

2012 Florida A&M University Research Annual Report of Accomplishments and Results

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I. Report Overview

1. Executive Summary

This annual report provides an overview of the accomplishments of the Florida A&M University (FAMU) planned research programs during 2012. These activities were carried out through the College of Agriculture and Food Sciences (CAFS) during 2012. 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 2012, the planned programs continued to address a range of critical issues and needs identified by stakeholders. The cooperative partnerships between FAMU and its stakeholders and cooperators including: state and federal agencies, industry and non-governmental entities were further enhanced. Among some of the key stakeholders and cooperators engaged were: Florida Department of Agriculture and Consumer Services, Florida Farm Bureau, 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 five 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 and Bioenergy Research. A summary of the activities and results from each of the active program is provided below.

Viticulture and Small Fruits Research: 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 non-traditional small fruits, including chestnuts, 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 2012 research efforts were focused in the following areas: development of new and improved grape cultivars for Florida, screening for fruit rot, downy mildew and crown gall diseases in muscadine grapes, evaluation of Florida hybrid bunch grapes germplasm for disease resistance, identification of best management practices for Florida grapes and small fruits, identification of important viticulture genetic markers, identification of proteins and metabolites relating to disease tolerance and important physiological functions of grapes, identification of constraints in sugar metabolism in muscadine grapes, evaluation of gene expressions and differential to determine disease tolerance in muscadine and Florida hybrid bunch grapes, evaluation of the effects of water stress/drought on biochemical and molecular changes in grapes, evaluation of triploids and tetraploids for development of seedless muscadine grapes, development of disease and virus free explants of muscadine and bunch grapes for the clean vine project, invitro evaluation of strains of subepidermal cells of muscadine pericarp for use as a source of flavonoid compounds, development of new value-added products from grapes and small fruits and evaluation of chestnuts and non-traditional small fruits, blackberries and raspberries for North Florida. During 2012, 7 papers were published. In addition, 1,500 hybrid seedlings from the breeding program were produced, and 73 hybrid selections of seedlings. Our patent application on the production of in-vitro strains of subepidermal cells of muscadine grapevine pericarp for use as a source of flavonoid

compounds is pending and research on value-added products has yielded encouraging results culminating in the submission of three patent applications for the production of nutraceuticals. The program was also continued contributing to the teaching program through support of graduate and undergraduate student research and training. In 2012, two students graduated from the M.S. program. The program was also involved in a range of extension and outreach activities including: workshops, grape field days, IPM field day, seminars and a grape harvest festival. Stakeholder and public participation at these events has been strong.

Preserving Water Quality of North Florida Watersheds: The mission of the Center for Water Quality is to protect, improve, and conserve the quality and quantity of Florida's water resources; enhance sustainable water management practices and address stakeholder needs in managing and mitigating water pollution problems. During 2012, the Center continued research on studying the effects of changes in land cover and land-use on soil erosion, water quality and biodiversity of fresh water streams in Apalachicola River Watershed. This project is supported by Evans-Allen Funds. Other funded research includes "Developing a decision support interface system for selection and implementation of agricultural best management practices in Florida. A major goal of this project is to provide information that will enable state governmental agencies to effectively address water quality issues related to agricultural nutrients through development of an "intelligent" automated computer module for use by agency extension personnel to assist producers in the selection of Best Management Practices (BMPs) to reduce nutrient loadings to surface waters in Florida. This initiative is in response to increased pressure on the state of Florida, to reduce nutrient levels in impaired water bodies to meet federally-mandated standards. The module will automate the current manual checklist method of assisting producers with BMP selection. The module will be used to gather information from producers on existing farm management practices. Two workshops were convened with the Florida Department of Agriculture and Consumer Services (FDACS) to gather input, discuss agency needs and design the module. Other on-going faculty research focuses on the "Assessment of Bacterial Impairment in Two Rural Watersheds in North Florida" where samples from the creeks are being evaluated for fecal coliform counts and nitrate levels. Other research focuses on levels of pharmaceuticals namely estradiol, an estrogen hormone found in Water in Tallahassee. The water quality laboratory in the Center was enhanced through the acquisition of an Inductive coupled plasma optical emission spectrometer (ICP-OES), Ion Chromatograph, Microwave Digestor and Laboratory Information Management System (LIMS) Software. These instruments were installed and methods were set up for conducting various analyses. The LIMS database software which has been installed to track soil and water analysis data in the center is now implemented and is being used to electronically store the analytical data generated in the lab. Also a microbiology lab was set up for the analysis of total coliform, fecal coliform and E.coli in water samples. Several undergraduate and graduate students from the center were provided experimental learning opportunities in the center laboratories (water quality, soil science and GIS laboratories) with were employed to work in the laboratory. Ongoing continues on the revision of graduate and curriculum in Soil and Water Science. Research accomplishment into the fourth year of the Evans Allen Funded project on the Apalachicola watershed included: studying the effects of land-use practices on aquatic insect communities in streams of the Apalachicola Bluffs and Ravines Region. Specifically, investigating the effects of how dammed ravine streams, to create impoundments affects aquatic insect communities of these headwater streams. Results showed that dammed streams had higher water temperatures during the summer and that they had less species richness and diversity.

Strategic Research for the Management of Invasive Pest Species: The Center for Biological Control was established as a unique partnership between FAMU, the USDA -ARS and the USDA -APHIS. The Center conducts research on the ecologically-based management of established pests and invasive alien species; provides education and training opportunities to undergraduate and graduate students with internships scholarships, and fellowships; transfers knowledge to the public through workshops, newsletters and extension services; and strengthens national and international collaborations. In 2012, the Center began implementing its fourth five-year plan under the "Strategic Research for the Management of Invasive Pest Species" 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 comprehensive, approach that includes prevention and mitigation. Should alien invasive species gain entry, then emphasis switches to early detection, eradication, and management. Thus, the strategic research on IAS ranges 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 other grants from NIFA and cooperative agreements with APHIS and ARS. The Center is also actively involved in training students. During 2012, the Center hosted 16 graduate students (three of them graduated with a MS. Degree) and 8 undergraduate students, who are actively involved in the research activities. Faculty and students have been recipients of several Awards at professional meetings (Entomological Society of America Annual meeting, Minorities in Agriculture, Natural Resources and Related Sciences, Association of Research Directors Symposium...). The Faculty was very successful in securing extramural funds to support the programs of the Center. Our patent applications on the production of fungus spores of *Metarhizium* to control the destructive and invasive alien pest of honey bee colonies is pending; it should provide new control avenues to beekeeping and enhance crop pollination. Center faculty also participated in several training workshops, national and international collaborations and other extension led activities.

Rural Development and Statewide Goat Research: The rural development research program is focused on providing science based research information to rural communities as well as limited resource citizens of urban communities in collaboration with community based as well as faith based organizations. During 2012, the program was focused on community development, asset building, hunger, homelessness and climate change. In addition, an environmental education and asset curriculum was developed in collaboration with community based organizations and university personnel. This curriculum may be used across the life span to develop a community driven process of preserving the environment and acquiring assets. Participants in these meetings were able to see how the decisions they made impacted other areas in their county. Each of the programs/activities provided opportunities in those targeted audiences to improve their acquisition of services and or facilitate their engagement with their respective audiences.

Bioenergy Research: During 2012, the Bioenergy Research Program carried out integrated activities that linked closely with both extension and teaching. In particular, the group focused its activities in two strategic areas: 1) Biofuels, and 2) Bio-products. The research activities focused on: feedstock development, conversion processes and system integration. These three enabling activities are critical to the development of newly emerging national industries for biofuels and bio-products. The feedstock development work focused on agroforestry evaluation of fast growing tree species. Activities under conversion processes were directed at understanding microbial hydrolysis mechanisms. System integration activities focused on growing algae in waste water. The potential for positive state and national impact is tremendous, as Florida has the abundant biomass resources. By using waste water to grow algae and agroforestry techniques for feedstock development, a biomass initiative will spawn a brand new industry in Florida. Small farmers could generate new incomes by using thousands of acres now largely considered wastelands. In addition, technologies developed at CAFS can be transferred to our industrial partners for commercialization, which will be a significant boost towards energy independence. In addition to the research activities, the program also provided opportunities for experiential training for both undergraduate and graduate students. In addition, two biofuels conferences were held on the FAMU campus in 2012. These outreach priorities were geared toward farmers, landowners, processors, stake holders, advocacy groups and consumers. Priorities included enhancing public familiarity and exposure to bio-based industries and sustainability concepts to create more informed producers and consumers.

Total Actual Amount of professional FTEs/SYs for this State

| Year: 2012 | Extension | | Research | |
|------------|-----------|------|----------|------|
| | 1862 | 1890 | 1862 | 1890 |
| Plan | 0.0 | 0.0 | 0.0 | 25.0 |
| Actual | 0.0 | 0.0 | 0.0 | 30.3 |

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

- Internal University Panel
- Combined External and 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 maintenance of a high quality and accountability of its research program, FAMU has implemented a revised process for the review and monitoring of research projects funded under the Evans-Allen program. Project ideas are developed from the bottom up, with ideas being generated by individual or groups of faculty in response to stakeholder needs. Center Advisory Councils play an important role in identifying priorities. Project ideas fall within the priority areas identified in the university's strategic plans. Additionally, the project ideas are also linked to priority areas for USDA and/or the state of Florida. Full proposals are developed by faculty/unit leader teams and once completed these are subjected to a peer review process. The main objective of the process is to assure quality, scientific merit, feasibility and impact of the proposed research. The review process proceeds through a series of steps. 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 including at least one external reviewer. The internal reviewers are drawn from among CAFS faculty while external reviewers may be drawn from among 1890 and 1862 scientists, CARET representatives, commodity associations, extension workers and other stakeholders. Comments or suggestions made for improvement of the proposal are then incorporated into the revised proposal. Planned programs are monitored through annual evaluation which will include review by Center Advisory Councils as appropriate. The five year POW modified every year to ensure it continues to meet the requirements and the needs of the program. During 2012, planned programs were reviewed by the different Center Advisory Councils. In addition, the programs were discussed with different stakeholder groups such as the Florida Viticulture Advisory Council Meeting and at the annual meetings of the Florida Grape Growers Association.

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
- Survey of traditional stakeholder groups
- Survey of traditional stakeholder individuals
- Survey specifically with non-traditional groups
- 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 three 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 including USDA ARS and USDA APHIS, and state agencies (Florida Department of Agriculture and Consumer Services and Florida Fish and Wildlife Commission), FAMU Extension, University of Florida and Pest Management Industry. Advisory Councils generally met at least once during the 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. Both traditional and nontraditional stakeholders were encouraged to participate in the planning process. In addition program newsletters were mailed to stakeholders and direct contact was made through the mail, email or telephone.

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.

The linkage between the research program and FAMU's extension and teaching programs continues to be critical in this process. 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 the general public (open meeting advertised to all)
- Meeting specifically with non-traditional groups
- Survey specifically with non-traditional groups
- 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 farmer and commodity groups. These activities were coordinated with FAMU's extension program in order to avoid duplication and ensure maximum synergy. 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/revision of 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 and biosecurity, 4) rural development and development of small ruminant production, 5) development of bioenergy opportunities especially for small farming systems, 6) climate change as a cross cutting issue, and 7) adolescent and childhood obesity.

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 | 2078987 |

| 2. Totaled Actual dollars from Planned Programs Inputs | | | | |
|---|--------------------------------|-----------------------|-----------------|--------------------|
| Extension | | | Research | |
| | Smith-Lever 3b & 3c | 1890 Extension | Hatch | Evans-Allen |
| Actual Formula | 0 | 0 | 0 | 1942316 |
| Actual Matching | 0 | 0 | 0 | 971159 |
| Actual All Other | 0 | 0 | 0 | 0 |
| Total Actual Expended | 0 | 0 | 0 | 2913475 |

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

V. Planned Program Table of Content

| S. No. | PROGRAM NAME |
|--------|--|
| 1 | Global Food Security and Hunger - Viticulture and Small Fruits Research |
| 2 | Global Food Security and Hunger - Strategic Research for the Management of Invasive Pest |
| 3 | Climate Change - Preserving Water Quality of North Florida Watersheds |
| 4 | Climate Change - Rural Development and Climate Change Research Program |
| 5 | Sustainable Energy - Bioenergy Research |
| 6 | Childhood Obesity - Research |
| 7 | Food Safety - Research |

V(A). Planned Program (Summary)

Program # 1

1. Name of the Planned Program

Global Food Security and Hunger - Viticulture and Small Fruits Research

Reporting on this Program

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

| KA Code | Knowledge Area | %1862 Extension | %1890 Extension | %1862 Research | %1890 Research |
|---------|---|-----------------|-----------------|----------------|----------------|
| 201 | Plant Genome, Genetics, and Genetic Mechanisms | | | | 25% |
| 203 | Plant Biological Efficiency and Abiotic Stresses Affecting Plants | | | | 25% |
| 205 | Plant Management Systems | | | | 50% |
| | Total | | | | 100% |

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

| Year: 2012 | Extension | | Research | |
|--------------------------|-----------|------|----------|------|
| | 1862 | 1890 | 1862 | 1890 |
| Plan | 0.0 | 0.0 | 0.0 | 6.0 |
| Actual Paid Professional | 0.0 | 0.0 | 0.0 | 10.0 |
| Actual Volunteer | 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 | 794090 |
| 1862 Matching | 1890 Matching | 1862 Matching | 1890 Matching |
| 0 | 0 | 0 | 397045 |
| 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 Viticulture and Small Fruit Research Program conducted a wide range of viticulture research to address industry needs and concerns, and provided services to help stakeholders in the industry. The program also conducted research on non-traditional small fruits, including chestnuts, for North Florida.

Faculty were involved in statewide extension and outreach activities as well as in teaching and training graduate and undergraduate students. Activities under the research program focused on the following areas:

- Development of new and improved grape cultivars for Florida.
- Screening hybrid selections for superior characteristics in muscadines and Florida Hybrids Bunch grapes.
- Investigating the mechanism of host resistance of downy mildew.
- Evaluation of germplasm for disease resistance in Florida hybrid bunch grapes.
- Identification of best management practices for Florida grapes and small fruits.
- Identification of important viticulture genetic markers.
- Identification of an characterization of leaf proteins in Vitis species to improve their photosynthetic efficiency and sugar content and composition.
- Determining the relationship between sucrose content and invertase activity in muscadine grapes.
- Characterization of berry proteome to identify proteins associated with disease tolerance and nutraceutical properties of muscadine grapes.
- Determining the synthetic and accumulation patterns of nutraceutical compounds in developing and ripening muscadine grapes.
- Metagenomics study of muscadine grape berry to isolate and characterize berry micro flora beneficial to human health.
- Evaluation of triploids and tetraploids for development of seedless muscadine grapes.
- Development of disease and virus free explants of muscadine and bunch grapes for the clean vine project.
- Invitro evaluation of strains of subepidermal cells of muscadine pericarp for use as a source of flavonoid compounds.
- Development of new value-added products from grapes.
- Evaluation of non-traditional small fruits, blackberries and raspberries for North Florida.
- Evaluation of chestnuts for North Florida.
- Evaluation of IPM strategies on vegetables.

In addition faculty were involved in several extension and outreach activities including the following:

- Student training, community service and youth development.
- Seminars and workshops for grape growers and general public.
- Grape Growers Field Day
- Grape Harvest Festival
- 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, grape nurseries, small minority farmers and rural communities, chestnut growers and graduate and undergraduate students working in viticulture and small fruits. The secondary stakeholders and target audience included: hobbyists and homeowners with grapes and small fruits, home winemakers and Florida nurseries.

3. How was eXtension used?

Extension was used to reach out to our target audience to help them in their farming operations by providing new knowledge and information on problem solving and new opportunities in farming. Extension was also used to promote the various events that were organized by the Center.

V(E). Planned Program (Outputs)

1. Standard output measures

| 2012 | Direct Contacts Adults | Indirect Contacts Adults | Direct Contacts Youth | Indirect Contacts Youth |
|---------------|------------------------|--------------------------|-----------------------|-------------------------|
| Actual | 3250 | 1500 | 220 | 210 |

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

Patent Applications Submitted

Year: 2012
 Actual: 4

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

| 2012 | Extension | Research | Total |
|---------------|-----------|----------|-------|
| Actual | 0 | 7 | 7 |

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Hybrid seedlings from breeding program.

| | |
|-------------|---------------|
| Year | Actual |
| 2012 | 1506 |

Output #2

Output Measure

- Advanced hybrid selection.

| Year | Actual |
|-------------|---------------|
| 2012 | 18 |

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

| O. No. | OUTCOME NAME |
|--------|---|
| 1 | Continued industry growth - increased in new vineyards and wine production in the state. |
| 2 | Release of new cultivars (change in knowledge). |
| 3 | Release of new cultivars (change in action). |
| 4 | Release of new cultivars (change in condition). |
| 5 | Public and stakeholder participation at workshops, field days, seminars and harvest festival (change in action). |
| 6 | Public and stakeholder participation at workshops, field days, seminars and harvest festival (change in condition). |

Outcome #1

1. Outcome Measures

Continued industry growth - increased in new vineyards and wine production in the state.

2. Associated Institution Types

- 1890 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

| Year | Actual |
|-------------|---------------|
| 2012 | 35000 |

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

The Florida grape and wine industry including: growers, wineries and consumers.

What has been done

New knowledge on vineyard management, value-added products, and small fruit management was generated. The breeding program has progressed satisfactorily and several advanced lines are being evaluated in preparation for release in the near future. Several important genetic markers, genes, proteins and metabolites were identified and these will greatly facilitate the breeding and biotechnology programs. A patent application on the production of in-vitro strains of sub-epidermal cells of muscadine grapevine pericarp for use as a source of flavonoid compounds is pending. Research on value-added products has resulted in the submission of four patent applications for the production of nutraceuticals.

Results

New vineyard acreage increased by 16 acres. In 2012 there were 16 Florida Farm Wineries which produced about 435,000 gallons of wine in 2012, an increased of about 35,000 gallons. More people are interested in Florida grapes and wines as reflected by increased attendance in workshops, field days and the grape harvest festival.

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

Release of new cultivars (change in knowledge).

Not Reporting on this Outcome Measure

Outcome #3

1. Outcome Measures

Release of new cultivars (change in action).

Not Reporting on this Outcome Measure

Outcome #4

1. Outcome Measures

Release of new cultivars (change in condition).

Not Reporting on this Outcome Measure

Outcome #5

1. Outcome Measures

Public and stakeholder participation at workshops, field days, seminars and harvest festival (change in action).

2. Associated Institution Types

- 1890 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

| Year | Actual |
|-------------|---------------|
| 2012 | 3500 |

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Grape growers, processors, small fruit growers and local rural communities were directly impacted by FAMU's viticulture and small fruit program.

What has been done

New knowledge on vineyard management, value-added products, small fruit management, and vegetable production using Integrated Pest Management techniques were shared with stakeholders and thus leading to increased industry growth, productivity and farm income through extension and outreach activities.

Results

- Greater public awareness of Florida grapes, wines and non-traditional small fruits.
- Increased production and sale of Florida wines.
- Increased faculty productivity in research output and grant procurement.
- Increased production of vegetables by local and rural communities.
- 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 |

Outcome #6

1. Outcome Measures

Public and stakeholder participation at workshops, field days, seminars and harvest festival (change in condition).

Not Reporting on this Outcome Measure

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 (Three tier system). This requirement restricts the ability of Florida wineries, particularly the small wineries, to market their wines to retail stores. Small wineries are often unable to pay for the services of distributors or distributors are not interested in promoting Florida wines because of the relatively low market volume. The sale of non-Florida wines presents a formidable challenge to the local wine industry.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

The evaluation results indicated that the program achieved satisfactory progress towards meeting the goals in the plan of work. Program faculty have been very productive in terms of publishing their research in reputable journals and participating in relevant scientific meetings. They have also been successful in procuring external grants from various agencies to further support the program. The breeding program continued to evaluate several advanced lines that are being prepared for release in the near future. Several important genetic markers, genes, proteins and metabolites were identified and these are expected to greatly facilitate the breeding and biotechnology efforts. A patent application on the production of in-vitro strains of sub-epidermal cells of muscadine grapevine pericarp for use as a source of flavonoid compounds is pending. However, several cosmetic products incorporating the sub-epidermal cells have been developed and are under evaluation. Research on value-added products yielded encouraging results as evidenced by the submission of four patent applications for the production of nutraceuticals. The small fruit program continued to evaluate non-traditional small fruits, including raspberries and blackberries. The results from these evaluations will be used to make appropriate

recommendations for small and limited resource farmers. Extension and outreach activities have been very successful and effective. Stakeholder and public participation in events such as workshops, grape field days, IPM field day, seminars and grape harvest festival has been high.

Key Items of Evaluation

V(A). Planned Program (Summary)

Program # 2

1. Name of the Planned Program

Global Food Security and Hunger - Strategic Research for the Management of Invasive Pest Species

Reporting on this Program

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

| KA Code | Knowledge Area | %1862 Extension | %1890 Extension | %1862 Research | %1890 Research |
|---------|---|-----------------|-----------------|----------------|----------------|
| 135 | Aquatic and Terrestrial Wildlife | | | | 25% |
| 211 | Insects, Mites, and Other Arthropods Affecting Plants | | | | 25% |
| 215 | Biological Control of Pests Affecting Plants | | | | 25% |
| 216 | Integrated Pest Management Systems | | | | 25% |
| | Total | | | | 100% |

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

| Year: 2012 | Extension | | Research | |
|--------------------------|-----------|------|----------|------|
| | 1862 | 1890 | 1862 | 1890 |
| Plan | 0.0 | 0.0 | 0.0 | 5.0 |
| Actual Paid Professional | 0.0 | 0.0 | 0.0 | 4.0 |
| Actual Volunteer | 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 | 299085 |
| 1862 Matching | 1890 Matching | 1862 Matching | 1890 Matching |
| 0 | 0 | 0 | 149543 |
| 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

Offshore research: Offshore research on seven high risk species (Planococcus lilacinus, Rhyncophorus ferrugineus, Rhyncophoruscruentatus and Rhyncophoruspalmarum, Oxycarenus hyalinipennis, Tuta absoluta, and Anastrepha grandis)was carried out or initiated in Trinidad, Dominican Republic, Curacao and Aruba, Kenya, and Panama with a view to generate data on biology, ecology, surveillance and control. These pests are listed as high priority threats by USDA APHIS. Research activities were conducted in collaboration with several international partners.

Onshore research: Biological control of Hydrilla verticillata. A survey of the upper 1.5 miles of the river of the Wacissa Springs Group was conducted. A descriptive scale of 0-3 was used with 0 indicating Hydrilla undetected and 3 completely choked. Survey results of the Wacissa River indicated varying levels of Hydrilla infestations. Thus, for mitigation purpose, cultures of Hydrilla were established in the laboratory from Wacissa Big Blue Spring, Wacissa #2 and Garner Spring. The Hydrilla tip mining midge, Cricotopus lebetis were reared in the laboratory for release into Wacissa River to assess its effectiveness in controlling Hydrilla.

Benefits and risks of biological control: The effectiveness of risk communication activities for entomophagous biological control agents were compiled. Data on classical and fortuitous biological control were collected for use to populate existing or new databases. These data allow the testing on hypothesis relating to safety issues.

2. Brief description of the target audience

The target audience include: federal and state biosecurity agencies, farmers, general public, extension workers and pest management specialists. For instance, the information on the invasive weed Hydrilla will be used by target fishermen and general public (who use the aquatic resources for recreation), water resource managers and private industry such as bottled water enterprises. The work on offshore pests is aimed at safeguarding US Agriculture, farmers, food and ornamental growers, the nursery industry and government agencies

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

| 2012 | Direct Contacts Adults | Indirect Contacts Adults | Direct Contacts Youth | Indirect Contacts Youth |
|---------------|------------------------|--------------------------|-----------------------|-------------------------|
| Actual | 200 | 500 | 50 | 1500 |

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

Patent Applications Submitted

Year: 2012
 Actual: 2

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

| 2012 | Extension | Research | Total |
|--------|-----------|----------|-------|
| Actual | 3 | 9 | 12 |

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Electronic identification keys/tools/resources developed.

| Year | Actual |
|------|--------|
| 2012 | 2 |

Output #2

Output Measure

- Knowledge generated on specific target pests and used for the development of contingency plans.

| Year | Actual |
|------|--------|
| 2012 | 6 |

Output #3

Output Measure

- Analyses conducted on key issues regarding safety and specific target biological control agents studied to determine safety.

| Year | Actual |
|------|--------|
| 2012 | 2 |

Output #4

Output Measure

- Target biological control agents introduced and established against specific insect pest or weed targets.
Not reporting on this Output for this Annual Report

Output #5

Output Measure

- Undergraduate and graduate students trained through mentorship and involvement in research programs.

| Year | Actual |
|-------------|---------------|
| 2012 | 26 |

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

| O. No. | OUTCOME NAME |
|--------|--|
| 1 | Digital identification keys/tools/resources for the identification of invasive species utilized. |
| 2 | More effective strategies for the identification, prevention or management of invasive species. |
| 3 | Integrated pest management approaches adopted by farmers leading to greater profitability. |
| 4 | The introduction and spread of IAS minimized. |
| 5 | More effective management of aquatic weeds in first order springs. |
| 6 | Trade between the US and partners is safer through implementation of strategies to mitigate the introduction of invasive insect pests and weeds. |
| 7 | Well trained undergraduates and graduates contribute to the effective management of native and non-native pests |

Outcome #1

1. Outcome Measures

Digital identification keys/tools/resources for the identification of invasive species utilized.

Not Reporting on this Outcome Measure

Outcome #2

1. Outcome Measures

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

Not Reporting on this Outcome Measure

Outcome #3

1. Outcome Measures

Integrated pest management approaches adopted by farmers leading to greater profitability.

Not Reporting on this Outcome Measure

Outcome #4

1. Outcome Measures

The introduction and spread of IAS minimized.

Not Reporting on this Outcome Measure

Outcome #5

1. Outcome Measures

More effective management of aquatic weeds in first order springs.

2. Associated Institution Types

- 1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

| Year | Actual |
|-------------|---------------|
| 2012 | 1 |

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Hydrilla, an invasive and noxious weed is considered the second most important aquatic weed world-wide behind water hyacinth. Currently, many springs and first order streams in Florida are infested with this weed. As a result, the ecosystem has degraded, and the spring and river's ecological and recreational value has drastically diminished. Thus, the understandings of the risk of spread of Hydrilla to non-infested bodies of water and methods to mitigate the risk are needed. A range of stakeholders including: fisherman, canoeists, kayakers, boaters, swimmers, scuba divers, water resource managers, private industry is affected.

What has been done

Surveys of the Wacissa River indicated varying levels of Hydrilla infestations.

A web site was established to disseminate knowledge to these groups. An awareness campaign has been mounted using brochures and other paraphernalia such as, hats, and rulers.

Results

The Hydrilla tip mining midge, *Cricotopus lebetis* is being reared in the laboratory for release into Wacissa River to assess its effectiveness in controlling Hydrilla.

The web site is active and is providing knowledge to these groups. Public awareness materials have also been disseminated to stakeholders.

4. Associated Knowledge Areas

| KA Code | Knowledge Area |
|----------------|--|
| 135 | Aquatic and Terrestrial Wildlife |
| 215 | Biological Control of Pests Affecting Plants |
| 216 | Integrated Pest Management Systems |

Outcome #6

1. Outcome Measures

Trade between the US and partners is safer through implementation of strategies to mitigate the introduction of invasive insect pests and weeds.

Not Reporting on this Outcome Measure

Outcome #7

1. Outcome Measures

Well trained undergraduates and graduates contribute to the effective management of native and non-native pests

Not Reporting on this Outcome Measure

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 Programmatic Challenges

Brief Explanation

Government regulations regarding globalization of trade and transport has multiplied concerns of introduction of invasive species. This threat has increased as trade has grown and so have the complexities of trade especially in agricultural products. Increase in temperature improves the survival and rapid spread of arthropods pests to new environment where they become very destructive and difficult to control.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

The overall implementation of the research program in the Center for Biological Control was evaluated by the Center Advisory Council in May 2, 2012 and found to be progressing satisfactorily.

The Coffee mealybug, *Planococcus lilacinus* is particularly a serious threat because of its wide range of host plants. A country-wide survey in the Dominican Republic revealed the following species of mealybug: *Dysmicoccus boninsis*, *Dysmicoccus brevipes*, *Dysmicoccus neobrevipes*, *Ferrisia virgata*, *Hypogeococcus pungens*, *Paracoccus marginatus*, *Planococcus citri*, *Planococcus minor*, *Pseudococcus jackbeardsleyi*, *Puto barberi* and *Saccharicoccus*

sacchari. The parasitoid *Leptomastix dactylopii* was found attacking mealybugs in several genera including *Dysmicoccus*, *Planococcus*, *Paracoccus* and *Puto*. In addition, insect predators such as *Cryptolaemus montrouzieri* and *Cycloneda sanguinea* were also present in the areas surveyed, as well as the predatory Dipteran larvae: *Syrphidae*. Fortunately, the destructive species of mealybug, *P. lilacinus* was not found during the country wide survey.

Red palm weevil: Studies on *Rhyncophorus ferrugineus* were continued in Aruba and Curacao with efforts being targeted on development of trapping methods. The preliminary results of the acoustical analyses for *R. ferrugineus* indicated that early instar larvae were detectable in the field. This information is useful should the pest become introduced into the United States. In addition, data indicated that no *R. cruentatus* or *R. cruentatus* were captured in the survey in Aruba and these two species did not appear to be current threats to palms on the island

Hydrilla; The development of a biological control strategy for the invasive weed, *Hydrilla verticillata* was continued. Surveys of the Wacissa River indicated varying levels of *Hydrilla* infestations. For this purpose, the *Hydrilla* tip mining midge, *Cricotopus lebetis* was reared in the laboratory for release into Wacissa River to assess its effectiveness in controlling *Hydrilla*.

Key Items of Evaluation

Coffee mealybug: This invasive species (*Planococcus lilacinus*) is serious threat to US agriculture because of its wide range of host plants. It is a very detrimental pest in the Caribbean and its introduction in the US will have detrimental consequences. As a result, there is an urgent need to study the biology and dynamics of the pest populations and design management strategies.

Red palm Weevil: The red palm weevil is a major threat to the United States. Knowledge from this program will be beneficial to prevention/management programs. This is particularly relevant given the current concerns about the possible introduction of this pest in California.

Hydrilla: This study not only evaluates the efficacy of biological control agents for control and the management of the invasive aquatic weed in the Wacissa Springs and Wacissa River, but also, it provides experiential learning opportunities for students.

V(A). Planned Program (Summary)

Program # 3

1. Name of the Planned Program

Climate Change - Preserving Water Quality of North Florida Watersheds

Reporting on this Program

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

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

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

| Year: 2012 | Extension | | Research | |
|--------------------------|-----------|------|----------|------|
| | 1862 | 1890 | 1862 | 1890 |
| Plan | 0.0 | 0.0 | 0.0 | 6.0 |
| Actual Paid Professional | 0.0 | 0.0 | 0.0 | 5.0 |
| Actual Volunteer | 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 | 548420 |
| 1862 Matching | 1890 Matching | 1862 Matching | 1890 Matching |
| 0 | 0 | 0 | 274210 |
| 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 fourth year of the planned program were: on-going investigation of soil and nutrient erosion study in the Mear's Farm; collection and analysis of soil samples; investigated effect of dammed ravines on aquatic insect communities and sampling and collection of aquatic insects

2. Brief description of the target audience

The target audience for the program include: crop producers in the Apalachicola River Watershed, soil and water conservation organizations and personnel, extension workers, and small and limited resource farmers within the basin.

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

| 2012 | Direct Contacts Adults | Indirect Contacts Adults | Direct Contacts Youth | Indirect Contacts Youth |
|---------------|------------------------|--------------------------|-----------------------|-------------------------|
| Actual | 75 | 90 | 40 | 50 |

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

Patent Applications Submitted

Year: 2012
 Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

| 2012 | Extension | Research | Total |
|---------------|-----------|----------|-------|
| Actual | 0 | 3 | 3 |

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

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

Year Actual

2012 2

Output #2

Output Measure

- Data on soil erosion and nutrient loss under irrigated and non irrigated conditions.

| Year | Actual |
|-------------|---------------|
| 2012 | 3 |

Output #3

Output Measure

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

| Year | Actual |
|-------------|---------------|
| 2012 | 2 |

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

| O. No. | OUTCOME NAME |
|--------|--|
| 1 | Information on changing land-use patterns in the Apalachicola River Watershed. |
| 2 | Comparison of soil erosion measurements by the Mesh-bag method and the simulation results of RUSLE (the Universal Soil Loss Equation). |
| 3 | Identification of best management practices for efficient management of soil, water and nutrients. |
| 4 | Improvements of stream ecosystems. |

Outcome #1

1. Outcome Measures

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

2. Associated Institution Types

- 1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

| Year | Actual |
|-------------|---------------|
| 2012 | 0 |

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

The Apalachicola River Basin is a part of the greater Apalachicola-Chattahoochee- Flint Basin comprising almost 20, sq miles spread 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 needs in Florida. An inventory of land use pattern will assist the decision makers in maintaining water sustainability in the region. Agriculture being the major user of the water resources, it is imperative that we understand and plan for the future needs and how they will be met.

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. Also developing GIS-based data information to look at the land use/land -cover changes.

Results

Land-use/land-cover maps have been developed for the Apalachicola Watershed.

4. Associated Knowledge Areas

| KA Code | Knowledge Area |
|----------------|---|
| 111 | Conservation and Efficient Use of Water |

Outcome #2

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 | Actual |
|-------------|---------------|
| 2012 | 3 |

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 in developing scientific conservation policy and helpful to decision makers and farmers, because quality field soil erosion data is 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 particular conservation practice.

What has been done

We surveyed and generated detailed landscape micro topographic (contour) map of the 163 acre Mears Farm in Marianna, Florida (peanut and cotton rotation). We conducted experiments using mesh bags and mesh sheets to study the redistribution of eroded soil and associated nutrient loss during rain events. Soil loss and soil redistribution amounts were calculated.

Results

We have generated detailed micro topographic maps of the study areas. According to the topo 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 |

Outcome #3

1. Outcome Measures

Identification of best management practices for efficient management of soil, water and nutrients.

Not Reporting on this Outcome Measure

Outcome #4

1. Outcome Measures

Improvements of stream ecosystems.

Not Reporting on this Outcome Measure

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Public Policy changes
- Government Regulations
- Other (Suitable study site)

Brief Explanation

Over the 2011, the fields under study received 20-30% less rainfall. The crop residues left after harvesting of the peanut crop were minimal.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Our results show that the mesh-bag method can be successfully deployed to observe soil nutrient erosion under un-obstructed natural run-off field conditions of relatively large-scale field experiments. This is the first time a true field soil erosion technology has been developed to observe true soil erosion process in natural field conditions. The development of this technology will fill a significant gap in soil and water conservation science and will provide valuable information that has been unavailable in the past for the verification, validation and calibration of soil erosion models. The biological monitoring employed in this study may be effectively used in developing watershed protection and ecosystem management strategies.

Key Items of Evaluation

The mesh-bag method to estimate soil erosion under irrigated and non-irrigated conditions provides valuable information regarding the redistribution of top soil.

The EPT (Ephemeroptera, Plecoptera, Tricoptera) Aquatic Index may be used to determine the water quality status of freshwater streams in a watershed.

V(A). Planned Program (Summary)

Program # 4

1. Name of the Planned Program

Climate Change - Rural Development and Climate Change Research Program

Reporting on this Program

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

| KA Code | Knowledge Area | %1862 Extension | %1890 Extension | %1862 Research | %1890 Research |
|---------|--|-----------------|-----------------|----------------|----------------|
| 132 | Weather and Climate | | | | 25% |
| 605 | Natural Resource and Environmental Economics | | | | 25% |
| 608 | Community Resource Planning and Development | | | | 25% |
| 803 | Sociological and Technological Change Affecting Individuals, Families, and Communities | | | | 25% |
| | Total | | | | 100% |

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

| Year: 2012 | Extension | | Research | |
|--------------------------|-----------|------|----------|------|
| | 1862 | 1890 | 1862 | 1890 |
| Plan | 0.0 | 0.0 | 0.0 | 4.0 |
| Actual Paid Professional | 0.0 | 0.0 | 0.0 | 1.0 |
| Actual Volunteer | 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 | 154948 |
| 1862 Matching | 1890 Matching | 1862 Matching | 1890 Matching |
| 0 | 0 | 0 | 77474 |
| 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 rural development and climate change project is an integrated effort. The asset building and climate change joint venture will enhance the economic base of the community while incorporating environmental procedures that will result in high productivity. The following activities will be undertaken during the implementation of the planned program: Research and demonstration studies and needs surveys and focus groups, experimental studies, training of students, workshops and conferences.

2. Brief description of the target audience

The target audience for this program includes small/limited resource farmers, extension workers, rural residents, families and community groups.

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

| 2012 | Direct Contacts Adults | Indirect Contacts Adults | Direct Contacts Youth | Indirect Contacts Youth |
|---------------|------------------------|--------------------------|-----------------------|-------------------------|
| Actual | 150 | 200 | 75 | 150 |

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

Patent Applications Submitted

Year: 2012

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

| 2012 | Extension | Research | Total |
|---------------|-----------|----------|-------|
| Actual | 3 | 1 | 4 |

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Increase producer/community participation in rural development activities

| Year | Actual |
|-------------|---------------|
| 2012 | 8 |

Output #2

Output Measure

- Number of producers/communities adopting proposed interventions

| Year | Actual |
|-------------|---------------|
| 2012 | 4 |

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

| O. No. | OUTCOME NAME |
|--------|--|
| 1 | Improved environmental stewardship |
| 2 | A functional network mobilizing and supporting organizations and coalitions focused on asset building for people of all income levels. |
| 3 | Improved procedures and techniques for preserving natural resources and conservation widely adopted. |

Outcome #1

1. Outcome Measures

Improved environmental stewardship

Not Reporting on this Outcome Measure

Outcome #2

1. Outcome Measures

A functional network mobilizing and supporting organizations and coalitions focused on asset building for people of all income levels.

Not Reporting on this Outcome Measure

Outcome #3

1. Outcome Measures

Improved procedures and techniques for preserving natural resources and conservation widely adopted.

2. Associated Institution Types

- 1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

| Year | Actual |
|-------------|---------------|
| 2012 | 0 |

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code Knowledge Area

| | |
|-----|--|
| 132 | Weather and Climate |
| 605 | Natural Resource and Environmental Economics |
| 608 | Community Resource Planning and Development |
| 803 | Sociological and Technological Change Affecting Individuals, Families, and Communities |

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Appropriations changes
- Public Policy changes
- Competing Public priorities
- Competing Programmatic Challenges
- Populations changes (immigration, new cultural groupings, etc.)

Brief Explanation

V(I). Planned Program (Evaluation Studies)

Evaluation Results

The Programs/activities provided opportunities in those targeted audiences to improve their acquisition of services and or facilitate their engagement with their respective audiences. It is expected that the results will show neighborhood change over a five year period. Policy makers at the local, state and federal level may use the results to demonstrate neighborhood economic change. The program activities also provided an opportunity for grass roots community based organizations and universities to be engaged in the planning as well a data collection phase of a proposed federal black belt initiative.

Key Items of Evaluation

V(A). Planned Program (Summary)

Program # 5

1. Name of the Planned Program

Sustainable Energy - Bioenergy Research

Reporting on this Program

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

| KA Code | Knowledge Area | %1862 Extension | %1890 Extension | %1862 Research | %1890 Research |
|---------|--|-----------------|-----------------|----------------|----------------|
| 511 | New and Improved Non-Food Products and Processes | | | | 100% |
| | Total | | | | 100% |

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

| Year: 2012 | Extension | | Research | |
|--------------------------|-----------|------|----------|------|
| | 1862 | 1890 | 1862 | 1890 |
| Plan | 0.0 | 0.0 | 0.0 | 2.0 |
| Actual Paid Professional | 0.0 | 0.0 | 0.0 | 1.0 |
| Actual Volunteer | 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 | 145773 |
| 1862 Matching | 1890 Matching | 1862 Matching | 1890 Matching |
| 0 | 0 | 0 | 72887 |
| 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

Program activities were undertaken in several areas:

a. Development of hybrid hardwood tree species, such as sweetgum, eucalyptus and other

regionally appropriate energy crops.

- b. Implementation of a sustainable approach to feedstock production including: social, economic and environmental aspects of the bioenergy production chain.
- c. Development of biological and chemical conversion technologies which will accept a diverse range of feedstocks.
- d. Promotion of small business development to create jobs and build wealth in rural areas.
- e. Training of the next generation of green workers.

2. Brief description of the target audience

The target audience still remains our main stakeholders, the limited resources land-owners and the students. The general public will also participate in some of the surveys and activities promoting biofuels in the state.

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

| 2012 | Direct Contacts Adults | Indirect Contacts Adults | Direct Contacts Youth | Indirect Contacts Youth |
|---------------|------------------------|--------------------------|-----------------------|-------------------------|
| Actual | 1000 | 500 | 500 | 3000 |

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

Patent Applications Submitted

Year: 2012
 Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

| 2012 | Extension | Research | Total |
|---------------|-----------|----------|-------|
| Actual | 0 | 6 | 6 |

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Species of plants evaluated
Not reporting on this Output for this Annual Report

Output #2

Output Measure

- Extramural grants to support bioenergy research
Not reporting on this Output for this Annual Report

Output #3

Output Measure

- Partnerships with clientele
Not reporting on this Output for this Annual Report

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

| O. No. | OUTCOME NAME |
|--------|--|
| 1 | 1. Produce graduates in the agricultural sciences 2. Produce graduates with adequate knowledge in bioenergy 3. Establish demonstration projects at the research farm in Quincy, FL |

Outcome #1

1. Outcome Measures

1. Produce graduates in the agricultural sciences 2. Produce graduates with adequate knowledge in bioenergy 3. Establish demonstration projects at the research farm in Quincy, FL

2. Associated Institution Types

- 1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

| Year | Actual |
|-------------|---------------|
| 2012 | 0 |

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

The sharing of information and ideas among scientists is vital to the advancement of the bioenergy field as is the training of students to fill critical careers in the field.

What has been done

Several manuscripts have been published. The FAMU BioEnergy group also held several workshops/conferences. At least six students are undertaking various kinds of training under the program.

Results

Six peer reviewed publications were published and in addition, three workshop/conference activities were held. 1) Biofuels workshop at the Crescent Moon Organic Farm in Sopchoppy, Florida; Biofuels Symposium held on October 10-12, 2011, on the FAMU campus. The theme of the Conference was, "training the next generation of green workers." 3) Regional bioenergy summit held on the FAMU campus on February 18-19, 2011. The theme of this summit was: "embracing our tradition of partnership summit - 1890 land grants and HBCUs reconnecting with local communities to develop a green agenda?". Two B.S., three MS and two PhDs students are currently performing research in biofuels related area.

4. Associated Knowledge Areas

| KA Code | Knowledge Area |
|----------------|--|
| 511 | New and Improved Non-Food Products and Processes |

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
- Other (Students recruitment)

Brief Explanation

Although the program was able to demonstrate tremendous accomplishments during the year, it was clear that recruitment of a laboratory technician to support to activities would enhance the program output. Additionally there is need for a full-time field worker to help run field experiments.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Two B.S., three MS and two PhDs students are currently performing research in biofuels related area. Six manuscripts were published in peer-reviewed journals with international circulation. Two major bioenergy conferences were held on FAMU campus. In addition several workshops were held on the Sopchoppy Farm where limited landowners were provided with the necessary know-how to convert used cooking oil into biodiesel. Information generated from the program was shared with the general public. In addition, two small biofuels grants from agencies other than USDA were secured to further support the program.

Key Items of Evaluation

Scope of students training opportunities.
Scientific publications.
Dissemination and outreach activities through conferences and workshops.
Efforts to secure additional program support through development of other grants proposals.

V(A). Planned Program (Summary)

Program # 6

1. Name of the Planned Program

Childhood Obesity - Research

- Reporting on this Program
- Reason for not reporting
- N

V(B). Program Knowledge Area(s)

- 1. Program Knowledge Areas and Percentage

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

| Year: 2012 | Extension | | Research | |
|--------------------------|-------------------|-------------------|-------------------|-------------------|
| | 1862 | 1890 | 1862 | 1890 |
| Plan | 0.0 | 0.0 | 0.0 | 0.0 |
| Actual Paid Professional | {NO DATA ENTERED} | {NO DATA ENTERED} | {NO DATA ENTERED} | {NO DATA ENTERED} |
| Actual Volunteer | {NO DATA ENTERED} | {NO DATA ENTERED} | {NO DATA ENTERED} | {NO DATA ENTERED} |

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

| Extension | | Research | |
|---------------------|-------------------|-------------------|-------------------|
| Smith-Lever 3b & 3c | 1890 Extension | Hatch | Evans-Allen |
| {NO DATA ENTERED} | {NO DATA ENTERED} | {NO DATA ENTERED} | {NO DATA ENTERED} |
| 1862 Matching | 1890 Matching | 1862 Matching | 1890 Matching |
| {NO DATA ENTERED} | {NO DATA ENTERED} | {NO DATA ENTERED} | {NO DATA ENTERED} |
| 1862 All Other | 1890 All Other | 1862 All Other | 1890 All Other |
| {NO DATA ENTERED} | {NO DATA ENTERED} | {NO DATA ENTERED} | {NO DATA ENTERED} |

V(D). Planned Program (Activity)

1. Brief description of the Activity

Faculty research projects will focus on finding ways to prevent or reduce incidence of childhood obesity through: development of diverse choice of health food, food product development, community

engagement, nutrition and hunger and nutrition education and behavior.

2. Brief description of the target audience

Target audience will include: low to moderate income families, school, nutrition and health professionals, community leaders and local and state level agencies.

3. How was eXtension used?

{No Data Entered}

V(E). Planned Program (Outputs)

1. Standard output measures

| 2012 | Direct Contacts Adults | Indirect Contacts Adults | Direct Contacts Youth | Indirect Contacts Youth |
|---------------|------------------------|--------------------------|-----------------------|-------------------------|
| Actual | 0 | 0 | 0 | 0 |

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

Patent Applications Submitted

Year: 2012

Actual: {No Data Entered}

Patents listed

{No Data Entered}

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

| 2012 | Extension | Research | Total |
|---------------|-----------|----------|-------|
| Actual | 0 | 0 | 0 |

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- New healthy food choices made available

| Year | Actual |
|------|--------|
| 2012 | 0 |

Output #2

Output Measure

- Food products developed and made available

| Year | Actual |
|-------------|---------------|
| 2012 | 0 |

Output #3

Output Measure

- New communities engaged

| Year | Actual |
|-------------|---------------|
| 2012 | 0 |

Output #4

Output Measure

- Number of program participants reached to improve their food resource management

| Year | Actual |
|-------------|---------------|
| 2012 | 0 |

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

| O. No. | OUTCOME NAME |
|--------|---|
| 1 | Number of youth and adolescents documented to have adopted healthy eating or more active lifestyles. |
| 2 | Number of children, adolescent and adult participants documented to have reduced chronic disease indicators associated with obesity |

Outcome #1

1. Outcome Measures

Number of youth and adolescents documented to have adopted healthy eating or more active lifestyles.

2. Associated Institution Types

- 1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

| Year | Actual |
|-------------|---------------|
| 2012 | 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 |
|----------------|-----------------------|
| {No Data} | null |

Outcome #2

1. Outcome Measures

Number of children, adolescent and adult participants documented to have reduced chronic disease indicators associated with obesity

2. Associated Institution Types

- 1890 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

| Year | Actual |
|-------------|---------------|
| 2012 | 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

{No Data} null

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Programmatic Challenges

Brief Explanation

{No Data Entered}

V(I). Planned Program (Evaluation Studies)

Evaluation Results

{No Data Entered}

Key Items of Evaluation

{No Data Entered}

V(A). Planned Program (Summary)

Program # 7

1. Name of the Planned Program

Food Safety - Research

- Reporting on this Program
- Reason for not reporting
- N

V(B). Program Knowledge Area(s)

- 1. Program Knowledge Areas and Percentage

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

| Year: 2012 | Extension | | Research | |
|--------------------------|-------------------|-------------------|-------------------|-------------------|
| | 1862 | 1890 | 1862 | 1890 |
| Plan | 0.0 | 0.0 | 0.0 | 0.0 |
| Actual Paid Professional | {NO DATA ENTERED} | {NO DATA ENTERED} | {NO DATA ENTERED} | {NO DATA ENTERED} |
| Actual Volunteer | {NO DATA ENTERED} | {NO DATA ENTERED} | {NO DATA ENTERED} | {NO DATA ENTERED} |

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

| Extension | | Research | |
|---------------------|-------------------|-------------------|-------------------|
| Smith-Lever 3b & 3c | 1890 Extension | Hatch | Evans-Allen |
| {NO DATA ENTERED} | {NO DATA ENTERED} | {NO DATA ENTERED} | {NO DATA ENTERED} |
| 1862 Matching | 1890 Matching | 1862 Matching | 1890 Matching |
| {NO DATA ENTERED} | {NO DATA ENTERED} | {NO DATA ENTERED} | {NO DATA ENTERED} |
| 1862 All Other | 1890 All Other | 1862 All Other | 1890 All Other |
| {NO DATA ENTERED} | {NO DATA ENTERED} | {NO DATA ENTERED} | {NO DATA ENTERED} |

V(D). Planned Program (Activity)

1. Brief description of the Activity

The FAMU food safety program targets a range of audiences including food producers and processors, retailers and consumers. The program focus includes applied research along the continuum from farm to the table. Specific topics will include: sources of microbial contamination and microbial

resistance and development of food processing and storage technologies. The research program will link with extension efforts to provide educational programs to clientele.

2. Brief description of the target audience

Target audiences will include, small to medium sized limited resource producers, processors, retailers and consumers.

3. How was eXtension used?

{No Data Entered}

V(E). Planned Program (Outputs)

1. Standard output measures

| 2012 | Direct Contacts Adults | Indirect Contacts Adults | Direct Contacts Youth | Indirect Contacts Youth |
|--------|------------------------|--------------------------|-----------------------|-------------------------|
| Actual | 0 | 0 | 0 | 0 |

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

Patent Applications Submitted

Year: 2012

Actual: {No Data Entered}

Patents listed

{No Data Entered}

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

| 2012 | Extension | Research | Total |
|--------|-----------|----------|-------|
| Actual | 0 | 0 | 0 |

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Specific food chains assessed to identify sources of contamination

Year

Actual

2012 0

Output #2

Output Measure

- Number of producers/processors adopting new practices/processes

| Year | Actual |
|-------------|---------------|
| 2012 | 0 |

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

| O. No. | OUTCOME NAME |
|--------|---|
| 1 | Reduction in the incidences of food borne illnesses |

Outcome #1

1. Outcome Measures

Reduction in the incidences of food borne illnesses

2. Associated Institution Types

- 1890 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

| Year | Actual |
|------|--------|
| 2012 | 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 |
|-----------|----------------|
| {No Data} | null |

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges

Brief Explanation

{No Data Entered}

V(I). Planned Program (Evaluation Studies)

Evaluation Results

{No Data Entered}

Key Items of Evaluation

{No Data Entered}