

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

**Program # 9**

**1. Name of the Planned Program**

Managing Water, Energy, Waste and Air Quality in Agriculture

**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	14%	0%	2%	0%
104	Protect Soil from Harmful Effects of Natural Elements	2%	0%	3%	0%
111	Conservation and Efficient Use of Water	9%	0%	12%	0%
112	Watershed Protection and Management	21%	0%	12%	0%
131	Alternative Uses of Land	2%	0%	3%	0%
133	Pollution Prevention and Mitigation	19%	0%	22%	0%
134	Outdoor Recreation	2%	0%	3%	0%
141	Air Resource Protection and Management	1%	0%	1%	0%
205	Plant Management Systems	12%	0%	17%	0%
403	Waste Disposal, Recycling, and Reuse	13%	0%	13%	0%
511	New and Improved Non-Food Products and Processes	0%	0%	6%	0%
605	Natural Resource and Environmental Economics	4%	0%	5%	0%
	<b>Total</b>	100%	0%	100%	0%

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

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

Year: 2010	Extension		Research	
	1862	1890	1862	1890
Plan	17.0	0.5	11.0	0.0
Actual	19.0	0.0	19.0	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
1668428	0	1214088	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
1668428	0	1214088	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

Numerous meetings and workshops were conducted, including those for mandated certification. Faculty worked with a wide variety of audiences including policy makers, youth, farmers, and concerned citizens.

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

**Molecular Environmental Science:** focused on the processes controlling the cycling, transport, and bioavailability of nutrients and contaminants in the environment. Combining with molecular biological tools is providing new insights into the processes and mechanisms controlling nutrient and contaminant behavior in the environment.

**Nutrient Management:** focused on the biological and chemical pathways of nutrient cycling in soils. Methodologies include remote sensing methods and other protocols for mapping the spatial variability of soil properties, ammonia volatilization from surface applied urea fertilizer and animal manures and the development of better methods for the routine determination of soil pH and lime requirement.

**Remediation:** research continues on abiotic remediation and phytoremediation, including: studies in highly contaminated ground waters of an abandoned chemical plant

**Soil Biology and Biochemistry:** studied the influences of biological activity on soil structure and function. Focus on how soil invertebrates (especially earthworms) affect water-stable aggregate formation and the associated turnover and accumulation of soil organic matter and nutrients. Also focus on microorganisms influence on the soil environment. Used standard soil microbiology techniques to study microbial life and soil organic matter, as well as the more advanced techniques of compound specific isotope analysis, nuclear magnetic resonance spectroscopy, and DNA-based methods. Focus areas have implications for environmental quality, conservation management and carbon-sequestration in agricultural and forest soils.

**Soil Pedology:** conducted research on the genesis, landscape distribution, and interpretation of soils. Current research is focused on understanding of hydraulic properties of soils, including investigations of the relationships between redoximorphic features and depth and duration of seasonal saturation; and soil-landscape relationships and their effect on landscape redistribution of water.

**Waste Management:** The faculty in the waste management area conduct research on land application of industrial and animal wastes. Industrial by-products studied include coal combustion wastes, pulp and paper mill wastes, and sewage sludge. Animal wastes include different poultry manures, (large poultry industry in GA). The waste management area includes a focus on on-site wastewater (septic) management systems.

**Water Resources:** studied the effect of non-point sources of pollution on surface water. Primary pollutants: phosphorus, sediment, and bacteria. Research focused on water conservation options through management changes.

## 2. Brief description of the target audience

The primary target audiences are county extension agents, growers, industry representatives, consultants, contractors, media, regulatory and policy representatives, community leaders,

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

#### 1. Standard output measures

2010	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
<b>Plan</b>	3700	15000	100	100
<b>Actual</b>	5358	13900	645	1330

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

##### Patent Applications Submitted

Year: 2010  
 Plan: 1  
 Actual: 1

##### Patents listed

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

##### Number of Peer Reviewed Publications

2010	Extension	Research	Total
<b>Plan</b>	30	30	
<b>Actual</b>	83	80	163

### 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	Target	Actual
2010	400	271

**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.

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2010	2500	2090

**Output #3**

**Output Measure**

- Number of significant publications including referred journals articles, bulletins and extension publications.

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2010	5	46

**Output #4**

**Output Measure**

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

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2010	50	56

**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	Placement of graduate students in environmentally related jobs in industry, NGOs and/or government agencies.

**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>Quantitative Target</b>	<b>Actual</b>
2010	13000	101551

**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
112	Watershed Protection and Management
131	Alternative Uses of Land
133	Pollution Prevention and Mitigation
141	Air Resource Protection and Management
403	Waste Disposal, Recycling, and Reuse
511	New and Improved Non-Food Products and Processes

## **Outcome #2**

### **1. Outcome Measures**

Placement of graduate students in environmentally related jobs in industry, NGOs and/or government agencies.

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

- 1890 Extension

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

Change in Action Outcome Measure

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

<b>Year</b>	<b>Quantitative Target</b>	<b>Actual</b>
2010	2	0

### **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
112	Watershed Protection and Management
131	Alternative Uses of Land
133	Pollution Prevention and Mitigation
141	Air Resource Protection and Management
403	Waste Disposal, Recycling, and Reuse
511	New and Improved Non-Food Products and Processes

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

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

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

### **Brief Explanation**

Policy changes have been developed which did affect, lessening funding for research and support of farm environmental improvements.

Because of the drought, more emphasis was placed on water conservation issues and less on water quality issues than the planned initially called for. In 2010, State budget shortages have limited the number of faculty assigned to this issue. Also as a result of drought, many producers as some have cut herd sizes due to a lack of feed.

Government regulation concerning water use may also increase funding opportunities. Regulations and the interpretation and enforcement of the rules is constantly evolving and impacting our programs.

Interest and work continues on how to best manage water resources under volatile weather conditions to protect human uses and the value of ecosystem services. Government regulations continue to be key to designing best management practices for meeting the State's environmental and natural resource conservation objectives.

The increases in fertilizer prices is positively influencing the value of animal manures and increasing off farm demand.

The national push for biofuels is influencing nutrient management as animal diets are changing due to the high costs of corn.

## **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)
- Case Study

## **Evaluation Results**

Reporting on research, teaching, extramural funding, and publications was completed.

In Georgia, we did not conduct evaluation studies in 2010 although we contributed to regional evaluation efforts that are available on the website above.

Evaluations were performed following presentations at grower meetings

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. Reporting on research, teaching, extramural funding, and publications was completed.

Georgia contributed to regional evaluation efforts that are available on the website above.

Evaluations were performed following presentations at grower meetings

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.

## **Key Items of Evaluation**