2018 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

UF/IFAS - 1862 Extension and Research
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 2.3 million jobs, $165.5 billion in direct output (revenues), $137.2 billion in value added contributions, and accounting for 14.7 percent of total economic activity in 2016.[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 is a return of $20 in benefits from increased agricultural productivity.[2]

A significant challenge this year for UF/IFAS and the state of Florida was the devastation left behind by Hurricane Michael in October 2018. It came just one year after Hurricane Irma, the fifth most costly U.S. storm. With an estimated $25 billion in damages, Michael was half as costly as Irma but catastrophic for Florida Panhandle farmers and communities. Total agricultural loses due to Hurricane Michael are estimated at $2.8 billion, with the heaviest losses experienced by the timber industry ($1.3B), followed by field crops ($80M), specialty crops ($32M), and animals/animal products ($26M). Cotton and oyster farmers lost all or most of the entire season's crop. Lost sales revenue for the 2018-19 growing season for all Florida producers totaled $158 million. This does not include any costs for clean up or repair of storm damage, vet or medical bills, etc. Nearly three million acres of agricultural and forest lands were damaged, including about 350,000 acres that were damaged at catastrophic levels (95%+ damaged). The debris left behind leaves more than 200 communities at increased risk of forest fires. [3,4]

The disruption to communities, from both hurricanes Michael and Irma, in terms of housing, employment, medical care, education, etc., continues to this day. As a result, UF/IFAS Extension, in partnership with the Florida Department of Agriculture & Consumer Services (FDACS) and Florida State Agricultural Response Team (SART), will bring a series of free disaster mental health workshops to communities throughout the state in 2019:

- A day and a half of training aimed at providing Florida SART team members and partners, first and direct Responders, FDACS employees, UF/IFAS Extension faculty and staff and other community members active in disasters the skills needed to address mental health needs and issues following disasters.
- Day One: Mental Health First Aid - A one day 8-hour training developed by the National Council for Behavioral Health to provide attendees with an understanding of mental health, and how to support those with mental health challenges.
- Day Two: Mental health specific to disasters, including impacts on individuals, families and communities; understanding community recovery; and information on best practices

Trainings will be taught by UF/IFAS faculty and Certified Mental Health First Aid trainers. Participants who attend the Mental Health First Aid training in its entirety and pass course requirements will receive Mental Health First Aid Certificates.

The UF/IFAS Extension Disaster Education Network (EDEN) point of contact worked with our Communications division to develop a one-stop shop for Extension personnel to find over 45 resources posted before and after the hurricane. In addition, UF/IFAS developed printed versions of these to distribute in heavily hit counties that did not have internet/cell phone coverage. About 10 presentations have been given to various groups, including county Extension faculty, commodity groups, city and county administrators, and state officials, to share lessons learned, report on losses, etc. Most recently, UF/IFAS presented to the Agriculture Senate Committee in January 2019.

A UF/IFAS Extension scientist and his team played a critical role in quantifying the losses within the Florida agricultural sector due to Hurricane Irma. In 2018, he was recognized by industry and government officials for his reliable and consistent economic estimates sent to Washington, DC. As a result, the U.S. Senate Committee on Appropriations allocated $2.36 in relief funding for Florida. Additionally, methodologies and lessons learned from Irma were used for Hurricane Michael, only the response was quicker and stronger.

Florida also experienced historic blue-green algae blooms and red tide outbreaks in 2018, negatively impacting many communities and businesses in South Florida and along the Gulf Coast. Extension faculty worked with county governments, homeowners and business owners to assess water quality and continued to provide programming to residents and producers that emphasize ways to reduce use of fertilizers that contribute to these water problems. Extension agents and community leaders were trained in how to communicate to the public about the algae blooms and red tide. Six websites and blogs were developed to educate the public, the media and stakeholders, with each generating between 1,600 and 11,0000 unique visitors. In addition to the use of drones and other technologies and techniques aimed at improving water quality, scientists and engineers at UF/IFAS and the University of Iowa are working together on an innovative and low-cost soil sensor technology that will further help farmers reduce fertilizer use and its damaging runoff.

On April 1, 2019, Florida Governor Ron DeSantis was named Tom Frazer, director of the UF/IFAS School of Natural Resources and Environment, as the state's first Chief Science Officer. In that role, Dr. Frazer will be leading efforts to address the significant challenges to our rich natural environment including the red tide and harmful algal outbreaks that have impacted millions of Floridians.

[1]Court, C.D., Hodges, A.W., and Rahmani, M. 2018. Economic Contributions of Agriculture, Natural Resources and Food Industries in Florida in 2016. University of Florida/IFAS, http://edis.ifas.ufl.edu/fe1020.
[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]Court, C.D., Hodges, A.W., and Stair, C.A. November 13, 2018. County-Level Economic Losses for Florida Agriculture Resulting from Hurricane Michael. Online: https://fred.ifas.ufl.edu/DEStudio/T4/PDF/County-Level%20Economic%20Losses%20for%20Florida%20Agriculture%20Resulting%20from%20Hurricane%20Michael%2011-13-18.pdf
[4]Haughey, J. January 8, 2019. Hurricane Michael Tally at $5 Billion in Property Damage, $1.5 Billion in Crop Loss. Florida Watchdog.org. Online: https://www.watchdog.org/florida/hurricane-michael-tally-at-billion-in-property-damage-billion-in/article_5e71fc6e-1349-11e9-bc42-ff1b6ccc484a.html

FAMU/CAFS--1890 Extension
Although extension in Florida is made up of a collaboration between the 1862 UF/IFAS Extension and the

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 third in population growth after California 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 supports science-based information, as well as economic and social discovery, for limited resource farmers, rural and urban citizens and 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 programming to provide 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 Small-Scale Crop and Livestock Production, Alternative Market Development and Rural Economic Development.

Total Actual Amount of professional FTEs/SYs for this State

Year: 2018	Extension		Research	
	1862	1890	1862	1890
Plan	435.0	27.0	320.0	24.0
Actual	441.5	32.1	332.6	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

The Florida 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, FAMU director of cooperative extension program, four statewide program leaders, five district (regional) 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 23 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 may 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. In 2018, program leaders focused on implementing changes and improvements to the teams that were identified and/or discussed at team meeting throughout the year.

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 county and district directors. District directors select up to three priority items from the report for county directors to work on over the following year. They 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 district directors 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 peerreviewed 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
- Other (Contact traditional under-served clientele)

Brief explanation.

• Periodically, Florida Extension (UF and FAMU) conducts a comprehensive statewide needs assessment using several methods that target both traditional and non-traditional audiences, including listening sessions, focus groups, and surveys. This large-scale effort will start up in 2019.

• 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. The membership is expected to resemble the demographics of the target audience they serve and are reviewed as part of the faculty member's annual review.

• Academic departments and Research and Education Centers have advisory councils representing agricultural commodities, natural resource organizations, community and business leaders, etc.

• The Florida Agricultural Council (FAC) is a non-profit foundation that consists of five regional councils and meets at least once a year to discuss societal trends, educational and technical issues, and economic pressures that affect the ag and natural resources entities in the state.

• A Customer Satisfaction Survey was conducted in 13 counties in 2018. Survey protocol is available here. These data were reviewed by Extension administration and distributed on a public website via infographics.

• County Program Reviews were conducted in five counties in 2018 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 were invited to participate and provide feedback about the quality, effectiveness, and relevance of the Extension programs offered in the county. County directors from 2017 review submitted a report one-year after completion of the review, highlighting the progress made on three priority items that arose during the review.

FAMU (1890) Research

FAMU/CAFS has two academic divisions, including seven program areas, and one Research and Extension Center (REC) with advisory committees representing various agricultural industries, community and business leaders. Research advisory committees help to identify ways to encourage participation in long range planning. Input from stakeholders will be 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 will be held concerning the existing research program priorities and how Florida A&M University's research programs are and will be addressing stakeholder's needs. A Research Forum will be held to encourage stakeholder participation and facilitate interaction with researchers. Other public events are conducted to gather information from stakeholders. Whenever it is feasible, efforts will be made to coordinate relevant activities with extension to avoid duplication.

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, 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.

Florida Extension is beginning to plan for its next long-range plan (current one expires in 2023) and anticipates using a wide variety of methods to collect input from stakeholders, the general public, and non-traditional groups and individuals, including surveys, focus groups and listening sessions. In addition, we envision greater use of the U.S. Census and other primary and secondary data for needs assessment and identifying new, non-traditonal audiences. The planned use of a geographic information system (GIS) for mapping and analysis, such as ArcGIS, will expand the utility of these data.

1890 Research
Stakeholder input was collected throughout the year in informal and formal meetings. The research center advisory councils are critical since they include representatives from different stakeholder groups. Regular meetings of these Councils was held on the campus where research results was presented and stakeholders' input was requested. Input was also collected from other stakeholders identified through churches, schools, recreation centers, food-banks, and healthcare providers. Additionally and as appropriate, researchers from the university made presentations at meetings/conferences organized by different stakeholder groups. As appropriate, specific efforts was made to coordinate these activities with the extension program in order to avoid duplication of effort and redundancy.

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

Brief explanation.

We continue to use stakeholder feedback to identify emerging issues, help set priorities, and redirect Extension or Research programs if necessary. We work with our county partners when

hiring Extension faculty and staff.

Brief Explanation of what you learned from your Stakeholders

There is great need for help from farmers, communities and individuals affected by recent hurricanes and other natural disasters and events related to climate change.

IV. Expenditure Summary

1. Total Actual Formula dollars Allocated (prepopulated from C-REEMS)			
Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
{No Data Entered}	{No Data Entered}	{No Data Entered}	{No Data Entered}

2. Totaled Actual dollars from Planned Programs Inputs				
	Extension		Research	
	Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
Actual Formula	4772861	1916279	3593950	2069882
Actual Matching	4772861	1078686	3593950	836238
Actual All Other	0	0	0	0
Total Actual Expended	9545722	2994965	7187900	2906120

3. Amount of Above Actual Formula Dollars Expended which comes from Carryover funds from previous				
Carryover	0	289561	0	417535

V. Planned Program Table of Content

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
201	Plant Genome, Genetics, and Genetic Mechanisms	5%	0%	20%	30%
205	Plant Management Systems	5%	30%	10%	30%
301	Reproductive Performance of Animals	5%	0%	2%	0%
302	Nutrient Utilization in Animals	5%	0%	4%	0%
303	Genetic Improvement of Animals	5%	0%	7%	0%
304	Animal Genome	5%	0%	7%	0%
305	Animal Physiological Processes	5%	0%	6%	0%
307	Animal Management Systems	5%	20%	0%	20%
402	Engineering Systems and Equipment	5%	0%	2%	0%
404	Instrumentation and Control Systems	5%	0%	1%	0%
501	New and Improved Food Processing Technologies	5%	0%	0%	0%
502	New and Improved Food Products	5%	0%	5%	0%
503	Quality Maintenance in Storing and Marketing Food Products	5%	15%	2%	20%
601	Economics of Agricultural Production and Farm Management	5%	20%	15%	0%
602	Business Management, Finance, and Taxation	5%	10%	0%	0%
603	Market Economics	5%	0%	2%	0%
605	Natural Resource and Environmental Economics	5%	0%	5%	0%
607	Consumer Economics	5%	0%	5%	0%
610	Domestic Policy Analysis	5%	0%	7%	0%
807	Disaster Preparedness, Mitigation, Response, and Recovery	5%	5%	0%	0%
	Total	100%	100%	100%	100%

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2018	Extension		Research	
	1862	1890	1862	1890
Plan	150.0	15.0	100.0	10.5
Actual Paid	143.0	9.9	106.2	10.5
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**
1546474	590818	1537275	698647
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
1546474	463951	1537275	349323
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:
• 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.

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

2018	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	6225341	2799176	150	0

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

Patent Applications Submitted

Year:	2018
Actual:	57

Patents listed

1. No. 15/732,323 - Strawberry Plant Named 'Florida Brilliance'
2. No. PT 8428 - UF 1
3. No. PT 8429 - UF 2
4. No. PT 8430 - UF 3
5. No. 201800061 - W-55 - Tomato Cultivar
6. No. 2498 - Florida Beauty
7. No. 2017/3305 - Blueberry Plant Named 'C03-158'
8. No. 32689 - Inferno 'UF13-26-7' - Coleus Cultivar
9. No. 15/732,777 - Coleus Plant Named 'UF16-27-1'
10. No. 15/732,776 - Coleus Plant Named "UF16-64-1'
11. No. 15/732,779 - Coleus Plant Named 'UF16-5-6'
12. No. 15/732,775 - Coleus Plant Named 'UF16-72-8'
13. No. 15/732,778 - Coleus Plant Named 'UF16-88-9'
14. No. 15/732,774 - Coleus Plant Named 'UF16-1-20'
15. No. 62/497,350 - Blueberry Plant Named 'Magnus'
16. No. 120-2018 - Blueberry Plant Named 'FL98-325'
17. No. 2607 - Blueberry Plant Named 'C03-158'
18. No. 62/640,477 - Blueberry Plant Named 'Wayne'
19. No.62/640,517 - Blueberry Plant Named 'Optimus'
20. No.20180747 - FL98325
21. No. PT 8513 - N40W-6-3
22. No. PT 8512 - 950
23. No. 18-9402 - Florida Beauty' (FL 12.121-5) - Strawberry Cultivar
24. No. 15/932,769 - Basil Plant Named 'UF16-23-2'
25. No. 15/932,770 - Ruellia Plant Named 'R13-5-3'
26. No. 15/932,768 - Ruellia Plant Named 'R15-24-17'
27. No. 15/932,771 - Ruellia Plant Named 'R16-1-1'
28. No. 62/685,156 - St. Augustinegrass Plant Named 'FSA1602'
29. No. 62/685,173 - Zoysiagrass Plant Named 'FAES1312'
30. No. 62/685,170 - Zoysiagrass Plant Named 'FAES1313'
31. No. 62/685,161 - Zoysiagrass Plant Named 'FAES 1319'
32. No. 15/403,731 - Compositions and Methods for Modifying Perception of Sweet Taste
33. No. 15/477,563 - Viral-based Transient-Expression Vector System For Trees That Allows Multiple Applications
34. No. 15/521,838 - Chemical Lure for Asian Citrus Psyllid
35. No. 15/605,700 - Methods and Compositions For Preventing or Reducing Infections of Crop Plants By Bacterial and Fungal Pathogens
36. No. 62/536,706 - Cost-Effective Real-Time Tree Water Status Monitoring System For Irrigation Management and Stress Detection
37. No. 15/552,081 - Artificial Self-Sufficient Cytochrome P450S
38. No. 15/790,639 - Methods of Identifying Biologically Active Random Peptides in Plants and Libraries of Plants Expressing Candidate Biologically Active Random Peptides
39. No. 62/577,572 - Method for RNA-Guided Genome Complexity Reduction and Polymorphism Detection
40. No. 62/581,491 - Development of Non-transgenic HLB Resistant Citrus Varieties Via Genome Editing of Susceptibility Genes Using CRISPR-Cas9
41. No. 62/582,744 - Detection and Management of Target Vegetation in Cropping Systems Using Machine Vision
42. No. 62/582,696 - Precision Herbicide Applicator for Hole Punch Equipment
43. No. 62/581,070 - Mitigation of Maize Heat Stress with Recombinant 6-phosphogluconate

Dehydrogenase
44. No. 62/591,876 - Methods for Thaxtomin Production and Engineered Non-Native Streptomyces with Increased Thaxtomin Production in the Absence of Cellobiose
45. No. 62/594,108 - Gene Editing by Pollen-Mediated Transformation
46. No. 15/580,740 - VirB10 for Vaccination Against Gram Negative Bacteria
47. No. 62/598,205 - Novel Technology to Convert Low-Grade Phosphate Rock into Slow Release Fertilizers
48. No. 15/743,230 - Use of Elongator Genes to Improve Plant Disease Resistance
49. No. 62/621,567 - Edwardsiella Piscicida: A Vaccine Delivery Platform For Multiple Fish Pathogens
50. No. 15/888,715 - Materials and Methods for Respiratory Disease Control in Canines
51. No. 15/766,447 - A Thermostable Haloarchaeal Inorganic Pyrophosphatase
52. No. 15/974,315 - Citrus Tristeza Virus Based Vectors for Foreign Gene/s Expression
53. No. 62/672,092 - Tomato Brachytic Gene and Methods of Use
54. No. 62/691,022 - Menadione Compositions for Treating Plant Diseases in Grape Plants and Citrus
55.No. 16/066,926 - Stimuli-Responsive Polymeric Nanoparticles, Methods of Making Stimuli-Responsive Polymeric Nanoparticles, and Methods of Using Stimuli-Responsive Polymeric Nanoparticles
56. Muscadine Variety ? Onyx?- Application 15/999,995 -09/07/2018
57. Muscadine Variety ?Floriana?- Application 15/999,982-09/07/2018

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2018	Extension	Research	Total
Actual	339	842	1013

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
2018	0

Output #2

Output Measure

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

Year	Actual
2018	0

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.

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
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	36307

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Florida is the largest orange-producing state in the United States, and the third largest orange producer in the world behind Brazil and China. Approximately 95% of all oranges grown in Florida are processed for juice (USDA/NASS 2015). The Florida citrus industry and its position in the global citrus market is being jeopardized by a bacterial disease known as citrus greening or Huanglongbing (HLB) caused by the Asian citrus psyllid (ACP). According to a 2016 UF study, citrus greening affects 90% of citrus grown in Florida and is spreading into Texas and California.

What has been done
UF researchers and agents are developing innovative techniques and technologies to address citrus greening. In 2017, the Florida Department of Agriculture and Consumer Services (FDACS), in partnership with the University of Florida/Institute of Food and Agricultural Sciences (UF/IFAS), reared and released a parasitic wasp known as Tamarixia radiata. This parasitic wasp offers biological control of the ACP, in that it feeds on and kills the psyllid that transmits citrus greening disease. The UF/IFAS Extension Hillsborough County teamed up with the FDACS to become a release site for the wasps. Homeowners completed an online application to receive the wasps from FDACS. Each client received one-on-one guidance about release procedures.

Researchers have shown imaging from drones can accurately detect and count citrus trees and spaces where trees have been removed. This saves growers time, money and labor costs as they prepare and plan for replanting. Research is ongoing to detect the health status of trees using drones. Other researchers have found great success in using white and colored kaolin particle films to repel Asian citrus psyllid. And since 2014, UF/IFAS has been studying the use of screened structures known as Citrus under Protective Screen (CUPS) systems. In addition, researchers are identifying genes that resist citrus greening and transfer them to susceptible

commercial citrus varieties to make new varieties that will better tolerate or resist HLB.

For growers who have groves with high levels of HLB infections, citrus agents are sharing information with growers at seminars, conference and field days to help them maintain production levels.

Results

Tamarixia releases were conducted in 2018 and are available to homeowners, with assistance from Florida Extension agents. Drone use for grove management is being shared with Florida?s citrus growers. With regard to kaolin particle films, researchers found more than 90% reductions in psyllid populations among treated trees and disseminated the results of their research. These positive research results have led to numerous citrus growers starting to apply particle films to manage citrus plants. Research has shown the CUPS systems keeps out the Asian citrus psyllid and as added benefit, increased yield and quality. Several citrus growers are using the system or modifying practices to consider the use of the CUPS systems. Recent data from Hillsborough and Polk counties, where growers received Extension education on ACP management and control, show a 37% increase in average area production per acre (135 bxs vs. 99 bxs statewide).

4. Associated Knowledge Areas

KA Code	Knowledge Area
201	Plant Genome, Genetics, and Genetic Mechanisms
205	Plant Management Systems
502	New and Improved Food Products
601	Economics of Agricultural Production and Farm Management
607	Consumer Economics
807	Disaster Preparedness, Mitigation, Response, and Recovery

Outcome #2

1. Outcome Measures

Improved national and global capacity to meet growing food demands.

2. Associated Institution Types

- 1862 Extension
- 1862 Research
- 1890 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The fresh vegetable and fruit industry in the US -- a $57 billion industry -- is encountering difficulty remaining profitable in the face of ever-tightening economic constraints and environmental and labor regulations. Most fruiting vegetable crops are grown on raised plastic-covered beds (plasticulture) that have high input (water, nutrient, pesticide, fuel, labor, plastic) and production costs. The industry must find solutions that improve system efficiency by reducing resource input and production costs, mitigating productions risks, and more efficiently using limited land and water resources.

What has been done
Compact bed geometry is an innovative solution to help the industry remain competitive by addressing inefficiencies inherent in conventional raised beds used in plasticulture. Compact beds are narrower (16-24 in) and taller (10-12 in) than conventional beds (30-72 in wide by 6-8 in tall). The initial motivation behind the compact design research, begun at UF/IFAS in 2013, was to reduce inputs of water, nutrients, and fumigants but research has revealed additional benefits. Compact beds for tomatoes and eggplant have been implemented and evaluated on commercial farms in Florida, South Carolina and Virginia. Last year these efforts expanded to peppers and New Jersey (in collaboration with Rutgers). Given the success of compact bed geometry demonstrations other fresh produce commodities have asked for designs, evaluations, and demonstrations for vine crops such as watermelon. In 2018, three separate on-farm demonstrations were conducted in FL, VA, and NJ and researcher traveled to CA, NJ and GA to promote this approach and explore research and extension collaborations.

Results
Early results (2014-2018) showed reductions in water, fuel, plastic, fertilizer, pesticides, disease, flooding/soil saturation, and input costs and as a result, interest in compact bed geometry is growing. Since 2014, producers throughout the East Coast have started to adopt the compact bed geometry by changing their production system and machinery. During 2018, compact beds were evaluated in FL and VA. The compact bed geometry designed for plasticulture have showed reductions in irrigation (5-50%) and nutrient inputs (15-20%), runoff, carbon footprint (5-10%), fumigant (up to 50%), and production cost ($100 - $300/ac) without reduced yields for tomato, pepper, and eggplant. As a result of demonstrations, one of the top five tomato producers in the North America decided to test it on large scale by converting 10-20% of farms in FL and VA to compact beds. Preliminary results show increased yields (up to 50% more) on parts of production fields in its VA farms. Multiple farms representing almost 10,000 acres in FL, SC, and VA have already fully adopted or changing the geometries in phases. Several pepper producers in FL have started adopting the compact bed geometry, including one large grower (1200 acres) who adopted the compact bed geometry in 2018 after demonstrations showed reduced water (50%, irrigation volume), plastic, fuel, fertilizer, soil saturation and Phytophthora blight on his farms. Another company with farms on both U.S. coasts has changed their bed geometry producer as a result of demonstrations on their farms in FL. There are several reports (second-hand) of other farms implementing the compact beds for growing tomato, pepper, and eggplant throughout the east coast.

Potential economic impact for Florida alone will be savings of more than $5 million/yr. The design has already been adopted by multiple growers in FL, SC, GA, and VA. A 50% adoption in the U.S. could reduce production cost by $200 million, water (34 billion L), nitrogen (112,000 kg) and phosphorus (15,600 kg) losses, GHG emissions (580 million kg CO2-eq), and plastic waste (20,000 tons/year) each year. Importantly, compact bed geometries were found to reduce wind and flooding damage from Hurricane Wilma in September 2017 -- 41-93% of conventional beds had plastic (with drip lines) blown off while the plastic on compact beds remained intact. This potential, and additional, economic benefit could exceed $2,000/ac from re-bedding/re-applying. In the past two years, the vegetable industry has suffered an estimated $676 M in damages due to Hurricanes Irma and Michael. One of the largest tomato producers in the U.S. considered the hurricane resiliency an important benefit for adopting compact beds on its farms.

4. Associated Knowledge Areas

KA Code	Knowledge Area
201	Plant Genome, Genetics, and Genetic Mechanisms
205	Plant Management Systems
601	Economics of Agricultural Production and Farm Management
605	Natural Resource and Environmental Economics
807	Disaster Preparedness, Mitigation, Response, and Recovery

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

In addition to Hurricane Michael, Florida faced significant environmental issues in 2018, including:

- blue-green algae blooms in Lake Okeechobee, spreading to rivers, lakes and canals,
- outbreak of red tide in Southwest Florida and small section on east coast.

UF/IFAS continues to face budget cuts to several agricultural programs and centers. In 2018 4-H received received only half its requested amount and more importantly, it was non-recurring funds.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

- Number of producers indicating adoption of recommended practices, including Ag BMPs and Mobile Irrigation Lab (MIL): 8,543
- Number of acres on which the recommended practices were implemented: 1,565,395
- Number of producers reporting increased dollar returns or reduced costs: 5,182
- Number of farmers/ranchers who adopted a new crop variety or animal breed: 1,035
- Number of jobs created, jobs saved, or job promotions, as a direct or indirect result of your Extension program(s): 40,069
- Number of producers who adopted recommended livestock production practices: 6,966
- Number of producers who adopted recommended forage management practices: 3,025
- Number of new or improved value-added products sold by producers (or other members of the food supply chain): 55
- Number of new food processing facilities of any size (including inspected kitchens, niche meat processors, and larger animal/fruit/vegetable processors): 17
- Number of participants attending educational programming for small farm operators, processors (big and small), or beginning farmers/ranchers that adopted one or more recommended practices: 2,129
- Number of participants that adopted self-reliant food system practices, including creating a home or community garden, reducing food waste, preserving food, etc.: 10,348
- Number of viable technologies developed or modified for the increased sustainability, profitability, and/or competitiveness of agricultural or horticultural enterprises: 575
- Number of participants who report ability to make informed decisions on agriculture and the environment in their community because of information gained in extension programming: 2,665
- Number of participants who plan to increase purchases of Florida grown food: 451

Key Items of Evaluation

This was the second year of using our new statewide indicators. Last year, several infographics were developed using some of the statewide indicators or are currently under development. Florida Extension leadership has found these new indicators to be useful in communicating to our legislators and other stakeholders the value of our work. In 2018, the Program Development & Evaluation Center worked with Extension teams to refine the indicators and increase the use of evaluation tools that measure outcomes related to the statewide indicators.

This year we initiated the collection of information about Extension's impact on the local economy and jobs. Known as Workforce Indicators, the 2018 data for agricultural and horticultural programs are preliminary and will be vetted by state and county faculty later this year:

- Number of businesses created, retained, or expanded: 3,531
- Number of jobs created or retained: 4,319
- Number of participants reporting new leadership roles or opportunities undertaken: 872

Agriculture/horticulture teams are currently looking to tie their Plan of Work more closely to the statewide indicators so faculty have a clear picture of the team's goals and expectations for evaluation and measures of success. They will share the results of this pilot project with other Extension initiatives in the near future.

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	5%	10%	12%	0%
212	Diseases and Nematodes Affecting Plants	5%	5%	23%	0%
213	Weeds Affecting Plants	0%	10%	4%	0%
216	Integrated Pest Management Systems	20%	10%	23%	0%
311	Animal Diseases	0%	10%	8%	0%
312	External Parasites and Pests of Animals	5%	0%	2%	0%
314	Toxic Chemicals, Poisonous Plants, Naturally Occurring Toxins, and Other Hazards Affecting Animals	5%	0%	0%	0%
315	Animal Welfare/Well-Being and Protection	5%	15%	6%	0%
501	New and Improved Food Processing Technologies	5%	0%	0%	0%
504	Home and Commercial Food Service	10%	10%	0%	0%
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources	5%	0%	0%	0%
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins	15%	10%	9%	0%
721	Insects and Other Pests Affecting Humans	0%	0%	9%	0%
722	Zoonotic Diseases and Parasites Affecting Humans	5%	0%	4%	0%
723	Hazards to Human Health and Safety	15%	20%	0%	0%
	Total	100%	100%	100%	0%

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2018	Extension		Research	
	1862	1890	1862	1890

Plan	26.0	0.5	100.0	0.0
Actual Paid	19.2	6.9	103.9	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**
207457	411782	1005252	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
207457	429155	1005252	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.
• 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

2018	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	839416	377646	0	0

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

Patent Applications Submitted

Year: 2018

Actual: 2

Patents listed

1. No. 62/539,695 - Determination of Bacteria Viability by Measuring Transient Biogenic Amine Production
2. No. 15/863,463 - -Sensitive Nanoparticles for Detecting and Preventing Food Spoilage

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2018	Extension	Research	Total
Actual	20	35	55

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- test

  Not reporting on this Output for this Annual Report

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	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.

Not Reporting on this Outcome Measure

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

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	21198

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Through the ServSafe(R) program, UF/IFAS is actively training Florida's food service industry and expanding workers' earnings potential while also protecting its citizens. The CDC estimates about 48 million people get foodborne illness each year, resulting in an estimated 128,000 hospitalizations and 3,000 deaths. The average cost associated with each case of foodborne illness is $1,626. The most common contributing factors to foodborne illness outbreaks include unsanitary food handling and the improper cooking or serving. Most employers now require food safety certification and many young adults work in this industry. The Florida Career and Professional Education Act (CAPE) was created to provide a statewide planning partnership between business and education communities, to expand and retain high-value industry, and sustain a vibrant state economy.

What has been done
Many of the students participating in high school culinary arts program in Marion County have post-graduation plans to work in food service. The agent?s program was designed 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 program in preparation for employment. Through UF/IFAS Extension in Marion County, the Extension agent

collaborated with the Culinary Arts teacher to enhance the education experience by providing additional instruction. The classroom teacher provides daily instruction and hands-on food preparation experience and the Extension agent, as a certified instructor and proctor for ServSafe®, provides a review session and administers the national exam. The objectives were at least fifty percent of students will pass the exam (75% required) and increase knowledge of commercial food safety practices.

In Lee County an agent conducted yearlong ServSafe training for two middles school's advanced culinary classes.

Results

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. From 2012 to 2018, 227 students (seven groups), participated in the National Restaurant Association?s ServSafe® Managers Certification training and exam. Of the 227 students trained and tested, 173 (76%) 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. According to the Bureau of Labor Statistics for food service employees in Florida, there are significant salary differentials based on knowledge, skill, and certification status in food service. Food service managers average $32.05/hour, compared to food preparation workers at $11.33/hour and fast food cooks at $10.47/hour. Therefore, for the 173 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.

Both Lee County middle schools achieved the required 50% pass rate of the state?s Florida Career and Professional Education Act (CAPE) funding grant requirement for the ServSafe program. Meeting this threshold allowed the culinary arts teachers and individual schools to receive additional CAPE funding for their programs and schools. Both schools are currently offering this program for the 2018/2019 school calendar year.

4. Associated Knowledge Areas

KA Code	Knowledge Area
504	Home and Commercial Food Service
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

In addition to Hurricane Michael, Florida faced significant environmental issues in 2018, including:

- blue-green algae blooms in Lake Okeechobee, spreading to rivers, lakes and canals,
- outbreak of red tide in Southwest Florida and small section on east coast.

UF/IFAS continues to face budget cuts to several agricultural programs and centers. In 2018 4-H received received only half its requested amount and more importantly, it was non-recurring funds.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

- Number of participants demonstrating improved knowledge of food systems including food labels, production practices, food production and preservation, food waste management, etc.: 12,196
- Number of adults participating in food safety programs who adopted one or more recommended practices (i.e., handwashing, cross contamination, time and temperature controls, refrigerator temperature): 3,870
- Number of youth participating in food safety programs who adopted one or more recommended practices (i.e., handwashing, cross contamination, time and temperature controls, refrigerator temperature): 2,934
- Number of producers who developed a farm food safety plan: 114
- Number of growers, producers, food workers completing GAPs, GMPs, HACCP, PSA, PC, food safety certification (i.e., ServSafe), or farm food safety educational programs for Exempt and Qualified Exempt operations: 2,084
- Number of viable technologies developed or modified for the detection or characterization of food supply contamination from foodborne threats: 62

Key Items of Evaluation

This was the second year of using our new statewide indicators. Last year, several infographics were developed using some of the statewide indicators or are currently under development. Florida Extension leadership has found these new indicators to be useful in

communicating to our legislators and other stakeholders the value of our work. In 2018, the Program Development & Evaluation Center worked with Extension teams to refine the indicators and increase the use of evaluation tools that measure outcomes related to the statewide indicators.

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
101	Appraisal of Soil Resources	0%	0%	2%	0%
102	Soil, Plant, Water, Nutrient Relationships	10%	40%	35%	35%
103	Management of Saline and Sodic Soils and Salinity	0%	0%	1%	0%
104	Protect Soil from Harmful Effects of Natural Elements	0%	0%	6%	0%
111	Conservation and Efficient Use of Water	25%	30%	6%	35%
112	Watershed Protection and Management	15%	0%	15%	10%
123	Management and Sustainability of Forest Resources	10%	30%	3%	0%
132	Weather and Climate	5%	0%	3%	0%
133	Pollution Prevention and Mitigation	10%	0%	6%	20%
134	Outdoor Recreation	5%	0%	1%	0%
135	Aquatic and Terrestrial Wildlife	10%	0%	12%	0%
136	Conservation of Biological Diversity	10%	0%	10%	0%
	Total	100%	100%	100%	100%

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2018	Extension		Research	
	1862	1890	1862	1890
Plan	90.0	1.5	40.0	0.0
Actual Paid	110.5	2.0	89.4	14.0
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**
1194664	119954	707081	973829
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
1194664	92790	707081	486915
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?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2018	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	4876843	2194048	0	0

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

Patent Applications Submitted

Year:	2018
Actual:	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2018	Extension	Research	Total
Actual	113	568	681

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- test

  Not reporting on this Output for this Annual Report

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	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
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
With increasing climate variability and extreme weather events, it is more important than ever to increase the climate literacy of Extension faculty, producers and other stakeholders. Providing tools and knowledge to assess the effects of climate variability and change on crop and livestock production systems is critical to the ag industry in Florida. The goal is a vibrant and resilient agriculture in Florida, capable of mitigating climate related risks.

What has been done
During 2018, UF/IFAS greatly expanded the use of climate indicators of crop health due to a successful collaboration with the USDA?s National Agricultural Statistics Service to develop and operate a web-based climate information and decision support system (http://agroclimate.org/) aimed at helping agricultural and natural resource managers reduce risks associated with climate variability and change. What was originally a pilot project to monitor climate risk indicators in the Midwest USA was expanded to the entire country during 2018. This tool is now providing vital information to the USDA for the assessment of crop health and is expected to be further expanded in 2019. It provides information not only to the USDA internal use but also to agricultural stakeholders.

Results
What was originally a pilot project to monitor climate risk indicators in the Midwest USA was expanded to the entire country during 2018. This tool is now providing vital information to the USDA for the assessment of crop health and is expected to be further expanded in 2019. It provides information not only to the USDA internal use but also to agricultural stakeholders.

4. Associated Knowledge Areas

KA Code	Knowledge Area
132	Weather and Climate

Outcome #2

1. Outcome Measures

Enhance adaptive capacity to climate change.

Not Reporting on this Outcome Measure

Outcome #3

1. Outcome Measures

Increase water conservation.

2. Associated Institution Types

- 1862 Extension
- 1890 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	386541761

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
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 2015. Water supply needs are already exceeding capacity in some areas of the state. Conservation of existing water resources is an important solution. 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 Florida-Friendly LandscapingTM, Master Gardener, and Green Industry Best

Management Practices programs which consist of group educational events, workshops, and one-on-one educational programming statewide. These activities are designed to reach Florida residents and professionals who care for Florida?s landscapes to help them conserve water by encouraging the adoption of sound landscape water conservation practices and technologies. These programs are conducted throughout the state, often in partnership with local governments and with the support of volunteers.

Results

During 2018, UF/IFAS reported a combined estimated water savings of 386,541,761 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 4,393 households, or 104 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 $1,279,453.23 in water bill savings for participating households [based on the average statewide value of $3.31 per 1,000 gallons] and $1,005,008.58 in water delivery costs for utilities [based on the average cost of $2.60 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.

2. Associated Institution Types

- 1862 Extension
- 1890 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

If managed properly, forest land can yield economic and environmental benefits for generations to come. In partnership with the Florida Department of Agriculture and Consumer Services, the

Florida Forest Stewardship Program seeks to help private landowners develop a plan designed to increase the economic value of their forestland while maintaining its environmental integrity for future generations.

What has been done

In 2018 the Florida Forest Stewardship Program reached 739 landowners and professionals directly with workshops and field tours. Participants are private landowners who own at least 20 acres of land who do not manufacture forest products or provide public utility. The 2018 participants collectively own and/or manage over 2 million acres across Florida. Participants learn about natural resources management and may receive technical assistance. Program covers multiple-use resource management plans, including timber, soil, aesthetics, wildlife, water, and recreation. Some may receive documentation of active management which may reduce tax liability.

Results

Ninety-five percent of those completing event evaluations gained new skills and/or information about managing their forests and natural resources; and 93% will put those to use on their land or as part of their job. Thirty-seven percent reported that they had made positive changes to their land management practices based on participation in one or more Forest Stewardship events, on a total of 36,265 acres, collectively. A total of 624 partner/volunteer hours were leveraged in planning and conducting this year?s events. The program reached 5,084 landowners and professionals with the Florida Land Steward newsletter and 2,583 landowners and professionals receive regular email updates. Web resources collectively registered more than 906,000 visits, and we reached 3,700 contacts with social media posts.

4. Associated Knowledge Areas

KA Code	Knowledge Area
101	Appraisal of Soil Resources
102	Soil, Plant, Water, Nutrient Relationships
103	Management of Saline and Sodic Soils and Salinity
104	Protect Soil from Harmful Effects of Natural Elements
111	Conservation and Efficient Use of Water
112	Watershed Protection and Management
123	Management and Sustainability of Forest Resources
132	Weather and Climate
133	Pollution Prevention and Mitigation
134	Outdoor Recreation
135	Aquatic and Terrestrial Wildlife
136	Conservation of Biological Diversity

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

In addition to Hurricane Michael, Florida faced significant environmental issues in 2018, including:

- blue-green algae blooms in Lake Okeechobee, spreading to rivers, lakes and canals,
- outbreak of red tide in Southwest Florida and small section on east coast.

UF/IFAS continues to face budget cuts to several agricultural programs and centers. In 2018 4-H received received only half its requested amount and more importantly, it was non-recurring funds.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

- Number of producers who changed to appropriate fertilizer and pesticide rates: 3,240
- Number of new crop varieties and genotypes with climate adaptive traits: 91
- Number of new animal breeds and genotypes with climate adaptive traits: 2
- Number of gallons of water saved by production program participants (e.g., producers, farmers, ranchers) for the entire year: 3,593,801,000
- Number of producers that adopted one or more "good" water conservation practices such as reduced irrigation and use of water-saving technologies: 640
- Number of producers that adopted one or more "good" water quality practices such as reduced pesticides, animal waste or other pollutants: 2,021
- Number of producers that adopted recommended best practices for production agriculture related to invasive species, pest management, pollutant loads, and wetlands: 2,366
- Number of gallons of water saved by adult residential program participants (e.g., residents, HOAs, community gardens, developers, businesses: 299,018,610
- Number of adult residential participants that adopted one or more best management practices such Florida Friendly Landscaping principles: 11,340
- Number of youth participants that adopted one or more best management practices such as Ag BMPs or Florida Friendly Landscape principles: 1,385
- Number of gallons of water saved by professional landscapers or other Green Industry professionals for the entire year: 87,523,151

- Number of professional landscapers or other Green Industry professionals that adopted one or more best management practices such as GI-BMP: 3,434
- Number of outcomes resulting from informed community members taking action, such as formation of advisory groups, changes in homeowners associations rules, local initiatives and referendums related to natural resources: 216
- Number of acres on which recommended actions were implemented to manage or sustainably use fish and wildlife and wildlife habitat, including control of invasive species and pests, in natural areas and working landscapes including freshwater, marine, and wetland environments, rangelands, forests, parks and other green space in rural or urban areas: 1,246,347
- Number of participants who used information from environmental literacy and sustainability programs in a professional or work-related context as volunteers or employees (including docents, teachers, park rangers, ecotour guides, etc.): 4,478
- Number of adult participants who used information from environmental and sustainability programs to adopt personal stewardship behaviors (e.g., conservation of natural resources in one's home or residential community): 15,773
- Number of youth participants who used information from environmental and sustainability programs to adopt personal stewardship behaviors (e.g., conservation of natural resources in one's home or residential community): 1,250

Key Items of Evaluation

This was the second year of using our new statewide indicators. Last year, several infographics were developed using some of the statewide indicators or are currently under development. Florida Extension leadership has found these new indicators to be useful in communicating to our legislators and other stakeholders the value of our work. In 2018, the Program Development & Evaluation Center worked with Extension teams to refine the indicators and increase the use of evaluation tools that measure outcomes related to the statewide indicators.

This year we initiated the collection of information about Extension's impact on the local economy and jobs. Known as Workforce Indicators, the 2018 data for water and natural resources programs are preliminary and will be vetted by state and county faculty later this year:

- Number of businesses created, retained, or expanded: 563
- Number of jobs created or retained: 1,464
- Number of participants reporting new leadership roles or opportunities undertaken: 246

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
201	Plant Genome, Genetics, and Genetic Mechanisms	0%	0%	23%	0%
202	Plant Genetic Resources	0%	0%	10%	0%
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants	0%	0%	10%	0%
204	Plant Product Quality and Utility (Preharvest)	0%	0%	4%	0%
205	Plant Management Systems	10%	0%	8%	0%
206	Basic Plant Biology	0%	0%	44%	0%
403	Waste Disposal, Recycling, and Reuse	10%	0%	0%	0%
511	New and Improved Non-Food Products and Processes	10%	0%	1%	0%
512	Quality Maintenance in Storing and Marketing Non-Food Products	10%	0%	0%	0%
607	Consumer Economics	20%	0%	0%	0%
801	Individual and Family Resource Management	40%	0%	0%	0%
	Total	100%	0%	100%	0%

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2018	Extension		Research	
	1862	1890	1862	1890
Plan	4.0	1.0	20.0	0.0
Actual Paid	2.0	0.0	20.6	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**
22083	0	219556	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
22083	0	219556	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

• 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

2018	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	89537	40282	0	0

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

Patent Applications Submitted

Year: 2018

Actual: 1

Patents listed

No. 62/588,589 - Fermentation of Dihydroxyacetone by Engineered Escherichia coli and Klebsiella variicola to Products

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2018	Extension	Research	Total
Actual	1	8	9

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- test

  Not reporting on this Output for this Annual Report

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	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 Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The development of carbon-neutral energy sources has become one of the primary challenges of the twenty-first century. Perennial grasses such as energy cane have been proposed as feedstocks for lignocellulosic ethanol or direct combustion. Energy cane hybrids are wide crosses of commercial sugarcane (Saccharum spp.) with Saccharum spontaneum clones which produce high-biomass plants with high fiber content, and good cold and disease tolerance, as well as excellent ratooning ability (i.e., cut to stub during harvesting and new crop from regrowth). Florida has favorable climatic conditions and low opportunity-cost land for production of biomass crops and can be considered as one of the leading states for production of biomass as a source of renewable energy.

What has been done
Due to very limited genetic diversity in energy cane, research is focused on developing high biomass and disease resistant cultivars to improve the economics of lignocellulosic ethanol production. Work is ongoing to develop new energy cane cultivars for marginal soils in Florida. This goal will be achieved through our ongoing collaboration with USDA to produce and evaluate new energy cane germplasm for high biomass yield and disease resistance in multiple field trials.

Results
Cultivars produced through this research will be released for commercial cultivation and the success will be evaluated based on the adoption of these cultivars and improvement in economics of lignocellulosic ethanol production. In 2017, registrations of five energy cane cultivars was published in the Journal of Plant Registration. In 2018, international interest in our energy cane cultivar resulted in signing of new agreement with Dominican Republic to test our energy cane in their conditions. In addition to providing renewable energy, the use of energy cane for lignocellulosic ethanol production will have environmental benefits.

4. Associated Knowledge Areas

KA Code	Knowledge Area
201	Plant Genome, Genetics, and Genetic Mechanisms
202	Plant Genetic Resources
511	New and Improved Non-Food Products and Processes

V(H). Planned Program (External Factors)

External factors which affected outcomes

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

Brief Explanation

In addition to Hurricane Michael, Florida faced significant environmental issues in 2018, including:

- blue-green algae blooms in Lake Okeechobee, spreading to rivers, lakes and canals,
- outbreak of red tide in Southwest Florida and small section on east coast.

UF/IFAS continues to face budget cuts to several agricultural programs and centers. In 2018 4-H received received only half its requested amount and more importantly, it was non-recurring funds.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Energy programs are few and there is no statewide evaluation for this area. Extension agents report individual success stories related to homeowners and businesses, while researchers track adoption of new cultivars or practices related to biofuels and biomass.

Key Items of Evaluation

This was the second year of using our new statewide indicators. Last year, several infographics were developed using some of the statewide indicators or are currently under development. Florida Extension leadership has found these new indicators to be useful in communicating to our legislators and other stakeholders the value of our work. In 2018, the Program Development & Evaluation Center worked with Extension teams to refine the indicators and increase the use of evaluation tools that measure outcomes related to the statewide indicators.

This year we initiated the collection of information about Extension's impact on the local economy and jobs. Known as Workforce Indicators, the 2018 data for energy programs are preliminary and will be vetted by state and county faculty later this year:

- Number of businesses created, retained, or expanded: 3

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	20%	20%	40%	0%
702	Requirements and Function of Nutrients and Other Food Components	10%	10%	22%	0%
703	Nutrition Education and Behavior	40%	40%	3%	0%
704	Nutrition and Hunger in the Population	5%	0%	4%	0%
723	Hazards to Human Health and Safety	5%	10%	10%	0%
724	Healthy Lifestyle	20%	20%	21%	0%
	Total	100%	100%	100%	0%

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2018	Extension		Research	
	1862	1890	1862	1890
Plan	20.0	0.0	4.0	0.0
Actual Paid	8.8	2.8	8.8	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**
94620	164116	49188	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
94620	46395	49188	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.
• 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.
• 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

2018	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	381899	171813	0	0

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

Patent Applications Submitted

Year: 2018

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2018	Extension	Research	Total
Actual	32	45	77

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- test
  Not reporting on this Output for this Annual Report

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	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.
5	Children and adults improve health parameters

Outcome #1

1. Outcome Measures

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

Not Reporting on this Outcome Measure

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

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Diabetes and obesity are great threats to our healthcare system because there is no practical and effective way of maintaining a long-time control. Current medications cause many problematic side-effects, and significantly decrease the quality of life. Bioactive compounds from natural products can be used to improve health and mildly control pre-diabetes and obesity for a long term. More bioactive compounds need to be studied for their benefits. In the United States, over ten million tons of citrus fruits are used for juice and nearly five million tons of citrus byproducts (peel, rag, seeds etc.) are generated annually in Florida alone.

What has been done
Research was conducted on the use of natural bioactive compounds from citrus byproducts to positively impact human health and to better understand the molecular mechanism of anti-obesity and diabetes using citrus byproducts. Communication with citrus stakeholders to demonstrate greater utilization of citrus byproducts for human health improvement can potentially provide additional economic returns to benefit the citrus industry.

Results

The major work finished in 2018 was to test anti-obesity properties of orange peel. One major compound from the orange peel has been identified and verified for its anti-obesity activity. Tangeretin has been studied for its anti-obesity effects in the past, but how this compound metabolized in the body was not clear until now. Two journal articles were published on this research topic. Orange juice industry representatives are very interested in this information because the recovery rate of juice production is nearly 50% and byproducts (peel, seed and pulp) make up the rest. Orange peel accounts for most of the byproducts generated from the juice industry.

4. Associated Knowledge Areas

KA Code	Knowledge Area
702	Requirements and Function of Nutrients and Other Food Components

Outcome #3

1. Outcome Measures

Children practice healthy eating.

Not Reporting on this Outcome Measure

Outcome #4

1. Outcome Measures

Children engage in healthy levels of physical activity.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	8022

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Miami-Dade County has over 550,000 children 18 years or younger with over 137,000 live in households below the poverty level. Living in poverty allows health disparities to emerge. In addition, teachers in the area?s schools were very concerned about the ?unrestful? state of their students. Studies suggest relaxation techniques and physical activity lead to higher grades and

lower test anxiety. The social benefits are the increased ability in self-emotional regulation, calm in the classroom, and higher quality relationships. Learning and continuing to use these skills will help the youth in the future with their interpersonal relationships - familial or friendly.

What has been done

A UF/IFAS Extension agent received a $50,000 grant to implement Healthy Living education that provided a minimum of six teaching hours to a group of 1,000 underserved youth in Miami-Dade County. Most participants were aged 9-12. The principal partners were Miami-Dade School District, nonprofit aftercare centers, and the Miami-Dade County Parks, Recreation, and Open Spaces that had built spaces to accommodate classroom style teaching. Instruction was based on hands-on, experiential activities with reflection. and because mental health is a part of the Healthy Living Program, the program assistant, who is also a certified yoga instructor adapted a holistic mindfulness program that incorporated nutrition education, mindfulness, and yoga for exercise.

Results

Pre/post surveys were given to youth to fill out at the end of the program. The highest knowledge gain was in ?have you encouraged others to be active with you? with a 39% increase. The youth who received the holistic mindfulness program self-reported in essay format the decreases in anxiety while preparing and taking the FSA test, the increase in quality relationships with their siblings, and an increase in self-emotional regulation (mostly an ability to better control feelings of anger and frustration).

4. Associated Knowledge Areas

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

Outcome #5

1. Outcome Measures

Children and adults improve health parameters

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	6954

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Worldwide diabetes has risen from 108 million to over 422 million since 1980, accounting for over 8.5% of all adults. It is a major cause of blindness, lower limb amputation, kidney failure, heart attacks, stroke, and death. The vast majority of cases are categorized as type-2, which is largely the result of excess body weight and physical inactivity (World Health Organization, 2018). Self-management of diabetes through proper nutrition and exercise can reduce the damaging effects it has on the body, improve quality of life, reduce healthcare costs, and improve worksite and school absenteeism.

What has been done

Meal Planning for Diabetes is a six-week series developed in conjunction with the Tallahassee Memorial Healthcare Community Dietitian and presented as a team with FCS Agents from Jefferson and Gadsden Counties to the Seniors Life Skills Group at a local community center. The program was offered free of charge to participants and the Tallahassee Senior Center funded the food demonstration expenses. During six 2-hour classes, participants learned diabetes management strategies that included meal planning, carbohydrate counting, diabetic plate method, portion control, weight management, benefits of exercise, interpreting nutrition labels, smart shopping concepts, eating healthy when eating out, and practical approaches to reducing dietary sodium, cholesterol, saturated fat, and sugar for effective chronic disease management. Teaching methods included presentations, fact sheets, activities, group discussions, and food demonstrations.

Results

Big Bend Area Health Education Center (AHEC) conducted biometric health screenings (body weight, hemoglobin A1C, and blood pressure) pre-program and at 5-months post-program. Sixty percent reduced body weight, 80% had improved hemoglobin A1C levels, and 100% improved their blood pressure. Interactive small-group chronic disease management programs such as Meal Planning for Diabetes provide educational tools and skills to support the self-efficacy necessary to build confidence and behavior improvements. Participants are able to significantly improve health outcomes and reduce the risk of morbidities related to controllable lifestyle factors.

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

In addition to Hurricane Michael, Florida faced significant environmental issues in 2018, including:

- blue-green algae blooms in Lake Okeechobee, spreading to rivers, lakes and canals,
- outbreak of red tide in Southwest Florida and small section on east coast.

UF/IFAS continues to face budget cuts to several agricultural programs and centers. In 2018 4-H received received only half its requested amount and more importantly, it was non-recurring funds.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

- Number of children and youth who reported eating more of healthy foods (e.g., choose healthy options when eating out, increase fruit and vegetable intake, use food labels to make healthful food choices): 8,265
- Number of children and youth who reported adopting healthier eating patterns (e.g., Healthy US-Style -- MyPlate): 7,671
- Number of children and youth reporting increased physical activity: 5,655
- Number of children and youth reporting reduced sedentary time: 2,367
- Number of youth demonstrating improvement in health parameters such as physical fitness, blood pressure, or blood glucose: 818
- Number of adults who reported eating more of healthy foods (e.g., choose healthy options when eating out, increase fruit and vegetable intake, use food labels to make healthful food choices): 21,377
- Number of adults who reported adopting healthier eating patterns (e.g., DASH, Mediterranean-Style, Healthy US-Style -- MyPlate): 11,711
- Number of adults reporting increased physical activity: 5,387
- Number of adults reporting reduced sedentary time: 3,864
- Number of adults demonstrating increased awareness of personal health risks (e.g., high blood pressure, prediabetes): 17,107
- Number of adults demonstrating improvement in health parameters such as physical fitness, body mass index, blood pressure, or blood glucose: 6,136
- Number of adults reporting they had lower annual health care costs due to reduced

need for medical care or prescriptions: 167

Key Items of Evaluation

This was the second year of using our new statewide indicators. Last year, several infographics were developed using some of the statewide indicators or are currently under development. Florida Extension leadership has found these new indicators to be useful in communicating to our legislators and other stakeholders the value of our work. In 2018, the Program Development & Evaluation Center worked with Extension teams to refine the indicators and increase the use of evaluation tools that measure outcomes related to the statewide indicators.

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
607	Consumer Economics	3%	0%	10%	0%
608	Community Resource Planning and Development	5%	20%	0%	0%
723	Hazards to Human Health and Safety	5%	5%	0%	0%
724	Healthy Lifestyle	5%	5%	0%	0%
801	Individual and Family Resource Management	10%	15%	15%	0%
802	Human Development and Family Well-Being	10%	5%	20%	0%
804	Human Environmental Issues Concerning Apparel, Textiles, and Residential and Commercial Structures	2%	0%	5%	0%
805	Community Institutions, Health, and Social Services	10%	5%	20%	0%
806	Youth Development	40%	40%	30%	0%
807	Disaster Preparedness, Mitigation, Response, and Recovery	10%	5%	0%	0%
	Total	100%	100%	100%	0%

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2018	Extension		Research	
	1862	1890	1862	1890
Plan	145.0	10.0	6.0	0.0
Actual Paid	157.9	10.6	2.5	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**
1707563	629609	75598	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
1707563	46395	75598	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

2018	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	6954288	3128672	0	0

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

Patent Applications Submitted

Year: 2018

Actual: 7

Patents listed

1. No. 15/521,418 - Lactobacillus Acidophilus Surface Layer Portein A (SLPA) as a Therapeutic Agent for the Treatment of Inflammatory Diseases
2. No. 15/647,607 - Furniture Protector Against Bed Bugs and Other Crawling Insects
3. No. 62/550,585 - Optimizing Iron and Copper Utilization by Select Set of Amino Acids that Increased Villus Height
4. No. 62/587,049 - Fanless Mosquito Monitoring and Control Trap Using Pesticide-Impregnated Cloth
5. No. 15/997,257 - Lactobacillus Supplement for Alleviating Type I Diabetes
6. No. 62/677,785 - Mechanistic Bacterial Effector to Prevent Apoptosis of Human Beta Cells
7. No. 62/690,627 - Lactobacillus Formulations with Improved Stability and Efficacy

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2018	Extension	Research	Total
Actual	78	131	209

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- test
  Not reporting on this Output for this Annual Report

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	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	Communities improve in resiliency, economic development, leadership and citizen engagement

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 Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	141484

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
According to the 2012 research conducted by the National Association of Colleges and Employers (National Association of Colleges and Employers, 2014, Professional Standards for College and University Career Services 2014), a non-profit group that links college career placement offices with employers, the top five abilities which employers look for when hiring new graduates are: (1) teamwork; (2) decision-making and problem solving; (3) planning, organizing, and prioritization; (4) verbal communication; and (5) information processing. Through leadership opportunities, mentoring and community service, 4-H youth develop self-confidence and developed these skills needed to become productive citizens and be workforce ready. In particular, Florida 4-H seeks out opportunities for underrepresented youth to learn these important skills.

What has been done
Palm Beach County 4-H took 30 young women from Belle Glade to Florida 4-H University to meet with University of Florida (UF) faculty and staff as part of their Palm Beach County 4-H Women in STEM club, which is a grant-funded club through the USDA?s Women and Minorities in Science, Technology, Engineering and Mathematics Fields Grant Program (WAMS). The WAMS girls had been involved with 4-H since March 2018 and working with 4-H leaders and community partners, including the Belle Glade Youth Empowerment Center and Glades Central High School, on Food Safety and Food Science activities with 4-H Staff and partners serving as local mentors. To continue this learning experience, these young women attended Florida 4-H University, a week-long overnight event for young adults that includes hands-on, educational STEM workshops, exploration of career opportunities, and chance to interact with youth from all over the state.

In Hillsborough County, a different approach was used. Hillsborough County Public Schools (HCPS) sponsored a youth intern program where 16 at risk youth were selected to participate in a

six-week summer internship with a county department deemed suited to their interests. At risk youth were defined as being youth at risk of not finishing high school, with little interest to continue any education post high school and/or at risk of assuming low wage positions post high school. A UF/IFAS Extension commercial horticulture agent volunteered to supervise and mentor a high school student with interest in agriculture. HCPS provided students with training one day per week that introduced them to a variety of county departments to broaden knowledge about county functions and opportunities, and provided skills training regarding resume writing, interviewing and job search techniques. The student interacted with UF/IFAS Extension Hillsborough County four days per week during the six-week internship.

Results

During their 4-H University workshops, the WAMS girls brainstormed and developed a long-term, food science project that they began at Glades Central High School with local 4-H staff, Glades Central High School staff, and UF faculty in Gainesville remotely. This collaborative project has enabled these young women to gain interest and practical experience in STEM, make connections with UF faculty, and discover STEM careers.

During the internship, the high school student worked with various agents to learn about the overall function and mission of Extension. The student learned office, computer and reporting skills, achieved the Green Industries Best Management Practices certification, and participated in horticultural and farm site visits, performed soil and palm disease sampling, designed and installed ornamental pots, assisted with irrigation audits, and assisted with demonstration garden maintenance. The intern was also able to spend a day with the stadium maintenance crew of the Tampa Bay Buccaneers and utilize UF/IFAS publications to research his desire to become a blueberry farmer.

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 Action Outcome Measure

3b. Quantitative Outcome

Year	Actual

2018	23699

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Many households in the underserved areas in north Florida consist of members from several generations (grandparents, parents, aunts, uncles and children) especially among migrant families. Many of our participants experience running out of food before the next month. In Florida, approximately 14% of the population and 10% of families live in poverty , with 20% of the population living in poverty are under age 18.

What has been done
98% of adults participating in FAMU's nutrition education program completed the eight-week training. These adults were taught how to make better food choices, as well as how to shop and stretch the food dollar, and use food labels to choose best buys in order to make better decisions of how their food dollars are spent.

Results
Adult participants indicated an average of $4.10 savings on food per month as a result of the program.

4. Associated Knowledge Areas

KA Code	Knowledge Area
607	Consumer Economics
608	Community Resource Planning and Development
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
2018	39859

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
In Florida, the latest data available for the recidivism rate is about 25.2% for inmates released in 2013.

What has been done
FAMU Extension is helping to address recidivism by providing educational opportunities behind bars, thereby reducing the tendency of an ex-offender to reoffend through gainful employment after their release. A nine-session horticulture training program provided training in soils, botany, plant anatomy and physiology gardening and vegetable production.
Green Industries ?Best Management Practices (GI-BMP) workshop series taught landscape practices that are environmentally safe, landscape water conservation, and protection of ground and surface waters.

Results
Fourteen (14) Gadsden Re-Entry Center inmates participated in the horticultural training program and the Green Industries Best Management Practices (GI-BMP) certification training. 100% of the inmates tested received a score of 70% or better and earned their State of Florida Green Industries BMP certification. Likewise, another 6 participants at the Franklin County Jail in Eastpoint, FL also received their GI-BMP certification.

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
804	Human Environmental Issues Concerning Apparel, Textiles, and Residential and Commercial Structures
805	Community Institutions, Health, and Social Services

Outcome #4

1. Outcome Measures

Communities improve in resiliency, economic development, leadership and citizen engagement

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
A Gadsden County Extension agent serves on the Gadsden County Development Council. This is a small, majority African American community located in the Florida Panhandle that saw significant damage and power outages this year due to Hurricane Michael. Nearly one-fourth of its citizens are below the poverty level, compared to about 15% statewide (2013-17 American Community Survey 5-Year estimates). Florida Extension can help by increasing economic opportunity for small agricultural producers through the pursuit of funding opportunities to build and improve infrastructure in the county. This leads to greater marketing potential and profitability of small farmers in Gadsden County.

What has been done
In 2018, the county job fair attracted 114 attendees. Participants received information about career opportunities. The combined efforts of the members of GCDC resulted in the recruitment of two new businesses including expansion of Four Star Freightliner and the establishment of Hoover Treated Wood Products to Gadsden County in 2018.

Results
Four Star Freightliner will bring 40 permanent jobs with an economic impact of $2.3 million annually and four million in new tax revenues to Gadsden County. Once its new facilities are built, Hoover Treated Wood Products is estimated to bring in $5.3 million in new revenue to the county, with about 25 new jobs at an average salary of $40,000 plus benefits. The two businesses have employed 76 new employees in Gadsden County in 2018. The addition of these new businesses in 2018 is having a tremendous economic impact for Gadsden County. The county invests $160,000 annually into GCDC, with a return this year of over $10.9 million in increased tax revenues for their investment.

In addition, a rural development block grant (RDBG) for $199,999 was secured from USDA Rural Development for the purposes of constructing a local farmers market for Small Farmers in Gadsden County. Construction is still pending for 2019. An Ag BMP technician was hired in Gadsden County in 2018.

4. Associated Knowledge Areas

KA Code	Knowledge Area
608	Community Resource Planning and Development
805	Community Institutions, Health, and Social Services

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

In addition to Hurricane Michael, Florida faced significant environmental issues in 2018, including:

- blue-green algae blooms in Lake Okeechobee, spreading to rivers, lakes and canals,
- outbreak of red tide in Southwest Florida and small section on east coast.

UF/IFAS continues to face budget cuts to several agricultural programs and centers. In 2018 4-H received received only half its requested amount and more importantly, it was non-recurring funds.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

- Number of participants reporting they made changes that improved their physical mobility or safety within their home: 475
- Number of participants adopting one or more behaviors to improve the health of their home: 17,388
- Number of participants adopting one or more behaviors to improve their community living: 1,382
- Number of adult participants demonstrating improvement in money management skills or financial capability (i.e., earnings/income, spending, saving, investing, borrowing, protecting): 14,944
- Number of youth demonstrating improvement in money management skills or financial capability (i.e., earnings/income, spending, saving, investing, borrowing, protecting): 8,725
- Dollar value of grants generated by organizations or communities Extension assisted: $3,112,928
- Dollar value of other in-kind resources contributed by organizations and communities: $2,354,093
- Number of new or revised plans adopted that have begun to be implemented in a community, agency, local government, business or disaster: 142
- Number of new alliances formed through some type of formal agreement or MOU: 37
- Number of new alliances formed through an informal agreement without an

MOU: 219

- Number of youth who demonstrate improvement in communication skills: 62,570
- Number of youth who demonstrate improvement in appreciation of differences: 24,802
- Number of youth who demonstrate improvement in higher order thinking skills (e.g., decision making, critical thinking, goal setting): 54,112
- Number of volunteers who adopt best practices/behaviors that provide youth with a safe and inclusive environment (sense of belonging); a characteristic of a high-quality positive youth development (PYD) program: 4,893
- Number of youth reporting evidence of a safe and inclusive environment (sense of belonging); a characteristic of a high quality PYD program: 33,371
- Number of volunteers who adopt one or more best practices/behaviors of positive developmental relationships (express care, challenge growth, provide support, share power, and expand possibilities): 3,994
- Number of youth reporting the presence of one or more best practice of positive developmental relationships (express care, challenge growth, provide support, share power, and expand possibilities) during 4-H programs: 27,662
- Number of youth demonstrating engagement beyond six hours in 4-H: 89,169
- Number of youth demonstrating engagement beyond their club program: 27,375
- Number of youth who demonstrated behavior change in a subject matter (i.e., adoption of best practices, attained a new skill): 84,030

Key Items of Evaluation

This was the second year of using our new statewide indicators. Last year, several infographics were developed using some of the statewide indicators or are currently under development. Florida Extension leadership has found these new indicators to be useful in communicating to our legislators and other stakeholders the value of our work. In 2018, the Program Development & Evaluation Center worked with Extension teams to refine the indicators and increase the use of evaluation tools that measure outcomes related to the statewide indicators.
This year we initiated the collection of information about Extension's impact on the local economy and jobs. Known as Workforce Indicators, the 2018 data for family and consumer science, community resource development and 4-H programs are preliminary and will be vetted by state and county faculty later this year:

- Number of businesses created, retained, or expanded: 107 (FCS), 50 (CRD), 90 (4-H)
- Number of jobs created or retained: 414 (FCS), 704 (CRD), 19 (4-H)
- Number of participants reporting new leadership roles or opportunities undertaken: 1,143 (FCS), 666 (CRD), 5,898 (4-H)

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: 2018	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	0.0	0.0	5.0
Actual Paid	0.0	0.0	0.0	4.0
Actual Volunteer	0.0	0.0	0.0	0.0

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

Extension		Research	
Smith-Lever 3b & 3c	**1890 Extension**	**Hatch**	**Evans-Allen**
0	0	0	397406
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
0	0	0	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
0	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

FAMU (1890) Research

Studies on the Invasive Rice Stink Bugs Oebalus ypsilongriseus and Oebalus insularis (Hemiptera: Pentatomidae).
Potential Invasive Pests for U.S. Rice Growers

Stinkbug samples were collected in Arkansas, south Florida and Cuba. Oebalus pugnax, O. ypsilongriseus, and O. insularis were collected at all 3 locations. Oebalus pugnax were collected from 3 locations around the UARK Rice Resarch Center in Stuttgart Arkansas. Arrangements were made with our cooperator at the University of Arkansas for genetic analysis. Insects were analyzed by using molecular cladograms as well as population genetic analysis using Arlequin software. Oebalus ypsilongriseus and O. insularis were found in all the provinces surveyed and essentially occurred in all the rice fields at levels which would be considered above the economic thresholds in U.S. rice for O. pugnax. Since O. ypsilongriseus and O. insularis are introduced species and currently only occur in south Florida, no thresholds have been determined for them.
Preliminary results from mitochondrial DNA analysis support the theory that the origin of the south Florida populations is Cuba. However, the data hasn't been completely analyzed at the time of the report.

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

2018	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	200	540	40	1100

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

Year:	2018
Actual:	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2018	Extension	Research	Total
Actual	1	2	3

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Electronic identification keys/tools/resources developed

Year	Actual
2018	1

Output #2

Output Measure

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

Year	Actual
2018	4

Output #3

Output Measure

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

Year	Actual
2018	5

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
2018	10

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
2018	1

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Potentially invasive weevil species from the Caribbean islands 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 75 species of weevils on palms has been completed. Among these species 60 of them are pests while 15 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
2018	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. Furthermore, offshore studies on the soybean scale provide mitigation strategies for the Crypticerya genistae.

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.

Two ladybeetle predators, Anovia circumclusia and Chilocorus cacti provided successful control of the soybean scale.

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
2018	3

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)
in Florida. A new invasive species of Drosophila known as Spotted Wing Drosophila (SWD), Drosophila suzukii (Diptera: Drosophilidae) was detected in Florida in August 2009 in Hillsborough County. The species is native to South East Asia. The pest is now widespread in the eastern and western United States, as well as southern British Columbia, Canada, and is recently reported in Europe. The SWD is spreading rapidly and economic losses are severe, thus it is rapidly becoming a pest of great concern to fruits industry and growers. The current study was conducted to find out suitable traps for monitoring the SWD and to know possible management strategies to control this pest on soft-skinned fruits. Experiments were conducted in Tallahassee and Gainesville, Florida during summer 2015. Among the nine traps and/baits installed in blueberry fields for five weeks, preliminary results indicated that all traps were able to capture adults of D. suzukii. Among the treatments, two treatments captured highest number of flies including the Trece Trap + Trece Lure + Solution Bait (183 adults) followed by 151 flies in Trece Trap + Trece Lure + Solution Bait. The Trece Trap + Trece Lure + Solution Bait and Scentry Trap + Solution Bait captured 100 flies each and were found equally effective. The data of other four traps (including control) showed much less number of flies (35-58/trap) captured. Further study is necessary to conduct this work at broader level, therefore, additional localities are selected to carry out further experiments on traps and other suitable tools that are needed to develop and implement pest management strategies against this serious invasive pest.

Effects of Three Mulching Practices on the Density of Spotted-wing Drosophila (Diptera: Drosophilidae) on Blueberries in North Florida Spotted-wing Drosophila (SWD), Drosophila suzukii Matsumura (Diptera: Drosophilidae), is a native species from the Southeast Asia. The insect is a serious pest of soft-skinned fruits in Florida. Larvae of D. suzukii develop within the fruit making it unmarketable as fresh berries and causing great economic losses. Currently, there are limited options available for growers to control SWD. This study focuses on developing strategies to manage SWD effectively using cultural practices. The study was conducted at the University of Florida, North Florida Research and Education Center, in the summer of 2017 and 2018. The experimental design was two single unit experiment with two organic mulches [pine bark (PBM) and shortleaf pine needles (SPN)] and one non-organic mulch weed fabric mulch (WFM); in the control no mulch was applied. Adult flies were collected weekly (May-July) using ?Scentry® Traps? and ?Suzukii Bait Traps?. In 2017, Suzukii traps in SPN captured the highest number of flies and PBM had the lowest number of flies in 2017. In 2018, numbers were highest in SPN mulch and lowest in WFM. Similarly, Scentry® traps in SPN mulch in 2017 captured the highest number of adult flies and PBM had the lowest number of adult flies. In 2018 PBM had the highest number of captured adult flies and SPN had the lowest number. In both cases SPN accounted for the highest number of flies. In contrast PBM had the lowest number of flies. Further studies are needed to determine if mulch type affects the density of SWD.

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
2018	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, Crypticerya genistae) was carried out or initiated in Trinidad, Dominican Republic, Curacao and Aruba, Bahamas, Jamaica Haiti 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, conservation biological control 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).

In 2017, Suzukii traps shortleaf pine needle (SPN) mulch captured the highest number of flies and pine bark (PB) mulch had the lowest number of flies in 2017. In 2018, numbers were highest in SPN mulch and lowest in weed fabric mulch (WFM). Similarly, Scentry® traps in SPN mulch in 2017 captured the highest number of adult flies and PBM had the lowest number of adult flies. In 2018 PBM had the highest number of captured adult flies and SPN had the lowest number. In both cases SPN accounted for the highest number of flies.

Biological control of the soybean scale which destroys thousands of acres of peanuts in the Caribbean islands

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.

Soybean scale: The implementation of a biological control strategy for the soybean scale which destroyed thousands of acres of peanut by releasing Anovia circumclusia and Chilocorus cacti was successful in managing the soybean scales in Haiti.

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
2018	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
2018	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. We also provide offshore hands-on trainings, workshops and IPM designs needed to mitigate potential invasive pest species that are threats to the US agriculture.

Results
A total of 22 graduate and 12 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

In addition to Hurricane Michael, Florida faced significant environmental issues in 2018.

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. This was the second year of using our new statewide indicators. Last year, several infographics were developed using some of the statewide indicators or are currently under development. Florida Extension leadership has found these new indicators to be useful in communicating to our legislators and other stakeholders the value of our work. In 2018, the Program Development & Evaluation Center worked with Extension teams to refine the indicators and increase the use of evaluation tools that measure outcomes related to the statewide indicators.

Key Items of Evaluation

VI. National Outcomes and Indicators

1. NIFA Selected Outcomes and Indicators

Childhood Obesity (Outcome 1, Indicator 1.c)	
15936	Number of children and youth who reported eating more of healthy foods.
Climate Change (Outcome 1, Indicator 4)	
93	Number of new crop varieties, animal breeds, and genotypes whit climate adaptive traits.
Global Food Security and Hunger (Outcome 1, Indicator 4.a)	
36307	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)	
647	Number of new or improved innovations developed for food enterprises.
Food Safety (Outcome 1, Indicator 1)	
62	Number of viable technologies developed or modified for the detection and
Sustainable Energy (Outcome 3, Indicator 2)	
1	Number of farmers who adopted a dedicated bioenergy crop
Sustainable Energy (Outcome 3, Indicator 4)	
0	Tons of feedstocks delivered.