

# 2009 Florida A&M University Research Annual Report of Accomplishments and Results

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## I. Report Overview

### 1. Executive Summary

The economic situation continued to cast a dark cloud on many aspects of life in Florida with universities experiencing serious budget cuts. As a consequence, implementation of the land grant mission has called for tremendous innovation and resolve. This annual report for FY 09 provides an overview of the Florida A&M University (FAMU) planned research programs. As in previous years, the annual report for the FAMU Extension Program was prepared jointly with the University of Florida and is therefore not covered in this report. However, because of the integrated nature of some of the research and extension activities, it is inevitable that some extension activities especially those that are driven by research faculty will also be reported here. Furthermore, the research, extension and teaching programs continue to forge strong integrated linkages to ensure effective delivery of the mission.

During FY 2009, the planned programs continued to address a range of critical issues and needs identified by stakeholders. The cooperative partnership between FAMU and its stakeholders and cooperators including: state and federal agencies, industry and non-governmental entities was enhanced. Among some of the key stakeholders and cooperators engaged were: Florida Department of Agriculture and Consumer Services, Florida Grape Growers Association, Florida Goat Producers, Florida Fruit and Vegetable Growers, Tall Timbers (an environmental group), North Florida Small Farmers Cooperative, the US Department of Agriculture - Agricultural Research Service and Animal and Plant Health Inspection Service, and many other entities. FAMU's research program was organized around six programmatic areas which address critical issues at the state and national levels as follows: Viticulture and Small Fruits Research, Preserving Water Quality of North Florida Watersheds, Strategic Research for the Management of Invasive Pest Species, Rural Development and Statewide Goat Research, Bioenergy Research, and Public Health Entomology, Research and Education. A summary of the activities and results from each program is provided below.

**Viticulture and Small Fruits Research Program:** The Viticulture and Small Fruits Research Program is an active partner in promoting the grape industry within the state. The program is implemented by the Center for Viticulture and Small Fruit Research which conducts a wide range of research projects to address industry needs and concerns, and provides service to help stakeholders in the industry. The Center also conducts research in blackberries and evaluates non-traditional small fruits for North Florida. The faculty is involved in statewide extension and outreach activities as well as in teaching and training graduate and undergraduate students. During FY09, research efforts were focused in the following areas: development of new and improved grape cultivars for Florida, identification of best management practices for Florida grapes and small fruits, identification of genetic markers of viticultural importance and, proteins and metabolites relating to disease tolerance and important physiological functions of grapes, evaluation of water stress/drought on biochemical and molecular changes in grapes, development of new value-added products from grapes and small fruits and evaluation of non-traditional small fruits for North Florida. The program is also actively involved in extension activities, including organization of field days and seminars and workshops for grape growers and general public. During FY09, the program registered two patents and nine papers were published. In addition, the program produced 7,000 hybrid seedlings from the breeding program and at least three hybrid selections of seedlings. The program also identified 150 genes as well as validating 1008 SSR and 50 SNP markers. In FY09, the Florida grape industry saw a modest growth in acreage of new vineyards and at least two new wineries. The program also continued contributing to the teaching program through support of graduate and undergraduate student research and training.

**Preserving Water Quality of North Florida Watersheds:** The major goal of the Center for Water and Air Quality is to protect, preserve and improve the quality and the quantity of water resources in North Florida, where Florida A&M University is located. The current research in the center include: soil erosion, nutrient movement and aquatic fauna under irrigated and non-irrigated conditions in the Apalachicola River watershed funded through Evans-Allen Program; Hydrology of isolated wetlands in the Apalachicola National Forest, funded through the Forest Service, and, a NASA-funded project on developing a Best Management Practices model in the Suwannee River Basin in Florida. Additionally, the Center received an NSF grant to study the movement of particulate matter under controlled fire conditions in North Florida Forests. We have leveraged our formula funds to obtain additional support from various agencies including, NSF, NASA, EPA and in-kind support from the Florida Department of Agriculture. We recruited 3 graduate and 5 undergraduate students to train in soil, water and natural resource areas. All of the students are African-Americans, male as well as female, increasing the pool of minority students in agriculture and natural resources. Two Masters Students recently graduated, one conducted research on the vegetation in

North Florida wetlands and the other studied occurrence of *Escherichia coli* in the Ochlockonee River Basin. Recently, the Center hosted a symposium session on "Isolated Wetlands" at the National Land-grant and Sea Grant Meeting at Hilton Head, SC. Three scientists from the Center presented papers along with 6 others from 1862s and federal agencies. This was a first for an 1890 Institution, to hold a symposium session at the National Water Quality meeting. Publication wise, the Center faculty published 5 refereed papers, 2 extension type publications and 3 brochures for public-at-large. The Center provided soil and water Analysis facilities to 20 stakeholders, extension faculty, other FAMU faculty and students. Research accomplishments for the first year of the Evans-Allen funded project on the Apalachicola watershed study included selection of the study site and installation of Mesh-bags to measure soil erosion and nutrient loss under fallow-peanut-cotton rotation. Initial sampling of soil in 6 study plots gave the following results: soil pH 6.1-6.7, NO<sub>3</sub>-N 0.6-3.0 mg/kg and PO<sub>4</sub>-P from 5.96 to 50.88 mg/kg. The water samples collected at the bottom of the study plots had pH values from 6.0 to 6.3, NO<sub>3</sub>-N <1 mg/L and PO<sub>4</sub>-P also less than 1 mg/L. The two major creeks in the watershed, Sweetwater and Wilson-Mill, the major aquatic insect species depicting water quality are: Mayflies, Stoneflies and Caddis flies. During the current year, soil erosion and nutrient loss work will be studied for a full year and relevant field data will be collected.

**Strategic Research for the Management of Invasive Pest Species:** This planned program is implemented by the Center for Biological Control. The Center's research is focused in two key areas: management of invasive alien species (IAS), and development of integrated pest management. The Center's focus on these two areas recognizes that an effective approach for dealing with IAS requires a multi-pronged, approach that emphasizes prevention in the first instance. Should alien invasive species gain entry, then emphasis switches to early detection and eradication, and as a last resort, management. Therefore the strategic research on IAS cuts across the spectrum from prevention to management and restoration, with a particular focus on the following: Offshore pest mitigation, development of ecologically based management of invasive insect pests and weeds; Development of electronic diagnostic tools and resources (Expert Information Systems) for insect identification; Assessment of the economic impact of IAS and improving the safety of biological control. In addition to the Evans-Allen funds, the program of work is also supported through grants from NIFA and cooperative agreements with APHIS and ARS. During FY 09 the work funded under the Evans-Allen program was focused in three areas: development of Expert Information Systems, offshore research on high risk species, and the assessment of risks and benefits of biological control agents. Efforts to develop Expert Information Systems to support identification of potential invasive pest threats concentrated on the development of two Chrysomelid, one weevil and a palm resource which are in various stages of development. Further subfamilies of Chrysomelidae can be developed, beginning with Galerucinae for which one of the experts has indicated an interest in working with the program. The entire family Chrysomelidae has been listed as "actionable" by USDA so the entire family should eventually be treated. In the coming 5 year cycle there will probably be additional emerging pests which can be incorporated into expert system keys. Offshore research focused on generation of data on, surveillance, monitoring, biology, ecology and management of the three high risk pest threats (*Planococcus minor*, *Planococcus lilacinus* and *Rhyncophorus ferrugineus*) in Trinidad, Dominican Republic, and Curacao and Aruba. Other offshore research in Ecuador has focused on the assessment of the benefits and risks of biological control agents especially *Beauveria bassiana* on non-target organisms. Other offshore work has involved capacity building especially in the context of training of relevant authorities in trading partner countries in Latin America. During FY 09, in collaboration with other partners especially University of Florida, Center faculty contributed to the implementation of a training workshop which was geared towards training personnel in government agriculture ministries, agricultural universities on identification of high priority taxa such as thrips. This training is linked to the USAID IPM CRSP funding. The research program resulted in publication of four extension and eight research peer reviewed publications. Overall, however, the Center produced more than 40 publications with a similar number of conference presentations. In addition at no less than 10 graduate and undergraduate students were involved in the program's activities.

**Bioenergy Research Program:** During FY09, the FAMU BioEnergy Research Program was initiated. During this first year efforts were focused mainly on feedstock development and microbial processing. Several feed stocks are currently being evaluated in the greenhouse and in the field. As planned, the experimental field plot in Quincy was set up. Tests on several accessions of halophytes were initiated. Yield data were collected in the summer of 2009. The accessions did not perform as expected and seemed to require a lengthy acclimation period. The first year yield data were really modest. The 2010 harvest season is expected to be more productive. This will allow for seeds to be processed into biodiesel and for accessions to be evaluated for productivity and vigor. Another important aspect of the Bioenergy Group was the training of graduate and undergraduate students. Several students are receiving training in the area of bioenergy. These students will form the next generation of green workers, from which state and federal agencies can recruit. Collaborations with private industry were also established, including opportunities for internships.

**Rural Development and Statewide Goat Research:** In the U.S., meat goat production has become one of the fastest growing livestock industries and has proven to be a profitable enterprise for many farm families. Today, there are approximately 1,965,000 meat goats in the United States. Persistence among ethnic consumers (i.e., Caribbean Islanders, Hispanics, Muslims and Africans, Jewish) in maintaining their religious or cultural practices has increased demand for goat meat. It is expected that demand will continue to rise as the ethnic population in the U.S. continues to grow creating a myriad

of opportunities for small and limited resource farm families as a means of generating a source of income. Despite demand for goat meat, there are several challenges still facing the industry. Foremost is the lack of medications labeled for use in goats and there is also a paucity of information on meat goat production parameters from well planned and organized grazing trials.

The preliminary results from experiments under this planned program showed that goats, maintained in a feedlot environment were significantly heavier at the end of the trial compared to goats that were maintained in the four grazing systems. Their average rate of gain was 0.6 pounds per head per day. However, goats that were maintained on Cow Pea with little grain supplement gained an average of 0.4 pounds per head per day while the remaining goats in the grazing systems averaged between 0.3 to 0.1 pounds per day. These results indicated in order for goats to reach their optimum performance they would require some supplementation to maintain their overall condition. However, raising kids strictly in a feedlot environment may not be a cost effective method for most underserved farm families. Therefore, further studies will be conducted to determine which forage combination may be more advantageous for farmers with limited resources to harness the weight gains that are required to sell marketable kids.

The preliminary results were integrated into existing training programs that are sponsored annually at FAMU (i.e., Annual Goat Field Day, Master Goat Program) and several other training programs for goat producers throughout the state of Florida. On-farm consultations were also held on requested. Recommendations were made on grazing systems based on the preliminary results found on Cow pea and Bahiagrass and Pearl Millet and other management practices through a system approach. A participant of the Small Ruminant Program at FAMU was certified in as a Master Goat and Sheep producer. She adopted several sustainable production practices on her farm (biosecurity, rotational grazing, recording keeping) for both her goat herd and her sheep flock. During the year, she also built a facility on her farm to store goat and sheep meat for marketing purposes. Today, by adding value to her meat, she is marketing her goat and sheep products through several local outlets and receiving increased profits. In 2009, this farmer was also awarded, "Innovative Farmer of the Year" at the Small Farm Alternative Enterprise Conference (UF/FAMU) which was held last summer in Kissimmee, FL. Today she continues to share what she has learned from the Small Ruminant program at FAMU and her production and marketing strategies with other producers throughout the state of Florida. In 2009, there was a slight increase (0.67%) in the number of producers that had access to information on pasture management, herd health, biosecurity etc. from the FAMU website compared to 2008 (7000 hits in 2008 and 7047 hits in 2009).

**Public Health Entomology Research and Education:** The FAMU/CESTA John A. Mulrennan Sr., Public Health Entomology Research and Education Center (PHEREC) addresses the research and extension needs of over 60 organized local-government mosquito control agencies that spend in excess of \$200 million/year in protecting the general public from mosquitoes and mosquito-borne disease throughout Florida. PHEREC focuses primarily on technology development used by these agencies to insure safe and effective control procedures. During 2009 scientists at PHEREC increased their number of funded research projects to 11 that involved target-specific, effective pesticide application of public health arthropods with less environmental impact within the context of Integrated Mosquito Management. Training workshops, short courses, continuing education conferences, extension bulletins, and onsite demand for identification services continue to be the chief methods for transfer of this technology to stakeholders and the general public.

#### Total Actual Amount of professional FTEs/SYs for this State

Year: 2009	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	0.0	0.0	19.0
Actual	0.0	0.0	0.0	24.0

## II. Merit Review Process

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

- Internal University Panel
- Combined External and Internal University External Non-University Panel
- Expert Peer Review
- Other (Review by Stakeholders )

## 2. Brief Explanation

In order to ensure quality and accountability of its research program, Florida A&M University has established a revised process for merit and peer review of project proposals. The process also includes a component for monitoring and evaluation of projects funded under the Evans-Allen program. Projects are developed from the bottom up, with ideas being generated by individual or more typically groups of faculty in response to identified stakeholder needs. Center Advisory Councils play a critical role in reviewing the merit of project ideas. Project ideas are shaped by faculty/unit leaders in consultation with Center Advisory Councils and the Research Director. Full proposals are developed by faculty/unit leader teams and once completed these are subjected to a merit and peer review process. The main objective of the process is to assure the quality, scientific merit, feasibility and impact of the proposed research. The review process proceeds as follows: first, a preliminary review of the proposed research is made by the Research Director and discussions are held with the Principal Investigators regarding the relevance and the impact of the research on stakeholders. This is followed by a comprehensive review by three or more subject matter specialists. The reviewers will be drawn from among CESTA faculty and other external entities. External reviewers may be drawn from among 1890 and 1862 scientists, CARET representatives, commodity associations/stakeholders, extension workers and others. Comments or suggestions made for improvement of the proposal are then incorporated into the revised proposal prior to submission to NIFA for approval. Planned programs will be monitored through annual evaluation which will include review by Center Advisory Councils as appropriate. Annual reports of accomplishment will be generated. Research findings will be published in regular scientific and other outlets which may include additional peer review process.

## 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
- Other (Contact traditional under -served clientele)

#### Brief explanation.

Given the wide scope of FAMU's stakeholders, a broad based approach was taken to solicit their input through planned events, unscheduled activities and personal contacts. The primary links with stakeholder groups were maintained through specific research programs/centers. Thus, each of the four main research centers maintained an active Advisory Council, which typically comprised of representatives of key stakeholder groups. Thus the Advisory Council of the Center for Viticulture and Small Fruits comprises representatives from commodity groups such as the Florida Grape Growers Association, North Florida/Georgia Chestnut Growers Association and the Florida Viticulture Advisory Council. Other representatives come from private industry including wineries and processed fruit manufacturers as well as state agencies and other collaborators. For the Center for Water and Air Quality, the Council is made up of representatives from water management districts as well as federal and state agencies. The Advisory Council of the Center for Biological Control includes representatives from Florida Farm Bureau, Florida Nursery Growers Association, several federal and state agencies, FAMU Extension, University of Florida and Pest Management Industry. The PHEREC Research Advisory Council comprises of regional representatives in local-government mosquito control agencies in Florida as well as state and federal environmental agencies, industry and FAMU administration to serve in a rotating 3 year capacity. Advisory Councils generally met at least once during a year, which provided an important formal mechanism for provision of inputs from stakeholders. Other planned events included field days, growers meetings, and listening sessions several of which were held during the year. To ensure participation by a wide range of stakeholders, such events were widely promoted through various media.

**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
- Open Listening Sessions
- Needs Assessments
- Use Surveys

**Brief explanation.**

Different approaches were used to identify individuals and groups who represent FAMU's stakeholder base. This included a review of census data and specific consultations with state agencies, commodity associations/groups, farm bureau, county extension agents, CARET representatives, nonprofit public advocacy groups, and environmental organizations who were requested to provide names of individuals and groups who might benefit from FAMU's programs. Small farmers and underserved groups were identified by the University's field staff, paraprofessional workers and the extension personnel. Field days, on-farm demonstrations and other activities were also used to identify the stakeholders. The faculty and research administrators participated in several statewide meetings and workshops held by the Florida Department of Agriculture and Consumer Services, Florida Department of Environmental Protection and other organizations. One of the major outcomes of such meetings was to identify the potential stakeholders and individuals who could serve as members of the advisory committees for various research programs. Input from stakeholders is solicited through a variety of ways, including direct consultation, participation in advisory committees, surveys and listening sessions.

**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)
- Other (Through county extension agents)

**Brief explanation.**

Stakeholder input was collected continuously through informal and formal consultations. This included on and off campus meetings with various commodity groups. For instance, meetings with the Florida Grape Growers were held on the campus where research results were presented and stakeholder input was requested. Input was also solicited through stakeholder representation in specific center/program Advisory Councils. Surveys were also conducted with both traditional and non-traditional stakeholder groups. Information was also gleaned from various published reports.

**3. A statement of how the input will be considered**

- In the Budget Process
- To Identify Emerging Issues
- Redirect Research Programs
- In the Staff Hiring Process
- In the Action Plans
- To Set Priorities
- Other (College -wide strategic plan)

**Brief explanation.**

Stakeholder input was used in overall program assessment, planning and resource allocation. Thus the input was used determining the direction and emphasis of the entire research program including modifying existing projects, but also in identifying new issues that needed to be addressed and hiring of new staff. The input was also

factored in the development of college, and center/program strategic plans, and thus guided the development of extra mural grants and other complimentary activities.

**Brief Explanation of what you learned from your Stakeholders**

Inputs from stakeholders confirmed that the following issues were still of critical concern: 1) development of small farmer specialty crops such as grapes, small fruits and vegetables 2) water quality and quantity, 3) invasive alien species, 4) support for the development of small ruminant production, 5) development of bioenergy 6) management of human and livestock disease vectors, and 7) climate change as a cross cutting issue.

IV. Expenditure Summary

1. Total Actual Formula dollars Allocated (prepopulated from C-REEMS)			
Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
0	0	0	1846034

2. Totaled Actual dollars from Planned Programs Inputs				
	Extension		Research	
	Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
Actual Formula	0	0	0	1216871
Actual Matching	0	0	0	1216871
Actual All Other	0	0	0	0
Total Actual Expended	0	0	0	2433742

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

**V. Planned Program Table of Content**

<b>S. No.</b>	<b>PROGRAM NAME</b>
1	Viticulture and Small Fruit Research
2	Preserving Water Quality of North Florida Watersheds
3	Strategic Research for the Management of Invasive Pest Species
4	Statewide Goat Research Program
5	Community Based Organization
6	Bioenergy Research (Sustainable Energy)
7	Public Health Entomology, Research and Education

**V(A). Planned Program (Summary)****Program # 1****1. Name of the Planned Program**

Viticulture and Small Fruit 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				25%
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants				25%
205	Plant Management Systems				50%
	<b>Total</b>				100%

**V(C). Planned Program (Inputs)****1. Actual amount of professional FTE/SYs expended this Program**

Year: 2009	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	0.0	0.0	6.0
Actual	0.0	0.0	0.0	10.0

**2. Actual dollars expended in this Program (includes Carryover Funds from previous years)**

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
0	0	0	230321
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	0	230321
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 Center for Viticulture and Small Fruit Research conducts a wide range of research projects to address industry needs and concerns, and provides service to help stakeholders in the industry. The Center also conducts research in blackberries and evaluates non-traditional small fruits for North Florida. The faculty is involved in statewide extension and outreach activities as well as in teaching and training graduate and undergraduate students.

Conducts research in the following areas:

- Development of new and improved grape cultivars for Florida.
- Identification of best management practices for Florida grapes and small fruits.
- Identification of genetic markers of viticultural importance.
- Identification of proteins and metabolites relating to disease tolerance and important physiological functions of grapes.
- Evaluation of water stress/drought on biochemical and molecular changes in grapes.
- Development of new value-added products from grapes and small fruits.
- Evaluation of non-traditional small fruits for North Florida.

Conducts extension and outreach in the following areas:

- Student training, community service and youth development.
- Seminars and workshops for grape growers and general public.
- Grape Growers Field Day
- Grape Harvest Festival
- Provide technical advice and services to grape growers, processors and small farmers.

**2. Brief description of the target audience**

The primary stakeholders and target audience are:

- Grape growers and processors in Florida and neighboring states.
- Nurseries
- Small minority farmers and chestnut growers in Florida and neighboring states.
- Graduate and undergraduate students working in viticulture and small fruit.

The secondary stakeholders and target audience are:

- Hobbyists and homeowners with grapes and small fruits
- Home winemakers.
- Florida nurseries

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

**1. Standard output measures**

2009	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
<b>Plan</b>	200	200	100	50
<b>Actual</b>	1800	2500	300	500

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

**Patent Applications Submitted**

Year: 2009  
 Plan: 1  
 Actual: 2

**Patents listed**

Synchronized strains of subepidermal cells of muscadine grapevine pericarp for use as a source of flavonoids. (nutraceuticals) C-2503 (submitted)

Blended beverage composition of berry solids, yaupon solids and water. C-2405 (submitted)

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

**Number of Peer Reviewed Publications**

2009	Extension	Research	Total
Plan	3	6	
Actual	2	7	9

**V(F). State Defined Outputs****Output Target****Output #1****Output Measure**

- Research and Extension publications; Grant proposals submitted and funded; Dissemination of results to stakeholders; Training of graduate and undergraduate students. Increasing the number of grape growers in Florida over the 2007 base- long term measure

Year	Target	Actual
2009	20	0

**Output #2****Output Measure**

- Genes deposited in NCBI database 2009 Differential expression of genes to Pierce's disease infection in grapes. NCBI GenBank\_Accn: GT568886 - GT568892.

Year	Target	Actual
2009	{No Data Entered}	0

**Output #3****Output Measure**

- Hybrid seedlings from breeding program

Year	Target	Actual
2009	{No Data Entered}	7000

**Output #4****Output Measure**

- Advanced hybrid selections of seedlings

Year	Target	Actual
2009	{No Data Entered}	3

**Output #5****Output Measure**

- Genetic markers evaluated - 1008 SSR and 50 SNP

Year	Target	Actual
2009	{No Data Entered}	1008

**Output #6**

**Output Measure**

- Genes identified

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2009	{No Data Entered}	150

**Output #7**

**Output Measure**

- Workshops, seminars and conferences organized.

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2009	{No Data Entered}	9

**V(G). State Defined Outcomes**

**V. State Defined Outcomes Table of Content**

O. No.	OUTCOME NAME
1	Greater profitability and competitiveness; Increased value of grape commodities; Improved cooperation between the industry, state and federal agencies resulting in transfer of technology that will lead to growth and higher economic returns for Florida Grape Growers; Increased acreage of grapes for fresh fruit and processing; Better trained graduate and undergraduate students in viticulture and plant biotechnology.
2	Public and stakeholder participation at workshops, field days, seminars and grape harvest festival.

**Outcome #1****1. Outcome Measures**

Greater profitability and competitiveness; Increased value of grape commodities; Improved cooperation between the industry, state and federal agencies resulting in transfer of technology that will lead to growth and higher economic returns for Florida Grape Growers; Increased acreage of grapes for fresh fruit and processing; Better trained graduate and undergraduate students in viticulture and plant biotechnology.

**2. Associated Institution Types**

- 1890 Research

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2009	50	0

**3c. Qualitative Outcome or Impact Statement****Issue (Who cares and Why)****What has been done****Results**

The Florida grape and wine industry continues to grow at an encouraging rate. New vineyard increased by 35 acres, 2 new wineries and wine production increased to 357,000 gallons in 2009. More farmers are growing grapes and selling to the wineries. This has helped to reduce the purchase of out of state grapes from neighboring states. Overall wine sales and tax revenues have also increased. There is increased interest in Florida grapes and wines as reflected by increased attendance in enology classes and wine tasting sessions by the general public. Attendance at workshops, field day and the grape harvest festival has shown dramatic increased in number of participants.

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
201	Plant Genome, Genetics, and Genetic Mechanisms
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants
205	Plant Management Systems

**Outcome #2****1. Outcome Measures**

Public and stakeholder participation at workshops, field days, seminars and grape harvest festival.

**2. Associated Institution Types**

- 1890 Research

**3a. Outcome Type:**

Change in Condition Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2009	{No Data Entered}	1500

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

Small farmers, Florida grape growers and processors are directly impacted by FAMU's viticulture and small fruit program. The Center's research is geared towards addressing industry / stakeholders need. Increased vineyard acreage has helped wineries to increase wine production.

**What has been done**

New knowledge on vineyard, value-added products, and small fruit management are being shared with stakeholders which has helped to increase productivity and farm income through extension and outreach activities.

New gene discoveries are facilitating the breeding program at the Center.

**Results**

- \*Greater public awareness of Florida grapes, wines and non traditional small fruits.
- \*Increased sale of Florida wines.
- \*Increased faculty productivity in research output and grant procurement.
- \*Greater graduate student interest in viticulture and small fruit research.
- \*FAMU as the leader in warm climate grape (muscadine and Florida bunch hybrid) research.

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants
205	Plant Management Systems

**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

## Brief Explanation

The current regulation requires that the sale of Florida wines be conducted through a licensed distributor. This requirement restricts the ability of Florida wineries, particularly the small wineries, to market their wines directly to consumers except on-premise sales. Small wineries are often unable to pay for the services of distributors.

Sale of Florida wines through the internet is also restricted and appears to have a negative impact on small wineries.

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

### 1. Evaluation Studies Planned

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

## Evaluation Results

The Viticulture and Small Fruit Program was evaluated by the Office of Public Policy and Government Accountability of the Florida Legislature in 2007 and received a very favorable report.

The evaluation results indicated that the program achieve satisfactory progress with regards to its plan of work. The faculty has been very productive in terms of publishing their research in reputable journals and participating in the ARD Biennial Research Symposium. They have also been successful in procuring external grants from various agencies to keep their research going.

Our breeding program is progressing satisfactorily and we are continuing to evaluate several advanced lines that we are preparing to release in the near future. Several important genetic markers, genes, proteins and metabolites have been identified which will greatly facilitate our breeding and biotechnology programs. Research in the area of value-added products is also yielding encouraging results and we have been able to submit two patent applications for the production of nutraceuticals.

The small fruit program is continuing to evaluate non-traditional small fruits, including raspberries and blackberries. The results are encouraging and we will use the results of our evaluation to make appropriate recommendations for small and limited resource farmers.

The faculty has also done a good job in graduate student training. We have five graduate students who are working on various viticulture and small fruit projects at the Center and they are making satisfactory progress in their research. The training and level of support provided to the graduate and undergraduate students is commendable.

Our extension and outreach activities to promote and showcase our research and extension activities have been very successful. Stakeholder and public participations at our extension events such as workshops, field day, seminars and grape harvest festival have been very well attended.

## Key Items of Evaluation

N/A

**V(A). Planned Program (Summary)****Program # 2****1. Name of the Planned Program**

Preserving Water Quality of North Florida Watersheds

**V(B). Program Knowledge Area(s)**

## 1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
102	Soil, Plant, Water, Nutrient Relationships				35%
111	Conservation and Efficient Use of Water				35%
133	Pollution Prevention and Mitigation				30%
	<b>Total</b>				100%

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

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

Year: 2009	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	0.0	0.0	6.0
Actual	0.0	0.0	0.0	5.0

## 2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
0	0	0	499482
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	0	499482
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 activities during the first year of the project included: Project personnel meetings to plan for the implementation of the study; selection of a suitable site representing typical soil type, cropping system and management; collection of historic land-use data in the watershed and at the study site; installation of Mesh-bags to measure soil erosion; collection of soil and water samples; and monitoring of aquatic insects in two major streams in the watershed.

## 2. Brief description of the target audience

The target audience for the project include: crop producers in the Apalachicola River basin, small and limited resource farmers, extension personnel and environmental organizations.

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

**1. Standard output measures**

2009	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
<b>Plan</b>	200	100	50	50
<b>Actual</b>	80	100	40	40

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

**Patent Applications Submitted**

Year: 2009  
 Plan: 1  
 Actual: 0

**Patents listed**

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

**Number of Peer Reviewed Publications**

2009	Extension	Research	Total
<b>Plan</b>	3	5	
<b>Actual</b>	1	3	4

**V(F). State Defined Outputs**

**Output Target**

**Output #1**

**Output Measure**

- Research and extension-type publications Grant Proposals Submitted and Funded Dissemination of Results to Stakeholders Training of Graduate and Undergraduate Students

Year	Target	Actual
2009	50	0

**Output #2**

**Output Measure**

- Inventory of land use/land cover patterns in the Apalachicola River Basin

Year	Target	Actual
2009	{No Data Entered}	0

**Output #3**

**Output Measure**

- Data on soil erosion and nutrient loss under fallow condition at the study site

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2009	{No Data Entered}	0

**Output #4**

**Output Measure**

- Baseline aquatic insects data on two major water streams in the basin

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2009	{No Data Entered}	0

**V(G). State Defined Outcomes****V. State Defined Outcomes Table of Content**

O. No.	OUTCOME NAME
1	Reduction in the amount of agriculture runoff into groundwater; Adoption of program recommendations for improving water quality; Preservation of Florida's water resources; Improved environmental stewardship; Better understanding of aquatic fauna; Well-trained graduate and undergraduate students in soil and water sciences.
2	Information on changing land-use patterns in the Apalachicola River basin.
3	Comparison of soil erosion measurements by the Mesh-bag method and the simulation results of RUSLE (the Universal Soil Loss Equation).

## Outcome #1

### 1. Outcome Measures

Reduction in the amount of agriculture runoff into groundwater; Adoption of program recommendations for improving water quality; Preservation of Florida's water resources; Improved environmental stewardship; Better understanding of aquatic fauna; Well-trained graduate and undergraduate students in soil and water sciences.

Not Reporting on this Outcome Measure

## Outcome #2

### 1. Outcome Measures

Information on changing land-use patterns in the Apalachicola River basin.

### 2. Associated Institution Types

- 1890 Research

### 3a. Outcome Type:

Change in Knowledge Outcome Measure

### 3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	{No Data Entered}	0

### 3c. Qualitative Outcome or Impact Statement

#### Issue (Who cares and Why)

The Apalachicola River Basin has been is a part of the greater Apalachicola-Chattahoochee- Flint Basin comprising almost 20, sq miles in three states, Georgia, Alabama and Florida. The water demands have dramatically increased in the watershed due to: growing population around Atlanta, increase in irrigation acreage in mid-Georgia and marine and fisheries need in Florida.

An inventory of land use pattern will assist the decision makers in maintaining water sustainability in the region.

#### What has been done

We are collecting land-use data generated by various state agencies within the tri-state area and identifying the information gaps.

#### Results

We plan to have comprehensive land-use data and GIS maps of the region within next six months.

### 4. Associated Knowledge Areas

KA Code	Knowledge Area
111	Conservation and Efficient Use of Water

**Outcome #3****1. Outcome Measures**

Comparison of soil erosion measurements by the Mesh-bag method and the simulation results of RUSLE (the Universal Soil Loss Equation).

**2. Associated Institution Types**

- 1890 Research

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2009	{No Data Entered}	0

**3c. Qualitative Outcome or Impact Statement****Issue (Who cares and Why)**

The results of this study will generate quality field erosion data, which is valuable to scientific conservation policy and decision makers and farmers, because quality field soil erosion data is scarce and is urgently needed for reliable soil erosion models. Such models are the basis for soil and water conservation evaluations. A true field soil erosion data is of interest to farmers because they can judge for themselves the effects of a conservation practice.

**What has been done**

We surveyed and generated detailed landscape micro topographic (contour) map of the 163 acre Mears Farm (peanut and cotton rotation) and the slopes of the University farm. We installed 748 mesh bags in the Mears Farm to study the redistribution of eroded soil and associated nutrient loss during rain events.

**Results**

We have generated detailed micro topographic maps of the study areas. According to the top maps, we classified the areas in four erosion classes. The background information is critical to the mesh-bag method.

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships

**V(H). Planned Program (External Factors)****External factors which affected outcomes**

- Natural Disasters (drought, weather extremes, etc.)
- Other (Site location)

**Brief Explanation**

One of the major problems was to locate a suitable study site. Also, it was difficult to find a farmer willing to participate in the study. Excessive rain and cold temperatures in North Florida this winter/spring made it difficult to install mesh bags in the ground.

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

## 1. Evaluation Studies Planned

- During (during program)
- Time series (multiple points before and after program)

## Evaluation Results

The study was delayed due to excessive rain and cold temperatures. The first set of data on soil erosion will be collected in May. Nutrient analysis will also be performed at that time. That would be first opportunity to evaluate the study.

## Key Items of Evaluation

N/A

**V(A). Planned Program (Summary)****Program # 3****1. Name of the Planned Program**

Strategic Research for the Management of Invasive Pest Species

**V(B). Program Knowledge Area(s)**

## 1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
211	Insects, Mites, and Other Arthropods Affecting Plants				50%
215	Biological Control of Pests Affecting Plants				50%
	<b>Total</b>				100%

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

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

Year: 2009	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	0.0	0.0	3.0
Actual	0.0	0.0	0.0	4.5

## 2. 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	326008
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	0	326008
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

**Expert information systems:** Lucid software is being used to develop and deploy electronic identification tools and resources for selected taxa and commodities. **Offshore research:** Offshore research on three high risk species (*Planococcus minor*, *Planococcus lilacinus* and *Rhyncophorus ferrugineus*) is underway in Trinidad, Dominican Republic, and Curacao and Aruba with a view to generate data on biology, ecology and control. **Benefits and risks of biological control agents:** Experiments were initiated in Ecuador to assess the safety of *Beauveria bassiana* on non-target organisms.

## 2. Brief description of the target audience

The target audience include: federal and state biosecurity agencies, farmers, extension workers and pest management specialists.

**V(E). Planned Program (Outputs)****1. Standard output measures**

2009	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
<b>Plan</b>	150	100	50	50
<b>Actual</b>	220	400	40	20

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

Year: 2009

Plan: 1

Actual: 0

**Patents listed****3. Publications (Standard General Output Measure)****Number of Peer Reviewed Publications**

2009	Extension	Research	Total
<b>Plan</b>	2	3	
<b>Actual</b>	4	8	12

**V(F). State Defined Outputs****Output Target****Output #1****Output Measure**

- Identification of biological control agents against indigenous and non-indigenous pests. Development of effective and efficient IPM strategies. Research and extension publications. Training of graduate and undergraduate students

Year	Target	Actual
2009	50	0

**Output #2****Output Measure**

- Electronic identification tools

Year	Target	Actual
2009	{No Data Entered}	1

**Output #3****Output Measure**

- plans for the implementation of biological control against high risk invasive pests.

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2009	{No Data Entered}	3

**Output #4**

**Output Measure**

- Knowledge base on targeted high risk invasive species developed.

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2009	{No Data Entered}	3

**Output #5**

**Output Measure**

- Presentations at professional meetings.

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2009	{No Data Entered}	10

**Output #6**

**Output Measure**

- Major workshops/conferences organized.

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2009	{No Data Entered}	3

**Output #7**

**Output Measure**

- Training of graduate and undergraduate students.

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2009	{No Data Entered}	10

**V(G). State Defined Outcomes****V. State Defined Outcomes Table of Content**

O. No.	OUTCOME NAME
1	Better control of pest species using natural enemies; More efficient production and greater profitability; Efficient use of agricultural chemicals (pesticides) by producers; Development of better pest identification tools; Reduction in spread of invasive species; Well-trained graduate and undergraduate students in biological control research area.
2	More effective and timely identification of potential invasive species using electronic tools.
3	More effective strategies for the i prevention or management of invasive species.
4	Effective implementation of integrated pest management leading to more efficient production and greater profitability.
5	Well trained graduate and undergraduate students to take up careers related to the the management of native and non native pests.

## Outcome #1

### 1. Outcome Measures

Better control of pest species using natural enemies; More efficient production and greater profitability; Efficient use of agricultural chemicals (pesticides) by producers; Development of better pest identification tools; Reduction in spread of invasive species; Well-trained graduate and undergraduate students in biological control research area.

### 2. Associated Institution Types

- 1890 Research

### 3a. Outcome Type:

Change in Knowledge Outcome Measure

### 3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	50	0

### 3c. Qualitative Outcome or Impact Statement

#### Issue (Who cares and Why)

{No Data Entered}

#### What has been done

{No Data Entered}

#### Results

{No Data Entered}

### 4. Associated Knowledge Areas

KA Code	Knowledge Area
215	Biological Control of Pests Affecting Plants

## Outcome #2

### 1. Outcome Measures

More effective and timely identification of potential invasive species using electronic tools.

### 2. Associated Institution Types

- 1890 Research

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2009	{No Data Entered}	0

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

Digital identification tools will enhance identification activities at ports of entry.

**What has been done**

Authorities charged with safeguarding the nation at ports of entry require tools to support their efforts to identify potential invasive species. This is particularly critical given the increasing volume of trade and number of pest interceptions at ports of entry. This is happening when there is a serious attrition of taxonomists.

**Results**

Efforts are focused on developing at least four electronic identification tools using the Lucid platform.

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
211	Insects, Mites, and Other Arthropods Affecting Plants

**Outcome #3**

**1. Outcome Measures**

More effective strategies for the i prevention or management of invasive species.

**2. Associated Institution Types**

- 1890 Research

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2009	{No Data Entered}	3

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

Actions to prevent the entry of invasive alien species are likely to be more cost effective, additionally, availability of knowledge on management will facilitate rapid action should a species gain entry. Invasive alien species are a

threat to natural and managed ecosystems. Therefore they are a concern to farmers and natural area managers alike. Federal and state agencies charged with prevention and/or management of invasive species would benefit immensely from the knowledge generated from this work.

**What has been done**

Research is being conducted offshore on three high risk pest threats (Planococcus minor, Planococcus lilacinus and Rhynchophorus ferrugineus).

**Results**

Studies have been conducted to assess the pest status and to develop technologies for surveillance and monitoring of P. minor. Research has identified potential biological control agents that would be effective against this pest. Cooperative linkages have been established with authorities affected by, R. ferrugineus. Work has been initiated to monitor populations of this new invasive pest.

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
211	Insects, Mites, and Other Arthropods Affecting Plants
215	Biological Control of Pests Affecting Plants

**Outcome #4**

**1. Outcome Measures**

Effective implementation of integrated pest management leading to more efficient production and greater profitability.

**2. Associated Institution Types**

- 1890 Research

**3a. Outcome Type:**

Change in Condition Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2009	{No Data Entered}	0

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

Effective implementation of integrated pest management approaches will result in higher production and profitability while minimizing the negative impact of pest management practices on the environment. Farmers, consumers and the environment benefit from more effective implementation of integrated pest management. It leads to higher profitability, safer, produce and less adverse impacts on the environment.

**What has been done**

We have established a university-wide initiative which brings together IPM researchers to address critical pest challenges including training. A major area of emphasis is small farmer vegetable production, where several established invasive species have complicated implementation of IPM.

**Results**

Florida A&M University has a fully operational coordinated IPM program. Research to quantify the pest challenges in small farmer production is being conducted and results should be available during the next reporting period.

#### 4. Associated Knowledge Areas

KA Code	Knowledge Area
211	Insects, Mites, and Other Arthropods Affecting Plants
215	Biological Control of Pests Affecting Plants

#### Outcome #5

##### 1. Outcome Measures

Well trained graduate and undergraduate students to take up careers related to the the management of native and non native pests.

##### 2. Associated Institution Types

- 1890 Research

##### 3a. Outcome Type:

Change in Knowledge Outcome Measure

##### 3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	{No Data Entered}	0

##### 3c. Qualitative Outcome or Impact Statement

###### Issue (Who cares and Why)

There is a great need for trained persons to take up careers related to the management of invasive alien species in state, federal and private entities.

###### What has been done

Through involvement in research under the program, graduates and undergraduates are being trained in relevant areas.

###### Results

About 10 graduate and undergraduate students are involved in the research project.

#### 4. Associated Knowledge Areas

KA Code	Knowledge Area
211	Insects, Mites, and Other Arthropods Affecting Plants
215	Biological Control of Pests Affecting Plants

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

##### External factors which affected outcomes

- Government Regulations

##### Brief Explanation

Delays in approval of identification of material collected in the field due to governmental regulations delayed work on *Planococcus lilacinus*.

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

1. Evaluation Studies Planned

- Before-After (before and after program)
- During (during program)
- Time series (multiple points before and after program)

**Evaluation Results**

**Key Items of Evaluation**

N/A

**V(A). Planned Program (Summary)****Program # 4****1. Name of the Planned Program**

Statewide Goat Research Program

**V(B). Program Knowledge Area(s)****1. Program Knowledge Areas and Percentage**

<b>KA Code</b>	<b>Knowledge Area</b>	<b>%1862 Extension</b>	<b>%1890 Extension</b>	<b>%1862 Research</b>	<b>%1890 Research</b>
301	Reproductive Performance of Animals				10%
302	Nutrient Utilization in Animals				10%
307	Animal Management Systems				10%
311	Animal Diseases				10%
502	New and Improved Food Products				10%
601	Economics of Agricultural Production and Farm Management				30%
803	Sociological and Technological Change Affecting Individuals, Families, and Communities				20%
	<b>Total</b>				100%

**V(C). Planned Program (Inputs)****1. Actual amount of professional FTE/SYs expended this Program**

<b>Year: 2009</b>	<b>Extension</b>		<b>Research</b>	
	<b>1862</b>	<b>1890</b>	<b>1862</b>	<b>1890</b>
Plan	0.0	0.0	0.0	2.0
Actual	0.0	0.0	0.0	2.5

**2. Actual dollars expended in this Program (includes Carryover Funds from previous years)**

<b>Extension</b>		<b>Research</b>	
<b>Smith-Lever 3b &amp; 3c</b>	<b>1890 Extension</b>	<b>Hatch</b>	<b>Evans-Allen</b>
0	0	0	86069
<b>1862 Matching</b>	<b>1890 Matching</b>	<b>1862 Matching</b>	<b>1890 Matching</b>
0	0	0	86069
<b>1862 All Other</b>	<b>1890 All Other</b>	<b>1862 All Other</b>	<b>1890 All Other</b>
0	0	0	0

**V(D). Planned Program (Activity)****1. Brief description of the Activity**

The Statewide Goat Program is a truly integrated effort. The preliminary results from the grazing study were integrated into

the Cooperative Extension Program at Florida A&M University's Master Goat Program and the Annual Goat Field Day and through other training avenues (i.e., Master goat program at Tuskegee University, Sunbelt Expose, website), and UF/FAMU Small Farm Conference & Calhoun County that were developed for small ruminant producers. The results were also made available through the training materials and module that was developed on nutrition and pasture management for the training activities.

## 2. Brief description of the target audience

Agricultural professionals, students and primarily small farmers, particularly underserved farmers (i.e., minorities, limited resource farmers, socially disadvantaged farmers) that often do not have the necessary skills and knowledge to successfully operate a small ruminant (i.e., goats and sheep) production system.

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

#### 1. Standard output measures

2009	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
<b>Plan</b>	250	200	50	100
<b>Actual</b>	543	7547	0	0

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

##### Patent Applications Submitted

Year: 2009

Plan: 0

Actual: 0

##### Patents listed

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

##### Number of Peer Reviewed Publications

2009	Extension	Research	Total
<b>Plan</b>	3	1	
<b>Actual</b>	1	0	1

### V(F). State Defined Outputs

#### Output Target

##### Output #1

##### Output Measure

- Research and Extension Publications Grant proposals submitted and funded Dissemination of results to stakeholders Training of graduate and undergraduate students

Year	Target	Actual
2009	50	0

**Output #2****Output Measure**

- Number of producers had access to information (i.e, training meetings, 2- websites) on pasture management and internal parasite control methods and other sustainable goat production practices.

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2009	{No Data Entered}	8090

**Output #3****Output Measure**

- Training material available on pasture and nutrition management for small ruminant producers.

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2009	{No Data Entered}	1

**Output #4****Output Measure**

- Publications developed on related issues.

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2009	{No Data Entered}	1

**V(G). State Defined Outcomes****V. State Defined Outcomes Table of Content**

O. No.	OUTCOME NAME
1	More use of sustainable production practices; Reduction in feed and health costs; Enhanced marketable products and markets; Greater profitability and competitiveness; Well-trained graduate and undergraduate students.
2	Research to determine the impact of grazing systems on weanling kids conducted and made preliminary results available through training programs.
3	On-farm inspections were conducted by project leader and FAMU extension veterinarian to determine which production practices (i.e., grazing systems, pasture rotation, biosecurity, risk management) were actually adopted on farm, which were not and why. Information obtained help project leader to identify common issues small farmers faced when implementing what they learned through training and also gave project leader ideas on additional research activities to address to better address the needs of clientele.
4	A participant of the Small Ruminant Program at FAMU was certified in as a Master Goat and Sheep producer. She adopted several sustainable production practices on her farm (biosecurity, rotational grazing, recording keeping) for both her goat herd and her sheep flock. Later that year, she built a facility on her farm to store goat and sheep meat for marketing purposes. Today, by adding value to her meat, she is marketing her goat and sheep products through the New Leaf Market, Johnstons Meat Locker in Monticello, Fl and the Marketplace in Tallahassee, FL. and she is earning a profit from her small ruminant business because she knows how to better manage her animals as the direct result of this project. In fact, she credits FAMU, extension program for her success of her business. In 2009, Ms. Golden was also awarded, "Innovative Farmer of the Year" at the Small Farm Alternative Enterprise Conference (UF/FAMU) which was held last summer in Kissimme, FL. Today she continues to share what she has learned from the Small Ruminant program at FAMU and her production and marketing strategies with other producers throughout the state of Florida.

## Outcome #1

### 1. Outcome Measures

More use of sustainable production practices; Reduction in feed and health costs; Enhanced marketable products and markets; Greater profitability and competitiveness; Well-trained graduate and undergraduate students.

### 2. Associated Institution Types

- 1890 Research

### 3a. Outcome Type:

Change in Condition Outcome Measure

### 3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	40	0

### 3c. Qualitative Outcome or Impact Statement

#### Issue (Who cares and Why)

{No Data Entered}

#### What has been done

{No Data Entered}

#### Results

{No Data Entered}

### 4. Associated Knowledge Areas

KA Code	Knowledge Area
301	Reproductive Performance of Animals
302	Nutrient Utilization in Animals
307	Animal Management Systems
311	Animal Diseases
502	New and Improved Food Products
601	Economics of Agricultural Production and Farm Management

## Outcome #2

### 1. Outcome Measures

Research to determine the impact of grazing systems on weanling kids conducted and made preliminary results available through training programs.

### 2. Associated Institution Types

- 1890 Research

### 3a. Outcome Type:

Change in Knowledge Outcome Measure

### 3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	{No Data Entered}	8090

### 3c. Qualitative Outcome or Impact Statement

#### Issue (Who cares and Why)

Who cares? Consumers, producers and state and federal agencies.

Today, goat production has become one of the fastest growing livestock industries in the U.S., yet, small farmers, particularly underserved farmers (i.e., minorities, limited resource farmers, socially disadvantaged farmers) often do not have the necessary skills, knowledge or capital to successfully produce quality, safe products for consumers while earning an income. Therefore, by providing educational opportunities in small ruminant production that is research-based, producers are able to operate a more sustainable production system while providing quality, safe products that meets consumer demand.

#### What has been done

Experiment I: During the first year of this project Cow Pea, Pearl Millet and Bahiagrass were planted for spring and summer grazing to compare the performance of kids managed under extensive and intensive (fed-lot) feeding systems. Fifty 5 month year old kids were randomly assigned among four grazing system (either planted with Cow Pea, Pearl Millet or Bahiagrass) and one group of goats was maintained in a feed lot system. Minimal supplementation was provided for the goats in the grazing systems. Feed was supplemented to the kids when their BCS fall below 4. They will be fed at of rate of 0.5-1.0 pounds per head per day. Preliminary data was collected and evaluated using SAS for experiment.

Experiment II: The Internal Parasite Control Study will start this year due to external factors that were out of the researcher's control. For further explanation please see section 5 V. To assist producers in reducing the incidence of internal parasites, producers were trained on implementing Best Management Practices on farm and the results of this study will help farmers to deal with internal parasite problems once they occur.

#### Results

Goats that were maintained in a feedlot environment were significantly heavier ( $P > .1$ ) at the end of the trial compared to goats that were maintained in the four grazing systems. There average rate of gain was .6 pounds per head per day. However, goats that were maintained on Cow Pea will little grain supplement gained an average of .4 pounds per head per day while the remaining goats in the grazing systems averaged between .3 to .1 pounds per day. These results indicated in order for goats to reach their optimum performance they may require some supplementation to maintain their overall condition. However, raising kids strictly in a feedlot environment may not be a cost effective method for most underserved farm families. Therefore, further studies will be conducted to determine which forage combination may be more advantages for farmers with limited resources to harness the weight gains that are required to sell marketable kids. Recommendations were made to farmers during several venues including the certified Master Goat Program and the Annual Goat Field Day that was facilitated by Florida A&M University for producers, and other agricultural professionals (i.e., extension agents). On-farm consultations were also held on requested farm sites. Recommendations were made on grazing systems based on the preliminary results found on cow pea and Bahiagrass and Pearl Millet.

### 4. Associated Knowledge Areas

KA Code	Knowledge Area
---------	----------------

302	Nutrient Utilization in Animals
307	Animal Management Systems
311	Animal Diseases
502	New and Improved Food Products

**Outcome #3****1. Outcome Measures**

On-farm inspections were conducted by project leader and FAMU extension veterinarian to determine which production practices (i.e., grazing systems, pasture rotation, biosecurity, risk management) were actually adopted on farm, which were not and why. Information obtained help project leader to identify common issues small farmers faced when implementing what they learned through training and also gave project leader ideas on additional research activities to address to better address the needs of clientele.

**2. Associated Institution Types**

- 1890 Research

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2009	{No Data Entered}	7

**3c. Qualitative Outcome or Impact Statement****Issue (Who cares and Why)**

Who cares? Consumers, producers and state and federal agencies.

Today, goat production has become one of the fastest growing livestock industries in the U.S.

Yet, small farmers, particularly underserved farmers (i.e., minorities, limited resource farmers, socially disadvantaged farmers) often do not have the necessary skills, knowledge or capital to successfully produce quality, safe products for consumers while earning an income. Therefore, by providing educational opportunities in small ruminant production that is research-based, producers are able to operate a more sustainable production system while providing quality, safe products that meets consumer demand.

**What has been done**

Farm inspections were made to seven sites and evaluated based on information obtained during training program. Since farming involves in integrated approach, farm sites were evaluated on biosecurity measures that were put in place to prevent diseases on farm such as internal parasites. Other areas that were checked included grazing systems that were implemented on farm, record keeping, stocking rates, general health of animal and the presence of a breeding and herd health protocol for the animals on the farm.

**Results**

The farms were evaluated based on a 100 point system, only four farmers passed during the initial inspection. Two additional farmers passed the inspection during a second visit with a score of 80% or higher.

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
302	Nutrient Utilization in Animals

307	Animal Management Systems
311	Animal Diseases
502	New and Improved Food Products
601	Economics of Agricultural Production and Farm Management
803	Sociological and Technological Change Affecting Individuals, Families, and Communities

#### **Outcome #4**

##### **1. Outcome Measures**

A participant of the Small Ruminant Program at FAMU was certified in as a Master Goat and Sheep producer. She adopted several sustainable production practices on her farm (biosecurity, rotational grazing, recording keeping) for both her goat herd and her sheep flock. Later that year, she built a facility on her farm to store goat and sheep meat for marketing purposes. Today, by adding value to her meat, she is marketing her goat and sheep products through the New Leaf Market, Johnstons Meat Locker in Monticello, FL and the Marketplace in Tallahassee, FL. and she is earning a profit from her small ruminant business because she knows how to better manage her animals as the direct result of this project. In fact, she credits FAMU, extension program for her success of her business. In 2009, Ms. Golden was also awarded, "Innovative Farmer of the Year" at the Small Farm Alternative Enterprise Conference (UF/FAMU) which was held last summer in Kissimmee, FL. Today she continues to share what she has learned from the Small Ruminant program at FAMU and her production and marketing strategies with other producers throughout the state of Florida.

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

- 1890 Research

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

Change in Condition Outcome Measure

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

Year	Quantitative Target	Actual
2009	{No Data Entered}	1

##### **3c. Qualitative Outcome or Impact Statement**

###### **Issue (Who cares and Why)**

Who cares? Consumers, producers and state and federal agencies.

Today, goat production has become one of the fastest growing livestock industries in the U.S., yet, small farmers, particularly underserved farmers (i.e., minorities, limited resource farmers, socially disadvantaged farmers) often do not have the necessary skills, knowledge or capital to successfully produce quality, safe products for consumers while earning an income. Therefore, by providing educational opportunities in small ruminant production that is research-based, producers are able to operate a more sustainable production system while providing quality, safe products that meets consumer demand.

###### **What has been done**

Producer attended training program to improve her production, management and marketing skills in small ruminant production (i.e., goats and sheep).

###### **Results**

The farmer is now marketing grass-fed goats and sheep quality products to consumers and earning a substantial profit.

#### 4. Associated Knowledge Areas

KA Code	Knowledge Area
803	Sociological and Technological Change Affecting Individuals, Families, and Communities

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

##### External factors which affected outcomes

- Economy
- Other (Logistical issues)

##### Brief Explanation

The renovation of the small ruminant facility at FAMU in 2009, severely interfered with the researchers ability to completely address all of the goals of this project. Replacing old fencing and the construction of a small ruminant facility took longer than anticipated because funding was no longer available to complete the reconstruction after the economy begun to slow down. Therefore, there were several areas on the goat unit where the fencing had been removed and the animals were moved into smaller paddocks for several months. In light of this the herd was reduced in number to prevent overgrazing, health and other issues. This situation severely limited the research capabilities of this unit. However in April of this year, the facility has been completed renovated and the researchers on this project have made plans to continue the grazing and herd health studies immediately.

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

##### 1. Evaluation Studies Planned

- Before-After (before and after program)
- Case Study
- Other (On farm visits after project implementation.)

#### Evaluation Results

Results from the preliminary study, was integrated into the Master Goat Program at Florida A&M University to take a system approach to managing small ruminants (i.e., pasture management, breeding/reproduction, herd health). Pre examinations were conducted after each training program to determine what producers currently knew about small ruminant production (i.e., nutrition and pasture management, herd health). They were also given a post examination after the training program to measure what information had been transferred. The result showed each time that less than 5% of the producers were aware of many production practices that are required for raising healthy productive goats. This was especially surprising when most of the farmers that participated in the training activities had been goat farmers for over three years. Post examination results showed that 90% of the program participants understood how to better manage their pastures etc. to improve the quality of animals they raise. On-site inspection were also conducted on seven farms to determine which practices (i.e., pasture rotation, biosecurity) were adopted on farm and which practices were not. Results further showed that most sites that were visited adoptable 6 or more sustainable goat production practices on their farm including the pasture management practices that were recommended in the training program.

#### Key Items of Evaluation

N/A

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

**Program # 5**

**1. Name of the Planned Program**

Community Based Organization

**V(B). Program Knowledge Area(s)**

**1. Program Knowledge Areas and Percentage**

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
601	Economics of Agricultural Production and Farm Management				
803	Sociological and Technological Change Affecting Individuals, Families, and Communities				
805	Community Institutions, Health, and Social Services				
<b>Total</b>					

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

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

Year: 2009	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	0.0	0.0	2.0
Actual	0.0	0.0	0.0	0.0

**2. Actual dollars expended in this Program (includes Carryover Funds from previous years)**

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
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

**V(D). Planned Program (Activity)**

**1. Brief description of the Activity**

Activities for this year have focused upon assisting underserved residents throughout the state in securing and managing assets that would be instrumental in the response to natural disasters and with land retention (foreclosures, land default). The program is actively involved in developing a Black Studies program. Additionally priority areas for this past year have addressed preservation of natural resources in coastal communities. The church as a resource for community development and educational enhancement is also being developed.

## 2. Brief description of the target audience

The target audience for this work has been community based organizations, community leaders-including the church and health care providers.

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

#### 1. Standard output measures

2009	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
<b>Plan</b>	250	250	100	100
<b>Actual</b>	165	325	75	100

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

##### Patent Applications Submitted

Year: 2009

Plan: 0

Actual: 0

#### Patents listed

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

##### Number of Peer Reviewed Publications

2009	Extension	Research	Total
<b>Plan</b>	2	1	
<b>Actual</b>	0	0	0

### V(F). State Defined Outputs

#### Output Target

#### Output #1

##### Output Measure

- Production practice options for reducing the over-reliance on chemicals; More efficient cultural practices; Increase in economic returns to small farmers; Number of families availing the program recommendations; New value-added ventures; Number of small farmers participating; Number of graduate and undergraduate trained.

Year	Target	Actual
2009	50	0

**V(G). State Defined Outcomes**

**V. State Defined Outcomes Table of Content**

O. No.	OUTCOME NAME
1	Adoption of profitable enterprises and practices; Improved quality of life for rural families; More efficient use of agricultural chemicals by producers; Increased economic returns for small farmers; Identification of new value-added enterprises; Well-trained graduate and undergraduate students.

**Outcome #1**

**1. Outcome Measures**

Adoption of profitable enterprises and practices; Improved quality of life for rural families; More efficient use of agricultural chemicals by producers; Increased economic returns for small farmers; Identification of new value-added enterprises; Well-trained graduate and undergraduate students.

**2. Associated Institution Types**

- 1890 Research

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2009	20	0

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

This work has resulted in the institution having contact with numerous community based organizations. Citizens with limited resources have access to agencies and resources that can provide support. Worked collaboratively with Southern Region asset Bldg Coalition and Florida Family network. Workshops, conferences, and other networking activities resulted in addressing the plight of limited income families during the economic recession.

**What has been done**

Conferences have been held and a survey has been developed. In addition, we participated with the national assessment of the state asset score card where Florida received a "C" grade. The score card has resulted in several policy initiatives.

**Results**

On-going/ data gathering. One hundred fifty participated in asset building workshop and strategic planning meeting.

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
805	Community Institutions, Health, and Social Services

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

**External factors which affected outcomes**

- Competing Programmatic Challenges

**Brief Explanation**

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

1. Evaluation Studies Planned

**Evaluation Results**

**Key Items of Evaluation**

**V(A). Planned Program (Summary)****Program # 6****1. Name of the Planned Program**

Bioenergy Research (Sustainable Energy)

**V(B). Program Knowledge Area(s)****1. Program Knowledge Areas and Percentage**

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
204	Plant Product Quality and Utility (Preharvest)				50%
205	Plant Management Systems				25%
511	New and Improved Non-Food Products and Processes				25%
	<b>Total</b>				100%

**V(C). Planned Program (Inputs)****1. Actual amount of professional FTE/SYs expended this Program**

Year: 2009	Extension		Research	
	1862	1890	1862	1890
Actual	0.0	0.0	0.0	1.0

Actual	0.0	0.0	0.0	1.0
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**2. 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	74991
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	0	74991
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**

BioEnergy research was focused mainly on feedstock development and microbial processing. Several feed stocks were evaluated in the greenhouse and in the field. As planned in 2009, the experimental field plot in Quincy was set up. Tests were initiated on several accessions of halophytes. Yield data were collected in the summer of 2009. The accessions did not perform as expected. They seem to require a lengthy acclimation period. The first year yield data really modest and it is anticipated that greater progress will be made in 2010.

**2. Brief description of the target audience**

Small scale farmers, undergraduate and graduate students.

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

**1. Standard output measures**

2009	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
<b>Plan</b>	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}
<b>Actual</b>	100	1000	100	1000

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

**Patent Applications Submitted**

Year: 2009

Plan:

Actual: 0

**Patents listed**

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

**Number of Peer Reviewed Publications**

2009	Extension	Research	Total
<b>Plan</b>			
<b>Actual</b>	0	2	2

**V(F). State Defined Outputs**

**Output Target**

**Output #1**

**Output Measure**

- Submissions of Grant proposals to State and Federal Agencies.

Year	Target	Actual
2009	{No Data Entered}	5

**Output #2**

**Output Measure**

- Training of graduate and undergraduate students.

Year	Target	Actual
2009	{No Data Entered}	3

**Output #3**

**Output Measure**

- Publications in Peer-Reviewed Journals

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2009	{No Data Entered}	2

**V(G). State Defined Outcomes****V. State Defined Outcomes Table of Content**

O. No.	OUTCOME NAME
1	The number of manuscripts submitted and accepted for publications in peer-reviewed journals
2	Graduate and undergraduate students trained in the area of bioenergy.

**Outcome #1****1. Outcome Measures**

The number of manuscripts submitted and accepted for publications in peer-reviewed journals

**2. Associated Institution Types**

- 1890 Research

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2009	{No Data Entered}	0

**3c. Qualitative Outcome or Impact Statement****Issue (Who cares and Why)**

Scientists in the field of bioenergy could use the published work to improve or modify ongoing research works in their own lab.

**What has been done**

We have developed a protocol to isolate nucleic acids from recalcitrant plant tissues.

**Results**

High quality RNA was isolated from Muscadine grapes for the first time and a chalcone synthase gene was cloned.

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
204	Plant Product Quality and Utility (Preharvest)
205	Plant Management Systems
511	New and Improved Non-Food Products and Processes

**Outcome #2****1. Outcome Measures**

Graduate and undergraduate students trained in the area of bioenergy.

**2. Associated Institution Types**

- 1890 Research

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2009	{No Data Entered}	3

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

Industry, State and Federal agencies looking for new hires, now have a pool to choose from.

**What has been done**

Graduate and undergraduate students received high quality training in the area of feedstock development and conversion processes.

**Results**

The next generation of green workers is currently being trained.

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
204	Plant Product Quality and Utility (Preharvest)
205	Plant Management Systems
511	New and Improved Non-Food Products and Processes

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

**External factors which affected outcomes**

- Economy
- Competing Programmatic Challenges
- Populations changes (immigration, new cultural groupings, etc.)

**Brief Explanation**

If funding was available, more graduate students could have received training. Several students have expressed interests in being exposed to the sciences of bioenergy, however only two students could be supported.

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

1. Evaluation Studies Planned

- Time series (multiple points before and after program)

### **Evaluation Results**

We are constantly evaluating the program based on the amount of publications submitted and students trained. This allows us to make adjustments as we go along in order to meet set goals.

### **Key Items of Evaluation**

N/A

**V(A). Planned Program (Summary)****Program # 7****1. Name of the Planned Program**

Public Health Entomology, Research and Education

**V(B). Program Knowledge Area(s)****1. Program Knowledge Areas and Percentage**

<b>KA Code</b>	<b>Knowledge Area</b>	<b>%1862 Extension</b>	<b>%1890 Extension</b>	<b>%1862 Research</b>	<b>%1890 Research</b>
133	Pollution Prevention and Mitigation				20%
134	Outdoor Recreation				10%
135	Aquatic and Terrestrial Wildlife				5%
136	Conservation of Biological Diversity				5%
311	Animal Diseases				5%
312	External Parasites and Pests of Animals				5%
721	Insects and Other Pests Affecting Humans				30%
722	Zoonotic Diseases and Parasites Affecting Humans				10%
723	Hazards to Human Health and Safety				10%
	<b>Total</b>				100%

**V(C). Planned Program (Inputs)****1. Actual amount of professional FTE/SYs expended this Program**

<b>Year: 2009</b>	<b>Extension</b>		<b>Research</b>	
	<b>1862</b>	<b>1890</b>	<b>1862</b>	<b>1890</b>
Actual	0.0	0.0	0.0	2.1

Actual	0.0	0.0	0.0	2.1
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**2. Actual dollars expended in this Program (includes Carryover Funds from previous years)**

<b>Extension</b>		<b>Research</b>	
<b>Smith-Lever 3b &amp; 3c</b>	<b>1890 Extension</b>	<b>Hatch</b>	<b>Evans-Allen</b>
0	0	0	0
<b>1862 Matching</b>	<b>1890 Matching</b>	<b>1862 Matching</b>	<b>1890 Matching</b>
0	0	0	0
<b>1862 All Other</b>	<b>1890 All Other</b>	<b>1862 All Other</b>	<b>1890 All Other</b>
0	0	0	0

**V(D). Planned Program (Activity)****1. Brief description of the Activity**

Research is conducted to evaluate precision-targeted application of pesticides for adult and larval mosquito control of public health and nuisance importance. Also least toxic methods of control using new formulation chemistry (i.e. Natular<sup>a</sup> and novel soil bacteria) were evaluated as larvicides, as well as alternative non-pesticidal control techniques (i.e., trapping efficacy studies). Additional studies will be conducted that quantifies environmental residue levels of pesticides used in mosquito control. Dissemination of research results will be accomplished through submitted paper/poster presentations at professional meetings, training workshops, extension bulletins, online informational data bases, online networking sites and websites. Moreover, on-demand information to the general public concerning public health arthropod identification, biology, and control will be made available via one on one client contact.

## 2. Brief description of the target audience

Mosquito/arthropod control agencies; federal/state environmental and public health land management agencies; cooperative extension service; elementary and secondary teachers at public/private schools; home schoolers; and general public.

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

#### 1. Standard output measures

2009	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Plan	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}
Actual	350	350	100	100

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

##### Patent Applications Submitted

Year: 2009

Plan:

Actual: 2

##### Patents listed

Cilek, J. E. "Controlled Release Chamber for Dispensing Aromatic Substances". Patent 11/976,168.

Park, H. Invention Disclosure Dockets Nos. 20090421-01 and 20090421-02 - "Two Highly Mosquitocidal Bacillus Species" (patents pending).

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

##### Number of Peer Reviewed Publications

2009	Extension	Research	Total
Plan			
Actual	5	1	6

### V(F). State Defined Outputs

#### Output Target

##### Output #1

##### Output Measure

- Number of research projects that involve target-specific, effective pesticide application of public health arthropods with less environmental impact.

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2009	{No Data Entered}	11

**Output #2**

**Output Measure**

- Track client usage (number of persons/site visits) of extension-based online resources/informational materials and track attendance at on-site training workshops regarding biology and control of public health arthropods.

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2009	{No Data Entered}	450

**V(G). State Defined Outcomes****V. State Defined Outcomes Table of Content**

O. No.	OUTCOME NAME
1	Increase in number of research projects that involve target-specific, effective pesticide application of public health arthropods with less environmental impact.
2	Track client usage (number of persons/site visits) of extension-based online resources/informational materials and track attendance at training (continuing education) workshops regarding biology and control of public health arthropods.

**Outcome #1****1. Outcome Measures**

Increase in number of research projects that involve target-specific, effective pesticide application of public health arthropods with less environmental impact.

**2. Associated Institution Types**

- 1890 Research

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2009	{No Data Entered}	11

**3c. Qualitative Outcome or Impact Statement****Issue (Who cares and Why)**

Mosquitoes and related biting arthropods are responsible for transmitting pathogens that cause human and animal morbidity and mortality. Pesticides to control these pests are persistent organic pollutants that can pollute soil and air and contribute to climate change. Therefore research is needed to develop strategies to reduce pesticide use and incorporate environmentally friendly options into an integrated approach for control.

**What has been done**

Research studies on pesticide application procedures were conducted during the year that contributed to the proof of concept that reduced droplet size (and application volume) minimizes drift into non-target areas. In addition, studies on targeting specific areas for pesticide application rather than broadcasting the treatment were also conducted. Also the evaluation of least toxic materials (.e.g. Natular#61667; and novel soil bacteria) as larvicides were carried out as well as alternative non-pesticidal control techniques (i.e., trapping efficacy studies).

**Results**

It appears droplet size of pesticide applications influence drift into non-target areas. In addition, targeting specific areas for pesticide application, such as individual plants, rather than broadcasting the treatment is a promising avenue for further exploration. Least toxic materials (.e.g. Natular#61667; and novel soil bacteria) are promising larvicides while minimizing non-target impact. Mass trapping was found to be ineffective in achieving satisfactory mosquito control.

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
133	Pollution Prevention and Mitigation
134	Outdoor Recreation
135	Aquatic and Terrestrial Wildlife
136	Conservation of Biological Diversity
311	Animal Diseases
312	External Parasites and Pests of Animals
721	Insects and Other Pests Affecting Humans
722	Zoonotic Diseases and Parasites Affecting Humans

**Outcome #2****1. Outcome Measures**

Track client usage (number of persons/site visits) of extension-based online resources/informational materials and track attendance at training (continuing education) workshops regarding biology and control of public health arthropods.

**2. Associated Institution Types**

- 1890 Research

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2009	{No Data Entered}	330

**3c. Qualitative Outcome or Impact Statement****Issue (Who cares and Why)**

Dissemination of research results through extension activities addresses the needs of stakeholders such as the Florida Department of Agriculture & Consumer Services, arthropod control districts, counties and municipalities of the State, and the general public for the safe and effective control of public health arthropods.

**What has been done**

During the year scientists from the program have developed workshops and training conferences for federal/state/local mosquito control professionals that address the most current information available regarding the safe and effective control of mosquitoes. An online networking site regarding insecticide resistance monitoring and reporting was also instituted during the year. Scientists also provided several media interviews, provided identification, biology and information on control of public health arthropods including several K-6 school groups.

**Results**

Professionals from several federal/state/local agencies responsible for public health arthropod control were trained this year on the most current information available regarding the safe and effective control of mosquitoes. Online networking sites and the program's website were accessed by a variety of clientele during the year as they searched for safe and effective control of mosquitoes.

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
133	Pollution Prevention and Mitigation
134	Outdoor Recreation
135	Aquatic and Terrestrial Wildlife
136	Conservation of Biological Diversity
311	Animal Diseases
312	External Parasites and Pests of Animals
721	Insects and Other Pests Affecting Humans

722	Zoonotic Diseases and Parasites Affecting Humans
723	Hazards to Human Health and Safety

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

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

- Economy
- Public Policy changes
- Competing Public priorities

##### **Brief Explanation**

Continuous changes in research priorities, and level of funding, continue to be a challenge to obtaining grants at the state and federal levels. Non-uniformity of extramural funding affects programmatic elements which, in turn, affect the continuity of research/extension programs in order to adequately serve our clientele.

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

##### **1. Evaluation Studies Planned**

- After Only (post program)
- Retrospective (post program)

##### **Evaluation Results**

Clientele responses in training conference post-surveys indicated workshops were beneficial and of practical use in their professional careers. This was also the case in individual person-person inquiries regarding the networking sites. The Research Advisory Committee stated that the research conducted at FAMU/PHEREC directly benefits the local mosquito control programs in Florida and they were encouraged to see continuing efforts in evaluating and improving larviciding and adulticiding operations and formulations, monitoring insecticide resistance, evaluating non-target impacts, developing new or alternative control methods, evaluating repellents and traps, seeking to discover new biological control agents, and conducting mosquito borne disease ecology and surveillance studies.

##### **Key Items of Evaluation**

1. Participant responses in training conference and continuing education workshop post-surveys, and one-on-one interviews, indicated workshops were beneficial and of use in their professional careers.
2. PHEREC's Research Advisory Committee stated that the research conducted at FAMU/PHEREC directly benefits the local mosquito control programs in Florida and they were encouraged to see continuing efforts in evaluating and improving larviciding and adulticiding operations and formulations, monitoring insecticide resistance.