2016 University of Florida and Florida A&M University Combined Research and Extension Annual Report of Accomplishments and Results

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I. Report Overview

1. Executive Summary

The University of Florida's Institute of Food and Agricultural Sciences (UF/IFAS) is a federal-state-county partnership dedicated to developing knowledge in agriculture, human and natural resources, and the life sciences, and enhancing and sustaining the quality of human life by making that information accessible. While extending into every community of the state, UF/IFAS has developed an international reputation for its accomplishments in teaching, research and extension. Because of this mission and the diversity of Florida's climate and agricultural commodities, UF/IFAS has facilities located throughout Florida -- 14 academic departments and two schools based at the main campus in Gainesville, 18 research facilities, and an Extension office in each of Florida's 67 counties.

The research mission of UF/IFAS, conducted by the Florida Agricultural Experiment Station, is to discover new scientific knowledge, encourage innovative study and create applications based on sound science -- delivering solutions to the challenges facing agriculture, natural resources and life sciences in the State of Florida, our country and the world. Specifically, its goals include:

• Building agricultural systems research that is effective in preserving the diversity, building the strength and ensuring the development and economic sustainability of Florida's agriculture.

• Facilitating research within UF/IFAS that focuses on natural resources and environmental systems and emphasizes stewardship of the land and values of diversity in ecological systems. Programs serve to discover the underlying science of our natural resources while finding novel applications to preserve, protect and manage Florida's ecosystems.

• Focusing on human systems research and agriculture's impact on society and human behavioral issues related to food, natural resources, the environment and agriculture.

By seeking ways to enable the success of individual faculty and empowering multidisciplinary teams, we will achieve these goals and will strive to identify and meet future opportunities to further our research mission.

UF/IFAS provides research and development in support of Florida's agriculture, natural resources and related food industries. Agricultural research means that farmers can produce more fiber, food and fuel with the same amount of land and inputs; for the rest of us, research also reduces food prices, improves food safety and helps protect environmental quality. These industries are an economic powerhouse in Florida, providing more than 2.2 million jobs, $155.2 billion in direct output (revenues), $127.3 billion in value added contributions, and accounting for 15.3 percent of total economic activity in 2014.[1] According to an extensive analysis published in 2010 by a team of agricultural economists, for every $1 invested in U.S. agricultural research and development there's a return of $20 in benefits from increased agricultural productivity.[2]

The global population is expected to reach 9 billion people by 2050, which means doubling agricultural

production in order to meet food demands. Farm enterprises require new and innovative technologies to face and overcome these challenges. Artificial intelligence robotics is one of these technologies that promises to provide a solution. Resources are too thin and time is too short to achieve environmental goals without the transformative impacts of AI, along with the benefits of biotechnology. It is now clear that AI methods make it is possible to build a digital dashboard for the planet, allowing us to monitor, model, and manage environmental systems at a scale never before possible. We need more information with more frequency, than what is currently available. Several UF/IFAS researchers are using machine learning, a sub-category of AI, to address problems in natural resources research and management. Applications include optimizing complex computer models of organisms and ecosystems, and automating the interpretation and classification of remote sensing imagery. In addition, many are also heavily involved in the development and application of unmanned aerial vehicles (UAVs or drones) and remotely operated vehicles (ROVs) to efficiently obtain remote sensing data from terrestrial and marine environments. These unmanned flying or undersea robots are operated remotely or in autonomous mode to obtain data that a decade or so ago would only have been obtainable, at very high cost, from airplanes, satellites, or submarines. A biosensor research lab has developed a suite of rapid sensors for monitoring food safety (e.g., allergens, toxins, pathogenic bacteria). Machine learning algorithms process sensor data and provide early warning alarms in the event of hazard analysis and critical control points. Looking forward, this lab is initiating collaborations with industry to develop a wireless, smart sensing network that facilitates early detection in food processing facilities.

The UF/IFAS Extension mission is to develop educational programs targeting critical issues throughout Florida. These will be achieved by continuing to partner with clientele, volunteers, county governments, and public and private agencies. Teams of faculty and staff statewide focus on seven key areas:

1. Increasing the sustainability, profitability and competitiveness of agricultural and horticultural enterprises
2. Enhancing and protecting water quality, quantity and supply
3. Enhancing and conserving Florida's natural resources and environmental quality
4. Producing and conserving traditional and alternative forms of energy
5. Empowering individuals and families to build healthy lives and achieve social and economic success
6. Supporting urban and rural community resources and economic development
7. Preparing youth to be responsible citizens and productive members of the workforce

Florida Extension (UF and FAMU) has delivered science-based information to foster healthy people, a healthy environment, and a healthy economy for more than 100 years. Florida's economy is based on growth, tourism and agriculture. During the recession our population growth was largely flat, but growth has picked up recently and in 2014 the state passed New York to become the third most populous state at an estimated 19.9 million. Florida's population is estimated to reach 27.2 million by 2045.[3] With this growth comes the need for new information on food and fiber production, water conservation, natural resource protection, alternative energy and conservation, community resource development, and individual and family well-being. Extension will continue to improve the lives of Floridians as we face the challenges of tomorrow and beyond.

The goals and key areas outlined above are based on long-range, strategic planning processes by Florida Extension (UF and FAMU), resulting in the Extension Roadmap (2013-2023) and the Research Roadmap (2009, updated in 2013). While these program areas are designed to meet state needs, many directly relate to the six NIFA priorities.

In 2016, UF/IFAS Extension kicked off an 18-month project to assess the needs of urban audiences and whether we are meeting those needs. Phase 1 of the Urban Extension Needs Assessment is to conduct interviews with county faculty in four metropolitan areas to fully understand what Extension offers to urban audiences, how that differs from our more traditional audiences, and the unique challenges to working with urban audiences. A qualitative analysis of those interviews will be conducted and shared with the Extension Leadership Team and future steps will be determined.

At the request of the Florida Legislature in 2016, UF/IFAS and the Florida Department of Environmental Protection have begun a $1.6 million project designed to address the challenges in acquiring and analyzing water-related data in Florida, as well as identifying areas where there is duplication of data collection. Many state agencies collect, manage, and analyze water-related data from a wide variety of sources but access to those data by planners, researchers, and decision makers is difficult and time consuming. UF/IFAS and SAS (a leading analytics software company) have begun the process of data mapping, assessing data quality, data enrichment and analyzation. UF/IFAS has established cost-sharing partnerships with the Central Florida Water Initiative, including the Tohopekaliga Water Authority, the City of Apopka, the Orlando Utility Commission, and Orange County Utilities, and the St. Johns Water Management District.
2016 brought unexpected insect problems to the South Florida, Zika and New World Screwworm, causing potential harm to wildlife, pets and humans. The Key Deer population dropped by 10% due to the screwworm infestation until a five-month, multi-prong agency approach was implemented. Two UF/IFAS state specialists published a "Featured Creatures" article within two days of the announcement that the screwworm had reappeared after a more than 30-year absence. The document gathered 5,400 views in the first 90 days. The Florida Department of Agriculture and Consumer Services (FDACS) recently would down its screwworm efforts as no new infections have been found since January 10, 2017. UF/IFAS Extension educated the public about the Zika outbreak in an innovative, online Zika Challenge and public workshops. Extension faculty also assisted with the increased need for pesticide licensing training to mitigate the primary vector, Aedes aegypti, from urban areas.

[1]Hodges, A.W., Rahmani, M., and Stevens, T.J. 2016. Economic Contributions of Agriculture, Natural Resources and Food Industries in Florida in 2014. University of Florida/IFAS, http://edis.ifas.ufl.edu/fe993.
[2]Alston, J.M., Andersen, M.A., James, J.S., and Pardey, P.G. 2010. Persistence Pays: U.S. Agricultural Productivity Growth and the Benefits from Public R&D Spending. New York: Springer.
[3]Rayer, S. and Wang, Y. 2016. Florida Population Studies, Vol 49, Bulletin 174. University of Florida Bureau of Economic and Business Research. Online: http://tinyurl.com/hnzk322.

FAMU/CAFS--1890 Extension
Although extension in Florida is made up of a collaboration between the 1862 UF/IFAS Extension and the 1890 FAMU/CAFS Extension (and together they are the Florida Cooperative Extension Service), they will be reported separately as much as possible to provide a clearer picture of the strong programs and impact FAMU and UF/IFAS have individually on Florida and its citizens. The Cooperative Extension Program is the extension educational component of Florida A&M University's land grant mission. The FAMU Cooperative Extension Program, housed in the College of Agriculture and Food Sciences (CAFS), provides research-based educational information and direct technical assistance to improve the quality of life for limited resource citizens. As a result, countless residents in Florida have been enriched through the positive impact of significant information shared by specialists and agents through the Cooperative Extension Program. Reaching out to serve farmers, rural and urban families, elderly, youth, entrepreneurs, small business owners, and underserved communities continues to be a rich tradition of the FAMU Cooperative Extension Program.

FAMU/CAFS--1890 Research
Florida is one of the fastest growing states, currently ranking fourth in population growth after California,New York and Texas. Most of this growth has been taking place in major urban areas, but agriculture continues to play a significant role in Florida's economy. Florida's agriculture is both diverse and unique in terms of farm size, crops grown or livestock maintained, and economic investments. The changing demographics of the state and the consequent needs of our stakeholders dictate that we develop appropriate research programs which would address the key challenges to sustainable development.

Our research programs have a particular focus to the needs of small to medium scale, limited resource farmers. 90% of Florida's farms fit the definition of a small farm, which makes our mission particularly crucial in enhancing the overall economy of the state. The major areas of need are captured in the following planned programs:
1. Viticulture and Small Fruits Research
2. Preserving Water Quality of North Florida Watersheds Research
3. Strategic Research for the Management of Invasive Pest Species
4. Small Farm Production, Marketing, and Rural Economic Development

Viticulture and Small Fruits Research continues to provide leadership in the development of the grape and wine industry in Florida through quality research and statewide extension and outreach activities that address the needs and concerns of stakeholders. The Viticulture and Small Fruits Center recently released a fresh fruit muscadine cultivar and is working to release several wine grape cultivars in the near future that will greatly impact the marketability of Florida wines. In the area of plant biotechnology, researchers are working to identify molecular markers that will facilitate the breeding program and best management practices to enhance productivity and reduce cost. In the food biotechnology, researchers are working to develop high efficiency technology in the production of phytochemicals and nutraceuticals from grapes to address childhood obesity, food safety and food security issues. As a member of the USDA National Clean Plant Network, the Center will continue to improve on phytosanitary techniques in pathogen testing and disease elimination therapy and the production of clean vines. The Center will evaluate IPM techniques for vegetables and non-traditional small fruits, including blackberries for North Florida farmers to assist them in identifying alternative enterprises. The viticulture program attracts and supports many students who have chosen to do their research in grapes and small fruits. The faculty shares their expertise, knowledge and experience with the rest of the college by teaching graduate courses and participating in scholarly and professional activities.

Preserving Water Quality of North Florida Watersheds Research is administered through the Center for Water and Air Quality. The Center continues to work with undergraduate and graduate students, conduct need-based research and work with Cooperative Extension Program, as well as a number of diverse stakeholders. Its programs are focused on water quality and quantity issues in Florida Panhandle. Through the planned programs, the Center will continue to provide experiential learning opportunities for students in soils, water and natural resources areas.

Strategic Research for the Management of Invasive Pest Species is implemented by the Center for Biological Control. The problems posed by Invasive Alien Species (IAS) are broad, with impacts at the local, state, national and global levels. IAS pose major threats to agriculture and the environment. Concerted action and the continuum of prevention of imminent threats to the management of established species is required to mitigate the threats. This program takes a multidisciplinary approach with activities across the spectrum from prevention to management and restoration. The specific areas of focus include offshore pest mitigation, onshore development of ecologically based management of invasive insect pests and weeds, development of electronic diagnostic tools and resources for insect identification, assessment of the economic impact of IAS and improving the safety of biological control. The work of the Center integrates projects funded through other agencies which are all broadly focused on development of biologically based techniques for the management of pests. The program of work involves strong collaboration with USDA APHIS and USDA ARS, several state agencies and international cooperators, especially in the context of offshore work on IAS. An integral component of the research program is the training of undergraduate and graduate students and this emphasis will be continued.

Small Farm Production, Marketing and Rural Economic Development Research support science-based research information, as well as economic and marketing information, for limited resource farmers, rural citizens and urban communities to promote their economic and physical well-being. The program works collaboratively with horticulturists, social scientists, agricultural economists, rural

development specialists and extension to generate relevant socioeconomic data and to provide relevant outreach support to targeted clientele. The research findings are used to support extension personnel in providing appropriate and relevant programs and services. The program priorities are community development, asset building, food security and small farm production and marketing. Research areas will include Alternative Markets, Crop Production via Protected Agriculture, Small Ruminant Production and Rural Communities.

Total Actual Amount of professional FTEs/SYs for this State

Year: 2016	Extension		Research	
	1862	1890	1862	1890
Plan	435.0	27.0	350.0	24.0
Actual	440.0	29.5	324.0	24.0

II. Merit Review Process

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

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

2. Brief Explanation

UF/IFAS (1862) and FAMU/CAFS (1890) Merit Review

The Extension Leadership Team (ELT) meets monthly to discuss statewide programming and hiring, resource allocation, and professional development. These meetings serve as an ongoing evaluation of the quality and relevance of Extension programs to state program goals as identified by our seven Extension Initiatives. The ELT consists of the UF/IFAS dean and senior associate dean for Extension, four statewide program leaders, five district directors, a state specialist in program and professional development, and representatives from IT, communication services, human resources, financial services, and county operations.

Under the seven Initiatives, we have 24 teams called "Priority Work Groups." Both UF/IFAS and FAMU faculty serve on these self-directed teams and typically, a state specialist and a county Extension agent serve as co-leaders. A program leader provides oversight and guidance to the Priority Work Group. Members consist of both state specialists and county agents and together they work on program planning and evaluation, curricula development, and assess the need for new research. Priority Work Groups consult with external stakeholders as needed. Teams are expected to provide a plan of work and logic model to their program leader and these are posted online. Periodically, the Initiatives hold formal meetings to bring all the Priority Work Groups together to improve the quality and relevance of its Extension programming. At this year's annual Florida Extension meeting (EPAF) a half-day was set aside for Initiatives and Priority Work Groups meetings. In addition, in 2016, most of the Initiatives had large, multi-day meetings that brought together all of their Priority Work Groups. In April 2017, UF/IFAS will reinstate its Extension Symposium for state specialists and county Extension faculty, which will also incorporate Initiative team meetings.

UF/IFAS Extension conducts county program reviews, at least five per year, to insure its educational programming is effective and meets local needs. Teams consisting of state specialists, county faculty (from other counties) and Extension administrators and/or unit leads visit a single county for 2-3 days. Presentations and meetings are held with county Extension staff and faculty as well as county administrators, stakeholders, and clientele. Each review team submits a written report (including SWOT analysis and recommendations for improvements) to Extension deans, program leaders, and the appropriate CED and DED. DEDs select up to three priority items from the report for CEDs to work on over the following year. CEDs are required to complete a one-year follow-up report demonstrating the improvements or changes made to these priority areas. Reports are sent to Extension deans, program leaders, and DEDs and shared with unit leaders as needed. A state specialist is assigned to manage these program reviews and actively analyzes the data to look at statewide trends and patterns.
UF/IFAS conducts a similar review of its academic departments and Research and Education Centers (RECs). The senior vice president for UF/IFAS and deans representing our teaching, research and extension divisions visit about eight departments and RECs each year. Reviewers look at the strengths and challenges of the unit and its programmatic successes and opportunities, and provide recommendations for improvement in research, teaching and extension.

UF/IFAS (1862) Scientific Peer Review

All USDA funded projects must be submitted to the USDA/NIFA using the REEport system and must be peer reviewed by three researchers, with final approval from the unit leader. Peer reviewers may be a faculty member of the same department, another department at the university, or from another institution. Upon completion of the peer review and unit leader's approval, the project is reviewed at the research dean's office for USDA compliance and submitted to NIFA for their approval. REEport projects are also evaluated annually by the unit leader and program leaders via the Annual Progress Report, as well as the individual faculty's report of accomplishments and a plan of work for the next year. Research faculty at UF/IFAS may be evaluated on the traditional criteria such as quality and quantity of peer-reviewed publications and sponsored research as well as the evaluation data collected to measure the effectiveness of the transfer of research-based information to the community.

FAMU/CAFS 1890 Merit Review

All USDA funded projects must be submitted to the USDA/NIFA using the REEport system and must be peer reviewed with final approval from the unit leader. In order to ensure maintenance of a high quality and accountability of the research program, we have 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 also link 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 was 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 was followed by a comprehensive review by three or
more subject matter specialists including at least one external reviewer. The internal reviewers was drawn from among the college 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 were then incorporated into the revised proposal. Planned programs were monitored through annual evaluation which included reviews by Center Advisory Councils as appropriate. Upon completion of the peer review and unit leader's approval, the project was reviewed by the Research Director for USDA compliance and submitted to NIFA for their approval. REEport projects are also evaluated annually by the unit leader and program leaders via the Annual Progress Report, as well as the individual faculty's report of accomplishments and a plan of

work for the next year.

III. Stakeholder Input

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

- Use of media to announce public meetings and listening sessions
- Targeted invitation to traditional stakeholder groups
- Targeted invitation to non-traditional stakeholder groups
- Targeted invitation to traditional stakeholder individuals
- Targeted invitation to non-traditional stakeholder individuals
- Targeted invitation to selected individuals from general public
- Survey of traditional stakeholder groups
- Survey of traditional stakeholder individuals
- Survey of the general public
- Survey of selected individuals from the general public
- Other (Contact traditional under-served clientele)

Brief explanation.

To insure that UF/IFAS and FAMU/CAFS are conducting high quality research and educational programs that address critical state needs, the following methods are utilized to obtain stakeholder input:

• Periodically, Florida Extension (UF and FAMU) conducts a comprehensive statewide needs assessment. In August-December 2016, UF/IFAS conducted a statewide Community Input Survey as a five-year follow-up to our more comprehensive 2011-12 long-range planning initiative that included listening sessions in every county with clientele and stakeholders,10 regional meetings to discuss the findings of the listening sessions with our faculty, Extension and Research administrators and unit leaders, a Delphi study of key stakeholders and opinion leaders, and input from stakeholders and the public using focus groups and an online survey of nearly 4,300 Floridians. Underserved and under-represented groups were identified by faculty and strongly encouraged to participate in the listening sessions and survey.

The 2016 survey, with 442 respondents, was distributed online and promoted through our UF/IFAS websites, social media accounts, and blogs. Results were provided to the Extension Leadership Team.

In addition, in September 2016 through January 2017, UF/IFAS Extension conducted five listening sessions jointly with the Florida Farm Bureau Federation (FFBF). Held in five locations statewide with County Farm Bureau stakeholders and Extension professionals, these listening sessions are viewed as a first step in finding ways to work more closely on agricultural issues and public awareness. A report summarizing the key findings and recommendations from the listening sessions will be distributed to county Farm Bureau chapters, county Extension offices, and statewide Extension and Farm Bureau leadership.

• Each of the 67 county Extension offices has a county-wide advisory committee and each county faculty member is expected to have at least one program advisory committee. County Extension Directors (CED) and District Extension Directors (DED) review the membership of the committees as part of the faculty member's annual review. It is expected that the overall advisory committee is made up of members that represent county demographics and that each of the program advisory committees' membership resembles the demographics of the target audience they serve.

• Each UF/IFAS academic department, school and research center has an advisory council

representing various agricultural commodities, natural resource organizations, community and business leaders, etc.

- The Florida Agricultural Council, Inc. (FAC) is a non-profit foundation that consists of five regional advisory councils (RAC) that meet at least once a year and provides a forum to discuss societal trends, educational and technological issues, and economic pressures that affect agricultural and natural resource entities in Florida. The past three meetings the Extension dean has requested their input on four major UF/IFAS Extension initiatives-strategic staffing, revenue enhancement, urban Extension, and total UF engagement with Extension.
- A Customer Satisfaction Survey is conducted annually of 12-14 counties on a five-year rotation. Questionnaires are mailed to Extension program participants, asking them to rate their experience and the information provided. The county-level data are provided to the Extension dean, DEDs and CEDs for those counties, including information on positive or negative trends and findings. CEDs are encouraged to share the data with their faculty and staff. The Florida Department of Education is also provided a copy of the report. In 2016, infographics were developed for the counties so they may share the results more effectively with their county administrators. A data dashboard displaying the most recent five years (roughly the entire state) is under development and should be available in 2017.
- County program reviews are conducted in five different counties each year to insure the educational programming is effective and meets the needs of the county. County administrator(s) and stakeholders from each of the key program areas are invited to participate and provide feedback about the quality, effectiveness, and relevance of the Extension programs offered in the county.
- The Center for Public Issues Education (PIE Center) at the University of Florida conducts several interdisciplinary projects that measure the knowledge, behaviors and attitudes of consumers and constituents as it relates to agriculture and natural resources. The PIE Center then shares its findings with the public and stakeholders, including Florida Extension, through educational outreach and training programs using cutting-edge technology. The PIE Center uses online panels purchased through Qualtrics (online survey tool) and oversamples for minorities to ensure their opinions are accurately represented in the survey results.

FAMU/CAFS has two academic divisions, including seven program areas, and one Research and Extension Center (REC). There are advisory committees representing the various programs, industries and community and business leaders. In addition research advisory committees helped to identify ways to encourage participation in long range planning. Input from stakeholders were sought from multiple sources and at different levels. Various stakeholder groups such as Florida Grape Growers Association, Florida Meat Producers, Florida Farm Bureau, Florida Fruit and Vegetable Association, Florida Nursery Growers Association, CARET representatives, Florida Water Management District representatives, Florida Mosquito Control Association are represented in the different research program/center Advisory Councils. Through participation in these Councils as well as in other forums, follow-up discussions were held concerning the existing research program priorities and how Florida A&M University's research programs are and will continue to address stakeholder's needs. A show-and-tell event (Research Forum) is held periodically on the campus to encourage stakeholder participation and facilitate interaction with researchers. The College also holds several other public events during the year to gather information from stakeholders. Whenever it is feasible, efforts are made to coordinate relevant activities with extension to avoid duplication. Viticulture and Small Fruits Research: Stakeholders provided input into all viticulture programs especially at annual conferences and meetings where special sessions were provided to discuss issues and problems. This is the primary source of input from the stakeholders and valuable information and suggestions have been obtained at these meetings. A grower survey

was conducted to collect specific information, when necessary. The Florida Viticulture Advisory Council
met quarterly and provided a continuous flow of information and critique to the viticulture program. The Center also works closely with the Florida Department of Agriculture to identify and address any
special industry needs.

Preserving Water Quality of North Florida Watersheds: The Center for Water and Air Quality encouraged participation of both traditional and nontraditional stakeholders in the development of the program plan through the Center Newsletter, biennial meetings of the stakeholder group, information disseminated at field days and direct contact either through the mail, email or telephone.
Strategic Research for the Management of Invasive Pest Species: The Center for Biological Control continued to expand its Advisory Council to include both traditional and non-traditional stakeholders. This is the primary avenue through which stakeholder inputs are solicited. Additionally, ad hoc surveys to addressed specific issues may be carried out as necessary. Center faculty also participate in activities organized by stakeholders, and solicited feedback on the research program.

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

1. Method to identify individuals and groups

- Use Advisory Committees
- Use Internal Focus Groups
- Use External Focus Groups
- Open Listening Sessions
- Needs Assessments
- Use Surveys

Brief explanation.

We identify stakeholders through a variety of formal and informal means, including relationships with
Extension clientele, partnerships with collaborating organizations or companies, input from county administrators and other elected officials, advertising and social media, and suggestions from advisory committees and commodity groups. In addition to statewide efforts to identify key issues and stakeholders through our long-range planning process (as described in the first narrative), counties and districts as well as academic departments and Research and Education centers, may conduct their own listening sessions, needs assessments, and surveys to identify stakeholders.

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)

- Meeting specifically with non-traditional groups
- Survey specifically with non-traditional groups
- Survey of selected individuals from the general public
- Other (Through county extension agents)

Brief explanation.

See previous narratives in the Stakeholder Input section.

3. A statement of how the input will be considered

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

Brief explanation.

Listening was at the core of the Florida Extension Roadmap planning process and continues to be. Florida Extension actively sought diverse viewpoints regarding Florida's future through listening sessions, interviews, focus groups, and surveys that involved a wide range of citizens, educators, health care providers, state agencies, industry/trade associations, businesses, local governments, community leaders, and faculty members. This process identified a wide range of key issues that affect Florida's people, its economy, and its environment. As a result of this effort, we used that information to map out our statewide initiatives in our Extension Roadmap 2013-2023, recently developed strategic staffing and revenue enhancement plans and began an Urban Extension initiative. We use the Roadmap to guide our annual review and update of our statewide teams' action plans.
Input received from stakeholders through other formal and informal methods (described earlier) is used by administrators and faculty to evaluate and update the Extension and the Research Roadmaps as needed. The Florida Ag Council remains a very important source of input on organizational and programmatic initiatives. At the county level, stakeholder input is considered when making adjustments to planned programs, staffing, finances, administration, etc.

1890 Research
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

In the 2016 Farm Bureau Listening Sessions we identified ways to improve communication and work more collaboratively.
In the 2016 Community Input Survey the top issues identified were water, particularly quality and

prevention of pollution, and the environment. Land use (growth management, protecting natural areas) was also a high educational priority for many participants. K-12 education and youth also rate highly in the survey. These issues are rated about the same importance as they were in our 2011 study. On the other hand, issues and educational needs related to jobs and energy/oil have declined in importance. Results of this survey were provided to Extension Leadership Team and will be incorporated into long-range planning and Initiative team meetings.

In 2016 the Family and Consumer Science faculty reorganized their Initiative into three Priority Work Groups (Health and Wellness; Family Resource Management; and Nutrition and Food Systems) based on stakeholder and faculty input.

1890 Research

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 and 6) 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
4807157	1892434	3966508	2164036

2. Totaled Actual dollars from Planned Programs Inputs				
	Extension		Research	
	Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
Actual Formula	4682656	1753848	3490520	2221465
Actual Matching	4682656	946217	3490520	1082020
Actual All Other	0	0	0	0
Total Actual Expended	9365312	2700065	6981040	3303485

3. Amount of Above Actual Formula Dollars Expended which comes from Carryover funds from previous				
Carryover	0	378486	0	395901

V. Planned Program Table of Content

S. No.	PROGRAM NAME
1	Global Food Security and Hunger
2	Food Safety
3	Climate Change and Natural Resources
4	Sustainable Energy
5	Childhood Obesity
6	Family, Youth and Community
7	Strategic Research for the Management of Invasive Pest

V(A). Planned Program (Summary)

Program # 1

1. Name of the Planned Program

Global Food Security and Hunger

☑ 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
205	Plant Management Systems	5%	20%	5%	40%
211	Insects, Mites, and Other Arthropods Affecting Plants	5%	0%	10%	0%
212	Pathogens and Nematodes Affecting Plants	5%	0%	8%	0%
301	Reproductive Performance of Animals	5%	10%	5%	0%
302	Nutrient Utilization in Animals	5%	10%	5%	0%
303	Genetic Improvement of Animals	5%	0%	10%	0%
307	Animal Management Systems	5%	10%	1%	20%
402	Engineering Systems and Equipment	5%	0%	10%	0%
403	Waste Disposal, Recycling, and Reuse	5%	0%	1%	0%
404	Instrumentation and Control Systems	5%	0%	5%	0%
501	New and Improved Food Processing Technologies	5%	0%	3%	0%
502	New and Improved Food Products	5%	10%	5%	0%
503	Quality Maintenance in Storing and Marketing Food Products	5%	15%	4%	40%
601	Economics of Agricultural Production and Farm Management	6%	10%	5%	0%
602	Business Management, Finance, and Taxation	6%	10%	1%	0%
603	Market Economics	6%	5%	5%	0%
605	Natural Resource and Environmental Economics	6%	0%	5%	0%
607	Consumer Economics	6%	0%	5%	0%
610	Domestic Policy Analysis	5%	0%	7%	0%
	Total	100%	100%	100%	100%

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2016	Extension		Research	
	1862	1890	1862	1890
Plan	150.0	15.0	100.0	10.5
Actual Paid	153.8	8.1	62.7	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**
1616272	409948	1144622	996181
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
1616272	227092	1144622	640932
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

• Conduct research studies and experiments that will enhance or protect animal, plant, and food systems.
• Conduct genetic research on new forages, improving beef/forage integrated production systems, identifying animals with better pathogen resistance, and applying the latest technologies to select and breed animals that perform best under Florida's climactic conditions.
• Transfer research discoveries to Extension faculty through in-service trainings and EDIS publications.
• Maintain consistent communication with stakeholders to learn and prioritize needs.
• Fund, design and implement websites, conferences, curricula, fact sheets, workshops, field days, demonstrations, and programs to support a robust and resilient Florida food system.
• Publish research findings, program outcomes, and decision support tools.
• Provide leadership at local, regional, state and national levels to disseminate research findings and facilitate communication and foster current and new partnerships.

1890 Research

The small production, marketing and rural economic development project is an integrated effort. The asset building and research projects with other state and local agencies 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.

The viticulture and small fruit research project is also an integrated effort and will provide for extension and outreach, student/professional training and development and in addition the following:
RESEARCH
• Conventional breeding, evaluation and selection of hybrid vines for fresh fruit and wine.
• Embryo rescue, molecular, and mutagenic transformation to develop seedless muscadines.

• Identification, isolation, screening, characterization, and validation of genetic markers of viticulturally important genes.
• Identification, isolation, screening and validation of metabolities and proteins relating to growth function, fruit and wine quality, and disease tolerance.
• Stressed induced biochemical and molecular changes in grapes.
• Evaluation and understanding of antioxidant capacities of phytochemicals in grapes.
• Understanding the effects of grape phytochemicals in preventing diseases and obesity.
• Functional expression of flavonoid nutraceuticals in grapes.
• Identification of management practices for grapes and small fruits.
• Evaluation of non-traditional small fruits, including blackberries and raspberries.
• Evaluation, screening and production of 'clean vines' for industry.
EXTENSION AND OUTREACH TO BE CONDUCTED
- Vineyard visits and inspections.
- Workshops, field days, and seminars for grape growers, small farmers, processors and general public.
- Harvest festival for general public.
- Special presentations to high school and middle school students.
- Lab and field tours for farmers, students, public, and government officials.
- Promotional displays to promote program.

STUDENT TRAINING AND DEVELOPMENT
- Graduate student training.
- Undergraduate and high school students experiential learning.
- Student recruitment and work force development.

PROFESSIONAL DEVELOPMENT
• Professional associations' participation.
- Conduct quality and innovative research for new discoveries.
- Professional collaboration with industry partners and research/academic institutions.

2. Brief description of the target audience

- Producers
- Commodity Associations
- Owners/Operators
- Managers/Supervisors
- Workers/Laborers
- Allied Industry Representatives
- Farmers
- Regulatory agencies
- Local, state and federal government and policymakers
- Tribal government
- International governing bodies
- Harvesting/Packing/Processing/Distribution
- Harvesters/Packers
- Processors
- Food handlers
- Distributors/Transporters

- Retailers
- Consumers
- Buyers
- Entrepreneurs
- Importers/Exporters
- Youth and 4-H (K-12)
- Youth educators
- Extension faculty and professional staff

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2016	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	1574775	23117307	0	0

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

Patent Applications Submitted

Year:	2016
Actual:	65

Patents listed

1. Mandarin Tree Named 'LB8-9' (Brazil)
2. Blueberry Plant Named 'FL04-235' (Chile)
3. Blueberry Plant Named 'FL05-173' (Chile)
4. Blueberry Plant Named 'FL01-235' (China)
5. Blueberry Plant Named 'FL02-40' (China)
6. Blueberry Plant Named 'FL03-291' (China)
7. Blueberry Plant Named 'FL04-235' (China)
8. Blueberry Plant Named 'FL05-627' (China)
9. Blueberry Plant Named 'FL01-173' (Columbia)
10. Blueberry Plant Named 'FL02-40' (Columbia)
11. Blueberry Plant Named 'FL03-291' (Columbia)
12. Blueberry Plant Named 'FL04-235' (Columbia)
13. Blueberry Plant Named 'FL05-627' (Columbia)
14. Mandarin Tree Named 'LB8-9' (European Union)
15. Blueberry Plant Named 'C03-38' (European Union)
16. Blueberry Plant Named 'C03-158' (European Union)
17. Blueberry Plant Named 'C04-14' (European Union)
18. Blueberry Plant Named 'C04-51' (European Union)
19. Marquee Box Office Bronze 'UF09-8-37'- Coleus Cultivar (Japan)
20. Marquee Box Office Bronze 'UF08-5-10'- Coleus Cultivar (Japan)
21. Coleosaurus 'UF10-45-12'- Coleus Cultivar (Japan)
22. FlameThrower Chili Pepper (formerly Marquee Red Carpet)'UF08-19-10' - Coleus Cultivar (Japan)
23. Blueberry Plant Named 'FL03-291' (Peru)
24. Blueberry Plant Named 'FL04-235' (Peru)
25. Blueberry Plant Named 'FL05-627' (Peru)
26. 900 (South Africa)
27. 411 (South Africa)
28. 914 (South Africa)
29. Caladium plant named 'Passionista' (UF 4015) (USA)
30. Caladium plant named 'Sizzle' (UF 432) (USA)
31. Mandarin Tree Named 'N40W-6-3' (USA)
32. Mandarin Tree Named 'UFGlow' (USA)
33. FL02011-I-J2 - Oat Cultivar (USA)
34. Sweet Orange Tree Named 'Florida EV2' (USA)
35. Sweet Orange Tree Named 'Florida EV1' (USA)
36. Caladium Plant Named 'Fiesta' (USA)
37. Caladium plant named 'Cosmic Delight' (USA)
38. Caladium plant named 'Hearts Desire' (USA)
39. Blueberry Plant Named 'Patrecia' (USA)
40. Blueberry Plant Named 'FL06-556' (USA)
41. 157, peanut (USA)
42. Ruellia Plant Named 'R12-2-1' (USA)
43. Induced Expression of Proteins in Insect Cells (CIP of #49)
44. Drought Tolerant Plants
45. Oat Variety FL0720
46. Haploid Seed Classification using Single Seed Near-Infrared Spectroscopy
47. Method To Increase Photosynthetic Rates In a C4 Plant through Overexpression of Pyruvate Orthophosphate Dikinase
48. Material and Methods to Increase Plant Growth and Yield
49. Induced Expression of Proteins in Insect Cells (CIP) SEE #43

50. Drought Tolerant Plants
51. Bioinspired Insect Traps
52. Bacteria and Method for Improving Plant Growth and Health Using the Same (US from Provisional)
53. Plant Defense Inducers Compounds for Citrus Huanglongbing
54. Bacteria and method for improving plant growth and health using the same (Provisional)
55. Portable Spectrograph for High-Speed Phenotyping & Plant Health Assessment
56. Stimuli-Responsive Polymeric Nanoparticles, Methods of Making Stimuli-Responsive Polymeric Nanoparticles, and Methods of Using Stimuli-Responsive Polymeric Nanoparticles
57. Application of Biofilm Formation Inhibiting Compounds Enhances Control of Citrus Canker
58. Antimicrobial Compounds and Their Use in Treating Plant Disease
59. Citrus Plants Resistant to Huanglongbing
60. Citrus Varieties Resistant to Xanthomonas Citri Infection
61. Colored Clays for Agricultural and other Industrial Applications
62. Use of Elongator Genes to Improve Plant Disease Resistance
63. Engineering Bacteria for Production of Butyric Acid
64. Modification of The Xylan Utilization System For Production of Acidic Xylooligosaccharides From Lignocellulosics
65. Microorganisms Resistant to Nonvolatile Side Products from Acid Hydrolysate of Lignocellulosic Biomass

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2016	Extension	Research	Total
Actual	151	580	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Improve procedures and techniques of farming operations that will sustain small farm operations

Year	Actual
2016	0

Output #2

Output Measure

- Improve economic and marketing competitiveness for small and limited resource farmers.

Year	Actual
2016	0

Output #3

Output Measure

- # of participants reporting change in behavior in programs related to Animal Systems, Food Systems, Plant Systems, Integrated Pest Management, Farm Economics and Agricultural Awareness

Year	Actual
2016	28611

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Number of participants adopting best practices and technologies resulting in increased yield, reduced inputs, increased efficiency, increased economic return, and/or conservation of resources.
2	Improved national and global capacity to meet growing food demands.
3	Continued Industry Growth
4	Release of new cultivars (Change in Knowledge)
5	Release of new cultivars (Change in Action)
6	Release of New Cultivars (Change in Condition)
7	Improved national and global capacity to meet growing food demands (2)

Outcome #1

1. Outcome Measures

Number of participants adopting best practices and technologies resulting in increased yield, reduced inputs, increased efficiency, increased economic return, and/or conservation of resources.

2. Associated Institution Types

- 1862 Extension
- 1890 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2016	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
For the past 25 years UF/IFAS Extension has partnered with the FL Dept of Agriculture and Consumer Services (FDACS), the Suwannee River Water Management District and the USDA Natural Resources Conservation Service to develop systems and best practices that help Suwannee Valley watermelon growers conserve water, fuel and fertilizer. The watermelon industry statewide is $88 million annually and nearly one-third of Florida watermelons are grown in the Suwannee Valley area.

What has been done
Educating growers on research-based BMPs have led to an industry-wide shift from overhead irrigation techniques on open soils to a more efficient system of drip irrigation under plastic mulch.

Results
1) 2.1 billion gallons in annual water savings - roughly equivalent to the water use of 65,000 Florida residents
2) 180,000 lbs less nitrogen applied annually
3) 120,000-270,0000 gallons in diesel fuel savings per year
4) 50,000-60,000 lbs watermelons harvested per acre annually, compared to 25,000-40,000 lbs/acre in the early 1990s

4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems

211	Insects, Mites, and Other Arthropods Affecting Plants
212	Pathogens and Nematodes Affecting Plants
301	Reproductive Performance of Animals
302	Nutrient Utilization in Animals
303	Genetic Improvement of Animals
307	Animal Management Systems
402	Engineering Systems and Equipment
403	Waste Disposal, Recycling, and Reuse
404	Instrumentation and Control Systems
501	New and Improved Food Processing Technologies
502	New and Improved Food Products
503	Quality Maintenance in Storing and Marketing Food Products
601	Economics of Agricultural Production and Farm Management
602	Business Management, Finance, and Taxation
603	Market Economics
605	Natural Resource and Environmental Economics
607	Consumer Economics
610	Domestic Policy Analysis

Outcome #2

1. Outcome Measures

Improved national and global capacity to meet growing food demands.

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2016	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Though Florida is better-known for its oranges, the Sunshine State is also the No. 1 producer of zucchini squash in the nation, and now University of Florida Institute of Food and Agricultural Sciences researchers have found a new way to keep pests off the $70-million-a-year crop. Pests

like whiteflies and aphids transmit viruses to squash and significantly reduce yields, and the money growers make.

What has been done

The strategy is called "trap-cropping" the practice of growing high-value crops alongside "trap crops," which are less-valuable plants that have greater appeal to insect pests. The net result is, the pests congregate on the trap crops and largely ignore the target crops. Researchers planted less-valuable buckwheat alongside the squash. In the past, when UF/IFAS scientists tried to plant buckwheat with squash, they found squash yields went down because buckwheat and squash competed for space and resources, like water and nutrients.For this study, scientists went to the UF/IFAS Plant Science Research and Education Unit in Citra, Florida, and manipulated how buckwheat and squash were planted in order to reduce competition for resources. They found yields did not go down when altering planting schemes.

Results

Buckwheat attracts beneficial insects that use buckwheat for nectar and pollen, and those insects act as natural enemies to squash pests, such as whiteflies, aphids and thrips. Thus, buckwheat helps reduce pests on squash and attract good insects that eat the bad ones.

4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems
307	Animal Management Systems
501	New and Improved Food Processing Technologies
502	New and Improved Food Products
601	Economics of Agricultural Production and Farm Management
603	Market Economics
605	Natural Resource and Environmental Economics
607	Consumer Economics
610	Domestic Policy Analysis

Outcome #3

1. Outcome Measures

Continued Industry Growth

2. Associated Institution Types

- 1890 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2016	24

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Throughout its 39 years of existence the FAMU?s Center for Viticulture has administered the ?Grape Growing Incentive Program?; Grape Demonstration Project and now is leading ?Florida Vine Improvement and Distribution Program? and participate together with the FDACS in the Florida Increase Acreage Program. The Center?s research and extension work had great impact on the development of viticulture in Florida and neighboring southeastern states.

What has been done
New knowledge and expertise has been generated and information has been shared with stakeholders to help them improve their operations.

Results
Increased in vineyard acreage, Florida Farm Wineries and total wine production in the state.

4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems

Outcome #4

1. Outcome Measures

Release of new cultivars (Change in Knowledge)

2. Associated Institution Types

- 1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2016	2

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The southern grape industry is given priority and seeking the high quality stable red color red wine varieties: bunch grapes and muscadines as well.

What has been done
Several advanced breeding lines of both bunch and muscadine grapes have showed promising outcomes. These bunch advanced selections were resulted from hybridization of American species originated from the southeastern sates, Vitis vinifera wine grapes, and the backcrossing of those advanced selections. Their parentage involved major V. vinifera wine grapes, including Merlot, Cabernet Sauvignon, Zinfandel, and Syrah. Some of these hybrids are highly vigorous and disease resistant. The muscadine advanced selections are the hybrids of wine oriented crosses among muscadine grapes. During last few seasons, we have been evaluating these hybrids with information on both horticultural and wine characteristics, such as disease resistance, productivity, and wine traits.

Results
With the help from industry, we are gaining more experience and feel comfortable to make an initial wine selection, judged from both viticulture characteristics and wine quality. However, in order for us to fully evaluate their commercial potentials of these hybrids, we need support to evaluate them in different locations throughout the state under commercial cultural and processing standards. The perception of the commercial wineries and public acceptance would be the key criteria for us to determine if they will be released as new varieties to the industry.

4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems

Outcome #5

1. Outcome Measures

Release of new cultivars (Change in Action)

2. Associated Institution Types

- 1890 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2016	9

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Grape cultivar improvement is one of the most important projects for the continuous and dynamic growth of Florida grape and wine industries. Developmental biology of muscadine berry is poorly understood and critical in improving its quality. To sustain commercial southern grape/wine production is essential to understand and improve muscadine berry vinification qualities. Understanding the molecular and cellular events associated with muscadine berry development and ripening will help achieve this goal.

What has been done
More newly selected breeding lines will be added to the advance breeding lines pool.
This research employs high throughput sequencing to obtain a functional catalog of genes and proteins expressed during muscadine berry development and ripening.

Results
The program also has been collecting, evaluating, and maintaining grape germplasm for both bunch and muscadine germplasm and it is the part of the National Germpasm Repository for southern grapes. Currently, there are 56 muscadine cultivars, all Florida hybrid grapes, and 100 other bunch grapes that have potentials for southern grape industry. A total of 8 genes involved in berry ripening has been cloned and set of molecular markers related to disease tolerance of southern grapes has been identified.

4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems

Outcome #6

1. Outcome Measures

Release of New Cultivars (Change in Condition)

2. Associated Institution Types

- 1890 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2016	2

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Grape industry stakeholders have given high priority for the development of new cultivars that exhibit both stress resistance and superior fruit quality to mitigate production cost and expand market opportunities. Accordingly, the demand for innovative muscadine cultivars with enhanced fruit/vinification qualities has become an urgent request for the developing, diversity and sustainability of grape industry.

What has been done

In cooperation with industry partners (FGGA members and our stakeholders in neighboring states) has been deployed a fast 3 years evaluation trial to deliver novel, disease-resistant varieties with desired wine aroma and flavor characteristics, seedlesness and attractive large berry appearance for fresh fruit grape consumption respectively.

Results

Eleven advanced breeding lines including two seedless bunch grape hybrids, three seedless and three seeded muscadine for fresh consumption, and two bunch and one muscadine for wine-making are aggressively tested in the University?s experimental vineyard at the Center for Viticulture and Small Fruit Research and commercial vineyards in FL, GA, AL and TX.

4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems

Outcome #7

1. Outcome Measures

Improved national and global capacity to meet growing food demands (2)

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2016	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Plasticulture (the use of plastic in agriculture) is used globally to produce high-value vegetable (tomato, pepper, eggplant) and some fruit crops. The crops are grown on raised beds covered with plastic. The plastic mulch keeps away pests and weeds, creates a warmer soil environment, and protects the fertilizer from being washed away. The end result is a high yield and consistent fruit quality.

What has been done

Instead of planting crops on beds on shorter, wider raised beds, UF/IFAS researcher planted them in taller, narrower beds. The crops grew taller and narrower. With the compact designs, the crops needed less water irrigation and required less land. Researchers discovered they saved about 10 percent in fumigants and increased the yield and quality of the fruit.

Results

Farmers who adopt compact beds to grow peppers, Florida's second most valuable crop, can save $300/acre. A 30,000 acre operation can save $4-6 million a year even at a more conservative estimate of $200/acre in savings. Growers can increase revenue by growing more crops and increasing the yield, using less water and fumigant, and using less plastic and the cost of disposing the plastic.

4. Associated Knowledge Areas

KA Code	Knowledge Area
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
- Populations changes (immigration, new cultural groupings, etc.)

Brief Explanation

Many parts of the state are still struggling due to the economy and many areas are starting to grow again. This leads to greater numbers of people in need of help as well as more land use and growth management conflicts. Changes in financing and home ownership since the Great Recession continue to have an impact on Florida's population. Controversial issues such as climate change and GMOs take additional time and care when building relationships and trust with clientele, partners, and other stakeholders. Cuts to the university budget continue to have some impact. We continue to evaluate our Extension staffing needs statewide to ensure we are using our human resources most efficiently.

Florida also has three international shipping ports: Miami, Jacksonville and Tampa. Florida also has six international airports. Florida also had an estimated 113 million tourists in 2016, including more than 11 million from overseas. It has been estimated that this international influx into Florida has made us the entry point of one new invasive pest, plant or disease each week.
The state's farmers and growers took a big hit from Hurricane Matthew in October 2016. UF/IFAS estimates losses of at least $1.6 million for Asian vegetables and snap peas alone. Other lesser-damaged crops include cabbage, cauliflower, broccoli, squash, mustard greens, sweet corn and sweet potatoes. County farmers reported losses of 30-60% of their planted acerage and several reported complete loss of crops in the ground. In addition to crop losses, there was water and structural damage to greenhouses and other farm structures, and labor costs to clean up and replant crops.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

UF and FAMU's key evaluations, both quantitative and qualitative, are reported under the State Defined Outcomes and Outputs section. We continue to work on collecting statewide data on more focused, key indicators. While there has been a great deal of effort among the various Initiative teams for the past 2-3 years to create a set of common, statewide indicators, UF/IFAS continues to work on the collection of these key indicators using Qualtrics survey software. We anticipate piloting a new data collection method this spring. This will greatly improve our ability to gather statewide data on issues related to the NIFA priorities and other statewide initiatives.

Key Items of Evaluation

V(A). Planned Program (Summary)

Program # 2

1. Name of the Planned Program

Food Safety

☑ 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
211	Insects, Mites, and Other Arthropods Affecting Plants	0%	5%	20%	0%
212	Diseases and Nematodes Affecting Plants	10%	5%	25%	0%
213	Weeds Affecting Plants	0%	5%	5%	10%
215	Biological Control of Pests Affecting Plants	0%	10%	5%	0%
216	Integrated Pest Management Systems	10%	10%	15%	0%
311	Animal Diseases	10%	20%	5%	20%
314	Toxic Chemicals, Poisonous Plants, Naturally Occurring Toxins, and Other Hazards Affecting Animals	10%	10%	1%	20%
404	Instrumentation and Control Systems	10%	0%	5%	0%
501	New and Improved Food Processing Technologies	10%	5%	5%	15%
504	Home and Commercial Food Service	10%	15%	0%	35%
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources	10%	5%	3%	0%
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins	10%	5%	8%	0%
723	Hazards to Human Health and Safety	10%	5%	3%	0%
	Total	100%	100%	100%	100%

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2016	Extension		Research	
	1862	1890	1862	1890
Plan	26.0	0.5	100.0	0.0
Actual Paid	22.8	7.8	92.8	0.0
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**
239373	402230	1076000	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
239373	217630	1076000	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

• Conduct research studies and experiments that will enhance or protect Florida's food systems and supply.
• Conduct research to help reduce the incidence of foodborne illnesses and provides a safer food supply by: eliminating causes of microbial contamination and antimicrobial resistance; educating consumer and food safety professionals; and developing food processing technologies to improve food safety.
• Transfer research discoveries to Extension faculty through in-service trainings and EDIS publications.
• Maintain consistent communication with stakeholders to learn and prioritize needs.
• Fund, design and implement websites, conferences, curricula, fact sheets, workshops, field days, demonstrations, and programs to support food safety in Florida.
• Conduct one-on-one consultations with citizens, farmers, etc.
• Publish research findings, program outcomes, and decision support tools.
• Provide leadership at local, regional, state and national levels to disseminate research findings and facilitate communication and foster current and new partnerships.

2. Brief description of the target audience

• Professional food service workers/handlers
• Professional food service managers/operators
• Volunteers who work with food
• Consumers
• Home canners and food preparers
• Small farmers
• Organic farmers
• Agribusiness
• Food entrepreneurs

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2016	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	184491	2708285	0	0

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

Patent Applications Submitted

Year: 2016

Actual: 2

Patents listed

1) A Sonoelectrodepostion Unit for Fabrication of Catalytic Metal Films
2) PH-Sensitive Nanoparticles for Detecting and Preventing Food Spoilage

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2016	Extension	Research	Total
Actual	7	77	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- # of participants reporting change in behavior in programs related to Food Safety

Year	Actual
2016	18577

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Increase number of viable technologies to improve food safety.
2	Increase adoption of safe food handling practices at the individual, family, community, production, and supply system level.

Outcome #1

1. Outcome Measures

Increase number of viable technologies to improve food safety.

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2016	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The overall goal of the USDA Minor Use Animal Drug Program are to provide for human food safety and animal health through the judicious use of antibiotics and therapeutics in food and fiber producing animals.

What has been done
The objectives of the program: 1. Identify the animal drug needs for minor species and minor uses in major species. 2. Generate and disseminate data for the safe, effective, and legal use of drugs intended for use in minor animal species. 3. Facilitate FDA/CVM approvals of drugs for minor species and minor uses. The target audiences for this project are veterinarians and producers of minor-use food-producing animal species.

Results
Critical and emerging needs were identified by the Minor Use Animal Drug Program Technical Committee based on information obtained from stakeholders represented by animal industry groups and producer organizations, scientific and professional groups, literature surveillance, and research originating within the program. Published 211 articles in peer-reviewed journals. Thus, although FDA/CVM drug approvals have waned due to increasing costs, the Program has increased its efforts to supply critical data needs to minor species producers. The data generated by the Program is also shared with the Food Animal Residue Avoidance Database (FARAD program to further increase visibility. During the past five ears, NSRP-7 was responsible for three Public Master Files - Progesterone Solid Matrix for sheep (NADA 141-302), Lincomix for the control of American foulbrood in honey bees (NADA 111-636) and Chloramine-T for the control of mortality in freshwater-reared salmonids due to bacterial gill diseases (NADA 141-423). Further, the Program has supplied supplemental data to the US Fish and Wildlife Services in support of 21 New Animal Drug Applications. Together all these Public Master Files have supported FDACVM approval for 73 new drug products for use in minor food and fiber species. Currently there are

nine active research projects involving five animal species and seven different drugs.

4. Associated Knowledge Areas

KA Code	Knowledge Area
404	Instrumentation and Control Systems
501	New and Improved Food Processing Technologies
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources

Outcome #2

1. Outcome Measures

Increase adoption of safe food handling practices at the individual, family, community, production, and supply system level.

2. Associated Institution Types

- 1862 Extension
- 1890 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2016	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
In preparation for life beyond secondary school, high school students need to develop an appreciation for the importance of training and education to become productive wage earners. Many of the students participating in the Culinary Arts Program at Dunnellon High School in Marion County, Florida have post-graduation plans to work in food service. The purpose was to encourage students to attain a higher knowledge level through receipt of the National Restaurant Association?s ServSafe® Food Safety Training and Certification for Managers (ServSafe®) program in preparation for employment.

What has been done
Through UF/IFAS Extension in Marion County, the Extension agent collaborated with the Culinary Arts teacher to enhance the education experience by providing a variety of learning opportunities. The classroom teacher provided daily instruction and hands-on food preparation experience and the Extension agent, as a certified instructor and proctor for ServSafe®, provided review sessions, group activities, and administered the national exam.

Results

From 2012 to 2106 (five groups), multiple sessions were taught to 153 students using the ServSafe® Essentials curriculum supplemented with advanced information. Instruction was based on the experiential learning model to enhance cognitive development through ?real life situation?activities. Formative and summative evaluations: 40-item practice exam, chapter quizzes, written classroom activities, and national exam. Of the 153 students that were trained and tested, 122 (80%) received certification. The students that passed the exam increased their knowledge beyond the classroom and earned a credential that will enhance their ability to secure higher paying entry level positions with greater career opportunities. Labor statistics indicate there are significant salary differentials based on knowledge, skill, and certification status in food service. Food service managers average $25.83/hour, compared to food preparation workers at $10.39/hour and fast food cooks at $9.91/hour. Therefore, for the 122 who earned certification, their annual earning potential is higher, which hopefully will lead to advanced employment prospects and/or entry into higher education such as culinary school or college.

4. Associated Knowledge Areas

KA Code	Knowledge Area
404	Instrumentation and Control Systems
501	New and Improved Food Processing Technologies
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins
723	Hazards to Human Health and Safety

V(H). Planned Program (External Factors)

External factors which affected outcomes

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

Brief Explanation

Many parts of the state are still struggling due to the economy and many areas are starting to grow again. This leads to greater numbers of people in need of help as well as more land use and growth management conflicts. Changes in financing and home ownership since the Great Recession continue to have an impact on Florida's population. Controversial issues such as climate change and GMOs take additional time and care when building relationships and trust with clientele, partners, and other stakeholders. Cuts to the university budget continue to have some impact. We continue to evaluate our Extension staffing needs statewide to ensure we are using our human resources most efficiently. Florida also has three international shipping ports: Miami, Jacksonville and Tampa. Florida

also has six international airports. Florida also had an estimated 113 million tourists in 2016, including more than 11 million from overseas. It has been estimated that this international influx into Florida has made us the entry point of one new invasive pest, plant or disease each week.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

UF and FAMU's key evaluations, both quantitative and qualitative, are reported under the State Defined Outcomes and Outputs section. We continue to work on collecting statewide data on more focused, key indicators. While there has been a great deal of effort among the various Initiative teams for the past 2-3 years to create a set of common, statewide indicators, UF/IFAS continues to work on the collection of these key indicators using Qualtrics survey software. We anticipate piloting a new data collection method this spring. This will greatly improve our ability to gather statewide data on issues related to the NIFA priorities and other statewide initiatives.

Key Items of Evaluation

V(A). Planned Program (Summary)

Program # 3

1. Name of the Planned Program

Climate Change and Natural Resources

☑ 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	10%	50%	45%	35%
111	Conservation and Efficient Use of Water	25%	20%	10%	35%
112	Watershed Protection and Management	15%	0%	3%	0%
123	Management and Sustainability of Forest Resources	10%	10%	4%	0%
132	Weather and Climate	0%	20%	2%	0%
133	Pollution Prevention and Mitigation	10%	0%	6%	30%
135	Aquatic and Terrestrial Wildlife	15%	0%	15%	0%
136	Conservation of Biological Diversity	15%	0%	15%	0%
	Total	100%	100%	100%	100%

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2016	Extension		Research	
	1862	1890	1862	1890
Plan	90.0	1.5	40.0	0.0
Actual Paid	99.1	3.0	41.7	9.0
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**
1041299	273502	739493	698290
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
1041299	132470	739493	249868
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

• Conduct research studies and experiments that will enhance or protect Florida's environment and natural resources.
• Fund, design and implement websites, conferences, curricula, fact sheets, workshops, field days, demonstrations (e.g., beach cleanups, restoration projects, fish descending methods), and programs to support climate change, natural resources and water initiatives.
• Conduct one-on-one consultations including field visits, with citizens, farmers, etc.
• Transfer research discoveries to Extension faculty through in-service trainings and EDIS publications.
• Maintain consistent communication with stakeholders to learn and prioritize needs.
• Publish research findings, program outcomes, and decision support tools.
• Provide leadership at local, regional, state and national levels to disseminate research findings and facilitate communication and foster current and new partnerships.

2. Brief description of the target audience

• Green industry professionals
• Residents
• Residential communities
• Homeowners associations
• Urban property owners and managers
• Developers
• Homeowners
• Government officials
• Elected officials
• Tour providers
• Biologists
• Commercial and recreational fishers
• Producers and growers
• Large landowners
• Farmers
• Regulatory agencies
• Non-governmental agencies
• Local, state and federal government, planners and policymakers

- Entrepreneurs
- Volunteers
- Youth and 4-H (K-12)
- Youth educators
- Extension faculty and professional staff

3. How was eXtension used?

{No Data Entered}

V(E). Planned Program (Outputs)

1. Standard output measures

2016	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	825955	12124815	0	0

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

Patent Applications Submitted

Year:	2016
Actual:	3

Patents listed

1) Texturized Insecticidal Formulation
2) Recovery of Nutrient from Water and Wastewater by Precipitation as Struvite
3) Complexing Compositions, Methods, and Uses Thereof

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2016	Extension	Research	Total
Actual	84	506	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- # of participants reporting change in behavior in programs related to Water Conservation, Urban Water Quality, Ag Water Quality, Water Awareness, Natural Resources Decision Making, Natural Resources Operations, and Environmental Stewardship

Year	Actual
2016	17258

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Development of new knowledge and technologies.
2	Enhance adaptive capacity to climate change.
3	Increase water conservation.
4	Improve Florida's natural resources and environment through the use of trained volunteers.

Outcome #1

1. Outcome Measures

Development of new knowledge and technologies.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2016	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Each time you wash your face or brush your teeth, you just may be adding microscopic bits of plastic into the aquatic environment. Each time you do a load of laundry, you may inadvertently send tiny pieces of plastic to a nearby lake or ocean because when we wash synthetic fabrics, such as rayon and spandex, plastic threads get washed out with the rinse cycle and sent to a wastewater treatment plant. These tiny particles never biodegrade and are accidentally eaten by marine life, threatening their health. Toxins in the environment are attracted to and can easily adhere to their surface.

What has been done
In 2016 the Flagler County agent taught over 1,000 people about microplastics. The agent is also coordinating the statewide Florida Microplastic Awareness Project (FMAP), which was created using funds from a 2015 NOAA Marine Debris Program Outreach and Education grant. The FMAP teaches people about microplastics and their possible impacts. The project also trains citizen scientists to sample local coastal waters for the presence of microplastics. In 2016, volunteers collected and analyzed 770 water samples at 256 locations. Partners in the FMAP include ten other UF/IFAS Extension agents, two National Estuarine Research Reserves, the Florida Aquarium, MarineLab, the Marine Discovery Center and the St. Johns Riverkeeper.

Results
A total of 893 people have completed the Florida Microplastic Awareness Project's pledge (http://bit.ly/plasticpledge). 29 people (3.2%) were already taking all eight suggested actions to reduce plastic waste. On average, people pledged to make 3.4 behavior changes. In follow-up surveys received from 88 pledge-takers, 90% indicated that they had made at least one behavior change to reduce their plastic waste production. On average, people reported having made three behavior changes. 85% reported having shared information about microplastics with others. From the original pledge data, most people (64%) indicated that they were willing to read labels on

personal care products (like body wash, deodorant, toothpaste, facial scrub, makeup) and avoid products containing polyethylene. 55% were willing to bring their own foil or washable container to use as a "to go? box at restaurants, or pack lunch contents in reusable containers instead of single-use bags. 49% said they would avoid the use of plastic drinking straws and 39% said they would try to choose more natural fabrics rather than microfiber or other synthetic fabrics (acrylic, nylon, polyester, polypropylene).

In the follow-up survey, 70% of people reported having read labels on personal care products and avoided products containing polyethylene. Other commonly-taken actions included:
* Bringing their own reusable water bottle/cup instead of buying single-use plastic water bottles (44%),
* Recycling as many plastic items (those with the triangular recycle logo) as possible (44%)
* Bringing their own washable coffee/hot drink cup instead of using a disposable one (40%)
* Using paper or reusable shopping bags instead of single use plastic ones (39%).

The Gulf states from Texas to Florida will start microplastics sampling in 2017 and efforts are underway to start similar projects in Canada (Lake Huron) and Vermont (Lake Champlain).

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
111	Conservation and Efficient Use of Water
112	Watershed Protection and Management
123	Management and Sustainability of Forest Resources
133	Pollution Prevention and Mitigation
135	Aquatic and Terrestrial Wildlife
136	Conservation of Biological Diversity

Outcome #2

1. Outcome Measures

Enhance adaptive capacity to climate change.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2016	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Climate change is one of the most important and controversial scientific topics today. Most scientists believe that an accumulation of heat-trapping 'greenhouse gases" in the atmosphere is causing a slow but inexorable increase in Earth's average surface temperatures. This process is blamed for polar ice-cap losses, rising seas, coastal flooding and extreme weather events like heat waves and drought. The Black Angus is America?s most popular beef cattle breed, but on Florida ranches its dark coat absorbs solar radiation, making the animals susceptible to heat-stress issues.

What has been done
Researchers at the UF/IFAS Range Cattle Research and Education Center in Ona have developed a breed that seemingly combines the best of both worlds, the Ona White Angus, the result of crossbreeding light-coated cows and Angus bulls. Genetically, these cattle are similar to Black Angus and possess some of that breed?s best traits, such as fast growth and high fertility.

Results
The white coat enables the Ona White Angus to stay cooler in sunny pastures and could make it a logical choice for producers in tropical or sub-tropical climates.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
111	Conservation and Efficient Use of Water
112	Watershed Protection and Management
123	Management and Sustainability of Forest Resources
133	Pollution Prevention and Mitigation
135	Aquatic and Terrestrial Wildlife
136	Conservation of Biological Diversity

Outcome #3

1. Outcome Measures

Increase water conservation.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2016	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Water is among Florida's most valued resources. Despite having extensive water resources and high rainfall, water resources are stressed by the 20 million people who live here. By 2025, Florida?s population is expected to exceed 22 million residents. To meet the expected demand, Florida will need 9.1 billion gallons of fresh water per day, a 26.4 percent increase from today. Post-program evaluations reveal that Extension clients who engage in UF/IFAS programs are likely to adopt sound irrigation practices and technologies, such as converting turfgrass areas to landscape beds and installing technologies that limit the amount of water applied through an irrigation system. By making changes to the way they manage their landscape irrigation, Floridians are making a positive impact on the state?s water resources.

What has been done

UF/IFAS Extension addresses the need to conserve water by conducting major statewide programs such as the Florida-Friendly LandscapingTM and Master Gardener programs which consist of group educational events, workshops, and one-on-one educational programming statewide. These activities are designed to reach Florida residents and to help them conserve water by encouraging the adoption of sound landscape water conservation practices and technologies. These programs are conducted throughout the state and are often in partnership with local governments and with the support of volunteers.

Results

Because of UF/IFAS water conservation programs, Floridians are adopting sound landscape management practices that minimize water waste. During 2016, 16 counties reported a combined estimated water savings of 64,680,236 gallons of water annually, based on Extension clients? reported behavior change. To put this in perspective, this water savings is sufficient to supply water for a whole year to 735 households, or 15 subdivisions [based on the average of 88 thousand gallons per household per year, and subdivision size of 48 single family homes]. This water savings is valued annually at a total of $214,092 in water bill savings for participating households [based on the average statewide value of $3.31 per 1,000 gallons] and $129,360 in water delivery costs for utilities [based on the average cost of $2.00 per 1,000 gallons in delivery costs] statewide. This water savings also reduced wastewater fees for some households, and potentially contributed to water resource protection in communities across Florida.

4. Associated Knowledge Areas

KA Code	Knowledge Area
111	Conservation and Efficient Use of Water

Outcome #4

1. **Outcome Measures**

Improve Florida's natural resources and environment through the use of trained volunteers.

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
- Populations changes (immigration, new cultural groupings, etc.)

Brief Explanation

Many parts of the state are still struggling due to the economy and many areas are starting to grow again. This leads to greater numbers of people in need of help as well as more land use and growth management conflicts. Changes in financing and home ownership since the Great Recession continue to have an impact on Florida's population. Controversial issues such as climate change and GMOs take additional time and care when building relationships and trust with clientele, partners, and other stakeholders. Cuts to the university budget continue to have some impact. We continue to evaluate our Extension staffing needs statewide to ensure we are using our human resources most efficiently. Florida also has three international shipping ports: Miami, Jacksonville and Tampa. Florida also has six international airports. Florida also had an estimated 113 million tourists in 2016, including more than 11 million from overseas. It has been estimated that this international influx into Florida has made us the entry point of one new invasive pest, plant or disease each week.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

UF and FAMU's key evaluations, both quantitative and qualitative, are reported under the State Defined Outcomes and Outputs section. We continue to work on collecting statewide data on more focused, key indicators. While there has been a great deal of effort among the various Initiative teams for the past 2-3 years to create a set of common, statewide indicators, UF/IFAS continues to work on the collection of these key indicators using Qualtrics survey software. We anticipate piloting a new data collection method this spring. This will greatly improve our ability to gather statewide data on issues related to the NIFA priorities and other statewide initiatives.

Key Items of Evaluation

V(A). Planned Program (Summary)

Program # 4

1. Name of the Planned Program

Sustainable Energy

☑ 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
111	Conservation and Efficient Use of Water	30%	0%	5%	0%
123	Management and Sustainability of Forest Resources	10%	0%	5%	0%
131	Alternative Uses of Land	10%	0%	5%	0%
201	Plant Genome, Genetics, and Genetic Mechanisms	0%	0%	20%	0%
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants	0%	0%	10%	0%
204	Plant Product Quality and Utility (Preharvest)	2%	0%	10%	0%
205	Plant Management Systems	10%	0%	10%	0%
206	Basic Plant Biology	0%	0%	10%	0%
403	Waste Disposal, Recycling, and Reuse	20%	0%	0%	0%
511	New and Improved Non-Food Products and Processes	2%	0%	5%	0%
512	Quality Maintenance in Storing and Marketing Non-Food Products	0%	0%	5%	0%
605	Natural Resource and Environmental Economics	2%	0%	5%	0%
607	Consumer Economics	4%	0%	5%	0%
801	Individual and Family Resource Management	10%	0%	5%	0%
	Total	100%	0%	100%	0%

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2016	Extension		Research	
	1862	1890	1862	1890
Plan	4.0	1.0	20.0	0.0
Actual Paid	2.7	0.0	21.8	0.0
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**
28208	0	354669	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
28208	0	354669	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

- Conduct research studies and experiments that will identify and improve sustainable energy sources.
- Conduct research on crops for bioenergy production and produce value-added bio-based industrial products.
- Conduct research to develop biomass used for biofuels, design optimum forest products.
- Develop and deliver educational programs that work with citizens, businesses and government to support development of a sustainable and renewable energy supply in Florida.
- Develop and deliver programs that transfer new, research based technologies for renewable energy and alternative energy sources to Florida citizens and communities.
- Develop and implement extension educational programs to train producers, and processors about production, best management practices, marketing, processing technologies and distribution of bio-based feedstock.
- Develop and deliver programs for policy makers and consumers to increase biofuels literacy.
- Consult with landowners, developers and government to promote design, construction, and management practices that **measurably** reduce energy consumption in new developments.
- Develop/deliver educational programs addressing energy issues (i.e., Sustainable Floridians).
- Create websites to increase knowledge of personal energy use (i.e., www.MyFloridaHomeEnergy).
- Support energy efficient retrofit programs (i.e., PACE, Florida Energy Efficient Loans).
- Work with utilities, financial institutions and government to evaluate energy efficiency programs.

2. Brief description of the target audience

- General public
- Homeowners
- Agricultural producers/growers
- Business
- Developers
- Local government
- Homeowners
- Utilities
- Financial institutions

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2016	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	35449	520382	0	0

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

Patent Applications Submitted

Year:	2016
Actual:	3

Patents listed

1) Engineering Bacteria for Production of Butyric Acid (PRV2)
2) Modification of The Xylan Utilization System For Production of Acidic Xylooligosaccharides From Lignocellulosics
3) Microorganisms Resistant to Nonvolatile Side Products from Acid Hydrolysate of Lignocellulosic Biomass

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2016	Extension	Research	Total
Actual	7	14	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- # of participants reporting change in behavior in programs related to Energy Conservation, Alternative Energy Sources, Community Capacity Development

Year	Actual
2016	698

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Implementation of sustainable biofuels systems.

Outcome #1

1. Outcome Measures

Implementation of sustainable biofuels systems.

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2016	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Research at the University of Florida Institute of Food and Agricultural Sciences suggests a sweet potato variety may be well-suited for Florida production, offering a low-cost source of tubers for cattle feed plus fibrous vines that can be used as biofuel feedstock.This could be a key finding for the agriculture industry in Florida and to biofuel needs worldwide.The agriculture industry in Florida is looking to find new, viable crops to replace the citrus groves that have been diminished by the greening disease. Potato farmers are also trying to find new crops that offer both biofuel alternatives as well as food and/or animal feed opportunities. Although China produces 81 percent of the world?s sweet potatoes, U.S. sweet potato production reached a record high of 3.2 billion pounds in 2014, according to the U.S. Department of Agriculture.

What has been done
UF/IFAS researchers are conducting field trials on several varieties of sweet potatoes to determine if they are an economically viable crop that they can market.

Results
An industrial sweet potato variety known as CX-1 is showing great promise. Scientists found that CX-1 is a superior choice as a dual-purpose crop than the so-called ?table? varieties ? which people would normally eat ? known as Beauregard and Hernandez. They determined this by putting CX-1, Beauregard and Hernandez, through multiple tests in the field and laboratory in Gainesville. The CX-1 roots have higher starch content and thus higher potential for fuel ethanol yields than the table varieties. The study demonstrated CX-1?s value as animal feed and promotes the industrial sweet potato crop as a dual-purpose crop that could be used for both fuel ethanol ? from the starchy roots ? and nutritious animal feed ? from the vines.

4. Associated Knowledge Areas

KA Code	Knowledge Area
111	Conservation and Efficient Use of Water
123	Management and Sustainability of Forest Resources
131	Alternative Uses of Land
201	Plant Genome, Genetics, and Genetic Mechanisms
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants
204	Plant Product Quality and Utility (Preharvest)
205	Plant Management Systems
206	Basic Plant Biology
403	Waste Disposal, Recycling, and Reuse
511	New and Improved Non-Food Products and Processes
512	Quality Maintenance in Storing and Marketing Non-Food Products
605	Natural Resource and Environmental Economics
607	Consumer Economics
801	Individual and Family Resource Management

V(H). Planned Program (External Factors)

External factors which affected outcomes

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

Brief Explanation

Many parts of the state are still struggling due to the economy and many areas are starting to grow again. This leads to greater numbers of people in need of help as well as more land use and growth management conflicts. Changes in financing and home ownership since the Great Recession continue to have an impact on Florida's population. Controversial issues such as climate change and GMOs take additional time and care when building relationships and trust with clientele, partners, and other stakeholders. Cuts to the university budget continue to have some impact. We continue to evaluate our Extension staffing needs statewide to ensure we are using our human resources most efficiently. Florida also has three international shipping ports: Miami, Jacksonville and Tampa. Florida also has six international airports. Florida also had an estimated 113 million tourists in 2016, including more than 11 million from overseas. It has been estimated that this international influx into Florida has made us the entry point of one new invasive pest, plant or disease each week.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

UF and FAMU's key evaluations, both quantitative and qualitative, are reported under the State Defined Outcomes and Outputs section. We continue to work on collecting statewide data on more focused, key indicators. While there has been a great deal of effort among the various Initiative teams for the past 2-3 years to create a set of common, statewide indicators, UF/IFAS continues to work on the collection of these key indicators using Qualtrics survey software. We anticipate piloting a new data collection method this spring. This will greatly improve our ability to gather statewide data on issues related to the NIFA priorities and other statewide initiatives.

Key Items of Evaluation

V(A). Planned Program (Summary)

Program # 5

1. Name of the Planned Program

Childhood Obesity

☑ 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
701	Nutrient Composition of Food	10%	10%	30%	0%
702	Requirements and Function of Nutrients and Other Food Components	10%	5%	20%	0%
703	Nutrition Education and Behavior	40%	40%	25%	0%
723	Hazards to Human Health and Safety	10%	20%	5%	0%
724	Healthy Lifestyle	30%	25%	20%	0%
	Total	100%	100%	100%	0%

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2016	Extension		Research	
	1862	1890	1862	1890
Plan	20.0	0.0	4.0	0.0
Actual Paid	12.1	2.1	6.4	0.0
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**
127572	249409	105005	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
127572	85160	105005	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

• Conduct research studies and experiments that will increase taste and nutritional value of food, and develop methods and tools to effectively change behavior in the areas of human nutrition and physical activity.
• Conduct research to identify effective measures that guide individuals and families to make informed, sciencebased decisions that will reduce child obesity and improve health.
• Transfer research discoveries to Extension faculty through in-service trainings and EDIS publications.
• Maintain consistent communication with stakeholders to learn and prioritize needs.
• Fund, design and implement websites, conferences, curricula, fact sheets, workshops, field days, demonstrations, and programs to support efforts to reduce childhood obesity and improve family nutrition.
• Conduct one-on-one consultations with citizens, families, etc.
• Publish research findings, program outcomes, and decision support tools.
• Provide leadership at local, regional, state and national levels to disseminate research findings and facilitate communication and foster current and new partnerships.

At **FAMU** the childhood obesity program will have specific emphasis on low and moderate income communities. The ultimate goals of the program will be improve community food security and availability of healthy food choices and prevention of childhood obesity and reduction of long-term risks for chronic diseases.

2. Brief description of the target audience

- Parents
- Children and youth
- Caregivers
- Adults of all ages, including those with special needs
- Educators (K-12)
- Local, state, and federal agencies
- Non-profit agencies
- Schools and universities
- Businesses
- Faith-based organizations
- State and local health departments
- Hospitals
- Community agencies and organizations
- Master Nutrition Education Volunteers
- Health professionals

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2016	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	90691	1331319	0	0

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

Patent Applications Submitted

Year: 2016

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2016	Extension	Research	Total
Actual	30	18	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- # of participants reporting change in behavior in programs related to Nutrition

Year	Actual
2016	11315

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Development of methods of change that increase adoption of healthy eating habits by youth and adolescents
2	Research in the area of human nutrition, food safety and human health and well-being addressing problems and opportunities to the food industry and quality of life in Florida and throughout the world
3	Children practice healthy eating.
4	Children engage in healthy levels of physical activity.

Outcome #1

1. Outcome Measures

Development of methods of change that increase adoption of healthy eating habits by youth and adolescents

2. Associated Institution Types

- 1862 Extension
- 1890 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2016	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Franklin County is a sparsely populated, rural county where 100% of its school children qualify for the free or reduced lunch program and 21 % of the families in the county live below the poverty line. More than 20% of residents 25 years of age and above do not have a high school diploma and students consistently rank near the bottom in state standardized test scores. These statistics indicate that adults and youth could benefit from basic assistance in several areas including healthy eating, food preparation, and lifestyle habits.

What has been done
The USDA funded Family Nutrition Program (FNP) offers many opportunities to assist families in living healthier lifestyles. Franklin County is one of the counties in Florida where UF/IFAS has implemented the FNP program through local Extension programming. A full-time Program Assistant conducted 130 presentations to 2,112 youth and adults during the 2016 year related to nutrition and healthy eating habits. Adults received training through the curriculum ?Cooking matters in the community,?while youth participated in several different curricula.

Results
Of the 36 adults that completed surveys, 89% offer fruit to their children more often, 86% offer their children new healthy foods more often, 91% encourage proper handwashing more often, and 74% encourage their children to play actively more each day. Of the 45 grade 4-12 youth who completed the survey, 60% are more likely to choose healthy foods for snacks, 50% drink more plain water, and 48% are more likely to be physically active for 30 or more minutes each day. Of the 34 grade 2-3 youth who completed the survey, 64% drink more plain water, 55% spend less time playing video games, and 54% eat more whole grains.

4. Associated Knowledge Areas

KA Code	Knowledge Area
701	Nutrient Composition of Food
703	Nutrition Education and Behavior
723	Hazards to Human Health and Safety
724	Healthy Lifestyle

Outcome #2

1. Outcome Measures

Research in the area of human nutrition, food safety and human health and well-being addressing problems and opportunities to the food industry and quality of life in Florida and throughout the world

Not Reporting on this Outcome Measure

Outcome #3

1. Outcome Measures

Children practice healthy eating.

2. Associated Institution Types

- 1890 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2016	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
FAMU EFNEP focuses on reaching the poorest of the poor by working through families to address the health disparities associated with some of our most pervasive societal challenges?hunger, malnutrition, poverty, and obesity.

What has been done
Nutrition education follows a holistic approach and includes four core areas?diet quality and physical activity, food resource management, household food safety, and food security?to help families achieve a nutritionally sound diet.

Results
As a result of FAMU EFNEP, 85% of participating youth improved their abilities to choose foods according to Federal Dietary Recommendations; 41% of youth improved their physical activity practices; 47% youth indicated use safe food handling practices more often, and; 43% of youth improve their ability to prepare simple, nutritious, affordable food.

4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior
724	Healthy Lifestyle

Outcome #4

1. Outcome Measures

Children engage in healthy levels of physical activity.

2. Associated Institution Types

- 1890 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2016	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Many schools in Leon County have expressed a desire for after school programs that can help engage youth in activities that can be fun and educationally stimulating. Gardening activities have been found to be very engaging and will supplement formal education and enhance life skills.

What has been done
FAMU Extension?s school gardening program has been helpful in developing youth into leaders by engaging them in their communities, encouraging them to get outdoors, and heading on a pathway to healthier lives. Varied interactive teaching methods and activities was used to deliver the teaching these included hands on activities, field trips, games, posters, displays, lectures and seminars.

Results

83% of participants have indicated greater desire for being active outdoors. 55% of participants also indicated likeliness to participate in environmental activities such as recycling.

4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior
724	Healthy Lifestyle

V(H). Planned Program (External Factors)

External factors which affected outcomes

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

Brief Explanation

Many parts of the state are still struggling due to the economy and many areas are starting to grow again. This leads to greater numbers of people in need of help as well as more land use and growth management conflicts. Changes in financing and home ownership since the Great Recession continue to have an impact on Florida's population. Controversial issues such as climate change and GMOs take additional time and care when building relationships and trust with clientele, partners, and other stakeholders. Cuts to the university budget continue to have some impact. We continue to evaluate our Extension staffing needs statewide to ensure we are using our human resources most efficiently. Florida also has three international shipping ports: Miami, Jacksonville and Tampa. Florida also has six international airports. Florida also had an estimated 113 million tourists in 2016, including more than 11 million from overseas. It has been estimated that this international influx into Florida has made us the entry point of one new invasive pest, plant or disease each week.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

UF and FAMU's key evaluations, both quantitative and qualitative, are reported under the State Defined Outcomes and Outputs section. We continue to work on collecting statewide data on more focused, key indicators. While there has been a great deal of effort among the various Initiative teams for the past 2-3 years to create a set of common, statewide indicators, UF/IFAS continues to work on the collection of these key indicators using Qualtrics survey software. We anticipate piloting a new data collection method this spring. This will greatly improve our ability to gather statewide data on issues related to the NIFA priorities and other statewide initiatives.

Key Items of Evaluation

V(A). Planned Program (Summary)

Program # 6

1. Name of the Planned Program

Family, Youth and Community

☑ 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
723	Hazards to Human Health and Safety	3%	10%	0%	0%
724	Healthy Lifestyle	15%	25%	0%	0%
801	Individual and Family Resource Management	15%	10%	10%	0%
802	Human Development and Family Well-Being	15%	5%	15%	0%
803	Sociological and Technological Change Affecting Individuals, Families, and Communities	10%	0%	0%	0%
804	Human Environmental Issues Concerning Apparel, Textiles, and Residential and Commercial Structures	2%	0%	0%	0%
805	Community Institutions, Health, and Social Services	10%	20%	20%	0%
806	Youth Development	30%	30%	55%	0%
	Total	100%	100%	100%	0%

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2016	Extension		Research	
	1862	1890	1862	1890
Plan	145.0	10.0	6.0	0.0
Actual Paid	155.1	8.5	2.6	0.0
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**
1629932	418759	70731	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
1629932	283865	70731	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

• Conduct research studies and experiments to develop knowledge and tools that will improve the lives of individuals, youth, families and communities.
• Transfer research discoveries to Extension faculty through in-service trainings and EDIS publications.
• Maintain consistent communication with stakeholders to learn and prioritize needs.
• Fund, design and implement websites, conferences, curricula, fact sheets, workshops, field days, demonstrations, social media and marketing, and programs to support efforts to improve youth development and the organizations and volunteers that support it, family financial stability, homeownership and housing in Florida, health and wellness of residents, and community and economic development.
• Conduct one-on-one consultations with citizens, children and youth, families, etc.
• Publish research findings, program outcomes, and decision support tools.
• Provide leadership at local, regional, state and national levels to disseminate research findings and facilitate communication and foster current and new partnerships.

2. Brief description of the target audience

• Children and adolescents
• Teenagers
• Parents
• Families with children
• Childcare, after-school, and elder care providers
• Educators (K-12)
• Adults of all ages, including those with special needs
• Persons with type 2 diabetes
• Homeowners
• Prospective homeowners
• Renters
• Temporary/seasonal residents
• Housing professionals
• Developers
• Building/construction professionals
• Housing sales professionals
• Residential property managers
• Non-governmental organizations

- Community organizations
- Local business and industry representatives
- Local government and elected officials
- UF/IFAS and FAMU county and state faculty

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2016	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	1108274	16269188	0	0

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

Patent Applications Submitted

Year: 2016

Actual: 7

Patents listed

1) Type 1 Interferon Mimetics as Therapeutics for Cancer, Viral Infections, and Other Diseases (CIP)
2) Mosquito Control Device Using Durable Coating-Embedded Pesticides (DIV of 14641)
3) Artificial Self-sufficient Cytochrome P450s
4) Dual Action Lethal Ovitrap (CON of 14097)
5) A Thermostable Haloarchaeal Inorganic Pyrophosphatase
6) Novel Type 1 Diabetes Vaccines and Methods of Use
7) Fluid Bait Formulation and Their Use with Active Termite Infestation

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2016	Extension	Research	Total
Actual	48	178	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- # of participants reporting change in behavior in programs related to Health and Wellness, Family Resource Management, Youth Development, Organization and Volunteers that Serve

Youth, Economic Development, Community Capacity Building, and Public Policy.

Year	Actual
2016	79351

Output #2

Output Measure

- # of 4-H youth who enrolled in projects related to Communication, Decision Making and Leadership (including Workplace Preparation) skills

Year	Actual
2016	104772

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Youth learn skills to become productive members of the workforce.
2	Individuals and families learn skills to improve family financial stability.
3	Adults learn skills and techniques to improve their quality of life and personal safety.
4	Adults learn how to reduce risk of Zika virus in South Florida

Outcome #1

1. Outcome Measures

Youth learn skills to become productive members of the workforce.

2. Associated Institution Types

- 1862 Extension
- 1890 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2016	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Florida 4-H University is a weeklong overnight event for young adults held at the University of Florida each year. Attendees are selected to participate and must be between ages 14-18 and not yet graduated from high school. Research from Lerner et al. (2013) showed that 4-H members are four times more likely to contribute to their communities, perform academically higher, and are two times more likely to make healthier choices than adolescents not involved in 4-H.

What has been done
The 330 attendees participated in educational workshops led by University of Florida faculty, explored career opportunities, lead community service activities, interacted with youth from all over the state, and had fun while developing critical life skills that will help them become productive and engaged citizens in their communities, their country, and their world.

Results
A survey was conducted of participants at the conclusion of the event. As a result of attending 4-H University,
- 59% strongly agreed that they can weigh the pros and cons of future college/career options
- 55% strongly agreed they are able to solve problems at work and school
- 54% strongly agreed they are able to compare each possible solution with others to find the best one
- 64% strongly agree they are more likely to accept new and/or different people in my social group
- 72% strongly agree they are more likely to consider how others feel
- 78% strongly agree they are more likely to be responsible for their own choices
- 68% strongly agree they are more likely to make their own decisions instead of going along with the group

4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

Outcome #2

1. Outcome Measures

Individuals and families learn skills to improve family financial stability.

2. Associated Institution Types

- 1862 Extension
- 1890 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2016	115

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
As of July 2016 statistics on RealtyTrac showed that one in 903 households are facing foreclosure in Osceola County. We have the need to assist those residents who are facing a financial hardship situation, confronted with challenges of the loss mitigation process, and are unable to afford their mortgage payment. Collaborating with local agencies has widened the scope of residents reached and provided with awareness of the services available to them. As well as promoting the presence and relevance of UF/IFAS Extension in Osceola County.

What has been done
As a result of data collected since 2010, 683 clients participated in counseling through our Extension Program (foreclosure prevention) in Osceola County. The methods used to reach our clients were financial education through classes, workshops and one-on-one financial counseling sessions to address and monitor progress of participants? situations to obtain results. Also activities such as setting SMART goals, tracking monthly expenses, maintaining a budget, and learning how to save and stretch dollars. Our target audience is Osceola County and the adjacent counties? residents who are facing foreclosure. Our principal partners are non-profit organizations, government agencies and financial institutions who along with our funding agencies that have supported our programs throughout the years such are National Foreclosure Mitigation Counselling (NFMC), Florida Housing Finance Corporation (FCP), Heart of Florida United Way, Housing Urban Development (HUD), and Osceola County Community Development.

Results
A number of homeowners (471) were able to prevent foreclosure on their home resulting on a loan modification, deed-in-lieu, partial claim, forbearance, principal reduction or short sale. 132 were effectively referred out for legal advice due to the sensitivity of their case. 80 are still under review and pending for a resolution. 551 of these individuals had tried to resolve their housing hardship on their own, but were denied. Upon the help of our HUD-counseling program, most of them were able to achieve success in choosing an option best fitting their needs. According to a follow-up survey, three-fourths of participants (512) feel confident in managing their financial life and sustainability.

4. Associated Knowledge Areas

KA Code	Knowledge Area
801	Individual and Family Resource Management

Outcome #3

1. Outcome Measures

Adults learn skills and techniques to improve their quality of life and personal safety.

2. Associated Institution Types

- 1862 Extension
- 1890 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2016	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Parenting styles form the foundation of modern research concerning the parenting effect on child behavior, socialization, and school success. Parental styles are distinguished by three domains: parent responsiveness/warmth, psychological autonomy, and discipline/behavior management. Family dysfunction can occur because of extreme parenting styles, resulting in poor parent/child relationships, children?s social-emotional disorders, delinquent child behaviors, and abuse/neglect. When a destructive parenting style causes emotional or physical harm, children are sometimes removed from the home and the parent(s) must complete parenting classes. In Hillsborough County, nearly 6,000 children each year are removed from their families. Parenting education continues reaching families-at-risk in Hillsborough County, which results in healthier family relationships and more responsible, well-adjusted, and successful children.

What has been done

The Hillsborough County Extension parenting course begins by examining participants? current parenting styles. In 2015 nearly 150 parents attended court-ordered classes and learned how their discipline and communication skills shape their child?s behavior and long-term success. Family dysfunction is commonly passed from generation to generation, so parents are given tools for changing their destructive child-rearing practices. Parenting styles are the central focus of each class with topics covering; appropriate and effective discipline, important developmental assets for youth?s success, enhancing self-esteem, improving family communication, and managing stress.

Results

Pre-test knowledge was 31% and post-test scores were 70%; a 39% gain in knowledge. Evaluations showed 98% of participants identified their dominant parenting style, 86% understood the strengths and weaknesses of each style, and 99% set goals for improving their parenting skills. Although follow-up evaluations with this demographic group tend to have extremely low return rates, 68% of respondents felt they had improved family communication, 63% increased use of positive discipline while decreasing negative punishment, and 74% reported improved parent/child connections.

4. Associated Knowledge Areas

KA Code	Knowledge Area
723	Hazards to Human Health and Safety
724	Healthy Lifestyle
802	Human Development and Family Well-Being
806	Youth Development

Outcome #4

1. Outcome Measures

Adults learn how to reduce risk of Zika virus in South Florida

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2016	2271

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

In June 2016, UF/IFAS faculty created the Zika Challenge to proactively address emerging mosquito-related public health issues. News of Zika virus was rapidly spreading through the media. Florida residents and visitors were concerned for their health and safety. Many had questions about the mosquito-borne disease.

What has been done

The goal of the Zika Challenge was to provide professional development for UF/IFAS Extension agents and to engage them in outreach efforts that connect Floridians to IFAS' research-based information about mosquito management and personal protection. Public workshops were conducted and Extension volunteers were also trained on these practices to be better able to give accurate information to their friends and neighbors.The Zika Challenge was promoted through social media

Results

Based on follow-up surveys, 73% of respondents report they now use UF/IFAS recommended insect repellents. 89 percent report they eliminate standing water on their property. 84 percent said they share UF/IFAS information about mosquito repellants and source reduction with others. In Hernando County, 44% of the homeless population received free insect repellant. Two Extension agents successfully completed two licensing exams and earned their Florida Public Health Pest Control license to assist county employees combat the Zika outbreak.

4. Associated Knowledge Areas

KA Code	Knowledge Area
723	Hazards to Human Health and Safety

V(H). Planned Program (External Factors)

External factors which affected outcomes

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

Brief Explanation

Many parts of the state are still struggling due to the economy and many areas are starting to grow again. This leads to greater numbers of people in need of help as well as more land use and growth management conflicts. Changes in financing and home ownership since the Great Recession continue to have an impact on Florida's population. Controversial issues such as climate change and GMOs take additional time and care when building relationships and trust with clientele, partners, and other stakeholders. Cuts to the university budget continue to have some impact. We continue to evaluate our Extension staffing needs statewide to ensure we are using our human resources most efficiently.

Florida also has three international shipping ports: Miami, Jacksonville and Tampa. Florida also has six international airports. Florida also had an estimated 113 million tourists in 2016, including more than 11 million from overseas. It has been estimated that this international influx into Florida has made us the entry point of one new invasive pest, plant or disease each week.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

UF and FAMU's key evaluations, both quantitative and qualitative, are reported under the State Defined Outcomes and Outputs section. We continue to work on collecting statewide data on more focused, key indicators. While there has been a great deal of effort among the various Initiative teams for the past 2-3 years to create a set of common, statewide indicators, UF/IFAS continues to work on the collection of these key indicators using Qualtrics survey software. We anticipate piloting a new data collection method this spring. This will greatly improve our ability to gather statewide data on issues related to the NIFA priorities and other statewide initiatives.

Key Items of Evaluation

V(A). Planned Program (Summary)

Program # 7

1. Name of the Planned Program

Strategic Research for the Management of Invasive Pest

☑ 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	0%	0%	0%	25%
211	Insects, Mites, and Other Arthropods Affecting Plants	0%	0%	0%	25%
215	Biological Control of Pests Affecting Plants	0%	0%	0%	25%
216	Integrated Pest Management Systems	0%	0%	0%	25%
	Total	0%	0%	0%	100%

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2016	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	0.0	0.0	5.0
Actual Paid	0.0	0.0	0.0	4.5
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	526994
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
0	0	0	191220
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

FAMU (1890) Research

Offshore Studies on Rice Stink Bugs (Hemiptera: Pentatomidae): the Rice Stem Stink Bug Tibraca limbativentris and Oebalus spp, Potential Invasive Pests for U.S. Rice Growers

Stinkbug samples were collected in Arkansas, south Florida and Cuba. Entomologist Pedro López Del Castillo Centro Oriental de Ecosistemas y Biodiversidad (BIOECO), Zoology Department, Museo de Historia Natural Tomas Romay. Enramada # 661, Santiago de Cuba, 90 100 Cuba collected Oebalus spp. and T. limbativentris. Collections were made in south Florida with the assistance of Dr. Ron Cherry from the University of Florida Everglades Research & Education Center. These were 3 Locations 50 km NE of Belle Glade 3 Locations 25 km NE of Belle Glade and 3 Locations in Belle Glade. Oebalus pugnax, O. ypsilongriseus, and O. insularis were collected at all 3 locations. Oebalus pugnax were collected from 3 locations around the UARK Rice Research Center in Stuttgart Arkansas. Expenditures have been in line with the budget. About $4000 in travel was unused due to FAMU having complications approving foreign travel to Cuba in July. The samples are in Cuba, am making arrangements to bring them to Tallahassee. We are also attempting to make arrangements to add samples from Dominican Republic to the study during the 2016-17 continuation of this project. Arrangements have been made with our cooperator at the University of Arkansas for genetic analysis. Insects will be analyzed by using molecular cladograms as well as population genetic analysis using Arlequin software. Samples collected under objective 1 will be used in part for objective 2. Additional rice stink bug collections are in progress in Cuba, and Louisiana, but they won't be completed until late fall. We plan to expand collections into the Dominican Republic and one South American country (either Colombia or Brazil) as "out groups."

Survey and Development of Biological Control Strategies for the Spotted Wing Drosophila, Drosophila suzukii (Diptera: Drosophilidae), a Serious Fruit Pest New to Florida

2. Brief description of the target audience

FAMU (1890) Research

The target audience include: federal and state agencies, farmers, consumers, industry, extension workers and pest management specialists. For instance, the information on the interception of invasive species will be used by government agencies (USDA-APHIS, USDA-ARS), State agencies and general public and private industry. 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

2016	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	255	700	80	1700

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

Patent Applications Submitted

Year:	2016
Actual:	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2016	Extension	Research	Total
Actual	2	3	5

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Electronic identification keys/tools/resources developed

Year	Actual
2016	2

Output #2

Output Measure

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

Year	Actual
2016	6

Output #3

Output Measure

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

Year	Actual
2016	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
2016	17

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Digital identification keys/tools/resources for identification of invasive species utilized
2	Strategies for the identification, prevention or management of invasive species
3	Integrated pest management approaches adopted by farmers leading to greater profitibility.
4	The introduction and spread IAS minimized.
5	More effective management of aquatic weeds in first order springs.
6	Trade between the US and partners through implementation of strategies to mitigate the introduction of invasive insects, 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 identification of invasive species utilized

2. Associated Institution Types

- 1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2016	1

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Potentially invasive weevil species from the Caribbean countries to the United States: This system includes 42 invasive weevil species in 26 genera. Of these, 6 species are already established in the United States. The remaining species have great potential to become of economic importance to the United States as well as in Caribbean Countries.

What has been done

A computer based diagnostic keys using the LUCID platform has been developed

Results

A comprehensive list of around 80 species of weevils on palms has been completed. Among these species 60 of them are pests while 20 are considered plant pollinators.

4. Associated Knowledge Areas

KA Code	Knowledge Area
211	Insects, Mites, and Other Arthropods Affecting Plants
215	Biological Control of Pests Affecting Plants
216	Integrated Pest Management Systems

Outcome #2

1. Outcome Measures

Strategies for the identification, prevention or management of invasive species

2. Associated Institution Types

- 1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2016	2

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Florida faces a disproportionate risk from invasive pests which are a major threat to agriculture and the environment. Farmers, the general public, ornamental industry, and various state and federal agencies involved in efforts to mitigate the threats of invasive pests are concerned with these threats.

What has been done
Offshore studies are being conducted to generate knowledge that is critical for the development of mitigation measures against several pest threats. Studies on the red palm weevil (RPW), Rhynchophorus ferrugineus, in Curacao focused on development of optimal methods for operating pheromone traps and acoustically assessing infestations in individual trees. In addition, offshore studies on the coffee mealybug in the Dominican Republic provide useful insights for the development of the management strategy for Planococcus lilacinus.

Results

From a country-wide survey of 131 locations in 19 provinces in the Dominican Republic, eleven (11) species of invasive mealybug were identifies along with the parasitoid Leptomastix dactylopii and the predators, Cryptolaemus montrouzieri and Cycloneda sanguine.

Bucket traps with pheromone lures and a molasses food-bait mixture captured RPW adults reliably for about eight days. A portable, user-friendly acoustic sensor system enabled identification of larvae in individual infested trees through the use of signal processing analyses that screened out bird and wind noise. This information will assist future efforts to monitor, control, or eradicate RPW in Curacao, Aruba and nearby islands and the United States, should the pest gain entry.

4. Associated Knowledge Areas

KA Code	Knowledge Area
211	Insects, Mites, and Other Arthropods Affecting Plants
215	Biological Control of Pests Affecting Plants
216	Integrated Pest Management Systems

Outcome #3

1. Outcome Measures

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

2. Associated Institution Types

- 1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2016	1

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The decline of honey bee populations is causing serious problems for crop pollination, thus, production of crops and vegetables has declined to less than 50% for certain growers in the United States. Using best management practices and IPM strategies, vegetables, fruits, nut crops, and ornamental growers can reduce up to 50-80% the use of pesticides in their farms and secure a good level of profitability. This approach should help conserve beneficial species (parasitoids, predators, and crop pollinators).

What has been done
A study on monitoring and development of pest management strategies to control Drosophila suzukii and invasive pest of soft-skinned fruits was initiated. Several varieties of blueberries and strawberries were grown at the Center for Viticulture and Small Fruits Research and monitoring data were recorded.

Results
Monitoring and management of the Spotted Wing Drosophila, Drosophila suzukii (Diptera: Drosophilidae), a Serious Fruit Pest to Fruits and vegetables in Florida

The Scentry trap/Scentry lure was the only trap system to consistently capture the highest

number of flies throughout the five week trapping period. In addition, the total mean captures of D. suzukii revealed that the Scentry trap/Scentry lure had the highest captures in blueberries. All trap systems, during the peak of the growing season (May 2nd-May 9th) performed at a similar rate showing no differences amongst all traps tested. The effective performance of the Scentry trap can be due to the red color characteristic of the physical trap which may be more attractive to D. suzukii especially in fields with similarly colored host fruits as previously reported Due to its consistency, convenience, and effectiveness the Scentry trap/Scentry lure was recommended for monitoring D. suzukii.

The traps which caught more flies use the similar containers and bait amount, suggesting that a difference in entry area may increase traps efficiency and effectiveness. When evaluating all trap types, the number of captured flies increased as the entry area of traps. Although, other features also varied between the nine traps, the entry area may somewhat explain why traps with mesh openings often caught more flies than traps with holes (clear, commercial, and red). Therefore, further study is essential to use these traps in broader area with different host plants of the SWD. In addition, studies examining the shape, volatilization area of bait, orientation of the fly entry points, method to prevent escape, cost and ease of using monitoring and pest management traps should be tested in a multiple cropping settings. For growers and pest management specialists, traps need to be convenient to purchase, easy to construct, and easy to install and service. Proper training of stakeholders and extension agents to be involved in the management of the SWD is critical for successful implementation of pest management tools and other strategies including the use of potential biocontrol agents and chemical control.

4. Associated Knowledge Areas

KA Code	Knowledge Area
211	Insects, Mites, and Other Arthropods Affecting Plants
215	Biological Control of Pests Affecting Plants
216	Integrated Pest Management Systems

Outcome #4

1. Outcome Measures

The introduction and spread IAS minimized.

2. Associated Institution Types

- 1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual

2016 2

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

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.

What has been done

Offshore research on seven high risk species (Planococcus lilacinus, Rhyncophorus ferrugineus, Rhyncophorus cruentatus and Rhyncophorus palmarum, Oxycarenus hyalinipennis, Tuta absoluta, and Anastrepha grandis) was carried out or initiated in Trinidad, Dominican Republic, Curacao and Aruba, Bahamas, Jamaica and Panama with a view to generate data on biology, ecology, surveillance and control.

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

IPM for fruits and vegetables. Seasonal field days and workshops were provided to stakeholders and clienteles. Using best management practices and IPM strategies, vegetables, fruits, nut crops, and ornamental growers can reduce to 50-80% the use of pesticides in their farms and to conserve beneficial species (parasitoids, predators, and crop pollinators).

Results

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.

IPM for fruits and vegetables: The Scentry trap/Scentry lure was recommended as the best trap systems for use in the monitoring and management of D. suzukii in blueberries production.

4. Associated Knowledge Areas

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

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
2016	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
Field experiments were conducted to determine (a) whether or not C. lebetis can reduce the ability of hydrilla to outcompete and displace native American grass; (b) to determine how deep C. lebetis neonates can swim to locate hydrilla in the water and whether or not the water depth is a limiting factor in the establishment/survival of C. lebetis and (c) to determine the field host range of C. lebetis

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

Hydrilla and Vallisneria have been planted in tanks in a 2x2 factorial design and C. lebetis were released into the tanks to investigate their efficiency in controlling. Data indicated that C. lebetis was able to feed on several native plant species

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
216	Integrated Pest Management Systems

Outcome #6

1. Outcome Measures

Trade between the US and partners through implementation of strategies to mitigate the introduction of invasive insects, 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.

2. Associated Institution Types

- 1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2016	1

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

A safe agricultural system is critical to national security but U.S. crops, a cornerstone of our nation's economy, are vulnerable to attack. Events at the beginning of the new millennium further complicated issues relating to bio-security. More than ever, a plethora of actions are required in order to effectively safeguard our nation. Thus, more innovative and scientific programs must be developed in order to increase the number of well trained professionals to fill critical positions in research and regulatory functions in various agencies

What has been done

A central component of our work on invasive species is to train both graduate and undergraduate students to undertaken such professional careers. These students are involved in experiential learning, attending and presenting their research results at professional meetings

Results

A total of 17 graduate and 5 undergraduate students have been involved in projects related to invasive alien species

4. Associated Knowledge Areas

KA Code	Knowledge Area
135	Aquatic and Terrestrial Wildlife
211	Insects, Mites, and Other Arthropods Affecting Plants
215	Biological Control of Pests Affecting Plants
216	Integrated Pest 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

{No Data Entered}

V(I). Planned Program (Evaluation Studies)

Evaluation Results

The overall implementation of the research program in the Center for Biological Control

(CBC) was evaluated by the Advisory Council of CBC in December 2016 and found it to be satisfactorily.

Key Items of Evaluation

VI. National Outcomes and Indicators

1. NIFA Selected Outcomes and Indicators

Childhood Obesity (Outcome 1, Indicator 1.c)	
0	Number of children and youth who reported eating more of healthy foods.
Climate Change (Outcome 1, Indicator 4)	
3	Number of new crop varieties, animal breeds, and genotypes whit climate adaptive traits.
Global Food Security and Hunger (Outcome 1, Indicator 4.a)	
0	Number of participants adopting best practices and technologies resulting in increased yield, reduced inputs, increased efficiency, increased economic return, and/or conservation of resources.
Global Food Security and Hunger (Outcome 2, Indicator 1)	
0	Number of new or improved innovations developed for food enterprises.
Food Safety (Outcome 1, Indicator 1)	
0	Number of viable technologies developed or modified for the detection and
Sustainable Energy (Outcome 3, Indicator 2)	
0	Number of farmers who adopted a dedicated bioenergy crop
Sustainable Energy (Outcome 3, Indicator 4)	
0	Tons of feedstocks delivered.