for this Annual Report

Year	Target	Actual
2010	3	15

Output #3

Output Measure

- Number of Extension publications completed - fact sheets, newsletters, trial reports, web-based materials

☐ Not reporting on this Output for this Annual Report

Year	Target	Actual
2010	6	52

Output #4

Output Measure

- Number of statewide "Oklahoma Gardening" shows produced

☐ Not reporting on this Output for this Annual Report

Year	Target	Actual
2010	40	36

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

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

Add Cross-cutting Outcome/Impact Statement or Unintended or Previously Unknown Outcome Measure

Outcome #1

1. Outcome Measures

☐ Not Reporting on this Outcome Measure

Number of horticultural crop producers newly certified as organic

2. Associated Institution Types

☑ 1862 Extension
☑ 1862 Research

3a. Outcome Type:

◯ Change in Knowledge Outcome Measure
◉ Change in Action Outcome Measure
◯ Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	3	14

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Spinach anthracnose is an emerging disease on 3,000 acres of spinach grown in Oklahoma. Currently registered fungicides are not effective due to potential resistance development in the fungus.

What has been done
Field trials were conducted in the spring and fall evaluating the efficacy of fungicides and biological control products s for disease management.

Results
Two fungicides were identified that provide disease control. One is an experimental fungicide under development and the other is registered on other crops, but not spinach. The IR4 project (Pest Management Solutions for Specialty Crops and Minor Uses) has submitted a label for use of the latter product on spinach anthracnose using the Oklahoma data.

4. Associated Knowledge Areas

☐ 124 - Urban Forestry
☐ 202 - Plant Genetic Resources
☑ 204 - Plant Product Quality and Utility (Preharvest)
☑ 205 - Plant Management Systems
☑ 502 - New and Improved Food Products

- ☐ 901 - Program and Project Design, and Statistics
- ☐ 903 - Communication, Education, and Information Delivery

Outcome #2

1. Outcome Measures

☐ Not Reporting on this Outcome Measure

Number of volunteer hours provided to community horticulture programs statewide

2. Associated Institution Types

- ☑ 1862 Extension
- ☐ 1862 Research

3a. Outcome Type:

- ○ Change in Knowledge Outcome Measure
- ◉ Change in Action Outcome Measure
- ○ Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	20000	105420

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Rapid urban growth in many areas of the United States coupled with increased interest in the environment and home gardening have prompted an ever-increasing number of garden and landscape inquiries. Along with this interest, comes a multitude of gardening questions needing individual explanation and too few Extension staff members to answer each question. Many of these questions are seasonal in nature and are relatively easy to answer assuming that one has horticulture training.

What has been done
Oklahoma Master Gardeners are trained, supervised and recruited to: 1) improve overall efficiency in providing one-on-one service to the non-commercial horticulture clientele in the county, 2) provide group learning and teaching activities for non-commercial clientele, 3) allow agents to develop proactive Extension programs, and 4) form a group of Extension volunteers to support additional consumer horticulture efforts.

Trainees participate in a 10 - 13 week course receiving between 40 - 56 hours of course work on subjects including: basic plant science, vegetables, fruits, nuts, ornamentals, lawns, diagnosing pest problems, soils, and other related topics. Upon completion of the training period, satisfactorily passing an exam on materials and topics covered, and donating between 40 - 56 hours of volunteer time to the Horticulture program, the trainees are certified and awarded the title of Oklahoma Master Gardener.

Examples of Master Gardener Volunteer activities include: staffing plant clinics to answer phone and walk-in questions, manning educational exhibits, maintaining demonstration gardens, community beautification projects, serving as 4-H hort leaders and judges, speaking at club/civic meetings, teaching horticulture activities at nursing homes, etc., assisting in horticulture mailings, newsletters, etc., and appearing on TV and radio.

Results

The service from the Master Gardener volunteer program has proven to be a highly popular means of extending the knowledge of the Oklahoma State University Cooperative Extension Service to the residents of Oklahoma. The Oklahoma Master Gardener Program now has 29 counties participating in the program as of January 2011. The following data was provided by 24 of the 29 counties. Approximately 302 new Master Gardeners were trained during the 2010 training season. Close to 1,207 active Master Gardeners volunteered their time, contributing approximately 103,515 volunteer hours resulting in over 4,520,826 educational interventions with Oklahomans and as many as 1,200+ educational and community programs and activities being conducted in their communities in 2010. This translates to over $1,764,930 in service that was donated by volunteers (wage rate of $17.05/hour was used, which includes a 12% estimate of fringe benefits. This hourly rate is the assigned wage for nonagricultural workers in 2008 for the state of Oklahoma as published in The Independent Sector, an organization that ?serves as a national forum to encourage giving, volunteering and not-for-profit initiative? http://www.independentsector.org/programs/research/volunteer_time.html)

4. Associated Knowledge Areas

- ☑ 124 - Urban Forestry
- ☐ 202 - Plant Genetic Resources
- ☐ 204 - Plant Product Quality and Utility (Preharvest)
- ☑ 205 - Plant Management Systems
- ☐ 502 - New and Improved Food Products
- ☐ 901 - Program and Project Design, and Statistics
- ☑ 903 - Communication, Education, and Information Delivery

Outcome #3

1. Outcome Measures

☐ Not Reporting on this Outcome Measure

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

2. Associated Institution Types

- ☑ 1862 Extension
- ☐ 1862 Research

3a. Outcome Type:

- ○ Change in Knowledge Outcome Measure
- ◉ Change in Action Outcome Measure
- ○ Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	23000	4853905

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

- ☑ 124 - Urban Forestry
- ☐ 202 - Plant Genetic Resources
- ☐ 204 - Plant Product Quality and Utility (Preharvest)
- ☑ 205 - Plant Management Systems
- ☐ 502 - New and Improved Food Products
- ☐ 901 - Program and Project Design, and Statistics
- ☑ 903 - Communication, Education, and Information Delivery

V(H). Planned Program (External Factors)

External factors which affected 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

Brief Explanation

During the winter of 2009, a hailstorm that damaged greenhouse roofs affected some studies. New greenhouse coverings made further research possible during 2010. Limited formula funding is reducing the ability to conduct applied research that meets local needs. Fuel costs are impacting budgets (teaching, research, extension).

V(I). Planned Program (Evaluation Studies and Data Collection)

(OPTIONAL SECTION)

1. Evaluation Studies Planned

- ☑ After Only (post program)
- ☑ Retrospective (post program)
- ☐ Before-After (before and after program)
- ☑ During (during program)
- ☐ Time series (multiple points before and after program)
- ☐ Case Study
- ☐ Comparisons between program participants (individuals, group, organizations) and non-participants
- ☐ Comparisons between different groups of individuals or program participants experiencing different levels of program intensity.
- ☐ Comparison between locales where the program operates and sites without program intervention
- ☐ Other

Evaluation Results

{No Data Entered}

Key Items of Evaluation

{No Data Entered}

V(A). Planned Program (Summary)

Program # 5

1. Name of the Planned Program

Climate Change - Ecosystem and Environmental Quality and Management

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%		5%	
111	Conservation and Efficient Use of Water	13%		10%	
112	Watershed Protection and Management	10%		15%	
121	Management of Range Resources	13%		15%	
123	Management and Sustainability of Forest Resources	13%		10%	
133	Pollution Prevention and Mitigation	7%		10%	
134	Outdoor Recreation	5%		5%	
135	Aquatic and Terrestrial Wildlife	10%		5%	
136	Conservation of Biological Diversity	3%		5%	
205	Plant Management Systems	5%		10%	
403	Waste Disposal, Recycling, and Reuse	6%		5%	
605	Natural Resource and Environmental Economics	10%		5%	
	Total	100%		100%	

Add knowledge area

V(C). Planned Program (Inputs)

1. Actual amount of professional FTE/SYs expended this Program

Year: 2010	Extension		Research	
	1862	1890	1862	1890
Plan	8.0	0.0	7.0	0.0
Actual	10.0	0.0	14.3	0.0

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	**1890 Extension**	**Hatch**	**Evans-Allen**
140820	0	604802	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
140820	0	604802	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
1415298	0	3870599	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

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. Brief description of the target audience

Scientists, students, related agencies (Federal, State, private), landowners, farmers, ranchers, communities, consumers, weather reporters, land developers, state legislators, commodity groups, community leaders, fire departments, leaseholders

V(E). Planned Program (Outputs)

1. Standard output measures

2010	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Plan	400	5000	225	225
Actual	18443	238581	4253	7160

2. Number of Patent Applications Submitted (Standard Research Output)

Patent Applications Submitted

Year: 2010
Plan: 0
Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2010	Extension	Research	Total
Plan	10	10	
Actual	12	50	62

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Grant proposals written and submitted

☐ Not reporting on this Output for this Annual Report

Year	Target	Actual
2010	12	31

Output #2

Output Measure

- Manuscripts submitted for consideration of peer-reviewed publication

☐ Not reporting on this Output for this Annual Report

Year	Target	Actual
2010	15	62

Output #3

Output Measure

- Extension conferences, workshops and training sessions

☐ Not reporting on this Output for this Annual Report

Year	Target	Actual
2010	30	89

Output #4

Output Measure

- Research and Extension reports and fact sheets

☐ Not reporting on this Output for this Annual Report

Year	Target	Actual
2010	10	12

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

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

Add Cross-cutting Outcome/Impact Statement or Unintended or Previously Unknown Outcome Measure

Outcome #1

1. Outcome Measures

☐ Not Reporting on this Outcome Measure

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

2. Associated Institution Types

☑ 1862 Extension
☐ 1862 Research

3a. Outcome Type:

◯ Change in Knowledge Outcome Measure
◉ Change in Action Outcome Measure
◯ Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	900	1057

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
There are roughly 700 plus poultry farms in Eastern Oklahoma that produce more than 300 million birds and generate approximately 200,000 tons of poultry litter annually. Concerns about phosphorus from the litter polluting important water resources prompted the state of Oklahoma to pass the Registered Poultry Feeding Operations (RPFO) Act and the Poultry Waste Applicators Certification Act in 1998, paving the way for the Oklahoma Cooperative Extension Service (OCES) Poultry Waste Management (PWM) Education Program. Through this program, OCES educates over 1300 poultry feeding operators and waste applicators, addressing water quality concerns associated with improper or excessive land application of poultry litter.

As set forth in the Acts, all poultry production operators and poultry waste applicators must complete an initial nine-hour series of PWM educational sessions, and then each year attend three hours of continuing education (Annual Update Education). OCES provides the required training and issues certificates to attendees upon completion of each session.

What has been done
In 2010, Cooperative Extension Educators offered the initial nine-hour training sessions 5 times, attracting 81 new operators and applicators to the certification process. Initial PWM sessions cover basic training on regulations, water quality, animal waste management plans, nutrient management, soil sampling and spreader calibration procedures, conservation practices and poultry litter marketing. During 2010, an additional 976 operators received continuing education units to remain certified.
Annual Update Education balances environmental protection needs with the latest knowledge and

practices for poultry production. Over the past year, OCES developed 15 new presentations to meet educational needs. Annual Update Education efforts consisted of 81 hours of classroom and field instruction in 2010. Training efforts can be measured by multiplying hours given in a single class by the number of people attending that class, resulting in a unit of training called People-Hours. A total of 3,888 People-Hours were provided in 2010.

Results

A total of 2,446 people have received certificates of completion since the program began in 1998. Pre-test data (test taken before each chapter is presented) shows that 75% of the producers? answers were correct compared to post-test data (test taken after each chapter is presented) which shows that 89% of the answers were correct. Poultry production generates $613,000,000 in annual receipts annually in Oklahoma and no producer can operate without the initiatl training and annual cuntinuing education. Thus this training is significantly important to economic success of this industry.

OCES has also developed the Oklahoma Litter Market website to assist with the transfer of poultry litter to areas of need and away from nutrient surplus areas. The website, www.ok-littermarket.org, assists substantially in promoting the transfer of poultry litter out of Eastern Oklahoma to more distant areas of the state with nutrient-deficient soils. This site has made it possible to move thousands of tons of litter out of problematic watersheds to land that can use the litter productively and safely.

4. Associated Knowledge Areas

- ☐ 104 - Protect Soil from Harmful Effects of Natural Elements
- ☐ 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
- ☐ 205 - Plant Management Systems
- ☑ 403 - Waste Disposal, Recycling, and Reuse
- ☐ 605 - Natural Resource and Environmental Economics

<u>Outcome #2</u>

1. Outcome Measures

☐ Not Reporting on this Outcome Measure

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

2. Associated Institution Types

- ☑ 1862 Extension
- ☐ 1862 Research

3a. Outcome Type:

- ○ Change in Knowledge Outcome Measure
- ◉ Change in Action Outcome Measure
- ○ Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	70	105

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

- ☐ 104 - Protect Soil from Harmful Effects of Natural Elements
- ☐ 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
- ☑ 205 - Plant Management Systems
- ☑ 403 - Waste Disposal, Recycling, and Reuse
- ☐ 605 - Natural Resource and Environmental Economics

Outcome #3

1. Outcome Measures

☐ Not Reporting on this Outcome Measure

Number of animal waste analyses conducted for poultry litter application

2. Associated Institution Types

- ☑ 1862 Extension
- ☐ 1862 Research

3a. Outcome Type:

- ○ Change in Knowledge Outcome Measure
- ◉ Change in Action Outcome Measure
- ○ Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	100	900

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

- ☐ 104 - Protect Soil from Harmful Effects of Natural Elements
- ☐ 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
- ☑ 205 - Plant Management Systems
- ☑ 403 - Waste Disposal, Recycling, and Reuse
- ☐ 605 - Natural Resource and Environmental Economics

<u>Outcome #4</u>

1. Outcome Measures

☐ Not Reporting on this Outcome Measure

Peer-reviewed publications

2. Associated Institution Types

- ☑ 1862 Extension
- ☑ 1862 Research

3a. Outcome Type:

- ○ Change in Knowledge Outcome Measure
- ◉ Change in Action Outcome Measure
- ○ Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	10	62

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Expanding the knowledge base for managing natural resources is an important role of land grant universities. This knowledge base increases our ability to sustainably manage resources while supporting rural economies.

What has been done
Over 60 peer-reviewed manuscripts were published in an array of journals from very applied to very basic.

Results
Many of these manuscripts were published in high impact, international journals have a world-wide readership. The information can impact how forestry, rangelands, wildlife, and fisheries are managed.

4. Associated Knowledge Areas

- ☐ 104 - Protect Soil from Harmful Effects of Natural Elements
- ☑ 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
- ☐ 205 - Plant Management Systems
- ☐ 403 - Waste Disposal, Recycling, and Reuse
- ☑ 605 - Natural Resource and Environmental Economics

Outcome #5

1. Outcome Measures

☐ Not Reporting on this Outcome Measure

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

2. Associated Institution Types

☑ 1862 Extension
☐ 1862 Research

3a. Outcome Type:

◉ Change in Knowledge Outcome Measure
◯ Change in Action Outcome Measure
◯ Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	100	153

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The Water Research and Extension Center within the Division of Agricultural Sciences and Natural Resources (DASNR) focuses efforts for sustaining Oklahoma?s agriculture water supply, which is crucial to the state?s economy and the health and well-being of residents and the environment.

What has been done
The Water Research and Extension Center for DASNR developed a web site to consolidate material for managers and planners into one location.

Results
The website (http://agwater.okstate.edu/) has supplied information to 153 unique users (IP addresses) in 2010.

4. Associated Knowledge Areas

☐ 104 - Protect Soil from Harmful Effects of Natural Elements
☑ 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
- ☐ 205 - Plant Management Systems
- ☐ 403 - Waste Disposal, Recycling, and Reuse
- ☑ 605 - Natural Resource and Environmental Economics

Outcome #6

1. Outcome Measures

☐ Not Reporting on this Outcome Measure

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. Associated Institution Types

- ☑ 1862 Extension
- ☑ 1862 Research

3a. Outcome Type:

- ○ Change in Knowledge Outcome Measure
- ○ Change in Action Outcome Measure
- ◉ Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	{No Data Entered}	4

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Oklahoma agricultural producers and natural resource managers have the opportunity to move from calendar-based to weather-based farm management. Weather-based farm management can reduce farm inputs, increase crop yield and quality, improve farm sustainability, provide new integrated pest management (IPM) opportunities, improve environmental protection and expand crop marketing information. The Oklahoma Mesonet through its Mesonet and Agweather websites (http://mesonet.org and http://agweather.mesonet.org) gives farmers and ranchers weather-based risk management tools and information.

Weather-based management has been made possible because of the Oklahoma Mesonet, one of the most data-rich weather networks in the world. New weather data are transmitted every 5 minutes from a statewide system of 120 automated weather-monitoring towers. This constant flow of quality assured, research-quality weather data are used to maintain a wide spectrum of weather and agricultural decision support products made available via the Web. The challenge in implementing weather-based agricultural management includes increasing producer comfort with

computer operation, expanding grower weather knowledge, simplifying weather data display, shaping decision support products to meet day-to-day farm management needs and providing out-of-office data access.

What has been done

Oklahoma State University, the University of Oklahoma and the Oklahoma Climatological Survey (OCS) through the Oklahoma Mesonet have created multi-faceted agricultural and natural resource extension outreach and research programs. Mesonet Agweather (http://agweather.mesonet.org) provides access to weather data and products at no cost to Oklahoma farmers and ranchers. Ongoing extension and outreach efforts inform growers about the Mesonet Agweather website and introduce weather-based farm management tools via farm show exhibits, educational programs and printed materials. In 2010, efforts focused on promotion of the new Mesonet Drift Risk Advisor, revised Mesonet.org website and new Mesonet Mobile smartphone website.

The Drift Risk Advisor was made operational in January 2010 on the Agweather website. It allows applicators to enter lower and upper weather parameters for the materials they are applying and wind directions they need to avoid. The Drift Risk Advisor compares the entered weather parameters to an hour-by-hour National Weather Service forecast for the next 84 hours and shows times of high and low drift risk.

The revised Mesonet website acts as a single web portal to all Mesonet program websites. Data selection has been moved to a visual format, with small updated thumbnails of data products.

The new Mesonet Mobile website allows smartphone cellphone users with cellphone Internet access to view Mesonet data on the go.

Results

An economic survey completed by OU graduate student Kim Klochow using recognized economic analysis techniques, estimated that the 10% of Oklahoma crop land being managed with Oklahoma Mesonet data saved $8 million in production costs in 2008. Miss Klochow was only able to survey crop producers. This estimated value does not include the Mesonet value to livestock producers.

Mesonet Agweather has been shown to serve agricultural and horticultural enterprises on several levels. Dennis Brigham of Bentley Turf Farms told how he typically turns to Mesonet Agweather for weather information to help him schedule sod installation by his company?s installation crews. One day north of Mustang, a Bentley Turf Farms? crew was busy laying sod, while to the southwest a severe storm cell spawned a tornado. Dennis used the radar on the Mesonet Agweather website to track the storm. He determined that there was a high probability the tornado would track over the location where the crew was laying sod. Mesonet Agweather gave him enough lead-time to contact the crew leader and get the crew to travel south out of the tornado?s track. On this day, Mesonet Agweather quickly transitioned from being a day-to-day scheduling tool to a life and death safety tool.

Mark Hodges, past Executive Director for the Oklahoma Wheat Commission, has used Oklahoma Mesonet soil moisture and rainfall maps to build customer relations with international grain buyers of Oklahoma wheat. While Mark has not put a direct value on Oklahoma Mesonet data, he has stated that Mesonet information has been part of Oklahoma grain sellers marketing millions of bushels of wheat over multiple years to buyers in Mexico.

4. Associated Knowledge Areas

- ☑ 104 - Protect Soil from Harmful Effects of Natural Elements
- ☑ 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
- ☑ 205 - Plant Management Systems
- ☐ 403 - Waste Disposal, Recycling, and Reuse
- ☐ 605 - Natural Resource and Environmental Economics

V(H). Planned Program (External Factors)

External factors which affected 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

Brief Explanation

V(I). Planned Program (Evaluation Studies and Data Collection)

(OPTIONAL SECTION)

1. Evaluation Studies Planned

- ☑ After Only (post program)
- ☐ Retrospective (post program)
- ☑ Before-After (before and after program)
- ☑ During (during program)

- ☐ Time series (multiple points before and after program)
- ☐ Case Study
- ☑ Comparisons between program participants (individuals, group, organizations) and non-participants
- ☑ Comparisons between different groups of individuals or program participants experiencing different levels of program intensity.
- ☑ Comparison between locales where the program operates and sites without program intervention
- ☐ Other

Evaluation Results

{No Data Entered}

Key Items of Evaluation

{No Data Entered}

V(A). Planned Program (Summary)

Program # 6

1. Name of the Planned Program

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

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	15%		5%	
403	Waste Disposal, Recycling, and Reuse	4%		5%	
501	New and Improved Food Processing Technologies	20%		10%	
502	New and Improved Food Products	5%		15%	
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%		20%	
723	Hazards to Human Health and Safety	5%		10%	
	Total	100%		100%	

Add knowledge area

V(C). Planned Program (Inputs)

1. Actual amount of professional FTE/SYs expended this Program

Year: 2010	Extension		Research	
	1862	1890	1862	1890
Plan	1.6	0.0	4.0	0.0
Actual	0.0	0.0	5.4	0.0

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	**1890 Extension**	**Hatch**	**Evans-Allen**
20000	0	228127	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
20000	0	228127	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
1100000	0	1459963	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Conduct research that evaluates food processing technologies to improve food value, quality and safety. Provide technical applications, demonstrations and education for food processors. Develop rapid detection methods for allergens and toxins.

Conduct research to evaluate agricultural product storage and handling technologies to improve quality and safety. Develop technical applications, demonstrations and education for grain and food storage providers and handlers.

2. Brief description of the target audience

food processing industry, agriculture product manufacturers and marketers of grain, feed and food; private and government food safety regulators;

V(E). Planned Program (Outputs)

1. Standard output measures

2010	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Plan	450	8000	0	0
Actual	0	0	0	0

2. Number of Patent Applications Submitted (Standard Research Output)

Patent Applications Submitted

Year: 2010
Plan: 1
Actual: 1

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2010	Extension	Research	Total
Plan	5	8	
Actual	3	7	10

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Peer-reviewed journal articles

☐ Not reporting on this Output for this Annual Report

Year	Target	Actual
2010	8	7

Output #2

Output Measure

- Number of conferences and other extension outreach presentations

☐ Not reporting on this Output for this Annual Report

Year	Target	Actual
2010	8	8

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

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

Add Cross-cutting Outcome/Impact Statement or Unintended or Previously Unknown Outcome Measure

Outcome #1

1. Outcome Measures

☐ Not Reporting on this Outcome Measure

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

2. Associated Institution Types

☑ 1862 Extension
☑ 1862 Research

3a. Outcome Type:

○ Change in Knowledge Outcome Measure
○ Change in Action Outcome Measure
◉ Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	50	3

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Bacterial contamination of equipment in food processing plants is of concern to processors and consumers due to possible contamination of foods that may cause illness in consumer populations.

What has been done
Research evaluated products to sterilize and/or reduce contamination of foods during processing.

Results
14 antimicrobial products were determined to reduce contamination of which one product was superior to all others.

4. Associated Knowledge Areas

☐ 216 - Integrated Pest Management Systems
☐ 401 - Structures, Facilities, and General Purpose Farm Supplies
☐ 403 - Waste Disposal, Recycling, and Reuse
☑ 501 - New and Improved Food Processing Technologies
☐ 502 - New and Improved Food Products
☑ 503 - Quality Maintenance in Storing and Marketing Food Products

- ☐ 701 - Nutrient Composition of Food
- ☑ 711 - Ensure Food Products Free of Harmful Chemicals, Including Residues from
- ☑ 712 - Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and
- ☑ 723 - Hazards to Human Health and Safety

Outcome #2

1. Outcome Measures

☐ Not Reporting on this Outcome Measure

Number of food processors implementing new technologies or technology improvements

2. Associated Institution Types

- ☑ 1862 Extension
- ☑ 1862 Research

3a. Outcome Type:

- ○ Change in Knowledge Outcome Measure
- ◉ Change in Action Outcome Measure
- ○ Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	4	5

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Roasting equipment used in processing foods including coffee use significant amounts of energy. Processing companies and the general public wish to reduce energy use in the U.S. and to reduce food costs.

What has been done
New roaster designs were developed that improve energy efficiency and compared to on market systems.

Results
A new design was successful in reducing energy use while maintaining or improving performance and is being implemented within the industry.

4. Associated Knowledge Areas

- ☐ 216 - Integrated Pest Management Systems
- ☐ 401 - Structures, Facilities, and General Purpose Farm Supplies

- ☐ 403 - Waste Disposal, Recycling, and Reuse
- ☑ 501 - New and Improved Food Processing Technologies
- ☐ 502 - New and Improved Food Products
- ☑ 503 - Quality Maintenance in Storing and Marketing Food Products
- ☐ 701 - Nutrient Composition of Food
- ☑ 711 - Ensure Food Products Free of Harmful Chemicals, Including Residues from
- ☑ 712 - Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and
- ☑ 723 - Hazards to Human Health and Safety

Outcome #3

1. Outcome Measures

☐ Not Reporting on this Outcome Measure

New products produced

2. Associated Institution Types

- ☐ 1862 Extension
- ☑ 1862 Research

3a. Outcome Type:

- ○ Change in Knowledge Outcome Measure
- ○ Change in Action Outcome Measure
- ◉ Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	1	1

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

- ☐ 216 - Integrated Pest Management Systems
- ☐ 401 - Structures, Facilities, and General Purpose Farm Supplies
- ☐ 403 - Waste Disposal, Recycling, and Reuse
- ☐ 501 - New and Improved Food Processing Technologies

- ☑ 502 - New and Improved Food Products
- ☐ 503 - Quality Maintenance in Storing and Marketing Food Products
- ☑ 701 - Nutrient Composition of Food
- ☐ 711 - Ensure Food Products Free of Harmful Chemicals, Including Residues from
- ☐ 712 - Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and
- ☐ 723 - Hazards to Human Health and Safety

Outcome #4

1. Outcome Measures

☑ Not Reporting on this Outcome Measure

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

2. Associated Institution Types

- ☑ 1862 Extension
- ☑ 1862 Research

3a. Outcome Type:

- ○ Change in Knowledge Outcome Measure
- ◉ Change in Action Outcome Measure
- ○ Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	50	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

- ☑ 216 - Integrated Pest Management Systems
- ☑ 401 - Structures, Facilities, and General Purpose Farm Supplies
- ☐ 403 - Waste Disposal, Recycling, and Reuse
- ☐ 501 - New and Improved Food Processing Technologies
- ☐ 502 - New and Improved Food Products
- ☑ 503 - Quality Maintenance in Storing and Marketing Food Products

- ☐ 701 - Nutrient Composition of Food
- ☐ 711 - Ensure Food Products Free of Harmful Chemicals, Including Residues from
- ☐ 712 - Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and
- ☑ 723 - Hazards to Human Health and Safety

V(H). Planned Program (External Factors)

External factors which affected 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

Brief Explanation

V(I). Planned Program (Evaluation Studies and Data Collection)

(OPTIONAL SECTION)

1. Evaluation Studies Planned

- ☑ After Only (post program)
- ☐ Retrospective (post program)
- ☑ Before-After (before and after program)
- ☐ During (during program)
- ☐ Time series (multiple points before and after program)
- ☐ Case Study
- ☐ Comparisons between program participants (individuals, group, organizations) and non-participants
- ☐ Comparisons between different groups of individuals or program participants experiencing different levels of program intensity.
- ☑ Comparison between locales where the program operates and sites without program intervention
- ☐ Other

Evaluation Results

{No Data Entered}

Key Items of Evaluation

{No Data Entered}

V(A). Planned Program (Summary)

Program # 7

1. Name of the Planned Program

Family Resiliency and Economic Well-Being

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	5%		0%	
607	Consumer Economics	10%		0%	
724	Healthy Lifestyle	5%		0%	
801	Individual and Family Resource Management	37%		0%	
802	Human Development and Family Well-Being	40%		0%	
806	Youth Development	3%		0%	
	Total	100%		0%	

Add knowledge area

V(C). Planned Program (Inputs)

1. Actual amount of professional FTE/SYs expended this Program

Year: 2010	Extension		Research	
	1862	1890	1862	1890
Plan	40.0	0.0	0.0	0.0
Actual	23.0	0.0	0.0	0.0

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	**1890 Extension**	**Hatch**	**Evans-Allen**
308000	0	0	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
308000	0	0	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
3000000	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

- 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 other 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. Brief description of the target 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(E). Planned Program (Outputs)

1. Standard output measures

2010	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Plan	2000	150000	3000	2000
Actual	102690	5500000	23000	8183100

2. Number of Patent Applications Submitted (Standard Research Output)

Patent Applications Submitted

Year: 2010
Plan: 0
Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2010	Extension	Research	Total
Plan	2	0	
Actual	15	0	15

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Revised online curriculum

☐ Not reporting on this Output for this Annual Report

Year	Target	Actual
2010	0	0

Output #2

Output Measure

- Promotional materials and marketing campaign

☐ Not reporting on this Output for this Annual Report

Year	Target	Actual
2010	1	3

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Participants demonstrate improved food, nutrition, and/or physical activity behaviors
2	Participants will utilize recommended financial management practices
3	Participants will expand their knowledge of recommended financial management practices including a reduction in their debt levels and the use of credit.
4	Participants in assest building classes (i.e. investments, retirement, home-buyer education, entrepreneurship) will expand their knowledge on home-buying and maintenance, investments and retirement, and starting a business.
5	Participants will reduce their debt levels, their use of credit, feel more satisfied with and less stressed about their financial situation, and begin developing an asset base.
6	Participants in assest building classes (i.e. investments, retirement, home-buyer education, entrepreneurship) will have bought a home, started and 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.
7	Adults receiving the program will attain increased interpersonal cognitive problem-solving skills
8	Adults receiving the program reporting increased use of interpersonal cognitive problem-solving skills with cheldren/youth
9	Children and youth receiving the program will increase use of interpersonal cognitive problem-solving skills

Add Cross-cutting Outcome/Impact Statement or Unintended or Previously Unknown Outcome Measure

Outcome #1

1. Outcome Measures

☐ Not Reporting on this Outcome Measure

Participants demonstrate improved food, nutrition, and/or physical activity behaviors

2. Associated Institution Types

☑ 1862 Extension
☐ 1862 Research

3a. Outcome Type:

◯ Change in Knowledge Outcome Measure
◉ Change in Action Outcome Measure
◯ Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	240	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

☐ 602 - Business Management, Finance, and Taxation
☐ 607 - Consumer Economics
☑ 724 - Healthy Lifestyle
☐ 801 - Individual and Family Resource Management
☐ 802 - Human Development and Family Well-Being
☐ 806 - Youth Development

Outcome #2

1. Outcome Measures

☐ Not Reporting on this Outcome Measure

Participants will utilize recommended financial management practices

2. Associated Institution Types

☑ 1862 Extension
☐ 1862 Research

3a. Outcome Type:

◯ Change in Knowledge Outcome Measure
◯ Change in Action Outcome Measure
◉ Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	50	3014

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Economic indicators in Oklahoma, such as personal income are holding steady. Non-farm payrolls decreased by 5600 jobs in 2009 and the unemployment rate is 6.8%. However many families are struggling to make ends meet due to increases in health insurance rates and fuel costs. Increasingly, the aging population is taking on more credit card debt. Many Oklahomans? find themselves in peril of legal action and excessive fees because they employ more disruptive financial practices like payday loans and bogus check writing.

What has been done
Since 2007 extension educators in 14 counties have offered a financial literacy program for persons involved in dire financial circumstances like bankruptcy. In January of 2008 District 6 county extension educators began offering this program to court-ordered bogus check writers. In this region, the number of checks that are written on accounts with insufficient funds totals more than 6,000 in a year. These bogus checks cost merchants and consumers as costs are passed on. The Region 6 District Attorney?s office requested a partnership to deliver financial management classes to offenders in the District 6 counties: Grady, Caddo, Jefferson and Stephens. The program, Making Sense of Money Management was offered 18 times in 2008 and 2009.
Each member of the Family Economic Well Being Impact team dedicates 28 days to focus on financial literacy related programming. Offering classes as diverse as life skills education leading to employment, homebuyer education and basic money management and credit.

Results

This program has been expanded and is supported by 4 judges and 2 District Attorneys. The program prevents incarceration of the fraudulent check writers. In addition, the court waives the $198 fee for participants who complete the program. During 2010 90 participants completed the class reflecting a savings to them of $17,820. Comments from participants indicate that they could have avoided their current situation if they had the information presented in the classes before.

Members of the impact team reported 3,445 hours on specific impact team outreach with 11,479 participants. Twenty to 40% of participants report that they intend to make changes to their financial management practices.

4. Associated Knowledge Areas

- ☑ 602 - Business Management, Finance, and Taxation
- ☑ 607 - Consumer Economics
- ☐ 724 - Healthy Lifestyle
- ☐ 801 - Individual and Family Resource Management
- ☐ 802 - Human Development and Family Well-Being
- ☐ 806 - Youth Development

Outcome #3

1. Outcome Measures

☐ Not Reporting on this Outcome Measure

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

2. Associated Institution Types

- ☑ 1862 Extension
- ☐ 1862 Research

3a. Outcome Type:

- ◉ Change in Knowledge Outcome Measure
- ◯ Change in Action Outcome Measure
- ◯ Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	500	6048

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The 2008 Jumpstart Coalition for Personal Financial Literacy survey reflected that financial literacy scores for high school students were lower than their peers tested in 2006. High school

seniors only answered 48.3 percent of the questions correctly. Only 48% answered correctly that a credit card holder who pays only the minimum payment on a credit card balance would pay more in annual interest charges than someone who paid the balance in full each month. Lacking basic financial knowledge will costs these students in the long term. Oklahoma has passed legislation requiring that high school students have training in financial literacy before graduation. The Passport to Financial Literacy requirements will affect students who will graduate in 2014. They are required to be literate in 14 topic areas outlined in the legislation.

What has been done
Extension educators on the Family Economic Well Being impact team offer programs targeting youth audiences including high schools. The High School Financial Planning Program offered through the National Endowment for Financial Education offers free materials to instructors and students addressing 11 of the 14 topic areas required by the Passport for Financial Literacy. Reality Check is a program developed by the Jumpstart coalition which according to their website is a quick, easy and free online resource designed to help young people see what it?s really going to take to live independently as an adult consumer.

Results
Since the High School Financial Planning Program was revised in 2007 the materials have been provided to over 25,000 students in Oklahoma with 5200 in 2010. Additionally, all county educators are made aware of the availability of these materials and how they can be used to make connections with schools in their counties. Educators have used the Reality Check materials with 848 students in 9 schools.

4. Associated Knowledge Areas

- ☑ 602 - Business Management, Finance, and Taxation
- ☑ 607 - Consumer Economics
- ☐ 724 - Healthy Lifestyle
- ☐ 801 - Individual and Family Resource Management
- ☐ 802 - Human Development and Family Well-Being
- ☐ 806 - Youth Development

Outcome #4

1. Outcome Measures

☐ Not Reporting on this Outcome Measure

Participants in assest building classes (i.e. investments, retirement, home-buyer education, entrepreneurship) will expand their knowledge on home-buying and maintenance, investments and retirement, and starting a business.

2. Associated Institution Types

- ☑ 1862 Extension
- ☐ 1862 Research

3a. Outcome Type:

- ◉ Change in Knowledge Outcome Measure
- ◯ Change in Action Outcome Measure
- ◯ Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	200	3300

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

- ☑ 602 - Business Management, Finance, and Taxation
- ☑ 607 - Consumer Economics
- ☐ 724 - Healthy Lifestyle
- ☑ 801 - Individual and Family Resource Management
- ☐ 802 - Human Development and Family Well-Being
- ☐ 806 - Youth Development

Outcome #5

1. Outcome Measures

☐ Not Reporting on this Outcome Measure

Participants will reduce 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. Associated Institution Types

- ☑ 1862 Extension

☐ 1862 Research

3a. Outcome Type:

◯ Change in Knowledge Outcome Measure
◯ Change in Action Outcome Measure
◉ Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	50	446

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

☑ 602 - Business Management, Finance, and Taxation
☑ 607 - Consumer Economics
☐ 724 - Healthy Lifestyle
☐ 801 - Individual and Family Resource Management
☐ 802 - Human Development and Family Well-Being
☐ 806 - Youth Development

Outcome #6

1. Outcome Measures

☐ Not Reporting on this Outcome Measure

Participants in assest building classes (i.e. investments, retirement, home-buyer education, entrepreneurship) will have bought a home, started and 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. Associated Institution Types

- ☑ 1862 Extension
- ☐ 1862 Research

3a. Outcome Type:

- ○ Change in Knowledge Outcome Measure
- ◉ Change in Action Outcome Measure
- ○ Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	10	210

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
There has been a slow down in the housing market and an increase in home foreclosures. Purchasing a home represents the largest outlay of cash for most Americans and many view owning a home as an investment. In Oklahoma during 2010 the number of homes sold was down 10%. Oklahoma reported 5,806 foreclosures in the third quarter of 2010. This figure represents an increase of 2% over the previous quarter and a 15% increase over the same quarter of 2009.

What has been done
Since 2001, Oklahoma Cooperative Extension Service has worked with various agencies in the state in a collaborative effort to provide standardized homebuyer education to potential homebuyers. Research shows that homebuyer education and counseling lowers the incidences of foreclosure. Fourteen extension educators have been trained and certified to deliver homebuyer education programs. Seven hundred and fifty two individuals received homebuyer education from these educators thus providing them with the information they need to make good decisions about home purchase and homeownership.

Results
Twenty eight percent of participants in classes actually report purchasing a home. In cases where they give reasons for not purchasing a home 40% state the reason as recognizing they need to work on their finances.

4. Associated Knowledge Areas

- ☑ 602 - Business Management, Finance, and Taxation
- ☑ 607 - Consumer Economics
- ☐ 724 - Healthy Lifestyle
- ☐ 801 - Individual and Family Resource Management
- ☐ 802 - Human Development and Family Well-Being
- ☑ 806 - Youth Development

Outcome #7

1. Outcome Measures

☐ Not Reporting on this Outcome Measure

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

2. Associated Institution Types

☑ 1862 Extension
☐ 1862 Research

3a. Outcome Type:

◉ Change in Knowledge Outcome Measure
◯ Change in Action Outcome Measure
◯ Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	50	184

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
High risk behaviors in children and youth are serious concerns. In Oklahoma every year on average 6,000 youth under age 19 drop out of high school; 24,000 arrests involve children or adolescents; 2,300 babies are born to school-age teens; more teens engage in smoking, alcohol use, sexual activity, violence and weapon carrying than the national average (OK Institute for Child Advocacy; OK Youth Risk Behavior Survey). The many harmful or unhealthy risks encountered by families, children, and youth can impact long-term productivity, healthy functioning, and costs to communities and the state. Research has identified specific protective factors which have a positive influence on young people?s lives however, the average youth experiences less than half of these critical assets (Search Institute).

What has been done
Since 2007, the I Can Problem Solve program (ICPS; Shure, 2000) has been implemented by the impact team. During 2010, Extension Educators in 10 counties recruited preschool or elementary school teachers with a class of children ages 3 through 12 and provided training and technical support on the ICPS program. Seven group teacher trainings and nine individual teacher trainings were provided and nine teachers were provided individual consultation. Two 90-minute workshops were provided for professionals, one at a statewide conference, and the other at a national conference. One 90-minute workshops were provided for the Oklahoma Indian Head Start Directors Pre-Service Conference attended by 25 staff members who work in 21 community Head Start Centers operated by 10 Tribes. Three related programs were also presented: Raising a Thinking Child, to four parents; What do you do with the mad that you feel? to 13 child care providers, and Making ACE (Assets in Early Childhood Education) Connections: Building a Foundation for Early Childhood Education with ASSETS, presented to 13 child care providers.

Results
ICPS training evaluations completed by 21 participating teachers, child care providers, and youth workers from 3 different counties indicated:
?57% rated their understanding of ICPS before training as ?poor? or ?fair? and 33% as ?good?. After training, 100% rated their understanding as ?good? or ?excellent?.
?95% reported the level their knowledge had increased was ?good? or ?excellent?.

Impact evaluation questionnaires submitted by 12 teachers from 6 different counties with classrooms receiving or utilizing ICPS indicated:
?58% ?much? or ?very much? learned techniques from the program useful for managing the class/group.
?58% ?much? or ?very much? increased knowledge or understanding as a result of the program.

Oklahoma Indian Head Start Directors Pre-Service workshop evaluations from 25 participants indicated 84% increased in knowledge and 100% increased in understanding of the topic.

Completed evaluations from three parents who participated in the Raising a Thinking Child program indicated two of the three had better knowledge about the information taught in the program.

Evaluations completed by 13 child care providers who participated in What do you do with the mad that you feel? indicated:
?38% rated their understanding of the topic before training as ?poor? or ?fair? and 38% as ?good?. After training 92% reported their understanding as ?good? or ?excellent?.
?77% reported the level their knowledge had increased was ?good? or ?excellent?.

Evaluations completed by 11 of the child care providers who participated in Making ACE (Assets in Early Childhood Education) Connections: Building a Foundation for Early Childhood Education with ASSETS indicated:
?45% rated their understanding of the topic before training as ?fair? and 45% as ?good?. After training 81% reported their understanding as ?excellent?.
?100% reported the level their knowledge had increased was ?good? or ?excellent?.

4. Associated Knowledge Areas

- ☐ 602 - Business Management, Finance, and Taxation
- ☐ 607 - Consumer Economics
- ☐ 724 - Healthy Lifestyle
- ☐ 801 - Individual and Family Resource Management
- ☑ 802 - Human Development and Family Well-Being
- ☑ 806 - Youth Development

Outcome #8

1. Outcome Measures

☐ Not Reporting on this Outcome Measure

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

2. Associated Institution Types

☑ 1862 Extension
☐ 1862 Research

3a. Outcome Type:

○ Change in Knowledge Outcome Measure
◉ Change in Action Outcome Measure
○ Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	30	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
High risk behaviors in children and youth are serious concerns. In Oklahoma every year on average 6,000 youth under age 19 drop out of high school; 24,000 arrests involve children or adolescents; 2,300 babies are born to school-age teens; more teens engage in smoking, alcohol use, sexual activity, violence and weapon carrying than the national average (OK Institute for Child Advocacy; OK Youth Risk Behavior Survey). The many harmful or unhealthy risks encountered by families, children, and youth can impact long-term productivity, healthy functioning, and costs to communities and the state. Research has identified specific protective factors which have a positive influence on young people?s lives however, the average youth experiences less than half of these critical assets (Search Institute).

What has been done
During 2010, the I Can Problem Solve program was implemented in at least seven preschool, Head Start, elementary school, and afterschool program sites. Trained teachers, counselors, child care providers, and youth workers utilized the ICPS program in their classrooms or with groups. Some county educators also co-facilitated or directly presented lessons to the children. Four parents received the Raising a Thinking Child program.

Results
Impact evaluation questionnaires submitted by 12 teachers, counselors, child care providers, and youth workers with classrooms or groups that received or utilized ICPS indicated:
?58% reported ?much? or ?very much? having changed practices and interactions with the children/class as a result of the program and another 17% ?moderately? changed.
?58% reported ?much? or ?very much? using the skills learned through this program and another

17% ?moderately? used.
?75% rated the overall effect of this program on the teacher?s practices and interactions as ?somewhat good? or ?very positive?.
?67% rated the likelihood of using this program again in the future as ?very positive?.

Of Oklahoma Indian Head Start Directors Pre-Service workshop evaluations from 25 participants, 92% reported the information would be helpful in their work and 96% indicated they would use the information.

Completed evaluations received from three parents who participated in the Raising a Thinking Child program showed that:
?Two of the three parents reported their use of words and skills taught in the program had changed for the better.
?All three parents reported the effect of the program on interactions with their children was ?very positive?.
?All three parents reported the likelihood they will continue to use what they learned from the program was ?very positive?.

Of completed evaluations from 20 parents who participated in the A Parenting Journey program, 100% reported the information will be useful to them and 100% reported the handouts will be helpful.

Evaluations completed by 13 child care providers who participated in What do you do with the mad that you feel? indicated 92% found the information helpful to their work and were likely to use the information.

Evaluations completed by 11 of the child care providers who participated in Making ACE (Assets in Early Childhood Education) Connections: Building a Foundation for Early Childhood Education with ASSETS indicated 100% found the information helpful to their work and they were likely to use the information.

4. Associated Knowledge Areas

- ☐ 602 - Business Management, Finance, and Taxation
- ☐ 607 - Consumer Economics
- ☐ 724 - Healthy Lifestyle
- ☐ 801 - Individual and Family Resource Management
- ☑ 802 - Human Development and Family Well-Being
- ☑ 806 - Youth Development

Outcome #9

1. Outcome Measures

☐ Not Reporting on this Outcome Measure

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

2. Associated Institution Types

- ☑ 1862 Extension
- ☐ 1862 Research

3a. Outcome Type:

- ○ Change in Knowledge Outcome Measure
- ○ Change in Action Outcome Measure
- ◉ Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	750	1027

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
High risk behaviors in children and youth are serious concerns. In Oklahoma every year on average 6,000 youth under age 19 drop out of high school; 24,000 arrests involve children or adolescents; 2,300 babies are born to school-age teens; more teens engage in smoking, alcohol use, sexual activity, violence and weapon carrying than the national average (OK Institute for Child Advocacy; OK Youth Risk Behavior Survey). The many harmful or unhealthy risks encountered by families, children, and youth can impact long-term productivity, healthy functioning, and costs to communities and the state. Research has identified specific protective factors which have a positive influence on young people?s lives however, the average youth experiences less than half of these critical assets (Search Institute).

What has been done
Trained teachers, child care providers, counselors, and youth workers utilized the ICPS program in preschool centers, Head Start centers, elementary schools, and afterschool programs reaching 37 classrooms of children pre-Kindergarten through middle school grades. Some county educators also co-facilitated or directly presented some of the lessons to children in the classrooms.

Results
Impact evaluation questionnaires submitted by 12 teachers, child care providers, counselors, and youth workers with classrooms or groups of children who received ICPS indicated:
92% of the children are using the skills learned through this program ?moderately? or ?much?.
83% of the children are using the language of the program ?moderately? or ?much?.

4. Associated Knowledge Areas

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

- ☐ 724 - Healthy Lifestyle
- ☐ 801 - Individual and Family Resource Management
- ☑ 802 - Human Development and Family Well-Being
- ☑ 806 - Youth Development

V(H). Planned Program (External Factors)

External factors which affected 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.)
- ☑ null

Brief Explanation

{No Data Entered}

V(I). Planned Program (Evaluation Studies and Data Collection)

(OPTIONAL SECTION)

1. Evaluation Studies Planned

- ☑ After Only (post program)
- ☑ Retrospective (post program)
- ☑ Before-After (before and after program)
- ☑ During (during program)
- ☑ Time series (multiple points before and after program)
- ☑ Case Study
- ☑ Comparisons between program participants (individuals, group, organizations) and non-participants
- ☐ Comparisons between different groups of individuals or program participants experiencing different levels of program intensity.
- ☐ Comparison between locales where the program operates and sites without program intervention
- ☐ Other

Evaluation Results

Impact evaluation questionnaires submitted by 12 teachers, child care providers, and youth workers with classrooms or groups that received or were utilizing ICPS in 2010 indicated:

- 83% rated the overall effect of the program on the children's social and emotional development, the children's behavior, as well as on the classroom/group atmosphere as "somewhat good" or "very positive".
- 62-75% rated children increased the following positive behaviors from prior to the program to after the program: considerate and helpful to others, accepts responsibility for actions, expresses needs and feelings appropriately, thinks before acting, and listens to and understands other people's feelings.
- 75-87% rated children in their classroom increased in the following positive behaviors from prior to the program to after the program: understands consequences of behavior, cooperates and works well with others, and resolves peer problems on their own.

Completed evaluations received from three parents who participated in the Raising a Thinking Child program indicated that the effect of the program on their children's behavior was "very positive".

Key Items of Evaluation

In 2010, an Impact Evaluation Questionnaire and In-service Training Evaluation were collected from teachers after training or program delivery. Some questions utilized a retrospective pre/post approach.

V(A). Planned Program (Summary)

Program # 8

1. Name of the Planned Program

4-H Youth Development

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	4%		100%	
806	Youth Development	96%		0%	
	Total	100%		100%	

Add knowledge area

V(C). Planned Program (Inputs)

1. Actual amount of professional FTE/SYs expended this Program

Year: 2010	Extension		Research	
	1862	1890	1862	1890
Plan	65.0	0.0	0.0	0.0
Actual	100.0	0.0	0.5	0.0

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	**1890 Extension**	**Hatch**	**Evans-Allen**
1206593	0	2653	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
1206593	0	2653	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
10500000	0	16976	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

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. Brief description of the target 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(E). Planned Program (Outputs)

1. Standard output measures

2010	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Plan	1000	5000	2500	12500
Actual	19050	1000000	997355	7087988

2. Number of Patent Applications Submitted (Standard Research Output)

Patent Applications Submitted

Year: 2010
Plan: 0
Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2010	Extension	Research	Total

Plan	2	2	
Actual	0	0	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Web-delivered curriculum - lessons developed and tested

☐ Not reporting on this Output for this Annual Report

Year	Target	Actual
2010	1	12

Output #2

Output Measure

- Educational trainings offered for volunteers and staff

☐ Not reporting on this Output for this Annual Report

Year	Target	Actual
2010	5	55

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

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

Add Cross-cutting Outcome/Impact Statement or Unintended or Previously Unknown Outcome Measure

Outcome #1

1. Outcome Measures

☐ Not Reporting on this Outcome Measure

Certified participants will manage local programming

2. Associated Institution Types

☑ 1862 Extension
☐ 1862 Research

3a. Outcome Type:

○ Change in Knowledge Outcome Measure
◉ Change in Action Outcome Measure
○ Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	1000	2180

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Youth and families expect CES to provide a safe inclusive environment for positive youth development. 4-H volunteers are essential partners in creating a positive environment by focusing on the strengths of youth and providing positive ways for youth to meet their basic needs. CES is responsible for educating adult volunteers on positive youth development principles and practices to ensure programs generate opportunities for young people to reach their potential.

What has been done
Extension Educators have been provided training and materials for managing risk, volunteers and clubs at the local and county levels. Staff have been provided the philosophy and guiding principles for youth development through 4-H for Century III training. Volunteers who have been certified annually participate in four continuing education opportunities which draw upon core information found in three units of 4-H Volunteer Core Competency Curriculum. 4-H Professional Research Knowledge and Competencies (PRKC) for Extension Educators was provided through Everyone Ready an online volunteer management staff development plan.
Subject matter training conducted for educators and volunteers in WHEP, Shooting Sports, Forestry, Equine, Goat Science, state and district volunteer conferences, Companion Animal Citizenship, Video Production, Entomology, SET, Junior Master Gardner, Entomology Zoo, OMK (Military 4-H), Primitive Camping, Camp Safety.

Results

Volunteer certification program exists in 76 counties. 2180 certified adult and teen volunteers were reported to provide leadership to 993 4-H clubs and 950 short-term/special interest project groups. 40,802 youth were serviced by local 4-H clubs/project groups.

4. Associated Knowledge Areas

- ☐ 608 - Community Resource Planning and Development
- ☑ 806 - Youth Development

Outcome #2

1. Outcome Measures

☑ Not Reporting on this Outcome Measure

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

2. Associated Institution Types

- ☑ 1862 Extension
- ☐ 1862 Research

3a. Outcome Type:

- ○ Change in Knowledge Outcome Measure
- ◉ Change in Action Outcome Measure
- ○ Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	700	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

- ☐ 608 - Community Resource Planning and Development
- ☑ 806 - Youth Development

Outcome #3

1. Outcome Measures

☐ Not Reporting on this Outcome Measure

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

2. Associated Institution Types

☑ 1862 Extension
☐ 1862 Research

3a. Outcome Type:

◉ Change in Knowledge Outcome Measure
◯ Change in Action Outcome Measure
◯ Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	700	1943

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

☐ 608 - Community Resource Planning and Development
☑ 806 - Youth Development

Outcome #4

1. Outcome Measures

☐ Not Reporting on this Outcome Measure

Project curriculum in support of Mission Mandates

2. Associated Institution Types

- ☑ 1862 Extension
- ☐ 1862 Research

3a. Outcome Type:

- ◉ Change in Knowledge Outcome Measure
- ◯ Change in Action Outcome Measure
- ◯ Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	15	30

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Curriculum has been defined as anything that is planned to bring about a change in behavior. 4-H curriculum provides the framework for learning through 4-H. 4-H curriculum, to some extent, determines the effectiveness and strength of the total 4-H program. Today the Internet is loaded with information but it is often not research based or age appropriate and fails to lead youth through subject matter topics (projects) at their own pace.

What has been done
Oklahoma 4-H curriculum focuses on experiential, activity-based learning of life skills related to 4-H member project work. Curriculum materials were developed in conjunction with Extension Specialist and county staff to meet the demands of busy 4-H members and volunteers. Many pieces of our new curriculum have been developed in the ?Grab and Go? format for easy on-line access. Before new 4-H curriculum materials are released, they are piloted to ensure they meet standards for quality and usefulness.
A statewide curriculum in-service was held for 54 Extension educators. Participants experienced how the use of 4-H curriculum materials can lead to desired project outcomes and stimulate the interest of 4-H members. Forty-two 4-H volunteers experienced a similar session at during 4-H Parent Volunteer Conference.

Results
Thirty new pieces of Oklahoma 4-H curriculum are available to support 4-H member life skill development and project work.

4. Associated Knowledge Areas

- ☐ 608 - Community Resource Planning and Development
- ☑ 806 - Youth Development

Outcome #5

1. Outcome Measures

☐ Not Reporting on this Outcome Measure

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. Associated Institution Types

☑ 1862 Extension
☐ 1862 Research

3a. Outcome Type:

◯ Change in Knowledge Outcome Measure
◯ Change in Action Outcome Measure
◉ Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	36	51417

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
An assessment of the life skill and practice of 4-H record keeping indicate fewer members are doing project work for a sustained period of time. As a result, there is a decline in the development of a well balanced set of life skills ? relating/caring; managing/thinking; giving/working; and living/being. Positive youth development research has shown that youth gain the greatest benefit from an experience when there is long-term contact with a caring and significant adult.

What has been done
Staff development was done educators and volunteers related to health using ?Health Rocks?, ?Farm to You?, ?Food Showdown? and various items through a Walmart Health grant and the Healthy Oklahoma Impact team.

Results

4. Associated Knowledge Areas

☐ 608 - Community Resource Planning and Development
☑ 806 - Youth Development

Outcome #6

1. Outcome Measures

☐ Not Reporting on this Outcome Measure

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. Associated Institution Types

☑ 1862 Extension
☐ 1862 Research

3a. Outcome Type:

◯ Change in Knowledge Outcome Measure
◉ Change in Action Outcome Measure
◯ Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	10	10

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Our natural resources are finite and must be protected. Teaching youth to make wise environmental decisions rather than re-train them as adults is the most effective way to help them become good environmental stewards.

What has been done
Positive youth development opportunities contribute to the economic stability of a community. To strengthen human capital, 66 teams of teens (716) and adult mentors (262) were trained to embark on issue based programming. As a result, 51 action plans were developed and 33 completed. Healthy sustainable community projects include - international programming with students from Turkey; the planting of 300 trees and $65,000 in natural capital in one community which sustained multiple natural disasters over a two year period; mapping four city parks, water wells and sewer lift stations for city leaders and the development of responsible proactive youth learning to be community partners. Five-hundred and ten hours contributed to six forms of capital: natural, cultural, human, social, civic/political, and economic/financial.

Since 2000, 4-H Programs across the state have selected the Ronald McDonald Pop tab collection program as an environmental education community service project. County 4-H programs have reported collecting over 1500 pounds of pop tabs. At an average of 75 cents per pound, this effort has raised more than $1100 to support families living in the Ronald McDonald House while a sick child is being treated in the hospital. Other county 4-H programs have collected over 2000 pounds of aluminum cans to raise support for local 4-H clubs. Lincoln county 4-H teamed up with the local sheriff and courthouse personnel to collect and recycle 900 ink jet cartridges to protect landfills and water quality.

This year, Washita county 4-H celebrated Earth Day with a plastic recycling drive and collected 3000 plastic water bottles. As an extension they also added a recycling theme to their summer camp program and used recycled materials to make crafts, and each family went home with a recycling bin.

Water conservation has become a mainstay of Oklahoma 4-H?s environmental education programs. Beckham County 4-H taught 285 youth about water quality explaining to them that water is not clean just because it is clear. Plus they demonstrated how ground water can be contaminated by industry, agriculture and homeowners. Oklahoma and Canadian Counties have been taking the same message to completely different audience by teaching urban youth the value of water conservation and how to protect ground water in the city. They have reached over 16,000 youth and families with their environmental education efforts.
NRCS and Okfuskee County OCES teamed up to hold ?Fantastic Fridays? for youth ages 5 to 12. Sixty eight youth learned about water quality, water conservation, and recycling.

Results
4-H Programs across the state have selected the Ronald McDonald Pop tab collection program as an environmental education community service project. County 4-H programs have reported collecting over 1500 pounds of pop tabs. At an average of 75 cents per pound, this effort has raised more than $1100 to support families living in the Ronald McDonald House while a sick child is being treated in the hospital. Other county 4-H programs have collected over 2000 pounds of aluminum cans to raise support for local 4-H clubs. Lincoln county 4-H teamed up with the local sheriff and courthouse personnel to collect and recycle 900 ink jet cartridges to protect landfills and water quality.
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4. Associated Knowledge Areas

- ☐ 608 - Community Resource Planning and Development
- ☑ 806 - Youth Development

Outcome #7

1. Outcome Measures

☐ Not Reporting on this Outcome Measure

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

2. Associated Institution Types

☑ 1862 Extension
☐ 1862 Research

3a. Outcome Type:

◉ Change in Knowledge Outcome Measure
◯ Change in Action Outcome Measure
◯ Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	5000	8765

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
According to the 2007 State of the State Report, Oklahomans are below average or failing in several indicators of good health. As a State, our citizens tend to not eat enough fruits and vegetables each day. Many citizens are overweight or obese; get little or no physical activity and too many Oklahomans? use tobacco.
Diabetes, high blood pressure, high blood cholesterol, stroke, heart disease, asthma, lung cancer ? these are all negative consequences of the unhealthy lifestyles Oklahomans are living.

What has been done
4-H received a grant from the Walmart Foundation to which allowed counties to conduct local health education programs.
Youth were presented with educational programs related to healthy eating choices, use of substances, delaying sexual activity, and driving distracted.

Our projects began with four district youth conferences in October 2009 which was described in the mid-term report. Out of that event 47 mini-grant to local 4-H projects were funded. Some of those highlights follow.

In 9 counties projects focused on getting citizens to move more and eat less. Using Wii Fit computer programs purchased at Walmart, the educators conducted lessons on good nutrition and participants engaged in group physical fitness activities. In every county the educators indicated the participants reporting a loss of weight and BMI as indicated by the Wii exercise board estimator. In one county a young man has lost 50 pounds as a result of lifestyle changes he has made using the combination of the nutrition project and the Wii Fit. He has begun to run 1.5 miles per day in addition to eliminating sodas and snacks from his diet. In many counties both youth and adult fitness challenges have emerged.

In Tulsa County, Nutrition Education staff and volunteers were trained to conduct lessons in the classroom using whole grains. Using an Oklahoma Ag in the Classroom activity and additional nutrition education information they made Tortillas in a bag they have reached over 1200 3rd and 4th grade students with nutrition lessons along with action songs that included nutritional messages and physical activity.

Two of our State 4-H Leadership Team members took on projects of their own. Ashlan Wilson trained a team of other 4-H members who then conducted health education programs in schools in her county. In her own school she reached 233 elementary students through activities related to personal hygiene, primarily hand washing. School officials credit Ashlan with helping to reduce the spread of season colds and flu as a result of her lessons for elementary students.

State Secretary, Taler Sawatzky was moved to action after learning about the practice of female circumcision in Kenya and decided to involve other 4-H members in a campaign to raise money to send to Kenya to support the work of Outreach programs through Moi University that are being used to replace this practice with education as a right of passage for girls. She has shared brochures and information with over 10,000 people so far and has had an opportunity to meet with educational leaders from Moi University and the government of Kenya as a result of her efforts. (this number not included in the WM Grant total).

Results

All of the local projects have allowed citizens to learn through workshops demonstrations and hands-on activity the importance of better nutrition and the need for increased fitness. While no scientific analysis has been done and the duration of the grant was not enough to measure long-term impact on health, participants indicate short-term changes in regard to the foods they select, portion sizes, and the amount of physical activity.

Our State 4-H Vice President who has lost over 50 pounds as a result of this grant has shared his success story with countless other youth via Facebook, an interactive display at the World?s Largest Youth Livestock Show, and through speaking engagements as a state officer.

The other teen working on the Kenya project has been able to share her story with international visitors and her video conversation with Kenyan leaders has been on YouTube and Facebook. The long-term impact will make life better for girls have way around the planet from her, but still she sees this as part of making her world community better.

4. Associated Knowledge Areas

- ☐ 608 - Community Resource Planning and Development
- ☑ 806 - Youth Development

Outcome #8

1. Outcome Measures

☐ Not Reporting on this Outcome Measure

Increased number of collaborations with youth organizations

2. Associated Institution Types

☑ 1862 Extension
☐ 1862 Research

3a. Outcome Type:

○ Change in Knowledge Outcome Measure
◉ Change in Action Outcome Measure
○ Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	15	14

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
4-H Educators often attempt to solve critical issues without reaching out to other partners who have resources that might be useful in addressing those issues.

What has been done
4-H Faculty and Staff worked with numerous campus-wide faculty to develop new programs. The 4-H Food Showdown is collaboration with Hotel and Restaurant Administration, Nutritional Sciences, Food and Ag Product Center and numerous commodity groups, including the Made in Oklahoma Collation.
Meetings were held with the district council leaders of Boys and Girls Scouts, National Guard Youth Programs, Boys and Girls Clubs, youth workers on all active duty installations, the Red Earth Council in OKC, education directors of OKC Zoo and OK Science Museum, Farm Bureau, FFA, American Farmers and Ranchers and several commodity group reps on the Ag in the Classroom Advisory Board.
Extension Educators in Oklahoma, Cleveland, McClain, Canadian, and Pottawatomie combined efforts to plan and conduct a two-day educational workshop for workers and leaders in various youth serving agencies. The conference allowed a time for participants to learn about one and another programs but also an opportunity to conduct some general training on youth development, volunteer management, risk managements and related topics. Over 67 participated in the event. As a result of the meeting a new 4-H club is being established in John Marshall School system, a traditionally at-risk school.

Results
Minority youth are often less inclined to graduate from high school and to seek an advanced degree. This population of is at greater risk of engaging in early sexual activity which results in teen pregnancy.
What was done: A grant was written and obtained from National 4-H Council and the US Department of Juvenile Justice to create a 4-H mentoring program in OKC with two high risk groups. Faculty in FCS and 4-H have collaborated to secure a $85,000+ grant to implement a Latino Mentoring program in OKC. Two staff from the Latino Agency have been employed to work with mentors and youth who are meeting weekly to explore careers and to learn more about 4-H.

4. Associated Knowledge Areas

- ☐ 608 - Community Resource Planning and Development
- ☑ 806 - Youth Development

Outcome #9

1. Outcome Measures

☐ Not Reporting on this Outcome Measure

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

2. Associated Institution Types

- ☑ 1862 Extension
- ☐ 1862 Research

3a. Outcome Type:

- ◉ Change in Knowledge Outcome Measure
- ◯ Change in Action Outcome Measure
- ◯ Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	15	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The 4-H Shooting Sports program is designed to assist young people in personal development, the establishment of personal environmental ethics, and the exploration of life-long vocational and avocational activities. The program uses experiential learning and positive interactions with youth and adult role models to help young people develop self-concept, self-assurance and a positive self-image.
The content provides a framework of knowledge and skills for lifetime participation in recreation, hobbies and careers related to shooting sports and wildlife. Core concepts stress safety, ethical development, personal responsibility and life-time recreational skills.

What has been done
?Nearly 6000 youth are enrolled in the Shooting Sports and they need trained volunteers to instruct them regarding safe use of sporting arms, environmental ethics, and sportsmanship. In 2010, 76 new volunteers were trained and began working with youth in clubs.
?While most of the youth involved in SS would likely not become delinquents, some may be inclined to become involved in at risk behaviors if not involved in programs that encourage discipline. The estimated cost to keep one juvenile delinquent housed in a correctional facility is close to $55,000 per year. In a survey of youth and families in Texas, the estimated cost for a

youth to participate in 4-H shooting sports was about $4,000 a year.
?696 youth competed in one or more state shooting sports contests. Each of these youth had received a minimum of 8 hours of instruction before competing.

?In collaboration with OHE, two educational lessons were developed for their club members. The lessons were also used with 4-H audiences.
?Working with the Jenks Aquarium, The OKC Zoo and Oklahoma Science Museum, camps were conducted that reached over 4500 youth with messages about science and the environment.
?2009 National Conference Back Home Action Plan was a program called STEP: Students Tackling Environmental Problems. The State 4-H Leadership Council offered the program as a Traveling Workshop to be conducted at the county level for club and teen leaders.

Results
?Over 10% of the youth enrolled in the 4-H Shooting Sports program participated in one or more of the 10 state level competitive events offered to members.

4. Associated Knowledge Areas

- ☐ 608 - Community Resource Planning and Development
- ☑ 806 - Youth Development

Outcome #10

1. Outcome Measures

☐ Not Reporting on this Outcome Measure

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. Associated Institution Types

- ☑ 1862 Extension
- ☐ 1862 Research

3a. Outcome Type:

- ○ Change in Knowledge Outcome Measure
- ◉ Change in Action Outcome Measure
- ○ Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	7000	12000

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Youth need to learn acceptable animal husbandry practices, to demonstrate 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.

What has been done
Collaborating with the Oklahoma and National Pork Councils educators continued and expanded the use of the Pork Quality Assurance Plus (PQA Plus) youth education and youth certification program.

Results
Approximately 7000 youth 8-18 years of age in both 4-H and FFA programs were certified in the PQA Plus program as part of their county pork project and enabled them to show at the Oklahoma Youth Expo and the Tulsa State Fair. As a result of this program there has been a decrease in stress related deaths in exhibition animals and a more marketable meat product.

4. Associated Knowledge Areas

- ☐ 608 - Community Resource Planning and Development
- ☑ 806 - Youth Development

Outcome #11

1. Outcome Measures

☐ Not Reporting on this Outcome Measure

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

2. Associated Institution Types

- ☑ 1862 Extension
- ☐ 1862 Research

3a. Outcome Type:

- ◉ Change in Knowledge Outcome Measure
- ◯ Change in Action Outcome Measure
- ◯ Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	100	17544

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The US is falling dangerously behind other nations in developing its future workforce of scientists, engineers, and technology experts. Only 18% of US high school seniors are proficient in science (NAEP, 2005). Oklahoma 4-H is combating this issue by teaching youth about STEM.

What has been done
Oklahoma?s main vehicle for educating youth about science, technology, engineering, and math has been the 4-H Geospatial Institute. For 2010, this program was expanded from just geospatial technologies to include, digital photography, videography, and robotics, which became the 4-H STEM Institute. The STEM Institute was designed to train teams of youth and adult in the use and application of technology. These teams were then charged with the tasks of applying their technology specialty to a community service project or the development of a special project club. Once their project is established or complete the team was then expected to go teach other youth about their program and their technology.

Results
Digital Media
Nine teams of youth and adults were trained in videography and digital photography. These teams were expected to create digital media with the intent of creating awareness of an issue affecting youth. Each group took a unique approach to their project. Projects ranged from Bullying to Nutrition, Life on a Military Installation to how to give a 4-H presentation, and of course, all about 4-H. Creek County created podcasts of veterans. These videos were showcased at events for friends and family. Several of the videos were shown as school educational pieces. Teams held educational events to share their knowledge with other youth. The Creek County 4-H team invited military youth to a special training to help them tell their story with digital photography and podcasting.

Geospatial
Geospatial projects are about teaching youth how to think spatially. This is done by training them in GPS/GIS. Once trained, the teams of youth and adults are expected to apply the GIS technology. Currently five county teams are working on geospatial projects. Each of these groups has been teaching GPS workshops during summer camps, through school enrichment programs, and other venues. In addition to presenting workshops, these teams are partnering with local agencies to create maps as a community service. As an example Washita County 4-H partnered with the Cordell Fire Department to locate and map fire hydrants, the Noble County team mapped all the 4-H Shooting Sports clubs, Cleveland County team has been teaching younger 4-H member how to geocache and think spatially, Comanche County group created maps for the county fair and is seeking a grant to further their GIS knowledge and competencies.

Robotics
Six county 4-H groups learned about engineering and robotics. These groups have set up informational displays, and workshops. Robotics is a new addition to our STEM institute. This program is proving to be exciting and drawing a lot of interest from 4-H groups across the state.

4. Associated Knowledge Areas

- ☐ 608 - Community Resource Planning and Development
- ☑ 806 - Youth Development

Outcome #12

1. Outcome Measures

☐ Not Reporting on this Outcome Measure

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

2. Associated Institution Types

☑ 1862 Extension
☐ 1862 Research

3a. Outcome Type:

◉ Change in Knowledge Outcome Measure
◯ Change in Action Outcome Measure
◯ Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	500	12292

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Plants are vital to life on earth. They improve air and water quality, control erosion, provide food and medicine for animals, and have great aesthetic value as well. Children involved in plant science projects increase their agricultural literacy and generally become healthier through physical activity and increased knowledge of healthy eating.

What has been done
The OSU Department of Horticulture and Landscape Architecture and the OSU Department of Plant and Soil Sciences have facilitated plant and soil education for youth in Oklahoma through many activities, productions, and programs. Both departments have sponsored residential academies for youth to experience career-related activities in the plant sciences, hosted judging contests at the state fairs, provided workshops for youth and adults at conferences across the state, and have visited individual classrooms and youth groups throughout the state. Activities in 2010 include:
Presentations about Junior Master Gardener (JMG) ? Horticulture Industries Show (for industry professionals in OK/AR), Grove Home and Garden Show, Guthrie Home and Garden Show, Native American Horticulture Conference, Kay County Master Gardeners, Payne County Master Gardeners, Riverfield Country Day School (Tulsa, OK), Encyclomedia (state teacher conference), Ornamental Plant Materials Conference, Global Horticulture Conference
College/Career day presentations ? Shawnee Ag Futures Conference (central OK FFA students), Career Paths Expo (all 8th graders in Payne County), Oklahoma Youth Expo (Oklahoma 4H/FFA state livestock show), Stillwater Regional Career Fair, OSU Up-Close
Educational workshops ? ?Plants in the Classroom? (semester-long course for teachers interested in incorporating gardening into their curricula), training for Health and Nutrition from the

Garden (JMG curriculum) for Oklahoma educators, ?Sow, Hoe, and Grow? Ag in the Classroom State Conference, two trainings for JMG basic curriculum for Oklahoma educators
Presentations to Youth ? Stillwater High School biology class, Bixby YMCA 4-year-old program, OK Science Fest (Oklahoma 4th and 5th graders), Women in Science Conference (girls from around Oklahoma), OSU GardenFest, two visits to summer food program at Skyline Elementary (Stillwater, OK), 4H Roundup, Richmond Elementary (Stillwater, OK), Dove Science Academy (Oklahoma City, OK)
Productions ? 3 episodes for ?Oklahoma Gardening? TV show
Contests ? FFA Career Development Events (floriculture, nursery/landscaping, agronomy), Oklahoma State Fair, Oklahoma/Arkansas State Fair (Ft. Smith, AR), Tulsa State Fair
Residential Camps ? Grandparent University, Tomorrow?s Undergraduates Realizing the Future (?Camp TURF? ? 2 weeks of career-related activities for 25 first-generation college students from Oklahoma high schools), Plant Science Academy
Multi-State/National Conference Presentations ? National Children and Youth Gardening Symposium (Los Angeles, CA); National Summer Learning Association National Conference (Indianapolis, IN); Southwest Region - American Science Teacher Educators (Stillwater, OK)

Results

There was an increase in the number of registered Junior Master Gardener groups over previous years (5 new groups in 2010; 1 new group in 2009).

There was an increase in the number of 4H youth participating in the Oklahoma State Fair horticulture judging contest (42 in 2010; 38 in 2009).

There was an increase in the number of FFA youth participating in the Floriculture CDE contest (64 in 2010; 56 in 2009).

Students in Camp TURF were given pre- and post-surveys on a variety of subjects related to college preparation and attendance, as well as horticulture and landscape architecture. They used a Likert scale in their responses (1= strongly disagree, 5 = strongly agree). A sample of the results is below.

2010 TURF SURVEYSprepostDifference
I would like to go to college4.8754.8125-0.0625
I would feel comfortable around other students at college. 4.254.6250.375
I know how to find answers to my questions about college. 3.754.31250.5625
I know how to apply to college.2.8753.68750.8125
I know how to apply for financial aid.2.6253.81251.1875
I know what classes to take to get ready for college.3.754.56250.8125
I have the skills to be successful in college. 3.8754.1250.25
Horticulture careers are important to society.3.93754.31250.375
Landscape design involves creativity.4.54.81250.3125
Horticulture and landscaping careers can be fun.4.18754.31250.125
Landscape architects can make landscaping eco-friendly.4.18754.43750.25
There are a lot of different careers in horticulture.44.68750.6875
Science is something that only happens in a lab.1.81251.5-0.3125
I feel comfortable doing science.4.31254.25-0.0625
I am interested in a career in horticulture.33.3750.375
I am interested in a landscape contracting career.2.93753.06250.125
I am interested in becoming a landscape architect.2.87530.125
I am interested in running a greenhouse.3.06252.5625-0.5

I am interested in turf management.3.31252.875-0.4375

4. Associated Knowledge Areas

- ☐ 608 - Community Resource Planning and Development
- ☑ 806 - Youth Development

Outcome #13

1. Outcome Measures

☐ Not Reporting on this Outcome Measure

Increase knowledge and awareness of entomology.

2. Associated Institution Types

- ☑ 1862 Extension
- ☐ 1862 Research

3a. Outcome Type:

- ◉ Change in Knowledge Outcome Measure
- ◯ Change in Action Outcome Measure
- ◯ Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	750	380

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
All people on the planet rely upon insects for the ecological services they render?valued at $57 billion dollars, annually. Human agriculture is integrally connected to the life cycles, functions, and biologies of insects and their relatives. Insects are also a serious health concern because they kill more than 2 million people each year due to diseases.

What has been done
We have met with 4-H to educate them on the importance and fascination of insects. We have begun the revision of the 4-H entomology curriculum handbooks and the digitization of the curriculum to make it available online. We offer training for 4-H entomology projects. We published a coloring book on insects. The Insect Adventure provided an entomology unit at 4-H Military Camp; we provided 2 workshops on entomology at 4-H Ag Round up; we provided an

entomology presentation at the Collegiate 4-H Conference; and we met with 2 Oklahoma 4-H clubs at the facility. The Insect Adventure maintains 40+ species of arthropods to be able to provide hands-on educational activities to people across Oklahoma.

In addition in more general settings, in 2010, the Insect Adventure gave more than 140 individual presentations at both the Insect adventure facility and at locations throughout the state. These included the OKC State Fair, numerous County Fairs, the Wildlife Expo, Grandparent University, Insect Camp, Boy Scout Camp, as well as classroom visits. The Wildlife Expo had more than 51,000 attendees, and the OKC State Fair recorded more than 300,000 individuals that passed thru the building that the Insect Adventure kiosk is located in.

All, except the State Fair, were hands-on presentations with living arthropods where the message delivered was directed toward increasing an individual?s understanding of the impact and importance of this group of animals and the science surrounding them.

Results

There are an increased number of presentations being given to 4-H youths, leaders, volunteers, and educators regarding the value of insects and their interconnectedness with humans. Discussions involving arthropods in agriculture, ecological services, human and animal health, and food webs were completed. A better understanding of the interconnectedness of the living organisms on the Earth?including insects?will help 4-Hers become better stewards of the planet, better citizens, and caring environmentalists. Increased understanding and appreciation of the discipline of entomology through hands-on exploration will also address the STEM crisis in the US by helping people discover a fascination with science at a young age.

4. Associated Knowledge Areas

- ☐ 608 - Community Resource Planning and Development
- ☑ 806 - Youth Development

Outcome #14

1. Outcome Measures

☐ Not Reporting on this Outcome Measure

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

2. Associated Institution Types

- ☑ 1862 Extension
- ☐ 1862 Research

3a. Outcome Type:

- ◉ Change in Knowledge Outcome Measure
- ◯ Change in Action Outcome Measure
- ◯ Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	30	200

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The CDC reports that 2% of the US population suffers from dog bites each year. 1 in 6 of these bites will require medical attention and two thirds of them will be children. Approximately 70% of all fatal attacks involve children less than 10 years of age. According to the CDC most dog bites can be prevented with proper education. In order to decrease dog bite prevention children need to learn how to be safe around dogs and owners need to learn the importance of being responsible dog ownership.

What has been done
This year the Extension Office in Pawnee, OK incorporated Dog Bite Safety into the Pawnee Schools 5th grade Ag Safety Day program. Over 100 youth were taught how to: safely avoid stray dog encounters, safely approach their friends and families dogs, techniques to follow in case of a dog attack and how to recognize aggressive behaviors in dogs.

Results
Providing education and resources for teaching bite prevention safety to adult 4-H volunteers and 4-H Educators is key in reaching young people throughout the state. The following trainings provided education in bite prevention and free resources including handouts and video to volunteers: State 4-H Volunteer Leader Training to 25 adult volunteers, NW District 4-H Volunteer Training to 6 volunteers, Logan County Volunteer Training to 12 volunteers and State 4-H curriculum in-service to 15 4-H Extension Educators.

4. Associated Knowledge Areas

- ☐ 608 - Community Resource Planning and Development
- ☑ 806 - Youth Development

<u>Outcome #15</u>

1. Outcome Measures

☐ Not Reporting on this Outcome Measure

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

2. Associated Institution Types

- ☑ 1862 Extension
- ☐ 1862 Research

3a. Outcome Type:

- ◉ Change in Knowledge Outcome Measure
- ◯ Change in Action Outcome Measure
- ◯ Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	100	1233

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The Oklahoma National Guard amongst other branches are facing numerous and frequent deployments with 3,500 troops leaving in 2011 having been the largest deployment since the Korean War affecting individuals from all 77 counties. Military service members are deploying by the thousands at Ft. Sill and Tinker AFB annually. Military Kids that are affected by deployment are over looked and often put off as delinquent children, as a reaction to deployment stress in the school system, in rural counties, and urban communities. Raising awareness and keen sense of vigilance to the sensitivity of the issues facing military kids is important as to build a stronger, more focused, fighting military force and resulting in a safer America.

What has been done
A Military Community Support Luncheon program is conducted in pre-selected towns every month throughout the year to inspire the creation of a local support networks. The creation of two 4-H National Guard Clubs has been made through a close partnership and network with the Oklahoma National Guard. Seven Camping opportunities were provided to military kids and their family to help cope with the stresses of deployment and reintegration upon returning. A Speak Out Military Kids camp was conducted to empower military teens to express their stories and raise awareness of the issues facing military kids. Ten RSG trainings and seven informational briefings were conducted to educate the Oklahoma communities and develop vigilance and understanding to develop support during the deployment cycle. The partnership with OMK and State 4-H Capitol day, to educate legislators on the issues facing military kids, resulted in a $10 personal check from a representative to show his desire to support military. A fund raising initiative with Frontier City and White Water Bay resulted in $350 to the 4-H Foundation to be used for military kid support. Presentations were conducted to 4-H youth while preparing and fostering connection to military kids through the Hero Pack project.

Results

4. Associated Knowledge Areas

- ☐ 608 - Community Resource Planning and Development
- ☑ 806 - Youth Development

V(H). Planned Program (External Factors)

External factors which affected 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

Brief Explanation

V(I). Planned Program (Evaluation Studies and Data Collection)

(OPTIONAL SECTION)

1. Evaluation Studies Planned

- ☐ After Only (post program)
- ☐ Retrospective (post program)
- ☑ Before-After (before and after program)
- ☑ During (during program)
- ☑ Time series (multiple points before and after program)
- ☐ Case Study
- ☐ Comparisons between program participants (individuals, group, organizations) and non-participants
- ☑ Comparisons between different groups of individuals or program participants experiencing different levels of program intensity.
- ☐ Comparison between locales where the program operates and sites without program intervention
- ☐ Other

Evaluation Results

{No Data Entered}

Key Items of Evaluation

{No Data Entered}

V(A). Planned Program (Summary)

Program # 9

1. Name of the Planned Program

Turfgrass Development and Management

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	13%		10%	
201	Plant Genome, Genetics, and Genetic Mechanisms	0%		10%	
202	Plant Genetic Resources	5%		10%	
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants	0%		15%	
204	Plant Product Quality and Utility (Preharvest)	0%		5%	
205	Plant Management Systems	67%		15%	
206	Basic Plant Biology	0%		5%	
211	Insects, Mites, and Other Arthropods Affecting Plants	2%		10%	
212	Pathogens and Nematodes Affecting Plants	3%		10%	
216	Integrated Pest Management Systems	10%		10%	
	Total	100%		100%	

Add knowledge area

V(C). Planned Program (Inputs)

1. Actual amount of professional FTE/SYs expended this Program

Year: 2010	Extension		Research	
	1862	1890	1862	1890
Plan	1.6	0.0	2.0	0.0
Actual	2.0	0.0	2.1	0.0

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	**1890 Extension**	**Hatch**	**Evans-Allen**
35000	0	87537	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
35000	0	87537	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
300000	0	560218	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

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. 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. Brief description of the target 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(E). Planned Program (Outputs)

1. Standard output measures

2010	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Plan	2000	10000	0	0
Actual	26786	32411	0	0

2. Number of Patent Applications Submitted (Standard Research Output)

Patent Applications Submitted

Year: 2010

Plan: 0
Actual: 2

Patents listed
OKC 1134? bermudagrass. Filed Nov 1, 2010. US Provisional Patent Application 61/456,133. Turf Bermudagrass. OSU Ref. 2011.07 (OKC 1134). Inventors: Wu, Y., D.L. Martin, C.M. Taliaferro, J.A. Anderson and J.Q. Moss.

?OKC 1119? bermudagrass. Nov 1, 2010. US Provisional Patent Application 61/456,109. Turf Bermudagrass. OSU Ref. 2011.08 (OKC 1119). Inventors: Wu, Y., D.L. Martin, C.M. Taliaferro, J.A. Anderson and J.Q. Moss.

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2010	Extension	Research	Total
Plan	5	5	
Actual	3	3	6

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of peer-reviewed journal articles manuscripts submitted

☐ Not reporting on this Output for this Annual Report

Year	Target	Actual
2010	5	4

Output #2

Output Measure

- Number of final stage experimental bermudagrasses sent to national testing phase in the NTEP bermudagrass trial

☐ Not reporting on this Output for this Annual Report

Year	Target	Actual
2010	1	2

Output #3

Output Measure

- Number of turf/roadside vegetaion management workshops conducted

☐ Not reporting on this Output for this Annual Report

Year	Target	Actual
2010	15	20

Output #4

Output Measure

- Number of turfgrass managers trained in improved varieties and integrated turfgrass management systems

☐ Not reporting on this Output for this Annual Report

Year	Target	Actual
2010	500	1135

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

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
4	Turfgrass varieties evaluated for freeze tolerance
5	Reduce unneeded fungicide application to bentgras putting greens

Add Cross-cutting Outcome/Impact Statement or Unintended or Previously Unknown Outcome Measure

Outcome #1

1. Outcome Measures

☐ Not Reporting on this Outcome Measure

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

2. Associated Institution Types

☑ 1862 Extension
☑ 1862 Research

3a. Outcome Type:

○ Change in Knowledge Outcome Measure
○ Change in Action Outcome Measure
◉ Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	1	3

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Cool-season turfgrasses are utilized in shaded lawns and landscapes in Oklahoma. Traditionally only tall fescue was used in these areas. However, mixing of Kentucky bluegrass with tall fescue can result in increased cool-season grass stand persistence. Presumably the increased persistence is due to increases brown patch fungal disease.

What has been done
Since 2000, a list of suggested improved Kentucky bluegrasses and tall fescues has been provided to key turfgrass seed distributors with the intent of influencing whole sale buying decisions of the regional distributors as well as the improved varieties making their way to sod producers and consumer alike. As in previous years, information was provided to two regional seed distributors.

Results
Two sod producers utilized the improved tall fescue/Kentucky bluegrass 90:10 mixes to seed fields in 2009 resulting in increased availability of improved cool-season turfgrass products during the 2010 growing season. Reduced severity of brown patch fungal disease is anticipated on sites that utilized the improved mixes during the 2011 and subsequent growing season.

4. Associated Knowledge Areas

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

Outcome #2

1. Outcome Measures

☐ Not Reporting on this Outcome Measure

New turf varieties used by the Oklahoma golf course industry

2. Associated Institution Types

- ☑ 1862 Extension
- ☑ 1862 Research

3a. Outcome Type:

- ○ Change in Knowledge Outcome Measure
- ○ Change in Action Outcome Measure
- ◉ Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	0	3

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
A number of environmental and disease pressures are present on golf course putting greens. Creeping bentgrass is considered the elite putting surface grass but is disease prone. Improved disease resistance amongst creeping bentgrass varieties is known. Use of hybrid bermudagrasses can improve summer putting green stand persistence but regular covering of bermudagrass greens with tarps is necessary during acute low temperature events in winter.

What has been done
Five key inquiries were responded to with performance information on improved putting green varietal and species options. While educational programming at turfgrass conferences is important, critical decisions by golf course superintendents often come about from a multi-month fact gathering process which not only includes turfgrass conference educational information but extensive follow up research by the superintendent, including follow up consultations.

Results
Three golf courses in Oklahoma were converted from creeping bentgrass to more heat and drought tolerant Champion hybrid bermudagrass. The success of the installations will be judged over the next 5 years. One low budget private course in Osage county Oklahoma will trial an experimental OSU variety on their putting greens. Use of the yet un-named experimental putting green bermudagrass from OSU will increase the knowledge base concerning the potential for commercialization of this cold tolerant experimental variety. Declaration variety of creeping bentgrass was overseeded on one golf course in Oklahoma. Declaration, an offering from private industry, has shown improved dollarspot disease resistance in national putting green screening trials.

4. Associated Knowledge Areas

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

Outcome #3

1. Outcome Measures

☐ Not Reporting on this Outcome Measure

Number of turfgrass manager participants intending to adopt improved turf management practices

2. Associated Institution Types

- ☑ 1862 Extension
- ☐ 1862 Research

3a. Outcome Type:

- ○ Change in Knowledge Outcome Measure
- ◉ Change in Action Outcome Measure
- ○ Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	400	1029

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
New integrated turfgrass management practices can include development of disease resistant or stress tolerant varieties, elucidation of techniques that allow for improved pest control with equal or less pesticide applications.

What has been done
A spring dead spots disease/winter kill management workshop, a summer general turfgrass field day, a two day general turfgrass conference, 3 sprayer calibration workshops and 14 roadside vegetation management continuing education workshops were conducted to teach Best Management Practices in fine and roadside turfgrass in 2010. Over 1,135 attendees were present at these workshops.

Results
Eighty percent of fine turf managers trained and 100% of roadside vegetation managers trained (a combined figure of 1,029 attendees) stated that they would be adopting the suggested Best Management Practices provided in the training sessions. Seventy percent of attendees felt the knowledge gained would help them manage turf in a more environmentally conscience manner. Forty-seven percent of attendees felt that increased knowledge would allow them to save their employers money in the future.

4. Associated Knowledge Areas

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

Outcome #4

1. Outcome Measures

☐ Not Reporting on this Outcome Measure

Turfgrass varieties evaluated for freeze tolerance

2. Associated Institution Types

- ☐ 1862 Extension
- ☑ 1862 Research

3a. Outcome Type:

- ◉ Change in Knowledge Outcome Measure
- ◯ Change in Action Outcome Measure
- ◯ Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	{No Data Entered}	2

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The ability to survive harsh winters is one of the primary factors limiting bermudagrass (Cynodon sp.) use across wide geographic areas. Consequently, improved stress tolerance has been a goal for programs breeding bermudagrasses.

What has been done
We evaluated freeze tolerance of OSU experimental bermudagrasses ?OKC 1119? and ?OKC 1134? as well as freeze tolerant and freeze susceptible cultivars for freeze tolerance in a controlled environment chamber.

Results
Freeze tolerance of OKC 1119 and OKC 1134 was not significantly different from Midlawn, a freeze tolerant reference cultivar. Patriot had greater freeze tolerance than all of the other genotypes examined, except OKC 1134. Tifway, a freeze susceptible standard cultivar, had freeze tolerance significantly less than the other cultivars examined. OKC 1119 and OKC 1134 when commercialized and installed by end users will be less likely to sustain winterkill than Tifway in areas that frequently experience low temperatures.

4. Associated Knowledge Areas

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

Outcome #5

1. Outcome Measures

☐ Not Reporting on this Outcome Measure

Reduce unneeded fungicide application to bentgras putting greens

2. Associated Institution Types

☐ 1862 Extension
☑ 1862 Research

3a. Outcome Type:

◯ Change in Knowledge Outcome Measure
◯ Change in Action Outcome Measure
◉ Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	{No Data Entered}	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
A number of serious diseases attack bentgrass putting greens across the US and world. Fungicides are very expensive and they posse off target environmental risk. A reliable method of prediction of the need for fungicide applications is needed to both control putting green diseases and reduce the number of unnecessary applications.

What has been done
To improve management recommendations and promote wise-use of fungicides, researchers developed weather-dependent predictive algorithms using risk indices and linear regression techniques to predict infection periods for several bentgrass putting green pathogens. Independent validation studies (studies not used in the model building process) were conducted in 2009 and 2010.

Fungicide protection was predicted during all periods when significant dollar spot events were recorded. If these had been actual trials rather than dramatizations, the advisory would have resulted in a significant savings in the number of fungicide sprays in both locations as compared to a traditional, calendar-based 14-day spray program. In Oklahoma alone, three and six fungicide sprays could have been saved over the 2009 and 2010 growing seasons, respectively.

Results
Successful results in preliminary modeling allowed researchers success in obtaining USGA funding for a two-year study to validate the model in diverse locations around the country including Oklahoma, Mississippi, Pennsylvania, California, Wisconsin, and Tennessee. This research will result in the development of a new and improved disease advisory for

recommending fungicide applications for dollar spot management. This advisory will be much more accurate than previous advisories because it uses regression-based models and temperature and relative humidity as inputs rather than rainfall. The improved accuracy, ability to use the advisory throughout the United States, and speed at which a recommendation can be obtained from the system will result in more timely applications of fungicide and reduce unnecessary fungicide applications. This will improve the control of dollar spot, which translates to improved golf playing conditions, and will reduce the amount of unnecessary fungicide applications. By reducing fungicide applications turfgrass managers can save money (hundreds of dollars per acre per application) and reduce the negative environmental and human effects that often coincide with pesticide use.

4. Associated Knowledge Areas

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

V(H). Planned Program (External Factors)

External factors which affected 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

Brief Explanation

Two Oklahoma Sod producers went out of business in 2010. This was due to one retirement and one business closure. An expected 5 bankruptcies did not occur due to a temporary but substantial increases in common bermudagrass sales due to the worst winter kill of golf course, lawn and sports field turf since the spring of 1990. Sod sales are projected to return to low levels in 2011 due to a slow construction market. Adoption of new varieties is expected to be minimal in 2011. Widespread loss of creeping bentgrass on

putting greens in the southern US spurred the conversion of putting greens on 3 golf courses from bentgrass to ultradwarf hybrid bermudagrass.

V(I). Planned Program (Evaluation Studies and Data Collection)

(OPTIONAL SECTION)

1. Evaluation Studies Planned

- ☐ After Only (post program)
- ☑ Retrospective (post program)
- ☑ Before-After (before and after program)
- ☑ During (during program)
- ☑ Time series (multiple points before and after program)
- ☐ Case Study
- ☐ Comparisons between program participants (individuals, group, organizations) and non-participants
- ☐ Comparisons between different groups of individuals or program participants experiencing different levels of program intensity.
- ☐ Comparison between locales where the program operates and sites without program intervention
- ☐ Other

Evaluation Results

The Oklahoma Turfgrass Conference represents the largest single educational event of the OSU Turfgrass Team. In a post-conference survey of 2010 attendees, 93% of conference attendees said they would consider attending the 2011 conference while 7% were unsure. Eighty percent of attendees felt education at the conference left them with knowledge such that they could better management their facility. Seventy percent of attendees felt the knowledge gained would help them manage turf in a more environmentally conscience manner while 10 % felt the opposite. Only 47% of attendees felt that increased knowledge would allow them to save their employers money in the future. Of the attendees that felt the increased knowledge would allow them to save their employers money, 58% felt the savings would be from 0 to 5%, 33% felt the savings would be in the 5 to 10% range and 8% felt the savings would be more than 10%. Ninety percent of attendees felt that knowledge gained from this or a previous Oklahoma Turfgrass conference would allow them to maintain higher quality turf. Fifty-seven percent of attendees had cut fertilizer and pesticide inputs during the 2010 growing season.

Key Items of Evaluation

Post education session survey of attendees intent to adopt or continue to use complicated arrays of new Best Management Practices presented during educational workshops. Perception of attendees concerning whether or not the adoption of the most recent BMPs led to a net savings in overall management costs for their employers, whether

the information presented at the workshop will help the employee better manage turfgrass problems, whether or not employment of the information presented will results in a net decrease of fertilizer or pesticide usage by the business.

V(A). Planned Program (Summary)

Program # 10

1. Name of the Planned Program

Community Resource and Economic Development

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%	

Add knowledge area

V(C). Planned Program (Inputs)

1. Actual amount of professional FTE/SYs expended this Program

Year: 2010	Extension		Research	
	1862	1890	1862	1890
Plan	12.0	0.0	1.0	0.0
Actual	14.0	0.0	4.1	0.0

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	**1890 Extension**	**Hatch**	**Evans-Allen**
200000	0	172422	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
200000	0	172422	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
1000000	0	1103460	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Strategic planning training and strategic planning for communites, 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 entrepreneurship training and development.

2. Brief description of the target 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, other agencies

V(E). Planned Program (Outputs)

1. Standard output measures

2010	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Plan	890	10650	0	0
Actual	75010	497000	1010	0

2. Number of Patent Applications Submitted (Standard Research Output)

Patent Applications Submitted

Year: 2010
Plan: 0
Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2010	Extension	Research	Total
Plan	5	3	
Actual	6	8	14

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of community services plans completed

☐ Not reporting on this Output for this Annual Report

Year	Target	Actual
2010	30	31

Output #2

Output Measure

- Number of education modules completed

☐ Not reporting on this Output for this Annual Report

Year	Target	Actual
2010	1	3

Output #3

Output Measure

- Number of county officer training courses conducted

☐ Not reporting on this Output for this Annual Report

Year	Target	Actual
2010	35	61

Output #4

Output Measure

- Number of manufacturing firms receiving applications engineering assistance

☐ Not reporting on this Output for this Annual Report

Year	Target	Actual
2010	50	146

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

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

Add Cross-cutting Outcome/Impact Statement or Unintended or Previously Unknown Outcome Measure

Outcome #1

1. Outcome Measures

☐ Not Reporting on this Outcome Measure

Number improving business skills

2. Associated Institution Types

☑ 1862 Extension
☐ 1862 Research

3a. Outcome Type:

◉ Change in Knowledge Outcome Measure
◯ Change in Action Outcome Measure
◯ Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	150	1758

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done
The PRIDE and related employee training programs teach front line employees good customer service habits. This is important in attracting and retaining a customer base ? hence maintaining and/or increase jobs, business income and increase community sales tax revenue.

Results
During 2010 over 1,400 Oklahomans received PRIDE and PRIDE related employee (customer service) training.

4. Associated Knowledge Areas

☑ 608 - Community Resource Planning and Development

Outcome #2

1. Outcome Measures

☐ Not Reporting on this Outcome Measure

Number of manufacturing jobs created or retained

2. Associated Institution Types

- ☑ 1862 Extension
- ☐ 1862 Research

3a. Outcome Type:

- ○ Change in Knowledge Outcome Measure
- ◉ Change in Action Outcome Measure
- ○ Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	50	133

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Of the over 5000 manufacturers in Oklahoma, approximately half are located in rural areas and are extremely important to their local economies. The loss or downsizing of even one of these wealth-generating small or mid-sized companies can have devastating consequences for the host and surrounding communities. These rural firms face particular difficulty in getting relevant and usable information and technical assistance that will keep them abreast of the rapid changes in manufacturing technology.

What has been done
To address the difficulties faced by our small rural manufacturers, the College of Engineering, Architecture and Technology and the Division of Agricultural Sciences and Natural Resources at Oklahoma State University work in partnership to provide technical assistance through the Applications Engineering program. Since 1997, Applications Engineers have been deployed in the state in collaboration with the Oklahoma Cooperative Extension Service and the Oklahoma Manufacturing Alliance to provide on-site engineering assistance.
In order to receive engineering assistance the client must agree to a post-project impact assessment. This impact assessment is done using procedures developed by the National Institute for Standards and Technology for the Manufacturing Extension Partnership. The client is contacted some months after the completion of an activity and is asked a series of questions designed to assess the impact of the effort.

Results
The impact of this program is measured in several ways. One is the economic value of the service to the company as reported by the client. Another measure is the number of jobs created or retained. Both impacts are measured by an independent survey of the client. Number of jobs created or retained is translated into economic impact using an income multiplier to compute the direct, indirect, and induced effects due to a change in the number of jobs in the manufacturing sector.

The multiplier was developed from data collected from two different sources. First, the average salary for manufacturing in Oklahoma ($34,323) was taken from the U.S. Bureau of Labor Statistics published information for 2001. Secondly, the income multiplier of 2.2 was obtained from IMPLAN data for Oklahoma. The total economic impact can be computed by multiplying the

average annual salary times the income multiplier to arrive at $75,511 for each new or retained job in the manufacturing sector.

In 2010, the Applications Engineers client projects resulted in increased sales of more than $7.9 million, while retaining an additional $18.9 million in sales that would have otherwise been lost. Further, the expertise provided by our engineers created cost savings of $3.1 million, and avoided additional costs estimated at $3.1 million. With 84 new jobs created and 49 jobs retained, our projects provided an additional $11,000,000 to the state?s economy. Finally, the clients invested over $8,100,000 in new plant facilities and equipment, for a total economic impact of $51,200,000.

4. Associated Knowledge Areas

☑ 608 - Community Resource Planning and Development

Outcome #3

1. Outcome Measures

☐ Not Reporting on this Outcome Measure

Number of communities where capacity was increased

2. Associated Institution Types

☑ 1862 Extension
☑ 1862 Research

3a. Outcome Type:

○ Change in Knowledge Outcome Measure
◉ Change in Action Outcome Measure
○ Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	30	125

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Oklahoma has 77 county offices each with multiple elected and appointed officials. These postions turn over often due to elections, retirements, resignations, etc. Also, state and federal laws and policy intrepretations change regularly. Thus on-going education and training is important to the efficient and lawful running of county and minucipal government.

What has been done
The County Training Program provides on-going training for county government personnel each year. State appropriations and user fees fund this program.

Results
Two hundred one (290) county government personnel out of three hundred fourteen (479) who participated in training between July 1, 2010 and December 31, 2010 said they not only ?learned? something useful, but ?put into practice? something they learned at the training session. The County Training Program conducted sixty short-courses during this timeframe. Although county officers and deputies immediately indicate on post-course evaluations that the programs are good and appreciated, the question is ?Are these county officials benefiting from and applying lessons learned when they return to their office?? Each six months participants are surveyed. Each person had the option to respond by mail or via a website. All responses were anonymous. About 45% responded. The following is a summary of the responses to each question:

1. Ninety-three percent of respondents described the course as excellent or good.
2. Over ninety percent judged the class to be worth the time, effort, and expense.
3. Ninety percent said they learned some or several things they could take back to the office and put to use.
4. Sixty-one percent said that they did put one or more things into use back at the office.
5. Examples of what they did are numerous. Some of these are easily understood and others are not. All responses show impact. An exact quantitative or qualitative measure would be difficult to determine.
6. Eighty-nine percent said they learned worthwhile information even if they did not put it into use.
7. Twenty percent said that the economic downturn will limit their attendance at CTP programs.

4. Associated Knowledge Areas

☑ 608 - Community Resource Planning and Development

Outcome #4

1. Outcome Measures

☐ Not Reporting on this Outcome Measure

Number of participants that plan to open/expand a business

2. Associated Institution Types

☑ 1862 Extension
☑ 1862 Research

3a. Outcome Type:

○ Change in Knowledge Outcome Measure
◉ Change in Action Outcome Measure
○ Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	100	93

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Small businesses in rural areas tend to struggle to establish a market presence and compete in today?s economy.

What has been done
During 2010, the Oklahoma State University e-commerce program provided training to over 300 small businesses on how to plan, effectively set up, and promote their websites, which can help address these issues. Prior to the training, 55% indicated that they already had a website. 90% of all participants rated the section on ?Small Business Websites 101? as very useful, as 93% of all participants rated the section on Website Marketing as very useful. We also held sessions specifically on getting your business found on the Internet, of which 97% of attendees found ?very useful.? After the training, 97% of respondents planned on either developing a new website or altering their current site.

Results
These half-day, hands-on sessions are positively impacting rural businesses as evidenced by success stories of former attendees. These include those who have developed websites to promote their business (such as the bloodhound breeder near Moore ? www.hickoryridgekennels.com), began accepting transactions online (like the cabin owner in Idabel ? www.blackbearcabinok.com), or made successful changes to their online strategy (such as the policy consultant near OKC that incorporated search engine optimization techniques into her site, and started her own blog at www.policyandperformanceconsultants.com). Further, anecdotal evidence suggests that the improved advertising offered by a website can increase small business sales anywhere from 20% to over 200%. With average sales of $150,000 (which was the average displayed in a small business report by Mississippi State in 2007) this implies that the e-commerce program increased the revenue of small businesses in Oklahoma by between $9.3 and $93.0 million during 2010.

4. Associated Knowledge Areas

☑ 608 - Community Resource Planning and Development

Outcome #5

1. Outcome Measures

☐ Not Reporting on this Outcome Measure

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

2. Associated Institution Types

☑ 1862 Extension

☐ 1862 Research

3a. Outcome Type:

◯ Change in Knowledge Outcome Measure
◉ Change in Action Outcome Measure
◯ Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	15	11

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Retail activity is important to Oklahoma municipalities because the retail sales and use taxes represent major sources of revenue which finance municipal services.

What has been done
Retail Trade Analysis continues to be a popular Extension program, providing sixteen communities with data useful to evaluating their retail development programs and creating new retail opportunities.

Results
At least two communities realized economic growth due in part to this program. Josh McKim, Executive Director of Economic Development, uses the reports on a regular basis to target and attract new retail businesses to Stillwater. He finds the reports so valuable, he has begun to order them bi-annually and use them to benchmark his efforts for retail development. Tommy Kramer, Executive Director of the Durant Industrial Authority, also used the reports from the retail trade analysis to identify and target new retail establishments for Durant, OK. One particular success he had involving this data was securing a movie theater management company to build a new Cineplex in Durant.

4. Associated Knowledge Areas

☑ 608 - Community Resource Planning and Development

<u>Outcome #6</u>

1. Outcome Measures

☐ Not Reporting on this Outcome Measure

Number of leadership class graduates actively participating in community or industry

2. Associated Institution Types

- ☑ 1862 Extension
- ☐ 1862 Research

3a. Outcome Type:

- ○ Change in Knowledge Outcome Measure
- ◉ Change in Action Outcome Measure
- ○ Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	90	46

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
OALP empowers and develops emerging agriculture and community leaders. OALP graduates have a greater understanding of people and processes and greater understanding of various systems of economics and government and are able to solve problems and explore opportunities for Oklahoma agriculture and rural communities.

What has been done
OALP empowers and develops emerging agriculture and community leaders. OALP graduates have a greater understanding of people and processes and greater understanding of various systems of economics and government and are able to solve problems and explore opportunities for Oklahoma agriculture and rural communities.

Results
The total Class XIV experience resulted in three members being selected to serve on advisory committees at the national level. Two of the three are serving at the Secretary of Agriculture Tom Vilsack?s request. Three additional members from Class XIV are serving on local school boards. OALP Class XV commenced in August 2010. The class consists of twenty one participants and has completed four seminars (over 12 days) that will enable participants to enhance agricultural and leadership skills.

4. Associated Knowledge Areas

- ☑ 608 - Community Resource Planning and Development

V(H). Planned Program (External Factors)

External factors which affected 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

Brief Explanation

Some program state budgets were reduced during 2010 including the county government trainin program. We also lost a small and home business specialist during this time and this position will not be replaced in the near future due to budget constraints.

V(I). Planned Program (Evaluation Studies and Data Collection)

(OPTIONAL SECTION)

1. Evaluation Studies Planned

- ☑ After Only (post program)
- ☑ Retrospective (post program)
- ☑ Before-After (before and after program)
- ☐ During (during program)
- ☐ Time series (multiple points before and after program)
- ☑ Case Study
- ☐ Comparisons between program participants (individuals, group, organizations) and non-participants
- ☐ Comparisons between different groups of individuals or program participants experiencing different levels of program intensity.
- ☐ Comparison between locales where the program operates and sites without program intervention
- ☐ Other

Evaluation Results

{No Data Entered}

Key Items of Evaluation

{No Data Entered}

V(A). Planned Program (Summary)

Program # 11

1. Name of the Planned Program

Global Food Security and Hunger - Integrated Pest Management

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	2%		4%	
205	Plant Management Systems	10%		10%	
211	Insects, Mites, and Other Arthropods Affecting Plants	15%		20%	
212	Pathogens and Nematodes Affecting Plants	6%		20%	
213	Weeds Affecting Plants	10%		5%	
215	Biological Control of Pests Affecting Plants	8%		5%	
216	Integrated Pest Management Systems	36%		20%	
601	Economics of Agricultural Production and Farm Management	4%		5%	
901	Program and Project Design, and Statistics	1%		1%	
	Total	100%		100%	

Add knowledge area

V(C). Planned Program (Inputs)

1. Actual amount of professional FTE/SYs expended this Program

Year: 2010	Extension		Research	
	1862	1890	1862	1890
Plan	3.5	0.0	2.0	0.0
Actual	5.0	0.0	5.8	0.0

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	**1890 Extension**	**Hatch**	**Evans-Allen**
150000	0	244043	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
150000	0	244043	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
670000	0	1561821	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

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. Brief description of the target audience

Agricultural Producers, Agricultural Groups, Commercial Growers, Retailers, Agricultural Professionals (private, commercial and non-commercial), and landowners, nurseries, individual stakeholders.

V(E). Planned Program (Outputs)

1. Standard output measures

2010	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Plan	1000	4600	0	0
Actual	6798	105400	200	0

2. Number of Patent Applications Submitted (Standard Research Output)

Patent Applications Submitted

Year: 2010
Plan: 0
Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2010	Extension	Research	Total
Plan	4	4	
Actual	45	4	49

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Stakeholder assessment

☐ Not reporting on this Output for this Annual Report

Year	Target	Actual
2010	0	14

Output #2

Output Measure

- IPM schools, conferences and workshops

☐ Not reporting on this Output for this Annual Report

Year	Target	Actual
2010	10	26

Output #3

Output Measure

- Pesticide applicator education schools and workshops

☐ Not reporting on this Output for this Annual Report

Year	Target	Actual
2010	21	21

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

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
5	Acres of canola under aphid management

Add Cross-cutting Outcome/Impact Statement or Unintended or Previously Unknown Outcome Measure

Outcome #1

1. Outcome Measures

☐ Not Reporting on this Outcome Measure

Peer reviewed research publications and extension publications

2. Associated Institution Types

☑ 1862 Extension
☑ 1862 Research

3a. Outcome Type:

○ Change in Knowledge Outcome Measure
◉ Change in Action Outcome Measure
○ Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	5	49

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

☑ 133 - Pollution Prevention and Mitigation
☐ 202 - Plant Genetic Resources
☑ 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
☐ 901 - Program and Project Design, and Statistics

Outcome #2

1. Outcome Measures

☐ Not Reporting on this Outcome Measure

Increased use of pest management approaches for targeted cropping system acres

2. Associated Institution Types

☑ 1862 Extension
☑ 1862 Research

3a. Outcome Type:

◯ Change in Knowledge Outcome Measure
◉ Change in Action Outcome Measure
◯ Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	4500	27000

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Prior to the last two years cotton yield losses due to horseweed (Conyza canadensis) have been steadily increasing. Many times producers have stated (and visual surveys around the state confirmed) that uncontrolled or under controlled populations have become so severe that their cotton is deemed un-harvestable. Uncontrolled weeds are often responsible for some of the discrepancy between planted and harvested acres in Oklahoma.

What has been done
Several research projects have been initiated focusing on effective control measures for horseweed in no-till cotton production. The results of these projects have been distributed across the state each year to individual growers, cotton gins and county agricultural educators in order to publicize the effectiveness of these programs and increase awareness of effective control strategies. In addition to these materials, effective control strategies have been presented at over a dozen grower meetings in the states cotton growing regions as well as at national meetings.

Results
As a result, Oklahoma?s ratio of harvested to planted acres has increased in both 2009 and 2010 (>94%). In 2010 growers communicated (and visual surveys confirmed) that fewer acres were lost to uncontrolled horseweed than prior years. Oklahoma planted 285,000 acres and harvested 270,000 of those acres in 2010 (an increase of 75,000 from the year before). In addition the state?s average yield was one of the highest on record at approximately 740 lbs/Acre. Many growers have personally commented on the effectiveness of our recommendations and our message about ?timely? control for horseweed in no-till cotton. Implementing these recommendations has proven very effective for many no-till cotton producers across the state.

4. Associated Knowledge Areas

- ☑ 133 - Pollution Prevention and Mitigation
- ☐ 202 - Plant Genetic Resources
- ☑ 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
- ☐ 901 - Program and Project Design, and Statistics

Outcome #3

1. Outcome Measures

☐ Not Reporting on this Outcome Measure

Number of trained certified pesticide applicators

2. Associated Institution Types

- ☑ 1862 Extension
- ☐ 1862 Research

3a. Outcome Type:

- ◉ Change in Knowledge Outcome Measure
- ◯ Change in Action Outcome Measure
- ◯ Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	200	200

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

- ☑ 133 - Pollution Prevention and Mitigation
- ☐ 202 - Plant Genetic Resources
- ☑ 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
- ☑ 901 - Program and Project Design, and Statistics

Outcome #4

1. Outcome Measures

☐ Not Reporting on this Outcome Measure

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

2. Associated Institution Types

- ☑ 1862 Extension
- ☑ 1862 Research

3a. Outcome Type:

- ○ Change in Knowledge Outcome Measure
- ◉ Change in Action Outcome Measure
- ○ Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	10	15

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
We had research and extension IPM programs targeted at SW Oklahoma wheat growers and their needs to improve yields and net profit per acre. Ten programs were conducted on diseases and insects that effect wheat. Programs included discussions on identification, evaluation of populations, economic thresholds, remedial control and loss prevention.

What has been done
Demonstrations on varieties, diseases and insect tolerance and seed treatment testing were located in nine strategic locations in SW Oklahoma. Plot tours with control and prevention techniques were discussed at these locations. In addition ten meetings were held that offered results of wheat research on disease and insect IPM. Information on IPM was discussed and

results were used by growers in making control decisions. Pest identification, damage and control measures were implemented by growers in the region. More than 500 growers attended wheat IPM meetings and 1,050 growers used IPM disseminated in SW Oklahoma.

Results
Growers replaced former varieties with Duster which is resistant to the Hessian Fly. This saved at least 15 bushels per acre from loss to the HF on 50% of the acres in SW Oklahoma. In addition the Glance and Go method of evaluating greenbug damage saved an average of $5 per acre on 40% of wheat acres in SW OK. Information in winter Grain Mite and Brown Wheat Mite saved an average of $5 per acre on 10% of the acres in SW OK. These savings were a result of using control measures only when economically feasible and using the most effective product for control.

4. Associated Knowledge Areas

- ☑ 133 - Pollution Prevention and Mitigation
- ☐ 202 - Plant Genetic Resources
- ☐ 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
- ☐ 901 - Program and Project Design, and Statistics

Outcome #5

1. Outcome Measures

☐ Not Reporting on this Outcome Measure

Acres of canola under aphid management

2. Associated Institution Types

- ☑ 1862 Extension
- ☑ 1862 Research

3a. Outcome Type:

- ○ Change in Knowledge Outcome Measure
- ◉ Change in Action Outcome Measure
- ○ Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	{No Data Entered}	75000

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Canola acreage has increased from 5000 acres to more than 80000 in 2010. Key pests of canola include an aphid complex that includes the cabbage aphid, the green peach aphid and the turnip aphid. In addition, army cutworm was considered to be a problem in substantial acres in 2010.

What has been done
A survey of canola growers conducted in 2006 indicated that 90% of growers were either highly or moderately concerned with managing insect pests in canola, and 83% indicated that aphids were the most important pest.

Results
An aphid pest management plan was developed from research conducted by Dr. Kristopher Giles that combined seed treatment with field scouting and was able to save growers an average of $30 per acre in spray costs. This resulted in a potential reduction of $3 million in 2010.

4. Associated Knowledge Areas

- ☐ 133 - Pollution Prevention and Mitigation
- ☐ 202 - Plant Genetic Resources
- ☑ 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
- ☐ 901 - Program and Project Design, and Statistics

V(H). Planned Program (External Factors)

External factors which affected 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

Brief Explanation

V(I). Planned Program (Evaluation Studies and Data Collection)

(OPTIONAL SECTION)

1. Evaluation Studies Planned

- ☐ After Only (post program)
- ☐ Retrospective (post program)
- ☑ Before-After (before and after program)
- ☑ During (during program)
- ☐ Time series (multiple points before and after program)
- ☐ Case Study
- ☐ Comparisons between program participants (individuals, group, organizations) and non-participants
- ☐ Comparisons between different groups of individuals or program participants experiencing different levels of program intensity.
- ☐ Comparison between locales where the program operates and sites without program intervention
- ☐ Other

Evaluation Results

{No Data Entered}

Key Items of Evaluation

{No Data Entered}

V(A). Planned Program (Summary)

Program # 12

1. Name of the Planned Program

Food Safety - Agricultural Biosecurity

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	25%		5%	
212	Pathogens and Nematodes Affecting Plants	5%		60%	
213	Weeds Affecting Plants	20%		5%	
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins	25%		20%	
903	Communication, Education, and Information Delivery	25%		10%	
	Total	100%		100%	

Add knowledge area

V(C). Planned Program (Inputs)

1. Actual amount of professional FTE/SYs expended this Program

Year: 2010	Extension		Research	
	1862	1890	1862	1890
Plan	1.5	0.0	3.0	0.0
Actual	0.5	0.0	1.6	0.0

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	**1890 Extension**	**Hatch**	**Evans-Allen**
20000	0	66316	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
20000	0	66316	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
300000	0	424408	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

*Develop the **Oklahoma Center for Agricultural Microbial Forensics and 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

Research conducted to determine plant and human pathogen movement to and within plants, produce and processing products. Research conducted to determine source of human pathogen contaminants on produce and food products. Education materials developed and presented to industry and regulatory groups regarding human and plant pahtogens sources and methods of contamination.

Research conducted to determine identification markers of human and plant pathogens that occur on plants, produce and food products.

2. Brief description of the target 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(E). Planned Program (Outputs)

1. Standard output measures

2010	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Plan	300	10000	0	0
Actual	500	200	80	0

2. Number of Patent Applications Submitted (Standard Research Output)

Patent Applications Submitted

Year: 2010
Plan: 0
Actual: 1

Patents listed
pathogen sensor, OSU ref. 2010.26

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2010	Extension	Research	Total
Plan	1	5	
Actual	0	18	18

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of OSU faculty and staff affiliated with the new Oklahoma Center for Agricultural Microbial Forensics Biosecurity

☐ Not reporting on this Output for this Annual Report

Year	Target	Actual
2010	8	41

Output #2

Output Measure

- Number of grant/contract proposals submitted in agricultural microbial forensics and biosecurity

☐ Not reporting on this Output for this Annual Report

Year	Target	Actual
2010	5	2

Output #3

Output Measure

- Number of journal articles submitted with emphasis on agricultural microbial forensics and biosecurity

☐ Not reporting on this Output for this Annual Report

Year	Target	Actual
2010	6	6

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

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

Add Cross-cutting Outcome/Impact Statement or Unintended or Previously Unknown Outcome Measure

Outcome #1

1. Outcome Measures

☐ Not Reporting on this Outcome Measure

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

2. Associated Institution Types

☐ 1862 Extension
☑ 1862 Research

3a. Outcome Type:

○ Change in Knowledge Outcome Measure
○ Change in Action Outcome Measure
◉ Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	20	20

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

☐ 211 - Insects, Mites, and Other Arthropods Affecting Plants
☑ 212 - Pathogens and Nematodes Affecting Plants
☐ 213 - Weeds Affecting Plants
☑ 712 - Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and
☑ 903 - Communication, Education, and Information Delivery

Outcome #2

1. Outcome Measures

☐ Not Reporting on this Outcome Measure

Number of forensics-relevant journal articles published

2. Associated Institution Types

☐ 1862 Extension
☑ 1862 Research

3a. Outcome Type:

◉ Change in Knowledge Outcome Measure
◯ Change in Action Outcome Measure
◯ Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	2	3

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

☐ 211 - Insects, Mites, and Other Arthropods Affecting Plants
☑ 212 - Pathogens and Nematodes Affecting Plants
☐ 213 - Weeds Affecting Plants
☑ 712 - Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and
☑ 903 - Communication, Education, and Information Delivery

Outcome #3

1. Outcome Measures

☑ Not Reporting on this Outcome Measure

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

2. Associated Institution Types

- ☑ 1862 Extension
- ☑ 1862 Research

3a. Outcome Type:

- ○ Change in Knowledge Outcome Measure
- ○ Change in Action Outcome Measure
- ◉ Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	30	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

- ☐ 211 - Insects, Mites, and Other Arthropods Affecting Plants
- ☑ 212 - Pathogens and Nematodes Affecting Plants
- ☐ 213 - Weeds Affecting Plants
- ☑ 712 - Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and
- ☐ 903 - Communication, Education, and Information Delivery

V(H). Planned Program (External Factors)

External factors which affected 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 ()

Brief Explanation

V(I). Planned Program (Evaluation Studies and Data Collection)

(OPTIONAL SECTION)

1. Evaluation Studies Planned

- ☐ After Only (post program)
- ☐ Retrospective (post program)
- ☐ Before-After (before and after program)
- ☑ During (during program)
- ☑ Time series (multiple points before and after program)
- ☐ Case Study
- ☐ Comparisons between program participants (individuals, group, organizations) and non-participants
- ☐ Comparisons between different groups of individuals or program participants experiencing different levels of program intensity.
- ☐ Comparison between locales where the program operates and sites without program intervention
- ☐ Other

Evaluation Results

{No Data Entered}

Key Items of Evaluation

{No Data Entered}

V(A). Planned Program (Summary)

Program # 13

1. Name of the Planned Program

Structure and Function of Macromolecules

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%		15%	
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants	0%		15%	
206	Basic Plant Biology	0%		10%	
211	Insects, Mites, and Other Arthropods Affecting Plants	0%		5%	
212	Pathogens and Nematodes Affecting Plants	0%		5%	
304	Animal Genome	0%		10%	
305	Animal Physiological Processes	0%		25%	
311	Animal Diseases	0%		5%	
312	External Parasites and Pests of Animals	0%		5%	
501	New and Improved Food Processing Technologies	0%		5%	
	Total	0%		100%	

Add knowledge area

V(C). Planned Program (Inputs)

1. Actual amount of professional FTE/SYs expended this Program

Year: 2010	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	0.0	3.0	0.0
Actual	0.0	0.0	9.2	0.0

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	**1890 Extension**	**Hatch**	**Evans-Allen**
0	0	389938	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
0	0	389938	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
0	0	2495518	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

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. Brief description of the target audience

Team members

- 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(E). Planned Program (Outputs)

1. Standard output measures

2010	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Plan	0	0	0	0
Actual	0	0	0	0

2. Number of Patent Applications Submitted (Standard Research Output)

Patent Applications Submitted

Year: 2010
Plan: 1
Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2010	Extension	Research	Total
Plan	0	10	
Actual	0	10	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

● Number of manuscripts submitted based on reserach efforts

☐ Not reporting on this Output for this Annual Report

Year	Target	Actual
2010	8	0

Output #2

Output Measure

● Number of extramural grants submitted with preliminary data from research efforts

☐ Not reporting on this Output for this Annual Report

Year	Target	Actual
2010	16	0

Output #3

Output Measure

- Number of presentations given at meetings and conferences to disseminate research results

☐ Not reporting on this Output for this Annual Report

Year	Target	Actual
2010	19	0

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Number of graduate students graduated and postdoctorial associates mentored in structural biology
2	Number of manuscripts published
3	Number of invitations faculty receive to present research findings at universities and colleges and national and international meetings

Add Cross-cutting Outcome/Impact Statement or Unintended or Previously Unknown Outcome Measure

Outcome #1

1. Outcome Measures

☐ Not Reporting on this Outcome Measure

Number of graduate students graduated and postdoctorial associates mentored in structural biology

2. Associated Institution Types

☐ 1862 Extension
☑ 1862 Research

3a. Outcome Type:

○ Change in Knowledge Outcome Measure
◉ Change in Action Outcome Measure
○ Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	4	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

☑ 201 - Plant Genome, Genetics, and Genetic Mechanisms
☑ 203 - Plant Biological Efficiency and Abiotic Stresses Affecting Plants
☑ 206 - Basic Plant Biology
☑ 211 - Insects, Mites, and Other Arthropods Affecting Plants
☑ 212 - Pathogens and Nematodes Affecting Plants
☑ 304 - Animal Genome
☑ 305 - Animal Physiological Processes
☑ 311 - Animal Diseases

- ☑ 312 - External Parasites and Pests of Animals
- ☑ 501 - New and Improved Food Processing Technologies

Outcome #2

1. Outcome Measures

☐ Not Reporting on this Outcome Measure

Number of manuscripts published

2. Associated Institution Types

- ☐ 1862 Extension
- ☑ 1862 Research

3a. Outcome Type:

- ◉ Change in Knowledge Outcome Measure
- ◯ Change in Action Outcome Measure
- ◯ Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	8	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

- ☑ 201 - Plant Genome, Genetics, and Genetic Mechanisms
- ☑ 203 - Plant Biological Efficiency and Abiotic Stresses Affecting Plants
- ☑ 206 - Basic Plant Biology
- ☑ 211 - Insects, Mites, and Other Arthropods Affecting Plants
- ☑ 212 - Pathogens and Nematodes Affecting Plants
- ☑ 304 - Animal Genome

- ☑ 305 - Animal Physiological Processes
- ☑ 311 - Animal Diseases
- ☑ 312 - External Parasites and Pests of Animals
- ☑ 501 - New and Improved Food Processing Technologies

Outcome #3

1. Outcome Measures

☐ Not Reporting on this Outcome Measure

Number of invitations faculty receive to present research findings at universities and colleges and national and international meetings

2. Associated Institution Types

- ☐ 1862 Extension
- ☑ 1862 Research

3a. Outcome Type:

- ○ Change in Knowledge Outcome Measure
- ◉ Change in Action Outcome Measure
- ○ Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	6	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

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

- ☑ 211 - Insects, Mites, and Other Arthropods Affecting Plants
- ☑ 212 - Pathogens and Nematodes Affecting Plants
- ☑ 304 - Animal Genome
- ☑ 305 - Animal Physiological Processes
- ☑ 311 - Animal Diseases
- ☑ 312 - External Parasites and Pests of Animals
- ☑ 501 - New and Improved Food Processing Technologies

V(H). Planned Program (External Factors)

External factors which affected 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

Brief Explanation

V(I). Planned Program (Evaluation Studies and Data Collection)

(OPTIONAL SECTION)

1. Evaluation Studies Planned

- ☐ After Only (post program)
- ☐ Retrospective (post program)
- ☐ Before-After (before and after program)
- ☑ During (during program)
- ☑ Time series (multiple points before and after program)
- ☐ Case Study
- ☐ Comparisons between program participants (individuals, group, organizations) and non-participants
- ☐ Comparisons between different groups of individuals or program participants experiencing different levels of program intensity.
- ☐ Comparison between locales where the program operates and sites without program intervention

☐ Other

Evaluation Results

{No Data Entered}

Key Items of Evaluation

{No Data Entered}

V(A). Planned Program (Summary)

Program # 14

1. Name of the Planned Program

Glodal Food Security and Hunger - Farm and Agribusiness Management

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	50%		100%	
602	Business Management, Finance, and Taxation	15%		0%	
603	Market Economics	20%		0%	
610	Domestic Policy Analysis	15%		0%	
	Total	100%		100%	

Add knowledge area

V(C). Planned Program (Inputs)

1. Actual amount of professional FTE/SYs expended this Program

Year: 2010	Extension		Research	
	1862	1890	1862	1890
Plan	8.8	0.0	3.0	0.0
Actual	7.5	0.0	1.5	0.0

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	**1890 Extension**	**Hatch**	**Evans-Allen**
125000	0	63663	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
125000	0	63663	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
1100000	0	407432	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

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. Brief description of the target audience

Managers, owners, and employees of farms and agribusinesses

V(E). Planned Program (Outputs)

1. Standard output measures

2010	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Plan	500	1000	100	200
Actual	8141	194720	400	5000

2. Number of Patent Applications Submitted (Standard Research Output)

Patent Applications Submitted

Year: 2010
Plan: 0
Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2010	Extension	Research	Total
Plan	10	10	
Actual	35	20	55

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of board members of farmer-owned cooperatives receiving credentialed director training for board goverence

☐ Not reporting on this Output for this Annual Report

Year	Target	Actual
2010	50	45

Output #2

Output Measure

- Number of software decision analysis aids developed

☐ Not reporting on this Output for this Annual Report

Year	Target	Actual
2010	2	2

Output #3

Output Measure

- Number of manuscripts submitted to refereed journals

☐ Not reporting on this Output for this Annual Report

Year	Target	Actual
2010	10	15

Output #4

Output Measure

- Number of farm income tax managment schools conducted

☐ Not reporting on this Output for this Annual Report

Year	Target	Actual
2010	10	10

Output #5

Output Measure

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

☐ Not reporting on this Output for this Annual Report

Year	Target	Actual
2010	1	1

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

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
5	Participants Increasing Knowledge of the Cattle Marketing System - Packer-Feeder Simulation
6	Potential difference in productivity through genetic markers

Add Cross-cutting Outcome/Impact Statement or Unintended or Previously Unknown Outcome Measure

Outcome #1

1. Outcome Measures

☐ Not Reporting on this Outcome Measure

Number of tax preparers using information from OCES tax schools

2. Associated Institution Types

☑ 1862 Extension
☐ 1862 Research

3a. Outcome Type:

◉ Change in Knowledge Outcome Measure
◯ Change in Action Outcome Measure
◯ Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	300	1250

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Frequent changes in Federal and Oklahoma State Tax Laws create a need to keep tax preparers informed of the impact of the changes and how to best help their clients utilize the tax planning and management opportunities available in the current tax laws. These tax schools are designed to update tax preparers about new laws and regulations covering farm, non-farm business and individual taxpayer issues.

What has been done
The mission of the Oklahoma State University Tax Schools is to provide a quality tax education experience for income taxpreparers. This program has been conducted for the past 46 years. It has grown from a one-day seminar to its present form of two days per location for the fall Farm and Business Tax Institutes and the summer Tax Clinic. The combination of all the schools allows a preparer to get the full 40 hours of CPE/CLE as required by state. Topics covered range from presentation of new tax laws and their implications, agricultural issues, business issues, tax planning opportunities, professional ethics, retirement, and social security to name a few. Twelve two day sessions are conducted each year with two of these in the summer and ten in the fall and two one day special topics courses. Total 2010 attendance for the schools was approximately 2,030 tax preparers in 11 workshops. Certified public accountants make up 46 percent of the attendance, 27 percent are tax preparers and bookkeepers, 10 percent are enrolled agents, 2 percent are attorneys, and the remaining 15 percent come from a variety of backgrounds. These tax preparers file roughly 80 percent of the farm returns for taxpayers in the state of Oklahoma.

Results

High quality, professional instruction is provided to make continuing education credit available for Certified Public Accountants, Enrolled Agents, and Tax Attorneys. Many of those attending have stated that they have been coming to these programs since they began. Participants filed more than 37,645 Federal farm tax returns and 255,428 Federal non-farm tax returns as reported by the participants in the most recent program evaluations. Most of the tax preparers that attend are from Oklahoma however there have been preparers from Kansas, Texas, New Mexico, Arkansas, Florida, and California attending the program in order to maintain their Oklahoma accreditation. Participants in these schools have indicated on the evaluation form that they file approximately 297,000 Federal non-farm income tax returns as well as 40,000 Federal farm returns. This is roughly 65 percent of the total farm returns filed in Oklahoma. A recently added question asked the participants to place a subjective value on the education received which they then use to assist their clients with tax planning advice to reduce Federal and Oklahoma income taxes, to increase return filing accuracy, to provide retirement planning assistance, and/or to educate their clients of important estate planning tools. The participants were asked specify a value per return they filed which averaged just slightly greater than $80.00 per return. Therefore using the number of participants willing to provide this information (roughly 25% of the participants) and the average number of returns completed by this group annually (195 returns) the value of the tax schools is over $7,500,000 for 2010. Other testimonials from attendees follow.

4. Associated Knowledge Areas

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

Outcome #2

1. Outcome Measures

☐ Not Reporting on this Outcome Measure

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

2. Associated Institution Types

- ☑ 1862 Extension
- ☐ 1862 Research

3a. Outcome Type:

- ○ Change in Knowledge Outcome Measure
- ◉ Change in Action Outcome Measure
- ○ Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	150	155

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The board of directors of an agricultural cooperative has responsibility for strategic decisions and for safeguarding the organizations assets. Agricultural cooperative board members are producers who are elected by the membership to serve with only token remuneration. In recent times, all board members, including cooperative board members are under intense scrutiny. The incidence of legal proceedings against board members has increased dramatically. These litigations are typically initiated by owner (member) groups and they focus on the competency and diligence of the board. The severe repercussions from errant business decisions and the intense scrutiny of board member competency have created a critical need for educational programs.

What has been done
In response to the critical need to improve the competencies of cooperative board members the Oklahoma Credential Cooperative Director (OCCD) program was created. The OCCD program involves two days of training on finance, legal responsibilities, parliamentary procedure, effective meeting management, strategic planning and other related topics. In designing the OCCD curriculum, board of director training material from across the U.S. was examined. OCCD instructors include OCES faculty as well as industry experts including bankers, auditors, attorneys and consultants. The OCCD program is delivered simultaneously at a central location and via two-way interactive video at eight remote locations across Oklahoma.

The OCCD program was initiated in November of 2001 Since then it has been offered fifteen times (spring and fall) with twelve advanced sessions. Over 3800 directors have attended the Credentialing sessions and over 1,500 directors have returned for advanced training.

Results
The directors completing the OCCD program have a better understanding of financial management and the legal roles and responsibilities of the board of directors and are able to make better business decisions and to safeguard the assets of their cooperative organizations. Currently there are over 150 Credentialed directors representing 44 cooperatives and over 150 more directors who are progressing through the credentialing training. Over 400 directors from 37 separate cooperatives have attended an advanced session. Twenty cooperatives have achieved the status of having every board member credentialed. The typical Oklahoma cooperative includes 1,500 or more farmer members and organizational assets of over $10M. The OCCD program impacts thousands of Oklahoma producers by enhancing the board?s ability to manage and safeguard cooperative assets

4. Associated Knowledge Areas

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

Outcome #3

1. Outcome Measures

☐ Not Reporting on this Outcome Measure

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

2. Associated Institution Types

☑ 1862 Extension
☐ 1862 Research

3a. Outcome Type:

○ Change in Knowledge Outcome Measure
◉ Change in Action Outcome Measure
○ Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	200	175

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Production management, business planning, risk management and marketing are major issues for the beef producers who comprise Oklahoma?s #1 agricultural industry.

What has been done
A comprehensive educational program developed and delivered in cooperation between Agricultural Economics, Animal Science, Plant and Soil Science, Vet Med, Biosystems and Ag Engineering . The OSU Master Cattleman Program was launched in 2004 with the objective of enhancing the profitability of beef operations and the quality of life of beef producers by equipping them with vital information on many aspects of beef production, business planning, risk management and marketing. The educational curriculum is based on the Oklahoma Beef Cattle Manual. PPTs and lesson plans are available to educators via the Master Cattleman website. Producers must complete 4 hours in each of 6 subject matter areas plus an additional four hours of instruction or special projects. Local Extension educators plan and organize the Master Cattleman educational series and select the specific curriculum offered.

Results
An additional 30 producers were certified under the OSU Master Cattleman Program in 2010

4. Associated Knowledge Areas

☑ 601 - Economics of Agricultural Production and Farm Management

- ☑ 602 - Business Management, Finance, and Taxation
- ☐ 603 - Market Economics
- ☐ 610 - Domestic Policy Analysis

Outcome #4

1. Outcome Measures

☐ Not Reporting on this Outcome Measure

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

2. Associated Institution Types

- ☑ 1862 Extension
- ☐ 1862 Research

3a. Outcome Type:

- ◯ Change in Knowledge Outcome Measure
- ◉ Change in Action Outcome Measure
- ◯ Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	100	50

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The meat goat industry has been rapidly expanding in Oklahoma and the United States. Meat goat numbers in Oklahoma have gone from not even being counted by USDA to 94,000 in 2007, ranking 5th in the U.S goat numbers. This rapid expansion in goat numbers has created a need for meat goat production education. In addition to the differences between goat production and other livestock production systems, many goat producers are relatively new to livestock production. These producers not only need education on goat production practices but also education on how to do the simple management techniques such as ear tagging, castrating, and body scoring that many livestock producers take for granted. The Oklahoma Meat Goat Boot Camp was created to meet the educational needs of these goat producers.

What has been done
The Oklahoma Meat Goat Boot Camp is a three day workshop that combines hands-on demonstration and activities with classroom presentations and exercises. Camps size was limited to 50 participants. Cost to the participants was $100. During the three days each participant gain information and skills on animal identification, hoof care, fencing, forage management, business management, nutrition, parasite control, herd health management, predator control, kidding and neonatal care and reproduction and pregnancy diagnosis.

Results
All participants were asked to evaluate the program and determine the impact to their operation. The following are the results from the evaluations.

?80% of the sessions taught were of great value to participants
?425% potential adoption rate of information and management practices from the boot camp
?Average perceived dollar value of the information presented was $20.89/goat
?Total value perceived for the 2010 programs was $93,600

4. Associated Knowledge Areas

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

Outcome #5

1. Outcome Measures

☐ Not Reporting on this Outcome Measure

Participants Increasing Knowledge of the Cattle Marketing System - Packer-Feeder Simulation

2. Associated Institution Types

- ☑ 1862 Extension
- ☑ 1862 Research

3a. Outcome Type:

- ◉ Change in Knowledge Outcome Measure
- ◯ Change in Action Outcome Measure
- ◯ Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	{No Data Entered}	125

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Price discovery is consistently cited as a critical issue in the beef industry. Increasing consolidation of buyers and changing pricing methods have heightened the need for producers, cattle feeders and affiliated agribusiness professionals to understand fed cattle market dynamics,

the behavior of buyers and sellers, and alternative pricing methods.

What has been done
The Fed Cattle Market Simulator was developed at Oklahoma State University in 1990 and has been used in all three missions of the Land Grant University mission ? teaching, extension, and research.

While the focus of simulation workshops is on price discovery, participants also learn the importance of several economic concepts, including value of information, market dynamics, breakeven analysis, derived demand, production efficiency, economies of size, hedging and risk management, and industry behavior and performance. This one-of-a-kind market simulator is used for groups of 24-48 people. The team has conducted workshops with persons as young as teenagers to persons in corporate executive management positions. Workshops of four hours are most common, but more in-depth, intensive workshops are offered to some groups, up to two-day sessions at large agribusiness corporations. Numerous extension and research publications have been written concerning the Fed Cattle Market Simulator in classroom teaching, extension education, and experimental simulation research.

Results
The simulator has been the basis for an OSU course offered once a year for 14 years. It has been the basis for marketing workshops with over 100 groups of 25 or more participants. One of the largest agribusiness firms has incorporated it into its annual employee training program. The developers have conducted 18 workshops with its managers from sales, procurement, and corporate operations. The developers have conducted producer workshops in 17 states, two provinces in Canada, and one state in Mexico, including 8 times at the national convention of the National Cattlemen?s Beef Association. Over 20 workshops with producers have been conducted in Oklahoma. A large foundation in Oklahoma has included the simulator in its annual AgVenture youth camp for the past 9 years. Agricultural economists in other states have adopted the software for use in classroom teaching and extension education programs (Colorado State University, Iowa State University, Kansas State University, Sam Houston State University, South Dakota State University, Texas A&M University, Texas Christian University, and University of Kentucky). During 2010, 3 workshops were conducted with over 125 participants.

Workshop evaluations clearly indicate the value of the simulator in teaching economics concepts. Anecdotal evidence indicates the market simulator changes attitudes about how markets work and why; increases knowledge and understanding of pricing methods for various genetic types of cattle; and enhances the bargaining skills of producers. Evaluation comments indicate the market simulator aids participants to better understand price discovery.

4. Associated Knowledge Areas

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

Outcome #6

1. Outcome Measures

☐ Not Reporting on this Outcome Measure

Potential difference in productivity through genetic markers

2. Associated Institution Types

☐ 1862 Extension
☑ 1862 Research

3a. Outcome Type:

◉ Change in Knowledge Outcome Measure
◯ Change in Action Outcome Measure
◯ Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	{No Data Entered}	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Advances in genetic testing technology have prompted members of the beef industry to consider the effects of using genetic marker tests to improving selection and marketing of beef cattle. Several companies such as Merial and Pfizer now offer and sell a host of genetic tests for beef cattle, but at present it is unclear whether the benefits of using the tests exceed the costs.

What has been done
?Developed models to determine the value of genetic markers to sort feedlot cattle
?Conducted statistical analysis to determine the relative profitability of feedlot cattle with differing genetic markers
?Conducted statistical analysis to determine the effect of genetic markers on yearling bull sales prices
?Conducted surveys of bull buyers to determine the value of genetic marker information
?Developed models to determine the economic value of genetic information to determine the genome-wide effects of improving beef tenderness via genetic marker-based selection of bulls and replacement heifers
?Written several papers on the topic and given presentations to numerous producer, industry, and academic audiences

Results
?Determined that an industry-wide strategy to select bulls in the upper 30% of genetic merit of meat tenderness would result in increased profitability of $9.60/head for feeder cattle and $1.23/head for fed cattle in 20 years. The net present value of the genetic improvement program

estimated to produce economic benefits of $7.6 billion.
?Determined that there is a more than $60/head difference in the profitability of animals with the best genetic markers compared to those with the worst.
?The models developed to determine the value of genetic information to optimally sort cattle have been used by a number of the largest feedlots in the U.S.

4. Associated Knowledge Areas

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

V(H). Planned Program (External Factors)

External factors which affected 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

Brief Explanation

V(I). Planned Program (Evaluation Studies and Data Collection)

(OPTIONAL SECTION)

1. Evaluation Studies Planned

- ☑ After Only (post program)
- ☑ Retrospective (post program)
- ☑ Before-After (before and after program)
- ☑ During (during program)
- ☐ Time series (multiple points before and after program)
- ☐ Case Study

- ☐ Comparisons between program participants (individuals, group, organizations) and non-participants
- ☐ Comparisons between different groups of individuals or program participants experiencing different levels of program intensity.
- ☐ Comparison between locales where the program operates and sites without program intervention
- ☐ Other

Evaluation Results

{No Data Entered}

Key Items of Evaluation

{No Data Entered}

V(A). Planned Program (Summary)

Program # 15

1. Name of the Planned Program

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

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	55%		10%	
205	Plant Management Systems	20%		25%	
307	Animal Management Systems	5%		15%	
402	Engineering Systems and Equipment	20%		50%	
	Total	100%		100%	

Add knowledge area

V(C). Planned Program (Inputs)

1. Actual amount of professional FTE/SYs expended this Program

Year: 2010	Extension		Research	
	1862	1890	1862	1890
Plan	4.0	0.0	2.0	0.0
Actual	0.0	0.0	1.6	0.0

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
60000	0	66316	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
60000	0	66316	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
500000	0	424408	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

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. Brief description of the target audience

Crop and livestock producers, food processors, input suppliers, equipment manufacturers.

V(E). Planned Program (Outputs)

1. Standard output measures

2010	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Plan	400	1000	0	0
Actual	1107	3380	0	0

2. Number of Patent Applications Submitted (Standard Research Output)

Patent Applications Submitted

Year: 2010
Plan: 1
Actual: 1

Patents listed

Solie, J.B., M.L. Stone, and W.R. Raun. 2010. Hand held optical sensor for measuring the normalized difference vegetative index in plants. Prov. Patent 12/820,669

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2010	Extension	Research	Total
Plan	1	8	
Actual	0	11	11

V(F). State Defined Outputs

Output Target

<u>Output #1</u>

Output Measure

- Training sessions and demonstrations for use of new technologies and applications

☐ Not reporting on this Output for this Annual Report

Year	Target	Actual
2010	10	2

Output #2

Output Measure

- New technology applications

☐ Not reporting on this Output for this Annual Report

Year	Target	Actual
2010	2	3

Output #3

Output Measure

- Number of trained extension personnel using hand-held sensors with producers

☐ Not reporting on this Output for this Annual Report

Year	Target	Actual
2010	34	40

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Commercialization of hardware/instrumentaion
2	Number of producers adopting and practicing sensor-based technologies
3	Number of acres where sensor-based technologies are applied
4	Sensor Technology Applications

Add Cross-cutting Outcome/Impact Statement or Unintended or Previously Unknown Outcome Measure

Outcome #1

1. Outcome Measures

☐ Not Reporting on this Outcome Measure

Commercialization of hardware/instrumentaion

2. Associated Institution Types

☑ 1862 Extension
☑ 1862 Research

3a. Outcome Type:

○ Change in Knowledge Outcome Measure
○ Change in Action Outcome Measure
◉ Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	1	1

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

☑ 102 - Soil, Plant, Water, Nutrient Relationships
☑ 205 - Plant Management Systems
☐ 307 - Animal Management Systems
☑ 402 - Engineering Systems and Equipment

Outcome #2

1. Outcome Measures

☐ Not Reporting on this Outcome Measure

Number of producers adopting and practicing sensor-based technologies

2. Associated Institution Types

- ☑ 1862 Extension
- ☑ 1862 Research

3a. Outcome Type:

- ○ Change in Knowledge Outcome Measure
- ◉ Change in Action Outcome Measure
- ○ Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	750	1200

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

- ☑ 102 - Soil, Plant, Water, Nutrient Relationships
- ☑ 205 - Plant Management Systems
- ☐ 307 - Animal Management Systems
- ☐ 402 - Engineering Systems and Equipment

Outcome #3

1. Outcome Measures

☐ Not Reporting on this Outcome Measure

Number of acres where sensor-based technologies are applied

2. Associated Institution Types

- ☑ 1862 Extension
- ☑ 1862 Research

3a. Outcome Type:

- ○ Change in Knowledge Outcome Measure
- ○ Change in Action Outcome Measure
- ◉ Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	155000	500000

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
On a worldwide scale, nitrogen use efficiency (NUE) for cereal grain production is approximately 33%. This means that 67% of the applied nitrogen is not utilized by the plant. The use of sensors for crop management decisions is becoming more popular and more crop producers and consultants are exploring this technology.

What has been done
Optical Pocket Sensor developed and tested in Mexico, India, , and that will ultimately cost only $200, versus $4000 for the current GreenSeeker.

?Following successful conferences from 2003 to 2009 a network of collaborating scientists continues that includes groups from Argentina, Canada, Mexico, and the USA. OSU hosted this group in August, 2010. The combined effort of more than 100 scientists working in nitrogen management will accelerate progress needed for improving nitrogen use efficiency using precision sensing technologies.

Workshops Coordinated (2010):
Annual International NUE Conference, Stillwater, OK, Aug 4-5, 2010 (attended by 100 scientists from all over the world)

Results
Optical pocket sensor developed, tested, and delivered to various worldwide locations, including many with CIMMYT staff. This will for many farmers replace the GreenSeeker sensor.

?Continued development/extension of sensor based N management practices in Ciudad Obregon, MX with Dr. Ivan Ortiz-Monasterio. SBNRC, GreenSeeker, and now pocket sensors now used in India, China, Mexico, Turkey, Canada, Kenya, Australia, Argentina, Uzbekistan, and Zimbabwe.

?The Sensor Based Nitrogen Rate Calculator now has 28 functional algorithms that are being used for improved fertilizer N recommendations in Mexico, Argentina, Turkey, India, Australia, Canada, India, Kenya, and Zimbabwe and many states in our country.

?Productivity in 2010 was almost equal to 2006 and 2008 (#2 and #3 all time), and watershed years where more than 25 significant products/year including journal publications, degrees, books, book chapters, patents, workshops, web sites, grants, classes, and proceedings were delivered (Figure 1). Further extension of the N Rich Strip with BAE Faculty had a significant impact in 2009 and 2010. This year, our recommendations for wheat farmers should result in extensive N savings

N Algorithms Developed (Sensor Based Nitrogen Rate Calculator) (2010):
(http://www.soiltesting.okstate.edu/SBNRC/SBNRC.php)

New algorithms (3) developed, placed on-line and that are now being used by producers in each respective region included

1.Generalized Algorithm (option 26)
2.GA (generalized algorithm) Phone AP (option 27)
3.Winter Wheat Protein Optimizer (option 28)

Patents (2010):

1.Solie, J.B., M.L. Stone, and W.R. Raun. 2010. Hand held optical sensor for measuring the normalized difference vegetative index in plants. Prov. Patent 12/820,669

4. Associated Knowledge Areas

- ☑ 102 - Soil, Plant, Water, Nutrient Relationships
- ☑ 205 - Plant Management Systems
- ☐ 307 - Animal Management Systems
- ☑ 402 - Engineering Systems and Equipment

Outcome #4

1. Outcome Measures

☐ Not Reporting on this Outcome Measure

Sensor Technology Applications

2. Associated Institution Types

- ☐ 1862 Extension
- ☑ 1862 Research

3a. Outcome Type:

- ○ Change in Knowledge Outcome Measure
- ◉ Change in Action Outcome Measure
- ○ Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	{No Data Entered}	1

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Oklahoma pecans have a good reputation for quality of nutmeats, but also are known for containing larvae of the pecan weevil. Weevil damage can be so bad at times that Oklahoma pecans are severely discounted even to the point where no price is offered. Therefore, efficient and cost-effective pest management strategies have always been a focus for pecan researchers and growers.

Pecan can be attacked by more than twenty types of insects. Pecan weevil (Curculio Caryae) is one of the most destructive pests of the Oklahoma pecan. Its larva resides inside the nut and feeds on nutmeat. Sorting of defective nuts is not possible because nutmeat defects are not fully recognizable by physical properties, color and appearance of whole unshelled nuts. Commercial sorters are available to sort nutmeat after shelling the nuts, resulting in unnecessary shelling of defective nuts. This calls for development of automated inspection systems to identify good pecan nuts from defective ones before shelling them. Some sensing techniques which can look inside the nuts without breaking or opening them would be useful.

What has been done

Work continued on development of an automated in-orchard monitoring system for pecan weevils. Current commercial components were evaluated and used for in-field monitoring during the 2010 weevil emergence season. We collected additional image sets for continued insect recognition and classification work. Image processing routines were improved for identifying live insects in natural poses, where position and orientation are variable.

We continued our work on x-ray imaging of in-shell pecans. A new local adaptive thresholding method with a new hypothesis: reversing the water flow and a simpler thresholding criterion is proposed. The new hypothesis, reversing the simulated water flow, reduced the computational time by 50-60% as compared to the existing fastest Oh method. The proposed method could segment both larger and smaller (presence of insect exit paths) defects. The proposed method worked well for other unimodal images taken from published research studies and it should be extendable to other food and agricultural images characterized by unimodal histogram and poor contrast.

Results

Additional progress has been made in furthering the research to realize a wireless in-field insect monitoring system. Our understanding of weevil behavior has improved significantly, providing experience that will improve the efficacy of future work. Development of hardware and software has continued, with the realization that power consumption is an extremely difficult problem for wireless sensor systems.

Improved pattern recognition classifiers and other image processing algorithms have been developed to improve the feature classification accuracy. The newly developed local adaptive thresholding method can be extended to other food product images. This algorithm was published in 2010 in the Transactions of the ASABE journal.

4. Associated Knowledge Areas

- ☐ 102 - Soil, Plant, Water, Nutrient Relationships

- ☑ 205 - Plant Management Systems
- ☐ 307 - Animal Management Systems
- ☑ 402 - Engineering Systems and Equipment

V(H). Planned Program (External Factors)

External factors which affected 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 ()

Brief Explanation

V(I). Planned Program (Evaluation Studies and Data Collection)

(OPTIONAL SECTION)

1. Evaluation Studies Planned

- ☐ After Only (post program)
- ☐ Retrospective (post program)
- ☐ Before-After (before and after program)
- ☑ During (during program)
- ☑ Time series (multiple points before and after program)
- ☐ Case Study
- ☐ Comparisons between program participants (individuals, group, organizations) and non-participants
- ☑ Comparisons between different groups of individuals or program participants experiencing different levels of program intensity.
- ☐ Comparison between locales where the program operates and sites without program intervention
- ☐ Other

Evaluation Results

{No Data Entered}

Key Items of Evaluation

{No Data Entered}

V(A). Planned Program (Summary)

Program # 16

1. Name of the Planned Program

Sustainable Energy - Bio-Based Products Development

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	75%		75%	
901	Program and Project Design, and Statistics	25%		25%	
	Total	100%		100%	

Add knowledge area

V(C). Planned Program (Inputs)

1. Actual amount of professional FTE/SYs expended this Program

Year: 2010	Extension		Research	
	1862	1890	1862	1890
Plan	1.0	0.0	3.0	0.0
Actual	1.0	0.0	5.2	0.0

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	**1890 Extension**	**Hatch**	**Evans-Allen**
40000	0	220169	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
40000	0	220169	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
300000	0	1409034	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Research

Project proposals
Technical papers
Journal articles
Patents
Products taken to commercialization by industry

2. Brief description of the target audience

Other scientists, industry, agricultural producers, commercial developers;

V(E). Planned Program (Outputs)

1. Standard output measures

2010	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Plan	500	10000	0	0
Actual	659	131000	0	0

2. Number of Patent Applications Submitted (Standard Research Output)
Patent Applications Submitted

Year: 2010
Plan: 2
Actual: 2

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2010	Extension	Research	Total
Plan	2	10	
Actual	2	22	24

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

● Journal Articles

☐ Not reporting on this Output for this Annual Report

Year **Target** **Actual**

2010	6	22

Output #2

Output Measure

- Technical papers and presentations

☐ Not reporting on this Output for this Annual Report

Year	Target	Actual
2010	15	24

Output #3

Output Measure

- New processes developed

☐ Not reporting on this Output for this Annual Report

Year	Target	Actual
2010	1	1

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Products/processes taken to commercialization by industry

Add Cross-cutting Outcome/Impact Statement or Unintended or Previously Unknown Outcome Measure

Outcome #1

1. Outcome Measures

☑ Not Reporting on this Outcome Measure

Products/processes taken to commercialization by industry

2. Associated Institution Types

☐ 1862 Extension
☑ 1862 Research

3a. Outcome Type:

◯ Change in Knowledge Outcome Measure
◯ Change in Action Outcome Measure
◉ Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	2	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

☑ 511 - New and Improved Non-Food Products and Processes
☐ 901 - Program and Project Design, and Statistics

V(H). Planned Program (External Factors)

External factors which affected 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

Brief Explanation

V(I). Planned Program (Evaluation Studies and Data Collection)

(OPTIONAL SECTION)

1. Evaluation Studies Planned

- ☐ After Only (post program)
- ☐ Retrospective (post program)
- ☐ Before-After (before and after program)
- ☑ During (during program)
- ☐ Time series (multiple points before and after program)
- ☐ Case Study
- ☐ Comparisons between program participants (individuals, group, organizations) and non-participants
- ☐ Comparisons between different groups of individuals or program participants experiencing different levels of program intensity.
- ☐ Comparison between locales where the program operates and sites without program intervention
- ☐ Other

Evaluation Results

{No Data Entered}

Key Items of Evaluation

{No Data Entered}

V(A). Planned Program (Summary)

Program # 17

1. Name of the Planned Program

Childhood Obesity - Human Nutrition and Health

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%	

Add knowledge area

V(C). Planned Program (Inputs)

1. Actual amount of professional FTE/SYs expended this Program

Year: 2010	Extension		Research	
	1862	1890	1862	1890
Actual	29.0	0.0	0.0	0.0

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	**1890 Extension**	**Hatch**	**Evans-Allen**
333000	0	0	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
333000	0	0	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
3000000	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

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.

Accomplished through programs such as:
Healthy Oklahoma Youth
Farm to You
Food and Fun for Everyone
Fresh Start - Nutrition and You
Community Nutrition Education Program

2. Brief description of the target 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(E). Planned Program (Outputs)

1. Standard output measures

2010	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Plan	{NO DATA	{NO DATA	{NO DATA	{NO DATA
Actual	169278	6050000	30000	550000

2. Number of Patent Applications Submitted (Standard Research Output)
Patent Applications Submitted

Year: 2010
Plan:
Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2010	Extension	Research	Total
Actual	11	5	16

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Revised online curriculum

☐ Not reporting on this Output for this Annual Report

Year	Target	Actual
2010	{No Data Entered}	5

Output #2

Output Measure

- Promotional materials and marketing campaign

☐ Not reporting on this Output for this Annual Report

Year	Target	Actual
2010	{No Data Entered}	2

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Number of youth improving food, nutrition and 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.

Add Cross-cutting Outcome/Impact Statement or Unintended or Previously Unknown Outcome Measure

Outcome #1

1. Outcome Measures

☐ Not Reporting on this Outcome Measure

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

2. Associated Institution Types

☑ 1862 Extension
☐ 1862 Research

3a. Outcome Type:

◯ Change in Knowledge Outcome Measure
◉ Change in Action Outcome Measure
◯ Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	{No Data Entered}	15840

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Over the past decade, the percentage of those overweight has steadily increased in Oklahoma. As many as one in five Oklahoma children are at-risk of overweight or overweight; and two-thirds of adults are overweight or obese. Among children and adolescents, overweight increases the risk of type 2 diabetes, high blood pressure, and cardiovascular disease. The health of Oklahoma youth can be improved by increasing knowledge, skills, attitudes and behaviors related to food and physical activity. Overweight, obesity and associated health problems have a significant economic impact. The estimated annual cost of overweight and obesity in the United States is $117 billion. Just a 10% sustained weight loss has been estimated to reduce an overweight person?s lifetime medical costs by $2,200 to $5,300.

What has been done
Healthy Oklahoma Youth progrma is delivered primarily by OCES FCS educators in school settings. The curriculum was found to result in important improvements in food, nutrition and physical activity behaviors were observed among participating Oklahoman youth which can have a role in reducing overweight and risk of related chronic diseases.

Results
This program was provided to 15,840 children and youth. The statistically significant observed improvements in food, nutrition and physical activity behaviors include:
34% increase in eating whole grain breads and cereals.
27% increase in eating fruits and vegetables.

26% increase in drinking milk or eating cheese or yogurt
32% increase in eating low-fat meats
33% increase in eating foods from 2 or 3 MyPyramid food groups for breakfast.
30% increase in snacking only when hungry.
39% increase in using nutrition facts labels to make food and beverage choices.
34% increase each in eating small amounts of high fat foods and sugar-sweetened beverages.
22% increase in time spent in physical activity.

4. Associated Knowledge Areas

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

Outcome #2

1. Outcome Measures

☐ Not Reporting on this Outcome Measure

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

2. Associated Institution Types

- ☑ 1862 Extension
- ☐ 1862 Research

3a. Outcome Type:

- ○ Change in Knowledge Outcome Measure
- ◉ Change in Action Outcome Measure
- ○ Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	{No Data Entered}	19600

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Over the past decade, the percentage of those overweight has steadily increased in Oklahoma. As many as one in five Oklahoma children are at-risk of overweight or overweight; and two-thirds of adults are overweight or obese. Among children and adolescents, overweight increases the risk of type 2 diabetes, high blood pressure, and cardiovascular disease. The health of Oklahoma youth can be improved by increasing knowledge, skills, attitudes and behaviors related to food and physical activity. Overweight, obesity and associated health problems have a significant economic impact. The estimated annual cost of overweight and obesity in the United States is $117 billion. Just a 10% sustained weight loss has been estimated to reduce an overweight person?s lifetime medical costs by $2,200 to $5,300.

What has been done
Farm to You is an exemplary demonstration of collaboration between state agencies and community partners with the common mission of delivering research-based information and programs to help Oklahoma youth address major health concerns that affect their quality of life. These concerns include increased rates of obesity, limited physical activity, low consumption of fruits and vegetables, high prevalence of tooth decay and a high rate of tobacco use among adolescents and teens. The educational initiative is designed to increase awareness of the relationships between agriculture, food and health.

The Farm to You program consists of a distinctive 40-foot-by-40-foot enclosed walkthrough exhibit that travels throughout the state to scheduled community sites. The exhibit is quickly assembled with the help of school and community volunteers. At each of nine stations, students spend about six minutes participating in activities demonstrating where food grows, how food is used by the body to grow and develop, and how health habits keep the body healthy. Students meet Farmer Pete at the Cheeseburger Farm where MyPyramid foods are grown. They follow that food to the market to investigate Nutrition Facts labels, and then go on to the Healthy Cool Café where they take responsibility for choosing a variety of healthy foods. The adventure continues through an oversized mouth where they practice flossing, then travel through the digestive system, muscles, bones and skin where they engage in activities to reinforce desired health behaviors.

Results
During 2010 the exhibit was experienced by approximately 19,600 youth and supported by 133 community volunteers. In a case/controlled evaluation, the exhibit was found to enhance behavior change in students who were exposed to both classroom nutrition education lessons and the exhibit compared to those exposed solely to the classroom lessons. The statistically significant self-reported food, nutrition and physical activity behaviors included:
?Increased consumption of whole grain foods
?Increased consumption of fruits and vegetables
?Increased consumption of dairy foods
?Use of the nutrition facts label for choosing healthful foods
?Eating smaller amount of high fat foods
?Consuming smaller amounts of sugar-sweetened beverages
The project received national attention by being featured in Weighing the Options: How Can We Encourage Healthy Weights among America?s Youth, a publication of the National Issues Forum Network, West Virginia Center for Civic Life. In 2010, it received the Dr. Rodney Huey Memorial Champion of Oklahoma Health Award.

4. Associated Knowledge Areas

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

Outcome #3

1. Outcome Measures

☐ Not Reporting on this Outcome Measure

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. Associated Institution Types

☑ 1862 Extension
☐ 1862 Research

3a. Outcome Type:

◯ Change in Knowledge Outcome Measure
◉ Change in Action Outcome Measure
◯ Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	{No Data Entered}	27457

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Over the past decade, the percentage of those overweight has steadily increased in Oklahoma. As many as one in five Oklahoma children are at-risk of overweight or overweight; and two-thirds of adults are overweight or obese. Among children and adolescents, overweight increases the risk of type 2 diabetes, high blood pressure, and cardiovascular disease. The health of Oklahoma youth can be improved by increasing knowledge, skills, attitudes and behaviors related to food and physical activity. Overweight, obesity and associated health problems have a significant economic impact. The estimated annual cost of overweight and obesity in the United States is $117 billion. Just a 10% sustained weight loss has been estimated to reduce an overweight person?s lifetime medical costs by $2,200 to $5,300.

What has been done
Food and Fun for Everyone is a nutrition education curriculum for middle-elementary school age children. The curriculum focuses on eating a variety of food, increasing consumption of whole grains, fruit and vegetables and low-fat dairy, eating breakfast, food safety and being physically active. During 2010, the program served 27,457 low-income youth.

Results
In a formal evaluation the program was found to have positive, significant behavior changes for six of the eight food, nutrition and physical activity behaviors in third grade children, and positive, significant changes in seven of the eight food, nutrition and physical activity behaviors in fourth grade students. The program is delivered primarily by Community Nutrition Eductaion Programs

(CNEP) paraprofessionals in school settings.

4. Associated Knowledge Areas

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

Outcome #4

1. Outcome Measures

☐ Not Reporting on this Outcome Measure

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

2. Associated Institution Types

- ☑ 1862 Extension
- ☐ 1862 Research

3a. Outcome Type:

- ○ Change in Knowledge Outcome Measure
- ◉ Change in Action Outcome Measure
- ○ Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	{No Data Entered}	2931

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
This program addresses critical issues of Oklahomans such as 1 in 5 children are at risk of being hungry. In September 2010, the number of Oklahomans receiving SNAP benefits (previously food stamps) increased for the 30th straight month reaching an all time high of 612,347 persons. Among the 354,800 people served by Oklahoma Food Banks 40% report having to choose between paying for food or paying their utilities or heating fuel, 31% report having to chose between paying for food or medicine or medical care, and 26% report having to choose between paying for food and paying their rent or mortgage.

What has been done
Fresh Start: Nutrition & You is administered by the Community Nutrition Education Programs (CNEP), this is a voluntary program for low-income adults/families that are at or below 185% of the federal poverty guidelines, willing to participate in a long term educational experience designed to coach for behavior change in food consumption, food handling, and food budgeting practices. On average, graduates of the program participate in more than 11 lessons and enroll longer than 4 months. Program participants learn to feed their families in order to promote good health and plan and budget their food dollars so their family won?t go hungry at the end of the

month. In FY10 this program had a positive impact on the health and wellness of 5,529 low-income Oklahoma families.

Results
During the FY10 program year, the evaluation process was completed for 2,931 program participants who have graduated from the Fresh Start: Nutrition & You program. Based on pre/post evaluations there were improvements in food, nutrition and physical activity behaviors.

Over 95 percent of program graduates demonstrated improvements in diet-related behaviors.

Over 26 percent of program graduates reported an increase in physical activity.

35 percent of program graduates less often ran out of food before the end of the month.

37 percent of program graduates reported that their children ate breakfast more often.

55 percent of program graduates more often followed the recommended practice of not thawing foods at room temperature. Furthermore,

36 percent always follow the recommended practice.

49% of CNEP participants are ethnic minorities.

In Oklahoma, CNEP reaches a more ethnically diverse population than the Supplemental Nutrition Assistance Program (SNAP) previously known as food stamps. In FY 10, the Community Nutrition Education Programs (CNEP) and the Oklahoma Cooperative Extension Service leveraged state monies from 5 funding sources to bring approximately $4 million in federal nutrition education program funds to the state, resulting in an estimated health care savings of more than $26 million from the prevention of nutrition-related chronic diseases and conditions among Oklahoma citizens.

4. Associated Knowledge Areas

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

V(H). Planned Program (External Factors)

External factors which affected 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

Brief Explanation

V(I). Planned Program (Evaluation Studies and Data Collection)

(OPTIONAL SECTION)

1. Evaluation Studies Planned

- ☐ After Only (post program)
- ☐ Retrospective (post program)
- ☐ Before-After (before and after program)
- ☐ During (during program)
- ☐ Time series (multiple points before and after program)
- ☐ Case Study
- ☐ Comparisons between program participants (individuals, group, organizations) and non-participants
- ☐ Comparisons between different groups of individuals or program participants experiencing different levels of program intensity.
- ☐ Comparison between locales where the program operates and sites without program intervention
- ☐ Other

Evaluation Results

{No Data Entered}

Key Items of Evaluation

{No Data Entered}