2009 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 develop 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. Significant research and/or extension efforts and developments during 2009 included the following:

Plant Biological Technologies. Employing resistance resources in locally adapted cultivars is the most effective means to control powdery mildew. There are approximately thirty-six loci that have been associated with resistance to powdery mildew in wheat, but most of them are introgressed from alien or wild species that bring over undesirable traits and cannot be used directly in breeding programs. SSR markers were used to screen genetic loci for powdery mildew, molecular markers for different Pm3 alleles were mapped in the population. The segregation of powdery mildew resistance in a population of Jagger (susceptible) x 2174 (resistant) was controlled by a major QTL associated with the Pm3 gene on the short arm of chromosome 1A and modified by four minor QTLs on chromosomes 1B, 3B, 4A and 6D. The resistant Pm3 allele was present among 4 of 31 cultivars currently being produced in the southern Great Plains. The results from this study have been published in Molecular Breeding (Chen et al. 2009, 24:141-152).

Crop Enterprises. At the completion of the educational programming in August of 2009, 25% of eligible FSA contracts in Oklahoma decided to take the ACRE option. This represented 33% of eligible contract acres (over 2.7 million acres) and was the highest ACRE signup percentage in the nation for the 2009 crop. Our programming also helped several producers in deciding not to enroll in the ACRE program when it was not in their individual best interest. On average it is estimated that ACRE enrollees will collect over $40.00 per acre in Federal payments for the 2009 crop year, compared to around $15.00 per acre on acres enrolled in DCP. Thus the ACRE enrollment educational program conducted by OCES contributed significantly to a gain in income of over $65,000,000 for Oklahoma wheat producers in 2009.

The Oklahoma State University Soil Testing Lab analyzed approximately 3,400 soil samples from wheat producers in 2009. Previous experience and soil sampling recommendations indicate that each sample represents approximately 80 acres; therefore, samples analyzed in the lab represent 272,000 acres. Results show an average of 30 lbs of nitrate-N per acre was available for crop use. These data were reported back to stakeholders for a total potential savings of $4,000,000 in nitrogen fertilizer cost to Oklahoma wheat farmers.

Animal Enterprises. 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 between $800 million to $900 million annually in economic losses from death, decreased performance, and antimicrobial treatment costs. Research findings showed that as the number of antimicrobial treatments for BRD increases, average daily gain in the backgrounding phase decreases, cost-per-unit increases, and net returns decline. Days on feed needed to reach a common 12th rib fat thickness increased by 7 days for every increase in number of antimicrobial treatment required. Increased days on feed, lower final body weight and lower carcass value resulted in an $11.36 loss in income for every time an animal was treated. Decreasing the average number of times an animal is treated for BRD by one treatment would result in a nearly $9 million savings to Oklahoma feedlot cattle producers. In addition, marbling scores, color stability and overall acceptance of the final beef product by consumers decreases as the number of antimicrobial treatments increases.

Agricultural Biosecurity. Fresh produce has been and will likely continue to be associated with foodborne illness outbreaks. Researchers demonstrated that a high proportion of feral blow flies captured in leafy greens fields were carrying the human pathogen, E. coli O157:H7. This elevates blow flies, which are not normally associated with foodborne pathogens, to the level of potential vector of these pathogens to unprocessed leafy greens. Researchers showed that house flies

regurgitate live E. coli O157:H7 onto spinach plants, suggesting that this might be an important route of contamination in field situations that interface with filth fly breeding areas. As a result of this work, at least one distributor of leafy greens is implementing wider border zones separating cow-calf operations and greens production areas in California.

Integrated Pest Management. Canola is a potentially valuable rotation crop for Oklahoma wheat growers. It allows them opportunities to manage difficult grassy weeds such as Italian ryegrass, and cheat while providing them with an additional cash crop. Insect pests (aphids and caterpillars) regularly infest winter canola throughout winter and spring causing economic damage. Entomologists and area agronomists conducted research demonstrations from 2005-2007 to evaluate management strategies for canola aphids. They determined that aphids could be effectively managed with a combination of insecticide seed treatments and regular scouting using a threshold of 200 aphids per plant. The research demonstrations showed that producers could save an average of $30 per acre by reducing insecticide applications from four per season to one with no loss in yield. This resulted in $1.1 million in potential cost savings in the 2008-2009 canola crop.

Food Processing, Product Storage and Food Safety. Pesticides are used to fumigate grain storage facilities and the pesticides used are often toxic to humans. Fumigation of large concrete grain silos is difficult and dangerous. Workers and managers of storage facilities would like to have the safest fumigation systems available. A closed loop fumigation system was installed in a concrete silo facility in Broken Arrow, OK. The system reduces loss of fumigant to the environment. The installation of the system was managed to save approximately $5000 in installation costs. The system will provide a safer working environment for workers and reduce liability to the company from worker safety and reduced impact on the neighborhood environment.

Family Resiliency and Economic Well-Being and Human Nutrition and Health. 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 2009, the program served 27,457 low-income youth. The program is delivered primarily by CNEP paraprofessionals in school settings. Paired t-test of pre-post student questionnaire responses revealed positive, significant ($p < 0.50$) behavior changes in third grade children for six of the eight behaviors (hand washing, drinking water, consuming dairy foods, and eating fruit, vegetables and whole grains). Fourth grade students reported positive, significant ($p < 0.50$) changes in seven of the eight behaviors (same as third grade with addition of eating breakfast more often).

Commercial and Consumer Horticulture. 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 26 counties participating in the program as of January 2010. The following data was provided by 22 of the 26 counties. Approximately 313 new Master Gardeners were trained during the 2009 training season. Close to 1,208 active Master Gardeners volunteered their time, contributing approximately 65,417 volunteer hours resulting in over 5,160,263 educational interventions with Oklahomans and as many as 1,200+ educational and community programs and activities being conducted in their communities in 2009. This translates to over $1,059,101 in service that was donated by volunteers (wage rate of $16.19/hour was used, which includes a 12% estimate of fringe benefits. This hourly rate is the assigned wage for nonagricultural workers in 2007 for the state of Oklahoma as published The Independent Sector, an organization that "serves as a national forum to encourage giving, volunteering and not-for-profit initiative,"

Community Resource and Economic Development. The Northwest Oklahoma Alliance (NwOA) is seeking to establish an industrial park in Avard, OK to utilize an existing rail spur to create much needed, high paying jobs in that region. Early in the process, NwOA approached OCES about doing an economic impact analysis of the types of jobs that they hope to create in the industrial park. Based upon direct employment estimates, the park could house 1,770 employees and over $500 million dollars of capital investment. The analysis suggested that the park could create up to $31 million in additional payroll outside of the industrial park, over $4 million in sales tax revenue, and $5.3 million in ad valorem tax revenue for Woods County. The report was used by NwOA to pursue several grants to fund the land purchase and infrastructure development of the industrial park. Specifically, the report contributed to an ARRA grant application that was funded for $1 million, and secured a letter of credit from local banks in the amount of $2.25 million. The report contributed to a final grant, still under review, for $1.5 million from EDA. Thus, the report has generated $3.25 million dollars, and it is being used to pursue an additional $1.5 million. Sonja Cook, Executive Director of Woods County Economic Development Committee, said, "I truly feel we would not be this far if it weren't for the assistance of your office."

Farm and Agribusiness Management. Participants in the Oklahoma Farm and Business Tax Institute schools have indicated on the evaluation form that they file approximately 250,000 Federal non-farm income tax returns as well as 57,750 Federal farm returns. This is roughly 70 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 (192 returns) the value of the tax schools is over $7,357,000 for 2009.

Total Actual Amount of professional FTEs/SYs for this State

Year: 2009	Extension		Research	
	1862	1890	1862	1890
Plan	205.0	0.0	83.0	0.0
Actual	263.0	0.0	95.0	0.0

II. Merit Review Process

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

- Internal University Panel
- Combined External and Internal 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 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. During 2009 the Director (OCES and OAES) and Vice President DASNR conducted five regional forums with agricultural, business and community leaders around the state. These listening forums were designed to get candid input from stakeholders. Only the Director and a recorder were present from the Division - with a summary later made avaiable to all staff.

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

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.

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
- Meeting with invited 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)

Dean's Regional Forums (five)

This statutory committee meets 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.

Created a weather model using our statewide Mesonet system to help with 2-4-D drift problems.
Hired machinery engineer to help develop harvest and handling for cellulosic materials used in biofuel production
Hired a housing expert
Continued emphasis on wheat variety improvement especailly quality and dual-purpose production
Helped develop an oilseed commission
Developed a grape production manual
Conducted extensive programming around the farm bill and the ACRE program
Added field tests relating to pests in winter Canola
Put the SunUp PBS television program into full production
Attempted to change statutory requirements relating to Poultry Waste management Education
Developed additional food safety video for cleaning and handling wild-caught fish
Developed a Water Law Manual for the state.
Developed a Deer Farming Educational course with the collaboration of other OSU units.
Conducted research on large animal composting and created a video and fact sheet and training.
Worked with Kansas State University to develop analysis tool for farmers contracting to biofuels plant
Increased programming due to economic downturn relating to handling credit and loss of income for families
Reviewed cotton research and extension programs

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

IV. Expenditure Summary

1. Total Actual Formula dollars Allocated (prepopulated from C-REEMS)			
Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
5276481	0	3462883	0

2. Totaled Actual dollars from Planned Programs Inputs				
	Extension		Research	
	Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
Actual Formula	2707333	0	3462883	0
Actual Matching	2707333	0	3462883	0
Actual All Other	34758509	0	23836960	0
Total Actual Expended	40173175	0	30762726	0

3. Amount of Above Actual Formula Dollars Expended which comes from Carryover funds from				
Carryover	2407665	0	0	0

V. Planned Program Table of Content

V(A). Planned Program (Summary)

Program # 1

1. Name of the Planned Program

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	4%		10%	
304	Animal Genome	0%		10%	
305	Animal Physiological Processes	0%		10%	
306	Environmental Stress in Animals	4%		10%	
307	Animal Management Systems	40%		20%	
308	Improved Animal Products (Before Harvest)	7%		5%	
311	Animal Diseases	8%		5%	
315	Animal Welfare/Well-Being and Protection	3%		5%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

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

Year: 2009	Extension		Research	
	1862	1890	1862	1890
Plan	24.0	0.0	10.0	0.0
Actual	27.0	0.0	9.0	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**
300000	0	326751	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
300000	0	326751	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
3700000	0	2198672	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.

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

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

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

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

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

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

2. Brief description of the target audience

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

V(E). Planned Program (Outputs)

1. Standard output measures

2009	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Plan	2000	2050	100	200
Actual	167406	1074000	3300	26500

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

Year: 2009
Plan: 1
Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2009	Extension	Research	Total
Plan	10	10	
Actual	33	30	63

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Conferences, symposiums, and meetings

Year	Target	Actual
2009	25	866

Output #2

Output Measure

- Peered reviewed journal articles

Year	Target	Actual
2009	15	30

Output #3

Output Measure

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

Year	Target	Actual
2009	18	33

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	Use of distillers grain as livestock feed
6	Economic Effects of Genetic Marker Selection and Management in Beef Cattle

Outcome #1

1. Outcome Measures

Number of producers registered with a premise ID

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	3000	9253

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. A National Animal Identification System (NAIS) had been proposed to help control a disease outbreak should it occur in the United States.

What has been done
In a collaborative effort with the Oklahoma Youth Expo, the Tulsa State Fair, and the Oklahoma Department Agriculture Food and Forestry, the team from Oklahoma State University initiated the first project (currently in its fourth year) in the country to integrate use electronic identification technology within the shows management program at major Oklahoma youth livestock shows for entry nomination, entry verification, show management, and potential 48 hour animal trace back in the case of a disease outbreak.

Results
This year approximately 39,400 youth livestock projects were tagged and approximately 99,400 have been tagged over the last four years. Ultimately the success is measured by steady stepwise adoption of electronic data management of two of the largest youth livestock shows in the country and integration into other Oklahoma shows.

4. Associated Knowledge Areas

KA Code	Knowledge Area
307	Animal Management Systems
315	Animal Welfare/Well-Being and Protection

Outcome #2

1. Outcome Measures

Total number of producers certified as Master Cattlemen

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	350	523

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 has been a highly sought after source of economic and production information. This interdisciplinary team effort has resulted 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.

Results
In 2009, the Master Cattleman Beef Summit drew 160 participants. Participants said that as a result of the conference they better understand the management of cow/calf enterprise risk, how to assess forage availability and growth using different methods and how to calculate appropriate stocking rates. Many also had the opportunity to gain "hands on" experience with one or more software tools designed to improve their production and financial records and support ranch decisions.

4. Associated Knowledge Areas

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

Outcome #3

1. Outcome Measures

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 Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	3000	3750

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Cow-calf producers need timely reminders of management techniques and timely access to current market situations. Research-based answers to routine production questions are important to cow calf producers during each season of the year. New research with valuable production ideas should quickly be made available to those producers that can use this knowledge. The rapidly changing grain and cattle markets are very influential in the success or failure of any cow calf enterprise.

What has been done
A weekly newsletter is compiled by an OSU Extension Cattle Specialist with input from OSU Extension Livestock Marketing Specialist and from OSU Extension Food Animal Health Specialists. Each Friday afternoon, the newsletter containing pertinent management and marketing information is sent directly to nearly 650 ranches. The newsletter also goes to each OSU County Extension office. In addition, the newsletter is made available to other electronic agriculture media sources to further extend the knowledge and market knowledge available.

Results
The Cow Calf Corner Newsletter is sent each week to 800 ranches for their information and managerial decisions. New subscriptions have increased by 50 in 2009 alone. The newsletter is routinely quoted in "Cow Calf Weekly" email newsletter from Beef magazine and "CattleNetwork.com" and other printed and on-line publications. A recent survey of OSU Extension Field Staff on the utilization of the Cow Calf Corner Newsletter:

4. Associated Knowledge Areas

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

Outcome #4

1. Outcome Measures

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 Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	10	150

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 between $800 million to $900 million annually in economic losses from death, decreased performance, and antimicrobial treatment costs. Despite improved vaccines and antimicrobials, BRD rates have been increasing during recent years.

What has been done
We observed the effects of segregation of commingled, newly received heifer calves with a high risk of developing BRD into BRD-outcome groups (never treated vs. number of times treated) on feedlot performance and carcass characteristics when heifers in outcome groups were fed to a similar body compositional endpoint. We also determined the effect of number of treatments for BRD on meat shelf-life, tenderness, and palatability.

Results
As the number of antimicrobial treatments for BRD increases, average daily gain in the backgrounding phase decreases, cost-per-unit increases, and net returns decline. Days on feed needed to reach a common 12th rib fat thickness increased by 7 days for every increase in number of antimicrobial treatment required. Increased days on feed, lower final body weight and lower carcass value resulted in an $11.36 loss in income for every time an animal was treated. Decreasing the average number of times an animal is treated for BRD by one treatment would result in a nearly $9 million savings to Oklahoma feedlot cattle producers. In addition, marbling scores, color stability and overall acceptance of the final beef product by consumers decreases as the number of antimicrobial treatments increases.

4. Associated Knowledge Areas

KA Code	Knowledge Area
308	Improved Animal Products (Before Harvest)
311	Animal Diseases

Outcome #5

1. Outcome Measures

Use of distillers grain as livestock feed

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	{No Data Entered}	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
As the U.S. grain ethanol industry continues to expand, the availability of by-products generated from milling processes will increase. Planned ethanol plant constructions within 100 miles of the Oklahoma panhandle could eventually produce 500 million gallons of ethanol per year. Along with ethanol, about 5.7 millions tons of wet distiller's grains plus solubles (approximately 30% dry matter) will be produced per year (~15,333 tons/day). Feeding to livestock appears to be one of the most logical uses of these byproducts. Ruminants have the advantage that they can effectively use the product in a wet form which reduces cost associated with drying, but requires the wet product be used within approximately 100 miles of the ethanol facility to control transportation cost. Therefore, a tremendous opportunity for Oklahoma cattle feeders may be available with a developing grain ethanol industry.

What has been done
In a previous project, distillers replaced up to 30% of steam-flaked corn in traditional high plains feedlot cattle diets with wet distiller's grains. Replacing up to 30% of steam-flaked corn in cattle finishing diets resulted in similar performance and feed utilization to cattle receiving a traditional steam-flaked corn diet. However, this research has demonstrated that feeding levels of wet distiller's grain over 20% of the diet results in decreased consumer acceptability characteristics. The most notable characteristic is a more rapid development of undesirable dark color. In retail markets, dark products prices are reduced for quick sale or the product is discarded. Increased use of high levels of distiller's grain in a high percentage of feedlot cattle diets may significantly decrease retail returns from the sale of beef and further reduce consumer desirability of the product after being purchased. As such, the objectives of this study are to determine the impacts of pre-harvest anti-oxidant supplementation on carcass yield and quality grade factors, as well as the impact of pre and post-harvest management on color stability and consumer acceptability of steaks and ground beef from cattle fed wet distillers grains.

Results
There were no differences in ADG, G:F, and DMI for the pre-vitamin E supplementation period, the vitamin E supplementation period, or over the entire feeding period (P ≥ 0.11). Final BW, HCW, and carcass-adjusted final BW did not differ among treatments (P ≥ 0.06). Carcass characteristics (LM area, fat thickness, calculated YG, and KPH) were not affected by treatment (P ≥ 0.13). Percentage of cattle grading upper 2/3 choice, low choice, and select did not differ (P ≥ 0.57), nor did percentage calculated yield grades 2, 3, and 4 (P ≥ 0.07). Because of the potential impact of this study on color stability, product

was evaluated in modified atmosphere packaging and traditional retail overwrap packages. In each packaging type, data suggests that vitamin E will enhance retail display parameters as evaluated by trained panelists - improved muscle color, decrease in discoloration and higher overall appearance scores - as well as preference as outlined by a consumer panel. Data from this study illustrate that vitamin E can be supplemented in WDGS diets during the last 97 days of the feeding period to target improvements in meat quality with no adverse effects on animal performance or carcass characteristics.

4. Associated Knowledge Areas

KA Code	Knowledge Area
302	Nutrient Utilization in Animals

Outcome #6

1. Outcome Measures

Economic Effects of Genetic Marker Selection and Management in Beef Cattle

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	{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 optimally 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
*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 50% of genetic merit of meat tenderness would result in increased profitability (not counting genetic testing costs) of $4.34/head for feeder cattle and $1.54/head for fed cattle in 20 years. The present value of this 20 year selection strategy is projected to produce economic benefits of $3.5 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

KA Code	Knowledge Area
304	Animal Genome
307	Animal Management Systems
308	Improved Animal Products (Before Harvest)

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.)

Brief Explanation

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

1. Evaluation Studies Planned

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

Evaluation Results

Key Items of Evaluation

V(A). Planned Program (Summary)

Program # 2

1. Name of the Planned Program

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	40%		20%	
133	Pollution Prevention and Mitigation	4%		5%	
201	Plant Genome, Genetics, and Genetic Mechanisms	2%		20%	
204	Plant Product Quality and Utility (Preharvest)	10%		10%	
205	Plant Management Systems	23%		20%	
211	Insects, Mites, and Other Arthropods Affecting Plants	5%		5%	
212	Pathogens and Nematodes Affecting Plants	3%		5%	
213	Weeds Affecting Plants	9%		5%	
215	Biological Control of Pests Affecting Plants	2%		5%	
216	Integrated Pest Management Systems	2%		5%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

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

Year: 2009	Extension		Research	
	1862	1890	1862	1890
Plan	20.0	0.0	6.5	0.0
Actual	22.0	0.0	14.0	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**
275000	0	515058	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
275000	0	515058	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
3100096	0	3553734	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

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

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 and other crop producers and nutraceutical producers.

V(E). Planned Program (Outputs)

1. Standard output measures

2009	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Plan	5000	4000	0	0
Actual	63661	408599	0	0

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

Year: 2009
Plan: 0
Actual: 1

Patents listed
PVP - 'OK Rising'

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2009	Extension	Research	Total
Plan	10	10	
Actual	17	5	22

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Field Demonstrations

Year	Target	Actual
2009	30	105

Output #2

Output Measure

- Varieties of wheat realeased

Year	Target	Actual
2009	1	1

Output #3

Output Measure

- Crop production manuals and production newsletters

Year	Target	Actual
2009	14	42

Output #4

Output Measure

- Cotton weekly crop updates

Year	Target	Actual
2009	12	10

Output #5

Output Measure

- Cotton Web Page

Year	Target	Actual
2009	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	Increase in cotton production in eastern and central Oklahoma
3	Change in acreages that have crop rotations involving wheat
4	Number of acres where minumum or no-till production practices are applied
5	Number of varieties accepted by seed producers and producers to address end-use quality issues
6	Locally-controlled evaluations and agronomic data for oilseed crops
7	Number of wheat varieties accepted by seed producers and producers to address end-use quality issues and critical agronomic challenges
8	Locally-controlled evaluations and agronomic data for small grains crops
9	Increased use of information-based fertility decisions
10	Rapid response to minimize impact from unexpected crop losses due to weather or natural disaster.

Outcome #1

1. Outcome Measures

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 Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	50	45

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
Research indicates overgrazing wheat pasture by just one week can result in a decreased grain yield of up to 25% at harvest and mistiming grazing termination by two weeks will reduce the bushels of wheat at harvest by up to 60%! Given average yield, this equates into a 19 bu/ac loss. At current prices, this amounts to an $85 plus per acre potential loss of income for 'dual-purpose' wheat producers or a $255,000,000 potential annual loss for the state of Oklahoma. 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.

Results
It is estimated that at least 45% 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 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. Thus using the lower number of 45%, even removing cattle only three days earlier than they might have otherwise means use of first hollow stem criteria saved Oklahoma producers at least $20,000,000. This savings is a direct result of OAES research being extended by OCES.

4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems

Outcome #2

1. Outcome Measures

Increase in cotton production in eastern and central Oklahoma

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	1000	5000

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
204	Plant Product Quality and Utility (Preharvest)
205	Plant Management Systems

Outcome #3

1. Outcome Measures

Change in acreages that have crop rotations involving wheat

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	20000	85000

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Continous wheat production made control of grassy weeds almost impossible and costly. Rotations with other crops such as canola have proven efficient for reduction in weed pressures as well as other rotation generated synergies.

What has been done

Results
Canola acres in Oklahoma have double between 2009 and 2010 now at 85,000 from zero 5 years ago. A wheat-wheat-canola rotation is projected to net $20-$30 per acre more than continuous wheat. The result is more than $1,700,000-$2,550,000 of additional net income for Oklahoma producers in 2010.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
204	Plant Product Quality and Utility (Preharvest)
205	Plant Management Systems

Outcome #4

1. Outcome Measures

Number of acres where minumum or no-till production practices are applied

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	1000000	1000000

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.

What has been done
Since 2006, several trials have been initiated to identify profitable crop rotations for no-tillage cropping systems. Scientists will use these locations to characterize changes in soil chemical and physical properties (i.e. carbon sequestration rates). This collaborative project will provide researchers and 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.

Results
From 2007-2009, a no-till cropping systems handbook was published ("No-till Cropping Systems in Oklahoma") and distributed throughout the region. To date over 4,500 copies have been distributed to producers, Extension Educators, and consultants. A minimum of 6 no-till meetings were held around the state with no fewer than a total of 1000 combined attendees. In addition to local meetings, the second annual No-till Oklahoma (state-wide meeting) Conference was held and attended by 275 people from the southern plains region. Two hundred thousand acres were represented at the conference and a post-meeting survey indicated an average benefit of $15 per acre, resulting in an impact of $3,000,000 to the no-till producers in attendance.

Results from a survey sent out to Oklahoma producers through the Oklahoma NASS indicated that 33% of the 1200 respondents practiced no-till. This is a substantial increase compared to the estimated 8% in 2004!

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
133	Pollution Prevention and Mitigation
205	Plant Management Systems

Outcome #5

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	1	2

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
The hard-white wheat cultivars 'Billings' and 'Pete' were released in 2009. Billings offers outstanding disease resistance and superior top-end yield potential. Billings is specifically targeted towards grain-only producers with high-yield potential and will likely achieve high adoption rates in Northcentral OK, Southcentral KS, and irrigated areas of the OK and TX Panhandles.

Pete is an awnless hard red winter wheat that fits the needs of dual-purpose wheat producers who require flexibility. The awnless characteristic allows producers to use this variety exclusively as a forage or hay crop if desired; however, unlike other awnless hard red winter wheat varieties, Pete has good test weight and end-use characteristics which will ensure a quality product leaving OK grain elevators if producers decide to harvest grain as opposed to forage.

4. Associated Knowledge Areas

KA Code	Knowledge Area
201	Plant Genome, Genetics, and Genetic Mechanisms
204	Plant Product Quality and Utility (Preharvest)
205	Plant Management Systems
216	Integrated Pest Management Systems

Outcome #6

1. Outcome Measures

Locally-controlled evaluations and agronomic data for oilseed crops

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	20	0

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, 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.

Grain yield and other agronomic data for each variety of each crop were collected and distributed to stakeholders throughout the southern Great Plains. Over 1,000 stakeholders directly participated in field day activities at these research locations. Five extension publications were published and distributed to a minimum of 500 people via email list serve. Another 500 individuals received hard copies at meeting functions.

Results

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 production in Oklahoma. This information is readily accessible and has the potential to be utilized by thousands of producers trying this relatively "new" crop in Oklahoma. Considerable emphasis has been placed on providing information and technical assistance in production of winter Canola. In 2005 there was no Canola produced in Oklahoma and the 2009 plantings indicate over 80,000 acres of Canola in Oklahoma. In addition a Canola crushing facility has begun operation in the state. This increase in Canola production has been a direct result of OAES research and OCES educational programs.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
204	Plant Product Quality and Utility (Preharvest)
205	Plant Management Systems

Outcome #7

1. Outcome Measures

Number of wheat varieties accepted by seed producers and producers to address end-use quality issues and critical agronomic challenges

Not Reporting on this Outcome Measure

Outcome #8

1. Outcome Measures

Locally-controlled evaluations and agronomic data for small grains crops

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	{No Data Entered}	65

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems

Outcome #9

1. Outcome Measures

Increased use of information-based fertility decisions

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	{No Data Entered}	272000

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Nitrogen fertilizer is the single most expensive crop input for winter wheat producers in Oklahoma. In addition, overuse of nitrogen fertilizers can increase environmental impact of agricultural operations.

What has been done
The Oklahoma State University soil testing lab offers an unbiased, low-cost soil testing service for use by all Oklahoma residents.

Results
The Oklahoma State University Soil Testing Lab analyzed approximately 3,400 soil samples from wheat producers in 2009. Previous experience and soil sampling recommendations indicate that each sample represents approximately 80 acres; therefore, samples analyzed in the lab represent 272,000 acres. Results show an average of 30 lbs of nitrate-N per acre was available for crop use. These data were reported back to stakeholders for a total potential savings of $4,000,000 in nitrogen fertilizer cost to Oklahoma wheat farmers.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
205	Plant Management Systems

Outcome #10

1. Outcome Measures

Rapid response to minimize impact from unexpected crop losses due to weather or natural disaster.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	{No Data Entered}	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
An April freeze destroyed much of the Oklahoma wheat crop in 2009. Farmers and ranchers were forced to make complicated agronomic and economic decisions in a short period of time following the freeze. To complicate matters further, the Average Crop Revenue Election (ACRE) was a brand new option under the farm bill, and the decision regarding whether to choose ACRE or stick with the traditional program choice (DCP) was very complicated and had long-term repercussions. Key provisions in the new ACRE made it beneficial to producers when both state-level, and individual farm-level revenues fell short of historical benchmarks. The damage to the wheat crop from the April freeze meant these criteria would be met for many producers, but due to the complicated

nature of the ACRE program it became clear that many producers would elect to stick with the traditional program even though it might not be in their best financial interest.

What has been done
OSU Cooperative Extension specialists with expertise in agronomy, agricultural economics, and agricultural policy worked together to ensure that farmers and ranchers had the necessary information make decisions that would best serve their short and long-term financial interests. The OSU Wheat Multi-Use team developed and distributed freeze injury guides that helped producers identify freeze injury and assess percent damage. Samples were collected from replicated variety trials and random grower fields across the state and analyzed for freeze injury. Results were reported to stakeholders via electronic newsletter and mass media presentations.
The OSU Ag Policy team developed decision making tools and conducted an education programming effort regarding the ACRE program throughout the summer of 2009.

Results
The 2009 ACRE sign-up ended on August 14, 2009. The tool was widely used by Oklahoma Area Extension Specialists, County Extension Educators, and producers. For the 2009 ACRE program, Oklahoma had one of the highest participation rates in the country with over 12,000 producers submitting over 60,000 farm applications. About 25% of eligible FSA contracts in Oklahoma were enrolled in the ACRE program, compared to 7.7% for the entire nation. This represented over 33% of the acres. On average it is estimated that ACRE enrollees will collect over $45.00 per acre in Federal payments for the 2009 crop year, compared to around $15.00 per acre on acres enrolled in the DCP program. Overall, participating producers in Oklahoma will receive an estimated $113 million more income than had they not participated in the new ACRE program (after accounting for the loss in direct payments). This could lead to an estimated $238 million increase in economic activity for Oklahoma (about 2.1% of state GDP). Producers and federal agencies have expressed appreciation for the decision tool and willingness of county, area and state extension educators to work individually to understand the alternatives and consequences with objective, scientific information and tools.

4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems

V(H). Planned Program (External Factors)

External factors which affected outcomes
- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Public Policy changes
- Government Regulations

Brief Explanation

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

1. Evaluation Studies Planned

- Before-After (before and after program)
- During (during program)

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%		13%	
206	Basic Plant Biology	0%		14%	
211	Insects, Mites, and Other Arthropods Affecting Plants	0%		5%	
212	Pathogens and Nematodes Affecting Plants	0%		33%	
	Total	0%		100%	

V(C). Planned Program (Inputs)

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

Year: 2009	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	0.0	10.0	0.0
Actual	0.0	0.0	13.0	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	463552	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
0	0	463552	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
0	0	3198360	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

2009	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Plan	75	150	50	0
Actual	0	0	0	0

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

Year: 2009
Plan: 2
Actual: 1

Patents listed
Phytohormone coronatine as a harvest aid.

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2009	Extension	Research	Total
Plan	0	11	
Actual	0	25	25

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Grant proposals written and submitted

Year	Target	Actual
2009	22	14

Output #2

Output Measure

- Peer-reviewed publications including journal articles

Year	Target	Actual
2009	27	18

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Graduate students graduated

Outcome #1

1. Outcome Measures

Graduate students graduated

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	5	2

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Plant productivity provides the foundation for human food and fiber production and knowledge of the basic mechanisms of plant growth is requisite for continued development of human society. Technologies associated with plant growth are based on knowledge developed by scientists that are trained in university formal graduate programs.

What has been done
Graduate programs in the plant sciences have been developed and are operated through several academic departments.

Results
Graduate students with M.S. and/or Ph.D. degrees graduate from programs partially funded through these programs and these students move into careers in academia and industry.

4. Associated Knowledge Areas

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

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

Brief Explanation

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

1. Evaluation Studies Planned

    - During (during program)

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	11%		10%	
202	Plant Genetic Resources	1%		10%	
204	Plant Product Quality and Utility (Preharvest)	11%		15%	
205	Plant Management Systems	50%		35%	
502	New and Improved Food Products	7%		20%	
901	Program and Project Design, and Statistics	5%		5%	
903	Communication, Education, and Information Delivery	15%		5%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

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

Year: 2009	Extension		Research	
	1862	1890	1862	1890
Plan	14.0	0.0	5.0	0.0
Actual	16.0	0.0	4.0	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**
200000	0	154517	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
200000	0	154517	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
2400000	0	1066120	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 &ndash 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

2009	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Plan	140000	1200000	2500	0
Actual	95488	1427089	3414	32000

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

Year: 2009
Plan: 0
Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2009	Extension	Research	Total
Plan	5	5	
Actual	5	15	20

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- New Master Gardeners trained

Year	Target	Actual
2009	200	313

Output #2

Output Measure

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

Year	Target	Actual
2009	3	16

Output #3

Output Measure

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

Year	Target	Actual
2009	6	36

Output #4

Output Measure

- Number of statewide "Oklahoma Gardening" shows produced

Year	Target	Actual
2009	40	35

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

Outcome #1

1. Outcome Measures

Number of horticultural crop producers newly certified as organic

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	3	9

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
204	Plant Product Quality and Utility (Preharvest)
205	Plant Management Systems
502	New and Improved Food Products

Outcome #2

1. Outcome Measures

Number of volunteer hours provided to community horticulture programs statewide

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	20000	65417

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 26 counties participating in the program as of January 2010. The following data was provided by 22 of the 26 counties. Approximately 313 new Master Gardeners were trained during the 2009 training season. Close to 1,208 active Master Gardeners volunteered their time, contributing approximately 65,417 volunteer hours resulting in over 5,160,263 educational interventions with Oklahomans and as many as 1,200+ educational and community programs and activities being conducted in their communities in 2009. This translates to over $1,059,101 in service that was donated by volunteers (wage rate of $16.19/hour was used, which includes a 12% estimate of fringe benefits. This hourly rate is the assigned wage for nonagricultural workers in 2007 for the state of Oklahoma as published 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

KA Code	Knowledge Area
124	Urban Forestry
205	Plant Management Systems
903	Communication, Education, and Information Delivery

Outcome #3

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	22500	1160265

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Public concern for the environment continues to increase. Traditional landscape management practices have involved extensive use of pesticides, fertilizers, and other materials that could harm the environment if not used properly. Integrated Pest Management (IPM) uses biological principles, cultural practices, and some chemicals to control pest populations with minimal environ¬mental impact.

What has been done
Over 1000 IPM workshops, educational programs/seminars and Oklahoma Gardening segments are used to educate the public of IPM practices and other related gardening topics.

Results
Homeowners are better educated and can make choices in maintaining the landscape that are more environmentally friendly; approximately 125 commercial growers/retailers received IPM training - training influences consumers.

4. Associated Knowledge Areas

KA Code	Knowledge Area
124	Urban Forestry
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
- Competing Public priorities
- Competing Programmatic Challenges
- Populations changes (immigration, new cultural groupings, etc.)

Brief Explanation

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

1. Evaluation Studies Planned

- After Only (post program)
- Retrospective (post program)
- During (during program)

Evaluation Results

Key Items of Evaluation

V(A). Planned Program (Summary)

Program # 5

1. Name of the Planned Program

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
102	Soil, Plant, Water, Nutrient Relationships	10%		10%	
111	Conservation and Efficient Use of Water	5%		10%	
112	Watershed Protection and Management	10%		15%	
121	Management of Range Resources	13%		15%	
123	Management and Sustainability of Forest Resources	15%		10%	
133	Pollution Prevention and Mitigation	5%		10%	
134	Outdoor Recreation	6%		5%	
135	Aquatic and Terrestrial Wildlife	10%		5%	
136	Conservation of Biological Diversity	3%		5%	
403	Waste Disposal, Recycling, and Reuse	5%		5%	
605	Natural Resource and Environmental Economics	18%		10%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

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

Year: 2009	Extension		Research	
	1862	1890	1862	1890
Plan	8.0	0.0	12.0	0.0
Actual	11.0	0.0	15.0	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**
119000	0	549396	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
119000	0	549396	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
1459000	0	3790649	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

- A new Water Center was created

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
- 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), land owners, farmers, ranchers, communities, consumers, land developers, state legislators, commodity groups, community leaders

V(E). Planned Program (Outputs)

1. Standard output measures

2009	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Plan	400	550	200	200
Actual	19001	40588	4045	3050

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

Patent Applications Submitted

Year: 2009
Plan: 0
Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2009	Extension	Research	Total

Plan	10	10	
Actual	25	42	67

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Grant proposals written and submitted

Year	Target	Actual
2009	12	31

Output #2

Output Measure

- Manuscripts submitted for consideration of peer-reviewed publication

Year	Target	Actual
2009	15	42

Output #3

Output Measure

- Extension conferences, workshops and training sessions

Year	Target	Actual
2009	30	158

Output #4

Output Measure

- Research and Extension reports and fact sheets

Year	Target	Actual
2009	10	15

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	Percentage of poultry producers using at least one waste management BMP
3	Number of manure test conducted for land application by confined animal operations
4	Percantage of poultry opeartions conducting soil testing at least every other year
5	Peer-reviewed publications
6	Large Animal Carcass Composting
7	Number of people receiving Stream Stewardship Education
8	Number of Master Naturalists Trained
9	Deliberative Forum Framework for Water Issues
10	Water Conservation Programming and Website

Outcome #1

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	900	1126

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
112	Watershed Protection and Management
133	Pollution Prevention and Mitigation
403	Waste Disposal, Recycling, and Reuse

Outcome #2

1. Outcome Measures

Percentage of poultry producers using at least one waste management BMP

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	75	90

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
112	Watershed Protection and Management
133	Pollution Prevention and Mitigation

Outcome #3

1. Outcome Measures

Number of manure test conducted for land application by confined animal operations

Not Reporting on this Outcome Measure

Outcome #4

1. Outcome Measures

Percantage of poultry opeartions conducting soil testing at least every other year

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	92	93

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
112	Watershed Protection and Management
133	Pollution Prevention and Mitigation

Outcome #5

1. Outcome Measures

Peer-reviewed publications

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	10	42

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
111	Conservation and Efficient Use of Water
112	Watershed Protection and Management
121	Management of Range Resources
123	Management and Sustainability of Forest Resources
133	Pollution Prevention and Mitigation
134	Outdoor Recreation
135	Aquatic and Terrestrial Wildlife
136	Conservation of Biological Diversity
605	Natural Resource and Environmental Economics

Outcome #6

1. Outcome Measures

Large Animal Carcass Composting

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	{No Data Entered}	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Livestock mortality is an issue faced by every livestock farming operation, both large and small. For many producers, carcass disposal options are limited and can be costly. Improper disposal of dead animal carcasses, and the resulting leachate (carcass runoff), can negatively impact surface and groundwater. Additionally, state regulations exist regarding the proper disposal of livestock mortalities. One state approved procedure that livestock producers may not be familiar with is composting which creates a valuable by-product that can be returned to the soil as a fertilizer source.

What has been done
An Extension research project funded through the team initiative project (TIP) was designed and developed to research the efficacy of three bulking agents for composting stocker calf carcasses and demonstrate the results through Extension outreach programs. Following the study, a producer field day was held to share results with 36 producers that attended. A 45 minute presentation on the study was developed as part of the state mandatory Poultry Waste Management Education (PWME) program targeting 1200+ poultry producers and waste applicators, many of which raise livestock, and are required to receive 3 hours of continuing education units (CEU) each year. This presentation was given at 18 PWME meetings throughout the state. Research findings were also shared at Langston University's Goat Composting Workshop. Additionally, oral presentations of the research have been presented at the 3rd International Symposium: Management of Animal Carcasses, Tissues and Related By-Products held at UC-Davis, CA and the 2009 National Association of County Ag Agents Meeting and Conference in Portland, OR. Invited presentations for 2010 include the US Composting Council Annual Meeting in Orlando, FL, the Midwest American Society of Animal Science Annual Meeting in Des Moines, IA, the Kansas, Oklahoma, Missouri, Arkansas (KOMA) beef cattle conference in Joplin, MO and the Oklahoma Women in Ag Conference. The study was also featured on OSU's SUNUP agriculture television program. A paper was published in the 3rd International Symposium: Management of Animal Carcasses, Tissues and Related By-Products Proceedings. In addition, a journal article for Compost Science and an OSU Fact Sheet are currently in preparation for submission and publication. The presentation will also be added to the 2010 OSU Master Cattleman course as an elective chapter. Last, an in-service workshop was held at the OCES annual conference with approximately 17 attendees.

Results
Large animal carcass disposal remains a problem throughout the US. For many livestock producers, carcass disposal options are limited and can be costly. Improper carcass disposal can degrade surface and groundwater and result in increased disease transmission, endangering the health of humans, domestic livestock, wildlife and

pets. Composting dead animal mortalities is an inexpensive, biosecure and environmentally sound approach to addressing the issue of carcass disposal. An on-farm large animal composting study was conducted to determine the efficacy of 3 bulking agents for composting stocker calf carcasses. The treatments consisted of pine shavings (Trt. A), a 50:50 mixture of poultry litter and pine shavings (Trt. B), and hay (Trt. C). Each treatment was replicated 4 times. Twelve separate compost bins were constructed and carcasses were placed on the center of an 8 x 8 x 2 ft. pad of bulking agent. Carcasses were covered until completely surrounded with at least 18 in. of additional treatment. The piles were left undisturbed while temperature was monitored using long-stem thermometers and data loggers. On days 75 and 150, each pile was turned. Samples were collected on day 150 for nutrient analysis. Significant C reductions were observed in Trts. B and C while significant increases in N were observed for all 3 Trts. Temperature range and mean for Trts. A, B, and C were (62.69 to 149.32; 122.59°F), (76.33 to 158; 130.19°F), and (40.68 to 132.67; 90.95°F), respectively. Treatments A and B formed a humus-like product, maintained sufficiently high temperatures required for effective pathogen kill (above 131°F), and were more effective at decomposing bones when compared to Trt. C.

4. Associated Knowledge Areas

KA Code	Knowledge Area
133	Pollution Prevention and Mitigation
403	Waste Disposal, Recycling, and Reuse

Outcome #7

1. Outcome Measures

Number of people receiving Stream Stewardship Education

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	{No Data Entered}	18351

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Streams are an important and highly vulnerable part of the landscape. The great majority of landowners and managers have no concept of how streams function. They don't see the link between their actions and stream channel stability or degradation. This lack of understanding is the foundation for widespread stream degradation throughout the state. Stream degradation causes serious ecological, esthetic and economic damage in the form of land loss, increased flooding, loss of fish habitat, and increased sedimentation. The costs of restoring impaired streams to proper functioning condition ranges from a bare minimum of $100 per linear foot to as high as $2,200 per linear foot. Viewed in these terms, prevention of stream degradation is extremely cost-effective.

What has been done
Stream hydrology trailers are highly engaging educational tools in which flowing water cuts through a bed of plastic grit to model stream processes. A wide variety of audiences have received live-action instruction in stream system function and necessary stewardship practices. Because trailers are located throughout the state, travel budgets are conserved and audiences continue to be able to be served. Participants observe the negative impacts of removing

riparian vegetation, modifying stream channels and the danger of building in floodplains, lending an understanding of causes and effects through compressed time observation.

Youth and adult audiences learn about streams from Extension educators at outdoor conservation classrooms, schools, landowner meetings, and other educational venues. Training sessions for Extension Service and other agency professionals were held to increase the number of instructors. The scope of usefulness of the trailers was increased through development of a model flood control retention structure with which landowners can be instructed in the proper maintenance and safe use of flood control impoundments.

Results
The seeds of change were sown in the minds of 18,351 Oklahomans in 2009 by the stream hydrology education program. Increasingly Oklahomans are learning to understand how streams work and the steps needed to maintain good stream health. When faced with a stream management decision, the odds are increasing that they will recall the need to tread gently lest they set in motion a chain of destructive changes they will regret. If only one tenth of one percent of the audience reached implements proper stewardship practices on 1000 linear feet of stream per person, then the potential cost savings resulting from avoiding the expense of stream restoration would be $1,800,000.

4. Associated Knowledge Areas

KA Code	Knowledge Area
112	Watershed Protection and Management
133	Pollution Prevention and Mitigation

Outcome #8

1. Outcome Measures

Number of Master Naturalists Trained

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	{No Data Entered}	300

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The percentage of Oklahomans who live in urban settings is large and increasing each year. Isolation from nature is especially detrimental to younger individuals who are not able to explore and experience the natural world during their formative years. Middle-aged and older Oklahomans typically have had positive outdoor experiences and do value natural environments. The aging of the baby boom is producing a growing number of early retirement age individuals hungry to learn more about nature and share their knowledge with others.

What has been done

With the cooperation of the Oklahoma County and Tulsa County Cooperative Extension Centers, two Master Naturalist Chapters are supported which offer educational programs, promote and organize trainings for new members and screen and coordinate worthwhile volunteer projects.

Results
Approximately 300 Oklahomans have gone through Master Naturalist basic workshops. Chapter meetings are held in Oklahoma City and Tulsa which feature educational programs. Volunteer projects in 2009 included educational efforts at the Wildlife Expo in Guthrie which reached more than 10,000 people. Volunteers also worked to monitor restored wetlands in cooperation with the U.S. Fish and Wildlife Service, surveyed bird populations at Arcadia Lake in cooperation with the Oklahoma Department of Wildlife Conservation, and were docents at Martin Park Nature Center and Oxley Nature Center. Volunteer hours in 2009 totaled 2808. At the recognized rate of $20.25 per hour (independentsector.org), this volunteer work is valued at $56,862. There are numerous other benefits of the volunteer work accomplished which are far in excess of this amount. Among these are increased understanding and recreational use of natural resources with resultant enjoyment, relaxation and health benefits as well as increased business for local economies.

4. Associated Knowledge Areas

KA Code	Knowledge Area
112	Watershed Protection and Management
121	Management of Range Resources
123	Management and Sustainability of Forest Resources
134	Outdoor Recreation
135	Aquatic and Terrestrial Wildlife
136	Conservation of Biological Diversity

Outcome #9

1. Outcome Measures

Deliberative Forum Framework for Water Issues

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	{No Data Entered}	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
There is no shortage of controversial issues related to water in Oklahoma. While the Comprehensive State Water Plan process brought an executive focus to the subject, judicial actions continue between Oklahoma and Arkansas, and Oklahoma and Texas. Within the state, water issues include state vs. tribal water rights, transfer of water rights, whether across a neighbor's property lines or across counties, aquifer depletion and recharge, water valuation, and competition for water use from multiple users.

Stories abound of angry, frustrated citizens who feel they have little power to influence important public decisions affecting their lives. This frustration is often characterized as apathy with little effort made to look deeper at the desire of regular people to express their views on public issues but believe they do not have a venue to do so.

Public deliberative forums allow an opportunity for interested parties to come together to learn more, to inform each other, to air their concerns, to weigh alternative approaches in a constructive manner, to reduce threats, to identify consequences of various policy directions and the associated tradeoffs, and to possibly find common ground for action. It allows the Extension professional to be viewed as a neutral, honest broker or facilitator who helps the community work toward solutions to tough issues.

What has been done
During 2007-2009 the Environmental Quality and Water Management Impact Team developed an issue guide for deliberative forums on water, Drawing Straws: Working Together to Manage Oklahoma's Growing Demand for Water, and provided the opportunity for Extension educators and their community partners to convene these forums. Opportunities were also provided to receive the corresponding moderator and recorder training to conduct these forums. The issue guide discusses three possible approaches to managing Oklahoma's water: (1) Allow water to be bought and sold in a free market like any commodity; (2) Promote conservation to balance water demands with water supply; and (3) Allow government - with public guidance - to treat water as a common good. The framework serves as a resource for Extension educators to provide understanding and awareness of water resource issues across OCES program areas. Seventeen deliberative forums were held in 12 different Oklahoma communities: Ada, Claremore, Hobart, Hugo, Oklahoma City, Poteau, Shawnee, Slaughterville, Stillwater, Tishomingo, Tonkawa, and Weatherford. Five extension professionals convened, moderated, and/or recorded forums and one educator completed the moderator/recorder training. Approximately 150 individuals attended forums and their ages ranged from 17 or younger to 65 or older.

Results
Some Common Ground for Action was heard at multiple forums across the state

*Dialogue on the issue of water needs to continue across the state
*Conservation education, beginning with the youth, is very important
*Education on water and its importance is critical
*One approach will not meet all needs, a combination of all three approaches is needed
Based on post-forum questionnaires completed by participants, the following impacts are projected for Oklahoma:

*42% of participants somewhat disagreed with the statement "state-mandated water conservation across all areas will damage Oklahoma's agricultural industry"
*48% of participants somewhat favored the action "require meters on all pumps permitted by the OWRB to measure water use and monitor water waste"
*64% of participants strongly favored the action "provide conservation incentives to the state's largest water users"
*54% of participants strongly favored the statement "we are willing to decrease our use of water EVEN IF doing so will require more sacrifice on some people, areas, and business sectors than others"
*56% of participants said they think differently about Oklahoma water now that they have participated in the forum
oComments from participants show they now have an increased awareness of the issue, a better understanding of its complexity, and are now considering more than one side of the issue
*61% of participants said they talked about different aspects of the issue of water in their forum that they had not considered before.
oSome of the new aspects considered include: groundwater ownership, water as a commodity, water shortages, and private sales of water

4. Associated Knowledge Areas

KA Code	Knowledge Area
111	Conservation and Efficient Use of Water

112	Watershed Protection and Management
136	Conservation of Biological Diversity

Outcome #10

1. Outcome Measures

Water Conservation Programming and Website

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	{No Data Entered}	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Water is a critical natural resource, essential for economic development and a desirable quality of life. Currently, few residents or water utility managers understand the potential for water conservation and its impact on the State. This project has evaluated the knowledge level and potential acceptability of water conservation technologies among water users and water suppliers across the State. The project found that water suppliers are largely unaware of the potential water savings and cost savings available from water conservation alternatives. Information on the value of water and the cost-effectiveness of individual conservation tools is needed to help water users and water managers make sound decisions.

What has been done
This project began in 2008, with a review of available literature and other education materials, and brainstorming sessions with county educators. Then, we followed with an intensive survey of virtually all water suppliers in the state. Results have been presented in in-service training sessions and educational programs on at least 9 occasions throughout the state. We have published one peer-reviewed article, one white paper for use at the Oklahoma Comprehensive Water Plan Update town hall in 2010, and one OSU fact sheet on water conservation tools; held one Southern Region water resources conference; and designed a water conservation website to warehouse educational materials to support extension programs in water conservation. The website, in particular, will project research-based information to water conservation to communities, households, and farms, helping them make better decisions for cost savings and conserving resources.

Results
Water conservation can be very cost-effective for water utilities and households. Some programs have achieved nearly 14:1 benefit-cost ratios. Implementation of results from this project has the potential to save Oklahoma households approximately $197 per year by adopting off-the-shelf water conserving technologies assuming current water rates. This equates to a savings of $263 million dollars per year for Oklahoma households and as much as $250 million for utilities.
This project is the first to provide a basis for implementing water conservation tools in the small water utilities and rural communities of Oklahoma and the surrounding states. Through a comprehensive survey this project identified that education, awareness of conservation tools, and technical expertise were the primary barriers to

small and rural water utilities adopting conservation practices. Also, the survey showed that although water conservation is very cost-effective (e.g., high benefit-cost ratios) alternative to expanding traditional supplies, use rates for price-based and non-price-based water conservation tools has been very low.
These results have been shared with the Oklahoma Water Resources Board and other stakeholders. Materials generated from this project address critical gaps in stakeholders' knowledge on an important natural resource issue, and can improve accessibility and efficient use of the resource. The materials have been the basis for presentations to the Oklahoma Water Resources Board, residents participating in the Oklahoma Comprehensive Water Planning process, the Oklahoma Ag Leadership program, and other natural resource and agricultural leaders and decision makers in the state. They have also been incorporated into materials used by the Oklahoma Water Resources Board and the Oklahoma Water Resources Research Institute during their deliberative process to update the state's water policy. Finally, OCES now has a trained core of interdisciplinary field staff and state specialists to lead education efforts on water conservation. The materials and outline for online or campus in-service activities are ready for implementation. Some of the more critical aspects are now part of the state water plan as it moves toward recommendation and resulting implementation public policy.

4. Associated Knowledge Areas

KA Code	Knowledge Area
111	Conservation and Efficient Use of Water

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

Brief Explanation

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

1. Evaluation Studies Planned

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

Evaluation Results

Key Items of Evaluation

V(A). Planned Program (Summary)

Program # 6

1. Name of the Planned Program

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	5%		5%	
401	Structures, Facilities, and General Purpose Farm Supplies	10%		5%	
403	Waste Disposal, Recycling, and Reuse	2%		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	20%		10%	
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources	9%		10%	
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins	20%		20%	
723	Hazards to Human Health and Safety	4%		10%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

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

Year: 2009	Extension		Research	
	1862	1890	1862	1890
Plan	1.5	0.0	8.0	0.0
Actual	1.3	0.0	10.0	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**
20000	0	377709	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
20000	0	377709	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
1030000	0	2606071	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

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

2. Brief description of the target audience

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

V(E). Planned Program (Outputs)

1. Standard output measures

2009	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Plan	450	7500	0	0
Actual	2354	55936	0	0

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

Patent Applications Submitted

Year: 2009
Plan: 0
Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2009	Extension	Research	Total

Plan	5	7	
Actual	16	70	86

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Peer-reviewed journal articles
  Not reporting on this Output for this Annual Report

Output #2

Output Measure

- Number of conferences and other extension outreach presentations

Year	Target	Actual
2009	8	124

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

Outcome #1

1. Outcome Measures

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

Not Reporting on this Outcome Measure

Outcome #2

1. Outcome Measures

Number of food processors implementing new technologies or technology improvements

Not Reporting on this Outcome Measure

Outcome #3

1. Outcome Measures

New products produced

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	1	1

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Control of food borne pathogens in livestock is important in helping assure microbial safety of the meat supply. Inclusion of direct fed microbials in diets of livestock may beneficially influence the immune system of the animals and thus exert control on the food borne pathogens that may reside in their intestines. Not only has the presence of pathogens such as Escherichia coli 0157:H7 and Salmonella in meat products led to incidences of food-borne illnesses, such organisms have cost the meat industry millions of dollars in recalling products found to be contaminated with these pathogens.

What has been done
Feeding trials have been done involving beagle puppies. The treatment group were fed a selected direct fed microbial (probiotic). Immunoglobulins and blood biochemistries were evaluated for both control (no) and treatment groups.
Several cultures of lactobacilli were fed to different groups of young pigs in an effort to select one or more that could beneficially impact the immune system of the animals. Although the data have not all been analyzed there

appears to be differences among the cultures with respect to influence on the animals.

Results

There were no significant differences between the two groups of puppies in terms of the health factors measured.

4. Associated Knowledge Areas

KA Code	Knowledge Area
502	New and Improved Food Products
701	Nutrient Composition of Food

Outcome #4

1. Outcome Measures

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 Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	25	1

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Pesticides are used to fumigate grain storage facilities and the pesticides used are often toxic to humans. Fumigation of large concrete grain silos is difficult and dangerous. Workers and managers of storage facilities would like to have the safest fumigation systems available.

What has been done
A closed loop fumigation system was installed in a concrete silo facility in Broken Arrow, OK. The system reduces loss of fumigant to the environment.

Results
The installation of the system was managed to save approximately $5000 in installation costs. The system will provide a safer working environment for workers and reduce liability to the company from worker safety and reduced impact on the neighborhood environment.

4. Associated Knowledge Areas

KA Code	Knowledge Area
216	Integrated Pest Management Systems

401	Structures, Facilities, and General Purpose Farm Supplies
503	Quality Maintenance in Storing and Marketing Food Products
723	Hazards to Human Health and Safety

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.)

Brief Explanation

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

1. Evaluation Studies Planned

- After Only (post program)
- Before-After (before and after program)
- Comparison between locales where the program operates and sites without program intervention

Evaluation Results

Key Items of Evaluation

V(A). Planned Program (Summary)

Program # 7

1. Name of the Planned Program

Family Resiliency and Economic Well-Being and 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
602	Business Management, Finance, and Taxation	1%		0%	
607	Consumer Economics	1%		0%	
703	Nutrition Education and Behavior	31%		0%	
724	Healthy Lifestyle	22%		0%	
801	Individual and Family Resource Management	15%		0%	
802	Human Development and Family Well-Being	29%		0%	
806	Youth Development	1%		0%	
	Total	100%		0%	

V(C). Planned Program (Inputs)

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

Year: 2009	Extension		Research	
	1862	1890	1862	1890
Plan	40.0	0.0	0.4	0.0
Actual	61.0	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**
480000	0	0	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
480000	0	0	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
6300000	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

2009	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Plan	2000	150000	3000	2000
Actual	246200	305180	61323	102590

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

Year: 2009
Plan: 0
Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2009	Extension	Research	Total
Plan	0	0	
Actual	8	3	11

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

● Revised online curriculum

Year	Target	Actual
2009	1	3

Output #2

Output Measure

- Promotional materials and marketing campaign

Year	Target	Actual
2009	1	123

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 plan to utilize recommended financial management practices
3	Participants plan to manage their use of credit and/or reduce debt
4	Participants will plan or revise an asset building strategy
5	Participants will utilize recommended financial management practices
6	Participants will manage their use of credit and reduce debt
7	Participants in assest building classes will have bought a home, started a savings account, started a retirement account, started a business, or made a positive change in their financial process
8	Adults receiving the program will attain increased interpersonal cognitive problem-solving skills
9	Adults receiving the program reporting increased use of interpersonal cognitive problem-solving skills with cheldren/youth
10	Children and youth receiving the program will increase use of interpersonal cognitive problem-solving skills
11	Healthy Oklahoma Youth
12	Farm To You
13	Health care savings from improved nutrition
14	Number of Families Participating in Parent Child Connections Program each year

Outcome #1

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	240	78975

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Food and Fun for Everyone - 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. 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
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 2009, the program served 27,457 low-income youth. The program is delivered primarily by CNEP paraprofessionals in school settings.

Results
Paired t-test of pre-post student questionnaire responses revealed positive, significant ($p < 0.50$) behavior changes in third grade children for six of the eight behaviors (hand washing, drinking water, consuming dairy foods, and eating fruit, vegetables and whole grains). Fourth grade students reported positive, significant ($p < 0.50$) changes in seven of the eight behaviors (same as third grade with addition of eating breakfast more often).

4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior
724	Healthy Lifestyle

Outcome #2

1. Outcome Measures

Participants plan to utilize recommended financial management practices

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	250	3604

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Oklahoma merchants lose millions of dollars each year as a result of bogus or insufficient fund checks. In 2007, the District Attorney's Office for District 6 of Oklahoma (Caddo, Grady, Jefferson and Stephens Counties) received 9,623 bogus checks. Because of Oklahoma Cooperative Extension's track record with Financial Management Education programs, a representative of the DA's office approached the FCS educator in Grady County about a partnership to provide financial management training for Bogus Check offenders.

What has been done
At the request of the District Attorney's office, a four-hour class was developed to provide individuals with the opportunity to improve their financial management skills and gain knowledge about financial opportunities. Objectives of the Making $ense of Money Management program are: Help individuals develop their financial management skills, including: Maintain/balance a checking account; Develop and maintain a household financial management plan; and Build confidence in managing finances; and Decrease recidivism of Bogus Check offenders. Each district court has mandated that convicted bogus check writers attend the class.

Results
In 2008, five classes were held in Grady, Caddo and Stephens County with 53 participants completing the class. Pre-test results

BehaviorPercentage
Spend more than they would like56.7%
Pay bills on time81.1%
Satisfaction with current financial situation32.4%
Current Level of Financial StressPercentage
Live from paycheck to paycheck56.8%
Could not find the money to pay for a financial emergency of $1,00072.6%
Goals for the next 12 monthsPercentage
Want to save for a specific goal62.2%
Save for an emergency fund56.8%
Reduce debt (goal ranged from $150 to $12,000)64.8%

A relatively small number of participants (16.2%) indicated that their level of household debt had increased over the past 12 months. The increase ranged from $165 to $7,800.

Follow-up survey 3-6 months following class

Although the number of responses was small (n=7), the results were encouraging. Participants show an increase in their feeling of satisfaction (6 to 7.4) and a lowered level of stress (7.6 to 6.7). Three respondents indicated they have reduced household debt and one indicated an increase in household savings. In general, the participants indicated that the information they received in the class was helpful in contributing to their increase level of satisfaction.

4. Associated Knowledge Areas

KA Code	Knowledge Area
602	Business Management, Finance, and Taxation
607	Consumer Economics

Outcome #3

1. Outcome Measures

Participants plan to manage their use of credit and/or reduce debt

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	300	1276

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Oklahoma merchants lose millions of dollars each year as a result of bogus or insufficient fund checks. In 2007, the District Attorney's Office for District 6 of Oklahoma (Caddo, Grady, Jefferson and Stephens Counties) received 9,623 bogus checks. Because of Oklahoma Cooperative Extension's track record with Financial Management Education programs, a representative of the DA's office approached the FCS educator in Grady County about a partnership to provide financial management training for Bogus Check offenders.

What has been done
At the request of the District Attorney's office, a four-hour class was developed to provide individuals with the opportunity to improve their financial management skills and gain knowledge about financial opportunities. Objectives of the Making $ense of Money Management program are: Help individuals develop their financial management skills, including: Maintain/balance a checking account; Develop and maintain a household financial management plan; and Build confidence in managing finances; and Decrease recidivism of Bogus Check offenders. Each district court has mandated that convicted bogus check writers attend the class.

Results
In 2009, classes were held in Grady, Caddo and Stephens County with 89 participants completing the class.

Comments from the end-of-class surveys show the program is changing attitudes:
"This class gave me hope. I can improve my situation."
"I am going to encourage my teenage daughter to take this class. I didn't know how to help her with money questions."
"My thoughts on saving money have changed - I'm gonna start a savings account."
"I will write down all $ transactions. I'm going to have a positive balance at the end of the month!"

Pre-test results Behavior Percentage
Spend more than they would like 56.7%
Pay bills on time 81.1%
Satisfaction with current financial situation 32.4%
Current Level of Financial Stress Percentage
Live from paycheck to paycheck 56.8%
Could not find the money to pay for a financial emergency of $1,000 72.6%
Goals for the next 12 months Percentage
Want to save for a specific goal 62.2%
Save for an emergency fund 56.8%
Reduce debt (goal ranged from $150 to $12,000) 64.8%
A relatively small number of participants (16.2%) indicated that their level of household debt had increased over the past 12 months. The increase ranged from $165 to $7,800.

Follow-up survey 3-6 months following class
Although the number of responses was again small, the results remain encouraging. Participants show an increase in their feeling of satisfaction (6 to 7.4) and a lowered level of stress (7.6 to 6.7). Three respondents indicated they have reduced household debt and one indicated an increase in household savings. In general, the participants indicated that the information they received in the class was helpful in contributing to their increase level of satisfaction.

4. Associated Knowledge Areas

KA Code	Knowledge Area
602	Business Management, Finance, and Taxation
607	Consumer Economics
801	Individual and Family Resource Management

Outcome #4

1. Outcome Measures

Participants will plan or revise an asset building strategy

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	180	567

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
With low incomes relative to the U.S. as a whole, achieving and maintaining a desirable and sustainable quality of life in Oklahoma is difficult. Poverty rates exceed 11% of Oklahomans in general and reach as high as 21% or more for families with children under 5 and over 50% of those household when it is a female-headed household. And it is not only those individuals and household with children that face financial difficulties. Over 20% of households, age 65 or over, are living on less than $17,000 per month. As with the rest of the nation, Oklahoma faces a shrinking middle class. Its citizens, youth included, face an ever increasing complex financial world with fewer and fewer tools available to handle the issues they face. The results are increases in bankruptcy filings, both personal and business, as well as the general feeling of financial insecurity--which may include inadequate planning for (and funding of) current and future income needs, inadequate insurance, excessive debt, and lack of wealth accumulation. These issues not only affect the welfare of the family, but the economic prosperity of the community and state as well.

What has been done
Specific programs on Home-Buyer Education: Dallas Field Trip, and Food Business Basic Training along with other specific entrepreneurship and retirement programs have been offered alone or in partnership with other agencies.

Results
Based on earlier work, 62% of individuals think they will open their own business at some time in their lives. Nearly 90% anticipate owning their own home. And 75% anticipate a good retirement.

4. Associated Knowledge Areas

KA Code	Knowledge Area
602	Business Management, Finance, and Taxation
607	Consumer Economics
801	Individual and Family Resource Management

Outcome #5

1. Outcome Measures

Participants will utilize recommended financial management practices

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	0	242

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

With low incomes relative to the U.S. as a whole, achieving and maintaining a desirable and sustainable quality of life in Oklahoma is difficult. Poverty rates exceed 11% of Oklahomans in general and reach as high as 21% or more for families with children under 5 and over 50% of those household when it is a female-headed household. And it is not only those individuals and household with children that face financial difficulties. Over 20% of households, age 65 or over, are living on less than $17,000 per month. As with the rest of the nation, Oklahoma faces a shrinking middle class. It's citizens, youth included, face an ever increasing complex financial world with fewer and fewer tools available to handle the issues they face. The results are increases in bankruptcy filings, both personal and business, as well as the general feeling of financial insecurity--which may include inadequate planning for (and funding of) current and future income needs, inadequate insurance, excessive debt, and lack of wealth accumulation. These issues not only affect the welfare of the family, but the economic prosperity of the community and state as well.

What has been done

Results
Results - Comparing studies of the participant's behaviors in this area This translates into behavioral changes, from when they first take classes through follow-up surveys, to 7% (242) more individuals paying their bills on time to 19% (656) individuals who have reduced their household expenditures.

4. Associated Knowledge Areas

KA Code	Knowledge Area
602	Business Management, Finance, and Taxation
607	Consumer Economics
801	Individual and Family Resource Management

Outcome #6

1. Outcome Measures

Participants will manage their use of credit and reduce debt

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	0	119

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
With low incomes relative to the U.S. as a whole, achieving and maintaining a desirable and sustainable quality of life in Oklahoma is difficult. Poverty rates exceed 11% of Oklahomans in general and reach as high as 21% or more for families with children under 5 and over 50% of those household when it is a female-headed household. And it is not only those individuals and household with children that face financial difficulties. Over 20% of households, age 65 or over, are living on less than $17,000 per month. As with the rest of the nation, Oklahoma faces a shrinking middle class. It's citizens, youth included, face an ever increasing complex financial world with

fewer and fewer tools available to handle the issues they face. The results are increases in bankruptcy filings, both personal and business, as well as the general feeling of financial insecurity--which may include inadequate planning for (and funding of) current and future income needs, inadequate insurance, excessive debt, and lack of wealth accumulation. These issues not only affect the welfare of the family, but the economic prosperity of the community and state as well.

What has been done
Cooperative Extension, in addition to the general financial literacy programs listed earlier, has implemented a debtor's education program, Money Matters in Challenging Times, to support the financial educational needs of individuals filing bankruptcy. Some of the same participants reported under the first objective could also be listed in this section but was done to avoid double-counting. We also have provided general budgeting classes and workshops.

Results
Some 19% of individuals or an estimated 119 individuals, between the initial survey and later follow-up work, no longer carry credit card balances. Fifty percent of households indicated that their household debt levels have decreased and 14% have indicated that household savings have increased.

4. Associated Knowledge Areas

KA Code	Knowledge Area
602	Business Management, Finance, and Taxation
607	Consumer Economics
801	Individual and Family Resource Management

Outcome #7

1. Outcome Measures

Participants in assest building classes will have bought a home, started a savings account, started a retirement account, started a business, or made a positive change in their financial process

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	0	11

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
602	Business Management, Finance, and Taxation
607	Consumer Economics
801	Individual and Family Resource Management
806	Youth Development

Outcome #8

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	100	95

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 2009, Extension Educators in 9 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. Two of the counties also involved afterschool and 4-H program youth workers. Six group teacher trainings and five individual teacher trainings were provided and 24 teachers were provided individual consultation. Two 90-minute workshops were provided for the Oklahoma Indian Head Start Directors Pre-Service Conference attended by 53 staff members who work in 21 community Head Start Centers operated by 10 Tribes. A related parenting program, Raising a Thinking Child, was also presented to four parents.

Results
ICPS training evaluations completed by 9 participating teachers, child care providers, and youth workers from 5 different counties indicated:
*78% rated their understanding of ICPS before training as "poor" or "fair" and 22% as "good". After training, 100% rated their understanding as "good" or "excellent".
*100% reported the level their knowledge had increased was "good" or "excellent".

Impact evaluation questionnaires submitted by 11 teachers from 6 different counties with classrooms receiving or utilizing ICPS indicated:
*64% "much" or "very much" learned techniques from the program useful for managing the class/group.
*55% "much" or "very much" increased knowledge or understanding as a result of the program.

Oklahoma Indian Head Start Directors Pre-Service workshop evaluations from 43 participants indicated 95% increased in knowledge and 50% increased in understanding of the topic.

4. Associated Knowledge Areas

KA Code	Knowledge Area
802	Human Development and Family Well-Being
806	Youth Development

Outcome #9

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	75	95

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 2009, the I Can Problem Solve program was implemented in at least 20 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 11 teachers, counselors, child care providers, and youth workers with classrooms or groups that received or utilized ICPS indicated:
*36% reported "much" or "very much" having changed practices and interactions with the children/class as a result of the program and another 45% "moderately" changed.
*45% reported "much" or "very much" using the skills learned through this program and another 45% "moderately" used.
*91% rated the overall effect of this program on the teacher's practices and interactions as "somewhat good" or "very positive".
*82% rated the likelihood of using this program again in the future as "somewhat good" or "very positive".

Of Oklahoma Indian Head Start Directors Pre-Service workshop evaluations from 43 participants, 97% reported the information would be helpful in their work and they would use the information.

4. Associated Knowledge Areas

KA Code	Knowledge Area
802	Human Development and Family Well-Being
806	Youth Development

Outcome #10

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	1250	1062

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
Research indicates greater social competence including interpersonal cognitive problem solving skills during early and middle-childhood years aids in preventing high-risk behaviors later in childhood and adolescence. Since 2007, the Family Resiliency Impact Team has implemented the I Can Problem Solve program (ICPS; Shure, 2000).

Extension Educators in 20 counties have provided training and technical support using the ICPS program with preschool, Head Start, or elementary school (K-2nd grade) teachers, counselors, child care providers and youth workers with classes or groups of children ages 3 through 12. Teachers have utilized the program in their classrooms while some county educators also have co-facilitated or directly presented lessons to children. Specific ICPS lessons are provided over 10-12 weeks utilizing word concepts, stories, and group interaction to develop students' thinking skills with daily real-life problems such as generating alternative solutions, identifying consequences, and empathy. Teachers and other adults are trained to demonstrate and reinforce skills beyond the actual lessons using dialoguing techniques, integration with other classroom curricula, and supplementary activities. During 2007-2009, ICPS was implemented in approximately 110 classrooms or groups in 70 sites reaching 1,860 children. ICPS training was provided to approximately 225 adults either individually or in groups. A related program, Raising a Thinking Child, has also been utilized with five small groups of parents.

Results
Evaluation questionnaires completed by participating teachers, child care providers, and youth workers after implementing the ICPS program indicate:
*Over 50% rated their understanding of the topic before training as "poor" or "fair" and less than 50% as "good"; After training, 100% rated their understanding as "good" or "excellent".
*Over 96% reported the level their knowledge had increased from training was "good" or "excellent".
*Over 85% reported "moderately" to "very much" having changed practices and interactions with the children/class as a result of the program
*About 90% rated the overall effect on their practices and interactions with children as "somewhat good" or "very positive".
*About 90% reported "moderately" to "very much" using the skills learned through this program.
*Over 85% rated their likelihood of using this program again as "somewhat good" or "very positive".
*About 86% rated the children in their classroom as "moderately" to "very much" using the skills learned through this program.
*Over 85% rated the overall effect of this program on the children's behavior as well as the classroom/group atmosphere as "somewhat good" or "very positive".
*Between 50-87% rated children had increased positive behaviors from before the program to after the program including: considerate and helpful to others, accepts responsibility for actions, cooperates and works well with others, expresses needs and feelings appropriately, thinks before acting, resolves peer problems on their own, understands consequences of behavior, and listens to and understands other people's feelings.
*Nearly 50% rated children had decreased verbal fights or provocation (uses put downs, name calling, teasing), and decreased hitting or pushing to solve conflicts.
*About 90% rated overall satisfaction with the ICPS program as "very positive" or "somewhat good".

Comments from teachers and/or extension educators indicate the I Can Problem Solve program "has been great to use to apply to real problems that come up throughout the day", has helped "see how certain words and phrases really worked", "how to approach a conflict better, and "be more patient and give the kids a chance to work out their problems with each other". Furthermore, the children are "using vocabulary words to solve their problems", "developing solutions on their own", "more creative at looking for alternatives", "continuing to improve in thinking before they act", "actively considering different ways to deal with situations", and "recognizing other emotions in their friends...they are more aware of others".

4. Associated Knowledge Areas

KA Code	Knowledge Area
802	Human Development and Family Well-Being
806	Youth Development

Outcome #11

1. Outcome Measures

Healthy Oklahoma Youth

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	{No Data Entered}	13766

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. 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
A nutrition education curriculum for upper-elementary school age children. The curriculum focuses on balancing food choices and physical activity, choosing healthful beverages, making healthful choices when snacking and eating out, and being physically fit. In 2009, the program reached 13,766 youth. The program is delivered primarily by OCES FCS educators in school settings.

Results
Results from pre-post student questionnaires indicated a 34% increase in eating whole grains; 27% increase in eating fruits and vegetables; 32% increase in eating healthful breakfasts; 31% increase in snacking only when hungry; 37% increase in using the nutrition facts label, 33% each increase in eating smaller amounts of high fat and sugar sweetened beverages; and 22% increase in time spent in being physically active.

4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior
724	Healthy Lifestyle

Outcome #12

1. Outcome Measures

Farm To You

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	{No Data Entered}	0

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. 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
An Interactive Agriculture, Nutrition & Health Adventure for Elementary School-Age Children. Farm to You enhances and supports the previously described nutrition education programs. It is a collaborative effort of multiple community partners. As of December 1, 2009, the Farm to You exhibit had been experienced by 20,100 youth and 1,452 community volunteers at 90 locations. It has been recognized nationally, endorsing OCES as a premier agency for providing agricultural and nutritional programming.

Results
As part of a comprehensive nutrition/health intervention, a greater percentage of fourth and fifth students reported increased frequency of practicing healthful behaviors (eating whole grains, eating fruits and vegetables, consuming dairy foods, eating low fat meats, being physically active, snacking only when hungry, and using the nutrition facts label to make food choices) compared to a control group, thus increasing program effectiveness.

4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior
724	Healthy Lifestyle

Outcome #13

1. Outcome Measures

Health care savings from improved nutrition

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	{No Data Entered}	26000000

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
*When considering overall nutritional status, Oklahoma ranks 50th among the 50 states.
*Oklahoma ranked 50th in the percentage of adults who consumed fruit two or more times per day.
*More than 84 percent of Oklahoma citizens reported consuming less than five servings of fruits/vegetables per day compared to almost 77 percent of the national average.
*Oklahoma ranks 47th nationally as approximately 30 percent of Oklahomans reported participating in no physical activity in the past 30 days compared to 22.6 percent nationally.
*The number of Oklahomans living below the poverty level exceeds the national average. The prevalence of low socio-economics status is associated with poor nutrition habits that contribute to chronic disease including heart disease, cancer, stroke, and obesity (OSDH).

What has been done
Through CNEP, OCES has leveraged state monies to provide over $3.8 million (FY09) in federal nutrition education program funds. This funding supports 113 jobs in 44 Oklahoma counties. CNEP is a voluntary program for adult participants of federal food assistance programs as well as impoverished youth in qualifying schools and communities. Program participants learn to feed their families in order to promote good health and to plan and budget their food dollars so their family won't go hungry at the end of the month.

The Community Nutrition Education Programs continue to be good stewards of taxpayer dollars. During FY09 CNEP increased adult and youth direct education participation from the previous year by 10 and 15 percent respectively. This was accomplished with a three percent decrease in full time equivalencies (FTE) of paraprofessional staff.

Results
In FY09 CNEP has had a positive impact on the health and wellness of 5,591 low-income Oklahoma families. During the FY09 program year 41,200 direct contacts (with persons) were made in hour-long learning sessions with enrolled CNEP participants.
Over 96 percent of adult graduates demonstrate a positive change towards a healthy diet. In addition, 39 percent of graduates less often ran out of food by the end of the month and 38 percent report that their children ate breakfast more often.
*CNEP staff provided a total of 5,912 hours of nutrition information on healthy eating practices, food preparation

and food safety to 27,457 qualifying Oklahoma youth during the 2009 fiscal year.
*A majority of youth (20,822) were taught through school enrichment programs, while 6,635 children received their nutrition education through short term and after school programs.
*After participating in CNEP, approximately 12 percent of surveyed youth participants more often consumed low-cost, healthy foods and eight percent increased their frequency of hand washing.
As Oklahoma is assumed to be representative of the national average in terms of cost-benefits effects of this program, then the effect of the CNEP funding resulted in health care savings of more than $26 million from the prevention of nutrition-related chronic diseases and conditions among Oklahoma citizens, according to the Battelle study conducted in 2007.

4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior
724	Healthy Lifestyle

Outcome #14

1. Outcome Measures

Number of Families Participating in Parent Child Connections Program each year

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	{No Data Entered}	211

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
On average each year in Oklahoma, more than 13,000 children are confirmed victims of child abuse and neglect. Over 60% of these children are under age six. About 40 Oklahoma children die due to abuse and neglect annually, over 70% of which did not live to age two. The majority (about 85%) of abuse and neglect occurs in the hands of a child's own parents. Neglect is most prevalent, indicated in nearly 85% of the confirmed cases. The most active and significantly influenced brain development period is birth to age 3. Research indicates that home visitation and parenting education and support services around the time of a baby's birth through early childhood reduces the risk of child abuse, and contributes to positive, healthy childrearing practices and family functioning.

What has been done
OCES implemented parent education home visitation programs in 1991. Currently, four OCES Parent Child Connections programs serve seven diverse, primarily rural counties: Canadian, Delaware, Texas and Southwest (Cotton, Jefferson, Comanche, and Stephens). Families are enrolled during pregnancy until 12 months after their baby's birth, and may continue the program until the child is age six. Participation is voluntary. Services include home visitation, center-based education and support, screening and assessment, and referrals to health care providers and other community resources. About 1/2 to 2/3 of the enrolled parents are single or divorced and 35% are under the age of 20.

In FY 2009, 211 families were provided 2,952 home visits and 566 child development screenings. In addition, 78 parent education, support group, and family activity sessions were conducted. During the last 5 years (FY 2005-2009), approximately 420 enrolled families have been served with 10,797 home visits and 1,500 child development screenings.

Primary funding for the programs is from state legislative appropriations through the Oklahoma State Department of Health, Child Abuse Prevention Fund. In the past 5 years (FY 2005-2009), contract awards have totaled over $2.37 million ($313,161-$588,765 annually). Three to five staff members are employed at each program site (approx. 13.5 FTE). Collaboration with a variety of local community organizations is emphasized to garner additional program support, better utilize scarce resources, and provide a comprehensive array of services to effectively meet families' needs.

Results

Based on a statewide evaluation of 22 programs (Oklahoma State Department of Health, 2007), 95% of children were up-to-date on their immunizations according to parent self-report compared to the Oklahoma state rate of 83%. Participant surveys indicate nearly 90% said it was "very true" that they felt better prepared to care for their children, and that the health and well-being of their children was improved. Previous evaluations of the OCES parent education/home visitation programs suggest that first-time mothers experienced significant improvement in infant development knowledge, understanding of empathic responsiveness and child and parent roles in the family, home safety, and involvement in community agencies (i.e., Culp, Culp, Blankemeyer, & Passmark, 1998).

Rigorous cross-sectional, comparison, and randomized control trial studies of similar programs in other states have reported significant, positive outcomes for families receiving services as compared to families not in the program, the county, community, or state as a whole. The outcomes include lower rates of child maltreatment, less physical and psychological abuse, fewer children hospitalized for child maltreatment, higher rates of linkages to a medical care provider and immunizations, fewer emergency room visits, higher birth weights, more responsive and developmentally stimulating home environments, greater parent-child interaction, increased child development and care knowledge, delayed subsequent pregnancies, improved educational and employment conditions, and lower dependence on public assistance (Healthy Families America, 2002, 2008).

Prevent Child Abuse America (2007) estimated the annual cost of child abuse and neglect in the U.S. at $103.8 billion including direct costs (i.e., hospitalization, mental health care, child welfare services, law enforcement) and indirect costs (i.e., special education, juvenile delinquency, mental health and health care, the adult criminal justice system, and lost productivity to society). Research suggests that prevention programs can reduce these expenses to our society as well as the non-monetary negative impacts on children, families, and communities.

4. Associated Knowledge Areas

KA Code	Knowledge Area
802	Human Development and Family Well-Being

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 (community/school support access)

Brief Explanation

Access to school classrooms is challenging in that great emphasis is placed on teaching the academic core curricula to meet federal and state performance criteria. The challenge is being addressed by tying nutrition education programming to the Oklahoma State Department of Education's Priority Academic Student Skills (PASS).

2008 saw the beginning of a serious economic downturn in the United States. While the OK economy weathered the initial phases in better shape than other parts of the country, those factors are now showing up in and OK slowdown. This has increased the interest in several of our financial management programs as well as our general press releases. However it also impacts the ability for many families to take many financial steps forward as they now struggle just to remain in place.

Another finding just beginning to show up on our surveys is the fact that once a person gains more financial knowledge they seem to become less satisfied and more depressed regarding their current financial situation. When this is linked to the general economic picture, we are today working with clients that are more and more stressed about the future.

For financial literacy for youth, a regulatory change requiring financial literacy education has substantially increased the orders and numbers of participants in the High School Financial Planning Curriculum.

Finally, the Federal Law change regarding the need for debtor education before completing bankruptcy proceedings continues to create opportunities and challenges. Some of our competitors are offering both the required debtor counseling and debtor education for a single price. Other agencies are offering on-line training again diluting our potential pool. OCES is currently the only service doing debtor education for the entire state on a face-to-face basis.

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

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

Evaluation Results

A quasi-experimental control group design study was conducted with 34 teachers and 368 preschool through 2nd grade children participating in the impact team's initial implementation of the I Can Problem Solve (ICPS) program in 2007 through early 2008. ICPS-trained children showed significant positive changes in social problem-solving skills and social competence

from pre-test to post-test compared to peers in classrooms not receiving ICPS. The quantity of alternative solutions the children gave to hypothetical problem situations significantly increased with moderate effect sizes. Significant changes in the quality of solutions were also found for ICPS-trained children as reflected in a decrease of manipulative solutions and increases in both passive and react-positive solutions. ICPS-trained children also had significantly greater composite solution competence (the sum of assertive and react-positive solutions less aggressive solutions). Furthermore, social behavior ratings for children in the ICPS intervention classrooms demonstrated significantly higher improvements with small to medium effect sizes on total competence, prosocial skills, emotional regulation, academic skills, and reduced aggression. Findings suggest that the ICPS program may be beneficial for a universal population of children in diverse and primarily rural school and community settings, and the Cooperative Extension Service system may provide a viable system for the diffusion and implementation of ICPS.

Impact evaluation questionnaires submitted by 11 teachers, child care providers, and youth workers with classrooms or groups that received or utilizing ICPS in 2009 indicated:

- 82% 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".
- 60-80% 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.
- 40-50% 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 two parents who participated in the Raising a Thinking Child program indicated that for both the effect of the program on their children's behavior was "very positive".

Key Items of Evaluation

In 2007 through early 2008, the following measures and procedures for both the intervention and control teachers and classes were utilized.

§ Child Interviews - OCES county educators met individually with each participating student with parental consent before and after the presentation of the ICPS program lessons. Ten scenarios were provided for the OCES educators to use along with guidelines on conducting the interviews. Each item presented a hypothetical story or scenario of a problem to be read to the child. The child was asked how the characters in the story, or themselves, might handle the situation, ideas for solving the problem, or feelings they may have. The children were prompted to provide as many different solutions as possible, up to four, which were documented in writing.

§ Teacher Ratings of Child Behavior &ndash Participating teachers were asked to complete a questionnaire pre- and post-program for each participating child in their classroom. The instrument was composed of 37 brief statements using a Likert scale.

In 2008 and 2009, 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%		0%	
806	Youth Development	96%		0%	
	Total	100%		0%	

V(C). Planned Program (Inputs)

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

Year: 2009	Extension		Research	
	1862	1890	1862	1890
Plan	65.0	0.0	0.0	0.0
Actual	100.0	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**
870000	0	0	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
870000	0	0	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
11600000	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Create a pilot-tested, web-based project curriculum which will be widely used in county extension programs. This curriculum will be designed to introduce students to precision agriculture and geospatial technology.

Start precision agriculture and geospatial 4-H project clubs by training 4-H volunteers and teen leaders to utilize the new materials to start precision agriculture project clubs.

Incorporate the precision agriculture curriculum into the Oklahoma Ag in the Classroom program. This curriculum will cover geospatial technologies and agricultural topics such as GPS/GIS, robotics, remote sensing, and precision agriculture.

Train Educators and county teams to conduct well water assessments. Trainings may include: Water-quality models,

Bluethumb monitoring, Aqua times, Mapping Abandoned wells, Watershed, streambank restoration, Storm drain labels etc.

Recruit Volunteers interested and committed to the concept of developing strong Youth-Adult Partnerships for the benefit of serving the community.

Provide training and materials for initiating and maintaining teams of youth and adults committed to serving the community.

Train and graduate the first class of 4-H Volunteers.

Involve community leaders and other youth serving agencies as instructors/resources during the training process.

4-H youth clubs and projects from all areas will be conducted, volunteers trained and managed

2. Brief description of the target audience

Youth (grades 6-8) in 10 pilot counties will test new agricultural technology curriculum.

Youth and adult leaders in 16 counties will conduct environmental impact programming to other 4-H youth and the public.

Youth and adult 4-H mentors and/or other youth serving agencies, and teens, as well as volunteers recruited to work with underserved audiences.

V(E). Planned Program (Outputs)

1. Standard output measures

2009	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Plan	55	150	650	1200
Actual	21000	300000	629354	3500000

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

Year: 2009
Plan: 0
Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2009	Extension	Research	Total
Plan	2	0	
Actual	2	0	2

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Web-based pilot curriculum - lessons developed and tested

Year	Target	Actual
2009	10	20

Output #2

Output Measure

- New Geospatial 4-H project clubs with an emphasis on precision agriculture

Year	Target	Actual
2009	10	5

Output #3

Output Measure

- Youth-adult environmental education teams

Year	Target	Actual
2009	20	20

Output #4

Output Measure

- Teams of youth and adults interested in and commited to developing strong youth-adult partnerships for serving the community

Year	Target	Actual
2009	55	66

Output #5

Output Measure

- Groups subsequently assisted and trained by "graduating" classes of youth community leadership.

Year	Target	Actual
2009	13	189

Output #6

Output Measure

- Number of Youth introduced to careers in natural resources, veterinary medicine and geospatial technology

Year	Target	Actual
2009	{No Data Entered}	1210

Output #7

Output Measure

- Number of youth reached with Junior Master gardener Program

Year	Target	Actual
2009	{No Data Entered}	1100

Output #8

Output Measure

- Number of Hero Packs disrtibuted to military youth

Year	Target	Actual
2009	{No Data Entered}	1300

Output #9

Output Measure

- Number of youth participating in shooting sports programs

Year	Target	Actual
2009	{No Data Entered}	5400

Output #10

Output Measure

- Youth were introduced to careers in natural resources, veterinary medicine and geospatial technology

Year	Target	Actual
2009	{No Data Entered}	1200

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Participants interested in pursuing a career in geospatial and precision technologies fields
2	Number of well-water assessments conducted
3	Number of well owners beginning voluntary well water testing for bacteria
4	Number of youth/adults that continue volunteer well-water testing and other environmental monitoring past training
5	Number of community leadership action plans completed
6	Number of trained and "graduated" youth and adult volunteers still providing direction tho their communities in elected and/or volunteer roles
7	Number of people understanding Youth-Adult Partnership and Service Learning and Progressive Leadership Development
8	Livestock Electronic Identification, Remote Monitoring, Traceability, and Data Management

Outcome #1

1. Outcome Measures

Participants interested in pursuing a career in geospatial and precision technologies fields

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	150	50

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results
In 2008-09, 11 county teams have received ESRI software grants worth over a million dollars. The grant recipients are identifying, selecting, and working on community projects. These teams are partnering with a school teacher and/or agency personnel. The youth are learning how they can affect change within a community using geospatial technology. The adults are learning how they can partner with youth and combine the strengths of all to form a better team. These teams are discovering the power of GIS and the numerous career opportunities associated with this technology. Upon completion of these projects, the communities will reap the benefits of a useful map and an educational program designed to enhance life in the community for the betterment of all involved. The teams are working on projects ranging from; emergency management, historical markers, storm drain locations, and flood zones.

4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

Outcome #2

1. Outcome Measures

Number of well-water assessments conducted

Not Reporting on this Outcome Measure

Outcome #3

1. Outcome Measures

Number of well owners beginning voluntary well water testing for bacteria

Not Reporting on this Outcome Measure

Outcome #4

1. Outcome Measures

Number of youth/adults that continue volunteer well-water testing and other environmental monitoring past training

Not Reporting on this Outcome Measure

Outcome #5

1. Outcome Measures

Number of community leadership action plans completed

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	55	33

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done
To strengthen human capital, 66 teams of teens (716) and adult mentors (262) were trained to embark on "issue" based programming.

Results
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.

4. Associated Knowledge Areas

KA Code	Knowledge Area
608	Community Resource Planning and Development
806	Youth Development

Outcome #6

1. Outcome Measures

Number of trained and "graduated" youth and adult volunteers still providing direction tho their communities in elected and/or volunteer roles

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	0	189

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done
Youth and adults completing the initial training and an action plan are being recruited to train future teams. They are also contributing to their communities as board members and leaders in organizations.

Results
The positive experience of Youth initially trained has resulted in 189 youth and adults returning as train the trainers.

4. Associated Knowledge Areas

KA Code	Knowledge Area
608	Community Resource Planning and Development
806	Youth Development

Outcome #7

1. Outcome Measures

Number of people understanding Youth-Adult Partnership and Service Learning and Progressive Leadership Development

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	500	1162

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done
To strengthen human capital, 66 teams of teens (716) and adult mentors (262) were trained to embark on "issue" based programming.

Results
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.

4. Associated Knowledge Areas

KA Code	Knowledge Area
608	Community Resource Planning and Development
806	Youth Development

Outcome #8

1. Outcome Measures

Livestock Electronic Identification, Remote Monitoring, Traceability, and Data Management

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual

2009	{No Data Entered}	39400

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. A National Animal Identification System (NAIS) had been proposed to help control a disease outbreak should it occur in the United States. These benefits include increased on farm management and use of information to generate additional revenues through transfer of information with the animals through their production system.

What has been done
In a collaborative effort with the Oklahoma Youth Expo, the Tulsa State Fair, and the Oklahoma Department Agriculture Food and Forestry, the team from Oklahoma State University initiated the first project (currently in its fourth year) in the country to integrate use electronic identification technology within the shows management program at major Oklahoma youth livestock shows for entry nomination, entry verification, show management, and potential 48 hour animal trace back in the case of a disease outbreak. Over the four years, this program has moved from a concept, evaluated the need to develop a system, development of a prototype program, testing of the prototype program in sheep show, integration of a tested sheep program, and development and testing of sheep program modifications to meet the demands of other species shows at both major state livestock shows.
This year approximately 39,400 youth livestock projects were tagged and approximately 99,400 have been tagged over the last four years.

Results
*While our goal is to provide education related to NAIS, records indicate that 9,253 Oklahoma livestock premises were registered in 2009
*We have directly assisted in the tagging of over 40,000 animals with electronic identification tags in OSU livestock production units and youth livestock projects in 2009.
*Assisted 3 Oklahoma companies developing electronic livestock identification and monitoring solutions with various aspects of grant funding seeking, product testing and evaluation in 2009.
*Efforts have resulted in three departmental reports, five abstracts with presentations, two fact sheets, and one M.S. thesis. One journal article has been submitted related to this project in 2009.

4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

V(H). Planned Program (External Factors)

External factors which affected outcomes
- Competing Programmatic Challenges
- Populations changes (immigration, new cultural groupings, etc.)

Brief Explanation

{No Data Entered}

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

1. Evaluation Studies Planned
   - Before-After (before and after program)

- During (during program)
- Time series (multiple points before and after program)
- Comparisons between different groups of individuals or program participants experiencing different levels of program intensity.

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	4%		15%	
201	Plant Genome, Genetics, and Genetic Mechanisms	0%		5%	
202	Plant Genetic Resources	0%		15%	
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants	0%		10%	
204	Plant Product Quality and Utility (Preharvest)	0%		5%	
205	Plant Management Systems	81%		15%	
206	Basic Plant Biology	0%		5%	
211	Insects, Mites, and Other Arthropods Affecting Plants	2%		10%	
212	Pathogens and Nematodes Affecting Plants	7%		10%	
216	Integrated Pest Management Systems	6%		10%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

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

Year: 2009	Extension		Research	
	1862	1890	1862	1890
Plan	1.6	0.0	3.3	0.0
Actual	2.0	0.0	2.0	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**
21000	0	57229	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
21000	0	57229	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
270000	0	394859	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

2009	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Plan	2000	10000	0	0
Actual	19274	45000	0	0

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

Year: 2009
Plan: 0
Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2009	Extension	Research	Total
Plan	5	5	
Actual	6	2	8

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of peer-reviewed journal articles manuscripts submitted

Year	Target	Actual
2009	5	2

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

Output #3

Output Measure

- Number of turf/roadside vegetaion management workshops conducted

Year	Target	Actual
2009	15	22

Output #4

Output Measure

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

Year	Target	Actual
2009	500	1345

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

Outcome #1

1. Outcome Measures

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 Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	0	2

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Turfgrass is used to stabilize hundreds of thousands of acres of roadsides, lawns, parks, golf courses and athletic fields in Oklahoma. Each use site has unique and specific functional objectives, whether it be for merely soil stabilization against wind and water erosion, suitable footing for an athlete or a proper putting surface for the game of golf.

What has been done
Turfgrass team members continued the screening of over 3,000 experimental and commercially available turfgrass genotypes or populations in order to develop new varieties or recommendations on proper selection of presently commercialized varieties.

Results
Four Oklahoma sod producers indicated that they will begin buffalograss sod production (2 different varieties) in 2010 to meet the increased potential sales demand for this specialty turfgrass species in the southern great plains region. Profitability should increase for sod producers by up to $0.08 per sq. ft. or by $3,485 per acre over the production of common bermudagrass.

4. Associated Knowledge Areas

KA Code	Knowledge Area
201	Plant Genome, Genetics, and Genetic Mechanisms
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants
204	Plant Product Quality and Utility (Preharvest)
205	Plant Management Systems

Outcome #2

1. Outcome Measures

New turf varieties used by the Oklahoma golf course industry

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	0	2

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Use of improved turfgrass varieties having increased abiotic or biotic stress tolerance can often times lead to reduced management inputs and reduced management costs for golf course owners and increased course profitability. Because of the high visibility of golf courses within the whole of the turfgrass industry, golf courses tend to be the "trend setters" for the whole of the turfgrass industry. Thus, management practices undertaken on golf courses often influence trends throughout the athletic turf and home lawn industries.

What has been done
Turfgrass team members continued the screening of over 3,000 experimental and commercially available turfgrass varieties (species, genotypes and/or populations) in order to develop new varieties or recommendations on turfgrass variety use. Yearly output of results influences variety recommendations that are provided to golf course managers through consultations and in workshop/conference sessions. Over 200 one on one consultations were conducted in 2009 with golf course managers covering new variety performance, general maintenance and pest management. A golf turf management educational session covering a broad range of golf course management topics was conducted by the OSU Turfgrass team in concert with the Oklahoma Turfgrass Research Foundation, the US Golf Association, the Oklahoma Golf Course Superintendents Association and various industry partners. The session was attended by 120 key golf course management personal at the 2009 Oklahoma Turfgrass Conference.

Results
One new creeping bentgrass blend having apparent improved summer performance was utilized on three golf courses in Oklahoma during overseeding of existing greens in fall of 2009. The impact of this variety upon management inputs will not be know until possibly the 2010 growing season or beyond. Seven golf course superintendents anticipate the use of a new bermudagrass (TifGrand), having improved shade tolerance, in shaded rough areas where soil erosion problems are occurring. The improved variety is not yet commercially available but licensing rights communications are being facilitated by OSU Turfgrass Team members.

4. Associated Knowledge Areas

KA Code	Knowledge Area

111	Conservation and Efficient Use of Water
202	Plant Genetic Resources
204	Plant Product Quality and Utility (Preharvest)
205	Plant Management Systems

Outcome #3

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	400	2976

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Nationally over 30 million acres of turfgrasses are maintained for the value of soil stabilization and aesthetics. In Oklahoma over 750,000 acres of maintained turfgrass areas are believed to be present. Prior to the economic down turn in the economy the annual maintenance expenditures for turfgrass in Oklahoma were believed to be approximately $800 million per year. Regardless of the availability of maintenance budget, turfgrass must remain in place providing suitable erosion resistant ground cover and a base functional quality for traffic tolerance, sport and aesthetic value.

What has been done
Turfgrass team members conducted over 27 educational sessions in Oklahoma for 1,700 professional/commercial turf managers in 2009. Over 3,200 professional and consumers received one on one consulting services concerning their turfgrass informational needs through email, US Mail and site visits. Turfgrass team members and industry cooperators relayed the latest information in Best Management Practices to participants in the education sessions/consultations.

Results
Turfgrass short course survey results indicated that over 90% of educational session participants intend to adopt current Best Management Practices information. Eighty-three percent of attendees at the Oklahoma State University's Turf Team's annual turf conference felt the education offered at the annual turfgrass conference better equipped them to perform their job more effectively and efficiently. Sixty-three percent of attendees of the conference felt the information gained at the conference would allow them to manage turf in a more environmentally conscious manner. Ninety-three percent of turf conference attendees felt participation at the Oklahoma turf conference increased their turf management knowledge. Forty-three percent of conference attendees felt that the 2009 or previous conferences offered by the OSU Turf Team allowed them to save their organization money through improved operations efficiency. For those conference participants who felt the knowledged gained would increase operations efficiency, 67% felt the savings would be in the 0 to 5% range, 25% of attendees felt the savings would be in the 5 to 10% range and 8% felt the savings would be more than 10% of annual operating funds. Seventy percent of turf conference attendees surveyed reported an active effort to

reduce pesticide, fertilizer water and other maintenance inputs to turfgrass.

4. Associated Knowledge Areas

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

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

Brief Explanation

The Oklahoma turfgrass industry was drastically affected by a slumping regional and national economy. Reduced new housing starts and building construction coupled with increases in unemployment has resulted in drastically decreased demand for turfgrass sod and thus decreased sod sales. Sod producers have responded by decreasing the number of acres devoted to production of common bermudagrass (also know as variety not stated types), which was 90% of the sales base of the Oklahoma sod production industry. Between 10 and 20% of common bermudagrass acres were estimated to have been intentionally destroyed by growers in 2009, with the intent to convert to other more profitable crops, following harvest of these acres. While the National Golf Foundation (NGF) reports that golf rounds in 2009 were down just 0.9% from 2008 nationally, the national median total revenue of courses was down 5.6% in 2009 over 2008, which meant that golf course maintenance budgets were likely reduced.

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

1. Evaluation Studies Planned

- Retrospective (post program)
- Before-After (before and after program)
- During (during program)
- Time series (multiple points before and after program)

Evaluation Results

Eighty-three percent of attendees at the Oklahoma State University's Turf Team's annual turf conference felt the education offered at the conference better equipped them to perform their job more effectively and efficiently while 7% did not and 10% were undecided. Sixty-three percent of attendees of the conference felt the information gained at the conference would allow them to manage turf in a more environmentally conscious manner while 23 percent were uncertain and 10 percent felt otherwise. Ninety-

three percent of turf conference attendees felt participation at the Oklahoma turf conference increased their turf management knowledge. Forty-three percent of conference attendees felt that the 2009 or previous conferences offered by the OSU Turf Team allowed them to save their organization money through improved operations efficiency while 37% were unsure and 20% felt otherwise. For those conference participants who felt the knowledged gained would increase operations efficiency, 67% felt the savings would be in the 0 to 5% range, 25% of attendees felt the savings would be in the 5 to 10% range and 8% felt the savings would be more than 10% of annual operating funds. A devastating downturn in the economy coupled with a need for increased operating efficiency and increased environmental awareness has resulted in substantial behavioral change when it comes to turfgrass management inputs by professionals in the industry. Seventy percent of turf conference attendees surveyed reported an active effort to reduce pesticide, fertilizer water and other maintenance inputs to turfgrass during the 2009 growing season while 17 percent reported no reduction in puts and 13% were unsure. The reduction in maintenance inputs did not show a strong link to size of acreage of the facility being managed. Oklahoma sod producers informally report approximately a 10 to 20% reduction in acres devoted to bermudagrass sod production; these acres being converted to other non-turfgrass agronomic crops due to drastically reduced sod sales due to substantial decreases in new housing starts and new construction overall.

Key Items of Evaluation

Post-program evaluation of feature educational programming event - The Oklahoma Turfgrass Conference and Trade Show audience represents approximately 300 to 400 participants annually from a broad cross section of the commercial/professional Oklahoma Turfgrass Industry. The audience segments include golf course management, professional lawn care, parks, grounds, athletic field management and sod/seed production. Approximately 10% audience participation in a post-conference web-based survey was achieved. In addition to questions on knowledge gained, economic survey, environmental stewardship and maintenance inputs, a annual email survey of approximately 1,800 turfgrass industry professionals is conducted to assess educational needs of the industry. Outcomes from the email survey are used to set the program agenda for the annual Oklahoma Turfgrass conference and upcoming industry workshops each year.

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%	

V(C). Planned Program (Inputs)

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

Year: 2009	Extension		Research	
	1862	1890	1862	1890
Plan	12.0	0.0	0.8	0.0
Actual	14.0	0.0	2.8	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**
200000	0	160240	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
200000	0	160240	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
1857000	0	1105606	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

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

2. 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

2009	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Plan	890	10650	0	0
Actual	93792	32000	0	0

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

Year: 2009
Plan: 0
Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2009	Extension	Research	Total
Plan	5	5	
Actual	5	4	9

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of community services plans completed

Year	Target	Actual
2009	30	12

Output #2

Output Measure

- Number of education modules completed

Year	Target	Actual
2009	1	1

Output #3

Output Measure

- Number of county officer training courses conducted

Year	Target	Actual

2009	35	89

Output #4

Output Measure

- Number of manufacturing firms receiving applications engineering assistance

Year	Target	Actual
2009	50	101

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

Outcome #1

1. Outcome Measures

Number improving business skills

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	150	342

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
608	Community Resource Planning and Development

Outcome #2

1. Outcome Measures

Number of manufacturing jobs created or retained

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	50	166

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 2009, the Applications Engineers client projects resulted in increased sales of more than $24,000,000, while retaining an additional $5,400,000 in sales that would have otherwise been lost. Further, the expertise provided by OCES Application Engineers created cost savings of $5,900,000, and avoided additional costs estimated at $1,800,000. With 99 new jobs created and 67 jobs retained, these projects provided an additional $12,500,000 to the state's economy. Finally, the client firms invested over $7,500,000 in new plant facilities and equipment, for a total economic impact of $57,500,000.

4. Associated Knowledge Areas

KA Code	Knowledge Area
608	Community Resource Planning and Development

Outcome #3

1. Outcome Measures

Number of communities where capacity was increased

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	30	115

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
County officers regularly turn over, new laws, ploicies and procedures are developed and new personnel (deputies)are hired. County officers are bound by law to maintain knowledge and knowledgable employees.

What has been done
The County Training Program conducted 71 short-courses during the year. With over 1,100 attendees.

Results
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?" In December 2009 CTP created a seven question survey. On January 4, 2010 it was mailed to all 505 course participants (second half of 2009)asking each to respond regarding the particular course taken. Six questions were course specific. The seventh question asked if economic conditions will limit future attendance. Each person had the option to respond by mail or via a website. All responses were anonymous. Sixty-three percent (314) responded. The following is a summary of the responses to each question:

Two hundred one (201) county government personnel out of three hundred fourteen (314) who participated in training between July 1, 2009 and December 31, 2009 said they put into practice something they learned at the training session.

1. Ninety-three percent of respondents described the course as excellent or good.
2. Eighty-eight percent judged the class to be worth the time, effort, and expense.
3. Ninety-two percent said they learned some or several things they could take back to the office and put to use.
4. Sixty-four 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-seven percent said they learned worthwhile information even if they did not put it into use.
7. Twenty-three percent said that the economic downturn will limit their attendance at CTP programs.

4. Associated Knowledge Areas

KA Code	Knowledge Area
608	Community Resource Planning and Development

Outcome #4

1. Outcome Measures

Number of participants that plan to open/expand a business

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	100	84

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 2009, the Oklahoma State University e-commerce program provided training to over 250 small businesses on how to plan, effectively set up, and promote their websites, which can help address these issues.

Results
Before the training, 46% indicated that they already had a website. Ninety percent of all participants rated the section on "Small Business Websites 101" as very useful, as 86% of all participants rated the section on Website Marketing as very useful. After the training, 91% of respondents planned on either developing a new website or altering their current site. 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 photographer in Duncan - www.memoriesrecapturedbyrosie.com), incorporated e-commerce sites (such as the jewelry saleswoman in El Reno - www.stephaniesselections.com), or made successful changes to their own site (such as the hotel owner in Shawnee who learned several techniques to draw more traffic - www.themaverickhotel.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 $7.5 and $75.0M during 2009.

4. Associated Knowledge Areas

KA Code	Knowledge Area
608	Community Resource Planning and Development

Outcome #5

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	15	12

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The Northwest Oklahoma Alliance is seeking to establish an industrial park in Avard, OK to utilize an existing rail spur to create much needed, high paying jobs in that region. Early in the process, NwOA approached OCES about doing an economic impact analysis of the types of jobs that they hope to create in the industrial park.

What has been done
Based upon direct employment estimates, the park could house 1,770 employees and over $500 million dollars of capital investment. The analysis suggested that the park could create up to $31 million in additional payroll outside of the industrial park, over $4 million in sales tax revenue, and $5.3 million in ad valorem tax revenue for Woods County.

Results
The report was used by NwOA to pursue several grants to fund the land purchase and infrastructure development of the industrial park. Specifically, the report contributed to an ARRA grant application that was funded for $1 million, and secured a letter of credit from local banks in the amount of $2.25 million. The report contributed to a final grant, still under review, for $1.5 million from EDA. Thus, the report has generated $3.25 million dollars, and it is being used to pursue an additional $1.5 million. Sonja Cook, Executive Director of Woods County Economic Development Committee, said, "I truly feel we would not be this far if it weren't for the assistance of your office."

4. Associated Knowledge Areas

KA Code	Knowledge Area
608	Community Resource Planning and Development

Outcome #6

1. Outcome Measures

Number of leadership class graduates actively participating in community or industry

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	75	25

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
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
- Competing Public priorities

Brief Explanation

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

1. Evaluation Studies Planned

- After Only (post program)
- Retrospective (post program)
- Before-After (before and after program)
- Case Study

Evaluation Results

Key Items of Evaluation

V(A). Planned Program (Summary)

Program # 11

1. Name of the Planned Program

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	5%		10%	
202	Plant Genetic Resources	8%		4%	
205	Plant Management Systems	8%		10%	
211	Insects, Mites, and Other Arthropods Affecting Plants	8%		20%	
212	Pathogens and Nematodes Affecting Plants	6%		20%	
213	Weeds Affecting Plants	5%		5%	
215	Biological Control of Pests Affecting Plants	5%		5%	
216	Integrated Pest Management Systems	51%		20%	
601	Economics of Agricultural Production and Farm Management	4%		5%	
901	Program and Project Design, and Statistics	0%		1%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

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

Year: 2009	Extension		Research	
	1862	1890	1862	1890
Plan	4.0	0.0	5.5	0.0
Actual	5.3	0.0	7.0	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**
54000	0	240361	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
54000	0	240361	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
664000	0	1658409	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Assessment of stakeholder priorities for IPM
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

2009	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Plan	1000	4300	0	0
Actual	20319	61000	0	0

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

Year: 2009
Plan: 0
Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2009	Extension	Research	Total
Plan	4	4	
Actual	31	6	37

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Stakeholder assessment

Year	Target	Actual
2009	0	7

Output #2

Output Measure

- IPM schools, conferences and workshops

Year	Target	Actual
2009	10	24

Output #3

Output Measure

- Pesticide applicator education schools and workshops

Year	Target	Actual
2009	20	37

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

Outcome #1

1. Outcome Measures

Peer reviewed research publications and extension publications

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	5	29

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

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

Outcome #2

1. Outcome Measures

Increased use of pest management approaches for targeted cropping system acres

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	4200	715640

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Canola is a potentially valuable rotation crop for Oklahoma wheat growers. It allows them opportunities to manage difficult grassy weeds such as Italian ryegrass, and cheat while providing them with an additional cash crop. Harvested acreage in Oklahoma has grown from 41acres in 2002 to over 40,000 acres in 2008-2009 worth ca. $9.1 million, and 85,000?100,000 acres of canola were planted in 2009-2010. However, insect pests (aphids and caterpillars) regularly infest winter canola throughout winter and spring causing economic damage. In 2007, canola producers were surveyed about their pest management concerns and listed insects as the second most important production problem that they faced and aphids (cabbage, turnip and green peach aphids) the key insect pest problem. Because producers were unfamiliar with their management, they often made multiple insecticide applications to control them with limited success.

What has been done
Entomologists and area agronomists conducted research demonstrations from 2005-2007 to evaluate management strategies for canola aphids. They determined that aphids could be effectively managed with a combination of insecticide seed treatments and regular scouting using a threshold of 200 aphids per plant.

Results
The research demonstrations showed that producers could save an average of $30 per acre by reducing insecticide applications from four per season to one with no loss in yield. This resulted in $1.1 million in potential cost savings in the 2008-2009 canola crop.

4. Associated Knowledge Areas

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

Outcome #3

1. Outcome Measures

Number of trained certified pesticide applicators

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	200	3676

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Pesticides are widely used for agricultural and horticultural production in Oklahoma. In wheat alone, more than 1 million pounds of pesticide active ingredients are applied. Their safe application is critical for minimizing environmental impacts and health risks. The regulation of pesticide use comes under the authority of the Pest Management Section of the Consumer Protection Services, Oklahoma Department of Agriculture. As such, ODAFF has been granted the authority to issue licenses to pesticide applicator companies and certified pesticide applicators. There are currently 18 certification categories for professional certification of pesticides in Oklahoma.

What has been done
The Oklahoma State Pesticide Safety Education Program offers educational programs targeted at pesticide applicators that includes content on using IPM approaches for managing pests and applying pesticides in a responsible, safe and legal manner. Programs include specific workshops related to pesticide application and Extension programs that offer Continuing Education Units (CES?s) in various certification categories that allow certified applicators to continually improve their knowledge of IPM and safe use of pesticides.

Results
In 2009, approximately 3600 people became certified pesticide applicators through testing or recertification via accumulation of Continuing Education.

4. Associated Knowledge Areas

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

Outcome #4

1. Outcome Measures

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 Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	10	15

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
More than 6 million acres of winter wheat are produced in Oklahoma each year. Insect pests feeding on wheat reduce yield and may need to be controlled with applications of insecticides. Growers must make decisions to treat based on abundance of insect pests and treatment costs.

What has been done
OSU has developed a simplified method of determining the economic treatment threshold for aphids for a field using a survey techniques called 'Glance and Go'.

Results
Education programs have been used to educate growers and scout in the use of glance n go. Growers and scouts have implemented the use and it is saving time and money. The number/proportion of growers using the method is increasing over time.

4. Associated Knowledge Areas

KA Code	Knowledge Area
133	Pollution Prevention and Mitigation
211	Insects, Mites, and Other Arthropods Affecting Plants
216	Integrated Pest Management Systems
601	Economics of Agricultural Production and Farm Management

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
- Populations changes (immigration, new cultural groupings, etc.)
- Other (Late spring cold weather reduced wheat yields 50%.)

Brief Explanation

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

1. Evaluation Studies Planned

- Before-After (before and after program)
- During (during program)

Evaluation Results

Key Items of Evaluation

V(A). Planned Program (Summary)

Program # 12

1. Name of the Planned Program

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	5%		5%	
212	Pathogens and Nematodes Affecting Plants	5%		60%	
213	Weeds Affecting Plants	5%		5%	
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins	70%		20%	
903	Communication, Education, and Information Delivery	15%		10%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

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

Year: 2009	Extension		Research	
	1862	1890	1862	1890
Plan	1.5	0.0	4.0	0.0
Actual	1.2	0.0	2.0	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**
22000	0	80120	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
22000	0	80120	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
270000	0	552803	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Establish the Oklahoma National Institute for Microbial Forensics and Agricultural Biosecurity (NIMFAB).
Host a workshop on plant pathogen forensics for training agency personnel.
Conduct scientific research focused on plant pathogen forensics, sociological impacts of terrorist acts and other areas of

agricultural biosecurity.

Develop an academic track for students seeking graduate degrees in forensic sciences dealing with microbial forensics, plant pathogen forensics and agricultural biosecurity.

Develop an undergraduate course in Agricultural Bbiosecurity

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 producers and crop consultants
Master gardeners
Oklahoma
OSU students and faculty
Professional/scientific societies
Key industries
The public

V(E). Planned Program (Outputs)

1. Standard output measures

2009	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Plan	300	100	0	0
Actual	535	200	0	0

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

Year: 2009
Plan: 0
Actual: 1

Patents listed
bio pathogen sensor device

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2009	Extension	Research	Total
Plan	1	4	
Actual	0	11	11

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

Year	Target	Actual
2009	8	41

Output #2

Output Measure

- Workshops to develop the discipline of plant pathogen forensics, train "first responders", and state and national stakeholders

Year	Target	Actual
2009	1	1

Output #3

Output Measure

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

Year	Target	Actual
2009	4	22

Output #4

Output Measure

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

Year	Target	Actual
2009	5	14

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

Outcome #1

1. Outcome Measures

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 Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	20	36

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
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.

What has been done
1. Developed real time PCR protocols for high priority plant pathogens.
2. Developed an agricultural database for the FBI microbial rosetta stone central agricultural database.
3. Developing a molecular pathogen strain discrimination tool.
4. Developed a decision tool to assist law enforcement to determine whether a disease outbreak is natural or intentional.

Results
1. Established operation plans including model pathogens.
2. Curated 100 high consequence plant pathogens and provided information to FBI.
3. One graduate student graduated and published one manuscript.
4. Developed poster presentation for national professional meeting.

4. Associated Knowledge Areas

KA Code	Knowledge Area
212	Pathogens and Nematodes Affecting Plants
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins
903	Communication, Education, and Information Delivery

Outcome #2

1. Outcome Measures

Number of forensics-relevant journal articles published

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	2	11

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
212	Pathogens and Nematodes Affecting Plants
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins
903	Communication, Education, and Information Delivery

Outcome #3

1. Outcome Measures

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

Not Reporting on this Outcome Measure

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
- Other (exotic pathogens, terrorism)

Brief Explanation

1. The FBI Scientific Working Group on CBRN Threats, established in 2003 to foster inter-agency communication and to gain academic and industry contributions to the development of the field of microbial forensics, was discontinued. This action affects the number and quality of NIMFFAB interactions with the FBI.

2. Increased restrictions on the ability of foreign nationals to work on certain biosecurity-related (and dual use) projects funded by federal security agencies has affected the ability of some NIMFFAB faculty to work on these projects and also has led to our stated preference for U.S. citizens when bringing faculty members, graduate students and postdocs into our programs.

3. USDA-CSREES has restructured the research priorities and framework for developing grants, moving towards larger, multidisciplinary programs in fewer emphasis areas. This is likely to have a major impact on biosecurity awards in the future.

4. A number of high-profile food-borne pathogen outbreaks occurred in 2009, continuing a multi-year trend in the increase of foodborne illnesses. As a result, food safety was named as one of the major S&T focus areas for the Obama administration (and a priority for the White House Office of Science & Technology Policy). Further, food safety also was named as one of the five major Emphasis Areas for 2010 NIFA proposals (RFA imminent). These factors place NIMFFAB food safety researchers in a position to take advantage of potential new funding streams.

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

1. Evaluation Studies Planned

- During (during program)
- Time series (multiple points before and after program)

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%	

V(C). Planned Program (Inputs)

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

Year: 2009	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	0.0	8.0	0.0
Actual	0.0	0.0	6.0	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	217469	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
0	0	217469	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
0	0	1500465	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

2009	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: 2009

Plan: 1

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2009	Extension	Research	Total
Plan	0	10	
Actual	0	21	21

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of manuscripts submitted based on reserach efforts

Year	Target	Actual
2009	8	21

Output #2

Output Measure

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

Year	Target	Actual
2009	16	13

Output #3

Output Measure

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

Year	Target	Actual
2009	16	27

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

Outcome #1

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	3	12

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Knowledge of the basic mechanisms that drive cell and organism growth are essential for human health and productivity of society. The structure and function of macromolecules is requisite knowledge to understanding life processes. Research and development in the life sciences is dependent on training of young scientists.

What has been done
Graduate training through formal programs and mentoring of young scientists through post doctoral programs is necessary for training new scientists. We continue to develop and maintain graduate education programs.

Results
Graduate and post graduate students are trained through formal course work and in lab mentoring.

4. Associated Knowledge Areas

KA Code	Knowledge Area
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

Number of manuscripts published

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	8	21

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Society is dependent on development of knowledge in the life sciences. Results of research that elucidates life systems must be circulated throughout society through the mechanism of publication.

What has been done
Life science research conducted in labs funded through the program results in publications.

Results
Publications depicting results of research funded through the program are subjected to peer review and published in journals with world wide circulation.

4. Associated Knowledge Areas

KA Code	Knowledge Area
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

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

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	5	6

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Results of life science research are discussed and circulated among peers working within the same area of research. These discussions and reviews result in increased productivity and circulation of new knowledge that provides for advances in our society.

What has been done
Scientists supported with the program funds have achieved national and world wide recognition and have been invited to national and international meetings to present and discuss results. Scientists and students attend and participate in science and technical meetings.

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
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

- Economy
- Appropriations changes
- Competing Public priorities

Brief Explanation

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

1. Evaluation Studies Planned

- During (during program)
- Time series (multiple points before and after program)

Evaluation Results

Key Items of Evaluation

V(A). Planned Program (Summary)

Program # 14

1. Name of the Planned Program

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	70%		100%	
602	Business Management, Finance, and Taxation	30%		0%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

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

Year: 2009	Extension		Research	
	1862	1890	1862	1890
Plan	8.8	0.0	4.0	0.0
Actual	6.0	0.0	2.0	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**
104000	0	62952	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
104000	0	62952	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
1427413	0	434345	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

2009	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Plan	500	1000	100	200
Actual	11912	97000	150	4800

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

Year: 2009
Plan: 0
Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2009	Extension	Research	Total
Plan	10	10	
Actual	30	20	50

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

Year	Target	Actual
2009	50	35

Output #2

Output Measure

- Number of software decision analysis aids developed

Year	Target	Actual
2009	2	5

Output #3

Output Measure

- Number of manuscripts submitted to refereed journals

Year	Target	Actual
2009	10	36

Output #4

Output Measure

- Number of farm income tax managment schools conducted

Year	Target	Actual
2009	10	12

Output #5

Output Measure

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

Year	Target	Actual
2009	0	125

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	Improved Cull Cow Marketing

Outcome #1

1. Outcome Measures

Number of tax preparers using information from OCES tax schools

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	300	1250

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
OSU's Division of Agricultural Sciences and Natural Resources, the Oklahoma Cooperative Extension Service, and the Agricultural Economics Department have sponsored the annual Farm & Business Tax Institute since 1962. Initially the Institute educated farmers, tax return preparers, and Extension specialists to properly prepare farm income tax returns. Over the years it has evolved into a professional continuing education program for tax practitioners addressing broader issues affecting individual taxpayers and businesses.

What has been done
The Fall Farm and Business Tax Institutes include ten 2-day sessions which are held in November and December at a variety of locations across Oklahoma. The educational content is updated each year and covers tax preparation issues that affect tax return preparers nationwide. Issues affecting Oklahoma preparers are often included in the workbook and included in the information presented at the institutes.

Beginning in the summer of 1989, the Summer Farm and Business Tax Clinics were introduced. These are 2-day sessions which are held annually in July and conducted in Oklahoma City and Tulsa. They are designed to explain tax issues that need more detailed coverage than the time allowed in the fall institutes as well as provide coverage of new legislation passed after the first of the year. In addition, different tax return preparation issues are covered in the summer clinics than those covered in the fall institutes.

In 2009, over 1,950 taxpreparers attended the ten fall institutes and the two summer clinics. High quality, professional instruction is provided to make continuing education credit available for Certified Public Accountants, Enrolled Agents, and Tax Attorneys as well as provide technical education for all tax return preparers. Most of the taxpreparers 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. Several participants have indicated that the ability to speak with a representative from Internal Revenue Service and/or the Oklahoma Tax Commission is part of the reason they attend plus the ability to learn about agriculture tax issues.

Results
Participants in these schools have indicated on the evaluation form that they file approximately 250,000 Federal non-farm income tax returns as well as 57,750 Federal farm returns. This is roughly 70 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 (192 returns) the value of the tax schools is over $7,357,000 for 2009.

4. Associated Knowledge Areas

KA Code	Knowledge Area
602	Business Management, Finance, and Taxation

Outcome #2

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	130	145

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 eleven times (spring and fall) with nine advanced sessions. Over 3600 directors have attended the Credentialing sessions and over 1,000 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

KA Code	Knowledge Area
602	Business Management, Finance, and Taxation

Outcome #3

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	100	20

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
601	Economics of Agricultural Production and Farm Management
602	Business Management, Finance, and Taxation

Outcome #4

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	150	95

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Meat goat production continues to be a fast growing agricultural enterprise in Oklahoma. It provides many small and mid-sized operators an opportunity for profitable returns on a reasonable investment.

What has been done
The fifth Oklahoma Meat Goat "Boot Camp" was conducted and attended by 35 producers representing about 3,900 meat goats.

Results
Prior to the training, producers indicated they conducted about 46.9% of the suggested practices. By the end ot the camp, they indicated they would conduct 97.8% of the suggested practices. Producers put a value of $17.50 per head on the information they gained and skills developed while at the Boot Camp. This represented a $67,800 value gained from this one Boot Camp.

4. Associated Knowledge Areas

KA Code	Knowledge Area
601	Economics of Agricultural Production and Farm Management
602	Business Management, Finance, and Taxation

Outcome #5

1. Outcome Measures

Improved Cull Cow Marketing

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	{No Data Entered}	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
For cow-calf producers, cull cow sales represent 15 to 20 percent of total ranch revenues. In many cases little thought is given to opportunities to economically increase the value of cull cows or change the timing of cull cow sales relative to the strong seasonal price tendencies of cull cow prices. In 2009, an added dimension was the plans for several dairy herd buyout programs that were expected to have short term impacts on cull cow prices. Beef cattle producers were very concerned about the timing of those additional dairy cow sales and the impacts they would have on cull cow markets.

What has been done
Increased efforts to notify beef producers of the pending dairy herd buyouts, the exact timing and number of animals involved and potential magnitude of impacts on cull cow prices. This information helped producers plan cull cow sales to avoid potential short term market lows. More generally, the impact of dairy herd buyouts and other factors provided an opportunity to highlight and emphasize opportunities to improve cull cow marketing relative to the normal practice of selling cull cows at the seasonal low price in the fall. For several months, outlook presentations and newsletter articles highlighted the normal seasonal patterns, the potential to add weight and value to cull cows by changing the timing of sales and the likelihood that 2009 was a good year to consider such opportunities.

Results
With respect to the dairy buyouts, the first of these occurred in May and June and the impacts were much as expected and previously communicated to producers. Cull cow prices in early June averaged about $7/cwt. lower than the prices four weeks before and after early June. Thus, the ability to avoid marketing at the short run low prices represents approximately $80/head for a typical cull cow. In the fall, when the majority of cull cows are marketed, the third dairy buyout, combined with other market conditions made it likely that holding and feeding cull cows would significantly enhance value. Producers were encouraged from summer into the fall to consider the potential value of feeding and delayed marketing of cull cows. The normally strong seasonal price pattern was stronger than usual this year and cull cow prices increased over 30 percent from the November 2009 low until mid-February 2010. The increased price plus expected weight gain over the period resulted in increased cull cow value of roughly 50 percent or over $200/head. Despite the unusually severe winter and cost of feeding cull cows, producers could have benefited from enhanced cull cow marketing realizing anywhere from $50 to $125/head of net return.

Oklahoma is the second largest beef cow state with 2.073 million head of beef cows. Approximately 12 percent or nearly 250,000 cows would typically be culled each year. The total industry potential value for one year is therefore $12.5 to over $31 million. If only 10 percent of the cull cows utilized this opportunity, the value would be from $1.25 to $3.1 million. Although there is no complete measure of producer's cull cow marketing practices in 2009, there is anecdotal confirmation that some producers took advantage of this opportunity.

4. Associated Knowledge Areas

KA Code	Knowledge Area

601 Economics of Agricultural Production and Farm Management

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.)

Brief Explanation

In 2009 farmers and agribusiness operators experienced a continued volatility in commodity and input prices. A late freeze and prolonged drought severly impacted wheat production. This environment created tremendous demand for Farm and Agribusiness Team members to respond to provide information and assistance to farmers and agribusiness managers. Responding to these urgent needs competed for time and resources relative to the planned activities and golas.

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

1. Evaluation Studies Planned

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

Evaluation Results

Key Items of Evaluation

V(A). Planned Program (Summary)

Program # 15

1. Name of the Planned Program

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	54%		10%	
205	Plant Management Systems	15%		25%	
307	Animal Management Systems	5%		15%	
402	Engineering Systems and Equipment	26%		50%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

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

Year: 2009	Extension		Research	
	1862	1890	1862	1890
Plan	4.0	0.0	4.0	0.0
Actual	1.0	0.0	2.4	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**
31000	0	85843	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
31000	0	85843	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
546000	0	592289	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

2009	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Plan	400	1200	0	0
Actual	1812	8600	0	0

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

Patent Applications Submitted

Year: 2009
Plan: 0
Actual: 1

Patents listed
plant nutrient sensor

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2009	Extension	Research	Total
Plan	1	8	
Actual	0	7	7

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

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

Year	Target	Actual
2009	8	56

Output #2

Output Measure

- New technology applications

Year	Target	Actual
2009	2	1

Output #3

Output Measure

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

Year	Target	Actual
2009	30	50

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

Outcome #1

1. Outcome Measures

Commercialization of hardware/instrumentaion

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	0	1

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Nitrogen is a limiting resource in crop production. Nitrogen use efficiency in cereal crops is approximately 33%. Producers need to be able to better utilize nitrogen in crop production but must also limit its use such that costs remain low and so that excess nitrogen does not escape the production system to off-site locations and serve as a pollutant.

What has been done
Optical tractor and hand held sensor devices have been developed that provide in field instantaneous analysis of nitrogen need in crops. The sensors have and/or are being developed for commercialization to assist in crop production.

Results
A hand held optical sensor has been developed that may ultimately be available on the market at a cost of approximately $100 per unit.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
205	Plant Management Systems
402	Engineering Systems and Equipment

Outcome #2

1. Outcome Measures

Number of producers adopting and practicing sensor-based technologies

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	500	500

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
205	Plant Management Systems

Outcome #3

1. Outcome Measures

Number of acres where sensor-based technologies are applied

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	140000	150000

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Better utilization of crop nutrients will reduce production costs and serve to limit off site negative impact of nutrients that escape production systems.

What has been done
Extension education and demonstration programs to industry and production groups have resulted in deployment of sensors for efficient application of nutrients. Results of surveys provide indicators of increased use of sensors in managing nutrients.

Results
Approximately 150,000 acres of wheat are monitored for nitrogen use and results are used to determine application rates.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
205	Plant Management Systems

V(H). Planned Program (External Factors)

External factors which affected outcomes
- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Appropriations changes
- Other (commercialization opportunities)

Brief Explanation

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

1. Evaluation Studies Planned

- During (during program)
- Time series (multiple points before and after program)
- Comparisons between different groups of individuals or program participants experiencing different levels of program intensity.

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

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	100%		100%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

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

Year: 2009	Extension		Research	
	1862	1890	1862	1890
Plan	1.0	0.0	3.0	0.0
Actual	0.3	0.0	4.7	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**
11333	0	171686	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
11333	0	171686	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
135000	0	1184578	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

- •Project proposals
- •Technical presentations
- •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

2009	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Plan	400	1000	0	0
Actual	998	220000	0	0

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

Year: 2009
Plan: 2
Actual: 3

Patents listed
Downdraft gaifier
Method to recycle enzymes
'Cimarron' switchgrass

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2009	Extension	Research	Total
Plan	1	10	
Actual	3	24	27

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Journal Articles

Year	Target	Actual
2009	6	17

Output #2

Output Measure

- Technical papers and presentations

Year	Target	Actual
2009	15	56

Output #3

Output Measure

- New processes developed

Year	Target	Actual
2009	2	3

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

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

Outcome #1

1. Outcome Measures

Products/processes taken to commercialization by industry

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	1	1

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Replacing foreign petroleum with domestic energy sources has become a priority for the nation. Using domestic energy sources enhances energy security while promoting economic growth. An exciting domestic energy source is ethanol from renewable resources, particularly cellulosic materials such as grasses, wood, and crop residues.

What has been done
Breeding grass crops for biomass production.
Developing harvesting and storage methods and practices for grass biomass.
Developing biomass conversion to ethanol through gasification.

Results
One new grass cultivar, 'Cimarron' was released for commercial production.
Sorghum biomass crop production practices were developed and results extended to producers.

4. Associated Knowledge Areas

KA Code	Knowledge Area
511	New and Improved Non-Food Products and Processes

V(H). Planned Program (External Factors)

External factors which affected outcomes

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

Brief Explanation

The decrease in available state funding for biofuel research had a negative impact on this program. While several studies have established some baseline information supporting the industry, lignocellulosic biofeedstock processing is still in its infancy, particularly in the area of densification and alternative methods of handling. More research support is required to move Oklahoma into a competitive

position, making it more attractive for a biorefinery to become established in Oklahoma.

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

1. Evaluation Studies Planned

- During (during program)

Evaluation Results

{No Data Entered}

Key Items of Evaluation

{No Data Entered}