2012 Alabama A&M University and Tuskegee University and Auburn University Combined Research Plan of Work

Status: Accepted

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I. Plan Overview

1. Brief Summary about Plan Of Work

Alabama is fortunate to have three land-grant universities - Alabama A&M University, Auburn University, and Tuskegee University - with distinct programs at each institution based on clientele needs. As administrators of the Alabama Agricultural Research Program (AARP), we are working closely and cooperatively to enhance partnerships among our universities in all areas of research, education, and extension; with other universities in the region, nationally, and internationally; and with state and federal laboratories and agencies. Alabama's three land-grant universities have played key roles for the development of agricultural enterprises in Alabama. The agricultural research programs of these universities have formed a partnership, the Alabama Agricultural Land-Grant Alliance (AALGA), to better address critical issues in food, agriculture, environment, bioenergy, and natural resources in the state, region, and nation through multidisciplinary, multi-institutional, science-based teams that focus on the opportunities and the challenges facing farmers, consumers and agribusinesses. AALGA also seeks to provide quality education that prepares professionals for career opportunities in food, agriculture, environment, and natural resources. Five program areas have been designed to address the most important components of the Alabama agricultural economy:Global food security, food safety, sustainable energy, climate change, and childhood obesity. Within each of the planned program areas, attention will be given to addressing rural issues, public interest, citizen diversity, and sustainability. Research programs at each of our institutions are closely linked to the Alabama Cooperative Extension System.

Estimated Number of Professional FTEs/SYs total in the State.

Year	Extension		Research	
	1862	1890	1862	1890
2012	6.9	4.0	91.6	68.0
2013	0.0	2.0	91.6	68.0
2014	0.0	2.0	91.6	68.0
2015	0.0	0.0	91.6	68.0
2016	0.0	0.0	91.5	68.0

II. Merit Review Process

1. The Merit Review Process that will be Employed during the 5-Year POW Cycle

- Internal University Panel
- Combined External and Internal University Panel
- Expert Peer Review

2. Brief Explanation

Merit evaluations are conducted annually on each project by a panel of faculty, department chairs and administrators as appropriate. Programs that encompass several projects, particularly those with identified funding sources (i.e., the AAES Hatch/Multistate Funding Program and the Evans-Allen Program) are evaluated by an administrative panel on an annual basis and for continued funding. Expert review panels made of both internal and external university faculty members will be organized to review research projects for Hatch and the Evans-Allen Program funding.

III. Evaluation of Multis & Joint Activities

1. How will the planned programs address the critical issues of strategic importance, including those identified by the stakeholders?

Through listening sessions conducted for the Alabama Agricultural Experiment Station (AAES), faculty meetings at Auburn University, Tuskegee University, and Alabama A&M University, research advisory committee meetings, AALGA joint discussions and planning meetings, focus groups, conferences, field days and selected advisory boards, our programs are planned to address the critical issues of strategic importance to agricultural issues important to Alabama and to the nation . These issues include, but are not limited to: 1) enhance the sustainability, competitiveness, and profitability of U. S. food and agricultural systems; 2) adapt to and mitigate the impacts of climate change on food, feed, fiber and fuel systems in the U.S.; 3) support energy security and the development of the bio-economy from renewable natural resources in the U.S.; 4) play a global leadership role to ensure a safe, secure and abundant food supply for the U.S. and the world; 5) improve human health, nutrition and wellbeing of the US population; 6) heighten environmental stewardship through the development of sustainable management practices; 7) strengthen individual, family and community development and resilience.

Our programs are planned to be aligned with the five research priority areas of NIFA and with Alabama agricultural needs as identified by stakeholders. As a result of the alignment, we will focus on the five programs: Enhancing Agricultural Production Systems/Global Food Security and Hunger; Food, Nutrition, Health and Well-being, and Childhood Obesity; Food Safety and Agricultural Biosecurity; Environment, Ecosystems, Natural Resources, and Climate Change; Bioenergy and Bio-based Economy. In addition, in order to allow innovative research and to address broad, industry-wide emerging issues, we will be open to support "Investigator-initiated Innovative Research and Industry-wide Emerging Issues".

FTEs are planned in each of the five programmatic areas. The five programmatic areas will be used as a guide for distributing funds administered through competitive mechanisms based on merit. Additional administrative balance will be sought among the five program areas.

2. How will the planned programs address the needs of under-served and under-represented populations of the State(s)?

The Alabama Agricultural Land Grant Alliance was created to provide coordinated efforts to address major agricultural issues in Alabama. In particular, the AALGA was created to address the needs of under-served and under-represented populations such as the minority farmers, producers, processors, and small-scale producers. Projects administered through AALGA will require collaboration across Auburn University, Tuskegee University and Alabama A&M University dealing with specific issues involving under-served and under-represented groups. We will also encourage integrated projects that address minority groups and under-served and under-represented groups.

3. How will the planned programs describe the expected outcomes and impacts?

Overall, the outcome measures and expected impacts are to demonstrate that agricultural research at our three institutions contribute to maintenance or growth in agricultural productivity, efficiency, and sustainability in agriculture-related industries and endeavors.

Specific measurement of outcomes and impacts will depend on each specific programmatic area. Here are some examples:

Enhancing Agricultural Production Systems/Global Food Security and Hunger: methods developed for best agricultural practices; number of farmers/producers informed of the best practices; improved varieties, animal stocks produced, extended, and adopted; agricultural productivity, efficiency, sustainability; reduction of population in hunger in the state, in the nation, and in the world as a result of the research/extension/and educational programs.

Food, Nutrition, Health and Well-being, and Childhood Obesity: Nutrition standards and practices development; extension and outreach to the general population on nutritional information; informed decision of food choices and physical activities; overall reduction of obesity, particularly childhood obesity;

Food Safety and Agricultural Biosecurity: Detection methods and technologies developed for biological contaminations; analytic methods and technologies for abiotic contaminants; training and education of various groups including the general public; decrease in severity and incidence of food-related illness; reduction of economic losses due to contamination; increased national competitiveness because of implementation of food safety standards.

Environment, Ecosystems, Natural Resources, and Climate Change: Methods and best practices development for agriculture that are related to climate change; maintenance or improvement of water quantity and quality; ecosystem health sustainability; reduction in carbon footprint; development of technologies leading to reduced impact on climate; carbon sequestration; enhanced capacity in climate buffering...

Bioenergy and Bio-based Economy: development and evaluation of feed stock crops; development and assessment of the best practices for bioenergy crops; development and genetic improvement of bioenergy crops; development of conversion technology; increased bioenergy supply; increased bioeconomy output; reduced dependence on foreign oil...

Specified outcome measures are data collected by state and federal agencies, and reflect demographic trends.

4. How will the planned programs result in improved program effectiveness and/or

Each of the planned programs addresses state and national needs, and will ultimately contribute to efficiencies and effectiveness in agriculture and agriculturally related issues.Through the planned programs, knowledge gaps and areas in which critical research is needed will be identified, emerging technologies will be identified, and new approaches and technologies will be developed.Relative to all activities, programs will be communicated in varying ways to stakeholders so that improvements can be adopted as appropriate.

Competition is a valid way for enhancing programmatic effectiveness and efficiency. Hatch funds will be distributed through competitive mechanisms such as

submission of grant proposals dealing with the issues of the programmatic areas. Assessment in output and outcome will be evaluated in the short and long term, respectively. Faculty members obtaining the research funds will be required to leverage the resources such that the impact of the Hatch funds will be leveraged. Obtaining extramural competitive funds is another indicator of the merits of the Hatch funds supported projects.

IV. Stakeholder Input

1. Actions taken to seek stakeholder input that encourages their participation

- Use of media to announce public meetings and listening sessions
- Targeted invitation to traditional stakeholder groups
- Targeted invitation to non-traditional stakeholder groups
- Targeted invitation to traditional stakeholder individuals
- Targeted invitation to selected individuals from general public
- Survey of traditional stakeholder groups
- Survey of traditional stakeholder individuals
- Survey of the general public

Brief explanation.

Through our research and extension faculty, routine work is ongoing with various commodity groups and clientele. Semi-annual meetings are organized by the Alabama Farmers Federation where faculty and administrators participate regularly. In addition, there are committees for each of the 17 commodity groups with regular meetings and forums for the relevant groups, and faculty members and administrators regularly participate to learn about the issues, comments, and concerns. In addition to the ALFA groups, the college and experiment station leadership, the department heads, and faculty are working closely with several major commodity organizations outside of ALF: Alabama Cattlemen's Association, Alabama Poultry and Egg Association, and Alabama Green Industry leadership. College level research advisory committees and advisory boards have been established for all three universities within AALGA to actively seek stakeholders' input, and provide advice to research Deans of the colleges.

AALGA and its partners have hosted "listening sessions" at key locations across the state. These sessions were advertised in varying ways to reach as broad an audience as possible; they were open to the general public. Participants identified several strategic areas which are in need of additional resources and effort (i.e., research and extension). These areas are noted in this plan of work. Regular input is also received from stakeholders through commodity group leaders, from advisory boards, formal and informal surveys, focus groups, field days, conferences and through discussion and feedback from state leaders on agricultural boards. Our Extension faculty also carry research appointment in most cases. They are working closely with the commodity groups and the public in general to bring back their concerns and feedbacks.

2(A). A brief statement of the process that will be used by the recipient institution to identify individuals and groups stakeholders and to collect input from them

1. Method to identify individuals and groups

- Use Advisory Committees
- Use Internal Focus Groups
- Use External Focus Groups

- Open Listening Sessions
- Needs Assessments
- Use Surveys

Brief explanation.

Several groups have been established and are continuing, such as advisory committees which encompass grower and consumer groups. Surveys are conducted through various AAES newsletters, as needed, and seek input from the general public.

Commodity groups are well organized through, e.g., their participation in the Alabama Farmers Federation and other groups.

Needs assessment are conducted through strategic planning, SWOT analysis, based on input from the agricultural industries and assessment from the faculty, their department head, and college and experiment station leadership.

2(B). A brief statement of the process that will be used by the recipient institution to identify individuals and groups who are stakeholders and to collect input from them

1. Methods for collecting Stakeholder Input

- Meeting with traditional Stakeholder groups
- Survey of traditional Stakeholder groups
- Meeting with traditional Stakeholder individuals
- Survey of traditional Stakeholder individuals
- Meeting with the general public (open meeting advertised to all)
- Meeting specifically with non-traditional groups
- Meeting specifically with non-traditional individuals
- Survey of selected individuals from the general public

Brief explanation.

A number of stakeholder groups have previously been identified, and input is collected through regular meetings with discussions and feedbacks. For example, at Auburn, several commodity groups have committees to evaluate on-going research and new research proposals. Direct feedback to researchers and AARP administration is through the projects that get funding and through discussion about new and emerging issues. At Tuskegee, input is also sought from workshops and special sessions during the Professional Agricultural Workers Conference and Farmers Conference that are organized annually. At Alabama A&M University, inputs are sort through workshops, 1890 Association of Research Directors, various departments, conferences and new research proposals.

Influential industry leaders are consulted for their input and feedback.

3. A statement of how the input will be considered

- In the Budget Process
- To Identify Emerging Issues
- Redirect Research Programs
- In the Staff Hiring Process

- To Set Priorities

Brief explanation.

Inputs from stakeholders are used to set program priorities and for identifying emerging issues relevant to agricultural activities. Their inputs are considered in the long term plan for hiring faculty members and staff members. Inputs concerning urgent and serious issues will be used to redirect research funds and used in the budget processes as well. Research priorities identified from stakeholders' input are used as guides for solicitation of research grant applications. Annual Hatch and Evans Allen funded internal grants program is conducted competitively; awards are made based on merit and relevance to the priority areas. Because the small size of the funding, such research funding has to be considered as seed funding. Leverage of additional funding is essential to carry the research priorities forward.

V. Planned Program Table of Content

V(A). Planned Program (Summary)

Program # 1

1. Name of the Planned Program

Global Food Security and Hunger

2. Brief summary about Planned Program

AAES and AALGA support research or research/extension integrated activities that will 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. Specific areas of research include, but are not limited to: value-added food; improved cropping systems; improved poultry and animal systems; genomic studies; genetic studies of agriculturally important traits and processes; basic agricultural research for the discovery of new and improved food and forest products, or alternatives to pesticides and antibiotics to control disease outbreaks; development of genetically enhanced plant varieties or animal stocks including aquaculture species; alternative specialty crops; fisheries and aquaculture; forest products and sustainable systems; market analysis and economics; rural communities, agricultural economics, and rural finance; needs of producers with limited resources; analysis of institutional and infrastructural constraints; integrated pest management; alternative and innovative products and new production methods; and organic agriculture, local food systems, and sustainable agriculture. Of particular interest are projects that present innovative synergies of disciplines and perspectives while advancing sustainability objectives. This priority is aligned with the USDA research priority area of Global Food Security and Hunger and with enhancing the competitiveness of Alabama agriculture in the global economy.

3. Program existence : Mature (More then five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

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			2%	3%
102	Soil, Plant, Water, Nutrient Relationships			2%	15%
111	Conservation and Efficient Use of Water			10%	0%
123	Management and Sustainability of Forest Resources			2%	5%
125	Agroforestry			2%	9%
132	Weather and Climate			4%	3%
201	Plant Genome, Genetics, and Genetic Mechanisms			6%	9%
202	Plant Genetic Resources			4%	10%
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants			6%	0%
205	Plant Management Systems			18%	2%
206	Basic Plant Biology			4%	0%
211	Insects, Mites, and Other Arthropods Affecting Plants			4%	2%
212	Pathogens and Nematodes Affecting Plants			4%	6%
213	Weeds Affecting Plants			2%	0%
216	Integrated Pest Management Systems			6%	6%
302	Nutrient Utilization in Animals			6%	10%
311	Animal Diseases			8%	0%
402	Engineering Systems and Equipment			2%	0%
502	New and Improved Food Products			4%	10%
601	Economics of Agricultural Production and Farm Management			4%	10%
	Total			100%	100%

V(C). Planned Program (Situation and Scope)

1. Situation and priorities

In the global economy, food security is a global issue. As the population of the world continues to grow, global food security is a great concern. This concern is magnified when the world is facing decreasing available land and a highly variable climate that is changing rapidly with more frequent extreme weather conditions. This is also coupled with the challenge of energy demands that may reduce food

availability by either using food resources for energy directly or using agricultural land for production of energy crops. If the population of the world doubles in 50 years, the demands for food will also be doubled. While increasing acreage can still account for a small percentage of the increased demands, there is no land to grow the needed food. The solution lies in technology development and applications.

It is clear that technologies need to be developed to fully understand and exploit the genome capacity of plants and animals, and best practices need to be developed to fully exploit the genetic capacity of animals and plants; methods and best practices have to be developed to adapt to the changing climate; technologies need to be developed to minimize environmental impact of agriculture, value-added foods need to be developed; improved cropping systems and improved poultry and animal systems need to be developed; alternatives to pesticides and antibiotics to control disease outbreaks need to be discovered and invented; genetically enhanced plant varieties or animal stocks including aquaculture species need to be developed; potential of alternative specialty crops need to be explored and utilized; fisheries and aquaculture, forest products and sustainable systems need to be developed; market analysis and economic analysis need to be conducted.

With 45% of Alabama's population residing in rural areas, there is a substantial (though frequently indirect) dependency on net returns from agricultural production. Alabama's producers range in size from small-scale, limited resource and/or family farms to corporately owned entities. All farmers and agricultural producers face declining returns from traditional crops and practices and from increasing fuel, energy, and animal feed costs. Priorities are to develop and evaluate new and improved production of high value, energy, and alternative/speciality crops, adaptation of the best and most efficient crop and animal management systems, and to transfer knowledge of these crops and systems to extension personnel, growers and other interested state citizens.

2. Scope of the Program

- In-State Extension
- In-State Research
- Multistate Research
- Integrated Research and Extension
- Multistate Integrated Research and Extension

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

- The upward trend of world population;

• Limited land for food production and decreasing land availability with increased levels of urbanization;

• Genomes of animal and plants harbor the potential for a larger capacity;

• Understanding genomes and genetics will help in utilization of genetic resources;

• Large potential to improve agricultural production based on best agricultural practices from planting to harvest, and any steps in between, as well as post harvest processing, value added processes, and marketing; Understanding plant and animal biology, physiology, agronomy, soils, plant protection, disease

and pest control and management are crucial element of the best practices;

• Sustainability is possible with the use of best agricultural practices;

• Climate change will not be too dramatic and rapid;

• Research and extension community can form teams to effectively address problems of global food security;

• Funding will be available throughout the course of the program;

• Producers will be informed and motivated to change;

• External funds can serve as catalysts for change;

• Staff can be hired and maintained with necessary skills and abilities.

• The largest agricultural industries in Alabama are forestry, poultry, cattle, and greenhouse and nursery crop production, and this trend will continue;

• Agriculture will remain an important component of the economy of the state of Alabama, and support from the state will be relatively stable;

• Greater production efficiency is possible;

• Producers will adopt new management strategies or technologies that are shown to increase production, increase production efficiency, enhance quality, reduce environmental impact, or improve profit margins;

• Resources including facilities and funds will remain sufficient to continue these planned program efforts.

2. Ultimate goal(s) of this Program

- increased agricultural output such as yields;
- enhanced production efficiency;
-reduced environmental impact;
-sustainability of production;
-value-added products;
-increased economic return;
-improved life quality because of sufficient and nutritious food.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2012	0.0	0.0	22.0	21.5
2013	0.0	0.0	22.0	21.5

Year	Extension		Research	
	1862	1890	1862	1890
2014	0.0	0.0	22.0	21.5
2015	0.0	0.0	24.0	21.5
2016	0.0	0.0	35.5	29.0

V(F). Planned Program (Activity)

1. Activity for the Program

Research will be conducted to understand the biology of plants and animals, understand their genome capacity and plasticity, understand genes controling production and performance traits, and use such knowledge to develop new cultivars in plant production systems and improved animal and fish stocks.

Research will be conducted to develop improved production methods such as improved crop production systems; improved poultry and animal production systems, develop nutritional strategies in animal production systems.

Research will be conducted to develop the best agricultural practices for growing crops and animals with minimal impact to the environment, lowest possible of input, and the maximal amount of output. Some of the examples include planting schemes, rotation, irrigation, harvest, and post-harvest technologies, pest and disease control, nutrition re-definition, management, feeding schemes, and other agriculturall practices.

Research will be conducted to 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.

Research results are shared with extension personnel for further dissemination, particularly to county agents and producers. Additional dissemination of results are through direct contacts with farmers and producers (such as at field days and demonstrations, and commodity meetings), through publications (experiment station bulletins, on-line reports, press releases, as well as scientific journal articles), and may include non-traditional efforts, such as working through community and the use of the Internet such as web sites, YouTubes, itunes, and other social media.

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension

Direct Methods	Indirect Methods

• Education Class • Workshop • Group Discussion • One-on-One Intervention • Demonstrations	• Newsletters • Web sites

3. Description of targeted audience

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

V(G). Planned Program (Outputs)

1. Standard output measures

Target for the number of persons(contacts) to be reached through direct and indirect contact

	Direct Contact Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
2012	4000	24000	2000	8000
2013	4000	24000	2000	8000
2014	4000	24000	2000	8000
2015	4000	24000	2000	8000
2016	4000	24000	2000	8000

2. (Standard Research Target) Number of Patent Applications Submitted

2012:1 **2013:**1 **2014:**1 **2015:**1 **2016:**0

3. Expected Peer Review Publications

Year	Research Target	Extension Target	Total
2012	100	10	110
2013	100	10	110
2014	100	10	110
2015	100	10	110
2016	100	10	110

V(H). State Defined Outputs

1. Output Target

- Publications

2012:110	**2013:**110	**2014:**110	**2015:**110	**2016:**110

- patent applications

2012:1	**2013:**1	**2014:**1	**2015:**1	**2016:**1

- method and best agricultural practices development

2012:3	**2013:**3	**2014:**3	**2015:**3	**2016:**3

V(I). State Defined Outcome

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 agricultural 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 Target

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 agricultural 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. Outcome Type : Change in Action Outcome Measure

2012:0	**2013:**0	**2014:**0	**2015:**0	**2016:**0

3. Associated Knowledge Area(s)

- 101 - Appraisal of Soil Resources
- 102 - Soil, Plant, Water, Nutrient Relationships
- 111 - Conservation and Efficient Use of Water
- 123 - Management and Sustainability of Forest Resources
- 125 - Agroforestry
- 132 - Weather and Climate
- 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
- 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

4. Associated Institute Type(s)

- 1862 Research
- 1890 Research

Outcome # 2

1. Outcome Target

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

2. Outcome Type : Change in Knowledge Outcome Measure

2012:1	**2013:**1	**2014:**1	**2015:**1	**2016:**1

3. Associated Knowledge Area(s)

- 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

4. Associated Institute Type(s)

- 1862 Research
- 1890 Research

Outcome # 3

1. Outcome Target

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

2. Outcome Type : Change in Knowledge Outcome Measure

2012:1	**2013:**1	**2014:**1	**2015:**1	**2016:**1

3. Associated Knowledge Area(s)

- 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
- 216 - Integrated Pest Management Systems

- 311 - Animal Diseases

4. Associated Institute Type(s)

- 1862 Research
- 1890 Research

Outcome # 4

1. Outcome Target

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. Outcome Type : Change in Knowledge Outcome Measure

2012:0	**2013:**0	**2014:**0	**2015:**0	**2016:**0

3. Associated Knowledge Area(s)

- 101 - Appraisal of Soil Resources
- 102 - Soil, Plant, Water, Nutrient Relationships
- 111 - Conservation and Efficient Use of Water
- 123 - Management and Sustainability of Forest Resources
- 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

4. Associated Institute Type(s)

- 1862 Research
- 1890 Research

V(J). Planned Program (External Factors)

1. External Factors which may affect 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.)

Description

Agricultural systems are complex and easily affected by each of the external factors that are indicated. Under the current economic situation, a stable work force and funding will be crucial for the success of the program.

V(K). Planned Program (Evaluation Studies and Data Collection)

1. Evaluation Studies Planned

- Retrospective (post program)
- During (during program)

Description

Specific projects that comprise the Planned Program are evaluated annually by department heads and chairs. Overview of programs is done by institution leaders. Every other year, the funded projects will be evaluated as to the leveraging of funding, scientific output, and long term economic and social impact.

2. Data Collection Methods

- Sampling
- Observation
- Journals
- Other (state and national statistics)

Description

Data to demonstrate program success will be obtained primarily from national and state agencies.Use of such data will avoid duplication of data collection effort and provide a broader perspective of changes. Additional information and data will be obtained through observation, sampling and reporting in professional journals. For example, a survey of the citizenry about their personal food production (i.e., home-grown tomatoes) could demonstrate greater producer numbers than otherwise documented. However, we do realize the complexities involved in collecting the data. For instance, the collected data may have a time lag of 3-5 years.

V(A). Planned Program (Summary)

Program # 2

1. Name of the Planned Program

Climate Change

2. Brief summary about Planned Program

AAES and AALGA supports research that generates knowledge to develop agricultural systems which maintain high productivity in the face of climate changes and reduce greenhouse gas emissions. This will help producers plan and make decisions in adapting to changing environments, sustaining economic vitality, and taking advantage of emerging economic opportunities offered by climate change mitigation technologies. The goal of this program is to understand interactions between agricultural and natural systems to promote the long-term sustainability of both. Specific areas of research include, but are not limited to: develop sustainable agricultural systems emphasizing energy conservation and utilization of renewable energy resources; improve understanding of the land-water interface and the urban-agriculture interface; contribute to solutions to the consequences of global climate change; provide a framework 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; water quality and improvement; 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 and with Alabama's long-term goal of best practices of conserving and utilizing natural resources while sustaining the environment.

3. Program existence : New (One year or less)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

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			5%	12%
111	Conservation and Efficient Use of Water			5%	5%
112	Watershed Protection and Management			10%	5%
123	Management and Sustainability of Forest Resources			5%	5%
125	Agroforestry			5%	15%
131	Alternative Uses of Land			5%	3%
132	Weather and Climate			15%	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%	7%
403	Waste Disposal, Recycling, and Reuse			10%	3%
610	Domestic Policy Analysis			5%	5%
903	Communication, Education, and Information Delivery			5%	5%
	Total			100%	100%

V(C). Planned Program (Situation and Scope)

1. Situation and priorities

Human activities, along with other known and unknown factors, have had a major impact on climate change. Such change is characterized by accumulation of carbon dioxide around the atmosphere of the globe that may account for global warming and related or unrelated global climate change. The impact of human activities are predicted to increase with the increasing human population, and increased industrialization and urbanization. Although the trend of global climate change is not certain, it is relatively clear that the global climate is changing with more and more frequent extreme weather conditions. This poses great long-term challenges to the very existence of human beings on this planet. Along with the increased human activity and climate change, the environmental sustainability is of paramount significance. This includes environments that affect agricultural production, air quality, water quantity and quality, waste management, carbon footprint and sequestration.

2. Scope of the Program

- In-State Extension
- In-State Research
- Multistate Research
- Integrated Research and Extension
- Multistate Integrated Research and Extension

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

-Human activities have have impact on climate change;

-Carbon footprint is a major cause of global warming and related and unrelated climate change;

-Carbon footprint can be controlled or reduced upon adoption of best agricultural practices;

-Carbon can be sequestered by adoption of certain agricultural practices;

-Best agricultural practices will help improve environment;

-Natural resources cannot be sustained if environmental quality continues to worsen;

-Citizens are responsive to actions to reduce carbon footprint;

2. Ultimate goal(s) of this Program

Develop agricultural systems which maintain high productivity in the face of climate changes and reduce greenhouse gas emissions. This will help producers plan and make decisions in adapting to changing environments, sustaining economic vitality, and taking advantage of emerging economic opportunities offered by climate change mitigation technologies. The goal of this program is to understand interactions between agricultural and natural systems to promote the long-term sustainability of both.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2012	0.0	0.0	20.0	12.0
2013	0.0	0.0	20.0	12.0
2014	0.0	0.0	20.0	12.0
2015	0.0	0.0	22.0	12.0
2016	0.0	0.0	22.0	12.0

V(F). Planned Program (Activity)

1. Activity for the Program

Research will be conducted to develop sustainable agricultural systems 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 framework 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 conserving and utilizing natural resources while sustaining the environment.

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension

Direct Methods	Indirect Methods
● Education Class ● Workshop ● Group Discussion ● One-on-One Intervention ● Demonstrations	● Public Service Announcement ● Newsletters ● TV Media Programs ● Web sites

3. Description of targeted audience

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

V(G). Planned Program (Outputs)

1. Standard output measures

Target for the number of persons(contacts) to be reached through direct and indirect contact

	Direct Contact Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
2012	4000	12000	1000	5000
2013	4000	12000	1000	5000
2014	4000	12000	1000	5000
2015	4000	12000	1000	5000
2016	4000	12000	1000	5000

2. (Standard Research Target) Number of Patent Applications Submitted

2012:1 **2013:**1 **2014:**1 **2015:**1 **2016:**0

3. Expected Peer Review Publications

Year	Research Target	Extension Target	Total
2012	50	10	60
2013	50	10	60
2014	50	10	60
2015	50	10	60
2016	50	10	60

V(H). State Defined Outputs

1. Output Target

- publications

2012:60 **2013:**60 **2014:**60 **2015:**60 **2016:**60

V(I). State Defined Outcome

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 Target

Reduced carbon footprint by adopting improved agricultural practices

2. Outcome Type : Change in Condition Outcome Measure

2012:0	**2013:**0	**2014:**0	**2015:**0	**2016:**0

3. Associated Knowledge Area(s)

- 102 - Soil, Plant, Water, Nutrient Relationships
- 111 - Conservation and Efficient Use of Water
- 112 - Watershed Protection and Management
- 123 - Management and Sustainability of Forest Resources
- 125 - Agroforestry
- 131 - Alternative Uses of Land
- 132 - Weather and Climate
- 133 - Pollution Prevention and Mitigation
- 135 - Aquatic and Terrestrial Wildlife
- 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
- 610 - Domestic Policy Analysis
- 903 - Communication, Education, and Information Delivery

4. Associated Institute Type(s)

- 1862 Research
- 1890 Research

Outcome # 2

1. Outcome Target

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

2. Outcome Type : Change in Condition Outcome Measure

2012:0	**2013:**0	**2014:**0	**2015:**0	**2016:**0

3. Associated Knowledge Area(s)

- 102 - Soil, Plant, Water, Nutrient Relationships
- 111 - Conservation and Efficient Use of Water
- 112 - Watershed Protection and Management
- 123 - Management and Sustainability of Forest Resources
- 125 - Agroforestry
- 131 - Alternative Uses of Land
- 132 - Weather and Climate
- 133 - Pollution Prevention and Mitigation
- 403 - Waste Disposal, Recycling, and Reuse
- 610 - Domestic Policy Analysis
- 903 - Communication, Education, and Information Delivery

4. Associated Institute Type(s)

- 1862 Research
- 1890 Research

Outcome # 3

1. Outcome Target

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

2. Outcome Type : Change in Knowledge Outcome Measure

2012:0	**2013:**0	**2014:**0	**2015:**1	**2016:**1

3. Associated Knowledge Area(s)

- 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

4. Associated Institute Type(s)

- 1862 Research
- 1890 Research

V(J). Planned Program (External Factors)

1. External Factors which may affect 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.)

Description

Agriculture and the natural environment are complex, interrelated systems --each of which are easily affected by the external factors that are indicated. Climate change is a largely unknown field of research, and any natural changes can override human efforts.

V(K). Planned Program (Evaluation Studies and Data Collection)

1. Evaluation Studies Planned

- Retrospective (post program)
- During (during program)

Description

Specific projects that comprise the Planned Program are evaluated annually by department heads and chairs. Overview of programs is by institution leaders.

2. Data Collection Methods

- Sampling
- Observation
- Other (state and national statistics)

Description

Data to demonstrate program success will be obtained primarily from national and state agencies.Use of such data will avoid duplication of data collection effort, and provide a broader

(possible) changes.Additional information and data will be obtained through observation, sampling and reporting in professional journals.

V(A). Planned Program (Summary)

Program # 3

1. Name of the Planned Program

Food Safety

2. Brief summary about Planned Program

AAES and AALGA support research and research/extension integrated activities that enhance food safety and agricultural biosecurity. The goal of this program is to develop technology and methods to protect the safety of agriculture and food, to enhance food safety, reduce epidemiology, and developing the knowledge and technology base for rapid detection of threat agents, including existing and emerging diseases of plants and animals, risk assessment, and facility and personnel security. Specific areas of research include, but are not limited to: reduce the incidence of food-borne illness and provide a safer food supply; eliminating causes of microbial contamination and antimicrobial resistance; educating consumer and food safety professionals; developing food processing technologies to improve food safety; developing technologies for tracing the sources of food production; developing technologies for rapid analysis and identification of food including seafood; development of technologies for rapid detection of biological and chemical contamination such as antibiotics, pesticides, and other contaminants. This priority is aligned with the USDA research priority area of Food Safety and with the needs of Alabama to ensure the safety and wellbeing of its citizens, and with the economic interest of Alabama in the global economy.

3. Program existence : New (One year or less)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
304	Animal Genome	5%		5%	10%
307	Animal Management Systems	10%		10%	20%
314	Toxic Chemicals, Poisonous Plants, Naturally Occurring Toxins, and Other Hazards Affecting Animals	10%		10%	10%
501	New and Improved Food Processing Technologies	15%		15%	20%
503	Quality Maintenance in Storing and Marketing Food Products	10%		10%	0%
504	Home and Commercial Food Service	5%		5%	0%
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources	10%		10%	15%
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins	30%		30%	15%
723	Hazards to Human Health and Safety	5%		5%	10%
	Total	100%		100%	100%

V(C). Planned Program (Situation and Scope)

1. Situation and priorities

Food safety is a major concern of consumers and the general public. Each year, 76 million people get sick, 325,000 people get severely sick, and 5,000 people die because of food safety related reasons. Of the food safety related concerns, biological contamination of pathogenic bacteria and viruses are very serious. However, issues concerning non-biological contaminants have not been seriously addressed. For instance, antibiotic use in the food chain can cause major problems due to the gain of antibiotic resistance that lead to fetal consequences in the long term.

2. Scope of the Program

- In-State Extension
- In-State Research
- Multistate Research
- Integrated Research and Extension
- Multistate Integrated Research and Extension

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

-Technologies can be developed for the rapid detection of foodborne pathogens;
-Technologies can be developed for detection of abiotic contaminants;
-Application of technologies can lead to safer food;
-Education and extension programs can increase the awareness of food processing industries and consumers leading to reduced food poisoning and food-related incidents;

2. Ultimate goal(s) of this Program

The goal of this program is to develop technology and methods to protect the safety of agriculture and food, to enhance food safety, reduce epidemiology, and develop the knowledge and technology base for rapid detection of threat agents, including existing and emerging diseases of plants and animals, risk assessment, and facility and personnel security.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2012	1.0	0.0	13.0	8.0
2013	1.0	0.0	13.0	8.0
2014	1.0	0.0	13.0	8.0
2015	1.0	0.0	14.0	8.0
2016	1.0	0.0	14.0	8.0

V(F). Planned Program (Activity)

1. Activity for the Program

Specific areas of research include, but are not limited to: reduce the incidence of food-borne illness and provide a safer food supply; eliminating causes of microbial contamination and antimicrobial resistance; educating consumer and food safety professionals; developing food processing technologies to improve food safety; development of technologies for tracing the sources of food production; development of technologies for rapid analysis and identification of food including seafood; development of technologies for rapid detection of biological and chemical contamination such as antibiotics, pesticides, and other contaminants. This priority is aligned with the USDA research priority area of Food Safety and with the needs of Alabama to ensure the safety and wellbeing of its citizens, and with the economic interest of Alabama in the global economy.

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension

Direct Methods	Indirect Methods

• Education Class • Workshop • Group Discussion • One-on-One Intervention • Demonstrations	• Public Service Announcement • Newsletters • TV Media Programs • Web sites

3. Description of targeted audience

Researchers, educators, producers, food processors, super markets, consumers, and the general public.

V(G). Planned Program (Outputs)

1. Standard output measures

Target for the number of persons(contacts) to be reached through direct and indirect contact

	Direct Contact Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
2012	4000	24000	1000	4000
2013	4000	24000	1000	4000
2014	4000	24000	1000	4000
2015	4000	24000	1000	4000
2016	4000	24000	1000	4000

2. (Standard Research Target) Number of Patent Applications Submitted

2012:1 **2013:**1 **2014:**1 **2015:**1 **2016:**0

3. Expected Peer Review Publications

Year	Research Target	Extension Target	Total
2012	60	5	65
2013	60	5	65
2014	60	5	65
2015	60	5	65
2016	60	5	65

V(H). State Defined Outputs

1. Output Target

- Publications

2012:65	**2013:**65	**2014:**65	**2015:**65	**2016:**60

V(I). State Defined Outcome

O. No	Outcome Name
1	Decreased incidence of cases of food poisoning (AL state stats, % deaths from Salmonella and other intestinal infections in 2004 = 1.6%). Program success will be indicated by a decline or no change in this incidence.
2	New technology(-ies) developed to monitor microbial contaminants. (Medium term outcome)
3	New professionals in workforce with training in food safety and security. (Long-term)

Outcome # 1

1. Outcome Target

Decreased incidence of cases of food poisoning (AL state stats, % deaths from Salmonella and other intestinal infections in 2004 = 1.6%). Program success will be indicated by a decline or no change in this incidence.

2. Outcome Type : Change in Action Outcome Measure

2012:0	**2013:**0	**2014:**0	**2015:**0	**2016:**0

3. Associated Knowledge Area(s)

- 304 - Animal Genome
- 307 - Animal Management Systems
- 314 - Toxic Chemicals, Poisonous Plants, Naturally Occurring Toxins, and Other Hazards Affecting Animals
- 501 - New and Improved Food Processing Technologies
- 503 - Quality Maintenance in Storing and Marketing Food Products
- 504 - Home and Commercial Food Service
- 711 - Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources
- 712 - Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins
- 723 - Hazards to Human Health and Safety

4. Associated Institute Type(s)

- 1862 Research
- 1890 Research

Outcome # 2

1. Outcome Target

New technology(-ies) developed to monitor microbial contaminants. (Medium term outcome)

2. Outcome Type : Change in Knowledge Outcome Measure

2012:0	**2013:**0	**2014:**1	**2015:**1	**2016:**1

3. Associated Knowledge Area(s)

- 304 - Animal Genome
- 503 - Quality Maintenance in Storing and Marketing Food Products
- 504 - Home and Commercial Food Service
- 711 - Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and

Other Sources

- 712 - Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins
- 723 - Hazards to Human Health and Safety

4. Associated Institute Type(s)

- 1862 Research
- 1890 Research

Outcome # 3

1. Outcome Target

New professionals in workforce with training in food safety and security. (Long-term)

2. Outcome Type : Change in Condition Outcome Measure

2012:0	**2013:**0	**2014:**0	**2015:**0	**2016:**0

3. Associated Knowledge Area(s)

- 304 - Animal Genome
- 307 - Animal Management Systems
- 314 - Toxic Chemicals, Poisonous Plants, Naturally Occurring Toxins, and Other Hazards Affecting Animals
- 501 - New and Improved Food Processing Technologies
- 503 - Quality Maintenance in Storing and Marketing Food Products
- 504 - Home and Commercial Food Service
- 711 - Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources
- 712 - Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins
- 723 - Hazards to Human Health and Safety

4. Associated Institute Type(s)

- 1862 Research
- 1890 Research

V(J). Planned Program (External Factors)

1. External Factors which may affect 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.)

Description

Food safety issues are very complex involving both spacial and temporal variations, the cause of which is sometimes difficult to determine. While reducing foodborne pathogens are possible, the key is public education and training related to the safety of food.

V(K). Planned Program (Evaluation Studies and Data Collection)

1. Evaluation Studies Planned

- Retrospective (post program)
- During (during program)

Description

Specific projects that comprise the Planned Program are evaluated annually by department heads and chairs. Overview of program is by institution leaders.

2. Data Collection Methods

- Sampling
- Observation

Description

Data to demonstrate program success will be obtained primarily from national and state agencies . Use of such data will avoid duplication of data collection efforts, as well as provide a broader perspective of family and community health. Additional information and data may be obtained through observation, by sampling and from reports in professional journals. For example, a survey of the citizenry about their perception of opportunities may reveal a different situation than are interpreted from the statistics.

V(A). Planned Program (Summary)

Program # 4

1. Name of the Planned Program

Childhood Obesity

2. Brief summary about Planned Program

AAES and AALGA support research and research/extension integrated activities to identify effective measures that guide individuals and families to make informed, science-based decisions that will reduce child obesity and improve health. The goal of this program is to improve nutrition and health and to ensure that nutritious foods are affordable and available, and to provide guidance so that individuals and families are able to make informed, science-based decisions about their health and well-being. Nutrition, obesity prevention, and strong families, youth, and communities are of paramount importance to Alabama agriculture. Specific areas of research include, but are not limited to: issues that affect quality of life and economic well-being of families and children; bioactive food components for optimal health; human nutrition and obesity; improvement in food quality and value. This priority is aligned with the USDA research priority area of Childhood Obesity, and with the strategic goal of a healthy economy and healthy people in Alabama.

Obesity and related health problems are concerns to all Alabama citizens. Research conducted for this program will address issues of food choice, life style choice, and these choices as related to community sustainability. Research will also address means of delivering or producing healthier food products.The long term goal is to achieve P4 food, i.e., personalized, preventive, predictive, and participatory food in order to have a healthy population.

3. Program existence : New (One year or less)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
701	Nutrient Composition of Food			15%	15%
702	Requirements and Function of Nutrients and Other Food Components			15%	15%
703	Nutrition Education and Behavior			15%	15%
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources			5%	5%
724	Healthy Lifestyle			10%	15%
802	Human Development and Family Well-Being			10%	5%
805	Community Institutions, Health, and Social Services			10%	5%
806	Youth Development			10%	20%
903	Communication, Education, and Information Delivery			10%	5%
	Total			100%	100%

V(C). Planned Program (Situation and Scope)

1. Situation and priorities

In the U.S., the population of Alabama ranks the second for obesity, hypertension, and related health problems, especially in minority groups. However, all citizens are vulnerable to these problems. Also related to this is an insufficient level of physical activity (sedentary lifestyle) by state citizens. Research priorities are to elucidate factors that contribute to unhealthy diet and lifestyle choices. Efforts are also being made to produce healthier plant- and animal-based foods (e.g., lower fat, higher vitamin content).

2. Scope of the Program

- In-State Extension
- In-State Research
- Multistate Research
- Integrated Research and Extension
- Multistate Integrated Research and Extension

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

-State obesity problem is mainly caused by lifestyles;
-Major factors affecting childhood obesity is the choice of food and lack of exercise;
-A list of nutritious and healthy food does exist;
-Best practices in choice of food and lifestyle can be developed;
-Individuals can change their behavior in choice of food and exercise
-Information on healthy food and healthy lifestyle can be effectively disseminated;
-Adoption of healthy food and healthy lifestyle will result in reduced incidence of childhood obesity.

2. Ultimate goal(s) of this Program

-Improve health status of state citizens.
-Reduce obesity problems in the state;
-Increase adoption of healthy food choice and healthy life style;
-Increase awareness of the relations between choice of food and lifestyle with the indicators of physical condition such as obesity.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2012	0.0	0.0	10.0	10.0
2013	0.0	0.0	10.0	10.0
2014	0.0	0.0	10.0	10.0
2015	0.0	0.0	12.0	10.0
2016	0.0	0.0	10.0	10.0

V(F). Planned Program (Activity)

1. Activity for the Program

Research will include studies of molecular and cellular mechanisms of obesity, mapping of obesity-related traits in the genomes using animal models, surveys on lifestyle habits (food choice, exercise) of citizens, evaluation of underlying reasons for these habits, program development for improvement, and measuring adoption of improved diets and activity levels. Research will also be conducted on, for example, animal production such that meat products are more healthy. In addition, research activities will explore non-traditional means of delivery of nutritive components. Research results are shared with extension personnel for further dissemination, particularly to county agents, consumers, and community leaders. Additional dissemination of results are through direct contact (such as survey participants and community gatherings), through publications (experiment station bulletins, on-line reports, press releases, as well as scientific journal articles), and may include non-traditional efforts, such as working through community and faith-based groups.

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension

Direct Methods	Indirect Methods
• Education Class • Workshop • Group Discussion • One-on-One Intervention • Demonstrations	• Public Service Announcement • Newsletters • TV Media Programs • Web sites

3. Description of targeted audience

All state citizens, particularly targeted groups of children and high-risk citizens. Students (K through 12; college groups). Food producers and marketers.

V(G). Planned Program (Outputs)

1. Standard output measures

Target for the number of persons(contacts) to be reached through direct and indirect contact

	Direct Contact Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
2012	4000	24000	3000	7000
2013	4000	24000	3000	7000
2014	4000	24000	3000	7000
2015	4000	24000	3000	7000
2016	4000	24000	3000	7000

2. (Standard Research Target) Number of Patent Applications Submitted

2012:0 **2013:**0 **2014:**0 **2015:**1 **2016:**1

3. Expected Peer Review Publications

Year	Research Target	Extension Target	Total
2012	50	10	60
2013	50	10	60
2014	50	10	60
2015	50	10	60

Year	Research Target	Extension Target	Total
2016	50	10	60

V(H). State Defined Outputs

1. Output Target

- publications

2012:60 **2013:**60 **2014:**60 **2015:**60 **2016:**60

V(I). State Defined Outcome

O. No	Outcome Name
1	Optimal nutritional recommendations made available to citizens
2	Public awareness of the relationship of healthy food and wellbeing and obesity
3	Reduction in obesity and overweight rate (66.6% in 2008) in population and children, and reduction of the level of obesity
4	health care cost will be lowered as a result of obesity reduction.

Outcome # 1

1. Outcome Target

Optimal nutritional recommendations made available to citizens

2. Outcome Type : Change in Knowledge Outcome Measure

2012:0	**2013:**0	**2014:**0	**2015:**0	**2016:**0

3. Associated Knowledge Area(s)

- 701 - Nutrient Composition of Food
- 702 - Requirements and Function of Nutrients and Other Food Components
- 703 - Nutrition Education and Behavior
- 711 - Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources
- 724 - Healthy Lifestyle

4. Associated Institute Type(s)

- 1862 Research
- 1890 Research

Outcome # 2

1. Outcome Target

Public awareness of the relationship of healthy food and wellbeing and obesity

2. Outcome Type : Change in Condition Outcome Measure

2012:0	**2013:**0	**2014:**0	**2015:**0	**2016:**0

3. Associated Knowledge Area(s)

- 701 - Nutrient Composition of Food
- 703 - Nutrition Education and Behavior
- 711 - Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources
- 724 - Healthy Lifestyle
- 802 - Human Development and Family Well-Being
- 805 - Community Institutions, Health, and Social Services
- 806 - Youth Development
- 903 - Communication, Education, and Information Delivery

4. Associated Institute Type(s)

- 1862 Research
- 1890 Research

Outcome # 3

1. Outcome Target

Reduction in obesity and overweight rate (66.6% in 2008) in population and children, and reduction of the level of obesity

2. Outcome Type : Change in Condition Outcome Measure

2012:65	**2013:**65	**2014:**65	**2015:**65	**2016:**60

3. Associated Knowledge Area(s)

- 701 - Nutrient Composition of Food
- 702 - Requirements and Function of Nutrients and Other Food Components
- 703 - Nutrition Education and Behavior
- 711 - Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources
- 724 - Healthy Lifestyle

4. Associated Institute Type(s)

- 1862 Research
- 1890 Research

Outcome # 4

1. Outcome Target

health care cost will be lowered as a result of obesity reduction.

2. Outcome Type : Change in Action Outcome Measure

2012:0	**2013:**0	**2014:**0	**2015:**0	**2016:**0

3. Associated Knowledge Area(s)

- 701 - Nutrient Composition of Food
- 702 - Requirements and Function of Nutrients and Other Food Components
- 703 - Nutrition Education and Behavior
- 711 - Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and

Other Sources

- 724 - Healthy Lifestyle
- 802 - Human Development and Family Well-Being
- 805 - Community Institutions, Health, and Social Services
- 806 - Youth Development
- 903 - Communication, Education, and Information Delivery

4. Associated Institute Type(s)

- 1862 Research
- 1890 Research

V(J). Planned Program (External Factors)

1. External Factors which may affect 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.)
- Other (catastrophic food poisoning)

Description

The economic status may have a major impact on choice of food and behavior. Stress is a major contributor to obesity, and economic stress and other stressful situations may complicate the efforts.

V(K). Planned Program (Evaluation Studies and Data Collection)

1. Evaluation Studies Planned

- Retrospective (post program)
- During (during program)

Description

Specific projects that comprise the Planned Program are evaluated annually by department heads and chairs. Overview of programs is by institution leaders.

2. Data Collection Methods

- Sampling
- Observation

Description

Data to demonstrate program success will be obtained primarily from national and state agencies.Use of such data will avoid duplication of data collection efforts, and provide a perspective of (possible) changes.Additional information and data will be obtained through observation, sampling and reporting in professional journals. For example, a survey of the citizenry about their healthy food choices from a health perspective could reveal information that is not available through other statistical

V(A). Planned Program (Summary)

Program # 5

1. Name of the Planned Program

Sustainable Energy

2. Brief summary about Planned Program

AAES and AALGA contribute to the national goal of energy independence by supporting science to develop biomass used for biofuels, design optimum forest products and crops for bioenergy production, and produce value-added bio-based industrial products. The goal of this program is to develop technology and increase our knowledge of efficient production of biomass for feedstocks and conversion of feedstocks to bioenergy and bioproducts, bioprocessing systems, biomass production, and conversion of byproducts into value-added products and to enhance understanding of the long-term sustainability of feedstock production and bioconversion systems including economics, social issues, land use policies, and energy security and the environment. Specific areas of research include, but are not limited to: alternative crops for efficient production of bioenery feedstocks, biotechnology of bioenergy crops to enhance production or to enhance its utilization as an energy source, and technology development for bioenergy conversion. This priority is aligned with the USDA priority area of Sustainable Energy and with the huge domestic energy demands.

3. Program existence : Intermediate (One to five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

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			5%	5%
125	Agroforestry			5%	10%
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			15%	15%
211	Insects, Mites, and Other Arthropods Affecting Plants			5%	5%
212	Pathogens and Nematodes Affecting Plants			5%	5%
216	Integrated Pest Management Systems			10%	10%
402	Engineering Systems and Equipment			5%	0%
405	Drainage and Irrigation Systems and Facilities			5%	0%
601	Economics of Agricultural Production and Farm Management			10%	10%
603	Market Economics			5%	5%
605	Natural Resource and Environmental Economics			10%	10%
607	Consumer Economics			5%	5%
	Total			100%	100%

V(C). Planned Program (Situation and Scope)

1. Situation and priorities

Alabama is rich in natural resources such as forestry and other sources suitable for consideration as bioenergy feedstocks. Alabama's climate is also highly adaptable to growth of highly productive energy crops such as switchgrasses. Development of methodologies and technologies for the utilization of such natural resources for the purpose of energy is an important priority for our country's energy-based economy.

2. Scope of the Program

- In-State Extension
- In-State Research
- Multistate Research

- Integrated Research and Extension
- Multistate Integrated Research and Extension

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

-Development of renewable energy will reduce the pressure of high gasoline prices, and in the long-term, should contribute to reduction of energy dependence on foreign sources.
-Production of bioenergy crops will not seriously affect agricultural production for food and feed crops.
-Bioenergy is economically viable.
-Government will have a sustainable energy policy.

2. Ultimate goal(s) of this Program

The goal of this program is to develop technology and increase our knowledge of efficient production of biomass for feedstocks and conversion of feedstocks to bioenergy and bioproducts, bioprocessing systems, and conversion of byproducts into value-added products and to enhance understanding of the long-term sustainability of feedstock production and bioconversion systems including economics, social issues, land use policies, and energy security and the environment.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2012	0.0	0.0	8.0	9.0
2013	0.0	0.0	8.0	9.0
2014	0.0	0.0	8.0	9.0
2015	0.0	0.0	10.0	9.0
2016	0.0	0.0	10.0	9.0

V(F). Planned Program (Activity)

1. Activity for the Program

Research will address issues related to renewable energy using bio-based feedstocks that ultimately contribute to the relief of energy dependence on foreign sources.The goal of this program is to increase our knowledge of bioconversion of feedstocks to bioenergy and bioproducts, bioprocessing systems, biomass production, and conversion of byproducts into value-added products and to enhance understanding of the long-term sustainability of feedstock production and bioconversion systems including economics, social issues, land use policies, and energy security and the environment. Specific areas of research include, but are not limited to: alternative crops for efficient production of bioenery feedstocks, biotechnology of bioenergy crops to enhance production or to enhance its utilization as an energy source, development of agricultural practices for newly identified bioenergy crops, and technology development for

bioenergy conversion. This priority is aligned with new initiatives on Bioenergy and Bioproducts Research in DOE, USDA, and several other federal agencies, and with the huge energy demands in the state and the nation

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension

Direct Methods	Indirect Methods
• Education Class • Workshop • Group Discussion • One-on-One Intervention • Demonstrations	• Public Service Announcement • Newsletters • TV Media Programs • Web sites

3. Description of targeted audience

Researchers, educators, extension personnel, community leaders, educators, 4H, youth centers, energy consumers, general public.

V(G). Planned Program (Outputs)

1. Standard output measures

Target for the number of persons(contacts) to be reached through direct and indirect contact

	Direct Contact Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
2012	1000	30000	1000	3000
2013	1000	30000	1000	3000
2014	1000	30000	1000	3000
2015	1000	30000	1000	3000
2016	3000	30000	2000	6000

2. (Standard Research Target) Number of Patent Applications Submitted

2012:0 **2013:**0 **2014:**1 **2015:**1 **2016:**2

3. Expected Peer Review Publications

Year	Research Target	Extension Target	Total
2012	15	0	15
2013	15	0	15

Year	Research Target	Extension Target	Total
2014	15	0	15
2015	15	0	15
2016	20	0	20

V(H). State Defined Outputs

1. Output Target

- Publications

2012:15 **2013:**15 **2014:**15 **2015:**15 **2016:**20

V(I). State Defined Outcome

O. No	Outcome Name
1	Development of efficient bioenergy crops
2	Increased acreage of bioenergy crops such as corn, switchgrasses, sweetpotatoes, and canola.
3	Increased percentage of bioenergy in the overall consumption of energy

Outcome # 1

1. Outcome Target

Development of efficient bioenergy crops

2. Outcome Type : Change in Knowledge Outcome Measure

2012:0	**2013:**0	**2014:**0	**2015:**1	**2016:**1

3. Associated Knowledge Area(s)

- 102 - Soil, Plant, Water, Nutrient Relationships
- 125 - Agroforestry
- 201 - Plant Genome, Genetics, and Genetic Mechanisms
- 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
- 216 - Integrated Pest Management Systems
- 402 - Engineering Systems and Equipment
- 405 - Drainage and Irrigation Systems and Facilities
- 601 - Economics of Agricultural Production and Farm Management
- 603 - Market Economics
- 605 - Natural Resource and Environmental Economics
- 607 - Consumer Economics

4. Associated Institute Type(s)

- 1862 Research
- 1890 Research

Outcome # 2

1. Outcome Target

Increased acreage of bioenergy crops such as corn, switchgrasses, sweetpotatoes, and canola.

2. Outcome Type : Change in Condition Outcome Measure

2012:300	**2013:**500	**2014:**500	**2015:**500	**2016:**500

3. Associated Knowledge Area(s)

- 202 - Plant Genetic Resources
- 203 - Plant Biological Efficiency and Abiotic Stresses Affecting Plants
- 205 - Plant Management Systems
- 212 - Pathogens and Nematodes Affecting Plants
- 216 - Integrated Pest Management Systems
- 402 - Engineering Systems and Equipment

4. Associated Institute Type(s)

- 1862 Research
- 1890 Research

Outcome # 3

1. Outcome Target

Increased percentage of bioenergy in the overall consumption of energy

2. Outcome Type : Change in Knowledge Outcome Measure

2012:2	**2013:**2	**2014:**2	**2015:**5	**2016:**6

3. Associated Knowledge Area(s)

- 402 - Engineering Systems and Equipment
- 601 - Economics of Agricultural Production and Farm Management
- 603 - Market Economics
- 605 - Natural Resource and Environmental Economics
- 607 - Consumer Economics

4. Associated Institute Type(s)

- 1862 Research
- 1890 Research

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

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

Description

Steady progress for the development of bioenergy or other types of renewable energy can be easily derailed by each of the external factors that are indicated. Inconsistent government policies can have serious consequences relative to the investment made to the bioenergy field.

V(K). Planned Program (Evaluation Studies and Data Collection)

1. Evaluation Studies Planned

- Retrospective (post program)
- During (during program)

Description

Specific projects that comprise the Planned Program are evaluated annually by department heads and chairs. Overview of programs is by institution leaders.

2. Data Collection Methods

- Sampling
- Observation

Description

Data to demonstrate program success will be obtained primarily from national and state agencies.Use of such data will avoid duplication of data collection efforts, as well as provide a broader perspective of energy utilization and distribution of various forms of energy. Additional information and data may be obtained through observation, sampling and reporting in professional journals.