2019 Annual Report of Accomplishments and Results

Florida
University of Florida
Florida A&M University

I. Report Overview

The NIFA reviewer will refer to the executive summary submitted in your Plan of Work. Use this space to provide updates to your state or institutions as needed.

1. Executive Summary - Updates to the 2017 Plan of Work

UF/IFAS Extension kicked off its next 10-year strategic planning process in 2019 with a meeting of Extension administrators from UF/IFAS and FAMU. The current plan runs through 2023. A 37-member steering committee was formed, and they met for the first time in February 2020. The committee consists of a broad cross-section of the UF/IFAS organization, Florida A&M University and other UF colleges, stakeholders around the state, and the City of Gainesville community. Stakeholder groups represented include the Florida Association of Counties, Florida Farm Bureau, Florida Watermelon Association, Florida Fertilizer and Agrichemical Association, and Faith Outreach Ministries. In recent years UF/IFAS Extension expanded its initiative to collaborate more closely with UF colleges such as Medicine, Engineering, and Health and Human Performance.

For the past two years, UF/IFAS has been restructuring its Extension workforce incrementally by hiring regional agents to replace county agents who have left or retired. All 67 counties will continue to be staffed by one or more county-based agents. This shift toward regional hirings is expected to continue in 2020 although with the coronavirus and leadership changes this may be modified. Staffing and organizational structure will be evaluated as part of the new strategic planning process.

Beginning in 2014 UF has greatly increased the number and quality of faculty hires. The most recent initiative, Faculty 500, is focused on junior faculty and increased emphasis on diversity and inclusion. Since 2017, UF/IFAS has hired 40 new faculty members, with 21 hired since August 2019.

In 2019, Florida was still recovering from Hurricane Michael (October 2018) and the blue-green algae blooms and red tide outbreaks. In August 2019, Florida Sea Grant and UF/IFAS convened a meeting of more than 70 Harmful algal blooms (HABs) experts. The UF/IFAS Florida Sea Grant

Harmful Algal Bloom State of the Science Symposium brought together researchers and state and federal agency representatives from around the state and across the country to discuss HABs, especially Karenia brevis red tide and Microcystis aeruginosa cyanobacteria. After two days of presentations and lively dialogue, participants identified current areas of knowledge, data gaps and areas of uncertainty, as well as short- and long-term research priorities. A summary document of scientific consensus statements and research priorities was developed to inform Florida's Harmful Algal Bloom and Blue-Green Algae Task Forces and to facilitate better public outreach and communication from the scientific community. Both Task Forces have already requested symposium findings and the research priorities were presented to the HAB Task Force during their first meeting in September 2019. Additionally, the symposium chairs are working with The Thompson Earth Systems Institute at the University of Florida to translate the symposium findings into public friendly formats.

Efforts continue to build up and keep current an inventory of Extension impact infographics. The UF/IFAS lobbyist, as well as county and district Extension directors, have found the infographics to be very effective when speaking to stakeholders and governmental officials.

Zoom guidelines for collecting demographic and evaluation data have been provided to Extension faculty who are teaching online due to COVID-19 so they may collect the necessary demographic and evaluation data needed to complete this report next year and for other federal requirements.

Impacts included in this report:

1. New detection system developed to combat citrus greening (Planned Program #1)
2. Agricultural awareness programs cultivate attitudes and behaviors that benefit the Ag industry (1)
3. Plant diagnostic clinic saves money and jobs (1)
4. Florida Brilliance strawberry cultivar popular with growers (1)
5. Long-term, close relationship with watermelon growers benefits clients, citizens, and the environment (1)
6. South Florida Beef-Forage Program participants indicate high adoption of best management practices (1)
7. Beekeeper education and training is critical to Florida's large honey industry (1)
8. Improving habitats for native bees improves pollination and the environment (1)
9. Peanut on-farm trial provides growers and agents with useful information about disease management (1)
10. FCC Coleman horticulture and culinary programs help inmates succeed in life after prison (1, 2, 6)
11. Improving the quality and safety of fresh-cut produce (1, 2)
12. Engaging agricultural leaders to find climate-smart solutions (1, 3)
13. Developing scallop harvesting regulations that everyone can live with (3)
14. "BioBlitz" events to track and measure biodiversity on public lands help combat non-native plant infestations (3)

15. Irrigation evaluations help residents conserve water (3)
16. Microplastics awareness project helps Floridians make positive changes (3)
17. Helping to keep Florida's well water well (3)
18. Energy programs help community save money and water (4)
19. Carnita as renewable biofuel for jet airplanes (4)
20. Extension improves access to Fresh Access Bucks (FAB) (5)
21. Successful partnership shows significant improvement in health outcomes (5)
22. Financial literacy and home ownership (6)
23. Re-entry programs (6)
24. 4-H Agri-STEM (6)
25. Financial assistance for young adults has long-term impact (6)
26. Homeflow program lowers housing costs for low-to-moderate households and first-time homebuyers (6)
27. Food entrepreneurship program helps keep new food businesses safe and successful (6, 2)
28. Assisting youth ranch through equine expertise, education, and strong networks (6)
29. Strengthening 4-H through volunteer training (6)
30. Revitalizing 4-H partnership with naval air station in Florida's panhandle (6)
31. Studies on the invasive rice stink bugs Oebalus ypsilongriseus and Oebalus insularis (Hemiptera: Pentatomidae). Potential invasive pests for U.S. rice growers (7)
32. Monitoring and management of the Spotted Wing Drosophila, Drosophila suzukii (Diptera: Drosophilidae) in Florida (7)
33. Digital identification tools for the identification of invasive species (7)
34. Biological control of major pests affecting food crops (7)
35. Strategies for the identification, prevention and management of invasive species (7)
36. Integrated Pest Management (IPM) approaches adopted by farmers leading to greater profitability (7)
37. Development of muscadine cultivars with superior characteristics (7)
38. Development of Florida hybrid bunch cultivars for wine with improved taste color, and shelf-life (7)
39. Enhancement of nutraceutical properties and utilization of value-added products from muscadine grapes (7)
40. Identification of suitable small fruits as alternative crops for small farmers in North Florida (7)
41. Identification of best management practices for grapes and small fruits (7)
42. Effect of Reclaimed wastewater irrigation on soil health and environment (7)
43. Bioavailability index of mercury in sediments (7)
44. Effects of vegetation type on carbon and nutrient composition greenhouse gases and methanogenesis pathways in wetlands (7)
45. Using aquatic insects as bioindicators to monitor and assess hydrological change in streams and isolated wetlands of North Florida (7)
46. Hydrologic exchanges between human and natural systems (7)

Merit and Scientific Peer Review Processes

The NIFA reviewer will refer to your Plan of Work. Use this space to provide updates as needed or activities that you would like to bring to NIFA's attention.

Process	Updates
1. The Merit Review Process	The Florida Extension Leadership Team meets monthly to discuss statewide programming, 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 Extension Director, statewide program leaders, district directors, state specialist in program & professional development, and representatives from IT, communication services, human resources, financial services, and county operations. Under the seven Initiatives, we have 23 Priority Work Groups (PWGs). Both UF/IFAS and FAMU faculty serve on these self-directed teams. A program leader provides oversight and guidance to the PWGs. Members consist of both state specialists and county agents together working on program planning and evaluation, curricula development, and assessing the need for new research. PWGs may consult with external stakeholders as needed. Teams 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 PWGs together to improve the quality and relevance of its Extension programming. Otherwise, the 2017 Plan of Work reflects the 2019 process.
2. The Scientific Peer Review Process	The 2017 Plan of Work reflects the 2019 process.

II. Stakeholder Input

The NIFA reviewer will refer to your Plan of Work. Use this space to provide updates as needed or activities that you would like to bring to NIFA's attention.

Stakeholder Input Aspects	Updates
1. Actions taken to seek stakeholder input that encouraged their participation with a brief explanation	In Fall 2019, UF/IFAS Extension initiated the planning process for its next strategic plan. The current plan expires in 2023. Members of the steering committee met in February 2020 and represent a broad section of internal and external stakeholders. The 2021 POW has more details. The Challenge 2050 project now offers an undergraduate certificate program that empowers students to take action in addressing the unstructured, complex and adaptive world challenges in sustainable development and food security. Students engage with stakeholders who serve as guest lecturers. Otherwise, the 2017 Plan of Work reflects the 2019 actions taken.
2. Methods to identify individuals and groups and brief explanation.	The 2017 Plan of Work reflects the 2019 methods used.
3. Methods for collecting stakeholder input and brief explanation.	The 2017 Plan of Work reflects the 2019 methods used.
4. A Statement of how the input will be considered and brief explanation of what you learned from your stakeholders.	The 2017-18 Urban Extension needs assessment consisted of dozens of in-depth interviews with UF/IFAS county faculty and staff in four metro areas. The project was shared with Extension leadership and used (and continues to be used) to evaluate our current programs and plan future efforts in urban communities. The project highlighted the need for more resources in urban counties, and unique challenges for urban areas related to transportation, population density, and diverse languages. UF/IFAS Communications moved two communication/marketing specialists to urban areas in the state. A proposal to open an Extension branch office in a walkable, downtown area was developed and is under consideration.

	The FAMU's Center for Biological Control research on offshore pests and invasive alien species is aimed at safeguarding the nation's agriculture and its related industries. Our stakeholders are seeing the need for technology transfers to fill the gap of knowledge and adoption of new technologies and tools, due to rapid changes in pest mitigation strategies.

III. Planned Program Table of Contents

V. Planned Program Activities and Accomplishments

Please provide information for activities that represent the best work of your institution(s). See Section V of the Guidance for information on what to include in the qualitative outcomes or impact statements. Add additional rows to convey additional accomplishments. You may expand each row as needed.

No.	Title or Activity Description	Outcome/Impact Statement	Planned Program Name/No.
1.	**New Detection System Developed to Combat Citrus Greening**	Citrus greening disease, also called Huanglongbing or HLB, continues to impact orange and grapefruit growers in Florida. The disease is spread by the Asian citrus psyllid as it feeds on citrus tree leaves. Florida's citrus production declined by 71 percent from 2000 to 2017, primarily due to losses from greening. According to UF/IFAS researchers, the state has lost about $7.8 billion in revenue, 162,200 citrus acres and 7,513 jobs to citrus greening since 2007. UF/IFAS scientists are developing a new tool, called the Automated Psyllid Detection System. It will display a count of the diseased psyllid on maps so that growers can see precisely see which areas are infected and conduct targeted insecticide spraying in those area. This is important because chemicals are expensive and can harm the environment, and pests can develop resistance to certain chemicals. The system automates a tap sample method that is currently used by some growers but is a manual, labor-intensive process. Utilizing machine vision and artificial intelligence (AI) the system distinguishes between psyllids and other pests. Recent tests showed it detected psyllids with 90 percent accuracy (https://doi.org/10.1016/j.compag.2019.04.022). The project is applying for a full patent and talking to companies about bringing the device to market. The system has the potential to be used for other crop insects.	1

2.	**Agricultural Awareness Programs Cultivate Attitudes and Behaviors that Benefit the Ag Industry**	According to the 2017 Census of Agriculture, Florida contains 47,590 farms, totaling 9.7 million acres of land in agricultural production. As such, agricultural lands account for approximately 28% of the total land area of Florida. In addition to generating food and other agricultural products, these lands provide an array of ecosystem services that benefit Florida residents including food, water filtration, flood protection, carbon sequestration, pollination, and recreation. However, agricultural lands and the ecosystem services provided by these lands are under threat from rapid population growth and urban development in Florida. It is estimated that by 2060, approximately 2.7 million acres of existing agricultural land in Florida (~28.3% of all agricultural land) will be converted to urban development to house the state's growing population. It is reasonable to expect that the conversion of agricultural land to urban development will reduce the provision of ecosystem services in Florida, which in turn will adversely affect the welfare of Florida residents. Not only does Florida agriculture provide food, environmental benefits, and tourism, it also provides over 1.5 million jobs and contributes over 140 billion dollars in annual economic impact to the state economy. Public support is required for policies that protect agricultural lands in Florida. However, it is unclear whether the majority of Florida residents are aware of the various ecosystem services provided by agricultural lands or the threats that population growth and poorly planned urban development pose to agriculture in Florida. Government officials, community leaders, and the general public influence purchasing behaviors and policy that affect agriculture, and they must be educated about the existence and value of Florida agriculture if they are to take action to support it. Agricultural tours and events serve as a means of educating people about agriculture in impactful ways that make agriculture real to them, offering the opportunity to see agriculture in action and meet the people who raise their food and agricultural products. In 2019, multiple Extension agents in five counties coordinated various farm tours, a food business networking event, presentations, and other agricultural awareness events, educating 882 people and conducting participant surveys. The tours and events educated participants about local	1

		agricultural enterprises, production practices, economic contributions, and history of locally produced livestock, dairy products, and crops, as well as discussion of current issues affecting agriculture such as the challenges of securing farm labor, competition from foreign imports, pest pressures, consumer perceptions, and food and worker safety regulations. Post-event surveys indicated the following averages: • 80% of participants reported increasing their knowledge of Florida agriculture. • 84% reported that they would share what they learned with others. • 67% reported actually sharing what they learned with others. • 89% of participants reported that they feel they can make improved decisions about agricultural issues. • 83% of participants reported they would increase their purchase of Florida foods or visit an agritourism operation as a result of what they learned. • 19% reported actually increasing their purchase of Florida grown products after the events. Additional agricultural awareness activities conducted by Faculty around the state included a school garden program to teach youth about food systems, a Local Food Trail tourism campaign, and a Farm to School program that enabled a school to purchase from local farms. Educating people about agriculture is the first step towards cultivating positive attitudes about agriculture, and empowering people to actively support agriculture through purchasing behaviors, advocacy, or policy. The impacts of agriculture literacy translate to policies that support sustainable agriculture and preservation of agricultural lands, having people who are qualified for agricultural-related careers, a diversified economy, food security, and the protection of our air, water, ecosystems, and wildlife.	
3.	**Plant Diagnostic Clinic Saves Money and Jobs**	Florida's environmental horticulture industry employs over 230,000 people and generated $21 billion in total output sales in 2015, according to the USDA Census of Agriculture. With commercial	1

		growers highly concentrated in the central Florida area, the Mid-Florida Research and Education Center's (MREC) plant diagnostic clinic serves both commercial growers and citizens in the Orlando area. The clinic is openly weekly, accepting samples for a free diagnosis of various plant health issues. The clinic is run by UF/IFAS Extension faculty and state specialists. The center's delivery of science-based recommendations to citizens and growers often result in significant savings for growers and residents. One of the most opportune times to educate growers is when they come to the weekly plant diagnostic clinic. In 2019, a new commercial grower came to the UF/IFAS MREC plant clinic for the second time. He works for a large grower that has locations throughout the Southeast. He was five weeks away from delivering 28,600 poinsettias to his retail customers. He thought the plants had Xanthomonas, a bacterial plant disease that has no cure. The UF/IFAS MREC diagnostic plant clinic determined that the plants did not have this detrimental disease. Instead, the poinsettias needed supplemental nutrients and fewer preventative chemical spray applications. The grower was able to pick off the damaged leaves and make fertilizer applications needed to save the crop. This saved the company $343,500 in lost plant sales and helped 11 employees keep their jobs.	
4.	**Florida Brilliance Strawberry Cultivar Popular with Growers**	Florida is the nation's No. 2 producer of strawberry, after California, and strawberry represents the No. 2 most valuable fruit crop produced in Florida, after citrus. In a typical year, Florida's total strawberry harvest has a farm-gate value of $250 million to $400 million. This industry is primarily based in the Tampa Bay area and has been an economic mainstay of the region for about a century. Florida growers are constantly trying to remain one step ahead of competitors in other U.S. states and other nations, not to mention pests and pathogens. For almost a century, the state's growers have had a staunch ally in the UF/IFAS strawberry breeding program, which has historically been the source of the most widely grown strawberry varieties in Florida. The breeding program is currently based at the UF/IFAS Gulf Coast Research and Education Center in Balm. Here, expert plant breeders collaborate with geneticists, entomologists, plant pathologists and even agricultural economists to	1

		determine exactly which traits are needed in the latest round of UF/IFAS strawberry cultivars, which are still bred using traditional methods, with no transgenic procedures involved. Released in 2018, Florida Brilliance was developed in response to grower need for strawberry varieties that bear large amounts of fruit in late November and early December, when strawberry supplies from other sources are limited, and Florida growers can potentially command higher prices. Sales figures from recent years indicated that the UF/IFAS-bred strawberry varieties Florida Radiance and Sweet Sensation had been responsible for good early yields, but growers believed that these varieties needed to be supplemented - or perhaps replaced - with a superior early-yielding variety. This was the primary motivation for development of Florida Brilliance, but the breeding team also sought to deliver a variety with longer shelf life, better flavor and improved shape, as well. Field trials conducted in 2015-16 and 2016-17 indicated that Florida Brilliance could deliver larger early yields, and larger total yields, than either Florida Radiance or Sweet Sensation. Immediately, Florida Brilliance gained favor with growers. During the 2019-20 season, Florida Brilliance was being cultivated on about 5,000 acres in Hillsborough county - about half the state's commercial strawberry acreage, according to the Florida Strawberry Growers Association. Members of the UF/IFAS strawberry breeding team anticipate that demand for Florida Brilliance will expand further during the 2020-21 season. Resource: https://edis.ifas.ufl.edu/hs1322	
5.	**Long-term, Close Relationship with Watermelon Growers Benefits Clients, Citizens, and the Environment**	The Suwannee Valley, located in North Central Florida, is a region known for watermelon production with approximately one-third of the state's acreage. The bulk of that acreage is located in 6-8 counties and the estimated value of watermelon in the region is from $35 to 50 million, depending on the year. Statewide, the watermelon industry is valued at approximately $88 million.	1

		For the past thirty years, the UF/IFAS Extension offices in those counties, along with regional and state specialists, have developed and refined a system of early detection of insects, diseases and other issues related to the watermelon crop. It is common for watermelon growers in the Suwannee Valley to see similar pest problems in such a localized area with distances of 100 miles or less. Extension agents visit many of these farms on a weekly basis during the main part of the growing season and quickly respond to questions from growers. The agents collect disease or insect specimens and deliver to the UF/IFAS diagnostic labs within 24 hours. A quick diagnosis of the issue is shared with the grower and communicated to the agent and specialist group. In addition, county agents have petiole sap testing tools and knowledge to help interpret soil moisture sensor data with growers. These two skills help growers refine water and fertilizer inputs. Once per week, or more frequently if needed, the regional Extension agent summarizes the findings of the week and communicates that along with other timely information on irrigation and nutrient management to the county agents who then, in turn, communicate to their growers. This method keeps the county agent in the loop with "their" growers and increases credibility. The most common method of communicating to growers is via some type of text group, but may also include emails, phone calls, and newspaper articles. This method of communication is highly appreciated by growers and helps growers react quickly and appropriately to current issues with research-based solutions provided by IFAS specialists. In the past two years, increased efforts to promote the use of electronic soil moisture sensors (SMS) have led to increased awareness and adoption of SMS. The training of 37 UF/IFAS Extension faculty members and eight Florida Department of Agriculture and Consumer Services (FDACS) technicians will enable them to guide growers on proper placement, adjustment and use of their sensors, and will also support efforts to educate new growers as the program expands. Growers are reporting a greater understanding of the impacts their irrigation decisions have on crop water and nutrient availability, and that SMS helps take the guesswork out of irrigating. Agents and technicians report that 90 percent of the participant growers surveyed at the recent SMS workshops and field days are considering or have made plans to adopt SMS. Although only 26 growers received sensors in the	

		2019 program, another 43 growers were reached with the field days and workshops. Attendees at these events came from Florida, Georgia and Alabama, representing more than 30,000 acres of irrigated farmland. Proper early detection and communication allow growers to make proper and timely decisions that typically result in $150-250 savings per acre. Based on approximately 7,000 acres, UF/IFAS agents' efforts on behalf of the watermelon industry in Suwannee Valley demonstrate an estimated economic benefit of $1 million to $1.75 million as a result of improved irrigation and nutrient management efficiency as well as reduced losses from insects and diseases. Adoption of best management practices and agricultural technologies can reduce growers' need for supplemental irrigation and, in turn, reduce the loss of nutrients from farmlands via surface run-off that eventually enters nearby water bodies. Protection of Florida's water resources is important to the public for numerous reasons, including the need for abundant potable water that residents use for drinking, irrigation, recreation and more. With plans to continue expanding the NFREC-SV program, the use of SMS among area growers has the potential to climb higher, which would result in significant water savings. Infographic: https://pdec.ifas.ufl.edu/impacts/Watermelon.pdf	
6.	**South Florida Beef- Forage Program Participants Indicate High Adoption of Best Management Practices**	The South Florida Beef-Forage Program (SFBFP) coordinates UF/IFAS research and Extension activities to help livestock producers enhance their forage and cattle production. The SFBFP is located in 16 counties and the Seminole Tribe of Florida. 352 south Florida livestock producers participated in our educational programs in 2019, representing 120,000 cattle and 377,000 acres of rangeland. Income in the beef cattle operation is based on pounds of weaned calves. Therefore, profitability of the beef cattle operation is directly related to reproductive efficiency in the cow herd. According to the National Animal Health Monitoring Service and various other research sources, reproduction	1

		efficiency can be increased between 5 and 20% by implementing recommended management practices in nutrition, pasture/hay management, reproduction, herd health, calf husbandry, calf marketing, and performance records. The SFBFP offers an intensive three-day course in reproductive management of the cow herd. The purpose of this school is to strengthen managerial capabilities of owners and operators of beef ranches. Responding participants indicated that they expect to improve the profitability of their operation by an average $7/head/year. Representing approximately 16,389 head of cattle, this translates to an estimated annual increase of $114,723 in profitability among this small group of owners and operators. Grazing positively impacts native ranges by reducing invasive vegetation and increasing wildlife habitats. Good forage management practices more efficiently utilize resources and will positively affect forage quality and yield thus improving nutrient availability to the cow herd while preserving natural resources. The SFBFP offers the Forage Management Tour and Workshop for beef cattle producers. The program involves seminars and field visits. In 2019, twenty-one beef cattle operators participated in the Tour and Workshop. Eighty-eight percent (88%) of responding participants indicated that they would adopt a new management practice(s) and/or change existing practices. Examples of adopted or changed practices include implementing weed management, rotational grazing, mob grazing smutgrass and pasture renovation. Responding participants manage 5,725 head of cattle on an estimated 25,550 acres in South Florida. Studies have shown that body condition score (BCS) is positively correlated with reproductive performance and this correlation is consistent across several cattle breeds. Livestock producers wish to better evaluate cattle nutritional status before supplementing the herd along with optimizing cow performance by utilizing a better nutritional management program. The Second Annual Nutrition for Beef Females Workshop series was presented in three of the 17 counties served by the South Florida Beef Forage Program, with 122 participants. In 2019 topics presented built upon those offered in the first series of seminars. These included concepts of nutrition, multiple supplementation strategies for beef females, impact of BCS on reproduction of beef	

		females, BCS training, impact of stocking rate on animal performance, stockpiling forage options and bailage and hay production. The interactive pre/posttest surveys were conducted using Turning Technologies software and equipment. Results revealed a 20% knowledge gain when selecting the proper BCS of beef cows. Nearly all (98%) 43 participants surveyed will implement at least one of the management strategies presented. Most health provisions that beef cattle receive are not provided by medical professionals but rather by ranchers, ranch managers, cowboys, and other handlers. Best management practices; such as identifying and recording body condition, handling pharmaceuticals properly, administering drugs and/or vaccines correctly, and partaking in other Beef Quality Assurance (BQA) practices will improve the health of the cow-herd and ultimately the quality of meat in the food supply. Cattle handlers can be hired without any formal training of beef cattle health protocols and may improperly address herd health. There are also new and emerging technological advances in medicine that needs to be brought to the attention of experienced ranchers and cattle handlers. Participants indicated a 93% increase in knowledge and understanding of topics presented. Seventy-two percent (72%) of responding participants indicated that they would adopt or change a management practice as a result of their participation. Respondents anticipate an average $14.25/head increased revenue by applying these practices. At the event, approximately 24,250 head of cattle were represented resulting in a revenue increase of $345,562 on South Florida ranches. Cow-calf operations in South Florida face dry winter months on average, where the reliance on warm season perennial grasses for forage, can lead to decreases in herd productivity and shortages in available feedstuff for cattle, thus increasing the risk for financial instability. Informed decision-making can lead beef cattle producers to improve the management of their herds. In South Florida, winter supplementation is a common practice that can provide herds with optimal nutrition in a critical time for most cow-calf operations. The Winter Supplementation Seminar was designed to provide beef cattle operators with the knowledge and tools to economically and efficiently manage	

		nutritional requirements of the cow herd. This seminar featured Extension specialists from the University of Florida and industry experts speaking about supplementation for a beef cattle herd in preparation for the winter and maintaining adequate body condition. This seminar was attended by 52 producers. Surveyed participants expressed an overall 42% increase in knowledge as a result of their participation in the seminar and 82% stated they plan to change an existing practice or begin a new one. Infographic: https://pdec.ifas.ufl.edu/impacts/Beef-Forage.pdf	
7.	**Beekeeper Education and Training is Critical to Florida's Large Honey Industry**	Honey bees contribute nearly $20 billion to the crop industry by providing pollination services all over the United States. There are nearly 5,000 registered beekeepers in the state of Florida, managing approximately 650,000 colonies. Florida's honey industry is ranked among the top five in the nation, producing more than 10 million pounds in 2018. Nearly 85% of these are considered "backyard" beekeepers (0–40 colonies), while the remaining 15% are "sideline" (41–100 colonies) or "commercial" beekeepers (100+ colonies). The UF/IFAS beekeeping program started in 1929 but received a boost in 2018 with the opening of its state-of-the-art facilities, known as the UF/IFAS Honey Bee Research and Extension Lab (HBREL). Beekeeping education and research continues to be an increasingly important part of Florida agriculture. Several programs are offered through HBREL and in counties throughout the state. Classroom, discussions, and hands-on experience is provided in regard to apiary education to enhance the confidence and skill of honey beekeepers of all levels. The UF/IFAS Bee Colleges provides formal and non-formal education to beekeepers and non-beekeepers around the world. In 2019, three sessions of Bee College were held, and 516 beekeepers attended —about 10% of all the beekeepers in the state of Florida. The apprentice-level UF/IFAS Florida Master Beekeeper Program was completed and made available online.	1

		In partnership with beekeeper associations, the inaugural Northeast Florida Honeybee Symposium was held in 2019 and brought together local and regional beekeepers, Florida State Beekeepers Association members, equipment distributors and vendors along with UF/IFAS research and Extension faculty. The program, targeted to experienced beekeepers and covering advanced topics, was such a success that the associations plan on holding a second symposium in 2020. In 2019, UF/IFAS worked with Black Bee Honey, a non-profit organization run by young entrepreneurs from low-income food desert areas in Orlando, Florida. The high school students have transitioned from purchasing wholesale honey to wanting to become beekeepers. This is a highly successful program, recognized throughout the county and state. The coordinator of this program has attended previous bee colleges, and the students recently received a scholarship to attend future bee colleges on the UF campus. Orange County is a unique county in that it is very urbanized in the middle, yet still has a piece of the Florida Wildlife Corridor running through it. After giving a talk about invasive species and their threat to Florida's ecosystems, a UF/IFAS Extension agent was invited to serve as a "bee liaison" on a grant proposal submitted to the Honey Bee Conservatory organization by the City of Orlando's Department of Sustainability and Resilience. If funded, the city will receive mason bees to release in parks that are in lower income areas to help educate residents on the importance of pollinators. Other impacts related to 2019 UF/IFAS bee programs: • 97% of previous Bee College participants indicated they had applied the knowledge and skills learned in past sessions. • Follow-up evaluations of program participants from north central Florida, showed most continue their beekeeping education (82%), including more than half (57%) indicating they shadow other beekeepers to increase their knowledge and skill. Sixty-eight percent reported they had registered their beehives through the Florida Department of Agriculture & Consumer Services (FDACS). By doing so, hobby beekeepers help protect the honeybee	

		industry by receiving annual inspections that monitor and prevent the spread of lethal agents. • At the symposium, 41 respondents representing 810 beehives over four counties, stated that the educational information provided had an economic benefit to their beekeeping operation of a combined amount of $15,990. • An agent working with twelve backyard beekeepers since 2017 conducted follow-up surveys and found participants reported savings of nearly $5,000 by purchasing the correct equipment needed to start their beehives. • A UF/IFAS researcher documented greater pollination success with an increase in managed honey bee visitation rates at five commercial blueberry farms in Florida.	
8.	**Improving Habitats for Native Bees Improves Pollination and the Environment**	Florida is home to an estimated 315 species of native wild bees that pollinate our crops, wildflowers, native trees, and ornamentals. Many of these species have declined in abundance in recent decades, and overall bee diversity has decreased. Major factors contributing to pollinator decline include loss of floral resources and nesting habitat. Gardening for pollinators has the potential to mitigate these negative effects by providing resources for bees. However, little information currently exists for Florida residents on gardening for native bees, with recommendations more specific to butterflies or hummingbirds. In 2019, a state specialist delivered programs, alongside UF/IFAS county Extension agents, on gardening and managing habitat for native bees to 175 Master Gardeners and 557 Florida residents engaged in gardening, land management, restoration, or conservation. Follow-up surveys showed 97% of program participants (111 of 115) reported increased knowledge on native wild bee biology, diversity, and conservation. Eighty-six percent of participants (104 of 121), reported that they were more likely or significantly more likely to buy recommended plants for bees and 94% (46 of 49) reported being more likely to adopt recommended management practices for bees. In a separate survey, 96% of participants (26 of 27) reported intent to adopt management recommendations for bee conservation. The changes made by participants in their gardening practices and land management decisions will increase floral and nesting resources for native wild	1

		bees, which are important pollinators for both crop and wild plants. Therefore, the conservation of native wild bees will benefit native plant biodiversity as well as regional crop production. Another UF/IFAS researcher has found that creating native wildflower habitats in out-of-play areas on golf courses increases the abundance and diversity of native bees and predatory and parasitic insects. They discovered that planting more diverse wildflower mixtures attracts significantly more native bees and provide significantly greater pest control benefits. Importantly, maintained turfgrass areas adjacent to wildflowers experience up to 50% greater rates of biological control of fall armyworm caterpillars, a key insect pest of maintained turfgrass on golf courses. Researchers also identified habitat types to replace with flowering plantings. For example, it is more ecologically and economically valuable to replace low-cut maintained turfgrass with flowering plants than it is to replace higher cut turfgrass with flowering plants. Based on these results, UF/IFAS has generated specific wildflower habitat planting recommendations that golf course superintendents can use to reduce the acreage of maintained turfgrass and the monetary and environmental costs associated with maintaining it (i.e., time and costs associated with mowing, irrigation, fertilization, and pesticides). Thus far, at least nine Florida golf courses have created conservation habitats based on the results and recommendations from this work. The clubs implementing these practices have also expressed interest in expanding beyond the current scale of their plantings. By implementing the minimum of what we recommend, a single wildflower planting takes approximately 5,000 square feet into space that does not require fertilization, mowing, or pesticide inputs and the 50% increase in pest control benefits extend to over ¾ of an acre surrounding each plot. Other golf courses in central Florida indicate they have already or plan to implement these conservation habitats based on UF/IFAS recommendations. One course has converted approximately 5 acres from maintained turfgrass to pollinator habitat. Another course has identified approximately 8 acres of land to convert from managed turf to pollinator conservation habitat over the next few years. I have also identified a network of over 30 golf courses throughout Florida who are interested in creating conservation	

		plantings or have already done so. Using this network, we plan to further advance this research and Extension program to broaden its impact. In coming years, we anticipate the number of acres of golf course conservation habitat to grow substantially.	
9.	**Peanut On-Farm Trial Provides Growers and Agents with Useful Information about Disease Management**	Peanut producers in North Florida are faced with the difficult task of determining the best fungicide spray program for disease management in peanuts. Each year new fungicides are labeled for peanut use that are more expensive than traditionally used products. These producers depend on unbiased Extension research to determine the effectiveness of new products and if they are cost-effective. Late and early leaf spot, Rhizoctonia limb rot, and white mold are the most common peanut diseases in North Florida. In the last eight years, the efficacy of four fungicide programs for the control of foliar and soil borne diseases in peanut was compared in on-farm research trials jointly organized by a UF/IFAS Hamilton County Agriculture Extension agent and a UF/IFAS plant pathologist, in a commercial peanut field in Hamilton County. This trial is the regional on-farm location for the statewide peanut disease research program. Each year, yield and quality were measured on peanuts harvested from plots consisting of 24 rows each and replicated 4 times. The spray programs were discussed during one on one field consultations and at in-season and winter peanut production meetings. Producers were also encouraged to visit the on-farm trial throughout the growing season to form their own assessments about the products. In 2018 a new fungicide Miravis was introduced to peanut producers as a superior product for the control of late and early leaf spot. This product is recommended to be applied with another fungicide Elatus which was released in 2016. The two products have a combined cost of $48 per acre when applied at labeled rates. This product is recommended to be used twice during the season. Producers attending the Hamilton County Peanut On-Farm Trial Field Day were interested in the products success. Although this fungicide treatment triples the price of other similar products it is the first that can be applied on a 28-day rotation cutting a producer's spray schedule from 7 applications to 5. This saves the producer time and money when covering multiple acres. In 2018 one producer applied this product using the pesticide schedule from the Hamilton County on-farm	1

		trial on half of his planted acres (300 acres). During a post-season visit in 2019 this producer indicated that he used it on all his 600 planted acres due to its disease management and reduction in labor hours of application. Overall, 5 producers decided to reduce their application program by 2 sprays through using the product Miravis, and 7 producers are using lower cost products they did not use before. These spray reductions have environmental impacts through reduction in trips across the field and fungicide spray contamination. The lower cost products can save producers $7 to $18 per acre for each spray they use in a season. For one producer, with 500 total acres of peanuts, they save $13 per acre on two sprays which led to a seasonal savings of $13,000. This research provides that opportunity to producers and agents which allows them to make better product decisions related to peanut disease management. It also provides researchers with information about how these products or programs respond to a pathogen population, which can lead to early identification of product efficacy problems related to resistance or novel pathogen introduction. It is also allowing producers to use less fungicide in their programs and teaching them when to use cheaper alternatives are effective. The Extension agents involved in these trials get hand on experience with disease management which increases their management recommendation confidence and disease identification. This provides producers with quick and accurate management solutions.	
10.	**FCC Coleman Horticulture and Culinary Programs Help Inmates Succeed in Life After Prison**	The Federal Correctional Complex, Coleman (FCC Coleman) is a United States federal prison for primarily male inmates in Sumter County, Florida. UF/IFAS Extension's FCC Coleman Federal Prison Horticulture and Culinary programs provide opportunities for inmates to receive certificates such as ServSafe®, the National Restaurant Association's ManageFirst Professional®, UF/IFAS Green Industries-Best Management Practices (GI-BMP), and the Florida Nursery, Growers and Landscape Association's Certified Horticulture Professional (FCHP). According to the United States Sentencing Commission (2016), the federal recidivism rate averages 49.3% within eight years of release. The 2019 recidivism rate for the 500 FCC Coleman students who	1, 2,

		successfully completed the horticulture program over the past nine years is 5.4%. The average cost of incarceration of federal inmates was $37,449 in 2018 (Bureau of Prisons, Federal Register, November 2019). The cost of incarceration of the 27 who returned to prison (5.4% of 500) equals $1,011,123 in 2018 dollars; the cost of housing 247 persons (49.3% of 500) is $9,249,903. This represents an estimated $8.2 million dollars in savings. Pass rates for the horticulture and culinary program participants in 2019: • Horticulture – 98% (57/58 students) received GI-BMP certification and the average score on the 200 question FCHP exam was 91% (70% is passing). • Culinary – In a program developed for medium security inmates, 78% (62/80) scored above the required minimum of 75% for ServSafe® and 70% for ManageFirst and successfully completed the program. In another program offered at the high security prisons, 61% (44/72) successfully completed the Extension program with the same required pass rates on exams. The UF/IFAS Extension programs at FCC Coleman are well-rounded, designed not only to provide credentials useful or required for employment but also skills and assistance that improve the inmate's likelihood of being hired. Classes in resume writing, interviewing techniques and mock interviews are tailored specifically to convicted felons and their unique situation. Follow-up with former students illustrates the successful transition from inmate to full-time employment in Florida and beyond. One student was released before he could receive his certificates, but he took his books to his interview to show what he had studied and was immediately hired at $19/hour as a landscaper in Minnesota. Another was hired by a large Florida producer as a supervisor rather than entry level employee and makes enough to support himself and his family. A former inmate and student now works as the lead cook at a South Dakota rescue mission, running the entire kitchen and doing all the food ordering and menu planning.	

		Infographic: https://pdec.ifas.ufl.edu/impacts/PrisonPrograms.pdf (under development, link may not work if not completed by the time this report is reviewed)	
11.	**Improving the Quality and Safety of Fresh-cut Produce**	Postharvest losses of fresh-cut produce are difficult to estimate but given the highly perishable nature of fresh-cuts compared to intact produce, the retail value of fresh-cut produce losses and wastage at all levels may exceed $9-10 billion annually. The appearance, convenience, and generally high nutritive value of fresh-cut vegetables and fruits drive sales, but repeat sales is dependent upon assurance of its safety and the products having pleasing texture and flavor. The industry primarily relies on established technologies derived mainly from practical experience to maintain visual quality and shelf-life with less consideration of the quality characteristics that drive repeat sales such as good flavor retention, maintenance of an appealing texture (crispness, crunchiness), and increased microbial quality leading to extended shelf stability and food safety. Through interaction with the industry we know that current technologies, especially for fresh-cut fruits, do not provide the shelf stability needed to supply long distance domestic markets with optimum flavor quality. In 2019, UF/IFAS researchers developed recommendations for minimum firmness for processing different cultivars, with and without additives. They showed that the lower temperatures in enclosed refrigerated retail display cases maintain higher quality and safety of leafy greens such as baby spinach, spring mix and Romaine lettuce. A study of the impact of the type of cooling for broccoli showed the potential to reduce the use of ice as a cooling method, thereby reducing worker safety by eliminating dripping during shipping and storage, lowering per-package weight, and increasing fuel efficiency. Researchers determined the required concentrations of free chlorine in hydrocooling systems in order to reduce microbial load on whole sweetcorn and demonstrated how trimming shanks better maintains total sugars and water content of sweetcorn kernels during storage.	1, 2

		This research team, working with an Extension agent, recently began evaluation of a purple-fleshed sweetpotato with potential as a high-value crop for Florida growers. With funding from a block grant from St. Johns County, UF/IFAS is working with a major grower to collect sweetpotato samples to determine quality during curing and storage over a 3-month period. A success story with this grower was that state specialists were able to help him improve his curing system by providing relevant information related to holding at elevated temperature and relative humidity conditions and high airflow rates. In conjunction with the grower changing his harvest method and curing the roots prior to washing, his results were impressive, going from almost complete loss to minimal loss. Results of these studies were distributed to horticultural and other plant scientists through publication in peer-reviewed scholarly journals, presentations at national/international scientific conferences, and incorporation into course curricula, as well as through presentations to related industry audiences. The PI was an instructor in the Extension workshop, "Fresh-Cut Products: The Science and Art of Quality and Safety," at UC Davis in September, while other state specialists conducted approximately 35 Produce Safety Alliance trainings on FSMA for industry and university professionals and a postharvest demonstration program on cooling fresh produce at the Florida AgExpo in November. Importantly, the PI on this Hatch project assembled a team of subject matter experts in 2019 and led the revision of the 1987 USDA-AMS Handbook No. 669, “Protecting Perishable Foods During Transport by Truck and Rail.” The document is now available at no charge through the UF/IFAS Extension’s online collection, EDIS, while it awaits the USDA’s extensive review process to be officially accepted. The new handbook, created under contract to USDA-AMS, provides comprehensive information for shippers, loaders, carriers and receivers regarding the equipment used to transport fresh and frozen perishable foods. It also offers recommendations for handling different perishable food items to reduce losses in quality while maintaining sanitary conditions. Among the major changes in the content of the revised guide is the addition of many commodities that have become more popular in the years since its last publication, including tropical fruits, fresh-	

		cut fruits and vegetables, packaged salads, and baby carrots. advancements in technology involving the transport of perishable goods also informed the new guidelines. Major advancements in technology involving the transport of perishable goods also informed the new guidelines. Work to develop a mobile-friendly version of the handbook is ongoing.	
12.	**Engaging Agricultural Leaders to Find Climate-Smart Solutions**	Florida agricultural leaders are calling for deeper exploration of farmers, ranchers, and forest landowners as suppliers of environmental protection as well as of food and fiber. Funded by a Turner Foundation planning grant, the Florida Climate-Smart Agriculture Initiative project began in early 2019 when Solutions from the Land (SfL), a non-profit that promotes farmer-inspired solutions to global challenges, and UF/IFAS held a meeting with some of Florida's most respected agricultural leaders. The discussion included a review of the impacts that extreme weather events and changing climatic conditions are having and are expected to have on the state's agriculture and forestry sectors. The project aims to assist Florida agriculture and forestry leaders in examining the vulnerabilities and opportunities created by changing climatic conditions in ways that are relevant to their daily lives and those of their customers. It will also seek to mobilize thought leaders to advocate for needed changes in land use practices, research, education, and policy. Work group members came to the consensus view that Florida agriculture was undergoing transformational change and that extreme weather events and changing conditions were a threat multiplier that required additional discussion. The group discussed a need for and benefits of developing an agricultural and forestry adaptive management strategy for the state based on climate-smart agriculture principles and agreed to develop an action plan for implementing the strategy. As for next steps, the work group agreed to: • Conduct a climate opportunity and vulnerability assessment; • Create a "futuring" document for Florida that identifies the specific vulnerabilities posed by increasingly erratic weather extremes and a changing climate; • Develop a comprehensive adaptive management strategy for Florida agriculture;	1, 3

		• Develop and implement an ecosystem services action plan that will enhance the resilience of Florida • At a time of multiple threats and challenges to Florida's agricultural and forestry systems, farmers, ranchers, and foresters can be at the forefront of providing sustainable solutions that benefit all of Florida's citizens. Website: https://www.sfldialogue.net/	
13.	**Developing Scallop Harvesting Regulations that Everyone Can Live With**	Taylor County, located in the Big Bend area of Florida's Panhandle, is one of the state's least-populous counties, but ranks No. 11 for total land area and has an unusually long coastline. Recreational fisheries related activities represent an important percentage of the coastal communities' income in Taylor County. Scallop season during summertime in Taylor County is one of the most important economic drivers as it attracts thousands of visitors who come to harvest this marine resource. In 2019, the Florida Fish and Wildlife Conservation Commission (FWC) proposed changes to the scallop harvesting regulation and the local stakeholders immediately wanted to weigh in, with the desire to keep a healthy scallop population but also a healthy economy. For some Taylor County businesses, the scallop season represents up to 70% of their annual revenue so changes in the start and closing dates would have a profound impact on their profitability. To assist FWC and stakeholders in the decision-making process, Taylor County UF/IFAS Extension delivered the latest scientific information at Chamber of Commerce meetings, workshops, etc. More than 150 people participated in Extension activities related to scallop harvesting. As a result of these efforts, a new proposal was presented by the county residents to the FWC commissioners, and it was accepted and adopted. Starting in 2020, with the new regulation in place, Taylor County will have a very well-established scallop harvesting based economy, while also more committed to adopt new strategies to protect the resource and the coastal economy. Currently, a new proposal to develop a scallop hatchery for	3

		re-stocking natural populations is being evaluated by different stakeholders to have a long-term sustainable plan for the Taylor County coastline.	
14.	**"BioBlitz" Events to Track and Measure Biodiversity on Public Lands and Help Combat Non-Native Plant Infestations**	The term "biodiversity" refers to the overall variety of living organisms found in a particular habitat, at a particular time. The concept of biodiversity has become increasingly important to scientists in recent decades, notably in Florida, which ranks No. 2 among U.S. states for the number of problematic, non-native plants and animals that have become established. These pest organisms are called invasive species, and they are a huge concern for wildlife experts and land managers in South Florida, where non-native species such as iguanas are a routine sight for residents. Efforts to manage these invasive pests are easier when land managers know where the target organisms are concentrated – an issue that can be addressed with biodiversity surveys. On public lands, funding to conduct biodiversity surveys may be scarce, or entirely unavailable. To help Broward County Parks and Recreation personnel address invasive species dwelling on park property, the UF/IFAS Extension Broward County Office and the UF/IFAS Fort Lauderdale Research and Education Center launched a public-participation event known as a "BioBlitz." The bioblitz concept has been popular nationwide for the past few years – the basic idea is to hold a family-friendly biodiversity survey at a particular location, using teams of volunteers led by experts. In Broward County, each BioBlitz event is divided into multiple sessions, typically two hours long, each one focused on a particular type of organism. Data collected during BioBlitz can be used in mapping invasive species presence and planning management efforts. Two successful BioBlitz were conducted in Broward County during county fiscal year 2018-19. A pilot event was held at Tree Tops Park in Davie during fall 2018; the program's official launch was held in March 2019 at Quiet Waters Park in Deerfield Beach. These initial efforts were supported by state, county and federal funding sources. At the March 30 BioBlitz event, about eight teams of volunteers logged a total of 350 plant and animal observations in Quiet Waters Park, representing sightings of 172 identified species. Only 12	3

		of these species had been previously documented on the publicly accessible biodiversity-tracking website known as iNaturalist, and so this event produced a 14-fold increase in documented knowledge concerning the park's biodiversity. The single most important observation was the sighting of monarch butterflies in the park, part of a small population that overwinters in South Florida, rather than Mexico. Statistics and other data were uploaded by organizers to the iNaturalist website, which forwards biodiversity data to the Global Biodiversity Information Survey, a worldwide repository that is often used by scientists. The event also included an invasive plant removal session, in which volunteers collected more than 1,700 gallons of creeping oxeye for disposal. The event drew about 70 volunteers, who gained familiarity with basic scientific fieldwork practices as well as local plants and animals; in so doing, they had the opportunity to perform a public service. Because the March 2019 event was an all-around success, organizers expect to hold a Broward BioBlitz biodiversity survey each spring and fall, beginning in 2020. Because BioBlitz recruits volunteers from the general public, it is an example of what's called "citizen science" – efforts to engage laypeople in simple scientific tasks that are educational and enjoyable. Citizen-science efforts can have tangible benefit to formal science by contributing submissions to public databases used by researchers. By enlisting Broward County residents in biodiversity surveys such as BioBlitz, UF/IFAS Extension personnel can leverage their resources and create citizen-scientists who help preserve the state's natural resources. Website: https://sfyl.ifas.ufl.edu/broward/urban-horticulture-and-natural-resources/bioblitz/	
15.	**Irrigation Evaluations Help Residents Conserve Water**	Water conservation activities are becoming more important to Florida each year, because the states steady population growth results in a corresponding increase for irrigation water. In Tampa Bay, home to the state's largest metropolitan area, the UF/IFAS Extension Hillsborough County Office runs a successful program to educate homeowners, landscaping professionals and business proprietors about water conservation—saving them money and helping to protect Florida's precious water resources.	3

		Hillsborough County lies in the heart of the greater Tampa Bay metropolitan area, which is Florida's largest metropolitan area, with a population of 1.4 million. Moreover, Tampa and surrounding communities received the No. 8 ranking in a recent tabulation of the fastest-growing metropolitan areas in Florida, developed by a real estate firm. With Tampa Bay's population growth comes the need for new residential homes, and with each home comes new demand for irrigation water, to establish and maintain turf and landscape plantings. Besides expected population increases, the Tampa Bay area faces ongoing issues with drought, as well as high water consumption during warm weather. These factors have made conservation an increasingly important issue for utility providers in the area. To promote water savings, in 2014, agents with the UF/IFAS Extension Hillsborough County Office organized a program to educate and assist homeowners, landscaping professionals and business proprietors. It focuses on helping these audiences understand irrigation systems and optimize their efficiency, free of charge. All advice and information provided is based on Florida-Friendly Landscaping principles, nine simple concepts that property owners and managers can put to use to help protect water quality and availability. One of the program's most beneficial offerings is its on-site irrigation evaluation service, which includes a full review of the irrigation system and its settings, inspections of the system and its components while in use, a landscape evaluation to determine whether further water savings might be possible with use of Florida-Friendly Landscaping principles, and a check of the systems rain-sensor apparatus. The evaluation service is available to all residents of unincorporated Hillsborough County residents using metered water provided by Hillsborough County Public Utilities Department - Water Resources. The evaluation is offered via a printed statement appearing on Hillsborough County Public Utilities bills two to four times each year. The evaluation process takes about two hours to complete and involves no obligation on client's part.	

		Tabulations based upon Hillsborough County Public Utilities Department - Water Resources water-use records for unincorporated areas of Hillsborough County indicated that the program had helped residents save 25,133,641 gallons of water during the 2019 federal fiscal year. Statewide infographic on landscape water conservation: https://pdec.ifas.ufl.edu/impacts/LandscapeWaterConservation.pdf	
16.	**Microplastics Awareness Project Helps Floridians Make Positive Changes**	According to the U.S. Environmental Protection Agency, 34.5 million tons of plastic waste were generated in the United States alone in 2015. This waste includes a wide variety of microplastics, which are plastic particles smaller than 5 mm in length – about the size of a sesame seed. Some of these particles are manufactured at small size (for example, microbeads used in facial scrubs), while others are derived from larger pieces that have broken apart as a result of physical actions and/or chemical changes. This second type of microplastic is most common in the environment and can result from breakdown of hard or soft plastics, and petroleum-based fabrics or foams. Microplastics have become a major concern because of their widespread presence in surface waters, oceans and sediments, where they pose a threat to marine ecosystems, aquatic animals and possibly humans. However, consumer behavior change can help reduce the amount of microplastics that enter the environment. The Florida Microplastics Awareness Project (FMAP), affiliated with Florida Sea Grant and UF/IFAS Extension, was created not only to raise awareness about microplastics but also to motivate institutions, businesses and individuals to take action. FMAP, launched in 2015 with a NOAA Marine Debris Program grant, teaches Florida residents about microplastics, their possible impacts and ways to reduce plastic waste. As of 2018, there were 11 Florida Sea Grant agents who had joined FMAP and were educating their communities about microplastics. In 2018, FMAP partnered with one county to join the national Skip the Straw Day event on Feb. 23, encouraging local restaurants and residents to stop using plastic straws. Also, a long-running FMAP program encourages residents to	3

		sign a pledge in which they agree to make behavior changes to reduce the amount of plastic they contribute to landfills. In 2018 alone, over 300 people completed the FMAP pledge. The FMAP community outreach, combined with strong student advocacy, has led some public-school officials to change their purchasing practices. During the 2018-19 academic year, school systems in at least eight Florida counties – Flagler, Indian River, Leon, Marion, Nassau, Osceola, St. Johns, Suwannee – had stopped using Styrofoam lunch trays and were using recycled paper trays. In Flagler County alone, this switch is expected to keep 1.3 million Styrofoam lunch trays out of local landfills, preventing countless billions of microplastic particles from forming. The Skip a Straw Day observance led to four restaurants and one coffee shop agreeing to provide straws only upon request or stop offering single-use plastic altogether. Among the 300+ residents who took the FMAP pledge in 2018, they committed to four behavior changes on average. Follow-up surveys in 2019 of 84 pledge-takers indicated that 95 percent of them had followed through with at least one behavior change they had planned to make, and 86 percent shared information about microplastics with others. Water quality is of paramount importance to Florida's people and its economy and is a concern in coastal communities as well as the state's interior. So long as Florida depends heavily on tourism, residential construction and agriculture as economic engines, the state will need ample supplies of potable water and abundant, ecologically healthy bodies of freshwater and similar marine shorelines. Because microplastic is a recent and growing threat to Florida's water quality, efforts to raise public awareness and change consumer behavior are first steps toward addressing the impact that microplastics have on Florida in the future.	
17.	**Helping to Keep Florida's Well Water Well**	UF/IFAS Extension well and septic education programs inform homeowners of the importance of water testing for harmful bacteria and proper maintenance. Septic systems are one of the major potential sources of well water contamination and Florida is home to largest concentration of	3

		springs in the nation. Springs are the window into the health of our groundwater, which is the source of 90% of drinking water for Floridians. According to the Florida Department of Health, there are an estimated 2.6 million septic systems in use. Under the 2016 Florida Water Bill, municipalities within a Basin Management Action Plan where septic systems produce 20% or more of the contaminants, are required begin a septic system remediation program and an education/community outreach component based on sound science. In recent years, UF/IFAS Extension has hired a water resources regional specialist (RSA) to focus on this issue and has increased training of its county Extension agents as well as residents and, local government staff and elected officials. Since 2017, 175 internal and external stakeholders have attended septic system programs given by the RSA either individually or as part of a UF/IFAS team. The "Is your water well?" educational program in Marian County reached 236 homeowners in 2019. Fifty-eight percent submitted their well water for free water testing, valued at $8,8401, and 85% had pumped their septic tank during the program or committed to doing so after the program. All participants said they improved their understanding of private well management, septic system maintenance, and the importance of protecting Florida's water. The information provided in these programs has the potential to reduce detrimental water quality impacts as well as save homeowners money. A septic system contributes an average of 17 pounds nitrogen to the groundwater every year. Among the 59 who said they had already pumped the sludge from their septic tank, they eliminated an estimated 1,003 pounds of nitrogen leaching into groundwater per year and saved nitrogen removal cost ranging from $30 to $6,619.2 Pumping out a septic system costs approximately $300-$400 every 3 to 5 years. Replacing a failed system costs between $8,000 and $14,000. Advanced systems, required in some areas, cost up to $20,000. In a separate but related program, UF/IFAS Extension helped the community navigate new septic laws passed by the Marion County in 2019. Numerous natural springs occur in Marion County and	

		efforts to protect water quality are ongoing. Marion County government officials notified homeowners on septic systems about a new program that will help them convert their septic systems. The homeowners—many of whom are low-income in rural areas and/or seniors on small, fixed incomes--read this to mean they would be responsible for the costs and panic ensued. County government was confronted with angry residents, so they reached out to the local Extension office for help. A deliberative forum was convened. About 30 residents and septic tank businesses attended the forum in addition to two government representatives and a wastewater expert. Tensions were high in the room as the forum began, and thanks to experienced moderators from the CIVIC program, everyone had an opportunity to express their concerns. As the conversations evolved, it became clear that this was becoming more a town hall meeting than a deliberative forum because this entire situation was born out of miscommunication. It turned out the government had a grant to fund the septic tank conversions and homeowners were only required to pay a small upfront fee (about $300) for which they would be reimbursed for once the project was complete. As this new information was slowly revealed, the tension in the room eased and the participants became less confrontational and more engaged. [1] Based on 2019 prices for commercial testing services. [2] USDA Economic Research Service, Research Report No. ERR-183, 2015. Range is $0.03 to $6.60 per pound. Costs vary widely due to several factors such as concentration of nitrogen, location, and the treatment methods used. Infographic: https://pdec.ifas.ufl.edu/impacts/Well&Septic.pdf (under development, link may not work if not completed by the time this report is reviewed)	
18.	**Energy Programs Help Community Save Money and Water**	UF/IFAS Sarasota County Extension energy programs saved an estimated 289,079 kWh and 187,200 gallons of water in 2019. Together, all the programs are helping the community reduce greenhouse gases, improve air quality, save money, increase housing and financial stability, improve ability of	4

		seniors to age in place, and grow the green economy by supporting clean technology and green businesses that provide these improvements. The Partners for Green Places program helps local nonprofits become more sustainable and financially resilient and enables them to put more funding to their missions. Three of the sixteen non-profits participating completed their efficiency upgrades in 2019. The projected annual energy savings from projects implemented at those three non-profits is 158,241 kWh and 109,211 gallons of water per year. This translates to over $35,000 in annual savings, an average simple payback of 2.3 years. Harvest House, a local nonprofit in Sarasota, Florida, is a good example of a successful partnership between Extension and nonprofits serving underserved audiences. Harvest House is known as a transformative organization for members of the community in need and the leaders continue to pioneer service-enriched housing programs. Harvest House operates nine supportive housing campuses and 30 affordable rentals encompassing 400+ beds and serving over 900 individuals annually. Harvest House received their energy and water audit and solar PV assessment in May 2019. The "Energy Roadmap" provided to Harvest House was filled with a detailed energy and water analysis of the buildings and recommendations for efficiency improvements through projects that range from no- to high-cost. Since Harvest House received their Energy Roadmap, they have installed programmable wi-fi thermostats, sealed gaps and leaks, and replaced HVAC units. In addition, they have plans to continue to install programmable wi-fi thermostats in similar buildings on their campuses and they have decided to fund a part-time maintenance staff member to transition to full-time. The new full-time maintenance employee will complete preventative maintenance on the HVAC units and carry out other recommendations in the Energy Roadmap. As a result of these facility upgrades, Harvest House expects about $4,671 in annual savings according to their Energy Roadmap. This figure does not include the potential savings from hiring a full-time preventative maintenance employee. The energy audit team predicts that the cost of this position would be paid off in 3-4 months due to the high need for preventative maintenance and the avoided	

		replacement costs. Actual savings on utility bills cannot be determined until at least one year has passed after the implementation of the efficiency projects. The solar programs have a longer time to adoption, given the higher cost of the investment, but participants report an increased likelihood to get quotes for solar installations, increasing the potential for adoption among participants. Electric vehicle programs have resulted in additional charging stations being installed, increased purchase of the vehicles and greater understanding of the technology increasing willingness to consider EVs in the future. The more families and organizations that are reached with these programs, the greater the impact will be.	
19.	**Carinata as Renewable Biofuel for Jet Airplanes**	UF/IFAS continue to make strides with carinata commercialization as a potential renewable biofuel for jet airplanes. As part of the Southeast Partnership for Advanced Renewables from Carinata (SPARC) consortium of nine universities, four USDA units, and several commercial industry partners, UF/IFAS researchers and Extension agents have been able to design management strategies for production of carinata and are working out pipeline strategies for best economics to reduce risk to each phase of carinata production and use. Partners have worked out conversion techniques with patents and have gotten federal approval meeting standards for fuel specifications for jets and other fuels. Members of SPARC include researchers conducting field experiments in more than a dozen locations on agronomic production issues like varieties, spacing, fertilizer, herbicide resistance, disease susceptibility, oil content, and frost tolerance. In 2019, 100% "drop-in" fuel has been used for F18 Department of Navy flights as well as commercial flights from LAX to Australia. As infrastructure is being set up, best fit pathways are being determined to reduce risks for everyone in the pipeline. At the same time, better varieties, including hybrids, are being developed which will produce higher yields. Since the inception of UF/IFAS research with carinata, yields have been increased by about 25% along with more cold hardy types.	4

		With some 800,000 acres across the south as potential area for expansion, carinata provides an economic and environmental alternative to "weedy fallow" and current unsustainable crop rotations. As carbon indexing (CI) brings attention to the footprint of new crops and practices like this, more consumers and marketing groups are eager to see concrete data on just what ecosystem benefits (including cash crop yield bumps) may result. A unique aspect of the SPARC collaborative project is how it integrates workstream groups to include chemistry-focused fuel teams, Extension, animal science, sociology, economics, and supply chain logistics experts who can understand and communicate their progress for the whole project. With strong and urgent demand worldwide for alternative energy projects, SPARC enters the space for integrated solutions at the right time.	
20.	**Extension Improves Access to Fresh Access Bucks (FAB)**	According to Feeding Florida.org, each year more than 3.5 million Floridians face hunger. In Lee County, more than 90,420 people are food insecure resulting in an overall food insecurity rate of 13.6%. While the Supplemental Nutrition Assistance Program (SNAP, formerly known as food stamps) addresses this problem by increasing purchasing power to buy food, the average cost of a meal in Lee County is 37% more than what SNAP benefits can afford per meal[1], making it hard for recipients to choose healthier options which often are more expensive. Fresh Access Bucks (FAB), a USDA funded statewide nutrition incentive program, has sought to bridge this gap since 2013. Designed to encourage SNAP recipients to redeem their benefits to purchase healthy produce directly from Florida farmers at participating outlets, FAB matches the SNAP purchase $1 for $1 with the Fresh Access Bucks program. Recipients spot the SNAP/EBT booth at participating markets, swipe their SNAP card, and through FAB receive double their SNAP/EBT dollars in tokens, up to $40, to spend on Florida-grown produce, plants and seeds that produce food to eat. FAB joined Feeding Florida, a Partner State Association of Feeding America, in 2018, to continue supporting SNAP recipients and Florida farmers throughout the state. While 51 markets statewide	5

		now accept FAB, the only Lee County FAB markets were located in south Cape Coral thus not accessible for most SNAP recipients due to the market's geographical location. In August of 2019, in strategic partnership with the FAB South Florida Regional Coordinator and the UF/IFAS Lee County Extension, Hubbell Farms became the first Lee County based producer to partner with FAB providing additional options for SNAP recipients to access affordable healthy food. With a produce stand located at their farm and a mobile market, traveling to communities of need such as low-income senior housing and food desert areas, Hubbell Farms has increased affordability and availability of fruits and vegetables in Lee County for SNAP recipients. [1] https://www.urban.org/does-snap-cover-cost-meal-your-county	
21.	**Successful Partnership Shows Significant Improvement in Health Outcomes**	2019 marks the 50th year of EFNEP nationally and in Hillsborough County. Over those fifty years, EFNEP has successfully impacted the lives and diets of countless families. In fact, EFNEP was the first nutrition education program for limited resource families and continues to lead out in efforts to reduce food insecurity for those families. In Florida, the University of Florida and Florida A&M University deliver EFNEP through the Extension and serve thousands of families each year. The success of the program is due in large part to the people who make up EFNEP – the paraprofessional educators who deliver direct teaching and the participants who learn from them and then go on to make the behavior changes needed to make their lives better. Evaluation results for 2019 adult participants, based on the Food & Physical Activity Questionnaire: • 96% (493 of 512) of participants showed improvement in one or more diet quality indicators (i.e., eating fruits, vegetables, red and orange vegetables, dark green vegetables, drinking less regular soda (not diet), drinking less fruit punch, fruit drinks, sweet tea, or sports drinks, and cooking dinner at home).	5

		• 87% (433 of 497) of participants showed improvement in one or more physical activity behaviors (i.e., exercising for at least 30 minutes, doing workouts to build and strengthen muscles, or making small changes to be more active) • 87% (437 of 500) of participants showed improvement in one or more food resource management practices (i.e., cook dinner at home, compare food prices, plan meals before shopping, look in refrigerator or cupboard before shopping, or make a list before shopping). • 86% (427 of 498) of participants showed improvement in one or more food safety practices (i.e., washing hands before preparing food, washing all items and surfaces after cutting raw meat or seafood, not thawing frozen food at room temperature, or using a meat thermometer) • 53% (267 of 507) of participants showed improvement in one or more food security indicators (i.e., not eating less than you wanted so there was more food for your family or having enough money to get food for your family). Florida Extension continues to partner with Advent Health (formerly Florida Hospital) and Food Is Medicine. This partnership formed a few years ago in response to the need to increase access to healthy food in Hillsborough County. EFNEP was invited to be one of a few education vendors for the program. The adult program participants are given a free health screening at program entry and exit, along with vouchers for produce which is made available to them after each class. Nurses take the measurements needed for Body Mass Index (BMI), blood pressure, blood sugar, and pulse. In addition, a produce vendor comes to the class site for the participants to do their shopping. This partnership continues to produce impressive results as indicated in the results shared at the most recent partner's meeting. Participants in the Tampa area had decreases in every measurement – in blood glucose, 45%; BMI, 38%; upper blood pressure (systolic), 58%; lower blood pressure (diastolic), 61%; and, pulse rate, 54%. The results of combining EFNEP's series-based nutrition education program, with health screenings, and increased access to produce were clear – this partnership is a hit.	

		The numbers were so impressive that the EFNEP program coordinators and UF/IFAS Family, Youth and Community Sciences Department (FYCS) administrators at the state level were intrigued as to whether data would show that these enhancements to EFNEP resulted in better outcomes compared to traditional EFNEP. The funding was secured, and a research study began in 2019. Preliminary data continues to show improvements in health outcomes as well as increased retention of participants. In addition, the UF study to investigate the impact of produce vouchers on traditional EFNEP programming will include cholesterol data, which is not collected by Advent Health. The final study groups will be completed in early 2020 and final results reported later in 2020.	
22.	**Financial Literacy and Home Ownership**	Families are unaware that financial security often begins with home ownership. The fear of revealing their financial records to lenders for evaluation to purchase a home often commit them to high credit card debt with no wealth building opportunities. FAMU Cooperative Extension's goal is to educate working families in home ownership evaluation, credit preparedness, loan types, and encourage them on the possibilities of financial health through real estate. Extension training and assistance led to seven (7) families buying or selling homes at a value of $1.2M in Gadsden County.	6
23.	**Re-Entry Programs**	In Florida, the latest data available for the recidivism rate is about 25.2% for inmates released in 2013. FAMU Cooperative 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. FAMU Cooperative Extension's involvement in recidivism reduction has resulted in our becoming a leader in the roll of providing recidivism seminars and inmate training courses in a multi-county service area in the panhandle of north Florida. The model developed is becoming the standard for the Florida Department of Corrections in their desire to go statewide with this type of job enhancing inmate training. Additionally, we are the first Extension Program to provide Green Industry training in the north Florida area for both male and female inmates in county jails, which are much more difficult to have successful training due to the shorter	6

		terms of incarceration. Twenty-seven (27) inmates earned their certificate of training in best management practices for the Florida Green Industries.	
24.	**4-H Agri-STEM**	4-H AgriSTEM provides open avenues for science and math interdisciplinary communication and education for K-12 students. Through experiential learning following state educational standards, students increase their understanding of entomology, food sciences and natural resources. The 4-H AgriSTEM Program has been such a great success at Bond Elementary School. For the past couple of years, the program has taught K-2 grade classes providing students with fun-filled activities and experiments that correlate with Florida State Standards and grade level curriculum. Students now have an increased interest in pursuing careers in science, technology, engineering, and mathematics fields.	6
25.	**Financial Assistance for Young Adults Has Long-term Impact**	Young adults entering the workforce faced nearly every day with financial decisions to make. Without guidance or previous knowledge of financial systems, savings, and purchasing methods, poor choices can lead to hardship and could result in years of economic distress. To improve the financial success of Floridians, UF/IFAS Extension agents offer one-on-one sessions of financial planning. In 2017, a client sought out the agent's help to complete her taxes utilizing the Volunteer Income Tax Assistance (VITA) program. During her appointment, the client explained that she knew little about money management and that her family did not have a working financial plan. Meeting monthly, for 12 months, the client worked with the agent to create a plan and put it into action. For the first time, the client was able to take a planned vacation and not have to worry about money. After a car accident, she was able to use a portion of her savings towards a replacement vehicle and reduce the amount of her vehicle loan. During this time, the client was living with her parents and siblings at a rented home. The owners of this property decided that it was time to stop renting their home and utilize the house for themselves. The client's family was tired of moving and wanted a home to call their own. Finally, the client made the decision; she would purchase her own home. After qualifying for a low-interest loan, based on her credit score, in the fall of 2019, at the age of 20, the client was able to purchase her very own home.	6

		Practicing good financial habits as a young adult can benefit individual's future interest loans, life satisfaction, and ability to make independent decisions, while reducing the risk of debt.	
26.	**Homeflow Program Lowers Housing Costs for Low-to-Moderate Income Households and First-time Homebuyers**	The U.S. Department of Housing and Urban Development (HUD) recently found that home ownership education and counseling substantially improves prospective and current homeowners' understanding of the process and decision-making relative to owning and maintaining a home. HUD found strong causal relationships between completing home ownership education and lower housing costs, saving more income, improving credit, avoiding delinquency, addressing defaults, and avoiding foreclosure. The outcomes were strongest for low-to-moderate income households (Evidence Matters, Spring 2016). In 2016, one of Habitat for Humanity's largest US affiliates, HabiJax, in Duval County, began using the UF/IFAS Homeflow Extension program (Cantrell, Ellis, & Harris, 2015) as its baseline educational program for all new homeowner candidates with the goal of minimizing the risk of its future mortgage foreclosures. In 2017, UF/IFAS Extension agents in other counties began incorporating Homeflow into First-time Homebuyer's programs and other Habitat for Humanity organizations. In 2019, the Homeflow program received its third straight year of funding from HUD and NIFA. Homeflow is a series of research-based modules that explores the relationships between the health of the home and its occupants, communications between occupants, home maintenance and operations, energy and functional efficiency, and home safety routines. Homeflow is about how the home "flows" together as a unit, starting with communications between occupants and progressing to specific steps that can help your home function smoothly and efficiently. Between 2016 and 2019, 160 individuals have completed the Homeflow program. About three in five graduates (N=98) participated through the Habitat homeownership program, which provides a 0% fixed-interest rate, 30-year mortgage upon graduation. HabiJax Homeflow graduates are	6

		estimated to save $350 per month over the cost of typical Section 8 housing rental in Duval County (Jacksonville). Habitat graduates from counties that are less urban areas are estimated to save $250/month due to lower housing costs. The other 62 individuals participated through non-Habitat, Homeflow trainings conducted for local governments to assist new homebuyers in qualifying for forgiveness on their down payments. These new homeowners are eligible for a 15% down payment (i.e., second mortgage) to be forgiven over the first five years of their mortgage. The average mortgage for these graduates is estimated at $275,000, which is aligned with the price of a 3-bedroom home that HabiJax builds for its graduates. Assuming a $275,000 mortgage (which aligns with the price of a three-bedroom home that HabiJax builds for its graduates), the 15% down payment forgiveness would render $41,250 in savings over the first five years of the mortgage. In sum, Homeflow graduates have saved an estimated $715,500[1] - $954,000 dollars to date, as detailed below: • 45 HabiJax graduates saving $350/month for 18 months (average mortgage held) = $283,500 • 53 Other Habitat graduates saving $250/month for 12 months = $159,000 • 62 Non-Habitat graduates saving $8,250/year ($41,250 divided by five years) for one year = $511,500 In 2019, 60 individuals successfully completed the Homeflow program. Half the participants were from HabiJax while the other half were from less urban areas. At an average monthly savings of $300/month (the average of $350 and $250), each graduate is estimated to save $3,600 per year. As a group, these 60 individual homeowners saved an estimated $216,000 in annual housing costs. In Lee County, a woman who attended one of the Homeflow classes as part of Habitat for Humanity's prospective homeowner educational class series, reported saving $50 per month on her electric bill by utilizing the energy conservation information offered in just one Homeflow session.	

		[1] A 25% deduction to the full $954,000 was calculated to account for errors in assumptions or estimations due to lack of data (e.g., how many failed to maintain mortgage payments since taking possession of their new home). Infographic: https://pdec.ifas.ufl.edu/impacts/Homeflow.pdf (under development, link may not work if not completed by the time this report is reviewed)	
27.	**Food Entrepreneurship Program Helps Keep New Food Businesses Safe and Successful**	With a growing interest in fresh local food, food businesses in the U.S. have changed over the past decade. More and more people are starting their own small-scale food production, and selling their products at farmers' markets, restaurants, or other local businesses. Since the passage of the Cottage Food Law in Florida, the number of small, home-based businesses has also increased. Running a food business can be a rewarding and exciting experience; however, running a successful business requires more than a good idea, detailed planning, and hard work. An estimated 26,000 new food products are introduced to the market every year, but only about 10% of these products last more than a year. UF/IFAS Food Science and Human Nutrition (FSHN) Department's Food Entrepreneurship Extension program helps starting and early-stage food entrepreneurs in Florida by providing critical information on starting and successfully managing and retaining food business. The training, conducted by state specialists and county Extension faculty, covers state and federal regulatory requirements, product development, food safety issues, as well as locating food testing labs, commercial kitchens, co-packers or process authorities. An online survey invitation was sent to 101 former workshop participants from 2017 and 2018 who agreed with future personal contact (at their 1-year and 2-year time points since the workshop). As of November 2019, 33 people responded to the survey. Key findings from the survey include: • 55% (n=18) have started a new business (n=11) or plan to start a business within one to two years (n=7).	6, 2

		• 24% (n=8) were already running a food business at the time of the training and their sales revenue has increased since the workshop. Among this group, most (63%) think the changes they made due to the training contributed to the revenue increase. • 12% (n=4) gave up the idea of starting business since the training as they realized they are not ready to start one. • 85% (n=28) said they changed their practices due to what they learned in the training. • 91% (n=30) said they still use the educational packet given at the training workshop as a helpful resource for their business. These early results show that the Food Entrepreneurship program helps people in Florida start and/or successfully run a food business. With its comprehensive approach and curriculum, focused on food safety and business planning, we suggest Florida's trained food entrepreneurs are more likely to produce and sell safe food products and comply with regulatory requirements, have increased chance of business success, and ultimately deliver greater economic development to the state. This past year the Food Entrepreneurship Action Team discussed the expansion of the program to all five Extension districts in Florida and developed a plan to use common measures for program evaluation and demonstrating impact. This will involve creating shared instruments for pre/post test, exit survey, and a follow-up survey for all trainings. With these data, an infographic can be created and can be easily updated each year. Resource: https://edis.ifas.ufl.edu/topic_series_food_entrepreneurship_in_florida Infographic on Community Resource Development efforts statewide: http://pdec.ifas.ufl.edu/impacts/crd.pdf	
28.	**Assisting Youth Ranch through Equine Expertise,**	In 2019, a UF/IFAS 4-H agent conducted an initial site visit at a local non-profit, 20-acre ranch in Marion County that houses youth and teaches them responsibility through their equine program.	6

	Education, and Strong Networks	The youth ranch was given feedback on their pasture management and recommendations heading into the growing season. A grazing management plan was developed that included rotational grazing and grouping horses by needs to make feeding time more manageable for the staff. The agent helped them with soil sampling and fertilization as well as herbicide recommendations, and referrals of local partners who offered in-kind support. As with many non-profit organizations, they rely on community support and donations to support the program. The follow-up site visit was in response to some equine health and nutrition questions. With all six horses on property being donated, previous history on each of the horses was limited. The agent assisted in body condition scoring the animals. Once the animals' condition had been assessed, the agent worked with the staff to develop an improved nutrition and feeding program for each horse. The agent helped to cut costs of the current feeding program by recommending a forage-based diet for the horses that were over-conditioned and reducing the amount of grain they received, and adding additional forage and fat to the diet of the under-conditioned horses. The economic savings of this shift in feeding amounted to approximately $145 per month for the ranch. This money can be used to provide the horses with routine care that will further assist in their well-being such as dental work and routine parasite management. The agent followed up two months after the nutrition plans were discussed and the staff reported that the hard to maintain horses were looking better and that the new feeding program was much easier for the ranch staff to manage. The agent was able to build a new relationship with a local farm that is providing a much-needed service to Marion County youth. Through this relationship the agent has become the point of contact for pasture and equine management questions. The agent utilizes community partnerships to further assist non-profit organizations such as this youth ranch. Contacts and follow-up education and outreach efforts established with the youth ranch were facilitated through strong relationships and referrals between the State Equine Specialist and the Marion County extension agent.	

29.	**Strengthening 4-H through Volunteer Training**	As the cornerstone of the 4-H program, the youth-adult partnership works to facilitate a safe environment for the youth in 4-H. Through proper screening, increased trainings and improved retention of volunteers, the Escambia County 4-H program has strengthened over the past year, evidenced by an increase in youth participation and success in county, state, district, state, and regional programs as well as increases in membership to 462 youth. Volunteers were trained on risk assessment, positive discipline, record keeping and recognition. Six new community partnerships were established that provided the Escambia 4-H youth with $18,000 in scholarships to attend events such as 4-H legislature, livestock judging camps, livestock showing camps, day camps, and summer residential camp. The scholarships lessen the financial burden on families and ensure everyone who wants to participate in 4-H competitions can. The value of the volunteer hours for UF/IFAS Escambia County 4-H is estimated at nearly $70,000. The Northview Community 4-H Club, located in Pensacola, is a good example of the big difference an enthusiastic and well-trained volunteer can make. In early 2017, the club consisted of seven youth from three families when a new volunteer leader joined, one who was unfamiliar with 4-H leadership. By November 2019, the club had grown to 46 active youth, supported by 18 active parent volunteers, and four level II screened adults. The volunteer leader has held fundraisers to raise money for scholarships, guided the youth to participate in livestock projects (36 youth) and state, district, regional and county events (14 youth). She has been very active in recruiting volunteers to not only help with her many responsibilities, but also has guided volunteers to start new spin and community-based clubs. Most importantly, the volunteer leader has consistently improved programming quality over time.	6
30.	**Revitalizing 4-H Partnership with Naval Air Station in Florida's Panhandle**	Escambia County, Florida is home to Naval Air Station Pensacola (NASP) a U.S. Navy facility perhaps best known as home of the Blue Angels flight team. The children of station personnel have access to two on-site youth development centers, which provide wholesome recreational activities. In the past, the two centers had a limited number of staff members who were focused on 4-H programming, but not enough to meet demand. Consequently, some youth living at the station	6

		received only limited exposure to 4-H and may have missed 4-H opportunities they would have liked to pursue. The county's 4-H leadership team recognized that the program had stagnated due to 4-H agent turnover and sought to revitalize the program and increase 4-H involvement by station youth. To refocus the partnership, which began in 2008, county 4-H agents and staff trained 35 Navy staff and volunteers in 4-H curriculum, policies and procedures between fall 2017 and fall 2018. The 4-H agents promoted the 4-H military partnership at local fairs, through social media campaigns, and through 4-H marketing materials. In addition, one 4-H program assistant visited each youth development center at least twice a month to assist with programming requests and to communicate programming opportunities to on-site 4-H leaders. The program assistant increased awareness of the partnership by connecting local media to the military youth programs, by providing marketing material support, and by conducting community events. The program assistant created the Try a Day at Camp event, in which 70 military youth spent a day at 4-H Camp Timpoochee in Niceville, Fla. Participants experienced archery, recreational sports, crafts and marine exploration, all of which are available to campers at the full residential camp. During the 2018-19 4-H year, the UF/IFAS Escambia County 4-H program reached 168 military youth via afterschool programs at the two youth development centers. All 168 were enrolled in 4-H online and regularly participated in 4-H programming. Of this group, there were 30 (including U.S. National Guard and Reserve) military youth participating in traditional 4-H clubs, excluding duplicates. Since the partnership was revitalized, more military youth have participated in programs beyond the club level: 11 served in county leadership roles; 18 participated in competitive events at the county level; 17 participated in competitive events at the district level; three served on state advisory boards for state 4-H events; six participated in competitive events at the state level; 19 participated in judging teams at the state level (one was a state champion team); and 76 participated in statewide 4-H events. After attending the Try a Day at Camp event, 26 youth (37 percent) attended the week-long residential program at 4-H Camp Timpoochee.	

		The 4-H Military Partnerships program was created to create opportunities and provide support to the children of U.S. military personnel and affiliates. Because many military families relocate on a frequent basis, on-site 4-H activities can help children feel a greater sense of stability and belonging. Furthermore, 4-H can help reduce parents' stress levels, by providing safe, adult-supervised activities to their children via a proven, trusted system. Nearly one-third of all Escambia County 4-H youth enrolled during 2018-19 had current or past immediate family military connections.	
31.	**Studies on the Invasive Rice Stink Bugs Oebalus ypsilongriseus and Oebalus insularis (Hemiptera: Pentatomidae). Potential Invasive Pests for U.S. Rice Growers.**	Analysis of genetic variation via sequencing of mitochondrial DNA COI gene along with the nuclear ITS1 or ITS2 genes, revealed that these invasive pests came from the Republic of Cuba. They could have been introduced by hurricane or tropical storm activities across Cuba and south Florida. The establishment of these two invasive stinkbugs could seriously impact rice growers in Arkansas, Louisiana, Mississippi, Missouri and Texas and also be of concern to other grains in the US.	7
32.	**Monitoring and Management of the Spotted Wing Drosophila, Drosophila suzukii (Diptera: Drosophilidae) in Florida.**	Among the different types of mulch that were field tested, the pine bark mulch provided the best results for the management of Drosophila suzukii in blueberries production. The Scentry trap and Scentry lure were the most effective trapping systems for monitoring D. suzukii, the destructive pest of soft-skinned fruits in Florida.	7
33.	**Digital Identification Tools for the Identification of Invasive Species.**	A computer based diagnostic keys using the LUCID platform was developed and a comprehensive list of 80 species of weevils on palm trees has been completed. Among these species 70 of them are pests while 17 are considered plant pollinators.	7

34.	**Biological Control of Major Pests Affecting Food Crops.**	A successful biological control for the soybean scale (Crypticerya genistae) using two ladybeetle predators, Anovia circumclusia and Chilocorus cacti was developed and widely adopted by growers.	7
35.	**Strategies for the Identification, Prevention and Management of Invasive Species.**	A novel, portable, user-friendly acoustic sensor system for identification of larvae in individual palm tree infested with red palm weevil through signal processing analyses without background noise was developed. It will be used for monitoring and management of the red palm weevil, a serious invasive pest species.	7
36.	**Integrated Pest Management (IPM) Approaches Adopted by Farmers Leading to Greater Profitability.**	A biologically-based integrated pest management strategy was developed to ensure profitability for the fruit and vegetable industry using best management practices, and conservation biological control strategy. This IPM program provides 50-80% reduction of pesticide applications and ensure conservation of beneficial species (parasitoids, predators, and crop pollinators).	7
37.	**Development of muscadine cultivars with superior characteristics.**	Improve economic and marketing competitiveness for small and limited resource farmers by developing a model of economically feasible and beneficial breeding pipeline evaluation trial and to screen and compare 11 advance breeding lines with currently cultivated standard cultivars under diverse growing conditions (in the state and the southeastern region). The 1st version of the whole-genome sequencing and assembly of the muscadine grape, Muscadinia rotundifolia cv. Noble. PCR-free libraries of total genomic DNA were generated and used to produce 200 million paired-end reads (~100 Gb) using different sequencing strategies, including Illumina HiSeq 2500 (produced 80M reads), Chicago (produced 181M reads) and Hi-C (produced 223M reads). Two (2) new patented muscadine grape cultivars were released: 'Floriana' US 2020/0084932 P1 and 'Florida Onyx' US PP31,407 P2.	7
38.	**Development of Florida hybrid bunch cultivars for**	Improved procedures and techniques of farming operations that will sustain small farm operations. Four (4) advance selections and 2 candidate new cultivars 'Blanc du Soleil' and 'Blanc du Leon,' are under evaluation in FL and TX.	7

	wine with improved taste color, and shelf-life.		
39.	**Enhancement of nutraceutical properties and utilization of value-added products from muscadine grapes.**	Developing a variety of value-added products and establishing feasible technology transfer for molecular farming of pharmaceutically important bioflavonoids by cell cultures of two major North American grape species: Muscadinia rotundifolia and Vitis aestivalis, will improve economic and market competitiveness for small and limited-resource farmers. Data collected over three (3) consecutive years from Muscadine grapes identified as high and low stilbene producing, are being assessed. The efficacy of muscadine berry phytochemicals against a variety of cancers (liver, pulmonary and mammary) was determined and the elite varieties with potent anti-cancer activity against specific tumors have been identified. The efficacy of muscadine berry phytochemicals against a variety of cancers (liver, pulmonary and mammary) was determined and the elite varieties with potent anti-cancer activity against specific tumors have been identified.	7
40.	**Identification of suitable small fruits as alternative crops for small farmers in North Florida.**	Diversifies production capacity, strengthens grower's economic vitality.	7
41.	**Identification of best management practices for grapes and small fruits.**	Improves production efficiency and fruit quality and expands market opportunities by evaluating the impact of trellis systems and management practices such as pruning, spacing and rootstock performance on yield and fruit quality of southern grapes (muscadine and Florida hybrid varieties).	7

42.	**Effect of Reclaimed wastewater irrigation on soil health and environment.**	Extensive soil samples have been collected from a 4,200-acre farm under treated wastewater irrigation to determine the presence and long-term impact of heavy metals and contaminants on the environment. Soil samples were analyzed for chemical (nutrients, pH, EC) and biological (microbial abundance and diversity) properties to formulate guidelines for wastewater disposal. Two undergraduate students were trained under the project and have now become proficient in soil analytical protocols.	7
43.	**Bioavailability Index of Mercury in Sediments**	Completed the theoretical basis of the methodology that will be shared with other researchers to facilitate their research in heavy metal contamination in coastal environment. We have established the theoretical basis of the mercury bioavailable (toxicity) index which will assist policy makers and in formulating food safety benchmarks for local authorities and state environmental agencies to track pollution in marine ecosystems. We also have determined the total and bioavailable fraction of mercury in the sediments of Apalachicola Bay in North Florida. This information will be shared with other researchers at professional meetings that will facilitate their work.	7
44.	**Effects of vegetation type on carbon and nutrient composition greenhouse gases and methanogenesis**	Determined the influence of soil nutrients such as different forms of organic carbon on wetlands vegetation types. Determined the influence of vegetation types on soil carbon quantities, composition and stability that provides essential research information for formulating guidelines and policies in protecting wetlands.	7

	pathways in wetlands.	Determined the influence of carbon composition on greenhouse gases emissions that shows the important role of wetlands in the environment. Determined the dominant methanogenesis pathways as influenced by different vegetation types.	
45.	**Using Aquatic Insects as Bioindicators to Monitor and Assess Hydrological Change in Streams and Isolated Wetlands of North Florida.**	Developed Biomonitoring handbooks and pamphlets used by Florida Department of Agriculture and Consumer Services (FDACS), Florida Department of Environmental Protection (FDEP) and other stakeholders.	7
46.	**Hydrologic Exchanges Between Human and Natural Systems**	There has been an increase in stakeholder and citizens' awareness of water quality issues related to interacting human and natural systems – through the development of various educational science and educational participatory programs.	7