V(A). Planned Program (Summary)

Program # 2

1. Name of the Planned Program

Natural resource conservation and management, environment sustainability and climate change

☑ 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			10%	5%
111	Conservation and Efficient Use of Water			10%	5%
112	Watershed Protection and Management			5%	15%
123	Management and Sustainability of Forest Resources			5%	5%
125	Agroforestry			5%	5%
131	Alternative Uses of Land			5%	5%
132	Weather and Climate			10%	10%
133	Pollution Prevention and Mitigation			10%	10%
135	Aquatic and Terrestrial Wildlife			5%	5%
201	Plant Genome, Genetics, and Genetic Mechanisms			5%	5%
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants			5%	5%
304	Animal Genome			5%	5%
403	Waste Disposal, Recycling, and Reuse			10%	10%
610	Domestic Policy Analysis			5%	5%
903	Communication, Education, and Information Delivery			5%	5%
	Total			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	0.0	0.0	20.0	12.0
Actual Paid Professional	0.0	0.0	22.0	12.0
Actual Volunteer	0.0	0.0	0.0	0.0

2. Institution Name: Auburn University

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	1322300	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
0	0	1322300	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
0	0	0	0

2. Institution Name: Alabama A&M University

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	0	254637
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
0	0	0	254637
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
0	0	0	0

2. Institution Name: Tuskegee University

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	0	334677
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
0	0	0	334677
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

Although this program was originally named ClimateChange, it was expanded to include environment, natural resources, and ecosystems. Research was conducted to develop sustainable agriculturals ystems emphasizing energy and resource conservation; improve understanding of the land-water interface and the urban-agriculture interface; contribute to solutions to the consequences of global climate change; provide a frame work for understanding and addressing issues of water quality and quantity, water reuse, carbon sequestration, air quality, and seek economically viable practices for improved sustainability in large- and small-scale agriculture; management of agricultural waste and residues generated through the animal and poultry and crop production systems; sustainable agriculture systems to enhance soil productivity and improve water infiltration and the plant-root environment ;ecotourism; invasive species; soil conservation, quality, and bio- indicators; rural-urban interface and environmental issues; wildlife management; restoration and best management practices; remote sensing and precision agriculture; and science-based policy development. This priority is aligned with the USDA research priority area of Climate Change with Alabama's long-term goal of best conservation and utilization of natural resources while sustaining th e environment.

In the second of a multiple year project, a $1.8million grant awarded to Auburn University from the U.S.Department of Defense, helps to develop a plan for sequestering carbon in longleaf pine forests on military bases - thus reducing the amount in the atmosphere.This project is led by Auburn's Schoolof Forestry and Wildlife Sciences, and includes as collaborators the USDA Forest Service's Southern Research Station and the University of Florida.

Long-term studies on land use and water quality were conducted in two watersheds in the Alabama River basins.Using the PLOAD method, results show that both watersheds had total Nitrogen and Phosphorus values that exceeded the EPAs' limits for rivers and streams. A study was conducted to quantify interactions between introduced yellow perch and resident sport fishes in two lake ecosystems. Results indicated that negative effects from competition were essentially nonexistent, while yellow perch actually provided potential positivee ffects as prey for piscivores during a short time in the spring. Researchers have also shown a dynamic microbial diversity in soils with different management strategies using soil enzyme activities and a correlation between soil enzyme activity and soil heath

Studies are being conducted atAlabama A&M University for a better understanding of the processes responsible for the development of redoximorphic features in soil, and to improve our knowledge to use such soil featuresas well as climatic data to identify flood vulnerable soils.

A comprehensive study of eight years was conducted to assess ecosystems interactions of large mouth bass in the Mobile-Tensaw Delta of Alabama that face a complex set of challenges and advantages in the coastal environment. Salinity can represent a stressor for fresh water fish, but the diversity of prey that can be found in low salinity waters is actually beneficial for young bass. Large mouth bass in the Delta live shorter lives and reproduce earlier in life than their fresh water counter parts.

2. Brief description of the target audience

Farmers, producers, land owners, industry leaders, policy-makers, citizens, and related federal agency personnel.

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	12500	55000	25000	110000

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	10	270	280

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- publications

Year	Actual
2013	0

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Reduced carbon footprint by adopting improved agricultural practices
2	Increased carbon sequestration by adoption of technologies and improved agricultural practices.
3	Identification of crop varieties and animal stocks that can adapt to a changing environment.

Outcome #1

1. Outcome Measures

Reduced carbon footprint by adopting improved agricultural practices

Not Reporting on this Outcome Measure

Outcome #2

1. Outcome Measures

Increased carbon sequestration by adoption of technologies and improved agricultural practices.

Not Reporting on this Outcome Measure

Outcome #3

1. Outcome Measures

Identification of crop varieties and animal stocks that can adapt to a changing environment.

2. Associated Institution Types

- 1862 Research
- 1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Crop varieties and animal breeds more adaptable to elevated temperature need to be developed in the face of climate change and extreme weather.

What has been done
Breeding work was conducted to select for drought and high temperature resistant cotton and peanut varieties; initial gene expression work was conducted to assess molecular responses of catfish to elevated temperature. Breeding work was conducted to select sweet potato varieties

adaptable to drought conditions

Results

Not achieved to the new varieties yet, but progress are being made to have drought resistant peanut varieties. Many catfish genes have been identified that respond to heat, and further analyses of associated genome markers are underway. Selection of drought tolerant sweet potato varieties have been selected for further field testing

4. Associated Knowledge Areas

KA Code	Knowledge Area
112	Watershed Protection and Management
133	Pollution Prevention and Mitigation
201	Plant Genome, Genetics, and Genetic Mechanisms
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants
304	Animal Genome
403	Waste Disposal, Recycling, and Reuse
903	Communication, Education, and Information Delivery

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

To be prepared for a changing climate, greater funding opportunities are essential. In spite of the very active research in this area in Alabama, funds are limited. NIFA should have long term sustainable funding in this area. It may seem to be remote, but climate is quietly changing. If we are not prepared, climate change may threaten the very existence of the human kind.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

This program was initially named climate change (and, starting this year, was changed to Natural resources, environment sustainability and climate change) and covers a broad range of research activities. It is the second largest program. Researchers work in the areas of natural resource conservation, management and utilization, environmental sciences, and

climate change. This is perhaps the most active research area in Alabama under the umbrella of AAES and AALGA.

We have many different research projects under this area with traditional environmental research and the more climate change oriented projects. Overall, research is very active in this area. Our recent research summary in the retreat indicated that we have the largest number of faculty who works in this area.

Key Items of Evaluation

To be prepared for a changing climate, greater funding opportunities are essential. In spite of the very active research in this area in Alabama, funds are limited. NIFA should have long term sustainable funding in this area. It may seem to be remote, but climate is quietly changing. If we are not prepared, climate change may threaten the very existence of the human kind.