

2010 Alabama A&M University and Tuskegee University and Auburn University Combined Research Annual Report of Accomplishments

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I. Report Overview

1. Executive Summary

This report covers all the three Alabama land grant universities, i.e., Alabama A&M University, Auburn University, and Tuskegee University for the research activities, results, and accomplishments during the 2010 fiscal year. These three universities have distinct agricultural programs based on clientele needs, however, the administrators of the Alabama Agricultural Research Program (AARP) work closely and cooperatively to enhance partnerships among the three universities in all areas of research, education, and extension. 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, energy, environment, climate, natural resources, human health and wellbeing, and other agricultural issues in the state, region, and nation via multidisciplinary, multi-institutional, science-based teams that focus on the opportunities and challenges facing farmers, consumers and agribusinesses. Working together, we have developed AARP priorities that include the following six areas of critical importance: (1) Global food security and hunger (i.e. our original research priority of "Enhancing agricultural production systems and value-added processing"); (2) Climate Change (i.e. our original priority of environment, ecosystems, and natural resources); (3). Food safety (i.e. our original priority of food, nutrition, health and well-being, and agricultural biosecurity); (4). Childhood obesity; (5). sustainable energy (i.e. our original priority on bioenergy and bio-based economy); and (6) Industry-wide emerging issues. In recognition of the importance of international agriculture programs in promoting the competitiveness of U.S. agriculture in the global market place, AARP supports and participates in the efforts of international program offices in the three institutions. AALGA also seeks to provide quality education that prepares professionals for career opportunities in food, agriculture, environment, bioenergy, and natural resources in the state, the region, and the nation. Alabama's three land-grant universities have played key roles in developing agricultural enterprises in Alabama and good progress was made in 2010.

Particularly, on the basis of major progress made in 2009, developing new varieties and crops, dissemination of information and applications of the new crop varieties began in 2010 with several specialty crops including seven chestnut varieties and two kiwifruit varieties. Release of these special crop varieties will have a major impact to the producers and consumers as they are superior in production and performance traits. In the area of food safety, the experiment stations of the three universities have been the major forces for research in securing our food. Auburn University started its AU Food Safety Initiative and is working to serve the nation as a "food safety hub" for developing detection technologies, food safety testing, food safety education and training. In 2010, Alabama A&M University started a program to enhance minority participation in food safety research, education and outreach. The three universities are seriously engaged in Alabama Obesity Initiative to address the serious issue of obesity in the state. Alabama is the second most obese state in the nation, and solutions must be generated from research, education, and extension programs. A team of scientists from the three institutions were awarded a NIFA CYFAR grant that is focused on childhood obesity programs targeted at the Head Start programs in disadvantaged minority communities in Alabama. In spite of the uncertainty, research in the areas of climate change and bioenergy started to gain ground with more and more citizens becoming aware of the problem and engaged for the real change. However, dealing with such major research issues, funding uncertainty is a serious problem. Two major teams involving researchers from Auburn University, Tuskegee University, and Alabama A&M University researchers are under consideration for major research funding under the NIFA Sustainable Energy societal challenge area, but funding decisions have

not been finalized. In the area of Climate Change, our researchers are among the major research teams as collaborators, but funding levels are still very low.

Total Actual Amount of professional FTEs/SYs for this State

Year: 2010	Extension		Research	
	1862	1890	1862	1890
Plan	6.9	4.0	91.6	68.0
Actual	6.9	4.0	91.6	68.0

II. Merit Review Process

1. The Merit Review Process that was Employed for this year

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

2. Brief Explanation

Internal merit evaluations were conducted on all existing projects by a panel of faculty, department heads/chairs and administrators as appropriate. Programs that encompass several projects, particularly those with identified funding sources (i.e., the AAES Hatch/Multistate Funding Program) were evaluated by an administrative panel to allocate continued funding.

Merits of new projects were evaluated by an expert panel composed of professionals from both within and out of state. In particular, experts from nearby universities such as University of Georgia, Mississippi State University, University of Florida and Texas A&M University were selected to cover professional areas of all six research priorities. A balanced representation was considered for various internal units, basic sciences, applied sciences, and extension. The research proposals were reviewed by all expert panelists, and a panel meeting of two days was conducted at Auburn University. The combined internal/external expert panel ranked the proposals into categories of outstanding/highest priority for funding, excellent/high priority for funding, very good/high priority for funding, good/medium priority for funding, fair/low priority for funding, and poor/do not fund. The panel made its recommendations to the Assistant Director of AAES, who work with staff of our financial office to determine the funding and funding levels, based on the panel recommendations and the availability of funds. A final recommendation was made by the Assistant Director to the Director of AAES, and funding decisions were made. Our funding guidelines require leverage of extramural funding to increase the impact of Hatch funds.

Similarly, at Tuskegee University, the merit review process involved both external as well as internal review panels. Experts in the program areas across 1890 as well as 1862 institutions were used as external panel members. Funding recommendations were made based on national and institutional priorities as well as the integrativeness of the project and the ability to leverage funding for the program. At AAMU, request for proposals was sent to faculty and chairs and shared with other Departments in the

university. A university wide meeting was held during which the Research Director made presentation centered on the NIFA priorities and current issues on agricultural sciences to involve inter- and multidisciplinary science research. Faculty responded to the call by submitting proposals on the due date. The proposals underwent initial screening and more documentation (collaboration letter from other institutions e.g. 1862, USDA) were requested where applicable. The proposals were reviewed by experts and recommendations made to the Research Director and shared with the Dean, School of Agricultural & Environmental Sciences (SAES). Letters were sent to PIs as to the decision on their projects. The recommended projects were submitted to USDA for final consideration and approval.

III. Stakeholder Input

1. Actions taken to seek stakeholder input that encouraged 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 non-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
- Survey specifically with non-traditional groups
- Survey specifically with non-traditional individuals
- Survey of selected individuals from the general public
- Other

Brief explanation.

A number of stakeholder groups have previously been identified, and input was collected through regular meetings with discussions and feedbacks. In particular, AARP works closely with the 18 commodity groups through the Alabama Farmers Federation, the Alabama Cattlemen's Association, the Alabama Poultry and Egg Association, and other agricultural organizations including the Federation of Southern Cooperatives and the Alabama Black Belt Action Commission. Commodity group committees were used to evaluate on-going research and new research proposals. Direct feedbacks to researchers and AARP administration was through projects that were funded and through discussions about new and emerging issues. Semi-annual meetings were held with various commodity groups. Administrators and faculty members regularly participate in commodity committee meetings and their semi-annual meetings.

2(A). A brief statement of the process that was 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
- Other

Brief explanation.

Several groups have been established and are continuing, such as advisory committees that encompass producers and consumer groups. Surveys were conducted through various AAES, SAES, and George Washington Carver Agricultural Environmental Sciences (GWCAES) newsletters, and input was sought from the general public. The core stakeholders group is the commodity groups, agricultural organizations, producers, processors, market professionals, and consumers. However, as modern agricultural research programs are dealing with food, environment, natural resources, energy, food safety that are relevant to all citizens as well as the traditional agricultural production areas that are indirectly relevant to the general public, the process had to take into account the whole cross section of the general public.

2(B). A brief statement of the process that was 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)
- Survey of the general public
- Meeting specifically with non-traditional groups
- Survey specifically with non-traditional groups
- Meeting specifically with non-traditional individuals
- Survey specifically with non-traditional individuals
- Meeting with invited selected individuals from the general public
- Survey of selected individuals from the general public
- Other

Brief explanation.

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3. A statement of how the input will be considered

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

- In the Staff Hiring Process
- In the Action Plans
- To Set Priorities
- Other

Brief explanation.

Inputs from stakeholders were used to set program priorities that are not only used for the distribution of research funds, but also for the hiring of new faculty and staff to meet the long term goals. Their inputs were also used to identify emerging issues relevant to agricultural needs. In a number of cases, research funds were redirected to address urgent and emerging agricultural issues identified by the agricultural industries. The inputs from stakeholders were also considered during strategic planning and whenever relevant, put into the action plans as well.

Brief Explanation of what you learned from your Stakeholders

Water issues, both quantities and quality, are becoming more and more important. Even though Alabama received plenty of rain in 2010 after the historically severe drought during the previous several years in the southeastern US. Environmental issues in relation to agriculture are critical; energy security and long term supply is vital to the state's economy. The issues related to bioenergy are yet to be settled. The high demands of grains for bioenergy development have resulted in, at least in part, a huge hike in animal feed prices, which put the animal-based agricultural businesses such as the poultry industry, the catfish industry, and the dairy industry at a very difficult situation. The public is still wondering about the resolve of US government in dealing with its energy, thereby doubtful about the future of bioenergy. Issues related to climate change started to gain major attention, but continued government support of research in this area is essential for the long term mitigation of the impact of economic activities on climate change. Issues related to childhood obesity and chronic diseases in minority and underserved adult populations are very alarming and need serious attention and funding to address these problems.

While focusing on five societal challenge areas is great, NIFA's research is significantly reduced in traditional agricultural research areas. Funds for fundamental research are minimal now, and foundational programs are seriously hampered. Many young faculty members are wondering if they will have a successful career in agriculture due to scarcity and limited research dollars.

IV. Expenditure Summary

Institution Name: Alabama A&M University

1. Total Actual Formula dollars Allocated (prepopulated from C-REEMS)			
Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
0	0	0	2502085

Institution Name: Auburn University

1. Total Actual Formula dollars Allocated (prepopulated from C-REEMS)			
Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
0	0	4554401	0

Institution Name: Tuskegee University

1. Total Actual Formula dollars Allocated (prepopulated from C-REEMS)			
Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
0	0	0	2482950

Institution Name: Alabama A&M University

2. Totaled Actual dollars from Planned Programs Inputs				
	Extension		Research	
	Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
Actual Formula	0	0	200000	2464107
Actual Matching	0	0	200000	2464107
Actual All Other	0	0	0	0
Total Actual Expended	0	0	400000	4928214

Institution Name: Auburn University

2. Totaled Actual dollars from Planned Programs Inputs				
Extension			Research	
	Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
Actual Formula	0	0	4302430	0
Actual Matching	0	0	4302430	0
Actual All Other	0	0	0	0
Total Actual Expended	0	0	8604860	0

Institution Name: Tuskegee University

2. Totaled Actual dollars from Planned Programs Inputs				
Extension			Research	
	Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
Actual Formula	0	0	0	1911853
Actual Matching	0	0	0	1911853
Actual All Other	0	0	0	0
Total Actual Expended	0	0	0	3823706

3. Amount of Above Actual Formula Dollars Expended which comes from Carryover funds from previous				
Carryover	0	0	0	0

V. Planned Program Table of Content

S. No.	PROGRAM NAME
1	Global Food Security and Hunger
2	Food Safety
3	Sustaining Environment, Ecosystems, and Natural Resources
4	Bioenergy and Bio-based Economy
5	Agricultural Genomics and Other Basic Agricultural Research
6	Supporting and enhancing economic opportunities and self-empowerment for families and
7	Industry-wide emerging issues

Add previously unplanned program

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
111	Conservation and Efficient Use of Water			5%	5%
112	Watershed Protection and Management			5%	2%
122	Management and Control of Forest and Range Fires			2%	3%
132	Weather and Climate			5%	2%
133	Pollution Prevention and Mitigation			5%	5%
136	Conservation of Biological Diversity			5%	3%
202	Plant Genetic Resources			2%	5%
205	Plant Management Systems			10%	5%
211	Insects, Mites, and Other Arthropods Affecting Plants			5%	5%
212	Pathogens and Nematodes Affecting Plants			10%	3%
216	Integrated Pest Management Systems			10%	5%
302	Nutrient Utilization in Animals			5%	10%
303	Genetic Improvement of Animals			5%	5%
304	Animal Genome			2%	5%
311	Animal Diseases			5%	2%
402	Engineering Systems and Equipment			2%	5%
403	Waste Disposal, Recycling, and Reuse			5%	5%
502	New and Improved Food Products			2%	5%
601	Economics of Agricultural Production and Farm Management			5%	10%
802	Human Development and Family Well-Being			5%	10%
	Total			100%	100%

Add knowledge area

V(C). Planned Program (Inputs)

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

Year: 2010	Extension		Research	
	1862	1890	1862	1890
Plan	2.0	0.0	29.8	21.5
Actual	0.0	0.0	29.8	22.5

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	1402430	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	1402430	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	1102180
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	0	1102180
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	675797
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	0	675797
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

The research priority on Global Food Security and Hunger covers the largest elements of traditional agricultural research including basic research of plant and animal biology, physiology, biochemistry, cell biology, genetics, genomics, and selective breeding; development of genetically improved plant and animal stocks; development of best agricultural practices such as water and soil management, irrigation, rotation, feed development for animals, agricultural production practices, post-harvest technologies for plants, and animal processing industries.

Research was conducted to develop and test new plant varieties and new animal and fish breeds, to investigate improved production methods such as new pesticides and cultivars in plant production systems, to develop efficient integrated pest management strategies, and to develop nutritional strategies in animal production systems. Research was also conducted in newer areas to explore innovative means to generate energy, and to explore methods for mitigating climate change. Economic analyses were conducted for various agricultural systems to increase profit margins and competitiveness of the US agriculture in the global economy.

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

2. Brief description of the target audience

Researchers, extension specialists, county agents, producers (particularly those that are innovative), all producers in the state, students (both K-12 and at our institutions), all state citizens. In the state, 48,000 people are directly involved in farming, but a larger group, approximately 476,000 are involved in agriculture-related business.

As modern agricultural issues deal with not only food, but also food safety, water, energy, the environment, climate, and human health and wellbeing, the real agriculture clientele is the general public or all the citizens of the state of Alabama.

V(E). Planned Program (Outputs)

1. Standard output measures

2010	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Plan	2000	12000	2000	8000
Actual	2000	12000	2000	8000

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

Patent Applications Submitted

Year: 2010
 Plan: 1
 Actual: 7

Patents listed

Three patents were issued in 2010 for new kiwi fruit and chestnut varieties: 'Au Fitzgerald' kiwi, 'Au Authur' kiwi and Buck IV' Chestnut varieties;
 2. Three more patents were submitted in 2010 for the development of three kiwi fruit varieties: 'AU Golden Tiger' 'AU Golden Sunshine', and 'AU Golden Dragon' kiwis.
 3. One patent was submitted for "Methods for the control of Animal intestinal parasites"

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2010	Extension	Research	Total
Plan	0	50	
Actual	0	80	80

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Publications

Not reporting on this Output for this Annual Report

Year	Target	Actual
2010	80	80

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Market value of agricultural products (\$ billion) (2006 = \$5.29 B). Program success will be indicated if market value of AL ag products stay level or increase. (Medium term outcome)
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.

Add Cross-cutting Outcome/Impact Statement or Unintended or Previously Unknown Outcome Measure

Outcome #1

1. Outcome Measures

- Not Reporting on this Outcome Measure

Market value of agricultural products (\$ billion) (2006 = \$5.29 B). Program success will be indicated if market value of AL ag products stay level or increase. (Medium term outcome)

2. Associated Institution Types

- 1862 Research
- 1890 Research

3a. Outcome Type:

- Change in Knowledge Outcome Measure
- Change in Action Outcome Measure
- Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	0	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

- 111 - Conservation and Efficient Use of Water
- 112 - Watershed Protection and Management
- 122 - Management and Control of Forest and Range Fires
- 132 - Weather and Climate
- 133 - Pollution Prevention and Mitigation
- 136 - Conservation of Biological Diversity
- 202 - Plant Genetic Resources
- 205 - Plant Management Systems
- 211 - Insects, Mites, and Other Arthropods Affecting Plants
- 212 - Pathogens and Nematodes Affecting Plants
- 216 - Integrated Pest Management Systems

- 302 - Nutrient Utilization in Animals
- 303 - Genetic Improvement of Animals
- 304 - Animal Genome
- 311 - Animal Diseases
- 402 - Engineering Systems and Equipment
- 403 - Waste Disposal, Recycling, and Reuse
- 502 - New and Improved Food Products
- 601 - Economics of Agricultural Production and Farm Management
- 802 - Human Development and Family Well-Being

Outcome #2

1. Outcome Measures

- Not Reporting on this Outcome Measure

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
- Change in Action Outcome Measure
- Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	0	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Farmers and producers need to have new and genetically improved plant varieties and animal stocks or aquaculture brood stocks to be competitive.

What has been done

New plant varieties are being selected, and animal and aquaculture brood stocks are also being selected. In particular, new varieties of kiwi fruit and chestnut were developed. These include the development of five kiwi fruit varieties: 'Au Fitzgerald' kiwi, 'Au Authur' kiwi, 'AU Golden Tiger' 'AU Golden Sunshine', and 'AU Golden Dragon' kiwis. One variety of chestnut 'Buck IV' Chestnut was also developed. Patents have been issued for 'Au Fitzgerald' kiwi and 'Au Authur' kiwi and the 'Buck IV' Chestnut.

Results

The Alabama Agricultural Experiment Station has released a hardy new sericea lespedeza cultivar that lends itself to multiple uses, including as a top-quality ground cover for rights of way, embankments and golf-course roughs and as living mulch for vegetable and possibly other crops. The cultivar, AU Pixie, is a perennial warm-season legume that has an attractive cascading appearance, is drought tolerant and can grow in soils with low acidity and fertility levels. This variety was developed by Dr. Jorge Mosjidis, a professor at Auburn University's agronomy and soils department.

AU Pixie has a wide range of applications. The new cultivar adapts to a wide range of soil types and can be grown throughout Alabama and in other regions where sericea lespedeza is commonly grown. As is the case with other sericea lespedeza varieties, AU Pixie helps protect soil from erosion, adds organic matter and nitrogen to the soil and is rarely affected by disease or insects.

Those qualities contribute to its value as living mulch. AU Pixie is the eighth improved sericea lespedeza cultivar the AAES has released since its first, Serala, in 1962. The most recent before AU Pixie was the 1997 release of AU Grazer, the first grazing-tolerant sericea lespedeza. New plant varieties are being selected, and animal and aquaculture brood stocks are also being selected. In particular, new varieties of kiwi fruit and chestnut were developed. These include the development of five kiwi fruit varieties: 'Au Fitzgerald' kiwi, 'Au Authur' kiwi, 'AU Golden Tiger' 'AU Golden Sunshine', and 'AU Golden Dragon' kiwis. One variety of chestnut 'Buck IV' Chestnut was also developed. Patents have been issued for 'Au Fitzgerald' kiwi and 'Au Authur' kiwi and the 'Buck IV' Chestnut.

4. Associated Knowledge Areas

- 111 - Conservation and Efficient Use of Water
- 112 - Watershed Protection and Management
- 122 - Management and Control of Forest and Range Fires
- 132 - Weather and Climate
- 133 - Pollution Prevention and Mitigation
- 136 - Conservation of Biological Diversity
- 202 - Plant Genetic Resources
- 205 - Plant Management Systems
- 211 - Insects, Mites, and Other Arthropods Affecting Plants
- 212 - Pathogens and Nematodes Affecting Plants
- 216 - Integrated Pest Management Systems
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- 303 - Genetic Improvement of Animals
- 304 - Animal Genome
- 311 - Animal Diseases
- 402 - Engineering Systems and Equipment
- 403 - Waste Disposal, Recycling, and Reuse
- 502 - New and Improved Food Products
- 601 - Economics of Agricultural Production and Farm Management

- 802 - Human Development and Family Well-Being

Outcome #3

1. Outcome Measures

- Not Reporting on this Outcome Measure

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

2. Associated Institution Types

- 1862 Research
- 1890 Research

3a. Outcome Type:

- Change in Knowledge Outcome Measure
- Change in Action Outcome Measure
- Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	0	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Diseases of plants and animals cause large economic losses and they are the most prominent issue in production agriculture. Therefore, plant pathological research needs to be conducted to control and manage plant diseases. With animals, diseases issues are very significant. In particular, animal disease issues are specific to each animal groups and specific strategies need to be developed for cattle, goat, swine, poultry, and aquaculture species.

Plant and animal diseases can result in high production costs and loss of income to the producers. For instance, the control of internal parasites of animals by use of chemical drugs can be expensive and also result in the parasites developing resistance to the drugs.

What has been done

With plants, molecular research was conducted to explain the basic methods of infection of two important plant pathogenic bacteria: *Xylella fastidiosa* (Xf) and *Acidovorax citrulli* (Ac). We are also identifying variations in populations of Xf in the US, particularly in molecules used as the arsenal to cause infection in the plant. The knowledge from our research will have an impact in designing control methods to mitigate the losses caused by the phytopathogenic bacteria studied here.

Our studies included applied and basic research in plant virology. The knowledge gained from our projects was shared through scientific publications and presentations at regional and national meetings. Journal publications provide an avenue to other scientists in numerous disciplines such as plant pathology, entomology, horticulture, agronomy and other related fields. The opportunity to present our findings at meetings provides a more personal touch to sharing our findings.

Meeting attendees can discuss our findings in person, often on a one-on-one basis. Meetings also allow us to share our data to large groups that may include growers and individuals involved in sales of agricultural products.

Commercial crude bioglycerin and biodiesel can be used to prepare formulations with broadspectrum activities against most weeds and soilborne pathogens. The technology involved is simple and relatively easy to implement to develop products for use by our producers. For cattle heads, the epidemiology of bovine viral diarrhea, bovine trichomoniasis, and bovine anaplasmosis in Alabama was surveyed. A total of 68 herds were notified of the Alabama bovine anaplasmosis seroprevalence survey results, and many herd owners requested further consultation and diagnostic testing for anaplasmosis. The BVDV-exposed group weaned 29 calves, and the non-exposed control group weaned 30 calves. No calves were persistently infected with BVDV as determined by immunohistochemistry and antigen capture ELISA of ear notch skin biopsies. No health differences were observed in either group of calves pre- or post-weaning. Comparisons are currently being made between the two groups regarding several economically important measures of livestock production efficiency including pregnancy rate, percent calf crop, 205-day adjusted weaning weights, and calf weights 45 days post-weaning. Feeding technologies were developed to control internal parasites in goats using pine barks in the animal feed.

Results

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Our studies included applied and basic research in plant virology. The knowledge gained from our projects was shared through scientific publications and presentations at regional and national meetings. Journal publications provide an avenue to other scientists in numerous disciplines such as plant pathology, entomology, horticulture, agronomy and other related fields. The opportunity to present our findings at meetings provides a more personal touch to sharing our findings. Meeting attendees can discuss our findings in person, often on a one-on-one basis. Meetings also allow us to share our data to large groups that may include growers and individuals involved in sales of agricultural products.

Commercial crude bioglycerin and biodiesel can be used to prepare formulations with broadspectrum activities against most weeds and soilborne pathogens. The technology involved is simple and relatively easy to implement to develop products for use by our producers. For cattle heads, the epidemiology of bovine viral diarrhea, bovine trichomoniasis, and bovine anaplasmosis in Alabama was surveyed. A total of 68 herds were notified of the Alabama bovine anaplasmosis seroprevalence survey results, and many herd owners requested further consultation and diagnostic testing for anaplasmosis. The BVDV-exposed group weaned 29 calves, and the non-exposed control group weaned 30 calves. No calves were persistently infected with BVDV as determined by immunohistochemistry and antigen capture ELISA of ear notch skin biopsies. No health differences were observed in either group of calves pre- or post-weaning. Comparisons are currently being made between the two groups regarding several economically important measures of livestock production efficiency including pregnancy rate, percent calf crop, 205-day adjusted weaning weights, and calf weights 45 days post-weaning. With poultry species, research was conducted to control emerging and re-emerging poultry diseases. Wild ducks carry AIVs and orthomyxoviruses in Florida. Water fowl should be tested for the viruses. 2) ILTV vaccines are wide spread in Alabama and Georgia, causing a mild form of ILTV. New management techniques should be done to eliminate the reservoir viruses from rodents, beetles, and drinking waterers. A new RT-PCR and loop-mediated isothermal

amplification assay (LAMP) were developed and found to be specific, sensitive, and reproducible for ILTV detection. 3) Immunodeficiency caused by ubiquitous immunosuppressive viruses can have an effect on evolution and persistence of respiratory viruses in flocks. 4) We have developed new AIV vaccines, which could be farther developed for use in controlling AIV in chickens. Significant reduction in internal parasite infection was achieved when goats were fed with feed containing up to 25% pine barks. This sustainable technology can save farmers money by reducing cost of production as well as loss of animals through internal parasite infection. A patent application has been submitted.

4. Associated Knowledge Areas

- 111 - Conservation and Efficient Use of Water
- 112 - Watershed Protection and Management
- 122 - Management and Control of Forest and Range Fires
- 132 - Weather and Climate
- 133 - Pollution Prevention and Mitigation
- 136 - Conservation of Biological Diversity
- 202 - Plant Genetic Resources
- 205 - Plant Management Systems
- 211 - Insects, Mites, and Other Arthropods Affecting Plants
- 212 - Pathogens and Nematodes Affecting Plants
- 216 - Integrated Pest Management Systems
- 302 - Nutrient Utilization in Animals
- 303 - Genetic Improvement of Animals
- 304 - Animal Genome
- 311 - Animal Diseases
- 402 - Engineering Systems and Equipment
- 403 - Waste Disposal, Recycling, and Reuse
- 502 - New and Improved Food Products
- 601 - Economics of Agricultural Production and Farm Management
- 802 - Human Development and Family Well-Being

Outcome #4

1. Outcome Measures

- Not Reporting on this Outcome Measure

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
- Change in Action Outcome Measure
- Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	0	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

The agricultural industries have been under fierce international competition. Economic sustainabilities were a major issue. Many farmers started to lose money because of high input costs. For instance, animal feed price was at almost record high levels in 2010. Therefore, technologies need to be developed, applied, and new approaches to farming and organization strategies need to be implemented.

What has been done

New technologies have been developed, best agricultural practices been developed and recommended for agricultural industrial uses. System approach was used to enhance profitability. For instance, pond to plate project was conducted to enable the catfish industry to have a profit margin wide enough to sustain the industry. Similarly, farm to folk project was conducted to sustain poultry industry.

Results

Hybrid catfish produced by crossing of channel catfish with blue catfish has generated really exciting results. The application of this technology alone, can revolutionize the catfish industry. A farm to folk system approach was adopted in poultry industry to enhance productivity, to reduce costs, and to enhance profitability, as well as to enhance food safety. Infrared camera technology was adopted by poultry industry to ensure efficient energy use in chicken houses. This technology alone, could save farmers millions of dollars.

4. Associated Knowledge Areas

- 111 - Conservation and Efficient Use of Water
- 112 - Watershed Protection and Management
- 122 - Management and Control of Forest and Range Fires
- 132 - Weather and Climate
- 133 - Pollution Prevention and Mitigation
- 136 - Conservation of Biological Diversity
- 202 - Plant Genetic Resources

- 205 - Plant Management Systems
- 211 - Insects, Mites, and Other Arthropods Affecting Plants
- 212 - Pathogens and Nematodes Affecting Plants
- 216 - Integrated Pest Management Systems
- 302 - Nutrient Utilization in Animals
- 303 - Genetic Improvement of Animals
- 304 - Animal Genome
- 311 - Animal Diseases
- 402 - Engineering Systems and Equipment
- 403 - Waste Disposal, Recycling, and Reuse
- 502 - New and Improved Food Products
- 601 - Economics of Agricultural Production and Farm Management
- 802 - Human Development and Family Well-Being

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.)
- Other

Brief Explanation

Last year was a dry year following a very wet year in 2009. Also, in 2009, much rain in the Fall prevented harvest of soybeans and cotton from the fields that led to huge economic losses. The dry cycle of the climate has led to difficulties for the cattle industry.

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

(OPTIONAL SECTION)

1. Evaluation Studies Planned

- After Only (post program)
- Retrospective (post program)
- Before-After (before and after program)

- During (during program)
- Time series (multiple points before and after program)
- Case Study
- Comparisons between program participants (individuals, group, organizations) and non-participants
- Comparisons between different groups of individuals or program participants experiencing different levels of program intensity.
- Comparison between locales where the program operates and sites without program intervention
- Other

Evaluation Results

Good progress was made in 2010. As agriculture in Alabama is adapting to global competition and changes due to bioenergy and climate change issues, research focus has been shifted to development of best agricultural practices.

Key Items of Evaluation

Research in this program focused on development of best agricultural practices including utilization of superior genetic stocks and varieties, rotation, irrigation, precision agriculture, and non-tillage farming. For instance, we have developed new varieties of several specialty crops such as chestnuts, Satsuma mandarin, and kiwi fruits. Testing the performance of these new specialty crops are under way, and their utilization is expected to have a major economic impact. Rotation methods have been developed. For instance, rotation with Sunn hemp can have a major effect on reduction of nematode for other crops.

Increases in animal feed prices has forced the farmers to re-evaluate the "best agricultural practices" so they are profitable.

V(A). Planned Program (Summary)

Program # 2

1. Name of the Planned Program

Food Safety

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			10%	25%
702	Requirements and Function of Nutrients and Other Food Components			10%	20%
703	Nutrition Education and Behavior			20%	20%
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources			30%	12%
721	Insects and Other Pests Affecting Humans			10%	0%
724	Healthy Lifestyle			20%	23%
	Total			100%	100%

Add knowledge area

V(C). Planned Program (Inputs)

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

Year: 2010	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	0.0	12.7	10.0
Actual	0.0	0.0	12.7	10.0

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	600000	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	600000	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	299315
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	0	299315
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	452281
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	0	452281
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

Research was conducted to determine nutrition and health relationships. Alabama is the second most obese states in the nation, and much of this condition could be because of food choices and lifestyle. Research was conducted to evaluate lifestyle habits (food choice, exercise, etc.) of citizens, evaluation of underlying reasons for these habits, program development for improvement, and measuring adoption of improved diets and activity levels.

Research is also being conducted to produce healthier and safe food such as fruits and vegetables. In the area of food safety, technologies were developed for rapid detection of food borne diseases, and non-biological contaminants such as antibiotics, pesticides, PAHs, heavy metals, etc.

Databases were established to secure agriculture and food in the face of bioterrorism. Such efforts focus on infectious agents of human diseases, but also include infectious diseases of animals and plants, including those of aquatic animals.

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

2. Brief description of the target audience

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

V(E). Planned Program (Outputs)

1. Standard output measures

2010	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Plan	2000	18000	3000	7000
Actual	2000	18000	3000	7000

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

Patent Applications Submitted

Year: 2010

Plan: 1

Actual: 2

Patents listed

RNA-based Sensor for the Detection of Chemical and Biological Substances
 Expression of tobacco osmotin in Escherichia coli for biocidal activity and medical application

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2010	Extension	Research	Total
Plan	0	10	

Actual	0	21	21
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V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- publications

Not reporting on this Output for this Annual Report

Year	Target	Actual
2010	10	21

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

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. (Short-term outcome)
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)

Add Cross-cutting Outcome/Impact Statement or Unintended or Previously Unknown Outcome Measure

Outcome #1

1. Outcome Measures

Not Reporting on this Outcome Measure

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. (Short-term outcome)

2. Associated Institution Types

- 1862 Research
- 1890 Research

3a. Outcome Type:

- Change in Knowledge Outcome Measure
- Change in Action Outcome Measure
- Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	0	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Food safety related incidents cause serious public health problems and cause huge economic losses. Any recalls of food products lead to huge economic losses. In the serious cases, food poison causes human fatalities, and therefore, the public is highly interested in this issue.

What has been done

Research was conducted to develop rapid detection technologies;
Training and education sessions were conducted to disseminate knowledge, information, and technologies.

Results

Method of food safety detection have been developed;
Sensitive sensor-based technology have been developed.
Various food safety issues have been addressed through training and educational sessions. For instance, seafood evaluations found that unsaturated fatty acids are beneficial to human health; however, mercury contamination of seafood reduced this benefit. Research results was used to make a balanced recommendation of seafood consumption.
Alabama has one of the highest rates of obesity in the United States, and obesity is associated with increased risk of many other diseases. Identification of dietary patterns in other vulnerable populations such as the elderly and food insecurity will assist in the development of evidence-based dietary recommendations specifically for these groups. Several new findings resulted from the studies conducted this past year are being used to develop intervention strategies to help college students avoid unhealthy changes in body weight,

shape, and composition. Findings were also used to develop healthy food choices and activities for Head Start program providers, students and parents to reduce childhood obesity. Successful strategies for a worksite weight loss program have been developed. Such research results were used by practicing dietitians for dietary and physical activity recommendations for weight loss in obese older adults that minimize the likelihood of adverse effects on nutritional status.

4. Associated Knowledge Areas

- 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
- 721 - Insects and Other Pests Affecting Humans
- 724 - Healthy Lifestyle

Outcome #2

1. Outcome Measures

- Not Reporting on this Outcome Measure

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

2. Associated Institution Types

- 1862 Research
- 1890 Research

3a. Outcome Type:

- Change in Knowledge Outcome Measure
- Change in Action Outcome Measure
- Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	1	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Technology is lacking to rapidly detect biological contaminants in food. Therefore, new technologies need to be developed to detect foodborne biological and abiotic contaminants. The public care about these technologies.

What has been done

PCR-based technologies have been developed to detect bacterial contaminations, to differentiate species of seafood in order to protect consumer's interest.

Results

New methodologies have been developed to rapidly detect bacterial contaminations; Barcoding methods have been developed to differentiate seafood species, particularly catfish species.

RNA-based detection technologies have been developed and patent application has been submitted.

4. Associated Knowledge Areas

- 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
- 721 - Insects and Other Pests Affecting Humans
- 724 - Healthy Lifestyle

Outcome #3

1. Outcome Measures

- Not Reporting on this Outcome Measure

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

2. Associated Institution Types

- 1862 Research
- 1890 Research

3a. Outcome Type:

- Change in Knowledge Outcome Measure
- Change in Action Outcome Measure
- Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	30	30

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Next generation of professionals with knowledge and training in food safety are needed.

What has been done

Through research, food safety professionals including technical staff and graduate students, postdoctoral fellows are trained.

Results

Food safety professionals are trained and generated from the universities to work in the area of food safety and food biosecurity.

4. Associated Knowledge Areas

- 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
- 721 - Insects and Other Pests Affecting Humans
- 724 - Healthy Lifestyle

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.)
- Other ()

Brief Explanation

The economic crisis has had an negative impact on this program.

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

(OPTIONAL SECTION)

1. Evaluation Studies Planned

- After Only (post program)
- Retrospective (post program)
- Before-After (before and after program)
- During (during program)
- Time series (multiple points before and after program)
- Case Study
- Comparisons between program participants (individuals, group, organizations) and non-

participants

- Comparisons between different groups of individuals or program participants experiencing different levels of program intensity.
- Comparison between locales where the program operates and sites without program intervention
- Other

Evaluation Results

Good progress was made in the areas of food safety, nutrition and wellbeing, obesity, and agricultural biosecurity.

Key Items of Evaluation

Alabama has initiated statewide efforts in fighting off obesity. Alabama Agricultural Research Program joined the effort and are a major research force for the studies of nutrition and childhood obesity.

Auburn University established an AU Food Safety Initiative that intends to become a national hub in food safety.

The AU Food Safety Initiative is focused on development of food safety detection technologies, food safety testing, training, and education. This initiative has led to the establish of a Center or Institute of Food Systems, a structure that is broadened from the original focus of food safety. A director was just nominated recently.

V(A). Planned Program (Summary)

Program # 3

1. Name of the Planned Program

Sustaining Environment, Ecosystems, and Natural Resources

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			10%	10%
111	Conservation and Efficient Use of Water			10%	10%
112	Watershed Protection and Management			20%	20%
125	Agroforestry			5%	5%
132	Weather and Climate			5%	5%
133	Pollution Prevention and Mitigation			5%	5%
135	Aquatic and Terrestrial Wildlife			5%	5%
141	Air Resource Protection and Management			5%	5%
216	Integrated Pest Management Systems			5%	5%
306	Environmental Stress in Animals			5%	5%
403	Waste Disposal, Recycling, and Reuse			10%	10%
405	Drainage and Irrigation Systems and Facilities			5%	5%
610	Domestic Policy Analysis			5%	5%
	Total			100%	100%

Add knowledge area

V(C). Planned Program (Inputs)

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

Year: 2010	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	0.0	22.1	12.0
Actual	0.0	0.0	22.1	12.0

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	1200000	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	1200000	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	392502
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	0	392502
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	190993
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	0	190993
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

Research was conducted to develop better ways of: managing agricultural wastes; promoting agro-tourism; and analyzing land and water use patterns and resources. Research results are shared with extension personnel for further dissemination, particularly to county agents, producers, industry leaders, policy-makers, citizens, and related federal agency personnel. Additional dissemination of results are through direct contact (such as demonstrations and community 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 faith-based groups.

Research was conducted to characterize the digestive utilization ozone-exposed forage by ruminant; precision agriculture practices were developed with Management Approaches Toward Environmental Stewardship for Alabama; research was conducted to develop Systems for Controlling Air Pollutant Emissions and Indoor Environments of Poultry, Swine, and Dairy Facilities; Horticultural Production Practices were developed for Carbon Sequestration and reduce Greenhouse Gas Emission Reduction.

2. Brief description of the target audience

Producers, industry leaders, policy-makers, citizens, and related federal agency personnel.

V(E). Planned Program (Outputs)

1. Standard output measures

2010	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Plan	1200	9000	300	900
Actual	1200	9000	500	1200

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

Patent Applications Submitted

Year: 2010
 Plan: 0
 Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2010	Extension	Research	Total
Plan	0	50	
Actual	0	60	60

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- publications

Not reporting on this Output for this Annual Report

Year	Target	Actual
2010	50	60

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Estimated tourism receipts = \$7.6 billion in 2005. Success of this program will result in maintenance or increase in revenue (medium term outcome).
2	Fish consumption advisories in sampled waters = 26 instances in 2004 (ADEM water board). Success of this program will result in decline of water contaminants that accumulate in fish, and consumption advisories will also subsequently decline. (Long-term outcome)
3	Incidence of ground water contamination of ~ 5000 sampled sites = 20% in 2002-2003. Success of this program will result in a decline of contaminant incidence (medium term outcome).

Add Cross-cutting Outcome/Impact Statement or Unintended or Previously Unknown Outcome Measure

Outcome #1

1. Outcome Measures

- Not Reporting on this Outcome Measure

Estimated tourism receipts = \$7.6 billion in 2005. Success of this program will result in maintenance or increase in revenue (medium term outcome).

2. Associated Institution Types

- 1862 Research
 1890 Research

3a. Outcome Type:

- Change in Knowledge Outcome Measure
 Change in Action Outcome Measure
 Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	0	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

The citizens care about agricultural practices and their impact on environment. In particular, how to reduce waste, reduce carbon emission is important in relation to climate change.

What has been done

Precision agricultural practices were developed that significantly enhances agricultural productivity while minimizing environmental impact.

Results

Precision agricultural practices were developed that significantly enhances agricultural productivity while minimizing environmental impact. John Fulton, Auburn biosystems engineering associate professor and precision ag specialist, said the estimated 50 percent of farmers across the state who have adopted at least one precision farming technology or site-specific management strategy saved an estimated \$10 million on crop inputs in 2009 and saw their overall return increase anywhere from \$2 to \$8 per acre.

Producers who incorporated variable-rate technology, guidance systems, automatic section controls and other precision ag tools into their operations also reported significant savings in time and labor due to the improved efficiency the technologies provide.

In addition to enhancing farmers' bottom lines, precision agriculture also is allowing these producers to farm in more environmentally sustainable ways. They have reduced the overall amount of pesticides and nutrients they apply to cropland and pastures by an average of 10 percent. Precision farming means inputs can be applied when and where they are needed, which can mean fewer trips across fields along with less soil compaction and risk of erosion and chemical runoff into surface water. Precision agriculture is an ever-evolving approach to farming

in which producers use GPS, aerial images and geographic information systems software as well as sensors installed on farm machinery to gather detailed data about how soil fertility, terrain, weed populations, crop yields and other conditions affecting crop growth vary within a given field.

4. Associated Knowledge Areas

- 101 - Appraisal of Soil Resources
- 102 - Soil, Plant, Water, Nutrient Relationships
- 111 - Conservation and Efficient Use of Water
- 112 - Watershed Protection and Management
- 125 - Agroforestry
- 132 - Weather and Climate
- 133 - Pollution Prevention and Mitigation
- 135 - Aquatic and Terrestrial Wildlife
- 141 - Air Resource Protection and Management
- 216 - Integrated Pest Management Systems
- 306 - Environmental Stress in Animals
- 403 - Waste Disposal, Recycling, and Reuse
- 405 - Drainage and Irrigation Systems and Facilities
- 610 - Domestic Policy Analysis

Outcome #2

1. Outcome Measures

- Not Reporting on this Outcome Measure

Fish consumption advisories in sampled waters = 26 instances in 2004 (ADEM water board). Success of this program will result in decline of water contaminants that accumulate in fish, and consumption advisories will also subsequently decline. (Long-term outcome)

2. Associated Institution Types

- 1862 Research
- 1890 Research

3a. Outcome Type:

- Change in Knowledge Outcome Measure
- Change in Action Outcome Measure
- Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	24	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Environmental pollutions cause major economic losses. On the cost and places close to the watershed, environmental pollution causes fish consumption advisories in sample waters. Research need to be conducted to monitor environmental pollutions.

What has been done

Research was conducted to prevent and reduce environmental impact of agricultural activities.

Results

Fish consumption advisories were significantly down in recent years.

4. Associated Knowledge Areas

- 101 - Appraisal of Soil Resources
- 102 - Soil, Plant, Water, Nutrient Relationships
- 111 - Conservation and Efficient Use of Water
- 112 - Watershed Protection and Management
- 125 - Agroforestry
- 132 - Weather and Climate
- 133 - Pollution Prevention and Mitigation
- 135 - Aquatic and Terrestrial Wildlife
- 141 - Air Resource Protection and Management
- 216 - Integrated Pest Management Systems
- 306 - Environmental Stress in Animals
- 403 - Waste Disposal, Recycling, and Reuse
- 405 - Drainage and Irrigation Systems and Facilities
- 610 - Domestic Policy Analysis

Outcome #3

1. Outcome Measures

- Not Reporting on this Outcome Measure

Incidence of ground water contamination of ~ 5000 sampled sites = 20% in 2002-2003. Success of this program will result in a decline of contaminant incidence (medium term outcome).

2. Associated Institution Types

- 1862 Research

- 1890 Research

3a. Outcome Type:

- Change in Knowledge Outcome Measure
- Change in Action Outcome Measure
- Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	0	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

- 101 - Appraisal of Soil Resources
- 102 - Soil, Plant, Water, Nutrient Relationships
- 111 - Conservation and Efficient Use of Water
- 112 - Watershed Protection and Management
- 125 - Agroforestry
- 132 - Weather and Climate
- 133 - Pollution Prevention and Mitigation
- 135 - Aquatic and Terrestrial Wildlife
- 141 - Air Resource Protection and Management
- 216 - Integrated Pest Management Systems
- 306 - Environmental Stress in Animals
- 403 - Waste Disposal, Recycling, and Reuse
- 405 - Drainage and Irrigation Systems and Facilities
- 610 - Domestic Policy Analysis

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.)
- Other

Brief Explanation

The economic crisis has had a negative impact on this program.
Natural forces can have a fundamental impact on environment and climate change that are well beyond human control.

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

(OPTIONAL SECTION)

1. Evaluation Studies Planned

- After Only (post program)
- Retrospective (post program)
- Before-After (before and after program)
- During (during program)
- Time series (multiple points before and after program)
- Case Study
- Comparisons between program participants (individuals, group, organizations) and non-participants
- Comparisons between different groups of individuals or program participants experiencing different levels of program intensity.
- Comparison between locales where the program operates and sites without program intervention
- Other

Evaluation Results

Good progress has been made in the areas of environmental studies, natural resource conservation and utilization, and climate change.

Key Items of Evaluation

Water research is a leading research area in Alabama under this program. Water use and reuse, quantity and quality issues are becoming more and more important. The Water Resources Center at Auburn University is a hub of water research. Alabama Water Watch Program has been recognized by EPA to be a role model for the nation. The outreach programs of Alabama Water Watch have established similar Water Watch programs around the world.

Precision agriculture research has generated significant economic impact for the state.

In 2010, the Gulf Oil Spill had a major impact on the region's economy. The policy makers are facing a great delima: One the one hand, we need to be aware of the environmental and ecological impact of the oil spill and stress the need for research; on the other hand, we need to encourage the public to come to the Gulf of Mexico beaches to spend their time here. This is a very difficult situation, and governmental research need to be enhanced to study the impact of the oil spill.

V(A). Planned Program (Summary)

Program # 4

1. Name of the Planned Program

Bioenergy and Bio-based Economy

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
202	Plant Genetic Resources			5%	5%
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants			20%	20%
205	Plant Management Systems			20%	20%
212	Pathogens and Nematodes Affecting Plants			10%	10%
216	Integrated Pest Management Systems			10%	10%
402	Engineering Systems and Equipment			15%	15%
403	Waste Disposal, Recycling, and Reuse			5%	5%
601	Economics of Agricultural Production and Farm Management			5%	5%
605	Natural Resource and Environmental Economics			5%	5%
607	Consumer Economics			5%	5%
	Total			100%	100%

Add knowledge area

V(C). Planned Program (Inputs)

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

Year: 2010	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	0.0	8.0	9.0
Actual	0.0	0.0	8.0	9.0

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	400000	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	400000	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	200000
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	0	200000
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	200000
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	0	200000
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

Research was conducted to assess: the productivity of different plant crops, alternative crops and forest such as switchgrasses, poplars trees, pine trees as well as algae for the production of biomass;

Research was conducted to develop the best production practices that influence the yield and production duration of these plants or algae, genetic or physiological improvements of such crops through breeding or biotechnology, and impact of bio-energy crops on agriculture in a broad spectrum of issues such as rotation, irrigation, water requirements, production and processing, environmental, economic, and social impact;

Research was conducted for the development of technologies for efficient conversion of cellulose-based bio-energy; development of technologies for utilization of by-products and waste from bio-energy processing.

2. Brief description of the target audience

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

V(E). Planned Program (Outputs)

1. Standard output measures

2010	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Plan	1000	30000	1000	3000
Actual	1500	40000	2000	3000

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

Patent Applications Submitted

Year: 2010
 Plan: 0
 Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2010	Extension	Research	Total
Plan	0	15	
Actual	0	15	15

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Development of bioenergy crops, best practices for such bioenergy crops

Not reporting on this Output for this Annual Report

Year	Target	Actual
2010	{No Data Entered}	0

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Development of technology for production of bioenergy crops or algae leading to the increase of yields (ton per acre per year)
2	Publications
3	Increased acreage of bioenergy crops such as corn, switchgrasses, sweetpotatoes, and canola.
4	Increased percentage of bioenergy in the overall consumption of energy

Add Cross-cutting Outcome/Impact Statement or Unintended or Previously Unknown Outcome Measure

Outcome #1

1. Outcome Measures

- Not Reporting on this Outcome Measure

Development of technology for production of bioenergy crops or algae leading to the increase of yields (ton per acre per year)

2. Associated Institution Types

- 1862 Research
 1890 Research

3a. Outcome Type:

- Change in Knowledge Outcome Measure
 Change in Action Outcome Measure
 Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	8	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Bioenergy crops need to be identified, evaluated, and tested for their productivity.

What has been done

A number of bioenergy crops have been evaluated for their potential as substrate for bioenergy production.

Results

A number of bioenergy crops have been evaluated for their potential as substrate for bioenergy production. Switchgrasses are particularly valuable. Alabama has a high acreage of coverage by pine trees. Evaluation of pine trees and substrates was also conducted.

4. Associated Knowledge Areas

- 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

- 403 - Waste Disposal, Recycling, and Reuse
- 601 - Economics of Agricultural Production and Farm Management
- 605 - Natural Resource and Environmental Economics
- 607 - Consumer Economics

Outcome #2

1. Outcome Measures

- Not Reporting on this Outcome Measure
Publications

2. Associated Institution Types

- 1862 Research
- 1890 Research

3a. Outcome Type:

- Change in Knowledge Outcome Measure
- Change in Action Outcome Measure
- Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	12	10

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Scientific knowledge and know-hows need to be made available through scientific publications.

What has been done

Publications were made to report the research results.

Results

A total of 10 publications were produced in bioenergy area.

4. Associated Knowledge Areas

- 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
- 403 - Waste Disposal, Recycling, and Reuse
- 601 - Economics of Agricultural Production and Farm Management
- 605 - Natural Resource and Environmental Economics
- 607 - Consumer Economics

Outcome #3

1. Outcome Measures

- Not Reporting on this Outcome Measure

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

2. Associated Institution Types

- 1862 Research
- 1890 Research

3a. Outcome Type:

- Change in Knowledge Outcome Measure
- Change in Action Outcome Measure
- Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	100	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

- 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

- 403 - Waste Disposal, Recycling, and Reuse
- 601 - Economics of Agricultural Production and Farm Management
- 605 - Natural Resource and Environmental Economics
- 607 - Consumer Economics

Outcome #4

1. Outcome Measures

- Not Reporting on this Outcome Measure

Increased percentage of bioenergy in the overall consumption of energy

2. Associated Institution Types

- 1862 Research
- 1890 Research

3a. Outcome Type:

- Change in Knowledge Outcome Measure
- Change in Action Outcome Measure
- Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	2	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

- 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
- 403 - Waste Disposal, Recycling, and Reuse
- 601 - Economics of Agricultural Production and Farm Management

- 605 - Natural Resource and Environmental Economics
- 607 - Consumer Economics

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.)
- Other

Brief Explanation

Climate and funding can significantly affect the outcome of bioenergy research. Gas prices can also significantly affect the outcomes.

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

(OPTIONAL SECTION)

1. Evaluation Studies Planned

- After Only (post program)
- Retrospective (post program)
- Before-After (before and after program)
- During (during program)
- Time series (multiple points before and after program)
- Case Study
- Comparisons between program participants (individuals, group, organizations) and non-participants
- Comparisons between different groups of individuals or program participants experiencing different levels of program intensity.
- Comparison between locales where the program operates and sites without program intervention
- Other

Evaluation Results

Good progress was made, but major research funding is needed to make a difference.

Key Items of Evaluation

NIFA's approach of funding Bioenergy research has changed drastically with very large societal challenges grant still under consideration. Obviously, whoever receive the funding can continue the research. However, many others who are not successful in funding may no longer be able to continue research activities without funding.

V(A). Planned Program (Summary)

Program # 5

1. Name of the Planned Program

Agricultural Genomics and Other Basic Agricultural Research

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
201	Plant Genome, Genetics, and Genetic Mechanisms			10%	30%
202	Plant Genetic Resources			10%	30%
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants			10%	10%
303	Genetic Improvement of Animals			20%	20%
304	Animal Genome			30%	10%
311	Animal Diseases			20%	0%
	Total			100%	100%

Add knowledge area

V(C). Planned Program (Inputs)

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

Year: 2010	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	0.0	10.0	6.0
Actual	0.0	0.0	10.0	6.0

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	450000	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	450000	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	370110
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	0	370110
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	217782
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	0	217782
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

Research was conducted to determine structure, organization, and expression of genomes of various plant and animal species. Particular focus species include beef cattle, catfish, watermelon, peanut, sweet potatoes, and cotton. Molecular markers of various kinds will be developed, mapped, and association studies will be conducted to link molecular markers with performance traits. Genetic, physical, and haplotype maps will be constructed to fully understand genome structure, evolution, expression, and function. Micro-RNA transcriptome was characterized from cotton. Catfish genome was sequenced.

2. Brief description of the target audience

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

V(E). Planned Program (Outputs)

1. Standard output measures

2010	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Plan	1000	30000	1000	3000
Actual	1000	30000	1000	3000

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

Patent Applications Submitted

Year: 2010
 Plan: 0
 Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2010	Extension	Research	Total
Plan	0	10	
Actual	0	20	20

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Publications
- Not reporting on this Output for this Annual Report

Year	Target	Actual
2010	10	20

Output #2

Output Measure

- Development of molecular markers
- Not reporting on this Output for this Annual Report

Year	Target	Actual
2010	1000	200000

Output #3

Output Measure

- Increased genetic map resolution in the unit of centi-Morgans
- Not reporting on this Output for this Annual Report

Year	Target	Actual
2010	5	5

Output #4

Output Measure

- Identification of traits linked markers for marker-assisted selection
- Not reporting on this Output for this Annual Report

Year	Target	Actual
2010	2	0

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Development of molecular markers
2	Increased genetic map resolution in the unit of centi-Morgans
3	Identification of traits linked markers for marker-assisted selection
4	Discovery, characterization, and application of genes of agricultural relevance

Add Cross-cutting Outcome/Impact Statement or Unintended or Previously Unknown Outcome Measure

Outcome #1

1. Outcome Measures

Not Reporting on this Outcome Measure

Development of molecular markers

2. Associated Institution Types

1862 Research

1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

Change in Action Outcome Measure

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	1000	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Molecular markers are needed for the identification of species, varieties, populations, and also to linked them to performance traits for selection programs.

What has been done

Genome of catfish was sequenced, Micro-RNA was characterized from cotton, sweet potato genes were characterized.

Results

Many DNA markers were identified that can be used for the differentiation of species, varieties, lines, and strains. These markers are also useful for population studies and for selective breeding programs.

4. Associated Knowledge Areas

- 201 - Plant Genome, Genetics, and Genetic Mechanisms
- 202 - Plant Genetic Resources
- 203 - Plant Biological Efficiency and Abiotic Stresses Affecting Plants
- 303 - Genetic Improvement of Animals
- 304 - Animal Genome
- 311 - Animal Diseases

Outcome #2

1. Outcome Measures

Not Reporting on this Outcome Measure

Increased genetic map resolution in the unit of centi-Morgans

2. Associated Institution Types

1862 Research

1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

Change in Action Outcome Measure

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	5	5

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Linkage maps provide basis for geneticists to characterize the performance traits. Selective breeders need to know which chromosome harbors traits-related genes.

What has been done

Linkage maps were constructed for catfish.

Results

Detailed genetic linkagemap was constructed using BAC end sequences-associate microsatellite markers.

4. Associated Knowledge Areas

201 - Plant Genome, Genetics, and Genetic Mechanisms

202 - Plant Genetic Resources

203 - Plant Biological Efficiency and Abiotic Stresses Affecting Plants

303 - Genetic Improvement of Animals

304 - Animal Genome

311 - Animal Diseases

Outcome #3

1. Outcome Measures

Not Reporting on this Outcome Measure

Identification of traits linked markers for marker-assisted selection

2. Associated Institution Types

1862 Research

1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

Change in Action Outcome Measure

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	2	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Association of traits with DNA markers are the first step for genome-based selection programs.

What has been done

Research was conducted to develop single nucleotide polymorphism platforms to identify ytrait-associated markers.

Results

Single nucleotide polymorphisms have been identified for the construction of SNP chips that are useful for use in genome-based selection.

4. Associated Knowledge Areas

201 - Plant Genome, Genetics, and Genetic Mechanisms

202 - Plant Genetic Resources

203 - Plant Biological Efficiency and Abiotic Stresses Affecting Plants

303 - Genetic Improvement of Animals

304 - Animal Genome

311 - Animal Diseases

Outcome #4

1. Outcome Measures

Not Reporting on this Outcome Measure

Discovery, characterization, and application of genes of agricultural relevance

2. Associated Institution Types

1862 Research

1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

Change in Action Outcome Measure

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	20	50

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Agriculturally important genes are those affect traits. Their identification and characterization is the first steps for biotechnology applications.

What has been done

Many genes and gene families have been characterized, in particular, genes involved in the innate immune systems have been characterized to determine resistance and susceptibility-related genes.

Results

Innate immune genes and antimicrobial peptide genes have been identified, mostly from fish. These genes are important to understanding of disease resistance.

4. Associated Knowledge Areas

201 - Plant Genome, Genetics, and Genetic Mechanisms

202 - Plant Genetic Resources

203 - Plant Biological Efficiency and Abiotic Stresses Affecting Plants

303 - Genetic Improvement of Animals

304 - Animal Genome

311 - Animal Diseases

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.)
- Other

Brief Explanation

The economy really had some impact on the funding of the projects. Alabama agricultural research has been under funded.

USDA has reduced its funding for basic research, and significantly reduced its funding in animal genomics.

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

(OPTIONAL SECTION)

1. Evaluation Studies Planned

- After Only (post program)
- Retrospective (post program)
- Before-After (before and after program)
- During (during program)
- Time series (multiple points before and after program)
- Case Study
- Comparisons between program participants (individuals, group, organizations) and non-participants
- Comparisons between different groups of individuals or program participants experiencing different levels of program intensity.
- Comparison between locales where the program operates and sites without program intervention
- Other

Evaluation Results

In spite of low funding, good progress has been made in this area.

Key Items of Evaluation

Fundamental research is key to scientific understanding of agricultural problems. Plant and animal genome research need to be given the largest attention as possible. Government should be persistently push the cause to the fruition.

Aquaculture genome research at Auburn University is leading the nation in genomics research. Researchers at Auburn has made genetic linkage maps, physical maps, identified markers related to performance traits, and obtained funds for whole genome sequencing of catfish.

V(A). Planned Program (Summary)

Program # 6

1. Name of the Planned Program

Supporting and enhancing economic opportunities and self-empowerment for families and communities

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
123	Management and Sustainability of Forest Resources			5%	0%
134	Outdoor Recreation			10%	10%
802	Human Development and Family Well-Being			30%	30%
803	Sociological and Technological Change Affecting Individuals, Families, and Communities			25%	25%
804	Human Environmental Issues Concerning Apparel, Textiles, and Residential and Commercial Structures			0%	5%
805	Community Institutions, Health, and Social Services			20%	20%
806	Youth Development			10%	10%
	Total			100%	100%

Add knowledge area

V(C). Planned Program (Inputs)

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

Year: 2010	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	0.0	5.0	8.0
Actual	0.0	0.0	5.0	8.0

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	250000	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	250000	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	100000
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	0	100000
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	100000
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	0	100000
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

Research was conducted to assess: impact of technological and sociological changes on family and communities; impact of family interactions on success of youth; availability and accessibility of health and social services to rural families and communities. Research results are shared with extension personnel for further dissemination, particularly to community leaders and educators and through leadership training. Additional dissemination of results are through direct contact (such as at school and community meetings), 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. Brief description of the target audience

Extension personnel, community leaders, educators, 4H, youth centers.

V(E). Planned Program (Outputs)

1. Standard output measures

2010	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Plan	0	0	0	0
Actual	1000	5000	1000	5000

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

Patent Applications Submitted

Year: 2010
 Plan: 0
 Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2010	Extension	Research	Total
Plan	0	0	
Actual	0	12	12

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Publications

Not reporting on this Output for this Annual Report

Year	Target	Actual
2010	10	12

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	High school graduation rate (88.8% AL Dept. Educ. 2004-2005, from drop-out rate = 11.18%). Improvements in community and family integrity should increase this (medium term outcome).
2	Educational attainment (post secondary) (AL Dept Educ., Fall 2005, 55.8% of all high school graduates were enrolled in AL colleges). Success of this program should increase this (long-term outcome).
3	The number of small businesses should increase with success of this program. In 2001, US Bureau of Labor states that 229.7 (in thousands) 'non-employer' firms were existent in AL (medium term outcome).

Add Cross-cutting Outcome/Impact Statement or Unintended or Previously Unknown Outcome Measure

Outcome #1

1. Outcome Measures

- Not Reporting on this Outcome Measure

High school graduation rate (88.8% AL Dept. Educ. 2004-2005, from drop-out rate = 11.18%). Improvements in community and family integrity should increase this (medium term outcome).

2. Associated Institution Types

- 1862 Research
 1890 Research

3a. Outcome Type:

- Change in Knowledge Outcome Measure
 Change in Action Outcome Measure
 Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	89	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

- 123 - Management and Sustainability of Forest Resources
 134 - Outdoor Recreation
 802 - Human Development and Family Well-Being
 803 - Sociological and Technological Change Affecting Individuals, Families, and
 804 - Human Environmental Issues Concerning Apparel, Textiles, and Residential and
 805 - Community Institutions, Health, and Social Services
 806 - Youth Development

Outcome #2

1. Outcome Measures

- Not Reporting on this Outcome Measure

Educational attainment (post secondary) (AL Dept Educ., Fall 2005, 55.8% of all high school graduates were enrolled in AL colleges). Success of this program should increase this (long-term outcome).

2. Associated Institution Types

- 1862 Research
- 1890 Research

3a. Outcome Type:

- Change in Knowledge Outcome Measure
- Change in Action Outcome Measure
- Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	56	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

- 123 - Management and Sustainability of Forest Resources
- 134 - Outdoor Recreation
- 802 - Human Development and Family Well-Being
- 803 - Sociological and Technological Change Affecting Individuals, Families, and
- 804 - Human Environmental Issues Concerning Apparel, Textiles, and Residential and
- 805 - Community Institutions, Health, and Social Services
- 806 - Youth Development

Outcome #3

1. Outcome Measures

- Not Reporting on this Outcome Measure

The number of small businesses should increase with success of this program. In 2001, US Bureau of Labor states that 229.7 (in thousands) 'non-employer' firms were existent in AL (medium term outcome).

2. Associated Institution Types

- 1862 Research
 1890 Research

3a. Outcome Type:

- Change in Knowledge Outcome Measure
 Change in Action Outcome Measure
 Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	300	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

- 123 - Management and Sustainability of Forest Resources
 134 - Outdoor Recreation
 802 - Human Development and Family Well-Being
 803 - Sociological and Technological Change Affecting Individuals, Families, and
 804 - Human Environmental Issues Concerning Apparel, Textiles, and Residential and
 805 - Community Institutions, Health, and Social Services
 806 - Youth Development

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.)
- Other

Brief Explanation

The economic crisis had much impact on the outcomes of this research priority.

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

(OPTIONAL SECTION)

1. Evaluation Studies Planned

- After Only (post program)
- Retrospective (post program)
- Before-After (before and after program)
- During (during program)
- Time series (multiple points before and after program)
- Case Study
- Comparisons between program participants (individuals, group, organizations) and non-participants
- Comparisons between different groups of individuals or program participants experiencing different levels of program intensity.
- Comparison between locales where the program operates and sites without program intervention
- Other

Evaluation Results

Good progress have been made, but long term social impact can not be assessed at this time.

Key Items of Evaluation

Research funding is now very limited from NIFA. With the vast majority of AFRI funds committed to societal challenge areas, research funds for other priority areas was significantly reduced now.

V(A). Planned Program (Summary)

Program # 7

1. Name of the Planned Program

Industry-wide emerging issues

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
111	Conservation and Efficient Use of Water			1%	0%
112	Watershed Protection and Management			1%	0%
121	Management of Range Resources			1%	0%
131	Alternative Uses of Land			1%	0%
202	Plant Genetic Resources			1%	0%
206	Basic Plant Biology			1%	0%
211	Insects, Mites, and Other Arthropods Affecting Plants			1%	0%
212	Pathogens and Nematodes Affecting Plants			1%	0%
214	Vertebrates, Mollusks, and Other Pests Affecting Plants			1%	0%
215	Biological Control of Pests Affecting Plants			1%	0%
216	Integrated Pest Management Systems			1%	0%
302	Nutrient Utilization in Animals			30%	30%
303	Genetic Improvement of Animals			16%	20%
308	Improved Animal Products (Before Harvest)			10%	20%
402	Engineering Systems and Equipment			1%	0%
403	Waste Disposal, Recycling, and Reuse			1%	0%
601	Economics of Agricultural Production and Farm Management			30%	30%
605	Natural Resource and Environmental Economics			1%	0%
	Total			100%	100%

Add knowledge area

V(C). Planned Program (Inputs)

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

Extension	Research
------------------	-----------------

Year: 2010	1862	1890	1862	1890	
	Plan	2.0	0.0	4.0	1.5
	Actual	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	0	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	0	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	200000	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	200000	0
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	75000
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	0	75000
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

Research projects and extension efforts was made to address the industry's concern.

2. Brief description of the target audience

The agricultural commodity groups, industry groups, the producers, educators, researchers, extension specialists, agents, and the general public.

V(E). Planned Program (Outputs)

1. Standard output measures

2010	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Plan	0	0	0	0
Actual	1000	5000	1000	4000

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

Patent Applications Submitted

Year: 2010
 Plan: 0
 Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2010	Extension	Research	Total
Plan	0	0	

Actual	0	0	0
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V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Industry issues are addressed

Not reporting on this Output for this Annual Report

Year	Target	Actual
2010	{No Data Entered}	0

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Concerns of the industry under consideration are addressed satisfactorily.

Add Cross-cutting Outcome/Impact Statement or Unintended or Previously Unknown Outcome Measure

Outcome #1

1. Outcome Measures

Not Reporting on this Outcome Measure

Concerns of the industry under consideration are addressed satisfactorily.

2. Associated Institution Types

1862 Research

1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

Change in Action Outcome Measure

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	0	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

When industry is facing significant issues, land grant universities are called upon to deal with the issues.

What has been done

Cattfish industry was facing a significant disease issue, so we invested in research to address the disease problem.

Results

Industry concern was addressed satisfactorily.

4. Associated Knowledge Areas

- 111 - Conservation and Efficient Use of Water
- 112 - Watershed Protection and Management
- 121 - Management of Range Resources
- 131 - Alternative Uses of Land
- 202 - Plant Genetic Resources
- 206 - Basic Plant Biology
- 211 - Insects, Mites, and Other Arthropods Affecting Plants

- 212 - Pathogens and Nematodes Affecting Plants
- 214 - Vertebrates, Mollusks, and Other Pests Affecting Plants
- 215 - Biological Control of Pests Affecting Plants
- 216 - Integrated Pest Management Systems
- 302 - Nutrient Utilization in Animals
- 303 - Genetic Improvement of Animals
- 308 - Improved Animal Products (Before Harvest)
- 402 - Engineering Systems and Equipment
- 403 - Waste Disposal, Recycling, and Reuse
- 601 - Economics of Agricultural Production and Farm Management
- 605 - Natural Resource and Environmental Economics

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.)
- Other

Brief Explanation

The economic crisis significantly reduced the ability of universities to deal with industry issues.

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

(OPTIONAL SECTION)

1. Evaluation Studies Planned

- After Only (post program)
- Retrospective (post program)
- Before-After (before and after program)
- During (during program)
- Time series (multiple points before and after program)
- Case Study

- Comparisons between program participants (individuals, group, organizations) and non-participants
- Comparisons between different groups of individuals or program participants experiencing different levels of program intensity.
- Comparison between locales where the program operates and sites without program intervention
- Other

Evaluation Results

Good progress was made.

Key Items of Evaluation

Emerging issues from the industry should be given a high priority.