

V(A). Planned Program (Summary)

Program # 1

1. Name of the Planned Program

Global Food Security and Hunger

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			5%	5%
102	Soil, Plant, Water, Nutrient Relationships			5%	5%
111	Conservation and Efficient Use of Water			5%	5%
125	Agroforestry			0%	5%
132	Weather and Climate			5%	5%
201	Plant Genome, Genetics, and Genetic Mechanisms			5%	5%
202	Plant Genetic Resources			5%	10%
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants			5%	5%
205	Plant Management Systems			20%	10%
206	Basic Plant Biology			5%	5%
211	Insects, Mites, and Other Arthropods Affecting Plants			5%	5%
212	Pathogens and Nematodes Affecting Plants			5%	5%
213	Weeds Affecting Plants			5%	0%
216	Integrated Pest Management Systems			5%	5%
302	Nutrient Utilization in Animals			5%	15%
311	Animal Diseases			5%	5%
402	Engineering Systems and Equipment			2%	0%
502	New and Improved Food Products			3%	0%
601	Economics of Agricultural Production and Farm Management			5%	5%
	Total			100%	100%

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2011	Extension		Research	
	1862	1890	1862	1890

Plan	0.0	0.0	24.0	21.5
Actual Paid Professional	0.0	0.0	24.0	21.5
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	1340000	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	1340000	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	962105
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	0	962105
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	801828
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	0	801828
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

This research program was designed to develop improved production methods such as improved crop production systems; improved poultry and animal production systems, conduct research to understand the biology of plants and animals, understand their genome capacity and plasticity, develop new cultivars in plant production systems and improved animal and fish stocks, develop nutritional strategies in animal production systems, develop value-added food, alternatives to pesticides and antibiotics to control disease outbreaks, develop integrated pest and disease management systems for plants and animals, and conduct economic analysis to increase profit margins.

AAES and AALGA support research or research/extension integrated activities that boost Alabama agricultural production, lower production costs, contribute to global capacity to meet the growing food demand, and foster innovation in fighting hunger by addressing food security for vulnerable populations. The goal of this program is to enhance competitiveness and sustainability of rural community and farm economies of Alabama in the global market through development and/or application of technologies, farming approaches, or organizational strategies that ensure the sustainability of rural communities and agricultural and forestry production systems.

In 2011, agronomists continue to search for high-yielding varieties of field corn, soybean, wheat, sweetpotato, specialty vegetable crops and cotton to ensure a stable food supply. Included in this work are trials to compare the genetic potential of newly developed crop strains, crop response to weather extremes, variety competitiveness with emerging herbicide resistant weeds, efficiency under various soil fertility regimen, and ability to survive and produce economically, environmentally sustainable crops. As the U.S. population dynamics have evolved, so too the efforts of the scientists have expanded to include multiple use crops that can be utilized as food, fiber, and energy resources.

Plant pathologists and entomologists continue to search for better ways to control plant diseases and insect pests. Research included studies of molecular mechanisms of insecticide resistance, innovative methods to control pests as well as integrated pest managements. Research was conducted to evaluate new control strategies for herbicide resistant weeds. Controls measures were evaluated for control of invasive species such as cogon grass. Research was also conducted to evaluate Integrated Pest Management strategies for limited research farms.

Horticulturists have introduced new crops for farmers and economic growth in the City of Valley: The project identifies specialty crops that will expand the variety of vegetables that local farmers can provide to Farmers Markets while responding to the needs of consumers in South Central Alabama. A number of alternative fruit varieties were evaluated in Alabama for their performance including eleven banana cultivars, Pierce's Disease resistant *V. vinifera*, Pierce's Disease resistant hybrid bunch grapes and seedless table grapes, and 10 newly released blueberry cultivars.

Poultry scientists continue to work on disease control, wellbeing issues of the poultry industry, and efficient ways of producing broilers. Along with Biosystems engineers, poultry scientists have developed

newer chicken houses that have better insulation to reduce energy costs and increase profit margins for producers.

Small ruminant scientists continue to work on the evaluation of year round grazing forages for goats. Studies also continue agro-forestry and using goats for forest vegetation management.

Economic issues under the new economic structure (e.g., more expensive feed, higher costs of transportation and energy, etc) are reevaluated to develop the best agricultural practices for farmers and producers to gain profits.

Research was continued on the isolation and characterization of several stress responsive transcription factors (NAC) in *Citrullus colocynthis*, a very drought tolerant cucurbit species. Two NAC genes were isolated and cloned and their subcellular location was investigated. Investigations were conducted focused on the effects of freeze-pruf, a foliar spray designed to boost the plant's cold acclimation potential, on Satsuma seedlings. Results from experiments with different Satsuma seedlings sprayed with water or freeze-pruf followed by cold treatment did result in similar levels of cold injury and mortality. A 454 transcriptome sequencing project was initiated for *Castanea pumila* var. *pumila*, the Allegheny chinkapin, for development of species specific single nucleotide polymorphisms to detect the incidence and level of hybridization occurring American *Castanea* species in the Appalachian forest ecosystem.

Efforts in Ending Child Hunger in Alabama: The goals were to (1) conduct a needs assessment to generate baseline data which will be used to develop and implement a breakfast promotion intervention in subsequent years; and (2) build a statewide network of multi-sector stakeholders to carry out the intervention. The needs assessment data, focused on children's current dietary patterns, as well as participation in, access to, and attitudes toward school breakfast and lunch programs, was collected from children, parents, and school personnel. The network of multi-sector stakeholders included representatives from both the public and private sectors.

As a part of the precision agriculture research, a subsurface drip irrigation (SDI) utilizing a conservation system with cover crops was implemented. Best agricultural practices were evaluated and developed.

Aquaculture researchers continue their efforts on genetics work to develop better genetic stocks with greater growth rate, feed conversion efficiency and disease resistance. Technologies for efficient production of hybrid catfish were refined to be more efficient for production of fingerlings.

Introduction of New Crops for Farmers and Economic Growth in the City of Valley

The project identifies specialty crops that will expand the variety of vegetables that local farmers can provide to Farmers Markets while responding to the needs of consumers in South Central Alabama.

2. Brief description of the target audience

Researchers, extension specialists, county agents, farmers and producers in the state, processors, students (both K-12 and at our institutions), ag industries, all state citizens. 48,000 people are said to be directly involved in farming.

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2011	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	20500	105000	10500	55000

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
Actual	10	236	246

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Publications

Year	Actual
2011	246

Output #2

Output Measure

- patent applications

Year	Actual
2011	0

Output #3

Output Measure

- method and best agricultural practices development

Year	Actual
2011	5

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	The long term target is to increase or to sustain agricultural production as measured by market value of agricultural products (2008 = \$4.67 billion). Program success will be indicated if market value of AL ag products stay level or increase. The short term outcome target will be the number of producers who are informed of the method developed, the varieties developed, or the best practices developed; The mid-term measure will be the number of farmers and producers adopting the methods, varieties, improved genetic stocks, or adopting the best agricultural practices.
2	Development of new variety of crops, new breeds of animals and stocks of poultry or aquaculture species
3	Development of technologies for control and management of plant diseases, pests, and animal diseases
4	Development and/or application of technologies, farming approaches, or organizational strategies that ensure the sustainability of rural communities and agricultural and forestry production systems.

Outcome #1

1. Outcome Measures

The long term target is to increase or to sustain agricultural production as measured by market value of agricultural products (2008 = \$4.67 billion). Program success will be indicated if market value of AL ag products stay level or increase. The short term outcome target will be the number of producers who are informed of the method developed, the varieties developed, or the best practices developed; The mid-term measure will be the number of farmers and producers adopting the methods, varieties, improved genetic stocks, or adopting the best agricultural practices.

Not Reporting on this Outcome Measure

Outcome #2

1. Outcome Measures

Development of new variety of crops, new breeds of animals and stocks of poultry or aquaculture species

2. Associated Institution Types

- 1862 Research
- 1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	1

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

New seed stocks or animal brood stocks are extremely important in terms of agricultural production.

What has been done

New crop varieties have been introduced and evaluated in Alabama. Technologies for efficient hybrid catfish production were developed.

Results

Now the catfish industry uses over 25% of hybrid catfish. As reproduction issues are further resolved, the hybrid catfish will have a huge economic impact. It is estimated the yield was increased over 20% and the processing yield was improved 5%.

4. Associated Knowledge Areas

KA Code	Knowledge Area
201	Plant Genome, Genetics, and Genetic Mechanisms
202	Plant Genetic Resources
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants
205	Plant Management Systems
206	Basic Plant Biology
211	Insects, Mites, and Other Arthropods Affecting Plants
212	Pathogens and Nematodes Affecting Plants
213	Weeds Affecting Plants

Outcome #3

1. Outcome Measures

Development of technologies for control and management of plant diseases, pests, and animal diseases

Not Reporting on this Outcome Measure

Outcome #4

1. Outcome Measures

Development and/or application of technologies, farming approaches, or organizational strategies that ensure the sustainability of rural communities and agricultural and forestry production systems.

2. Associated Institution Types

- 1862 Research
- 1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	1

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Application of technologies can enhance agricultural production, saving costs, and increase productivities.

What has been done

Adoption of Precision agriculture practices and technologies

Results

Precision agriculture adoption in Alabama continues to increase with technology being implemented on nearly 70% of the croppable land. This project has indicated a potential 10% reduction on applied nutrients and pesticides when Alabama farmers adopt these modern tools. This reduction has led to enhancing environmental stewardship at the farm level while providing savings to Alabama farmers. In 2011, Alabama farmers saved over \$22,000,000 on inputs through the adoption of guidance systems, variable-rate technology and automatic section control.

4. Associated Knowledge Areas

KA Code	Knowledge Area
101	Appraisal of Soil Resources
102	Soil, Plant, Water, Nutrient Relationships
111	Conservation and Efficient Use of Water
125	Agroforestry
132	Weather and Climate
202	Plant Genetic Resources
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants
205	Plant Management Systems
211	Insects, Mites, and Other Arthropods Affecting Plants
212	Pathogens and Nematodes Affecting Plants
213	Weeds Affecting Plants
216	Integrated Pest Management Systems
302	Nutrient Utilization in Animals
311	Animal Diseases
402	Engineering Systems and Equipment
502	New and Improved Food Products
601	Economics of Agricultural Production and Farm Management

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

Many factors affect global food security. Human population growth and the irregular climate patterns are among the major threats to world food security.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

This is the largest program in Alabama involving research in the development of new crop varieties, adoption of new seed and brood stocks, new animal breeds, development of best agricultural practices, and application of new technologies in a variety of areas ranging from integrated pest management to precision agriculture.

Good progress has been made in this area. In particular, the evaluation of many germplasm stocks that were developed elsewhere in Alabama allows adoption of genetic material in Alabama, enhancing productivity. The technologies involved in hybrid catfish production were improved. Now 25% of the industry is hybrid catfish. The application of hybrid catfish alone translates into multi-million dollars of economic gains per year.

Key Items of Evaluation

Precision agriculture adoption in Alabama continues to increase with technology being implemented on nearly 70% of the croppable land. This project has indicated a potential 10% reduction on applied nutrients and pesticides when Alabama farmers adopt these modern tools. This reduction has led to enhancing environmental stewardship at the farm level while providing savings to Alabama farmers. In 2011, Alabama farmers saved over \$22,000,000 on inputs through the adoption of guidance systems, variable-rate technology and automatic section control.