

2007 Oklahoma State University Combined Research and Extension Annual Report

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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 several years we have developed multi-disciplinary TEAMS of research and extension faculty based on priority research and extension needs. The TEAMS are based on priorities identified by stakeholders and research and extension faculty and specialists. Our Planned Program areas as identified in our Plan of Work serve as overarching guides for the priority areas. Each of the TEAM activities is thus covered under one of the Planned Program areas. Each of the research and extension faculty members and/or specialists remains administratively connected to a disciplinary department or geographic unit. However, each also plans and conducts research and/or extension program efforts in close collaboration with other individuals within at least one multi-disciplinary TEAM.

Significant research and/or extension efforts and developments during 2007 included the following.

Agricultural Biosecurity. The National Institute for Microbial Forensics for Agricultural Biosecurity (NIMFAB) was formally established within DASNR in 2007. A Director was named and one new faculty member hired and a second position is currently advertised. Two significant grants were awarded to the Institute included a national needs fellowship award through NSF and a privately funded award through Fresh Express, to conduct research in the area of microbial forensics. Four graduate students have been recruited and are conducting research under the auspices of the program. Additionally, the OSU Provost office selected this program as the lead unit for developing a cluster of faculty members to develop research, extension and teaching programs and has promised funding for hiring three additional faculty members as part of the Institute.

Bio-based Products. The Oklahoma Bioenergy Center was initiated by the state of Oklahoma in 2007 and the research and extension efforts within DASNR are the prominent activities. Based on research and extension efforts within DASNR the state legislators and governor allocated \$10 million toward research and extension efforts for fiscal year 2008, promised an additional \$30 million over the next three years, and appropriated \$10 million for construction of a research and extension center to be focused on bioenergy efforts in southern Oklahoma in collaboration with the Noble Foundation, Ardmore.

Crop Enterprises. In 2007, a no-till cropping systems handbook was published. Three thousand copies of "No-till Cropping Systems in Oklahoma" was distributed to producers, Extension Educators, and consultants. Six no-till meetings were held around the state with over 800 combined attendees. Preliminary results of a no-till survey conducted in Oklahoma indicated that 33% of the 1,200 respondents practiced no-till. This is a substantial increase compared to the 2004 numbers of approximately 8%.

Consumer Horticulture. The Oklahoma Master Gardener Program now has 24 counties participating in the program. A survey conducted in 15 of the 24 counties shows: 215 new Master Gardeners trained in 2007; 987 active Master Gardeners volunteered their time, contributing 48,518 hours of volunteer service and reaching over 224,867 Oklahomans with over 1000 educational and community programs. This translates to over \$910,683 in-service that was donated by volunteers.

Human Nutrition and Health. The Healthy Oklahoma Impact Program reached 6,810 youth during the program's first two years (2006-07). Important improvements in food, nutrition and physical activity behavior were observed among Oklahoman youth who participated in the "Healthy Oklahoma" Impact Program. Statistically significant improvements in food and nutrition behaviors were observed among Oklahoma youth with: 24% increase in milk intake, 23% increase in fruit intake, 21% increase in vegetable intake, 14% increase in eating breakfast, 27% increase in eating smaller portions of unhealthy foods, 31% increase in reading food labels to learn serving sizes, 31% increase in reading food labels to make healthy food choices, and 21% increase in time spent in physical activity. These outcomes represent improvements in food, nutrition and physical activity behaviors which can decrease the risk of overweight related chronic diseases including type-2 diabetes, heart disease, stroke, and certain types of cancer and food borne illness.

Community Resource and Economic Development. To address the difficulties faced by our small rural manufacturers, the Applications Engineering program provides technical 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. One measurement of impact 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. In 2007, the Applications Engineers client projects had the following impacts: sales increase of \$87,325,002; sales retained (otherwise been lost) \$19,057,500; cost savings \$8,590,919; costs avoided \$13,643,600; 268 new jobs created at \$75,511 per job for \$20,236,948; 306 jobs retained at \$75,511 per job \$23,106,366; 4 jobs lost at \$75,511 per job -\$302,044; investment in new plant facilities and equipment \$16,403,940; for a total impact of \$188,062,231.

Sensor-Based Technologies. Sensors have been developed that can determine need for fertilizers in crops. Use of the sensor to determine whether deficits occur can provide better use and application of costly fertilizers saving producers and consumers money. Extension personnel worked with producers to establish variable rate fertilizer strips of crops in fields so that sensors could be used to document differences in fertilizer activity and resulting plant growth and production. Green Seeker hand-held sensors were used in 586 fields (representing over 250,000 acres) to take readings on plant health and measures used to make decisions as to fertilizer application and rate. Producers using the system were found to apply approximately 25% less nitrogen at a savings of approximately \$15/acre. The resulting savings in fertilizer use is estimated over \$3.3 million.

Plant Biological Technologies: Molecular research requires advanced instruments and technical expertise that are not available to individual research programs and therefore we have developed a CORE facility that supports basic research across disciplines and units. The Facility was awarded more than \$500,000 in extramural federal funding and more than \$450,000 in local awards to acquire cutting edge major equipment to analyze DNA and proteins. The Facility also participated in community outreach (30 contacts), faculty recruitment (40 contacts), and student education (60 contacts).

Technology Partnership Practice of the Battelle Memorial Institute was commissioned in 2007 to review and investigate economic impacts of DASNR programs. In that process the following three case studies were highlighted by the Battelle study.

Selected impacts on Oklahoma Wheat Industry

DASNR research and extension increased productivity and profitability in multiple ways:

- Planting and stocking rate efficiencies for dual-use wheat = \$121 million
- Grazing termination and optimization = \$42 million
- OK Green Gold supplementation = \$11 million
- 20% estimated productivity improvement for DASNR-developed winter wheat varieties = \$220 million in output (\$120 million value-added, \$20 million in labor income, 4,400 jobs)

Selected Impacts on Oklahoma Cattle Industry

Multiple DASNR research and extension projects in nutrition, forage operations, dual-use wheat reproductive science, waste management, value-added products, and production recommendations-result in broad economic impacts.

- Calf preconditioning recommendations with potential for total direct impact (in terms of cattle value increases) of \$37 million
- 5 to 15% productivity increase, via DASNR recommendations resulting in efficiency and value gains (at just the 5% level), \$285 million in increased output, \$91 million in value-added, 3,375 jobs, and \$25 million in labor income.

Selected Impacts on Oklahoma Turfgrass Industry

Oklahoma turfgrass industry is built on high-performance DASNR developed varieties. OSU has top performing variety in independent trials.

- Sod production has a \$77 million total impact in Oklahoma and generates 1,000 jobs. Large proportion of benefits from this industry are allocable to DASNR breeding, management research and extension activities.
- Extension recommended practices in roadside verge maintenance, saving state \$560,000 annually.

Total Actual Amount of professional FTEs/SYs for this State

Year:2007	Extension		Research	
	1862	1890	1862	1890
Plan	159.0	0.0	55.0	0.0
Actual	263.0	0.0	83.0	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 Experiment Station projects, whether supported by Hatch or McIntire-Stennis funds, are peer reviewed prior to submission. This includes the Special Grants. It should be noted that stakeholder input into the planning process, position priorities, and research areas to be pursued by the scientists could be considered as the initial step in the review process. This valuable input helps in the merit and relevancy of our projects; it is a continual practice during the decision process to fill new positions, and direct research efforts and approaches to high priority needs.

Each department in OAES is required to have three reviews for a project (selected by the appropriate Department Head), with one of those reviews being external to the department. In those cases, this will be from another department in the Division, from another College at OSU, or another state with expertise in the area. These reviews are approved at both the departmental and OAES Directorate levels before submission to CSREES. The principal investigator is required to respond to the comments provided by the reviewers before final approval is granted.

All OAES/OCES teams are required to have a team plan of work which is reviewed by team members, the administrative leaders, and the appropriate OAES/OCES assistant and associate directors. All team plans of work are reviewed with respect to relevance, the Division Strategic Plan, stakeholder input, and team competitive advantage. All individual OCES plans of work (5-year and annual) developed by county, area, district and state program professionals are reviewed in reference to quality and relevance by at least two individuals with program and/or administrative responsibility pertinent to the individual's program area. The reviewers assess the merit of the program plans of work with respect to issues, needs, and problems identified through stakeholder input, quantity of effort planned in relation to appointment, and plans to evaluate and report program quality and impact. County 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 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 state-wide and unit advisory groups are notified through direct contact. Several programs have targeted non-traditional stakeholder participation - including sustainable agriculture, agri-biosecurity, water, wildlife, youth, etc. Several surveys of existing and potential interest groups were conducted during the year as part of graduate student programs and the Oklahoma Agricultural Statistics group has worked with us on several farm related surveys. Farm commodity groups regularly are invited to campus and we attend most of their meetings in order to hear input.

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

Collecting, analyzing, and communicating stakeholder input is a continuous and broad-based process within the Oklahoma Cooperative Extension Service (OCES) and the Oklahoma Agricultural Experiment Station (OAES). In this process, a variety of strategies and techniques are used to seek stakeholder input and encourage participation. The Division of Agricultural Sciences and Natural Resources (DASNR) has a broad-based advisory council representing industry, agencies and communities. This DASNR Advisory Committee met on April 11 and October 30 of 2007. In addition, all the DASNR units have one or more advisory committees. For example, the Biosystems and Agricultural Engineering Advisory Committee met April 26-27, 2007; the Oklahoma Food and Agricultural Products Research and Extension Center (FAPC) Industry Advisory Committee met twice – June 14 and November 8; and the Oklahoma Sustainable Agriculture program advisory committee met November 8.

The OCES has maintained a grass-roots Program Advisory Committee System for years. This past year, 2-4 of these groups met in 76 counties in the state. Summaries of their input can be found at <http://intranet.okstate.edu/OCES/index.htm>

Numerous program advisory committees also met during the year. For example, the following committees met: Advisory Boards to the County Training Program met in January and July; Fitzwater Cooperative Chair Advisory Committee met in April and July; the Bollenbach Wildlife Advisory Committee met in May; Advisory Committee for the DNA/Protein Resource Facility met in September; the Soil Fertility Research and Education Advisory Board met in May and December and the Ag in the Classroom Advisory Committee met in March, May August and October.

OAES and OCES use OSU and DASNR media resources to seek input from traditional and new stakeholders. During the year OCES and OAES representatives attended numerous meetings with commodity groups including: Ok Wheat Growers Assoc., Ok Wheat Commission, Ok Peanut Commission, Ok Hay and Seed Assoc., Ok Greenhouse Growers, Ok Nursery and Landscape Assoc., Texas-Oklahoma Cotton Working Group, Ok Vegetable Assoc., Oklahoma-Kansas Canola Growers Association; Oklahoma-Texas Watermelon Association, Ok Turfgrass Research Foundation, Ok Wheat Research Foundation, Ok Golf Course Superintendents Assoc., Ok Crop Improvement Assoc., Ok Home and Community Education Assoc., Ok Grain and Feed Assoc., Grain Elevators and Processors Society, Ok Grape Growers and Winemakers Assoc., Ok Pecan Growers Assoc., Ok Cattlemans Assoc., Beef Industry Conference Advisory Committee, and Ok Beef Industry Council.

During the year, we also sought stakeholder input through interactions with many agencies, governmental and non-governmental entities such as: Ok Department of Agriculture, Food and Forestry, Ok Council on Economic Education, Ok Bankers Association, Federal Reserve Bank, Noble Foundation, Kerr Center for Sustainable Agriculture, Consumer Credit Counseling Services, Ok Department of Human Development and Family Services, and Ok Agricultural Statistical Services.

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)

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3. A statement of how the input was 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

During 2007, Phase II of a study of the Division’s Agbioscience Activities was completed by the Technology Partnership Practice of the Battelle Memorial Institute. The study (Phase I and Phase II) looked at the agbioscience sector in Oklahoma and the Division’s activities as well as functional impact through applications in science, technology, training, community service, workforce development, and knowledge diffusion. This report was shared with numerous advisory and stakeholder groups. It generated discussion and input from these groups and individuals. To view the Phase II report go to <http://www2.dasnr.okstate.edu/OSU%20DASNR%20Executive%20Summary.pdf>

Input from advisory groups and other stakeholders is used broadly to provide direction to the system as a whole and to individual programs. Program Advisory Committee input provides direction for local programs as well as program development at the area and state level in Extension and also at times provides feedback and direction to applied research. These committees also provide direction to county, area and state extension personnel as they write their annual plans of work. For example, recent emphasis in meat goat production was in part due to the input by local PACs. Commodity group panels often provide direction directly to extension specialists and researchers and often support those efforts with funding. These groups typically provide input into research and extension personnel needs. An example would be input from commodity groups and farm organizations recently looking at development of biodiesel which would use sorghum as one of the plant feedstocks. This generated considerable research and extension effort into production of sweet sorghum. Input from other program areas such as sustainable agriculture gets written directly into those program plans of work. Broad input from groups such as the Dean’s Advisory Council and the FAPC Advisory committee often directly effect direction of hiring emphasis. A recent example would be the hiring of an extension state specialist to improve training and certification of non-traditionally trained vocational agriculture teachers around the state. Likewise advisory groups and volunteers provide direction in hiring needs in family and consumer science and youth programs. Volunteer advisory groups also provide important input. An Oklahoma County Master Gardener group helped lead the effort for OCES and the City of Edmond to develop a low water use and maintenance educational garden and landscape demonstration.

Brief Explanation of what you learned from your Stakeholders

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IV. Expenditure Summary

1. Total Actual Formula dollars Allocated (prepopulated from C-REEMS)			
Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
5132629	0	5638219	0

2. Totaled Actual dollars from Planned Programs Inputs				
	Extension		Research	
	Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
Actual Formula	5793919	0	5014000	0
Actual Matching	5793919	0	5014000	0
Actual All Other	20517000	0	23326000	0
Total Actual Expended	32104838	0	33354000	0

3. Amount of Above Actual Formula Dollars Expended which comes from Carryover funds from previous years				
Carryover	661290	0	0	0

V. Planned Program Table of Content

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

Program #1

V(A). Planned Program (Summary)

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	32%		24%	
302	Nutrient Utilization in Animals	4%		5%	
303	Genetic Improvement of Animals	1%		2%	
304	Animal Genome	0%		4%	
305	Animal Physiological Processes	0%		4%	
306	Environmental Stress in Animals	0%		2%	
307	Animal Management Systems	52%		35%	
308	Improved Animal Products (Before Harvest)	6%		4%	
311	Animal Diseases	3%		15%	
315	Animal Welfare/Well-Being and Protection	2%		5%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

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

Year: 2007	Extension		Research	
	1862	1890	1862	1890
Plan	22.0	0.0	8.0	0.0
Actual	28.8	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
644679	0	552000	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
644679	0	552000	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
2250000	0	2568000	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 Bovine Viral Disease Virus (BVDV) infected beef breeding herds and develop a control program including biosecurity and enhanced vaccination programs.

Demonstrate the economic effects of BVDV and Bovine Respiratory Disease (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.

Developed meat goat production handbook and meat goat production educational program.

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

Target for the number of persons (contacts) reached through direct and indirect contact methods

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
Plan	550	1550	100	200
2007	196792	12085391	2100	3000

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

Patent Applications Submitted

Year	Target
Plan:	0
2007 :	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

	Extension	Research	Total
Plan			
2007	38	39	77

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Conferences, symposiums, and meetings

Year	Target	Actual
2007	20	181

Output #2

Output Measure

- Peered reviewed journal articles

Year	Target	Actual
2007	10	39

Output #3

Output Measure

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

Year	Target	Actual
2007	15	38

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	Number of cattle identified in compliance with the National Animal Identification Plan
3	Total number of producers certified as Master Cattlemen
4	Number of producers implementing improved management, grazing systems and beef production systems resulting in improved sustainability.
5	Number of producers implementing management programs to decrease the incidence and economic impact of BVDV and BRD
6	Meat Goat Numbers in the State

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
2007	10000	0

3c. Qualitative Outcome or Impact Statement**Issue (Who cares and Why)**

One of the largest threats to the livestock industry is the natural or intentional disease outbreak that affects the marketing of livestock products. A National Animal Identification System (NAIS) has been proposed to help control a disease outbreak should it occur in the United States. The NAIS proposes a combination of identifying locations where animals are present (premise identification), unique animal identification, and a movement database to allow determination of diseased animal movements and potential animals infected within two days. A recent report suggest the being able to reduce the time to track diseased animals from eight days to two days may reduce the direct economic impact on the livestock industry by 7.2 billion dollars. While the NAIS has undergone a change to not be federally mandatory by 2009, voluntary participation is being promoted under Federal/State/Industry partnerships.

What has been done

In 2007, four external grants and three internal grants were submitted related to electronic animal technologies and NAIS related education. A survey was conducted at the Oklahoma Cattlemen's Convention to determine the attitudes and perception of Oklahoma cattlemen related to the NAIS. Five Extension Educator, 29 adult producer, and 6 youth/adult activities were held in which use of electronic identification (EID) technologies for NAIS or production management were discussed or demonstrated. Both the Willard Sparks Research Center and the North Range Beef Cattle Unit have been equipped with EID technologies which are being integrated into the unit management systems. As technology advancements occur, they are evaluated for practical usefulness at the research stations. We continue to expand and update educational material on our www.OKAnimalID.com website. Shirt pocket NAIS and electronic identification management folders developed and printed in late 2006 were distributed to County Educators.

Results

In 2007 external grants were secured for related research totaling over \$324,000 and extension grants totaling \$50,440.

While our goal is to provide education related to NAIS, records indicate that 3,178 Oklahoma livestock premises were registered in 2007

We have directly assisted in the tagging of over 22,000 animals with electronic identification tags in OSU livestock production units and youth livestock projects.

Assisted 5 Oklahoma companies developing electronic livestock identification and monitoring solutions with various aspects of grant funding seeking, product testing and evaluation.

Efforts have resulted in 1 peer reviewed publication, two abstracts with presentations, and a web article.

4. Associated Knowledge Areas

KA Code	Knowledge Area
307	Animal Management Systems

Outcome #2

1. Outcome Measures

Number of cattle identified in compliance with the National Animal Identification Plan

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	25000	22000

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

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4. Associated Knowledge Areas

KA Code	Knowledge Area
307	Animal Management Systems

Outcome #3

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
2007	250	355

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 OK 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. The objective of this project is to enhance the biological and economic efficiency, as well as enhance the quality of life of beef cattle producers, through a comprehensive and consistent educational curriculum delivered locally. The expected long-run impact of the Master cattleman program and associated education programs is that producers will have a better base for making decisions, improving financial and production performance and lowering (or reducing) risk.

What has been done**Beef Cattle Manual**

An interdisciplinary team of state specialists, area specialists and other professionals published a Beef Cattle Manual in spring 2004, which was updated and reprinted in fall 2005. The manual contains 40 chapters addressing various business, production, and natural resource topics. Updates for a new edition were begun in fall 2007.

Master Cattleman Program

A Master Cattleman program was developed using the Beef Cattle Manual as the primary reference. Learning modules including PowerPoint slides, lesson plans, a quiz and a quiz key were developed and made accessible to local educators and participants through the website, www.agecon.okstate.edu/cattleman. Extension educators coordinate meetings and provide instruction in cooperation with state and area specialists. To become a "Master Cattleman", a producer must complete twenty eight hours of instruction and successfully complete the quiz associated with each learning module.

Master Cattleman Summit

In August 2006, the first Master Cattleman Summit was held on campus with nearly 200 participants. The second Master Cattleman Summit was held in August 2007 on the OSU campus. Attendance was excellent with 140 participants for the two-day conference. For this conference, we were able to incorporate both the Electronic Cattle Management components and make use of the Clickers to enhance the learning experience. Feedback from these participants indicates that this was one of the most effective educational events our project management team has organized to date.

Website

The Master Cattleman website at agecon.okstate.edu/cattleman was continually updated. On the Resources page, results of surveys conducted with the initial manual distribution were posted. PPTs were reposted when updated. Efforts continued to refine the website to report data by year and to get county data and lists of graduates updated.

Results

Beef Cattle Manual

Approximately 7,500 manuals have been distributed through local Extension offices through 2007.

Master Cattleman Program

More than 550 students have enrolled in the program and more than 350 have "graduated", 43% of the graduations occurred in 2007. At present, there are approximately 130 continuing MC students. Twenty six county or multi-county units have initiated a Master Cattleman educational program. Through 2007, approximately 485 educational sessions have been conducted, with 101 of those held in 2007. Table 2 lists individual events for 2007.

Cow-calf assessment data continued and analysis of stocker assessment data was begun.

* Vestal, Mallory, C. Ward, D. Doye and D. Lalman. "Cow-Calf Production Practices in Oklahoma - Part 1." OSU AGE-245. October 2007.

* Vestal, Mallory, C. Ward, D. Doye and D. Lalman. "Cow-Calf Production Practices in Oklahoma - Part 2." OSU AGE-245. October 2007.

* Vestal, M., C. Ward, D. Doye and D. Lalman. "Is Anyone Doing What Experts Recommend? Analysis of Oklahoma Cow-Calf Producers' Management Practices." Selected Poster. SAEA Annual Meeting. Mobile, AL. February 2007.

At the Southern Association of Agricultural Scientists annual meeting in February, the principal investigators participated in an Organized Symposia, "Master Cattleman/Cattle Producer Educational Programs in the South". In addition, a presentation, "Reaching New Audiences with Oklahoma's Master Cattleman Program" was made at the National Farm Management Conference in Rochester, MN, June 2007.

Pocket-sized beef enterprise record books were printed with the Master Cattleman and RMA logos and distributed widely to producers through Extension educators. A fact sheet dealing with management and marketing of cull beef cows was developed and is in the process of being printed for broad distribution.

4. Associated Knowledge Areas

KA Code	Knowledge Area
303	Genetic Improvement of Animals
121	Management of Range Resources
307	Animal Management Systems
302	Nutrient Utilization in Animals
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 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
2007	2000	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Wheat Pasture Stocker Cattle Educational Programming

Over 600,000 stocker cattle, both imported and native, graze wheat pasture in Oklahoma in a typical year. Wheat forage is utilized on part of the over five million acres of small grain pasture in Oklahoma. The stocker cattle industry is the largest livestock enterprise in Western Oklahoma and adds millions of dollars in gross income to the economy. Buy-sell margin, stocker health, plus forage production, management and supplementation are key factors that affect the profitability of stocker cattle producers. Stocker cattle producers purchase both native calves and stocker calves imported from across the nation. Handling the various health and nutritional challenges of these stressed stocker calves are in high demand from stocker producer clientele. Many larger stocker operations manage large numbers of high-risk, stressed calves and require specialized educational programming. Other programming priorities for these producers include assisting these producers develop a balanced, low-cost forage growing program, proper nutritional supplementation and assistance with ration formulation utilizing various grain co-products.

What has been done

Wheat Pasture Stocker Cattle Educational Programming

Two wheat pasture stocker cattle conferences (Wheatland Stocker Conference, Enid & Southwest Stocker Cattle Conference, Lawton) were attended by over 350 stocker producers in 2007 to update producers on key management information. Three major topics are the center of the conference program. 1) Stocker health during the 45 day receiving period. Emphasis is placed on vaccine research, proper antibiotic use, and following beef quality assurance guidelines. 2) Market analysis for both buying stockers and selling feeder cattle. 3) A research update from the OSU Wheat Pasture Research Station.

Over 450 cattlemen attended 15 county educational meetings related to wheat pasture grazing. Topics covered included: 1) Supplementation to stretch wheat pasture. 2) Feeding the OSU small package supplement program. 3) Prevention of wheat pasture bloat. 4) Proper mineral supplementation. 5) Removing cattle from grazing at first hollow stem for maximum grain production. 6) Stocking rate research data. 7) Instruction and distribution of OSU computer programs to budget stocker purchases and evaluate feed rations. These topics were also covered in numerous farm visits, phone consultations, newspaper columns and county newsletter articles.

A statewide/multi-state conference - Stocker Receiving Management Conference - was held in Enid with more than 150 stocker producers, managers and veterinarians from 4 states attending. Stocker cattle receiving management, health and nutrition, are the major topics emphasized. Low Stress Cattle Handling was the topic that received the most positive producer feedback from the 2007 conference.

Results

Wheat Pasture Stocker Cattle Educational Programming

Producers gained key economic skills in determining the proper amount and type of feed supplements to provide to stockers on wheat pasture. Knowledge was gained for utilizing available feed grains or byproduct feeds as low cost alternatives for wheat pasture supplementation and for efficient growing programs prior to grazing. Producer attitudes were improved regarding their commitment to follow beef quality assurance guidelines. Key stocker budget factors were reviewed and lowering cost of production emphasized in presentations.

Reducing stocker health impacts and death loss is a key component to a profitable stocker cattle enterprise. The Stocker Receiving Management Conference reached influential managers and veterinarians to update them on the latest educational information on stocker topics regarding low stress handling, vaccination protocols, antibiotic effectiveness, and stressed calf nutritional requirements.

Forage Breeding

One new forage bermudagrass cultivar 'Goodwell' was released by Oklahoma Agricultural Experiment Station in March 2007. The cultivar has excellent cold hardiness and high forage yield potential under irrigation in the High Plains. Goodwell is shorter in plant height, and has larger stems and wider leaves and produces a denser sod than "hay type" standards Midland, Midland 99 and Tifton 44. Compared to "grazing type" cultivars like Greenfield, Goodwell is taller growing and has much larger stems and leaves, but forms a less dense sod. Planting stock of Goodwell will be distributed through licensed growers and a plant patent application has been submitted.

Half-sib seed of selected forage bermudagrass parents has been harvested in the fall 2007 and will be used to establish a selection nursery in the summer 2008.

Improved efficiency of feed and forage use by beef cattle**Maintenance energy requirements in beef cows**

Animal scientists determined that there is variation among beef cows for the amount of feed required to maintain weight during pregnancy. However the variation in maintenance energy requirements is not associated with the performance of calves. Identification of cows that require less energy to maintain weight may increase efficiency of production.

A major cost of beef production is the feed necessary to maintain weight of cows during pregnancy. There is at least a 25 % difference in the amount of feed required to maintain weight between the most efficient and least efficient cows. If cows could be identified and selected for a 5% increase in efficiency of feed utilization, this could reduce the cost of production of beef calves in Oklahoma by at least \$10,000,000 each year.

4. Associated Knowledge Areas

KA Code	Knowledge Area
121	Management of Range Resources
306	Environmental Stress in Animals
302	Nutrient Utilization in Animals
307	Animal Management Systems

Outcome #5**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 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	0	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Bovine Respiratory Disease, Bovine Viral Diarrhea Virus and other stress-related diseases of shipping-stressed stocker and feeder cattle are estimated to cost cattlemen \$800-900 million annually. Understanding the impact of stress and disease on muscle and fat growth potential is essential for improving production efficiency of beef cattle, as well as meat quality and food safety. Therefore, an acute phase immune response has the potential to have long-term effects on animal growth and development. In pigs, perpetual immune stimulation resulted in the production of proinflammatory cytokines (e.g., TNF- α , IL-6), which antagonized insulin-mediated anabolic processes. As a result, growth is potentially suppressed to ensure that adequate energy and nutrients are available for immune function and homeostasis. The loss of anabolic stimuli and increased mobilization of energy and protein retards growth. Because growth rate and efficiency are drivers of profitability in the beef cattle industry, understanding the biological links that exist between immune function and growth is essential for increasing profitability of the enterprise and producing wholesome beef.

What has been done

One project evaluates the effects of bovine respiratory disease on feedlot performance, carcass characteristics, meat quality, genomics, and metabolomics. A model has been established using a BRD pathogen (*Mannheimia haemolytica*) challenge following short-term exposure (72 h) to Bovine Viral Diarrhea (BVD) persistently infected calves. Based on preliminary results, the disease challenge model was successful in the induction of BRD associated with BVD and *M. haemolytica*. Results validating the challenge model include decreased feed intake, increased rectal temperature, and decreased percent blood lymphocytes, which are all confirmed indicators of morbidity in cattle. In addition, antibodies to BRD and BVDV in blood have confirmed that cattle were infected.

Our research has identified the diversity of bovine viral diarrhea viruses (BVDV) indicating the distribution of the BVDV subtypes, BVDV1a, BVDV1b, and BVDV2a. The predominant subtype in this region is BVDV 1b with approximately 80% of the isolates as BVDV1b with 10% each for BVDV1a and BVDV2a. However the US vaccine strains contain only BVDV1a and BVDV2a. Potentially the current BVDV vaccines are not protecting against the major BVDV subtype in cattle. The persistently infected (PI) animal with BVDV is the major reservoir of BVDV for susceptible cattle. We have utilized numerous tests to confirm PI cattle using viral isolation, immunohistochemistry, antigen capture ELISA (ACE), and PCR tests. We have found the ACE and IHC tests to be important tests to detect PI cattle. However the pooling of multiple samples for PCR testing has not been shown, in our hands, to be a reliable method to correctly identify PI animals with both false positives and false negatives using the pooled assay. We believe one test for one animal is the method of testing. Research has shown that susceptible calves exposed to PI cattle are more susceptible to *Mannheimia haemolytica* with resulting bovine respiratory disease signs. We have demonstrated that testing for and eliminating PI BVDV cattle upon arrival in a 60 day starter yard increases feedlot performance and economic return.

Results

- * Improving energy and amino acid use of a calf during an immune response will increase feedlot income by maintaining efficiency of animal growth and carcass quality.
- * Recently we have identified bovine coronavirus (BCV) infections in cattle in the feedlot. The viruses are not normally found in cattle upon entry, but the virus becomes quite commonly isolated from nasal swabs in the first two weeks after commingling. We have 9.5% of the lungs of cattle dying in the feedlot with pneumonia that are positive for bovine coronavirus using PCR of the lung homogenates. Often we have found BCV in the the nasal swabs of BVDV PI cattle. Potentially the immunocompromised PI cattle may serve as shedders for the BCV. We have recently developed a system using swine monolayer cultures to propagate BCV. This system is being adapted also for serology using ELISA tests.

4. Associated Knowledge Areas

KA Code	Knowledge Area
306	Environmental Stress in Animals
311	Animal Diseases
315	Animal Welfare/Well-Being and Protection

Outcome #6**1. Outcome Measures**

Meat Goat Numbers in the State

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	{No Data Entered}	94000

3c. Qualitative Outcome or Impact Statement**Issue (Who cares and Why)**

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

What has been done

The Oklahoma Meat Goat Boot Camp is a three day workshop that combines hands-on demonstration and activities with classroom presentations and exercises. Camps size was limited to 50 participants. Cost to the participants was \$100. During the three days each participant would attend each of the following sessions:

- * Ear Tagging, Castrating and Tattooing - This session explains the importance of animal identification and the different methods used for identification as well as the USDA Scrapies identification program. Participants are given a demonstration on how to place ear tags in a goat's ear and how to tattoo a goat. Also, a discussion on the different methods of castration and why male goats are castrated is conducted. A demonstration on how to castrate a goat using the banding method is also performed. Participants are then allowed to practice any or all of these management practices on live goats.
- * Hoof Trimming and Aging - This session demonstrates how to properly trim goat's hooves and age mature goats. Participants then have the opportunity to trim hooves and age live goats.
- * Electric Fence Building - Educators talk about the basics of constructing electric fencing for goats and demonstrate how to build an electric fence. After the demonstration participants are encouraged to practice some of the techniques shown.
- * Forage Evaluation Techniques - This session gives the participants a presentation on the effect of forage quality on a goat's diet and performance. Participants are then shown different types of forages and given a demonstration on how to take a forage sample and interpret the results. Participants participate in a forage evaluation exercise and contest.
- * Forage Systems - Participants are given a short presentation about forage budgeting and the different varieties advantages and disadvantages. Participants are divided into 6 groups. Each group, with the help of an extension facilitator has to develop a forage grazing plan for a case study farm. The groups are then brought back together to discuss the different forage plans.
- * Business Management - Participants are given a presentation about budgeting and business planning. Participants are divided into 6 groups with an extension facilitator. These groups complete a budgeting exercise for 1 of 6 different production plans. The groups are then brought back together to discuss the resulting budgets.
- * Nutrition - Participants are given a presentation over the basics of balancing feed rations for goats and the different feeds available. Participants are given a ration balancing exercise to complete and discuss.
- * Parasite Life Cycle and Management - Participants are given a presentation about the different internal and external parasites that affect goat production and their methods of control. After the presentation participants are broken up into two groups for demonstration of the following parasite management systems:
 - o Fecal Egg Count - Participants are shown how to collect and measure fecal egg counts in goat feces samples.
 - o FAMACHA - Participants are shown how to use the FAMACHA eye scoring systems to detect and treat parasites. When completed the participants are certified to use FAMACHA system.
- * Herd Health Management - Participants are given a presentation over general herd health practices and the administration of a herd health protocol. Participants are then allowed to administer shots, take temperatures and other general health practices with a group of live goats.
- * Predator Control - Participants take part in a panel discussion with three to four goat producers using different methods of predator control. Each panel member discusses the reasons for their management practices and participants are allowed to ask questions of the panel members.
- * Kidding and Neonatal Care - Participants are given demonstrations over kidding and care of the newborn goat. Different strategies are discussed for problem births, taking care of weak

Results

The demand for this educational experience has been outstanding. Class size was limited to 50 participants so that producers would be in smaller groups. The first camp filled up before local advertising could begin. This demand caused the organizers to conduct a second boot camp four months later. As the organizers, we underestimated the interest from goat producers from outside of Oklahoma. To date two camps have been completed with 111 participants from fifteen states. Participants have come from as far away as Michigan, New Jersey, New York, North Carolina, Tennessee, Kentucky and Georgia.

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

- * 80% of the sessions taught were of great value to participants
- * 42.5% potential adoption rate of information and management practices from the boot camp
- * Average perceived dollar value of the information presented was \$20.89/goat
- * Total value perceived for both camps \$93,600

Quotes from participants:

"This class was awesome! I think it should be taught in high schools or at least tech schools! The instructors were invaluable, knowledgeable, very friendly, nice and ready to answer any questions. They went above and beyond." - October 07 Boot Camp

"I really thought this was a great opportunity and it certainly helped me better understand concepts on the industry." - June 07 Boot Camp

"The best educational program on livestock production that I have attended. I plan returning for more education programs." - June 07 Boot Camp

"Excellent, excellent, excellent. Invaluable information that I need last year!"

Overall, as the organizers, we have felt that this program has been a huge success that has filled a void in small animal production. Plans are to have a third workshop in April 2008 and one each year until no more interest.

4. Associated Knowledge Areas

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

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Natural Disasters (drought, weather extremes, etc.)

Brief Explanation

Very wet season

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

Technology Partnership Practice of the Battelle Memorial Institute was commissioned in 2007 to review and investigate economic impacts of DASNR programs. In that process the following three case studies were highlighted by the Battelle study.

Selected Impacts on Oklahoma Cattle Industry

Multiple DASNR research and extension projects in nutrition, forage operations, dual-use wheat reproductive science, waste management, value-added products, and production recommendations-result in broad economic impacts.

- Calf preconditioning recommendations with potential for total direct impact (in terms of cattle value increases) of \$37 million

- 5 to 15% productivity increase, via DASNR recommendations resulting in efficiency and value gains (at just the 5% level), \$285 million in increased output, \$91 million in value-added, 3,375 jobs, and \$25 million in labor income.

Key Items of Evaluation

Program #2

V(A). Planned Program (Summary)

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	33%		6%	
133	Pollution Prevention and Mitigation	4%		4%	
201	Plant Genome, Genetics, and Genetic Mechanisms	2%		10%	
204	Plant Product Quality and Utility (Preharvest)	7%		11%	
205	Plant Management Systems	37%		12%	
211	Insects, Mites, and Other Arthropods Affecting Plants	6%		18%	
212	Pathogens and Nematodes Affecting Plants	1%		5%	
213	Weeds Affecting Plants	7%		15%	
215	Biological Control of Pests Affecting Plants	1%		4%	
216	Integrated Pest Management Systems	2%		15%	
Total		100%		100%	

V(C). Planned Program (Inputs)

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

Year: 2007	Extension		Research	
	1862	1890	1862	1890
Plan	11.3	0.0	6.0	0.0
Actual	20.5	0.0	13.5	0.0

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

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
451080	0	736000	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
451080	0	736000	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
1580000	0	3424000	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Wheat variety development and testing
 Developed a no-till production manual
 Wheat quality and product development and testing
 Wheat management newsletter, website
 Tested and demonstrated alternative cropping systems and rotations
 Improved web-based delivery of cropping systems information
 Weekly crop updates during production season
 Grower meetings/workshops
 Field/demonstration days
 No-till conference

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, peanut, and other crop producers and nutraceutical producers.

V(E). Planned Program (Outputs)

1. Standard output measures

Target for the number of persons (contacts) reached through direct and indirect contact methods

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
Plan	1500	2500	0	0
2007	122240	4449116	0	0

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

Patent Applications Submitted

Year	Target
Plan:	0
2007 :	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

	Extension	Research	Total
Plan			
2007	13	10	23

V(F). State Defined Outputs

Output Target

Output #1**Output Measure**

- Field Demonstrations

Year	Target	Actual
2007	30	26

Output #2**Output Measure**

- Varieties of wheat released

Year	Target	Actual
2007	1	0

Output #3**Output Measure**

- Crop production manuals and production newsletters

Year	Target	Actual
2007	14	15

Output #4**Output Measure**

- Cotton weekly crop updates

Year	Target	Actual
2007	10	13

Output #5**Output Measure**

- Cotton Web Page

Year	Target	Actual
2007	1	2

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	Change in fertilization and pesticide inputs due to diversified systems
5	Number of acres where minimum or no-till production practices are applied
6	Number of varieties accepted by seed producers and producers to address end-use quality issues
7	Provide locally-controlled evaluations and agronomic data for commercially released wheat cultivars and advanced experimental breeding lines
8	Characterize the nutritional and health benefits of widely-grown, commercially-available hard red and hard white winter wheat varieties.
9	Provide nutrient management strategies to wheat producers through intensive soil sampling and educational meetings

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
2007	40	40

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 a \$190 + per acre potential loss of income for 'dual-purpose' wheat producers or a \$475,000,000 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 40% 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.

4. Associated Knowledge Areas

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

Outcome #2**1. Outcome Measures**

Increase in cotton production in eastern and central Oklahoma

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	1500	500

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Eastern and Central Oklahoma have historically been good cotton production areas, but with difficulty in controlling the boll weevil and cotton bollworms, most producers switched from cotton. As a result, most of the areas have lost their cotton infrastructure and older equipment has been outdated. Now the boll weevil has been eradicated from the state and use of transgenic cotton has eliminated the bollworm problem. Conditions looked promising for a resurgence of cotton production in these areas, but in 2007, the price of corn and soybeans jumped and producers lost interest in cotton.

What has been done

Producers were contacted in central Oklahoma, and McClain and Garvin county CED's were contacted and they arranged a cotton meeting at Wayne, Oklahoma. The meeting was held, and no farmers attended. A cotton tour was held in Canadian and Grady counties with good interest and attendance, and we worked with a consultant that had some cotton in south central Oklahoma. One trip was made to help him with a production problem. Five hundred acres of additional cotton was planted in central Oklahoma.

Results

Due to the above conditions, only 500 acres were planted and managed. As long as the corn and soybean prices remain high producers will not be willing to commit to another crop.

4. Associated Knowledge Areas

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

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 Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	5000	0

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
102	Soil, Plant, Water, Nutrient Relationships

Outcome #4

1. Outcome Measures

Change in fertilization and pesticide inputs due to diversified systems

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	5000	95000

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Since 1950, cropping systems in Oklahoma have tended to be monoculture systems. The lack of crop diversity has led to an increase of fertilizer and pesticide use. Until recently producers have had little incentive to not over fertilize, especially with nitrogen. Demonstration trials conducted in 2005 indicated a \$14/acre benefit from sensor based nitrogen management over corn sites in NE Oklahoma. Similarly, wheat trials in NW Oklahoma showed a \$10/acre benefit using the flat N rates determined using the GreenSeeker sensor combined with the on-line Sensor Based Nitrogen Rate Calculator.

What has been done

Extension programs have been developed to diversify cropping systems and actively manage N fertilizer during the growing season. In the past, N fertilizer recommendations have not been very accurate at predicting N fertilizer needs. This is in large part due to the preceding crop N use or contribution. Fertilizer application information was recorded for 586 fields, representing over 250,000 acres, where Extension personnel had placed Ramp Calibration Strips in the fall of 2006. This will expand the adoption of sensor based nitrogen management to predict N needs of the crop regardless of previous crop. Pesticide extension programs have focused on the benefits of diversifying cropping systems.

Results

Data collected from the 2006 fields indicated that typical nitrogen topdress rate was 110 lbs/ac. The average recommended rate from reference strips was about half the typical rate at 53 lbs nitrogen per acre. The average nitrogen rate applied to these fields was 80 lbs/ac. While farmers did not completely accept the reference strip recommendation, it appears that they were willing to reduce nitrogen rates. They applied an average of 25% less nitrogen than typical. Assuming nitrogen costs 50 cents per pound, farmers saved an average of \$15/ac or over \$3,750,000. This is similar to what research has shown. In terms of diversifying cropping systems to reduce pesticide uses we conducted 8 meetings that specifically discussed the benefits of crop rotations and diversifying current systems. More than 400 total producers were in attendance at these meetings. Preliminary results of a survey sent out to Oklahoma producers indicated that 59% of the respondents practiced some type of crop rotation.

4. Associated Knowledge Areas

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

Outcome #5**1. Outcome Measures**

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

2. Associated Institution Types

•1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	300000	900000

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.

What has been done

A collaborative extension effort has been undertaken in Oklahoma. Organizations involved include Oklahoma State University, Oklahoma Conservation Commission, and Oklahoma NRCS. Planning commenced in 2007 for a state-wide no-till meeting to be held in 2008.

Results

In 2007, a no-till cropping systems handbook was published ("No-till Cropping Systems in Oklahoma") and distributed throughout the state. Three thousand copies were 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 800 combined attendees. Preliminary results of a no-till survey conducted in Oklahoma indicated that 33% of the 1200 respondents practiced no-till. This is a substantial increase compared to the 2004 numbers.

4. Associated Knowledge Areas

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

Outcome #6**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
2007	1	0

3c. Qualitative Outcome or Impact Statement**Issue (Who cares and Why)**

Unlike other major commodity crops, there is not a large private-industry presence in wheat breeding. As a result, stakeholders rely heavily on public breeding programs to provide affordable and well-adapted cultivars for production in the southern Great Plains region. Furthermore, farmers are not currently incentivized for producing above-average quality wheat, so it is critical that breeding programs ensure that released cultivars are of high milling and baking quality.

What has been done

The Wheat Improvement Team at Oklahoma State University is a cross-cutting group of scientists and extension professionals who work collectively to improve the quality and yield of cultivars grown in the southern Great Plains. This group includes breeders, physiologists, entomologists, plant pathologists, virologists, and a cereal chemist who conduct research and extension projects that work towards the end goal of releasing wheat cultivars with improved yield and quality.

Results

Over 900 individual wheat crosses were made in 2007. In addition over 200 experimental lines and 25 advanced lines were tested in over ten environments in the state of Oklahoma. The experimental hard white wheat cultivar OK00611W was identified as having potential for release to producers; however, the devastating spring freeze and late-season rain storms resulted in insufficient grain production for release. Release to foundation seed producers is likely in 2008. The hard red variety 'Endurance' has above average end-use quality and superior adaptation to the dual-use environment of the southern plains. Adoption of this variety has grown from 0.6% adoption in 2006 to 11% adoption by Oklahoma producers in 2008 (approximately 660,000 acres). Conversely plantings of the variety 'Big Max' which has unacceptable milling and baking characteristics dropped from 1.1% of planted acreage to 0.9% of planted acreage. This represents a change in farmer attitude regarding the importance of end-use quality of wheat.

4. Associated Knowledge Areas

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

Outcome #7**1. Outcome Measures**

Provide locally-controlled evaluations and agronomic data for commercially released wheat cultivars and advanced experimental breeding lines

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	{No Data Entered}	66

3c. Qualitative Outcome or Impact Statement**Issue (Who cares and Why)**

Genotype by environment interactions are the overriding factor determining yield and many end-use quality parameters. Therefore, stakeholders require locally-controlled, research-based quantitative comparisons of wheat cultivars commonly grown in the southern Great Plains. In addition stakeholders need the opportunity to evaluate new cultivars and advanced experimental lines in "real world" settings.

What has been done

Approximately 20 cultivars were evaluated in replicated small grain performance trials at 24 sites throughout Oklahoma. In addition, 42 non-replicated demonstration sites were planted throughout the state. Almost all of these replicated and non-replicated trials were planted on farmer's fields and the producer was actively involved in preparation and execution of the research protocol.

Results

Forage yield, grain yield, fungicide response, and grazing tolerance data were collected and distributed to stakeholders throughout the southern Great Plains. Over 2,000 stakeholders directly participated in field day activities at these research sites. Simply put, these are among the most frequently requested and most highly valued data requested by stakeholders each year

4. Associated Knowledge Areas

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

Outcome #8**1. Outcome Measures**

Characterize the nutritional and health benefits of widely-grown, commercially-available hard red and hard white winter wheat varieties.

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	{No Data Entered}	31

3c. Qualitative Outcome or Impact Statement**Issue (Who cares and Why)**

Wheat grain consists of about 50% of the biomass produced by the crop. Various forms of bran, wheat germ and the "clean-out" of the screen room represent about 25% of the original grain and they are potentially of considerable economic significance to the miller. Today, wheat is mainly grown for its flour. However, wheat bran, germ and even straw contain numerous health beneficial compounds which can be used for development of functional foods and nutraceuticals. Even though Oklahoma is one of the largest wheat growing states in the nation, utilization of this crop for value-added products have not been exploited to their full capacity.

What has been done

Our team characterized 31 wheat varieties for their nutritional and health beneficial components. We also examined various extraction techniques for recovery of oil from wheat germ and determined their suitability for future research endeavors. Other topics researched under this objective include utilization of supercritical carbon dioxide for wheat germ oil extraction and refining techniques and the effect of variety, irrigation and environment on health beneficial bioactive compounds in whole wheat grain grown at three different locations in OK. We have completed a similar study for wheat straw.

Results

Our research has clearly shown that wheat is an excellent crop for development of a "biorefinery system" which can produce a number of high value products derived from wheat. It is expected that data generated by our team will provide the necessary genetic survey to initiate a breeding program that specifically targets nutritionally beneficial bioactive compounds. There is also potential that the processes developed for enrichment of bioactive compounds in wheat extracts could lead to technology transfer to industry and we are taking steps to expedite commercialization.

4. Associated Knowledge Areas

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

Outcome #9

1. Outcome Measures

Provide nutrient management strategies to wheat producers through intensive soil sampling and educational meetings

2. Associated Institution Types

•1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	{No Data Entered}	450

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Wheat is the most important field crop in Oklahoma. Improved soil nutrient management can increase economic efficiency in wheat production. However, many farmers are unaware of the merit of soil testing and have not tested their fields regularly although fertilizers have been regularly applied. This practice may not be economically or environmentally sound. It is possible to apply unneeded fertilizer if the nutrient status of cropland is unknown. This practice not only wastes money, but the additional nutrients may also enter water supplies. On the other hand, applying inadequate fertilizer can reduce yields and decrease profits. Laboratory analysis of soil samples can determine the nutrient status of the soil and soil acidity, and thus help farm operators fine-tune their fertilizer programs.

What has been done

A free wheat soil testing and educational program was conducted to promote statewide soil testing in the summer of 2007. Over 3000 soil samples were submitted to the Soil, Water and Forage Analytical Laboratory for analysis by 37 participating counties. Over 20 educational meetings were conducted to assist farmers in making better decisions on nutrient management, and other important subjects related to wheat production. Those meetings were attended by more than 450 producers and extension personnel.

Results

Soil analysis data showed a significant amount of residual nitrate N existed in the surface and subsurface soils. Credits should be given to the residual to reduce cost and minimize N loss. Low soil pH remains to be a major yield limiting factor for wheat forage and grain production. Survey conducted at the educational meetings indicated that participants had a better understanding of the traditional and new nutrient management strategies. Many producers expressed interest in implementing N-rich strips, having soil tests more frequently, adjusting fertilizer amounts per soil test recommendations, timing nitrogen application better, paying more attention to soil pH, seed quality, and seeding dates and rates.

4. Associated Knowledge Areas

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

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Natural Disasters (drought, weather extremes, etc.)

Brief Explanation

The spring of 2007 was among the wettest on record in the state of Oklahoma. As a result many wheat experiments were lost due to flooding and waterlogged field conditions. In addition a mid-April freeze event eliminated >95% of the wheat crop in eastern OK and caused severe lodging to at least 500,000 acres in north-central OK.

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

1. Evaluation Studies Planned

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

Evaluation Results

Technology Partnership Practice of the Battelle Memorial Institute was commissioned in 2007 to review and investigate economic impacts of DASNR programs. In that process the following three case studies were highlighted by the Battelle study.

Selected impacts on Oklahoma Wheat Industry

DASNR research and extension increased productivity and profitability in multiple ways:

- Planting and stocking rate efficiencies for dual-use wheat = \$121 million
- Grazing termination and optimization = \$42 million
- OK Green Gold supplementation = \$11 million
- 20% estimated productivity improvement for DASNR-developed winter wheat varieties = \$220 million in output

(\$120 million value-added, \$20 million in labor income, 4,400 jobs)

Key Items of Evaluation

Program #3**V(A). Planned Program (Summary)****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%		5%	
203	Plant Biological Efficiency and Abiotic Stresses Affecting Pl	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%		53%	
	Total	0%		100%	

V(C). Planned Program (Inputs)**1. Actual amount of professional FTE/SYs expended this Program**

Year: 2007	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	0.0	6.0	0.0
Actual	0.0	0.0	10.2	0.0

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

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
0	0	552000	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	552000	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	2568000	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

Target for the number of persons (contacts) reached through direct and indirect contact methods

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
Plan	75	100	50	0
2007	0	0	0	0

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

Patent Applications Submitted

Year	Target
Plan:	0
2007 :	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

	Extension	Research	Total
Plan			
2007	0	36	36

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Grant proposals written and submitted

Year	Target	Actual
2007	20	46

Output #2

Output Measure

- Peer-reviewed publications including journal articles

Year	Target	Actual
2007	25	36

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 Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	14	8

3c. Qualitative Outcome or Impact Statement**Issue (Who cares and Why)**

Primary production of food and fiber for our society is dependent upon plant growth and productivity. Newly developed biological technologies including many techniques for studying the cellular and molecular mechanisms of plant growth are used to determine effects of abiotic and biotic factors on plant growth and productivity. These biological technologies are now being used to study abiotic and biotic impacts on plant growth and productivity and results are being used to develop more productive plants, crops and methods of managing production systems. Research and education professionals must be constantly trained to conduct teaching and research functions in the future.

What has been done

Graduate education programs to confer M.S. and Ph.D. degrees in various disciplines are maintained and faculty mentor and train the graduate students. Science graduate degrees are based on conduct of research and publication of results. The research work conducted is funded through state, federal and grants programs.

Results

Graduate students completed degree programs and move into research, education and extension positions with federal, state and private agencies.

4. Associated Knowledge Areas

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

Declining state and federal formula funding results in limiting purchase of significant new equipment to conduct research on plants and plant systems at the cellular and molecular level. Equipment limitations can slow rate of conduct of research and limit number of graduate students with access to the equipment to complete their degree research projects.

Extremes in weather conditions, hot/cold, wet/dry, can impact research projects that have progressed from the lab and greenhouse to the field. Field research generally must be conducted to verify results of work conducted in the lab and greenhouse.

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}

Program #4

V(A). Planned Program (Summary)

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
202	Plant Genetic Resources	3%		6%	
204	Plant Product Quality and Utility (Preharvest)	1%		5%	
205	Plant Management Systems	79%		40%	
502	New and Improved Food Products	1%		7%	
901	Program and Project Design, and Statistics	1%		10%	
903	Communication, Education, and Information Delivery	15%		32%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

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

Year: 2007	Extension		Research	
	1862	1890	1862	1890
Plan	14.0	0.0	2.6	0.0
Actual	14.0	0.0	4.9	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
308929	0	276000	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
308929	0	276000	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
1082000	0	1284000	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.
- 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
- Produced "Oklahoman's Guide to Growing Fruits, Nuts and Vegetables"

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

Target for the number of persons (contacts) reached through direct and indirect contact methods

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
Plan	90000	975000	1500	0
2007	28078	11488651	1500	0

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

Patent Applications Submitted

Year	Target
Plan:	0
2007 :	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

	Extension	Research	Total
Plan			
2007	42	9	51

V(F). State Defined Outputs

Output Target

Output #1**Output Measure**

- New Master Gardeners trained

Year	Target	Actual
2007	300	215

Output #2**Output Measure**

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

Year	Target	Actual
2007	3	8

Output #3**Output Measure**

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

Year	Target	Actual
2007	5	42

Output #4**Output Measure**

- Number of statewide "Oklahoma Gardening" shows produced

Year	Target	Actual
2007	35	34

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
2007	2	8

3c. Qualitative Outcome or Impact Statement**Issue (Who cares and Why)**

Organic agriculture is one of the fastest growing segments of agriculture in the United States today. There are estimates that growth of the organic industry is occurring at about 20% per year. Markets for organic produce are emerging throughout the country, in both large cities and small towns. People are seeking organic produce, and certain farmers are modifying their operations to respond to this demand. In Oklahoma, there is limited information about the crops that can be grown organically within the state, about the types of problems that are likely to be encountered, and about the possible organic solutions to problems that may develop.

In response to the demand for organic products and organic production information, scientists at the Lane Agricultural Center are developing procedures for organic vegetable production. Four years of investigation have been completed and work is continuing at this time. About eight acres have been certified by ODAFF as meeting the organic standards as outlined by the National Organic Program. The organically certified section of the Lane Agricultural Center is the only public institution in Oklahoma to have obtained NOP organic certification.

What has been done

The following is a summarization of work pertaining to the organic industry that is being conducted at the Lane Agricultural Center. Tomatoes, watermelon, southern peas, and sweet corn were grown in a study certified as organic under the USDA National Organic Program. The final year of this initial four crop-four year rotation was completed. Economic comparisons were developed for each of the four crops using treatments and yields from the study. All four crops were grown organically using poultry litter as a fertilizer, and using various organic supplements and techniques for pest control. In a separate study, tomatoes are currently being grown for the potting plant market in a greenhouse experiment using synthetic fertilizers, organic fertilizers, and humic acid supplements. In these studies, shoot and root size as well as shoot and root weights are being determined.

In another study, twelve types and cultivars of melons (cantaloupe and honey dew) were grown with both synthetic fertilizer (13-13-13) and organic fertilizer (raw poultry litter). Both treatments received 100 lbs of N per acre. All fertilizers were applied pre-plant due to restrictions in the National Organic Program certification that require manure-based fertilizers to be applied 120 days prior to harvest. Yields from synthetic fertilizers were greater than yields from poultry litter fertilizer. The highest yielding cultivars were "Achappara" and "Tamdew Improved".

An heirloom variety of "Hickory Cane" corn was grown with both organic (poultry litter) and conventional synthetic fertilizers. Six treatments consisting of two rates, two application strategies, and two materials were used. The organic treatments produced yields that were as good as, but not better than, the synthetic fertilizer treatments.

In a weed management study, tillage regimes following cereal rye cover crops were compared to determine their effect on weed suppression properties in vegetable plantings. Also, corn gluten meal in combination with tillage and a rye cover crop were examined for efficacy of weed suppression. Information from results has been presented to growers. Advantages and disadvantages of using cover crop management for weed control in vegetable crops have been determined and information has been presented. Organic insecticides were evaluated in the lab and field to determine rate response and effects on populations of harlequin bugs. Results indicated that pyrethrum and spinosad based insecticides resulted in significant mortality and control of harlequin bugs.

Results

Research results have been used to determine key problems, pests, and protocols for production of four vegetable crops in Oklahoma. Problems of soil maintenance and improvement have been determined, and procedures have been developed to maintain soil productivity. Presentations and on-site field days have been given to state and regional farmers, homeowners, agricultural extension employees, and agri-business personnel concerning organic vegetable production. Approximately 580 people attended a field day at the Lane Agricultural Center in 2007 which included presentations and information exchange with data presented from the organic research studies. Approximately 400 people attended the Oklahoma-Arkansas Horticulture Industries Show in 2007 which also included presentations on organic vegetable production. As a result of field days and educational meetings held for producers and county extension educators, dialogue has been established among scientists and producers. Four additional public presentations were made to growers, agri-business personnel, and extension educators. The results obtained from demonstration and research plantings of certified organic vegetable production and studies to evaluate weed control for organic vegetable production were presented. A total of approximately 250 people attended these presentations. Results of studies were also presented at the Interamerican Society for Tropical Horticulture Meetings in 2006 and 2007 to growers and scientist from fourteen countries.

Eight new producers/production units were added to the rolls of certified organic producers in Oklahoma last year.

4. Associated Knowledge Areas

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

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
2007	13000	50573

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

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.

Results

The Oklahoma Master Gardener Program now has 24 counties participating in the program as of January 2008. The following data was provided by 15 of the 24 counties. Approximately 215 new Master Gardeners were trained during the 2007 training season. Close to 987 active Master Gardeners volunteered their time, contributing approximately 48,518 hours of volunteer service and reaching over 224,867 Oklahomans with as many as 1000+ educational and community programs and activities being conducted in their communities in 2007. This translates to over \$910,683.00 in-service that was donated by volunteers (wage rate of \$18.77/hour was used, which includes a 12% estimate of fringe benefits. This hourly rate is the assigned wage for nonagricultural workers in 2006 as published in the Economic Report of the President. The Independent Sector, an organization that "serves as a national forum to encourage giving, volunteering and not-for-profit initiative," supplied this information). Reports are gathered yearly at the beginning of the following year.

4. Associated Knowledge Areas

KA Code	Knowledge Area
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
2007	2000	430688

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.

What has been done

State Specialists, County Educators and Volunteers work together to provide numerous and a wide variety of educational programs focused on teaching the home gardener best management practices and integrated pest management techniques so the home gardener can make wise choices regarding their gardens while at the same time protect their environment.

Results

Over 1,000 educational programs and activities were conducted last year to a wide variety of audiences. Programs and activities included home visits, club and group presentations, plant clinics, creating and maintaining demonstration gardens, elementary school presentations, Oklahoma Gardening - a how to television show, and other special projects. Published "Oklahoman's Guide to Growing Fruits, Nuts, and Vegetables."

4. Associated Knowledge Areas

KA Code	Knowledge Area
903	Communication, Education, and Information Delivery

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Other (Change in personnel)

Brief Explanation

Wet weatehr caused problems with some filed experiments.
 Cahnge in host of 'Oklahoma Gardening' television show reduced expected number of new episodes.

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

{No Data Entered}

Key Items of Evaluation

{No Data Entered}

Program #5**V(A). Planned Program (Summary)****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
104	Protect Soil from Harmful Effects of Natural Elements	2%		7%	
111	Conservation and Efficient Use of Water	6%		10%	
112	Watershed Protection and Management	16%		14%	
121	Management of Range Resources	10%		10%	
123	Management and Sustainability of Forest Resources	15%		9%	
133	Pollution Prevention and Mitigation	13%		15%	
136	Conservation of Biological Diversity	22%		5%	
205	Plant Management Systems	2%		7%	
403	Waste Disposal, Recycling, and Reuse	6%		14%	
605	Natural Resource and Environmental Economics	8%		9%	
	Total	100%		100%	

V(C). Planned Program (Inputs)**1. Actual amount of professional FTE/SYs expended this Program**

Year: 2007	Extension		Research	
	1862	1890	1862	1890
Plan	7.4	0.0	8.0	0.0
Actual	8.8	0.0	12.1	0.0

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

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
170963	0	690000	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
170963	0	690000	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
599000	0	3210000	0

V(D). Planned Program (Activity)**1. Brief description of the Activity**

- Design and conduct research
- Submit grant proposals
- Produce scientific publications
- Specialty conferences to address environmental issues of concern to Oklahoma,
- An Environmental Quality and Waste Management publications series
- Worked with numerous state agencies to conduct listening session for the development of a state water plan
- Poultry Waste Management Education conducted
- 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

Target for the number of persons (contacts) reached through direct and indirect contact methods

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
Plan	350	1500	150	150
2007	14817	521118	452	5100

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

Patent Applications Submitted

Year	Target
Plan:	0
2007 :	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

	Extension	Research	Total
Plan			
2007	19	15	34

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Grant proposals written and submitted

Year	Target	Actual
2007	10	56

Output #2

Output Measure

- Manuscripts submitted for consideration of peer-reviewed publication

Year	Target	Actual
2007	22	15

Output #3

Output Measure

- Extension conferences, workshops and training sessions

Year	Target	Actual
2007	25	145

Output #4

Output Measure

- Research and Extension reports and fact sheets

Year	Target	Actual
2007	5	42

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 management certification and number maintaining certification
2	Percentage of poultry producers using at least one waste management BMP
3	Number of acres applying BMPs (including prescribed burning) for Ecosystem restoration of native prairies, shrublands and forests
4	Number of manure test conducted for land application by confined animal operations
5	Percentage of poultry operations conducting soil testing at least every other year
6	Peer-reviewed publications
7	Reduce stormwater runoff and effluent load

Outcome #1**1. Outcome Measures**

Number of poultry producers and poultry litter applicators acquiring initial waste management 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
2007	1100	922

3c. Qualitative Outcome or Impact Statement**Issue (Who cares and Why)**

Poultry production ranks as the second or third highest in gross sales in the state. Application of poultry litter to the soils can have a very positive nutrient value. However, it can also result in phosphorous build up and migration into streams. This is an important cost to the state and Oklahoma has regulations requiring poultry producers and poultry waste applicators to get an initial waste management certification and maintain an annual level of continued education to maintain their certification. Without this certification poultry producers may not operate in the state.

What has been done

During 2007, 23 continuing education sessions were conducted for those needing to maintain certification. 50 Oklahoma producers and educators attended an OK-AR Grower Training and tour. A special waste management educational meeting was conducted for Southeast-Asian American poultry producers with a Laotian translator. Special producer field days were held at the Kerr Center for Sustainable Agriculture Ranch and the OSU Haskell Research Station - emphasizing pond, riparian, and nutrient management. In addition, the Oklahoma Poultry Waste Management Education program conducted by the Oklahoma Cooperative Extension Service maintains a website for producers at <http://www.poultrywaste.okstate.edu/>.

Results

Poultry producers in Oklahoma cannot remain in business without certification and annual continuing education. Thus, this program has an enormous economic impact as poultry is the state's second leading animal industry.

* 141 poultry producers and/or litter applicators were certified by attending the 9-hour poultry waste management initial education program.

* 781 poultry producers and/or litter applicators were able to maintain certification by attending at least three hours of continuing education.

4. Associated Knowledge Areas

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

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
2007	60	65

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Poultry production ranks as the second or third highest in gross sales in the state. Application of poultry litter to the soils can have a very positive nutrient value. However, it can also result in phosphorous build up and migration into streams. This is an important cost to the state and Oklahoma has regulations requiring poultry producers and poultry waste applicators to get an initial waste management certification and maintain an annual level of continued education to maintain their certification. Without this certification poultry producers may not operate in the state.

What has been done

The past calendar year included new Annual Update course topics such as: Carcass Disposal Options; Vaccination, Immune Response and Disease; Raising Healthy Flocks, Arkansas Nutrient Management Regulations, Guidance Systems for Fertilizer Application, Developing a Nutrient Management Plan using Litter and Commercial Fertilizer, New Technologies for Fertilizer Management, Properly Filling out Waste Applicator Forms, and Darkling Beetle and Fly Control . One meeting was designed for Southeast Asian American poultry producers, with a Laotian translator present.

Traditional topics were also addressed including: Proper Soil Sampling, Soil Fertility, Using Poultry Litter as a Fertilizer, and Litter Marketing and Incentive Programs.

The Eastern Oklahoma Agriculture Trade Show was held in Poteau with over 125 attending. Seminars given at the event included Forage and Nutrient Management, Animal Welfare Issues, National Animal ID, Fire Ant Control and Litter Transfer Implications, and Common Poultry Health Concerns.

Field tours such as the Spavinaw Creek Producer Tour, held in both spring and fall, covered topics such as: Proper Dead Bird Composting Techniques, Composting Poultry Litter, Grazing Management without using Manure Fertilizer, On-farm Best Management Practices, Edge of Field Monitoring of P Runoff, N Rich Strips in Bermudagrass, Status of Water Quality in Eucha/Spavinaw Watershed, and Soil Test P Variation including a Rainfall Simulator Demonstration.

The joint OSU/U of Arkansas Applied Broiler Research Farm Grower Training allowed producers to tour the farm while listening to presentations covering Avian Influenza and Raising Healthy Birds and viewing live demonstrations of Foam Mass Euthanasia, Litter Decaking Equipment, House Sanitation Spray Equipment, Carcass Incinerators, and Litter Flame Sanitizers.

A producer field day held at the Kerr Ranch in Poteau highlighted seminars on Manure Management in Cattle Operations, Pond Management and Grazingland Management.

The Forage and Pasture Seminar Tour held at the OSU Haskell Research Station included presentations on Managing Moisture - Nutrient Relationships, Commercial Fertilizer vs. Litter, and Water Development - Benefits of Keeping Cattle out of Water.

Results

- 536 producers soil tested during 2007
- 45 producers made changes in riparian areas during 2007

4. Associated Knowledge Areas

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

Outcome #3

1. Outcome Measures

Number of acres applying BMPs (including prescribed burning) for Ecosystem restoration of native prairies, shrublands and forests

2. Associated Institution Types

•1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	1000000	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
121	Management of Range Resources
123	Management and Sustainability of Forest Resources
136	Conservation of Biological Diversity

Outcome #4

1. Outcome Measures

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

2. Associated Institution Types

•1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	1250	66

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
133	Pollution Prevention and Mitigation
112	Watershed Protection and Management

Outcome #5

1. Outcome Measures

Percentage of poultry operations 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
2007	85	89

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
133	Pollution Prevention and Mitigation
112	Watershed Protection and Management

Outcome #6

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
2007	12	15

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Publication of research results in peer review journals is the main method of validating research results and disseminating the information to other professionals.

What has been done

Research scientists submitted manuscripts to be published in peer review journals, books and meeting procedures.

Results

More than 15 manuscripts were published during the year.

4. Associated Knowledge Areas

KA Code	Knowledge Area
136	Conservation of Biological Diversity
205	Plant Management Systems
403	Waste Disposal, Recycling, and Reuse
112	Watershed Protection and Management
121	Management of Range Resources
123	Management and Sustainability of Forest Resources
605	Natural Resource and Environmental Economics
133	Pollution Prevention and Mitigation
111	Conservation and Efficient Use of Water

Outcome #7

1. Outcome Measures

Reduce stormwater runoff and effluent load

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	{No Data Entered}	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Storm water runoff and related effluent is a significant problem due to soil types, building patterns, and weather occurrences. It results in costly physical damage as well as movement of nutrients into bodies of water in the watershed.

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
112	Watershed Protection and Management
104	Protect Soil from Harmful Effects of Natural Elements
133	Pollution Prevention and Mitigation

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Government Regulations
- Competing Public priorities

Brief Explanation

Extremely dry weather in 2006 reduced prescribed fire needs in 2007. In addition, it has become very difficult to capture numbers of acres under prescribed fire. Thus we will change this outcome measure in 2008-09 POW.

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

{No Data Entered}

Key Items of Evaluation

{No Data Entered}

Program #6

V(A). Planned Program (Summary)

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%		9%	
401	Structures, Facilities, and General Purpose Farm Supplies	4%		7%	
403	Waste Disposal, Recycling, and Reuse	3%		5%	
501	New and Improved Food Processing Technologies	37%		7%	
502	New and Improved Food Products	3%		6%	
503	Quality Maintenance in Storing and Marketing Food Products	10%		12%	
701	Nutrient Composition of Food	0%		6%	
711	Ensure Food Products Free of Harmful Chemicals, Including	6%		24%	
712	Protect Food from Contamination by Pathogenic Microorgani	32%		18%	
723	Hazards to Human Health and Safety	0%		6%	
Total		100%		100%	

V(C). Planned Program (Inputs)

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

Year: 2007	Extension		Research	
	1862	1890	1862	1890
Plan	1.3	0.0	1.8	0.0
Actual	1.8	0.0	8.3	0.0

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

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
27967	0	460000	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
27967	0	460000	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
400000	0	2140000	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.

•Provide educational and information for existing and those interested in food and agricultural product development and production

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

Target for the number of persons (contacts) reached through direct and indirect contact methods

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
Plan	450	5500	0	0
2007	1936	872646	0	0

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

Patent Applications Submitted

Year	Target
Plan:	0
2007 :	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

	Extension	Research	Total
Plan			
2007	16	9	25

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Peer-reviewed journal articles

Year	Target	Actual
2007	3	9

Output #2

Output Measure

- Number of conferences and other extension outreach presentations

Year	Target	Actual
2007	8	24

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

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	0	0

3c. Qualitative Outcome or Impact Statement**Issue (Who cares and Why)**

Food safety is of critical concern to processors and consumers. Minimization of the economic and health impacts from food safety crises requires testing methods that are robust, sensitive and rapid.

What has been done

Rapid detection methods using immuno-PCR-magnetic bead technology to detect toxins and real-time PCR to detect DNA from allergen causing foods are under development. Research has demonstrated the efficacy of the magnetic bead technology and efforts are under way to expand that research into other important food toxins. Enhanced sensitivity has been demonstrated using real-time PCR in soy products. Robustness of the method to detect soy DNA (both intact and severely degraded) has been demonstrated in a variety of highly processed soy products. Tests are currently underway to determine if there is a matrix effect.

Results

Magnetic bead coupled with immuno-PCR can effectively detect enterotoxin in foods. Real-time PCR can effectively detect soy DNA regardless of the degree of processing.

4. Associated Knowledge Areas

KA Code	Knowledge Area
723	Hazards to Human Health and Safety
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins

Outcome #2**1. Outcome Measures**

Number of food processors implementing new technologies or technology improvements

2. Associated Institution Types

•1862 Extension
•1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	2	1

3c. Qualitative Outcome or Impact Statement**Issue (Who cares and Why)**

Improvements in food processing technology often lead to better efficiency/utilization which directly relates to many types of benefits. Economic benefits are realized because the processor is usually able to improve utilization and quality of the product. Improved utilization also correlates with less waste which means better environmental stewardship. Improved processing technologies are correlated with fewer food safety concerns, which in turn equates to human health benefits.

What has been done

Design and evaluation of processing techniques to improve the palatability, shelf-life, and safety of meat/fish. Application of probiotics as animal/fish feed supplements to reduce pathogen shedding. Development of rapid extraction techniques to identify bioactive compounds from fruit and vegetable waste. Evaluation of fat, oil, and grease production in Oklahoma as potential sources of biofuel. Work with food processors to improve processing capacity.

Results

Research indicates that injection of a meat product with ammonium hydroxide solution may improve meat quality in terms of palatability, shelf-life and food safety. Team members helped design facilities, equipment, and techniques for the safe and efficient processing of paddlefish roe. This created a new income stream for the Oklahoma Department of Wildlife and facilitated conservation efforts for an endangered species.

4. Associated Knowledge Areas

KA Code	Knowledge Area
501	New and Improved Food Processing Technologies

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
2007	0	8

3c. Qualitative Outcome or Impact Statement**Issue (Who cares and Why)**

Oklahoma has traditionally been a strong agriculture commodity producing state that sends its products to other states for further processing. The economic impact of Oklahoma's agricultural sector can be significantly enhanced by increasing the amount of value-added processing occurring in-state. Developing new products is essential for providing value-added processing opportunities for new and existing businesses.

What has been done

The Robert M. Kerr Food and Agricultural Products Center works with clients to help them create, commercialize, and market new food and other agricultural products. This assistance takes the form of product formulation, development and evaluation of processing techniques, production of test batches, business planning and marketing assistance, and so on.

Results

Team members were instrumental in helping to develop processing techniques and in locating commercial processing facilities for a variety of products, including baked goods such as cinnamon rolls and various condiment sauces. In addition, commercial product formulations were devised for a number of further-processed products, including unique cuts of beef, and cooked and frozen entrees such as chili. A number of test batches of other products, - such as waffle mix, juice, salsa, and so on, - were produced in the Robert M. Kerr Food and Agricultural Products Center pilot processing facilities for feasibility assessment and test marketing purposes. Two of the new products developed, the cinnamon rolls and a condiment sauce, are currently in commercial production.

4. Associated Knowledge Areas

KA Code	Knowledge Area
502	New and Improved Food Products

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
2007	10	10

3c. Qualitative Outcome or Impact Statement**Issue (Who cares and Why)**

Due to federal regulations, persons fumigating must be certified and up to date on new regulations and storage methods for personal and food safety.

What has been done

Certification training and storage training was provided through nine workshops and one international conference held at Oklahoma State University.

Results

Ninety-eight individuals received certification and 273 people received additional training on storage methods, equipment and new regulations.

4. Associated Knowledge Areas

KA Code	Knowledge Area
503	Quality Maintenance in Storing and Marketing Food Products
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sourc
401	Structures, Facilities, and General Purpose Farm Supplies

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Other (personnel change)

Brief Explanation

Leading product storage research faculty member left OSU during the year.

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

{No Data Entered}

Key Items of Evaluation

{No Data Entered}

Program #7

V(A). Planned Program (Summary)

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	11%		0%	
607	Consumer Economics	3%		0%	
703	Nutrition Education and Behavior	33%		50%	
724	Healthy Lifestyle	19%		25%	
801	Individual and Family Resource Management	10%		0%	
802	Human Development and Family Well-Being	22%		25%	
806	Youth Development	2%		0%	
Total		100%		100%	

V(C). Planned Program (Inputs)

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

Year: 2007	Extension		Research	
	1862	1890	1862	1890
Plan	35.4	0.0	0.4	0.0
Actual	56.5	0.0	0.4	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
1266199	0	0	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
1266199	0	0	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
4400000	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

Target for the number of persons (contacts) reached through direct and indirect contact methods

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
Plan	1500	100000	2400	1000
2007	238367	1200000	357550	300000

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

Patent Applications Submitted

Year	Target
Plan:	0
2007 :	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

	Extension	Research	Total
Plan			
2007	13	0	13

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Revised online curriculum

Year	Target	Actual
2007	1	15

Output #2

Output Measure

- Promotional materials and marketing campaign

Year	Target	Actual
2007	1	35

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 asset 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	Number of teachers and child care providers learning interpersonal cognitive problem-solving techniques
9	Number of teachers and child care providers using interpersonal cognitive problem-solving techniques with children/youth
10	Number of children and youth using interpersonal cognitive problem-solving skills

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
2007	240	3196

3c. Qualitative Outcome or Impact Statement**Issue (Who cares and Why)**

Over the past decade, the percentage of those overweight has steadily increased in Oklahoma. As many as one in five Oklahoma children are at-risk of overweight or overweight; and two-thirds of adults are overweight or obese. Among children and adolescents, overweight increases the risk of type 2 diabetes, high blood pressure, and cardiovascular disease. The health of Oklahoma youth can be improved by increasing knowledge, skills, attitudes and behaviors related to food, physical activity and body image. 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

The Oklahoma Cooperative Extension Service Healthy Oklahoma Impact Program educates Oklahoma youth on healthy food, nutrition and physical activity behaviors. These efforts have been conducted primarily in elementary classroom settings across the state. The goal of the "Healthy Oklahoma" Impact Program is to encourage Oklahoma youth to improve food, nutrition and physical activity behaviors including: increased intake of dairy foods, fruits and vegetables, increased water intake, increased consumption of breakfast, making healthy snack choices, making healthy choices when eating out, increased use of nutrition facts labels, increased hand washing, and increased time participating in physical activity thereby reducing the overweight and obesity.

During 2007, a second strategy has been added to achieve the stated outcome measure. Oklahoma Cooperative Extension Service programs targeting youth populations have joined efforts with State agencies and agricultural commodity organizations to develop an interactive educational exhibit, titled Farm to You, to link the relationship between farms as the source of nutrient dense foods and role of these foods in building strong and healthy bodies. The collaborating programs and agencies include OCES Healthy Oklahoma Impact Program, OCES Community Nutrition Education Program (CNEP), OCES 4-H, OCES Ag in the Classroom, Oklahoma State Department of Health WIC Service, and Southwest Dairy Farmers. The exhibit will be ready for use as part of school and community nutrition education programming efforts in September 2008. Exhibit messages are consistent with and enhance the Healthy Oklahoma and CNEP youth program messages, are research based and consistent with United States Department of Agriculture (USDA) Dietary Guidelines for Americans 2005 and MyPyramid Food Guidance System.

Results

The Healthy Oklahoma Impact Program has reached 3,614 youth during the program's pilot year (2006) and 3,196 youth during the first year of implementation (2007), for a total of 6,810 youth. Important improvements in food, nutrition and physical activity behavior were observed among Oklahoman youth who participated in the "Healthy Oklahoma" Impact Program.

Statistically significant improvements in food and nutrition behaviors were observed among Oklahoma youth with:

- * 24% increase in milk intake
- * 23% increase in fruit intake
- * 21% increase in vegetable intake
- * 10% increase in water intake
- * 14% increase in eating breakfast
- * 21% increase in only snacking when hungry

- * 27% increase in eating smaller portions of unhealthy foods
- * 24% increase in choosing milk when eating out
- * 29% increase in choosing fruit when eating out
- * 24% increase in choosing a salad when eating out

Statistically significant improvements in using food labels and safe food handling practices also were observed among Oklahoma youth with:

- * 31% increase in reading food labels to learn serving sizes
- * 31% increase in reading food labels to make healthy food choices
- * 14% increase in washing hands before handling food
- * 14% increase in washing hands before eating

A statistically significant improvement in physical activity was also observed among Oklahoma youth with:

- * 21% increase in time spent in physical activity

These outcomes represent improvements in food, nutrition and physical activity behaviors which can decrease the risk of overweight related chronic diseases including type 2 diabetes, heart disease, stroke, and certain types of cancer and food borne illness.

The anticipated impact of Farm to You will be an increase in students' awareness of the farm as the source of nutrient dense foods and their contribution to the body's health and wellness, as measured through a pre/post evaluation design. The higher level of awareness will increase motivation and intent to change nutritional and lifestyle behaviors. In addition, Farm to You will market OCES as a premier agency for providing agricultural and nutritional related programming relevant to both urban and rural areas of the state; thus expanding use of OCES agriculture and nutrition programming targeting school age youth. The expanded use will be measured by comparing the baseline number of students reached to number of students reached after each year of implementation.

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
2007	300	4774

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 has implemented programs such as Dollar Decisions, Money Habitudes, High School Financial Planning Program, and Real World. All of these programs are designed to provide basic financial literacy training.

Results

Education programs for military personnel were done in Lawton for Ft. Sill personnel. Over 100 individuals signed up for direct deposit programs where a guaranteed return of 10% was offered. Many of these same individuals also signed up for the Thrift program. One Annie's Program was held and several more planned for 2008. Participants of the program indicated they were going to develop a binder with their financial information summarized. Another went to buy a computer to help her with her personal finances and also her business finances. One individual developed written goals after the program, another developed a business plan and a third started a record keeping program. Several programs were offered to help students evaluate their strengths, personalities and talents in terms of future job/career opportunities.

4. Associated Knowledge Areas

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

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 Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	300	16

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.

Results

Eighteen youth engaged in a youth literacy program indicated that they would pay their bills on time when they started handling their own finances. Another youth program watched the video, based on real world stories, "Maxed Out." This program showed how maxing out one's credit cards caused stress, took a substantial amount of time to manage, and even was a factor in the suicide death of 2 individuals. In a program on SMART goals, individuals indicated at the end that they would go home and develop goals regarding their own use of credit and how they could pay off debt.

4. Associated Knowledge Areas

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

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 Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	180	290

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

Specific programs on Home-Buyer Education: Train the Trainer Mini-Society, and Food Business Basic Training along with other specific entrepreneurship programs have been offered alone or in partnership with other agencies.

Results

- Based on previous surveys, an estimated 10 food-based businesses were started. Home buyer education courses remain offered in several areas in the state. In a follow-up on just 2 county programs, 15 people indicated that they had bought a home at an average price of \$65,000. Thirty-three youth, after the series of job opportunity classes, indicated that they were going to continue their education after graduating from high school. Several graduates of the Annie's projects indicated their intention of looking into estate planning and advanced investing opportunities. Several participants requested help in building a web page to further market their business.

4. Associated Knowledge Areas

KA Code	Knowledge Area
602	Business Management, Finance, and Taxation
806	Youth Development
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
2007	0	0

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

For this first year, educators have done informal and semi-formal feedback reporting following up on how program participants felt about the programs they offered and to gather some initial information on whether the participants were considering taking action on the material offered or if they even had already taken action.

Results

"Real World" participants indicated that they would be making changes in how they handled their personal finances. For example, one youth said that he would walk versus having a car. Three young women indicated that they would live together and share a car instead of each having a separate apartment and car. As noted earlier, students of basic financial literacy classes indicated that they had started record keeping systems of various types. They were taking more time to gather and maintain financial records. Over 30 indicated they would be requesting their credit reports.

4. Associated Knowledge Areas

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

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
2007	0	0

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

Programs such as Managing Your Money in Challenging Times, PowerPay, Bogus Check Writing, and Real World have been offered to over 500 participants. These programs, or parts of them, focus on helping people feel in control of their personal finances especially their use of credit and their total debt load.

Results

PowerPay was used by several educators to help individuals look at their current debt and make decisions as to which debt they wanted to pay off first and how they would then put those savings to use in paying down other debt. Two classes with a total of 46 individuals took an educational program for bogus check writers. Most of them set goals for themselves that they wanted to pay down debt and build up an emergency fund to avoid that in the future.

4. Associated Knowledge Areas

KA Code	Knowledge Area
602	Business Management, Finance, and Taxation
806	Youth Development
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 savins 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
2007	0	0

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

Classes have been offered in home buying, entrepreneurship, investing, retirement, and Annie's project. These classes have been offered to adult and youth audiences. They also have been offered to the general public, as inservice trainings, and as educational "train the trainer" programs for professionals from other programs. This has meant working with HeadStart programs, FCS teachers, military personnel, district attorneys, Extension educators from other states, and small business educators.

Results

- In a follow-up on just 2 county programs, 15 people indicated that they had bought a home at an average price of \$65,000. Thirty-three youth, after the series of job opportunity classes, indicated that they were going to continue their education after graduating from high school. Several graduates of the Annie's projects indicated their intention of looking into estate planning and advanced investing opportunities. Several participants requested help in building a web page to further market their business.

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

Number of teachers and child care providers learning interpersonal cognitive problem-solving techniques

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	30	57

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

High risk behaviors in children and youth, such as disconnection from school, alcohol and substance use, sexual activity, violence, and delinquency, have been identified as critical issues important for OCES to address. 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. 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 suggests that promoting interpersonal cognitive-problem solving skills during early and middle-childhood years aids in preventing engagement in high-risk behaviors later in adolescence.

What has been done

The I Can Problem Solve (ICPS) program (Shure, 2000) was implemented beginning in 2007. Each FCS/4-H county extension educator on the Family Resiliency impact team recruited one preschool or elementary school teacher to implement the curriculum with a class of children age 4 through 8. The county educators provided individual training and technical support on the ICPS program to the teachers. In some locations, additional teachers, teacher aides, or counselors were also trained. Educators also modeled presentation of the curriculum lessons and ICPS skills in the classroom

Results

Twenty-one (21) Extension educators from the following 20 counties participated in this project: Beckham, Cleveland, Cotton, Craig, Greer, Harper, Haskell, Hughes, Jackson, Kay, Kiowa, Major, McCurtain, Murray, Oklahoma, Pontotoc, Pottawatomie, Pushmataha, Sequoyah, and Tillman.

Ratings by participating teachers (N=15) immediately following ICPS implementation indicate:

- * 78% understood the content and key concepts "quite a bit" or "greatly/fully"
- * 60% felt "somewhat good" and 33% felt "very positive" about being prepared to implement the ICPS program on their own.

4. Associated Knowledge Areas

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

Outcome #9

1. Outcome Measures

Number of teachers and child care providers using interpersonal cognitive problem-solving techniques with children/youth

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	25	57

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

High risk behaviors in children and youth, such as disconnection from school, alcohol and substance use, sexual activity, violence, and delinquency, have been identified as critical issues important for OCES to address. 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. 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 suggests that promoting interpersonal cognitive-problem solving skills during early and middle-childhood years aids in preventing engagement in high-risk behaviors later in adolescence.

What has been done

Trained teachers utilized the program in their preschool centers, Head Start, and elementary school classrooms; some county educators also co-facilitated or directly presented some of the lessons to children in the classrooms. Three to four lessons were to be utilized each week for 10-12 weeks for a total of 36 lessons from the ICPS curriculum. The program curriculum utilizes a variety of methods including word concepts, pictures, role-play, puppets, stories, and group interaction to develop students' thinking skills such as generating alternative solutions, identifying consequences, and empathy. Daily real-life problems are used as examples. Teachers are trained to demonstrate and reinforce skills beyond the actual lesson presentations using dialoguing techniques, vocabulary words, and other supplementary activities to enhance interaction in the classroom.

Results

Ratings by participating teachers immediately following classroom implementation indicate:

- * 73% were using ICPS skills "often" or "frequently"
- * 64% used ICPS vocabulary words and 64% used ICPS dialoguing with children "quite a bit" or "greatly/fully"
- * 78% generated solution responses from children "quite a bit" or "greatly/fully"
- * 71% generalized use of ICPS to situations outside of lessons "quite a bit" or "greatly/fully"

* N=15; others N=14

The following comments were received by teachers:

- * (I'm) Very glad to be a part of this program - will be using it in the future to continue the growth of problem solving with the children.
- * This has been great to use to apply to real problems that come up through out the day.

The following comments were received by Extension Educators:

- * The teacher was beginning to see how certain words and phrases really worked. She especially liked "This is not a good time." She noticed that when she said that to a child they usually walked away without interrupting more.
- * The teachers are incorporating the concepts; Teacher is supporting the concepts.
- * Increased communication with children, children's awareness of others, and increased awareness of problem solving skills by staff.

4. Associated Knowledge Areas

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

Outcome #10

1. Outcome Measures

Number of children and youth using interpersonal cognitive problem-solving skills

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	500	1210

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

High risk behaviors in children and youth, such as disconnection from school, alcohol and substance use, sexual activity, violence, and delinquency, have been identified as critical issues important for OCES to address. 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. 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 suggests that promoting interpersonal cognitive-problem solving skills during early and middle-childhood years aids in preventing engagement in high-risk behaviors later in adolescence.

What has been done

The I Can Problem Solve program was implemented with 21 classes of children: four and five year olds in eight preschool, child care or Head Start centers, and Kindergarten through 2nd grade children in 13 elementary schools. Altogether, these classes included 370 children. It is estimated that another 840 children received the ICPS program in some manner by additional teachers, teacher aides, and school counselors.

Results

Immediately following implementation, intervention teachers (N=15) reported that of the children in their classroom:

- * 40% were using ICPS skills "often" or "frequently", and another 50% "sometimes"
- * 33% were "often" (about ¾ of the time) and 60% "sometimes" (about half of the time) exhibiting/using ICPS skills
- * 33% were "often" or "frequently" and over 50% were "sometimes" using ICPS skills and concepts outside of planned lessons.

The following comments regarding successes were received by teachers and/or extension educators:

- * The children are using the vocabulary words to solve their problems; offering 2-3 solutions before telling teachers.
- * Heard one of the students use a phrase that was introduced.
- * Students seem to remember and understand concepts being taught.
- * It really has showed children to think differently.
- * Children are being more creative at looking for alternatives; developing solutions on their own; actively considering different ways to deal with situations.
- * One girl who thought there was always only one "right" answer learned to think of other ways and realize others have feelings.
- * One child did not want to own up to his own actions. Now he does because he can see what he did and he makes the choice of how to change it.
- * A child with bullying tendencies was very quick to hit, take toys, and tattle - but now he thinks before he acts - uses his words and doesn't hit anymore.
- * I can see in several of the children that they are 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

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Public Policy changes
- Government Regulations
- Competing Public priorities
- Other (community/school support access)

Brief Explanation

•Support and engagement, access to schools – In two locations, county educators reported elementary school principals would not agree to complete the program implementation and evaluation protocol. In another location, a county educator reported staff turnover and teacher vacancy impeded the full implementation and completion of the program.

•Other academic requirements, classroom priorities, and time constraints were reported by several county educators and/or teachers as challenges to program implementation.

External factors which may have affected outcomes include competing programmatic challenges and accessing school classrooms. Oklahoma State Department of Health (OSDH) has begun initiatives to implement Coordinated School Health Programs in school settings and after school programs, both of which nutrition education and physical activity components. The programs are delivered by county health educators. To minimize the affect, the OSDH and Cooperative Extension FCS are making strong efforts to work collaboratively in communities to brace up programs and strengthen behavioral impacts. 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). Additionally, the Healthy Oklahoma Impact team will be encouraged to look for opportunities collaborate with OSDH to provide programming that reaches the targeted population in settings outside the classroom

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

Ratings by intervention teachers (N=15) regarding the overall effects of the ICPS program:

- Classroom climate - 20% "very positive" and 73% "somewhat good"
- Children's social and emotional development - 13% "very positive" and 67% "somewhat good"
- Children's behavior - 20% "very positive" and 73% "somewhat good"
- Overall satisfaction with the ICPS program - 50% "very positive" and 43% "somewhat good"
- Likelihood will use the ICPS program in the future – 40% "very positive" and 40% "somewhat good"

Nearly complete data was collected on about 18 intervention teachers and classes (those with which the ICPS program was implemented) and 18 comparison teachers and classes (those that did not receive the ICPS program). Partial data was collected from 3 other locations. It is anticipated that data analysis should include approximately 230 children in the intervention classes and 170 children in the comparison classes. Numerical data are being entered into SPSS software. Interview responses will be coded and entered. Qualitative responses to open-ended questions are being summarized. Data entry will continue through the spring 2008 and analysis should begin shortly thereafter.

Key Items of Evaluation

For both the intervention and comparison teachers and classes, all of the following measures and procedures for child interviews, teacher ratings of children's behavior and demographic information were utilized. Since the comparison groups did not receive the ICPS program intervention, the program process and quality measures were not collected. Data was collected only on individual children for whom parent/guardian consent was received.

§ Demographic information – The race/ethnicity, gender, and birth date of participating children.

§ Child Interviews - OCES county educators met individually with each participating student twice, before and after the presentation of the ICPS program lessons. A series of ten scenarios and questions were provided for the OCES educators to use along with guidelines on conducting the interviews. Each item presents a hypothetical story or scenario of a problem will 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 – Participating teachers were asked to complete a questionnaire pre- and post-program for each participating child in their classroom. The instrument is composed of 37 brief statements for which the teacher rates each item using a Likert scale.

§ Program Process and Quality – Three questionnaires assessed the use of the curriculum, program implementation, fidelity, and satisfaction. Teachers and county educators completed instruments mid-way through the intervention program and after conclusion of implementation.

Program #8

V(A). Planned Program (Summary)

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	3%		0%	
806	Youth Development	97%		0%	
	Total	100%		0%	

V(C). Planned Program (Inputs)

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

Year: 2007	Extension		Research	
	1862	1890	1862	1890
Plan	34.5	0.0	0.0	0.0
Actual	100.9	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
2244353	0	0	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
2244353	0	0	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
7660000	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.

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.

Conducted hundreds of animal, crop and environmental youth programs

Conducted hundreds of 4-H clubs and after school programs

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.

All statewide youth

V(E). Planned Program (Outputs)

1. Standard output measures

Target for the number of persons (contacts) reached through direct and indirect contact methods

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
Plan	42	150	425	750
2007	35000	2000000	462230	6000000

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

Patent Applications Submitted

Year	Target
Plan:	0
2007 :	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

	Extension	Research	Total
Plan			
2007	0	0	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Web-based pilot curriculum - lessons developed and tested

Year	Target	Actual
2007	10	10

Output #2

Output Measure

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

Year	Target	Actual
2007	0	12

Output #3

Output Measure

- Youth-adult environmental education teams

Year	Target	Actual
2007	90	16

Output #4

Output Measure

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

Year	Target	Actual
2007	42	21

Output #5

Output Measure

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

Year	Target	Actual
2007	0	0

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	Number of 4-H Environmental Stewardship Teams

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 Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	0	0

3c. Qualitative Outcome or Impact Statement**Issue (Who cares and Why)**

The estimated market revenue for geospatial technology by the year 2017 is \$757 billion. Agriculture was one of the first industries to apply GPS and GIS technology more than 10 years ago, yet less than 11.1% of US farms and agribusinesses utilize this technology that has been demonstrated to increase efficiency and profitability. The geospatial industry expects a 9-14% increase in workforce each year over the next 10 years. This tremendous potential for growth is only restricted by the ability of the educational system to provide the technical expertise and geospatial technology awareness needed by the industry.

These are the reasons the members of the Geospatial Initiative team are working to teach youth about GPS, GIS, precision agriculture, and remote sensing. These technologies will not only help teams of youth and adults work toward community development; they will also help the youth secure future careers.

What has been done

Currently 13 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.

Results

- * An evaluation report entitled Making 4-H Community Mapping Projects Successful has been published in the ESRI GIS Educator, which is an internationally distributed newsletter.
- * Twelve new geospatial lesson plans have been developed and are being pilot-tested
- * We have formed a new partnership with the University of Oklahoma's Center for Spatial Analysis.
- * Two of our county teams of youth and adults, along with myself, were invited to present poster presentations of their mapping projects at the National Council for Geographic Education, which is the national conference for geography.
- * Oklahoma has two youth and two adult representatives on the National GIS Leadership team. These youth and I were able to present information about our geospatial initiative team projects at the International ESRI Education Users Conference in San Diego, CA.
- * Our county teams have formed partnerships with Regional Development Authorities, local EMS services, school teachers, and other agencies. County Commissioners have requested assistance from our teams in creating geospatial maps to benefit the county.

4. Associated Knowledge Areas

KA Code	Knowledge Area
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806

Youth Development

Outcome #2**1. Outcome Measures**

Number of well-water assessments conducted

2. Associated Institution Types

•1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	200	0

3c. Qualitative Outcome or Impact Statement**Issue (Who cares and Why)****What has been done**

This program was changed

Results**4. Associated Knowledge Areas**

KA Code	Knowledge Area
806	Youth Development

Outcome #3**1. Outcome Measures**

Number of well owners beginning voluntary well water testing for bacteria

2. Associated Institution Types

•1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	5	4

3c. Qualitative Outcome or Impact Statement**Issue (Who cares and Why)**

Oklahoma's valuable environmental resources are in serious need of protection and improved stewardship. Restoration and enhancement of resources requires expanded awareness, knowledge, and appreciation of the environment and an upgrade of the stewardship ethic.

The era of abundant and free water has passed in Oklahoma. A review of the past 100 years of climate data shows that the last 20-30 years of the 20th century were above average in precipitation for Oklahoma. In fact, that period was the aberration and the norm is a cyclical pattern of shifting from wet periods to dry periods every 5-7 years. The first few years of the 21st century suggest we are re-entering the more cyclical phase. That factor provides a strong incentive to educate youth and the public on the importance of water conservation.

What has been done

4-H Environmental Stewardship teams have been formed in 16 counties throughout Oklahoma. These clubs study environmental issues, conduct research and perform service learning projects in their communities. Team projects are as individual as the members and the geography around them. All teams received training water conservation, water quality, and waste management/recycling.

Results

Environmental Impact team educators were trained on the revised Oklahoma Aqua Times lessons plans. Six counties reported these lessons were taught to 1,702 youth and adults. In Washita County, 80 students participated in a two-session program that not only stressed the importance of water conservation but also gave the students the opportunity to monitor their own families' water use for a week. Students saved an average of 50 gallons per family per day and they learned at least one new water conservation method. An estimated 4,000 gallons of water has been saved per day from this exercise.

A Cotton County 4-H member wrote a water conservation essay for the Governor's Water Conference. The member was the runner up in the 11th & 12th grade division; he was awarded a \$1,000.00 savings bond at the Governor's Water Conference Banquet for his efforts.

Another member of the 4-H Environmental Impact Team has started a water body clean-up project at a local park. The team periodically visits the newly finished pond and picks up debris and trash from the edges of the pond.

Educational programs such as the stream trailer, water hydrology model, and Aqua Times lessons were delivered to urban youth, after-school youth, as well as school enrichment, and 4-H club youth.

These youth learned the importance of water quality, water availability, and the importance of keeping our water clean. Some of the participating 4-H youth went a step further and developed illustrated presentations and workshops to share their new knowledge with other youth from their home counties.

In addition to these programs, members of the Environmental Impact team started Blue Thumb water monitoring projects, held EnviroVenture workshops, collected and recycled ink cartridges, mapped city storm drains, and Roger Mills County 4-H members even held a Wind Energy meeting for over 500 land owners to educate them about the benefits of wind energy.

4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

Outcome #4

1. Outcome Measures

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

2. Associated Institution Types

•1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	0	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

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
2007	42	21

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Oklahoma communities struggle with providing young people positive alternatives to substance abuse, teen pregnancy, and poor health and nutrition choices.

Community leaders, parents, and schools representatives observe both youth and even adults lack community interest and skills for making sound choices. In many instances existing community organizations struggle with recruiting, training, and retaining viable volunteer base necessary to meet community needs.

Participants of the Oklahoma 2001 National 4-H Youth Conversations and 2002 OCES Listening Forums identified the need for:

- Increased collaboration and organization of youth organizations in a unified front to address youth issues of: substance abuse, teen pregnancy, childhood obesity, nutrition and health, stress management, healthy choices, life skills development and job training;

- Positive role models and character education;

- Instilling a social and civic awareness of community needs and providing adult and youth audiences with the skills for taking a proactive role in their communities.

- Youth Governance

- Opportunities for exploring careers and continuing education beyond the classroom; and

- A method for identifying, recruiting, and training mentors/volunteers for working with youth.

What has been done

21 Action Plans have been initiated by 10 of 14 counties

Results

Case 1 - Bryant County

A town hall meeting was conducted and the main priority was underage drinking and its effects on the community. Approximately 110 persons attended this event including State Congressman and Representative, Police Chief, Choctaw Nation staff and persons from the Indian and Hispanic population.

Human Capital was enhanced as peer groups were used to address the issue of alcohol consumption. Youth become educated on the health risks involved with alcohol abuse and the number of youth being involved in this and other risky behavior is reduced.

Social capital was built as a safe and alcohol free environment were provided where youth can play games have activities and attend a concert. Youth who participated in BLT program were better equipped to get involved in their community in leadership roles and become active participants in positive change.

Civic capital was built as the youth initiated the community forum and woked to engage others. The net result was a well-attended forum with a cross section of public stakeholders and community groups.

Cultural capital was enhanced through the engagement of Native American and Hispanic populations who brought diverse opinions and input into the deliberations and enhanced collaboration. The strategy used was to engage an elder from the Choctaw Nation as a speaker during the forum.

This will be on going activities with showing videos, positive peer group activities and trying to reach the youth at a younger age by doing Wize Guyz and Girl Power programs within the county. The Girl Power and Wize Guyz are programs designed to address alcohol and its effects along with self esteem issues for all of the fifth grade boys and girls within all of the county schools.

A Saturday was taken to show youth that they can enjoy activities without alcohol. The Turning Point Coalition, Safe Schools Healthy Students along with the Bryan County Extension planned and conducted games, activities and concert for the youth to enjoy. During this time the youth could enjoy all of the activities without the influence of drugs or alcohol.

Case 2 - Caddo County

A public forum has been held where "Under Age Drinking" was identified as the issue that would be addressed through Youth/Adult Partnerships. Needs assessment were done by 2 means: a pre-survey sent to county officials, DHS personnel, teachers, School Administration and community leaders and the Public Forum and a survey during the forum. Over 100 attended the forum

Human Capital was developed as community apathy, from both youth and adults, was addressed as well as the problems of youth being involved in risky behavior and substance abuse.

Social capital was developed as the community acknowledged and discussed risky behavior and substance abuse issues. Youth leaders were instrumental in the communities awakening. Youth and adults agreed in the need to combat apathy, create safe places for youth to interact and the importance of fostering communications with young people.

Civic/Political Capital is being developed as Community Decision Makers become more aware of the knowledge, interest and abilities of youth going through training initiated by BLT. Youth voices are being listened to more.

Case 3 - Creek County

A public forum consisted of 36 adults and 42 youth from across Creek County representing 4-H, HCE, FFA, Student Council, Boy Scouts and Girl Scouts. The forum identified five major areas of needs assessment those were: youth/adult partnerships, teen behavior, drug and alcohol abuse, teen pregnancy, and community involvement.

Human capital was enhanced as the community embraces the need for attending training and working to develop healthy youth-adult partnerships. Social capital was be built as youth and adult learned to cooperate and appreciate the knowledge and skills they can contribute in addressing a community need. Civic/Political Capital was nurtured as youth voices, ideas

4. Associated Knowledge Areas

KA Code	Knowledge Area
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806

Youth Development

Outcome #6**1. Outcome Measures**

Number of trained and "graduated" youth and adult volunteers still providing direction to 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
2007	0	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
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
2007	{No Data Entered}	1552

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Oklahoma communities struggle with providing young people positive alternatives to substance abuse, teen pregnancy, and poor health and nutrition choices.

Community leaders, parents, and schools representatives observe both youth and even adults lack community interest and skills for making sound choices. In many instances existing community organizations struggle with recruiting, training, and retaining viable volunteer base necessary to meet community needs.

Participants of the Oklahoma 2001 National 4-H Youth Conversations and 2002 OCES Listening Forums identified the need for:

- Increased collaboration and organization of youth organizations in a unified front to address youth issues of: substance abuse, teen pregnancy, childhood obesity, nutrition and health, stress management, healthy choices, life skills development and job training;
- Positive role models and character education;
- Instilling a social and civic awareness of community needs and providing adult and youth audiences with the skills for taking a proactive role in their communities.
- Youth Governance
- Opportunities for exploring careers and continuing education beyond the classroom; and
- A method for identifying, recruiting, and training mentors/volunteers for working with youth.

What has been done

- * 1097 youth volunteers and 455 adults received 551.5 hours of training.
 - * 29 series of programs have been conducted (A series is defined as multiple sessions designed for a team being trained to plan, conduct and evaluate a service learning project.)
 - * 52 Single Workshop have been conducted (A single workshop is defined as one stand alone session taught to develop youth-adult teamwork and community awareness and activism.)
 - * Event Display produced (An event display is defined as an educational display used to promote BLT at community events, conferences and to partnering organizations.)
- Team members presented at 16 Conference (Conferences is defines as conducting a workshop or workshops at an organized Extension or Partnering Organization's conference.)

Results

An awareness is being generated in communities and organizations that youth have a valuable place in identifying and addressing needs within a community. The youth with the assistance of adult mentors are learning skills and being provided meaningful opportunities to apply the skills to real life situations. Youth and adults are learning youth have a place in governing their community needs.

4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

Outcome #8

1. Outcome Measures

Number of 4-H Environmental Stewardship Teams

2. Associated Institution Types

•1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	{No Data Entered}	16

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Oklahoma's valuable environmental resources are in serious need of protection and improved stewardship. Restoration and enhancement of resources requires expanded awareness, knowledge, and appreciation of the environment and an upgrade of the stewardship ethic.

The era of abundant and free water has passed in Oklahoma. A review of the past 100 years of climate data shows that the last 20-30 years of the 20th century were above average in precipitation for Oklahoma. In fact, that period was the aberration and the norm is a cyclical pattern of shifting from wet periods to dry periods every 5-7 years. The first few years of the 21st century suggest we are re-entering the more cyclical phase. That factor provides a strong incentive to educate youth and the public on the importance of water conservation.

Between 2000 and 2005, the amount of waste entering Oklahoma's landfills increased by almost 1.5 million tons. The Oklahoma Department of Environmental quality estimates that 80% of household trash (equivalent to 67 trash cans per person) has the potential to be recycled. While there is little economic incentive to recycle in Oklahoma, recycling or reusing materials preserves space in landfills for non-recyclable materials. In areas not served by waste collection services, household waste is dumped in ditches and gullies on county roads, creating an added clean-up expense for county commissioners and a hazard to livestock and water supplies in the area.

What has been done

4-H Environmental Stewardship teams have been formed in 16 counties throughout Oklahoma. These clubs study environmental issues, conduct research and perform service learning projects in their communities. Team projects are as individual as the members and the geography around them. All teams received training water conservation, water quality, and waste management/recycling.

Results

Each county participating in the 4-H Environmental Impact program worked with their OCES program advisory councils, 4-H Volunteer leaders' board and Teen Leader organization to select projects which would address their individual county needs. The selected projects fell into two categories: recycling and water conservation/water quality.

Recycling:

Oklahoma 4-H collected a total of 4,180 pounds of aluminum pop tabs this year for the Ronald McDonald charities. This means approximately 836 families could be housed for one week at a Ronald McDonald House. Cotton County alone recycled 930 pounds of aluminum cans (they donated 130 pounds of pop tabs to the Ronald McDonald House) the funds raised from the sale of the aluminum cans was used to support new 4-H environmental activities and other county 4-H activities, this was also the case for multiple 4-H environmental teams. Through the recycling program In Rogers County, participating families reported a change in household habits; they have now made recycling part of their daily routine. Other counties toured recycling centers, taught educational workshops, and prioritized recycling in their educational programs.

Water Quality/Conservation:

Environmental Impact team educators were trained on the revised Oklahoma Aqua Times lessons plans. Six counties reported these lessons were taught to 1,702 youth and adults. In Washita County, 80 students participated in a two-session program that not only stressed the importance of water conservation but also gave the students the opportunity to monitor their own families' water use for a week. Students saved an average of 50 gallons per family per day and they learned at least one new water conservation method. An estimated 4,000 gallons of water has been saved per day from this exercise.

A Cotton County 4-H member wrote a water conservation essay for the Governor's Water Conference. The member was the runner up in the 11th & 12th grade division; he was awarded a \$1,000.00 savings bond at the Governor's Water Conference Banquet for his efforts.

Another member of the 4-H Environmental Impact Team has started a water body clean-up project at a local park. The team periodically visits the newly finished pond and picks up debris and trash from the edges of the pond.

Educational programs such as the stream trailer, water hydrology model, and Aqua Times lessons were delivered to urban youth, after-school youth, as well as school enrichment, and 4-H club youth.

These youth learned the importance of water quality, water availability, and the importance of keeping our water clean. Some of the participating 4-H youth went a step further and developed illustrated presentations and workshops to share their new knowledge with other youth from their home counties.

In addition to these programs, members of the Environmental Impact team started Blue Thumb water monitoring projects, held EnviroVenture workshops, collected and recycled ink cartridges, mapped city storm drains, and Roger Mills County 4-H members even held a Wind Energy meeting for over 500 land owners to educate them about the benefits of wind energy.

4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

V(H). Planned Program (External Factors)

External factors which affected outcomes

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

Brief Explanation

The well testing program was discontinued and changed into a broader water quality team program due to unforeseen complications with well testing.

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}

Program #9

V(A). Planned Program (Summary)

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	3%		11%	
201	Plant Genome, Genetics, and Genetic Mechanisms	0%		1%	
202	Plant Genetic Resources	0%		8%	
203	Plant Biological Efficiency and Abiotic Stresses Affecting Pla	0%		3%	
204	Plant Product Quality and Utility (Preharvest)	0%		2%	
205	Plant Management Systems	84%		27%	
206	Basic Plant Biology	0%		1%	
211	Insects, Mites, and Other Arthropods Affecting Plants	0%		7%	
212	Pathogens and Nematodes Affecting Plants	5%		20%	
216	Integrated Pest Management Systems	8%		20%	
Total		100%		100%	

V(C). Planned Program (Inputs)

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

Year: 2007	Extension		Research	
	1862	1890	1862	1890
Plan	1.6	0.0	2.7	0.0
Actual	1.7	0.0	3.4	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
37806	0	184000	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
37806	0	184000	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
133000	0	856000	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

Target for the number of persons (contacts) reached through direct and indirect contact methods

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
Plan	2000	10000	0	0
2007	15500	636130	0	0

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

Patent Applications Submitted

Year	Target
Plan:	0
2007 :	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

	Extension	Research	Total
Plan			
2007	8	2	10

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of peer-reviewed journal articles manuscripts submitted

Year	Target	Actual
2007	2	2

Output #2

Output Measure

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

Year	Target	Actual
2007	0	3

Output #3

Output Measure

- Number of turf/roadside vegetaion management workshops conducted

Year	Target	Actual
2007	15	66

Output #4

Output Measure

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

Year	Target	Actual
2007	500	1111

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
2007	0	0

3c. Qualitative Outcome or Impact Statement**Issue (Who cares and Why)**

Grass turf is of societal interest to homeowners, commercial landscapes, public landscapes, sports fields and golf courses. New grasses that form turf are being developed that withstand greater use, more efficiently use water and fertilizer and are more aesthetically pleasing.

What has been done

Turf cultivars from the OSU breeding program and distributors are being evaluated for use in Oklahoma under a wide variety of conditions.

Results

Results from tests were provided to industry representatives, and five individuals now are producing a new OSU developed cultivar 'Patriot' for sale in Oklahoma and throughout the world. Over \$700,000 in sales were generated with the new cultivar.

4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems
204	Plant Product Quality and Utility (Preharvest)

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
2007	0	1

3c. Qualitative Outcome or Impact Statement**Issue (Who cares and Why)**

Golf course managers are selective in choosing turf cultivars that provide excellent golf 'play' under varying conditions and use. They require cultivars that are adapted for use on fairways, tees and greens.

What has been done

Different species and cultivars of grass are evaluated for use under differing conditions and results provided to golf course managers.

Results

Surveys of golf course managers indicated that 100% of new courses developed in Oklahoma have adopted use of the recommended cultivar based on Oklahoma trials.

4. Associated Knowledge Areas

KA Code	Knowledge Area
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
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	400	578

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Oklahoma has a thriving turfgrass industry spanning residential and commercial lawns, golf courses, parks, athletic fields, roadsides and sod production. The turfgrass research team at OSU addresses a number of management-related issues that must be communicated, along with other recently developed and historic techniques. The team's extension educators service this need using a variety of out reach education methods.

Oklahoma Dept of Transportation roadside vegetation managers (RVM) are entrusted with the management of over 400,000 acres of Oklahoma roadside rights of way. While a portion of these areas can remain completely natural, much of the acreage must be managed using an integrated herbicide and mowing program to hold plant community succession (weed invasion) at bay so proper motorist site distance is present. Neither grazing nor fire are viable management tools in the highway right of way.

What has been done

In 2007, 66 educational seminars were conducted for professional turfgrass managers. Among these events were multiple pesticide applicator certification and training events, equipment calibration workshops, a turf research station field day, a large state-wide conference and a joint Oklahoma-Arkansas turfgrass short course. Some 1,111 professionals participated in these events. Over 640 of the ODOT RVM employees attend OSU continuing education workshops each year. These individuals utilize an OSU generated Approved Herbicide and Adjuvant Product List (AHAL) and report to our program on the successes and failures of their weed control program each year.

Results

Ninety-four percent (47 of 50 participants) of the OK-AR turf short course attendees were either already using the suggested improved management practices or would be adopting the suggested methods. Ninety-four percent also felt they were better prepared to do their job following the educational event. This same percentage felt that they could manage turf in a more environmentally sound manner with their new knowledge. Eighty-four percent of the participants felt they could save money for their facilities using the information provided in the turf short course. In 2007 ODOT RVM managers treated over 123,800 acres of roadsides as a part of a yearly integrated vegetation management program. Using a good/fair/poor rating, a total of 246 transportation facility herbicide treatment events were evaluated. ODOT managers rated eighty-three percent of treatment events as having good, 15% fair and 2% poor results (205/36/5 participant events) in 2007.

4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems
111	Conservation and Efficient Use of Water
216	Integrated Pest Management Systems
204	Plant Product Quality and Utility (Preharvest)

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 spring of 2007 was cooler and wetter than average and a significant increase in disease due to the wet weather and water saturated soils reduced growth of turf grasses but provided increased opportunities to conduct work on pathogens and diseases of turf grasses.

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

Golf course variety establishment results were obtained through direct phone survey of golf course managers and sales data provided by the producing companies. Sod production data is based on licenses granted with license holders surveyed through phone call. Every other year the Oklahoma Sod Production industry participates in providing varietal production information for a Current Report on Oklahoma Sod availability (CR 6605). The annual Oklahoma-Arkansas Turfgrass Short Course is survey with a 4 page survey with a 98% participation rate. We survey each ODOT maintenance facilities' herbicide program each year with over 95% participation rate. Surveys were conducted following seminars and short courses. No changes in evaluation procedures are deemed necessary in 2008. Evaluation results suggest that the turfgrass industry is enthusiastic about the bermudagrass varieties that are research produces. Results also suggest that our program of management education and research is useful to them.

Technology Partnership Practice of the Battelle Memorial Institute was commissioned in 2007 to review and investigate economic impacts of DASNR programs. In that process the following three case studies were highlighted by the Battelle study.

Selected Impacts on Oklahoma Turfgrass Industry

Oklahoma turfgrass industry is built on high-performance DASNR developed varieties. OSU has top performing variety in independent trials.

- Sod production has a \$77 million total impact in Oklahoma and generates 1,000 jobs. Large proportion of benefits from this industry are allocable to DASNR breeding, management research and extension activities.
- Extension recommended practices in roadside verge maintenance, saving state \$560,000 annually.

Key Items of Evaluation

Sales and establishment of our bermudagrass varieties indicated that the program is successful. On site as well as mail surveys of extension programming indicated that our extension and research efforts were well-received by the public and by industry practitioners.

Program #10

V(A). Planned Program (Summary)

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: 2007	Extension		Research	
	1862	1890	1862	1890
Plan	12.7	0.0	0.8	0.0
Actual	14.3	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
331787	0	0	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
331787	0	0	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
1160000	0	0	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 entrepreneurship training and development.

2. Brief description of the target audience

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

V(E). Planned Program (Outputs)

1. Standard output measures

Target for the number of persons (contacts) reached through direct and indirect contact methods

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
Plan	880	5650	0	0
2007	39248	1833913	0	0

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

Patent Applications Submitted

Year	Target
Plan:	0
2007 :	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

	Extension	Research	Total
Plan			
2007	12	7	19

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of community services plans completed

Year	Target	Actual
2007	30	26

Output #2

Output Measure

- Number of education modules completed

Year	Target	Actual
2007	1	8

Output #3

Output Measure

- Number of county officer training courses conducted

Year	Target	Actual
2007	35	76

Output #4

Output Measure

- Number of manufacturing firms receiving applications engineering assistance

Year	Target	Actual
2007	45	79

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
2007	150	280

3c. Qualitative Outcome or Impact Statement**Issue (Who cares and Why)**

The number of people working at home grows annually by 5-10% (Link Resources, 1995). One reason for this is the economic situation (OCES, 1989, 1994). In Oklahoma, those economic reasons develop from our ranking of 40th in individual per capita income and 9th in the number of people at or below poverty (2002 Statistical Abstract). Other reasons are: lifestyle changes, increased family time, being one's own boss, and entrepreneurship.

What has been done**Results**

Based on previous work, in the last 5 years 30 new food-based businesses have started after participating in ,Basic Training., Studies show 28% of respondents started a business after attending a workshop. With an average income, this means over \$1,500,000 annually will be added to local Oklahoma economies. An owner,s start-up guide, Putting It All Together, has been provided to over 400 Oklahoma entrepreneurs and also to 15 other states. It has been rated as an excellent resource by over 90% of survey respondents. Food Business Basics, a start-up guide, has been developed and provided to more than 1500 aspiring entrepreneurs including all participants in the Food & Agriculture Products Center,s ,Basic Training, classes.

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 Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	50	574

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 2007, the Applications Engineers client projects had the following impacts:

Sales increase	\$87,325,002	
Sales retained (otherwise been lost)	\$19,057,500	
Cost savings	\$8,590,919	
Costs avoided	\$13,643,600	
268 new jobs created at \$75,511 per job		\$20,236,948
306 jobs retained at \$75,511 per job		\$23,106,366
4 jobs lost at \$75,511 per job		-\$302,044
Investment in new plant facilities and equipment		\$16,403,940
Total impact	\$188,062,231	

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
2007	30	102

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

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.

New county government officials are elected regularly and new employees hired often. By state law some need to receive training and others in order to do their job better.

What has been done

Deliberative forums provide a safe, non-partisan venue for Oklahomans to struggle with challenging public issues. These deliberations are based on the idea that in a democracy citizens have the responsibility to get together to talk through their common concerns, weigh possible alternative actions to address these problems, and inform policy makers and other community leaders about the desired direction for public action. Public deliberation provides a means by which Oklahomans make choices about the basic purpose and direction for their communities and country. As conveners, moderators, and recorders/reporters of deliberative forums, Extension professionals and other community leaders perform a non-biased, non-advocacy role in engaging Oklahomans in building community.

Also, 76 training classes were offered for county officials and their to learn a broad variety of mandatory subjects and elective subjects.

Results

Oklahoma Partnership for Public Deliberation (OPPD) has sustained continuous operation, pursuing its mission to foster participation in reasoned and informed decision making for the public good. The OPPD has conducted eleven Moderators & Recorders Academies (OMRA) to prepare approximately 225 Oklahomans to convene, moderate, record and report deliberative forums and study circles. These persons are prepared to give leadership to deliberative forums. To date, nearly 250 public forums have been conducted in Oklahoma on a wide range of topics.

Each year, the OPPD conducts 25-30 deliberative forums involving 1200-1400 people. Based on a joint study conducted by Oklahoma Cooperative Extension and Missouri Outreach and Extension in 2001, the following impacts are projected for Oklahoma forum participants:

- , • Contact made with office holders (62%)
- , • Community taskforce/study group was organized to address the issue (42%)
- , • Issue is now ,on the table, in the community (38%)
- , • Participants began to network with others on the issue (52%)

County government officers and/or employees from all seventy-seven counties attended one or more short-courses, one to two days in length. (Total attendance over 1,800.) Newly elected officials and newly hired employees find these short-courses to be of critical importance because they learn day to day county government duties. A good example is the Purchasing Procedures short-course. Purchasing agents are required by law to have the training. All other county officials benefit by avoiding illegal purchasing activity and avoiding conflict between requisitioning officers and the purchasing agent.

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

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	100	87

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 todays economy.

What has been done

The Oklahoma State University e-commerce program (established in mid-2007) has provided training to over 40 small businesses on how to plan, effectively set up, and promote their websites, which can help address these issues.

Results

Prior to the training, 49% indicated that they had a website. 80% of the respondents indicated that the website planning was very useful for their business, while 76% found the information on website promotion very useful. After the training, 92% of respondents planned on either developing a website or altering their current site.

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
•1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	15	36

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

The health sector is an often under appreciated component of many rural economies, typically accounting for between 10 – 20% of all jobs and income. This sector has had considerable difficulty remaining viable in traditional systems in rural areas. Thus many rural areas are subject to loss of facilities and services.

What has been done

The purpose of the Community Health Engagement Program is to actively engage community residents in health care decision making by showing them the importance of the health sector to their local economy. Options to upgrade health services are explored by using local surveys and budgets to assess feasibility.

Results

In 2007, 10 communities went through this process, and several made the decision to upgrade their services. A new physicians clinic was opened in Blanchard, Oklahoma; and the hospital in Hugo, Oklahoma decided that attempting to pass a city-level sales tax was the best way to fund future improvements. Several other communities are currently undergoing the process and may be implementing additional health services in the future.

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
2007	75	70

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Enabled and well informed leadership has been shown to be one of the key factors to successful transition and sustainability of rural communities. Oklahomas communities face challenges on several fronts. These challenges often include shifting populations, competition for economic development, and inadequate infrastructure and community services to support economic development and population changes. There is also concern about the short supply of community leaders prepared to meet those challenges. The development of local community leaders has been identified and emphasized on the state and national level. One Oklahoma study identified the need to provide opportunities at the local level to develop community leaders and assist with community improvement.

What has been done

Extension Family & Consumer Sciences programs has supported community leadership development through curriculum, educational sessions and consulting. From 1987 – 2002, the Family Community Leadership Program taught leadership to community teams working to address local issues, training about 200 persons in approximately 30 counties. The concept of team learning and collaboration was applied to the Initiative for the Future of Rural Oklahoma (Initiative), launched in 2002 by an interdisciplinary team including the departments of Agricultural Economics, Human Development & Family Science, and Design, Housing & Merchandising. The effort included 13 projects encompassing 17 counties and features educational programming in two areas: Leadership Development (addressed here) and Economic Development. The purpose of the Initiative was to enhance and develop the effectiveness of community leaders and county Extension Educators to identify and address critical issues confronting the community, especially those relating to leadership and community development. The current Developing Effective Leaders Program supports numerous county-Extension-based leadership programs in Oklahoma.

The Leadership Development program area is grounded in the concept of local management and implementation. The curriculum includes a menu of leadership topics prepared in modules for use at the local level

The Oklahoma Agricultural Leadership Program provides selected individuals with two-year training in leadership development.

Results

Through the Initiative, a variety of leadership strategies and skills were development and used to address community needs including:

- Creation of strong, enduring multi-county/multi-community leadership teams
- Development of mission statements for community leadership teams
- Utilization of citizen engagement approaches
- o Surveys
- o Deliberative Forums
- Involving youth to plan and conduct community development projects
- Creation and implementation of strategic plans
- Seeking additional resources through grantsmanship
- Learning more about other communities by conducting study tours

A variety of community development projects were implemented. Examples included the following:

- Community-wide tourism project
- Community pride programs
- Shop-at-home program
- Airport improvement project
- Building sidewalks
- Main Street improvement
- Visual merchandising seminars
- Community marketing video
- County sister-city program
- Primary care facility • Home-based and small business assistance projects
- County-wide economic development team
- Economic and community development conference
- Community economic development resource binder
- Community beautification through fire training
- County-wide high-speed internet access
- First-ever community-wide long-range plan
- County-wide clean-up and beautification
- Business development/expansion project
- Value-added merchandising

OALP is making a difference ,– several alums serve in major leadership positions at local, state, and national levels.

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

- 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

{No Data Entered}

Key Items of Evaluation

{No Data Entered}

Program #11

V(A). Planned Program (Summary)

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	4%		10%	
202	Plant Genetic Resources	0%		5%	
205	Plant Management Systems	5%		5%	
211	Insects, Mites, and Other Arthropods Affecting Plants	11%		15%	
212	Pathogens and Nematodes Affecting Plants	0%		15%	
213	Weeds Affecting Plants	5%		15%	
215	Biological Control of Pests Affecting Plants	4%		5%	
216	Integrated Pest Management Systems	71%		20%	
601	Economics of Agricultural Production and Farm Management	0%		5%	
901	Program and Project Design, and Statistics	0%		5%	
Total		100%		100%	

V(C). Planned Program (Inputs)

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

Year: 2007	Extension		Research	
	1862	1890	1862	1890
Plan	5.5	0.0	2.1	0.0
Actual	3.9	0.0	5.5	0.0

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

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
70140	0	322000	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
70140	0	322000	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
248000	0	1498000	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

Target for the number of persons (contacts) reached through direct and indirect contact methods

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
Plan	500	3700	0	0
2007	3069	44300	0	0

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

Patent Applications Submitted

Year	Target
Plan:	0
2007 :	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

	Extension	Research	Total
Plan			
2007	3	8	11

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Stakeholder assessment

Year	Target	Actual
2007	1	4

Output #2

Output Measure

- IPM schools, conferences and workshops

Year	Target	Actual
2007	10	7

Output #3

Output Measure

- Pesticide applicator education schools and workshops

Year	Target	Actual
2007	10	24

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
2007	2	7

3c. Qualitative Outcome or Impact Statement**Issue (Who cares and Why)**

Publications are the main means of distribution of new knowledge to other professionals and to the general public. The use of peer review for manuscripts provides a review to be as certain as possible that knowledge is fundamentally correct.

What has been done

Peer reviewed manuscripts based on research and demonstration work were published in journals.

Results

At least seven manuscripts were published.

4. Associated Knowledge Areas

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

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
2007	3600	225000

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

IPM tactics have been shown to result in increased efficiencies in crop production through increases in yield, and/or reductions in costs including those costs for pesticides.

What has been done

Research and demonstration of IPM programs has resulted in increase in knowledge of new or novel IPM methods for crop production systems and this has been demonstrated to producers.

Results

New or novel IPM methods have been implemented on approximately 225,000 acres of crop land in OK.

4. Associated Knowledge Areas

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

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
2007	100	525

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Commercial and private applicators of restricted use pesticides must be certified per federal and state regulations. Pesticide applicators are required to treat residential, public and commercial facilities and crops and pasture.

What has been done

Pesticide applicator training is conducted throughout the state and provides training for treating residential, commercial, crop and food storage facilities.

Results

Over 525 individuals have attended training, taken the test and achieved certification for pesticide application in residential, public, commercial facilities and/or on crops, pasture or grain storage facilities.

4. Associated Knowledge Areas

KA Code	Knowledge Area
216	Integrated Pest Management Systems
211	Insects, Mites, and Other Arthropods Affecting Plants
212	Pathogens and Nematodes Affecting Plants
133	Pollution Prevention and Mitigation
205	Plant Management Systems

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
2007	0	8

3c. Qualitative Outcome or Impact Statement**Issue (Who cares and Why)**

Monitoring crops for insect pests is a fundamental activity for successful IPM programs. The research based Glance and Go system has been developed to save growers and consultants time in the field monitoring wheat crops to determine whether insect pests occur and/or have reached numbers requiring treatment with pesticides.

What has been done

Research based program called Glance and Go was developed and validated in the field with growers and consultants to determine whether it save time to reach a valid decision as to whether or not to treat a wheat field for insect pests. A sample of wheat producers was surveyed to determine whether or not they were using the system and the majority were not aware the system existed.

Results

Based on survey findings, cooperative extension personnel have implemented a more focused project to educate a sub sample of producers about use of the system and this is being monitored at this time.

4. Associated Knowledge Areas

KA Code	Knowledge Area
215	Biological Control of Pests Affecting Plants
205	Plant Management Systems
211	Insects, Mites, and Other Arthropods Affecting Plants
133	Pollution Prevention and Mitigation
601	Economics of Agricultural Production and Farm Management
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
- Populations changes (immigration, new cultural groupings, etc.)

Brief Explanation

A cool and wet spring had a negative impact on wheat production, resulting in a significant total loss of production throughout the state. Several research and demonstration field plots were destroyed by the cold, wet weather and no wheat yield data could be registered.

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}

Program #12**V(A). Planned Program (Summary)****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	29%		5%	
212	Pathogens and Nematodes Affecting Plants	12%		60%	
213	Weeds Affecting Plants	0%		5%	
712	Protect Food from Contamination by Pathogenic Microorgani	26%		20%	
903	Communication, Education, and Information Delivery	33%		10%	
	Total	100%		100%	

V(C). Planned Program (Inputs)**1. Actual amount of professional FTE/SYs expended this Program**

Year: 2007	Extension		Research	
	1862	1890	1862	1890
Plan	1.0	0.0	1.0	0.0
Actual	0.7	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
3984	0	230000	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
3984	0	230000	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
35000	0	1070000	0

V(D). Planned Program (Activity)**1. Brief description of the Activity**

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

*Hosted a Workshop on Plant Pathogen Forensics to shape the emerging new discipline of plant pathogen forensics and to define a role for OSU and Oklahoma in that discipline.

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

*Develop an academic "track" for students seeking M.S. or Ph.D. degrees in established programs such as Plant Pathology, Biochemistry, Plant Sciences or Forensic Sciences, who seek plant pathogen forensics

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

Conducted two regional training session for Extension County Educators on Biosecurity

2. Brief description of the target audience

Key members of National and Oklahoma homeland security community (DHS, FBI, CIA, etc)

Key members of National and Oklahoma agricultural leaders and representatives

Oklahoma extension personnel

Master gardeners

Oklahoma producers and crop consultants

OSU students and faculty

Professional/scientific societies

Key industries

The public

V(E). Planned Program (Outputs)

1. Standard output measures

Target for the number of persons (contacts) reached through direct and indirect contact methods

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
Plan	100	150	0	0
2007	385	400	0	0

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

Patent Applications Submitted

Year	Target
Plan:	0
2007 :	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

	Extension	Research	Total
Plan			
2007	1	10	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
2007	6	5

Output #2

Output Measure

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

Year	Target	Actual
2007	1	2

Output #3

Output Measure

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

Year	Target	Actual
2007	1	12

Output #4

Output Measure

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

Year	Target	Actual
2007	1	10

V(G). State Defined Outcomes**V. State Defined Outcomes Table of Content**

O No.	Outcome Name
1	Establishment of the Oklahoma Center for Agricultural Microbial Forensics and Biosecurity
2	Number of invitations to agricultural biosecurity team members for participation in initiatives, programs, presentations, and consultations related to agricultural biosecurity and microbial forensics
3	Number of forensics-relevant journal articles published
4	Percentage of agricultural producers, handlers and processors employing at least one new (to them) practice to enhance biosecurity
5	Conduct research of relevance to forensic plant pathology.

Outcome #1**1. Outcome Measures**

Establishment of the Oklahoma Center for Agricultural Microbial Forensics and Biosecurity

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	1	1

3c. Qualitative Outcome or Impact Statement**Issue (Who cares and Why)**

In response to national security needs, OSU established an institute which will enhance local, state and national programs to support and address issues of crop and food biosecurity, and impacts on society and the economy.

What has been done

The National Institute for Microbial Forensics, and Food and Agricultural Biosecurity was established in 2007. A director and one faculty member were appointed to the institute. A website was established and proposals for funding were submitted to agencies. Initiated a graduate program and currently have 5 students associated with the institute.

Results

Two graduate students received M.S. degrees in Forensic Science with research focused on plant pathology. Forensic plant pathology objectives and needs have been added to the official U.S. Plant Disease Recovery Plans as part of the federally mandated National Plant Disease Recovery Program.

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 Occuring Toxi
903	Communication, Education, and Information Delivery

Outcome #2**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
2007	10	20

3c. Qualitative Outcome or Impact Statement**Issue (Who cares and Why)**

Microbial forensics is a new and emerging field of science within the national biosecurity program. National security needs dictate that research and training be conducted towards biosecurity needs.

What has been done

- Hosted a national workshop focused on development of forensic capacity.
- Made approximately 20 presentations to various public groups describing the needs and importance in protecting food and crop resources through forensic work.
- Developed a state-wide Agricultural Emergency Preparedness Task Force.

Results

- National policy-makers (Congressional members and staff) and federal agency administrators were educated regarding importance of food and crop biosecurity needs and development of forensic science infrastructure.
- Implemented a Memorandum of Understanding between Oklahoma State University & the Oklahoma Department of Food and Forestry to define emergency roles and responsibilities in case of bioemergency.

4. Associated Knowledge Areas

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

Outcome #3**1. Outcome Measures**

Number of forensics-relevant journal articles published

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	1	0

3c. Qualitative Outcome or Impact Statement**Issue (Who cares and Why)**

Dissemination of research results is critical to extension of knowledge, application of research to work related real-world problems and training professionals to deal with biosecurity needs.

What has been done

At least 10 manuscripts in science, peer review journals and additional publications have been published in the past year.

Results

The publication of refereed journal articles ensures distribution of knowledge to the scientific community and publication of books and presentations direct knowledge to the general public.

4. Associated Knowledge Areas

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

Outcome #4**1. Outcome Measures**

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

2. Associated Institution Types

•1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	0	0

3c. Qualitative Outcome or Impact Statement**Issue (Who cares and Why)**

The institute and the OSU Homeland Security Team have goals to increase the public awareness of vulnerabilities and preventive measures to safeguard Oklahoma and U.S. agricultural resources.

What has been done

Extension faculty and professionals attended a regional conference on Agricultural Terrorism and Natural Disasters. Extension professionals developed in-service training for district and county professionals.

Results

Prominant public leaders from throughout Oklahoma were included in training programs and are now more aware of vulnerabilities in our agricultural systems and more likely to initiate training and more likely to notice and respond to unusual events or occurrences.

4. Associated Knowledge Areas

KA Code	Knowledge Area
903	Communication, Education, and Information Delivery
212	Pathogens and Nematodes Affecting Plants

Outcome #5**1. Outcome Measures**

Conduct research of relevance to forensic plant pathology.

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	{No Data Entered}	0

3c. Qualitative Outcome or Impact Statement**Issue (Who cares and Why)**

Development of detection and diagnostic tools and strategies is a top priority of national defense units including U.S. DHS and FBI.

What has been done

Initiated research projects including one dealing with movement of E. coli within the food system.

Results

Results will indicate how the bacteria move among sectors in the food system and provide insight into control and management methods.

4. Associated Knowledge Areas

KA Code	Knowledge Area
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occuring Toxi
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
- Other (exotic pathogens, terrorism)

Brief Explanation

Biosecurity events and or natural disasters cannot be predicted and on occurrence may result in changes in priorities to research and education efforts. Federal and state public policy changes can result in changes in priorities in research and education efforts. Declining or limited state and federal funding appropriations may limit funds available to conduct research projects, train students and conduct education programs for professionals and the general public.

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}

Program #13**V(A). Planned Program (Summary)****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%		4%	
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plai	0%		4%	
206	Basic Plant Biology	0%		4%	
211	Insects, Mites, and Other Arthropods Affecting Plants	0%		4%	
212	Pathogens and Nematodes Affecting Plants	0%		4%	
304	Animal Genome	0%		4%	
305	Animal Physiological Processes	0%		64%	
311	Animal Diseases	0%		4%	
312	External Parasites and Pests of Animals	0%		4%	
501	New and Improved Food Processing Technologies	0%		4%	
	Total	0%		100%	

V(C). Planned Program (Inputs)**1. Actual amount of professional FTE/SYs expended this Program**

Year: 2007	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	0.0	6.4	0.0
Actual	0.0	0.0	8.4	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
0	0	460000	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	460000	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	2140000	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

Target for the number of persons (contacts) reached through direct and indirect contact methods

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
Plan	0	0	0	0
2007	0	0	0	0

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

Patent Applications Submitted

Year Target

Plan: 0

2007 : 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

	Extension	Research	Total
Plan			
2007	0	18	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of manuscripts submitted based on reserach efforts

Year	Target	Actual
2007	24	18

Output #2

Output Measure

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

Year	Target	Actual
2007	16	38

Output #3

Output Measure

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

Year	Target	Actual
2007	12	20

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
4	Number of new plant varieties developed from research
5	Number of new drugs that move into clinical or veterinary application
6	number of new pesticides developed that replace hazardous or less environmentally safe alternatives currently in use.

Outcome #1**1. Outcome Measures**

Number of graduate students graduated and postdoctoral 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
2007	5	6

3c. Qualitative Outcome or Impact Statement**Issue (Who cares and Why)**

Trained scientists are required to conduct research and teaching programs that provide increased knowledge of basic biology including molecular biology.

What has been done

M.S. and Ph.D. training programs are conducted in various of the disciplinary departments and graduate students were successfully graduated.

Results

Six, M.S. and/or Ph.D., students had graduate degrees conferred last year.

4. Associated Knowledge Areas

KA Code	Knowledge Area
201	Plant Genome, Genetics, and Genetic Mechanisms
305	Animal Physiological Processes
206	Basic Plant Biology
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants
212	Pathogens and Nematodes Affecting Plants
211	Insects, Mites, and Other Arthropods Affecting Plants

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
2007	16	18

3c. Qualitative Outcome or Impact Statement**Issue (Who cares and Why)**

Publication of results of research is the method of determining that research is valid, significant and that the results will be disseminated and retained.

What has been done

Research results were submitted through various written venues including peer review journals, books and meeting procedures.

Results

Research results were published in at least 18 peer reviewed science journals.

4. Associated Knowledge Areas

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

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
2007	3	20

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Regional, national and international prestige based on significance of research can be determined based on invitations to present results of research at other universities and/or science meetings.

What has been done

Research faculty were invited to make presentations regarding research at other universities and science meetings.

Results

Research faculty were invited to present research results to at least 20 different university and/or science meetings.

4. Associated Knowledge Areas

KA Code	Knowledge Area
201	Plant Genome, Genetics, and Genetic Mechanisms
206	Basic Plant Biology

Outcome #4

1. Outcome Measures

Number of new plant varieties developed from research

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	0	0

3c. Qualitative Outcome or Impact Statement**Issue (Who cares and Why)**

Results of molecular research may be used to develop new plant varieties especially using transgenic techniques.

What has been done

Research scientists are conducting work to determine cellular processes involved in vernalization of wheat. Determination of the processes could lead to changes at the cellular level to adapt wheat cultivars to colder or warmer climates.

Results

Research to date has resulted in publication of descriptions of cellular processes but no new varieties.

4. Associated Knowledge Areas

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

Outcome #5**1. Outcome Measures**

Number of new drugs that move into clinical or veterinary application

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	0	0

3c. Qualitative Outcome or Impact Statement**Issue (Who cares and Why)**

Macromolecules are biologically active and research based discoveries as to biological activity may lead to use to manage plant or animal diseases.

What has been done

Research is being conducted to determine biological activity of macromolecules in plant and animal system.

Results

No new macromolecules have been discovered or developed that are currently in drug trials.

4. Associated Knowledge Areas

KA Code	Knowledge Area
201	Plant Genome, Genetics, and Genetic Mechanisms

304	Animal Genome
305	Animal Physiological Processes
206	Basic Plant Biology

Outcome #6**1. Outcome Measures**

number of new pesticides developed that replace hazardous or less environmentally safe alternatives currently in use.

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	0	0

3c. Qualitative Outcome or Impact Statement**Issue (Who cares and Why)**

Increased knowledge of plant and animal cellular activities may provide insights into processes that could be disrupted to reduce pest ability to reduce plant or animal host growth.

What has been done

Research is being conducted to determine cellular processes.

Results

Research results have been published describing basic plant and animal cellular processes affected at the molecular level but no new biologically active molecules have been discovered that may be used to manage biological systems.

4. Associated Knowledge Areas

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

V(H). Planned Program (External Factors)**External factors which affected outcomes**

- Economy
- Appropriations changes
- Competing Public priorities

Brief Explanation

Declining state and federal formula funding results in limiting purchase of significant new equipment to conduct research on plant and animal systems at the cellular and molecular level. Equipment limitations can slow rate of conduct of research and limit number of graduate students with access to the equipment to complete their degree research projects.

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}

Program #14

V(A). Planned Program (Summary)

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	68%		50%	
602	Business Management, Finance, and Taxation	32%		50%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

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

Year: 2007	Extension		Research	
	1862	1890	1862	1890
Plan	8.8	0.0	3.5	0.0
Actual	9.0	0.0	4.1	0.0

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

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
198347	0	230000	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
198347	0	230000	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
750000	0	1070000	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.

Data based information regarding use of crops and crop residue for cost effective production of biofuels.

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

Target for the number of persons (contacts) reached through direct and indirect contact methods

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
Plan	500	1000	100	200
2007	6308	841325	130	3000

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

Patent Applications Submitted

Year	Target
Plan:	0
2007 :	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

	Extension	Research	Total
Plan			
2007	9	15	24

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 governance

Year	Target	Actual
2007	50	35

Output #2**Output Measure**

- Number of software decision analysis aids developed

Year	Target	Actual
2007	2	8

Output #3**Output Measure**

- Number of manuscripts submitted to refereed journals

Year	Target	Actual
2007	3	15

Output #4**Output Measure**

- Number of farm income tax management schools conducted

Year	Target	Actual
2007	10	14

Output #5**Output Measure**

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

Year	Target	Actual
2007	5	12

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

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 Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	300	300

3c. Qualitative Outcome or Impact Statement**Issue (Who cares and Why)**

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

What has been done

Farm and Business Tax Institutes and the summer Tax Clinic and one-day Special Topics Course. The combination of all the schools allows a preparer to get the full 40 hours of CPE/CLE as required by state. Topics covered range from presentation of new tax laws and their implications, agricultural issues, business issues, tax planning opportunities, professional ethics, retirement, and social security to name a few. Twelve two-day sessions are conducted each year and two one-day special topics courses. Total 2007 attendance for the schools was approximately 2,350 tax preparers. These tax preparers file roughly 80 percent of the farm returns for taxpayers in the state of Oklahoma.

Results

High quality, professional instruction is provided to make continuing education credit available for Certified Public Accountants, Enrolled Agents, and Tax Attorneys. Participants filed more than 37,645 Federal farm tax returns and 255,428 Federal non-farm tax returns as reported by the participants in the most recent program evaluations. Most of the tax preparers that attend are from Oklahoma however there have been preparers from Kansas, Texas, New Mexico, Arkansas, Florida, and California attending the program in order to maintain their Oklahoma accreditation.

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
2007	40	335

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.

Results

The OCCD program was initiated in November of 2001. Since then it has been offered ten times (spring and fall) with eight advanced sessions. Over 335 directors have attended the Credentialing sessions and over 250 directors have returned for advanced training. 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 180 Credentialed directors representing 44 cooperatives. There are 150 more directors who have completed one of the two required sessions. Two hundred and fifty directors from 37 separate cooperatives have attended an advanced session. The advanced attendance reflects the fact that almost every credentialed cooperative director returned for additional education. 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
601	Economics of Agricultural Production and Farm Management

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
2007	75	350

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Production management, business planning, risk management and marketing are major issues for the beef producers who comprise Oklahoma's #1 agricultural industry.

What has been done

The OSU Master Cattleman Program, a comprehensive educational program, was launched in 2004 with the objective of enhancing the profitability of beef operations and the quality of life of beef producers by equipping them with vital information on many aspects of beef production, business planning, risk management and marketing. The educational curriculum is based on the Oklahoma Beef Cattle Manual. Powerpoint Training curricula and lesson plans are available to educators via the Master Cattleman website. Producers must complete 4 hours in each of 6 subject matter areas plus an additional four hours of instruction or special projects. Local Extension educators plan and organize the Master Cattleman educational series and select the specific curriculum offered.

Results

Over 50 producers were certified under the OSU Master Cattleman Program in 2007

4. Associated Knowledge Areas

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

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
2007	25	150

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

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

What has been done

The Oklahoma Meat Goat Boot Camp was created to provide a multi-day workshop where producers could learn management and production practices that would help them own/operate a successful meat goat operation. Knowledge areas covered included ear tagging, castrating, tattooing, hoof trimming, aging, fence building, forage planning and evaluation, business planning and management, nutrition and ration balancing, parasite control, FAMACHA, fecal egg counts, neo-natal and birthing, general herd health management and reproduction management.

Results

The demand for this educational experience has been outstanding. Class size was limited to 50 participants so that producers would be in smaller groups. The first camp filled up before local advertising could begin. This demand caused the organizers to conduct a second boot camp four months later. As the organizers, we underestimated the interest from goat producers from outside of Oklahoma. To date two camps have been completed with 111 participants from fifteen states. Participants have come from as far away as Michigan, New Jersey, New York, North Carolina, Tennessee, Kentucky and Georgia.

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

- * 80% of the sessions taught were of great value to participants
- * 45% potential adoption rate of information and management practices from the boot camp
- * Average perceived dollar value of the information presented was \$20.89/goat
- * Total value perceived for both camps \$93,600

4. Associated Knowledge Areas

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

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

{No Data Entered}

Key Items of Evaluation

{No Data Entered}

Program #15

V(A). Planned Program (Summary)

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	62%		10%	
205	Plant Management Systems	24%		25%	
307	Animal Management Systems	2%		15%	
402	Engineering Systems and Equipment	12%		50%	
Total		100%		100%	

V(C). Planned Program (Inputs)

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

Year: 2007	Extension		Research	
	1862	1890	1862	1890
Plan	4.3	0.0	3.0	0.0
Actual	2.1	0.0	3.1	0.0

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

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
34788	0	184000	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
34788	0	184000	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
180000	0	856000	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. Extended hand held sensor systems to producers to improve nutrient management.

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

Target for the number of persons (contacts) reached through direct and indirect contact methods

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
Plan	300	800	0	0
2007	1986	130090	0	0

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

Patent Applications Submitted

Year	Target
Plan:	0
2007 :	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

	Extension	Research	Total
Plan			
2007	10	13	23

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
2007	5	1

Output #2

Output Measure

- New technology applications

Year	Target	Actual
2007	2	2

Output #3

Output Measure

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

Year	Target	Actual
2007	26	26

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/instrumentation

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	0	0

3c. Qualitative Outcome or Impact Statement**Issue (Who cares and Why)**

Sensor hardware and sensing software must first be conceptualized and then developed using research methods. Once developed the systems must be tested and validated for use. After successful development, the hardware and software must be packaged and made available to the general public for purchase and use.

What has been done

'Green Seeker' hardware and software has been developed for measuring plant 'health' and based on measurements the system either automatically make application of fertilizer to correct deficiencies or provide the information to a human applicator to make manual application.

Results

'Green Seeker' systems for use on tractors or hand carried have been developed for use in large or small production field situations. The systems are now available through the private market.

4. Associated Knowledge Areas

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

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
2007	100	100

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Sensors have been developed that can determine need for fertilizers in crops. Use of the sensor to determine whether deficits occur can provide better use and application of costly fertilizers saving producers and consumers money.

What has been done

Green Seeker sensors were used in 586 fields to take readings on plant health and measures used to make decisions as to fertilizer application and rate.

Results

Producers using the system were found to apply approximately 25% less nitrogen at a savings of approximately \$15/acre.

4. Associated Knowledge Areas

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

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
2007	10000	250000

3c. Qualitative Outcome or Impact Statement**Issue (Who cares and Why)**

Research and demonstration projects have shown that use of sensor-based fertilizer management strategies can reduce use of fertilizers and cost to society.

What has been done

Extension personnel worked with producers to establish variable rate fertilizer strips of crops in fields so that sensors could be used to document differences in fertilizer activity and resulting plant growth and production.

Results

Use of Green Seeker technology was documented on 586 fields in 2007, representing over 250,000 acres. The resulting savings in fertilizer use is estimated over \$3.7 million.

4. Associated Knowledge Areas

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

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

Cold and wet weather during the spring 2007 resulted in destruction of much of the winter wheat crop including many of the research and demonstration plots planted throughout the state of Oklahoma.

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}

Program #16

V(A). Planned Program (Summary)

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: 2007	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	0.0	3.0	0.0
Actual	0.4	0.0	2.5	0.0

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

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
2897	0	138000	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
2897	0	138000	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
40000	0	642000	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

Target for the number of persons (contacts) reached through direct and indirect contact methods

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
Plan	0	0	0	0
2007	0	0	0	0

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

Patent Applications Submitted

Year	Target
Plan:	2
2007 :	1

Patents listed

'Goodwell' bermudagrass; Yanqi Wu, Charles Taliaferro, and Rick Kochenower; filed on June 27, 2007.

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

	Extension	Research	Total
Plan			
2007	8	17	25

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Journal Articles

Year	Target	Actual
2007	4	17

Output #2

Output Measure

- Technical papers and presentations

Year	Target	Actual
2007	10	21

Output #3

Output Measure

- New processes developed

Year	Target	Actual
2007	0	0

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O No.	Outcome Name
1	Products/processes taken to commercialization by industry
2	Other Bio-Based Product Development

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
2007	0	1

3c. Qualitative Outcome or Impact Statement**Issue (Who cares and Why)**

The biofuels industries are rapidly growing across the U.S. The development and expansion of biofuels industries within Oklahoma could benefit farmers and ranchers, rural communities and the overall Oklahoma economy. The potential development and structure of biofuel production will depend upon a number of factors including the potential production of biofuel crops, the development of appropriate bioconversion technologies, and the profitability of biofuel cropping systems relative to land use alternatives.

What has been done

We are developing high yielding and widely adaptive switchgrass varieties for the southern central regions in the US for biomass feedstock production using conventional breeding and genomics technology. Four breeding populations have been progressed from cycle 1 to cycle 2. Gasification-fermentation: We are among a select few research groups having successfully produced ethanol from biomass-generated producer gas. Besides linking the gasifier to the bioreactor, the team has identified several novel solvent-producing anaerobic microbial catalysts, one being *Clostridium carboxidivorans* P7T which was isolated from the sediment of an agricultural settling lagoon. To date, P7 is the most researched of the suite of microbial catalysts the team has in their collection. It was the first reported microbe in which biomass-generated syngas, rather than commercially mixed gases, was used to produce ethanol. Thermotolerant yeast: *Kluyveromyces marxianus* IMB4 was used in a simultaneous saccharification and fermentation (SSF) process with cellulase enzymes to produce ethanol from switchgrass. This yeast allowed a temperature of 45°C(113°F) to be used in the process, as opposed to 37°C (99F), which is the temperature used for the most common ethanol producing yeast *Saccharomyces cerevisiae*. A greater temperature results in increased activity of cellulase and reduces SSF time.

At the request of Oklahoma Secretary of Energy, a comprehensive research project was organized that projected potential shifts into biofuel crops at various biofuel prices and summarized the regional impacts.

Research was conducted to determine the cost to produce switchgrass, to determine if the U.S. Department of Energy's estimated delivery cost of \$35 per dry ton is realistic, and to identify likely challenges to the development of switchgrass as a dedicated energy crop.

Results

Feedstock Development

Progeny test plots of the four switchgrass populations were established in 2007.

Conversion Technologies

Gasification-fermentation: The acetogen P7 has been subjected to producer gas generated from switchgrass using a pilot-scale fluidized bed air gasifier operating at 770 - 800°C. Gas composition is typically 14-19% CO, 15-18% CO₂, 3-5% H₂, 4-5% CH₄ and 50-60% N₂ with remaining constituents mostly C₂ compounds and low levels of NO_x. About 90-94% of carbon in switchgrass is converted to carbonaceous components in the producer gas with the balance in the forms of ash and tars. In addition to tars (over 220 different compounds have been identified in our biomass gasification studies), gaseous impurities such as methane, acetylene, ethylene, ethane, and nitric oxide can affect microbial catalysts performance. Recently, a 70-liter working volume bioreactor has been tested using P7 and gasifier-generated gases. Results from this reactor size will be used to determine critical bottlenecks in scaling up to larger reactor volumes as the process moves toward commercial-size units.

Thermotolerant yeast: During SSF of switchgrass treated by pressurized hot water prior to SSF, *K. marxianus* IMB4 at a temperature of 45°C produced an amount of ethanol equivalent to *S. cerevisiae* at 37°C, but IMB4 did it three days faster. Use of IMB4 could potentially reduce the time needed to produce ethanol from switchgrass by 43%.

Modeling and Economics

If price incentives were sufficient, Oklahoma producers could convert land from existing crops into increased production of biofuel crops. The results indicated potential biofuel crop adoption equivalent to 666 million gallons of ethanol and 388 million gallons of biodiesel at ethanol and biodiesel prices of \$2.50/gallon. At \$5.00/gallon ethanol and biodiesel prices the potential ethanol production was 971 million gallons and the biodiesel potential was 1 billion gallons. The production of cellulosic-based ethanol in Oklahoma is dependent upon the commercialization of conversion technologies and the development and adoption of specialized energy crops such as switchgrass. Under this scenario Oklahoma's potential ethanol production from switchgrass, cellulosic feedstocks was projected at 1.3 billion gallons with an ethanol price of \$2.50/gallon and 1.4 billion gallons at \$5.00/gallon ethanol.

Restricting switchgrass harvest from eight to two months per year increased the estimated delivered cost by 33 percent. This finding illustrates the potential economic value of a wide harvest window. It also suggests a potential economic problem for biorefineries designed to use crop residues as exclusive feedstock.

The estimated cost to deliver switchgrass feedstock to an Oklahoma located biorefinery ranged from \$48 to \$67 per dry ton. This is substantially more than the US-DOE goal of \$35. At 90 gallons per ton, the feedstock component estimated cost is \$0.53 to \$0.74 per gallon of ethanol, as opposed to the \$0.39 goal by US-DOE. It is unlikely that land, storage and harvest costs (with existing harvest technology) could be much less than those estimated. Reductions in cost necessary to achieve the \$35 goal would most likely require substantial increases in switchgrass yields per acre.

A wide variety of audiences, including agricultural community, potential business investors, decision makers, general public and professionals of technical societies have been educated on the potential of biomass-based liquid fuel production in Oklahoma. In many cases, we have saved interested parties from making questionable commitments and/or investments based on lack of conversion facilities and/or unfavorable economic climate.

4. Associated Knowledge Areas

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

Outcome #2**1. Outcome Measures**

Other Bio-Based Product Development

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	{No Data Entered}	0

3c. Qualitative Outcome or Impact Statement**Issue (Who cares and Why)**

Sweet sorghum: Major research questions are being answered in order to verify the feasibility of in-field production of ethanol from sweet sorghum include the following:

- Is in-field fermentation possible, with little or no process controls?
- What can we expect for sweet sorghum yields around Oklahoma?
- What is the length of the potential harvest window in Oklahoma?
- What kind of on-farm distillation/dewatering system would be most economical?
- What is the economic feasibility of the entire process?

What has been done

Utilizing production trials and juice collections at six Oklahoma Experiment Station sites, preliminary results suggest that sweet sorghum juice yields make this a feasible alternative for ethanol production. Ethanol yields per harvested acre could nearly double with the conversion of the processed bagasse, i.e. cellulosic ethanol.

Results

Sweet sorghum: Preliminary results suggest that sweet sorghum juices yields make this a feasible alternative for ethanol production. Ethanol yields per harvested acre could nearly double with the conversion of the processed bagasse. Because the proposed process is on-farm, it helps to de-centralize energy production, and could result in tremendous economic input for rural America, specifically for farmers.

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**

- Appropriations changes

Brief Explanation**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}