

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

**Program # 3**

**1. Name of the Planned Program**

Natural Resources and Environmental Management

Reporting on this Program

**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	12%		12%	
104	Protect Soil from Harmful Effects of Natural Elements	13%		8%	
111	Conservation and Efficient Use of Water	19%		15%	
112	Watershed Protection and Management	10%		7%	
121	Management of Range Resources	5%		7%	
132	Weather and Climate	2%		7%	
141	Air Resource Protection and Management	3%		5%	
205	Plant Management Systems	8%		8%	
511	New and Improved Non-Food Products and Processes	15%		12%	
601	Economics of Agricultural Production and Farm Management	3%		3%	
603	Market Economics	7%		3%	
605	Natural Resource and Environmental Economics	3%		13%	
	<b>Total</b>	100%		100%	

**V(C). Planned Program (Inputs)**

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

Year: 2013	Extension		Research	
	1862	1890	1862	1890
Plan	30.0	0.0	23.0	0.0
Actual Paid Professional	43.0	0.0	30.0	0.0
Actual Volunteer	0.0	0.0	0.0	0.0

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

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
883848	0	565828	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
2952796	0	4306134	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
1370230	0	533596	0

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

#### 1. Brief description of the Activity

- Understand the sources, fate, and transport of important water contaminants (i.e., fecal coliform bacteria, nutrients, sediment, and pesticides [especially atrazine herbicide]), and develop and determine the environmental and economic effectiveness of best management practices for these potential contaminants.

- Quantify the environmental and economic effectiveness of best management practices for improving water quality at the watershed level.

- Disseminate science-based information through environmental education programs for both youth and adults, and deliver extension programs aimed at stakeholders that focuses on adoption of best management practices in targeted areas for water quality improvement.

- Develop and test new crop, livestock, bioenergy, and riparian forest systems that will reduce water use while optimizing productivity, environmental quality, and profitability, including water saving technologies for concentrated animal feeding operations (CAFOs) and industries that process agricultural commodities.

- Develop an information and education program for policy makers, producers, water professionals, and youth audiences with respect to the Ogallala Aquifer, including assessment of the potential impacts of climate change on this important water resource.

- Develop an understanding of air quality impacts of rangeland burning, including extent and timing of burn events, influence of fuel load on emissions, modeling the downwind transport of particulate matter, and developing a climatology of extreme events.

- Disseminate science-based information and transfer technologies to stakeholders, and implement youth education programs focused on air quality.

#### 2. Brief description of the target audience

Agricultural producers, youths, policymakers/regulators, crop and livestock consultants.

#### 3. How was eXtension used?

eXtension was not used in this program

### V(E). Planned Program (Outputs)

#### 1. Standard output measures

2013	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	13000	0	1700	0

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

**Patent Applications Submitted**

Year: 2013

Actual: 0

**Patents listed**

**3. Publications (Standard General Output Measure)**

**Number of Peer Reviewed Publications**

2013	Extension	Research	Total
Actual	16	18	34

**V(F). State Defined Outputs**

**Output Target**

**Output #1**

**Output Measure**

- Number of educational programs delivered

Year	Actual
2013	399

**Output #2**

**Output Measure**

- Number participating in educational programs

Year	Actual
2013	11900

**Output #3**

**Output Measure**

- Number of refereed research publications

<b>Year</b>	<b>Actual</b>
2013	18

**V(G). State Defined Outcomes**

**V. State Defined Outcomes Table of Content**

O. No.	OUTCOME NAME
1	Producers adopt BMPs that protect environmental quality (measured by number adopting BMPs)
2	Producers adopt BMPs for atrazine and soil erosion (measured by number of acres)
3	Measurable improvement in water quality (percent reduction atrazine) in Little Arkansas River Watershed
4	An enhanced or improved economy as a result of bioenergy development (measured by number of new bio-based businesses created).

## **Outcome #1**

### **1. Outcome Measures**

Producers adopt BMPs that protect environmental quality (measured by number adopting BMPs)

### **2. Associated Institution Types**

- 1862 Extension
- 1862 Research

### **3a. Outcome Type:**

Change in Action Outcome Measure

### **3b. Quantitative Outcome**

<b>Year</b>	<b>Actual</b>
2013	103

### **3c. Qualitative Outcome or Impact Statement**

#### **Issue (Who cares and Why)**

Restoring water quality requires a fundamental change in practices and behavior toward the land and water. Behavior change in agriculture with respect to improving water quality involves raising awareness of issues and problems, identifying options for action, securing technical and financial assistance, and implementing change.

#### **What has been done**

Four watersheds within the Little Arkansas River watershed were targeted for implementation of BMPs for atrazine herbicide in 2013. The watersheds selected were: Dry Turkey Creek (18,996 acres), Upper West Emma Creek (25,752 acres), Lower Sand Creek (29,652 acres), and the Black Kettle Creek (20,087 acres). Atrazine runoff vulnerable fields outside of the four targeted watersheds were also made eligible for incentive payments.

#### **Results**

One hundred-three farmers committed to implementing atrazine BMPs on 19,544 acres of corn and grain sorghum. This equates to 40% of the corn and grain sorghum acres planted in the targeted watersheds.

### **4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
102	Soil, Plant, Water, Nutrient Relationships
111	Conservation and Efficient Use of Water
112	Watershed Protection and Management
121	Management of Range Resources

141 Air Resource Protection and Management

## **Outcome #2**

### **1. Outcome Measures**

Producers adopt BMPs for atrazine and soil erosion (measured by number of acres)

### **2. Associated Institution Types**

- 1862 Extension
- 1862 Research

### **3a. Outcome Type:**

Change in Action Outcome Measure

### **3b. Quantitative Outcome**

<b>Year</b>	<b>Actual</b>
2013	19544

### **3c. Qualitative Outcome or Impact Statement**

#### **Issue (Who cares and Why)**

The project goal is to assist farmers to voluntarily implement atrazine herbicide best management practices (BMPs) to meet surface water quality standards of 3 µg/L, with no seasonal spikes. A decision was made to target specific sub-watersheds within the Little Arkansas River watershed in order to document water quality improvements.

#### **What has been done**

Four watersheds within the Little Arkansas River watershed were targeted for implementation of BMPs for atrazine herbicide in 2013. The watersheds selected were: Dry Turkey Creek (18,996 acres), Upper West Emma Creek (25,752 acres), Lower Sand Creek (29,652 acres), and the Black Kettle Creek (20,087 acres). Atrazine runoff vulnerable fields outside of the four targeted watersheds were also made eligible for incentive payments. Corn and grain sorghum fields were targeted.

#### **Results**

One hundred three farmers committed to implementing atrazine BMPs on 19,544 acres of corn and grain sorghum. This equates to 40% of the corn and grain sorghum acres planted in the targeted watersheds. The City of Wichita provided \$50,000 for incentive payments.

### **4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
102	Soil, Plant, Water, Nutrient Relationships

- 111 Conservation and Efficient Use of Water
- 112 Watershed Protection and Management
- 121 Management of Range Resources
- 141 Air Resource Protection and Management

### **Outcome #3**

#### **1. Outcome Measures**

Measurable improvement in water quality (percent reduction atrazine) in Little Arkansas River Watershed

#### **2. Associated Institution Types**

- 1862 Extension
- 1862 Research

#### **3a. Outcome Type:**

Change in Condition Outcome Measure

#### **3b. Quantitative Outcome**

<b>Year</b>	<b>Actual</b>
2013	81

#### **3c. Qualitative Outcome or Impact Statement**

##### **Issue (Who cares and Why)**

The project goal is to assist farmers to voluntarily implement atrazine herbicide best management practices (BMPs) to meet surface water quality standards of 3 µg/L, with no seasonal spikes. A decision was made to target specific sub-watersheds within the Little Arkansas River watershed in order to document water quality improvements.

##### **What has been done**

Four watersheds within the Little Arkansas River watershed were targeted for implementation of BMPs for atrazine herbicide in 2013. The watersheds selected were: Dry Turkey Creek (18,996 acres), Upper West Emma Creek (25,752 acres), Lower Sand Creek (29,652 acres), and the Black Kettle Creek (20,087 acres). Atrazine runoff vulnerable fields outside of the four targeted watersheds were also made eligible for incentive payments. Corn and grain sorghum fields were targeted.

##### **Results**

Atrazine BMP implementation was predicted to reduce atrazine runoff by 81% on 19,544 acres and a total load reduction of 1181.5 lbs a.i. in targeted acres.

#### **4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
102	Soil, Plant, Water, Nutrient Relationships
111	Conservation and Efficient Use of Water
112	Watershed Protection and Management

#### **Outcome #4**

##### **1. Outcome Measures**

An enhanced or improved economy as a result of bioenergy development (measured by number of new bio-based businesses created).

##### **2. Associated Institution Types**

- 1862 Research

##### **3a. Outcome Type:**

Change in Condition Outcome Measure

##### **3b. Quantitative Outcome**

<b>Year</b>	<b>Actual</b>
2013	0

##### **3c. Qualitative Outcome or Impact Statement**

###### **Issue (Who cares and Why)**

Industry interested in our technology and findings through reading our publications.

###### **What has been done**

We did services for bioindustry such as biomass composition analysis, sweet sorghum composition analysis, and provided technical support. We did not directly create any new business but the results from our research can be adopted by industry.

###### **Results**

Research collaboration with industry.

##### **4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
511	New and Improved Non-Food Products and Processes
603	Market Economics

### **V(H). Planned Program (External Factors)**

#### **External factors which affected outcomes**

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

#### **Brief Explanation**

{No Data Entered}

### **V(I). Planned Program (Evaluation Studies)**

#### **Evaluation Results**

{No Data Entered}

#### **Key Items of Evaluation**

{No Data Entered}