

V(A). Planned Program (Summary)

Program # 5

1. Name of the Planned Program

Climate Change - Ecosystem and Environmental Quality and Management

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
104	Protect Soil from Harmful Effects of Natural Elements	5%		5%	
111	Conservation and Efficient Use of Water	13%		10%	
112	Watershed Protection and Management	10%		15%	
121	Management of Range Resources	13%		15%	
123	Management and Sustainability of Forest Resources	13%		10%	
133	Pollution Prevention and Mitigation	7%		10%	
134	Outdoor Recreation	5%		5%	
135	Aquatic and Terrestrial Wildlife	10%		5%	
136	Conservation of Biological Diversity	3%		5%	
205	Plant Management Systems	5%		10%	
403	Waste Disposal, Recycling, and Reuse	6%		5%	
605	Natural Resource and Environmental Economics	10%		5%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

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

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

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

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

V(D). Planned Program (Activity)

1. Brief description of the Activity

Design and conduct research

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

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

2. Brief description of the target audience

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

V(E). Planned Program (Outputs)

1. Standard output measures

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

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

Patent Applications Submitted

Year: 2010

Plan: 0

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2010	Extension	Research	Total
Plan	10	10	
Actual	12	50	62

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Grant proposals written and submitted

Year	Target	Actual
2010	12	31

Output #2

Output Measure

- Manuscripts submitted for consideration of peer-reviewed publication

Year	Target	Actual
2010	15	62

Output #3

Output Measure

- Extension conferences, workshops and training sessions

Year	Target	Actual
2010	30	89

Output #4

Output Measure

- Research and Extension reports and fact sheets

Year	Target	Actual
2010	10	12

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Number of poultry producers and poultry litter applicators acquiring initial waste management certification and number maintaining certification
2	Number of animal waste analyses conducted for land application of beef, dairy or swine waste.
3	Number of animal waste analyses conducted for poultry litter application
4	Peer-reviewed publications
5	Number of users accessing website designed to deliver information about water policy, conservation and efficient use
6	Number of web-based weather related decision tools provided through Oklahoma Mesonet to improve crop and livestock production and safety and/or reduce costs

Outcome #1

1. Outcome 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
2010	900	1057

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

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

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

What has been done

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

Annual Update Education balances environmental protection needs with the latest knowledge and practices for poultry production. Over the past year, OCES developed 15 new presentations to meet educational needs. Annual Update Education efforts consisted of 81 hours of classroom and field instruction in 2010. Training efforts can be measured by multiplying hours given in a single

class by the number of people attending that class, resulting in a unit of training called People-Hours. A total of 3,888 People-Hours were provided in 2010.

Results

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

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

4. Associated Knowledge Areas

KA Code	Knowledge Area
112	Watershed Protection and Management
133	Pollution Prevention and Mitigation
403	Waste Disposal, Recycling, and Reuse

Outcome #2

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	70	105

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
112	Watershed Protection and Management
133	Pollution Prevention and Mitigation
205	Plant Management Systems
403	Waste Disposal, Recycling, and Reuse

Outcome #3

1. Outcome Measures

Number of animal waste analyses conducted for poultry litter application

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	100	900

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
112	Watershed Protection and Management

133	Pollution Prevention and Mitigation
205	Plant Management Systems
403	Waste Disposal, Recycling, and Reuse

Outcome #4

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
2010	10	62

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

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

What has been done

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

Results

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

4. Associated Knowledge Areas

KA Code	Knowledge Area
111	Conservation and Efficient Use of Water
112	Watershed Protection and Management
121	Management of Range Resources
123	Management and Sustainability of Forest Resources

133	Pollution Prevention and Mitigation
134	Outdoor Recreation
135	Aquatic and Terrestrial Wildlife
136	Conservation of Biological Diversity
605	Natural Resource and Environmental Economics

Outcome #5

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	100	153

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

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

What has been done

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

Results

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

4. Associated Knowledge Areas

KA Code	Knowledge Area
111	Conservation and Efficient Use of Water
605	Natural Resource and Environmental Economics

Outcome #6

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	{No Data Entered}	4

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

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

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

What has been done

Oklahoma State University, the University of Oklahoma and the Oklahoma Climatological Survey (OCS) through the Oklahoma Mesonet have created multi-faceted agricultural and natural resource extension outreach and research programs. Mesonet Agweather (<http://agweather.mesonet.org>) provides access to weather data and products at no cost to Oklahoma farmers and ranchers. Ongoing extension and outreach efforts inform growers about

website and introduce weather-based farm management tools via farm show exhibits, educational programs and printed materials. In 2010, efforts focused on promotion of the new Mesonet Drift Risk Advisor, revised Mesonet.org website and new Mesonet Mobile smartphone website.

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

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

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

Results

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

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

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

4. Associated Knowledge Areas

KA Code	Knowledge Area
104	Protect Soil from Harmful Effects of Natural Elements
111	Conservation and Efficient Use of Water
121	Management of Range Resources

205 Plant Management Systems

V(H). Planned Program (External Factors)

External factors which affected outcomes

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

Brief Explanation

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}