

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

**Program # 2**

**1. Name of the Planned Program**

Climate Change

**V(B). Program Knowledge Area(s)**

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
101	Appraisal of Soil Resources	1%	0%	1%	0%
102	Soil, Plant, Water, Nutrient Relationships	4%	0%	2%	0%
104	Protect Soil from Harmful Effects of Natural Elements	2%	0%	2%	0%
111	Conservation and Efficient Use of Water	19%	0%	17%	0%
112	Watershed Protection and Management	11%	0%	7%	0%
131	Alternative Uses of Land	2%	0%	2%	0%
133	Pollution Prevention and Mitigation	19%	0%	19%	0%
134	Outdoor Recreation	2%	0%	1%	0%
136	Conservation of Biological Diversity	0%	0%	10%	0%
141	Air Resource Protection and Management	6%	0%	5%	0%
202	Plant Genetic Resources	0%	0%	10%	0%
205	Plant Management Systems	11%	0%	10%	0%
305	Animal Physiological Processes	2%	0%	0%	0%
306	Environmental Stress in Animals	2%	0%	0%	0%
307	Animal Management Systems	6%	0%	0%	0%
315	Animal Welfare/Well-Being and Protection	2%	0%	0%	0%
403	Waste Disposal, Recycling, and Reuse	8%	0%	9%	0%
511	New and Improved Non-Food Products and Processes	0%	0%	2%	0%
605	Natural Resource and Environmental Economics	3%	0%	3%	0%
	<b>Total</b>	100%	0%	100%	0%

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

1. Actual amount of FTE/SYs expended this Program

Year: 2011	Extension		Research	
	1862	1890	1862	1890
Plan	16.7	0.0	7.6	0.0

Actual Paid Professional	20.8	0.0	15.4	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
1765563	0	2117930	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
1765563	0	2117930	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	0	0

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

**1. Brief description of the Activity**

A large part of this program funded specialists and their direct efforts primarily to county agents. These agents disseminated this information to target audiences at the local level.

**Research, work, and education continued in:**

Animal Waste - participated in planning and instructing Nutrient Management

Biomicrometeorology -surface-atmosphere exchange of gases, turbulence and is generally focused on the exchange between the vegetated-canopy layer and its environment.

Molecular Environmental Science - processes controlling the cycling, transport, and bioavailability of nutrients and contaminants in the environment.

Nutrient Management - biological and chemical pathways of nutrient cycling in soils, including how environmental factors affect the rates of nutrient cycling.

Poultry Science - reduce environmental impact and increase energy efficiency in poultry houses.

Remediation - abiotic remediation and phytoremediation. Iron in conjunction with metal sulfides has been used for the effective remediation of halogenated solvents in groundwater.

Soil Biology and Biochemistry - influences of biological activity on soil structure and function.

Soil Pedology - the genesis, landscape distribution, and interpretation of soils.

Stream Restoration - worked with the Soque Watershed Association to secure a 319 grant to conduct a stream restoration project in North Georgia. This regional effort included NC State and Auburn University. A graduate thesis on Monitoring of Construction during Stream Restoration was completed and awarded a Graduate assistantship (\$12,000) for innovative involvement of public service in research.

Waste Management - land application of industrial and animal wastes ( by-products ). Industrial by-products studied include coal combustion wastes (fly ash, gypsum), pulp and paper mill wastes, and sewage sludge.

Water - continued to provide leadership in the Water Banner Program for the SE region. Maintain website for the States. Published numerous trade magazine articles, scientific abstracts, and proceedings.

USDA SCRI Grant work will continue through 2014, as will our related field demonstrations and our graduate student research projects in water conservation.

Worked to quantify water needs of various greenhouse and nursery crops. Presentations were made at scientific and industry meetings about more efficient ways to irrigate greenhouse and nursery crops. Several papers were published in scientific journals.

Plants have been supplied to private entities, state agencies, and federal agencies for reintroduction projects. Continued to work with growers, horticultural scientists, and state agencies.

Performed crosses in the following taxa: Delosperma, Ophiopogon, syringa, exochorda and spigelia. Evaluated abelia, vitex, amsonia, azalea, and little bluestem seedlings for desirable traits.

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

The target audiences include county extension agents, growers, producers, farmers, industry representatives, manufacturers, consultants, contractors, greenhouse owners, media, scientific peers, and environmental professionals.

Focus also includes public sector (federal and state) decision-makers, regulatory and policy representatives, community leaders, and environmental concern/interest groups.

## **3. How was eXtension used?**

The Climate Change planned program has faculty serving as leaders and/or active members in 4 public **eXtension** Communities of Practice. Our faculty utilize Ask an Expert Widgets and offer various resources for the public.

Overall, we have increased UGA **eXtension** user ids from 92 to 539 in 5 years, and 67,000 web hits on the National **eXtension** site came from Georgians in 2010. UGA has 9 faculty members serving as CoP leaders and 113 active members in 33 of the 47 public communities of practice.

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

### **1. Standard output measures**

2011	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
<b>Actual</b>	4072	24850	812	1425

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

**Patent Applications Submitted**

Year: 2011

Actual: 0

**Patents listed**

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

**Number of Peer Reviewed Publications**

2011	Extension	Research	Total
<b>Actual</b>	127	13	140

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

**Output Target**

**Output #1**

**Output Measure**

- Number of educational contact hours generated from formal educational programs presented to county extension agents by state faculty directly associated with this planned program.

Year	Actual
2011	171

**Output #2**

**Output Measure**

- Number of educational contact hours generated from formal educational programs presented directly to clientele by state faculty directly associated with this planned program.

Year	Actual
2011	586

**Output #3**

**Output Measure**

- Number of significant publications including articles, bulletins and extension publications. (excluding peer reviewed articles)

<b>Year</b>	<b>Actual</b>
2011	53

**Output #4**

**Output Measure**

- Number of invited presentations by faculty directly resulting from the success of this planned program.

<b>Year</b>	<b>Actual</b>
2011	63

**Output #5**

**Output Measure**

- Number of plant species propagated  
Not reporting on this Output for this Annual Report

**Output #6**

**Output Measure**

- Percent of GA poultry producers utilizing NMPs to manage P appropriately.

<b>Year</b>	<b>Actual</b>
2011	35

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

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

O. No.	OUTCOME NAME
1	Number of additional direct extension contacts made by volunteers, staff, or county agents not receiving federal funds as a direct outcome of the work of federally funded faculty associated with this planned program.
2	Percentage of Georgia poultry producers trained in Phosphorous(P) reduction/management methods.
3	Estimates of savings (\$ millions) resulting from reduced phosphorous (P) supplementation in poultry diets
4	Number of plantings by clientele

## **Outcome #1**

### **1. Outcome Measures**

Number of additional direct extension contacts made by volunteers, staff, or county agents not receiving federal funds as a direct outcome of the work of federally funded faculty associated with this planned program.

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

- 1862 Extension
- 1862 Research

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

Change in Knowledge Outcome Measure

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

<b>Year</b>	<b>Actual</b>
2011	121022

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

**Issue (Who cares and Why)**

**What has been done**

**Results**

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

<b>KA Code</b>	<b>Knowledge Area</b>
101	Appraisal of Soil Resources
102	Soil, Plant, Water, Nutrient Relationships
104	Protect Soil from Harmful Effects of Natural Elements
111	Conservation and Efficient Use of Water
133	Pollution Prevention and Mitigation
136	Conservation of Biological Diversity
141	Air Resource Protection and Management
202	Plant Genetic Resources
205	Plant Management Systems
403	Waste Disposal, Recycling, and Reuse
511	New and Improved Non-Food Products and Processes

## **Outcome #2**

### **1. Outcome Measures**

Percentage of Georgia poultry producers trained in Phosphorous(P) reduction/management methods.

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

- 1862 Extension
- 1862 Research

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

Change in Knowledge Outcome Measure

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

<b>Year</b>	<b>Actual</b>
2011	50

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

**Issue (Who cares and Why)**

**What has been done**

**Results**

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

<b>KA Code</b>	<b>Knowledge Area</b>
104	Protect Soil from Harmful Effects of Natural Elements
133	Pollution Prevention and Mitigation
141	Air Resource Protection and Management
307	Animal Management Systems
403	Waste Disposal, Recycling, and Reuse

## **Outcome #3**

### **1. Outcome Measures**

Estimates of savings (\$ millions) resulting from reduced phosphorous (P) supplementation in poultry diets

### **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>
2011	5

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

**Issue (Who cares and Why)**

**What has been done**

**Results**

**4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
133	Pollution Prevention and Mitigation
307	Animal Management Systems

**Outcome #4**

**1. Outcome Measures**

Number of plantings by clientele

Not Reporting on this Outcome Measure

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

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

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges
- Populations changes (immigration, new cultural groupings, etc.)

### **Brief Explanation**

#### **Economy:**

In 2011, budget shortages have resulted in the loss of key faculty and limited the number of faculty assigned to many focus areas of this issue.

The economy is also causing hardships for producers resulting in less funding available for on farm environmental improvements.

The increases in fertilizer prices is positively influencing the value of animal manures and increasing off farm demand. In addition, the national push for biofuels is influencing nutrient management as animal diets are changing due to the high costs of corn.

Increases in energy costs have made this project even more critical to poultry farmers. Continued increases in the cost of phosphorous (P) to supplement poultry diets have increased the use of enzymes. This has resulted in less P in poultry litter. Increased commercial fertilizer costs have also resulted in poultry litter being more valuable as a fertilizer and it being used more effectively.

Nitrogen (N) utilization and N based NMP have been competing issues with phosphorous utilization.

Unexpected escalation of commercial fertilizer prices has driven much of the current use strategies relative to poultry litter. In addition, poultry producers have gone longer between cleaning out houses. Although this has not resulted overall in more phosphorous being generated or land applied, it has resulted in higher phosphorous levels in litter samples tested.

#### **Drought:**

Drought has caused many producers to have cut herd sizes due to a lack of feed.

Watering restrictions put some limits on our outdoor plant propagation activities.

Because of the drought, more emphasis was placed on water conservation issues and less on water quality issues than the planned initially called for.

#### **Regulations:**

Government regulations continue to be the key to designing best management practices for meeting the State's environmental and natural resource conservation objectives.

Regulations and the interpretation and enforcement of the rules is constantly evolving and impacting several programs.

The ordinances and rules involving water conservation are changing monthly in Georgia due to the "The Water Wars between GA/FL and TN. Additionally our Governor and Legislature are changing rules in response to the increasingly severe drought, and our local officials are introducing new ordinances on the local level for the same reason. This has caused much confusion and difficulty delivering a cohesive message as the rules change monthly. We are doing everything we can to keep up.

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

### **Evaluation Results**

#### **Water Conservation:**

Growers reluctant to change are not the main problem. Delays, legal challenges and legislative disagreements in technical language is becoming the larger challenge to adoption of water conservation technology because growers don't want to invest until they see the new laws and regs legislators keep telling them are coming. Water conservation systems may costs tens of thousands of dollars and if growers buy the wrong system, and have to retrofit or buy yet another system, growers could face serious financial issues. Based upon our USDA SCRI Grant we will evaluate our field studies and demo studies in 2013 - 2014 for cultural and economic impact.

#### **Animal Waste and Nutrient Management:**

Most of the feedback has been positive. County agents and other stakeholders continue to request assistance through the program which indicates some level of satisfaction in the service they receive.

#### **Phosphorous management and reduction in poultry houses:**

Evaluations of ferric sulfate as a litter treatment for reducing ammonia generation and soluble phosphorous formation in commercial broiler houses have been conducted.

### **Key Items of Evaluation**

Water conservation efforts are making progress but still face regulatory barriers to fully implement.

Educational program have shown an increase in knowledge and change in behaviors.