

FY 2020 Annual Report of Accomplishments and Results

Georgia
University of Georgia
Fort Valley State University

I. Report Overview

The NIFA reviewer will refer to the executive summary submitted in your FY 2020 Plan of Work located in the Institutional Profile. Use this space to provide updates if needed.

1. Executive Summary (Optional)

This executive summary provides background information about Georgia and the state's Federal Report of Accomplishments. This summary provides data on the state and its universities, program highlights, examples of collaborative efforts between the University of Georgia (UGA) and Fort Valley State University (FVSU), and brief summaries of each of the eight planned programs.

BACKGROUND

FVSU and UGA address major agricultural issues and other problems that affect rural and urban areas, the environment, families and youth. This accomplishment report presents coordinated efforts between the state's 1862 and 1890 land-grant institutions, UGA and FVSU, respectively, and covers the joint planning that occurs between agricultural experiment stations and Cooperative Extension units at both universities.

Georgia's Extension program has 167 offices with programming in all of Georgia's 159 counties. FVSU and UGA personnel are housed jointly in county offices. Extension delivers programming in Agriculture and Natural Resources, Family and Consumer Sciences, and 4-H Youth Development as both individual county efforts and as multicounty programs. State faculty members deliver training to county agents and programming directly to clientele, when appropriate.

FVSU and UGA researchers and scientists conduct research programs through a system of agricultural experiment stations. There are several campuses throughout the state, but the four largest are located in Athens, Fort Valley, Tifton and Griffin, Georgia. In addition, 11 Georgia research and education centers and five 4-H facilities are located throughout the state.

Core programs and targeted issues are determined and guided by a structured program-development system, and they are the focus of this joint report. The program-development system is a multistep process that remains in operation throughout the year. It enables needs assessment, problem identification and program evaluation, which is used to determine impact. The Georgia program development model works in cooperation with multiple advisory systems at county and state levels.

EXTERNAL FACTORS

In 2020, the COVID-19 pandemic greatly impacted research and extension in Georgia. Both UGA and FVSU rallied to continue to serve Georgians with quality research, information, and programming in a manner that was safe and effective.

During the pandemic, research approval was coordinated under the guidance of UGA's office of the Vice President for Research. We effectively shut down research in March, and required approval from the VP Research for any activity (Phase 1 of the research shutdown). The VPR oversaw approval of any essential research requests in March and April 2020; essential research was considered care and maintenance of livestock, greenhouse, and laboratory colonies. Nearly all laboratory work was paused with only critical care of organisms, planting, and safety checks allowed. Over 1200 emails were exchanged with OVPR and researchers in CAES in March and April. In June, the university entered Phase 2, with researchers developing research resumption plans (RRP) to ensure social distancing, greatly reduced density of workers in an area, and following all Center for Disease Control guidelines in place at the time. All Project Investigators submitted an RRP that was approved by their head of department as well as the Associate Dean for Research in the College of Agricultural and Environmental Sciences. These RRP's were updated in August to reflect Phase 3, which remains in effect and relaxed some of the density guidelines but still incorporating social distancing, masks, sterilization, and disinfectant. Phase 3 guidelines are expected to remain in effect at least until the fall. The net result was that research activity was greatly reduced. However, we were still able to conduct some research as indicated in this report.

Georgia Extension provided online educational programming, consultations and essential lab services during the COVID-19 pandemic while observing safe health practices for employees and the public. We offered resources for adults and 4-H youth on health, food, finances, parenting, agriculture and more.

Extension saw a 20% increase in educational publication downloads. We also saw an increase of 3x more in digital media distribution. For every one person who directly receives digital 4-H materials, it is shared almost nine times.

Examples of publications created in direct response to the emergence of scams and staying healthy using common non-perishable food items:

- Temporary Publication 110, "[COVID-19 Scams](#)"
- Temporary Publication 109, "[Using Non-Perishable Items to Build a Healthy Plate](#)"

Agriculture and Natural Resources (ANR)

Impact Results of COVID 19 Survey

A collaborative effort successfully surveyed Georgia farmers to understand their concerns regarding the pandemic. Key findings were:

- 82% of farmers indicated a loss of revenue attributed to COVID 19. Those that are experiencing a decline in weekly sales are on average seeing revenue down by \$8,500 per week and those that are anticipating an annual loss, on average will lose \$49,000.
- The farmers were significantly more concerned with the potential financial impact of the COVID 19 pandemic than they were about getting sick or the emotional strain from the COVID 19 situation.
- Over half of the farmers indicated they are implementing social distancing measures to protect them and their customers. Approximately 20% were providing protective equipment to their employees. Only 5% indicated that they have closed their operation because of COVID-19.
- Nearly 70% of the farmers indicated they were not participating in any relief program while only 22% were participating in a federal program. Those participating, most were likely to have used the PPP. Over three quarters of the farmers indicated that these COVID relief programs would not provide sufficient relief.
- Livestock producers indicated that they experienced significant losses due to COVID 19.

Examples of Virtual ANR Programming

Landscaping/Gardening Video in Madison County - 7500 views; 45 shares

Pike County Beekeeping Workshop on Facebook reached 1033 people with 114 engagements including share, likes and comments

Fulton County did a virtual Facebook Tour of local farm on Beltline to assist farm to attract individuals and provide individuals with information about local fresh produce. reached 2,181 individuals with 885 views

For the week of 4/6 – 4/12, The “**Vegetable Garden Calendar**” publication was the most popular single page on the site, **4,306 visits**. That’s a 195% increase over the same time period last year!

Virtual livestock show has had over 2,100 people reached. I have had someone from the University of Maryland reach out to me to help them get something like this set up for their county fair.

Appling County Show Team 4-H’ers Donate Show Pigs to Local Food Bank

In response of the need for adequate food supply during COVID-19 at their local food bank, the Appling county 4-H livestock show team was able to help. Four Appling county 4-Hers donated their show pigs to the Appling county food bank after the county show. The Appling County Ag Agent secured sponsorship to cover the slaughter fee and as a result 650 pounds of pork was donated, enough for over 1,300 meals. According to the food bank director, the meat is currently feeding 60 families per week.

Structural Pest Control Certification Training

Center for Urban Agriculture offered two free webinars for Structural Pest control license holders to receive pesticide credit which is required by State Department of Agriculture to maintain their applicator license. Reached 877 license holders. The waived registration fees were a value of \$13,155 donated to the industry. In addition, 52,620 miles of travel were saved as well as \$4,210 savings in fuel.

Local Agricultural Literacy Initiative Videos during Georgia Ag. Week March 23rd – 27th

- [Williams Family Dairy, Madison, GA](#)
 - County Extension/4-H Facebook Page: **58 shares, 2,400 views, 5,288 total people reached & 970 engagements**
- [Porter Family Farms Row Crop Operation, Madison, GA](#)
 - County Extension/4-H Facebook Page: **35 shares, 396 views, 143 total people reached & 518 engagements**
- [Benkoski Family Dairy, Madison, GA](#)

- County Extension/4-H Facebook Page: **24 shares, 3,300 views, 7,655 total people reached & 829 engagements**

International Poultry Science Webinars

Extension Poultry Science has done 4 webinars to date. Pre-registration has been 860-1100 people. Participation during the webinar has been between 850-950 people. The participants are from 70 countries and 30 states.

Daily Ag Zoom Sessions

Covid-19 caused significant changes to how the UGA Extension Service could provide information to the state's citizens. On March 16 several Extension agents in Hart, Jones, Mitchell, Seminole, Stephens and Wilkes counties and a FFA Advisor came together to create a temporary virtual program that would provide 4-H'ers and their families with agriculturally related information. On March 23 the first of the Daily Ag Zoom sessions occurred only one week after the Governor's initial order to close schools due to Covid-19. The Daily Ag Zoom Session program was initially only planned to last until the end of March but was continued until April 27. The program provided timely and relevant information to viewers on topics in agronomy, horticulture, farm safety, forestry and natural resources, and livestock production. After the completion of the Daily Ag Zoom Sessions, evaluations were conducted in two parts to determine the overall effectiveness of the program. The first part was as an Ag Trivia Game to test viewers' knowledge of material covered during talks. The second part of evaluation was a short survey on how the program went and improvements that could be made in the future. In total about 620 individuals attended the live Zoom sessions, and video posted on social media received over 1,100 direct views and over 15,000 indirect views. Post evaluation of 4-H'ers' knowledge gained through an Ag Trivia Game showed 70 percent overall retention of information. Qualtrics XM survey on program effectiveness showed 100 percent of participants either thought the program was good to very good, and 100 percent of participants reported gaining valuable knowledge from programs. More important than knowledge gained was the sense of community provided to viewers at a distance. One parent wrote, "I was impressed with the Ag Zoom sessions. They provided a broad curriculum covering many topics of the agricultural industry. My child learned information relating to agriculture production and careers. We are grateful for the time and effort from the leaders and speakers. It provided a great way to learn and socialize during the Covid-19 quarantine."

4-H Youth

As COVID-19 cases increased across the state of Georgia in spring 2020, many safety precautions were taken to reduce risk and minimize potential exposure. Most traditional educational settings were forced to discontinue face-to-face activities. Many County Extension 4-H professionals began to offer virtual 4-H programming to reach traditional and new clientele through a variety of means by providing synchronous and asynchronous learning experiences.

When school systems began to share operating plans, county 4-H programs shifted their in-person delivery to hybrid or virtual offerings. Extension programming during the COVID-19 pandemic provides the opportunity for innovative delivery methods. Delivering content via technology in virtual settings is a new endeavor for practically all Georgia 4-H professionals. A gap in knowledge and technical skills needed to deliver virtual 4-H programs was identified. Georgia 4-H responded by offering three training sessions in early spring to increase confidence and skill sets related to program delivery. These 45-minute sessions consisted of practical ways that information could be conveyed by sharing the concepts of a flipped classroom, graphic organizers, and live-response feedback tools. These quick-response learning opportunities assisted 4-H professionals with spring programming which focused on judging team preparation, project achievement, and educational activities.

Once it became apparent that many counties would be offering hybrid or virtual 4-H in-school club meetings, Georgia 4-H responded by planning and implementing an additional four trainings focusing on delivering content with school partners. These 90-minute trainings consisted of teaching virtual activity engagement strategies, facilitating science-related content, and platforms that can be helpful in these delivery modes. 439 Extension professionals attended these trainings in real-time, with an additional 46 people viewing recordings of these sessions.

An assessment was distributed to participants after the sessions. Survey results indicated an increase in knowledge of the platforms, comfort level using online tools, and being able to select a tool based on educational goals were all gained by the participants. Additionally, all responses (n=78) indicated new confidence in being able to create effective online lessons and that participants will use this information in the future. One 4-H professional shared “I would personally like to thank you for sending out all of this information, it has helped me tremendously...It is making me a better, more prepared person.” Preparing 4-H professionals to deliver content regardless of delivery mode is critical to Georgia 4-H’s continued success. As COVID-19 continues, Georgia 4-H remains committed to ensuring 4-H professionals are sharing content using effective and efficient means.

In March 2020, five Area Project Achievement Contests were canceled that would have served over 1,500 4th – 6th grade 4-H youth. The Georgia 4-H faculty and staff quickly developed an online virtual Project Achievement Contest that had 427 participants, impacting youth from 47

counties in all regions of Georgia. Youth uploaded a video of their presentation. Their work was evaluated virtually by 170 UGA Extension staff and volunteer judges since UGA Extension employees were sheltering in place and working from home. Participating youth will be celebrated virtually through a statewide video posted to social media outlets and through local announcements of winners.

4-H Americorps members continue to directly serve Georgia's youth and provide them with some sense of normalcy by hosting online club and council meetings, judging team practices, robotics team brainstorming sessions, virtual project achievement, and interactive STEM and life-skills lessons. Some members are pioneering new and creative ways to connect with their 4-H'ers by developing original online programming and social media interactions such as virtual Performing Arts Club, "MY 4-H PASSPORT" – a spring activity guide, "Plugged into 4-H" – a multi-county effort that distributes daily lessons via email, remote garden tours, a virtual scavenger hunt, and an at-home community service competition, just to name a few. Besides serving 4-H youth during these challenging times, 4-H Americorps members are also finding ways to directly serve their communities through volunteerism. For example, members have assisted at area food banks, helped school systems prepare and deliver meals to kids, contributed to "Little Libraries" and "Little Food Pantries" in their neighborhoods, and even cut grass for elderly neighbors. 4-H Americorps members make a difference while making the best better!

Family and Consumer Sciences (FACS)

FACS Extension Professionals serve local communities to foster a healthy & prosperous Georgia.

In 2020, 65 FACS Agents and Educators made 205,659 face-to-face contacts and logged 144,479 educational hours. Recorded educational videos reached 807,721 views. FACS programming is valuable and vital. Our clients perceived economic value expected to be gained or saved was \$3.1 million in a year.

Program highlights from five focus areas are:

Health - 1401 pounds lost by 163 Diabetes Prevention program participants.

Money - \$188 K direct savings on tax preparation through virtual tax assistance.

Home - 954 homes tested for radon, the second leading cause of lung cancer.

Family - 1440 youth educated on creating healthy relationships.

Food - 1.9 million website users educated on preserving food safely.

COVID-19 FACS Media Reach

Between March 17 and April 5, 2020 (19 days) Extension Family and Consumer Sciences Specialists contributed to 9 news stories, videos, and posts reaching 119,825 people with over 1500 shares.

“Is Takeout Food Safe?”

Video shared from UGA Facebook on April 5
7,532 views, 51 shares, 2 comments, 101 likes

“Is Coronavirus a concern with takeout?”

Graphic posted on FACS Facebook page on March 21
921 shares, 11,605 engagements, 106,987 people reached, 156 likes

In March 2020, three Extension FACS stories posted to UGA Today received 7008 page views, based on media mention and page view data.

- Take-out food is a low risk option news story received 3629 page views
- Working at home with kids story media mentions received 1461 page views
- How to talk to your child about the virus received 1918 views

Virtual Income Tax Assistance program (VITA)

Agents in Morgan, Oconee, Wilkes and Elbert met with **78 families/individuals** – to complete filing federal tax returns. Agents worked with individuals to schedule individual appointments and coordinate site/systems for sharing reports and getting signatures, while maintaining social distance.

Prevent Type 2 Diabetes Program

Agents in Oglethorpe, Madison, Clarke, Elbert reached **79 individuals** through **12 zoom sessions**. DPP/T2 is a year-long diabetes prevention program; individuals commit to attending weekly educational sessions for 16-20 weeks, bi-weekly and monthly sessions for the remaining year. Agents translated educational materials to webinar format and offered zoom sessions; in addition, they created packets and coordinated distribution via postal mail or office pick-up/drop-off box.

Merit and Scientific Peer Review Processes

The NIFA reviewer will refer to your 2020 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 ONLY
<p>1. The <u>Merit Review Process</u></p>	<p>Supervisors are responsible for determining merit increases, which are related to the annual performance evaluation. Throughout the year, comments from external stakeholders are noted. For county Extension faculty, particular notice is taken of county stakeholder input.</p> <p>Both universities incorporated the items above in their respective merit review processes. Extension reviews the quality and relevance of the state program goals at the state, district and county levels. Departmental Extension coordinator contacts provide insight at the state level. The program development team provides the district-level input. This team consists of the district program development coordinators, evaluation specialists, and Extension administrators. County agents provide input directly to the program development team and the state Extension coordinators. The constituents provide input through the county council as part of the Extension leadership system.</p>
<p>2. The <u>Scientific Peer Review Process</u></p>	<p>All research projects conducted during this year were peer reviewed by both internal and external reviewers. In addition, greater than 20 percent of approved research projects are also associated with multistate/integrated projects that undergo an extensive review by the Southern Association of Agricultural Experiment Station Directors (SAAESD).</p>

II. Stakeholder Input

The NIFA reviewer will refer to your 2020 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 ONLY
<p>1. Actions taken to seek stakeholder input that encouraged their participation with a brief explanation</p>	<p>Each county Extension agent has an Extension leadership group that serves in an advisory capacity. Extension specialists and agents as well as administration are also well connected to industry and commodity groups and allied organizations.</p> <p>After visiting with local advisory committees, county agents provide data directly to state specialists through listening group meetings, which are conducted annually and by individual departments for a total of 12 or more meetings. The data from these agent/specialist sessions is then analyzed by the state program development team and recommendations are made for next year's programming. County agents also use input from advisory committees to plan, execute, evaluate and communicate programming at the local level.</p>
<p>1. Methods to identify individuals and groups and brief explanation.</p>	<p>Statewide stakeholders and potential collaborators were identified by faculty and recommendations were made to the dean for statewide advisory committees. The counties used a structured identification process to select a diverse advisory committee at the local level, to include representatives of both traditional and nontraditional stakeholder groups. The majority of counties reassessed and rotated their advisory committee membership this year.</p>
<p>2. Methods for collecting stakeholder input and brief explanation.</p>	<p>Stakeholder input is also sought by members of search and screen committees prior to selecting candidates to interview and prior to the final recommendation.</p> <p>UGA Extension has a strong relationship with commodity groups and industry organizations. We utilize these groups for needs assessments, industry trends and feedback.</p> <p>Individual county-level advisory committees meet up to four times during the year. One youth development statewide survey was conducted to collect county input. The statewide CAES advisory committee met two times during the year. In addition, college administration meets at least</p>

	<p>annually with the Department of Agriculture, Georgia Farm Bureau and commodity boards to gather input, identify needs and discuss programming priorities.</p>
<p>3. A Statement of how the input will be considered and brief explanation of what you learned from your stakeholders.</p>	<p>All input is channeled to college administration so they have the knowledge to make budgetary decisions. All vacant positions in all departments are brought to college-level administration for evaluation based on these criteria before a decision is made to refill. Positions may be redirected as needed. The dean solicits input from all faculty, staff and stakeholders prior to making hiring decisions on major administration positions. County agent and staff positions are reallocated to counties of higher need and those willing to contribute more county funding. Finally, legislative allocations greatly influence the type and amount of new positions added.</p>

III. Critical Issues Table of Contents

No.	Critical Issues in order of appearance in Table V. Activities and Accomplishments
1.	Animal Production
2.	Food Safety
3.	Health & Nutrition
4.	Community, Home and Life Skills
5.	Plant Production
6.	Sustainability, Conservation & the Environment
7.	Urban Agriculture
8.	Youth & Family Development

V. Activities and Accomplishments

Please provide information for activities that represent the best work of your institution(s). In your outcome or impact statement, please include the following elements (in any order): 1) the issue and its significance (e.g. who cares and why); 2) a brief description of key activities undertaken to achieve the goals and objectives; 3) changes in knowledge, behavior, or condition resulting from the project or program’s activities; 4) who benefited and how. Please weave supporting data into the narrative.

No.	Project or Program Title	Outcome/Impact Statement	Critical Issue Name or No.
1.	Conception rate for beef service sires	<p>The adoption of beef bull semen in dairy herds presents advantageous opportunities for farmers. Dairy farmers rely on replacement females to be of equal or greater value than those of the previous generation. A breeding strategy that is growing in popularity is to use sexed dairy semen on the best females to generate replacement heifers and to use beef semen on the remainder. When used, sexed semen yields the predetermined calf sex with about 90 percent probability, minimizing the chance of an unwanted male calf. Females not selected to produce the next generation of replacement heifers are increasingly being bred to beef bulls to produce crossbred calves for beef production. With the increasing use of beef semen in dairy herds, evaluating fertility of beef bulls becomes of utmost importance. UGA animal and dairy scientists developed a measure of sire conception rate for beef service sires. This measure evaluates the effect of bulls on the breeding outcomes (success or failure), while taking into account the mating cows' effects. As the beef sire conception rate is based on the approach used for evaluating dairy bull fertility, dairy farmers can now compare sire conception rates between dairy and beef bulls. They found that fertility levels between beef and dairy service sires are comparable, although beef sires are more frequently used in cows known to be problem breeders. They created a toll to evaluate beef service sire fertility that is comparable to dairy service sire fertility, and will help dairy producers to select the best beef sires to reduce breeding failure. Mating beef bulls to dams not producing replacement heifers will result in more valuable crossbred calves for beef output.</p>	Animal Production
2.	Encouraging Best Management Practices in Small Ruminants Farms	<p>As small farms gain popularity in the area, sheep and goat ownership is on the rise. The number of small ruminants in Oglethorpe County increased by 28 percent from 2018 to 2019. Over the past year, the UGA Agriculture and Natural Resources Extension Agent in Oglethorpe County has observed producers dealing with poor small ruminant animal health as a result of drug resistant</p>	Animal Production

		<p>parasites and a lack of education on best management practices for sheep and goats. So the agent developed curriculum and coordinated quarterly meetings of local sheep and goat producers. Topics include kidding/lambing, ear tagging, internal parasite management, hoof care, soil fertility, forage selection and general nutrition. The FAMACHA© method is a way for producers to identify specific animals that require treatment for internal parasites. Using this system can significantly decrease drug resistance in a small ruminant herd. A free online FAMACHA© certification opportunity was provided in cooperation with Fort Valley State University and Virginia State University Specialists. This essential certification process for parasite management is rarely offered at no charge to participants. The Extension agent has developed fact sheets and guides for use in the county office on common production issues. The agent also makes frequent farm visits with small ruminant producers and demonstrates hoof trimming techniques, animal visual inspections, and fecal sample collection. Participating producers indicated they intended to implement a variety of new practices, including nutritional flushing of females, implementing a controlled breeding season, making an emergency lambing kit, using soil testing services, over seeding pastures, and rotational grazing according to pasture height. Each of these changes in producer behavior has the potential to result in future increased profits and sustainability.</p>	
<p>3.</p>	<p>Georgia Pollinator Census Facebook Activities</p>	<p>During the Covid-19 crisis, families and educators teaching virtually were interested in activities that can be done at home. These activities needed to be easy to instruct, require few props, be educational and fun! The Georgia Pollinator Facebook page from the Georgia Center for Urban Agriculture already had an audience of educators as well as citizens interested in insects, so it was a natural fit to add activities and extra entomology education to the social media posts. During the Covid-19 crisis #FunActivityFridays were added as an easy, educational activity for participants to enjoy doing during the weekend. These included a Backyard Nature Hunt, building a pitfall trap and creating a sunflower house. Additional educational snippets were also added to the posts. In early March the Georgia Pollinator Census Facebook group had about 1,000 members. Since adding activities and additional online educational elements during the COVID crisis the group has grown to 1,466 as of June 29th, a 47 percent growth. Facebook group</p>	<p>Animal Production</p>

		analytics indicates that over the past three months engagement is up 56 percent. Comments on the posts indicate that families are participating and educators say they are using the elements in their online teaching.	
4.	Monitoring Poultry Floor Distribution	In commercial poultry houses, chicken density and distribution in drinking, feeding and resting zones are critical factors for evaluating flock production, bird health/well-being, and welfare. Proper distribution of chickens in the house could be an indication of animal well-being and house environmental management such as ventilation and litter quality concerns. Currently, daily routine inspection of broiler flock distribution in commercial grow-out houses is done manually, which is labor intensive and time consuming. A poultry engineering specialist in UGA poultry science department is studying artificial intelligence-based technology to monitor floor distribution of chickens automatically. An early version of a monitoring system, including data collection and model/algorithms for image analysis, has been developed and tested in research poultry houses at UGA. This system has been tested with the accuracy of 94 percent or higher in monitoring birds' distribution in feeding and drinking zones. The current finding provides the basis for developing an automated approach to monitoring poultry floor distribution and behaviors in commercial production systems.	Animal Production
5.	Poultry Ventilation and Management Webinars	Broiler house design has improved greatly over the last 30 years to meet the requirements of modern broilers. As a result, environmental conditions can be controlled much more closely with outside weather conditions having less of an effect. Management of these houses is complex and a lack of understanding of basic principles invariably has a negative influence on poultry performance and results in higher operation costs. The 2020 COVID-19 pandemic resulted in the cancellation of the annual workshop by UGA poultry scientists for flock supervisors. Instead, 13 webinars on hot weather poultry ventilation and management were offered. These webinars covered topics that focused on optimum ventilation rates to reduce energy costs while providing conditions for broiler comfort and growth during hot weather. Attendance in Spring 2020 averaged 1,000 people per webinar, representing 30 states and 70 countries. After receiving this training, flock supervisors who may have 20-25 farms each are better equipped to address their	Animal Production

		<p>growers' issues and questions. Depending on the management practices, savings of 10 to 35 percent in fuel usage have been observed. Conservative estimates of the economic impact resulting from lower fuel and electricity usage plus improved livability, growth, feed efficiency and yields exceed \$ 2.4 million annually in Georgia annually.</p>	
<p>6.</p>	<p>Small ruminant production</p>	<p>Small ruminant production continues to grow in popularity, resulting in new and beginning producers, hobby farmers and even pet owners searching out reliable information to help them care for their animals. During the COVID pandemic, providing information in an accessible format has been critical. Therefore, an educational virtual program was developed in collaboration with Extension Specialists at Virginia State University (Dr. Dahlia O'Brien), University of Maryland (Susan Schoenian) and Delaware State University (Dr. Kwame Matthews). This programming was also supported by grants written (including a funded SARE grant related to sericea lespedeza, a nutraceutical forage for small ruminant parasite management) and research conducted at the Universities, including collaboration with Dr. Tom Terrill at Fort Valley State University and Reed Edwards of FoxPipe Farm in South Carolina.</p> <p>"Weekly Worm Webinars", individual webinars on other topics and small ruminant Q&A session webinars and FAMACHA©/Integrated Parasite Management Training Webinars were offered. Many of the webinars were recorded, edited and posted on YouTube with links shared directly via the webinar registration list as well as through web sites (www.wormx.info/webinar-videosv; tinyurl.com/xy69znzz), newsletters, and social media. Webinar presentations on sericea lespedeza in collaboration with Dr. Tom Terrill and guest speaker Reed Edwards were recorded, edited and also posted online (youtu.be/-Fh_p0KdC8M; youtu.be/OT6cCcwW-vA).</p> <p>This programming filled an educational gap caused by the pandemic. For the two-webinar series (Weekly Worm Webinars and Q&A), nearly 2500 small ruminant producers participated while 5327 viewed the YouTube videos from the nine worm-related webinars. Polls provided during the ZOOM™ webinars revealed that more than 90% of webinar participants learned something new and 66 to 100% plan to use the information they gained. For the FAMACHA© programs, 412 producers, agents and youth participated in the webinars (2) on small ruminant internal parasite management and 61 small ruminant producers completed the requirements (passed a quiz and submitted a video) for and received FAMACHA© certification.</p>	<p>Animal Production</p>

		<p>Simple polls were provided during most of the webinars, asking questions related to demographics, if they felt they learned something new and if they felt they would use information they learned. For the FAMACHA© certification webinars (2) and resulting videos, participants desiring certification were required to pass a quiz on the webinar material and submit a video of themselves conducting the correct FAMACHA© procedure. This provided an indication of increased knowledge and skill in this area.</p> <p>Polls provided during webinars indicated that more than 90% of webinar participants learned something new and from 66 to 100% plan to use the information they gained. For the FAMACHA© certification, approximately 68 participants attempted passing a quiz indicating they had learned something new and 90% (61) passed and submitted a FAMACHA© video showing they learned how to do it, attaining certification.</p>	
7.	Vaccine to Decrease Clostridium in Poultry	<p>Clostridial-enteritis, also named as “Necrotic Enteritis” is a C. perfringens induced disease characterized with a significant decrease in growth performance and a massive increase in flock mortality. In 2013, Necrotic enteritis caused nearly \$2 billion to the poultry industry worldwide and \$60 million to the Georgia poultry industry. The cost of Necrotic Enteritis is increasing with adoption of no-antibiotic-ever rearing programs. A UGA poultry scientist developed an affordable nanoparticle based C. perfringens vaccine that can be delivered orally through drinking water. It successfully decreased C. perfringens load in chickens. Success of this project will lead to developing innovative vaccine delivery platforms against other intestinal pathogens like Campylobacter and Escherichia coli.</p>	Animal Production
8.	Virtual Animal Science Skill-a-thons	<p>As a result of COVID-19 Georgia 4-H animal science state contests were shifted to either a virtual format or outright cancelled. To provide youth and adults a fun and free opportunity to compete on a state, national and international level, several UGA Extension agents collaborated to offer a series of virtual skill-a-thons. The Virtual Invitational Dairy Bowl was held June 1, 2020 and was open to youth in 4-12 grades. The Monroe County Extension agent created a 50-question Junior test for 4-8 grade students and a 100-question Senior test for 9-12 grade students. Each test consisted of multiple-choice questions, fill-in-the-blank questions and expanded response</p>	Animal Production

		<p>questions. The Virtual Invitational Equine Skill-a-thon was held on July 30, 2020 and was open to all youth and adults. The Monroe County agent collaborated with the Jones County 4-H agent to create two tests. The four-part test consisted of multiple-choice questions, picture stations, a video of four horses to be evaluated for conformation, and a situation where a short answer response was submitted. The Virtual Invitational Sheep and Goat Skill-a-thon was held on September 21 to 27, 2020 and was open to all youth and adults. The Monroe County agent, in collaboration with the Upson/Lamar County and Pike County agents, created two four-part tests that consisted of multiple-choice questions, picture identification stations, two videos of four market lambs and breeding does to be evaluated for conformation, and a keep/cull situation where performance data on ewes and rams was presented. The Virtual Invitational Dairy Bowl engagement in social media contacts exceeded over 5,000 individuals, and 67 youth from seven states participated. The Virtual Invitational Equine Skill-a-thon engagement in social media posts contacts exceeded over 8,000 individuals, with 59 youth and 41 adults from 13 states participating. The Virtual Invitational Sheep and Goat Skill-a-thon contacts in social media exceeded 19,000 individuals, with 146 youth and 116 adults from 35 states and four countries participating.</p>	
<p>9.</p>	<p>Farmers to Families Initiative</p>	<p>As part of the Coronavirus Food Assistance Program, USDA is exercising authority under the Families First Coronavirus Response Act to purchase and distribute agricultural products to those in need. During July, UGA Extension in Telfair County became a collaborative partner for a weekly distribution of the Farmers to Families Food Boxes. Extension has been able to provide an additional two rounds of food box distribution in September and October, resulting in another seven weeks of food box delivery to Telfair County citizens. Extension is also providing SNAP-Ed (Supplemental Nutrition Assistance Program Education) materials to participants during the weekly food distributions, in addition to online videos for recipes for using the weekly food box items. The Farmers to Families Food Distribution partnership resulted in a total of 7,048 boxes of food valued at well over a quarter of a million dollars of free and fresh fruits, vegetables, dairy, and meat products. For many families, this weekly food box has provided more than just food. It has provided hope and assurance that they are not forgotten and their families are important.</p>	<p>Community, Home and Life Skills</p>

		<p>Extension’s response required many volunteers weekly to ensure that this initiative ran smoothly and accomplished the goals of providing as many families with food as possible. Each week, Extension coordinated at least 20 volunteers. In an attempt to ensure this food did not go to waste, the Extension Family and Consumer Sciences agent authored Facebook videos with quick, easy, and many no cook recipes that would provide ideas on how to easily prepare the food in each week’s delivery. To date, these eight videos have been viewed nearly 6,000 times in 23 states. The Farmers to Families initiative has allowed Extension to reach many individuals within the community who have never used Extension’s services before, with nearly 86 percent of survey participants reporting that they will actively seek out UGA Extension programming in the future. Nearly 95 percent of survey participants of the program report that their family is now consuming more dairy and fresh fruits and vegetables daily. In addition, 100 percent of surveyed participants report that they will continue to look for ways to increase their consumption of dairy, fresh fruits and vegetables, resulting in a much healthier community.</p>	
<p>10.</p>	<p>Advanced Software Tool for Salmonella</p>	<p>Salmonella is one of the most prevalent food-borne pathogens in the United States and worldwide. Salmonella serotyping is traditionally determined using a time-consuming laboratory protocol, and it has been the foundation of the national Salmonella surveillance system for over five decades. SeqSero, a publicly available bioinformatics tool developed and launched by a UGA lab with the Center for Food Safety in 2015, provided a faster alternative and has been used worldwide for Salmonella serotype prediction from whole genome sequencing data, which has helped transform Salmonella surveillance in the U.S. and other countries. The scientists have now created SeqSero2, an algorithmic transformation and functional update of the original SeqSero software. PulseNet, a national laboratory network that connects food-borne illness cases to detect outbreaks, has adopted SeqSero2 since 2019. Under PulseNet, SeqSero2 is used by every state public health laboratory to characterize every Salmonella isolate from the national surveillance. The USDA Food Safety and Inspection Service began using SeqSero2 as of January 2020. The National Antimicrobial Resistance Monitoring System uses SeqSero2 to analyze Salmonella isolates from ill people, retail meats, and food animals. The Food and Drug Administration has completed single-lab and multi-lab validation of SeqSero2 as well as agency-</p>	<p>Food Safety</p>

		<p>wide implementation and testing. Full regulatory implementation of SeqSero2 by FDA is expected by January 31, 2021. GenFS, an interagency standards group for next-generation sequencing of bacterial pathogens, has established a subcommittee dedicated to harmonizing Salmonella serotyping based on SeqSero2. Internationally, SeqSero2 has been integrated into Enterobase, a global genome database for enteric bacteria. SeqSero2 is also being incorporated to the NCBI Pathogen Detection system, a centralized system that integrates sequence data for bacterial pathogens.</p>	
<p>11.</p>	<p>Artificial neural network (ANN) modeling</p>	<p>Artificial neural network (ANN) modeling continues to emerge as a core technology for improving the production efficiency of several agricultural products. ANN models such as prediction, classification, and self-organizing maps have been applied successfully to solve a great variety of issues in agriculture. Despite its great potential, the application of ANNs in the field of agricultural sciences is still very limited. There is a huge demand to understand and predict the behavior of agricultural systems based on different physiological processes, and only ANNs will be able to deal with such complex data to underline the trends and specific behaviors of systems. Furthermore, ANN models are non-invasive, stress-free, time-efficient and lead to the same results as those obtained by means of other more invasive methods, thus offering a good alternative to be used in such studies.</p> <p>Therefore, the goal of this project is to build ANN models for several agricultural systems that would allow us to find practical solutions for better agri-business strategies and efficient product development at Fort Valley State University (FVSU). The specific objectives set-up to accomplish this goal are:1) evaluate several agricultural systems at FVSU for ANN modeling, 2) develop and validate ANN models in selected systems that have specific concern, and 3) identify optimal ANN models through performance in statistical indices.</p> <p>The proposed research is highly relevant to agriculture, food, and other related industries and is in agreement with the mission of FVSU (advance the cause of education and research) and priorities of NIFA (food security, climate variability and change, water sustainable bioenergy and childhood obesity prevention). Furthermore, this project will help FVSU better serve its clientele (mainly women and minority students) and meet long-term goals to assist surrounding</p>	<p>Food Safety</p>

		<p>communities and the rural-disadvantaged in Georgia through developing a technology base for hands-on research experience in the modern field of ANN and STEM education.</p> <p>Two research articles have been published so far. Currently, a graduate student is implementing ANN research in her thesis work.</p> <p>Selected students and faculty are have acquired the knowledge and skills of artificial neural networks.</p>	
12.	Developing Value-added Food Products	<p>UGA’s FoodPIC (Food Product Innovation and Commercialization Center) provides technical support and engages with entrepreneurs as they develop and commercialize new food and beverage products. The mission of FoodPIC is to ensure that food entrepreneurs are compliance-ready for manufacturing safe, shelf stable and legal food products before hitting the retail shelf. In 2019, the GDA/USDA awarded the UGA FoodPIC team a Specialty Crop Block Grant (SCBGP) of \$100,000 to develop value-added products from pomegranate. In spring, 2020 a \$30,000 grant was awarded to work on satsuma citrus. FoodPIC has also supported cutting edge research in human nutrition and disease management. The FoodPIC team developed several high protein foods for a long-term clinical trial entitled “Skeletal and Cognitive Effects of Nutrition from Eggs.” The development of “designed foods” as a delivery mechanism for nutraceutical or pharmacological components is another area of active research by medical scientists. The FoodPIC team recently developed four cookie variants, enriched with a specific blend of amino acids for an upcoming clinical trial for young patients suffering from Sickle Cell disease. In the past five years over 350 project proposals have been generated. By the end of June 2020, over 240 FoodPIC projects were successfully completed, which generated over \$520,000 in fees for service. These projects represent either new or expanding food businesses that have leveraged the technical expertise at FoodPIC since 2015.</p>	Food Safety
13.	Foodborne outbreaks	<p>Foodborne outbreaks due to common pathogens, such as Salmonella, Escherichia coli, and Listeria are increasing despite the use of various decontamination methods. So, there is a need to reduce the incidence of foodborne illnesses and provide safer food supply by eliminating</p>	Food Safety

		<p>microbial contamination and developing non-thermal food processing technologies to improve food safety.</p> <p>Thermal processing methods, including pasteurization, high temperature sterilization, etc., may not be appropriate for temperature sensitive foods, particularly meat. Therefore, non-thermal processing techniques are gaining popularity for increasing shelf life, eliminating common types of foodborne pathogens with lower treatment time, and minimal changes in quality of meat. Pulsed UV-light consisting of intense, short duration pulses from the electromagnetic spectrum in combination with lemon grass oil can be used for surface decontamination of foods.</p> <p>A series of studies were conducted to evaluate the synergistic antimicrobial efficacy of pulsed UV-light and lemongrass oil in inactivating Escherichia coli K12 on meat. A combination of lemongrass oil followed by PUVL for different treatment times was used to inactivate Escherichia coli K12 on beef and goat meat. Effect on quality and physical characteristics, including color, texture, crude fat, moisture content, and ash were evaluated.</p> <p>A graduate student completed her research and defended her master's thesis. A peer reviewed research paper was published in the International Journal of Food Science and Technology. A poster was presented at the SHIFT20 (Institute of Food Technologists 2020 Annual Meeting & Food Expo). This research has given a great opportunity for the PI to investigate the potential of pulsed UV-light in combination of lemongrass oil for inactivation of foodborne microorganisms.</p> <p>Effectiveness of pulsed UV-light in combination with lemongrass oil in reducing E. coli on meat.</p> <p>The E. coli bacteria on meat were reduced to below detection level.</p>	
<p>14.</p>	<p>Impact of COVID-19 to Fresh Food Industry</p>	<p>As soon as the COVID-19 outbreak was declared a pandemic on March 11, 2020, it became imperative to UGA agricultural and applied economists that an economic forecast analysis was necessary for the fresh food industry. This economic forecast report will serve as an educational and professional guide for farmers, researchers and UGA Extension staff, lending agencies, policy makers and others in agriculture to facilitate decision making. It would further provide information on future farming, resource allocation and financial planning for all growers. The</p>	<p>Food Safety</p>

		<p>economists set out to investigate the impact to the specialty crop industry value and supply chain. Their studies were strictly based on economic theory and empirical evidence. The goal was to capture the actual impact to the agricultural production, producers and consumers in Georgia and the United States. These studies will be useful to growers in their daily decision-making process and for policy implementation by state legislators, stakeholders and congressional representatives, especially in making difficult decisions that would be helpful for the state, fresh food industry, GFVGA, and affected fruits and vegetable farmers. Growers and stakeholders should think of these analyses as an awareness and preparation tool for the post-COVID-19 period. This information will help growers decide whether to increase or reduce acreages or to take out a loan or not. Knowing that there will be a shortage which will eventually increase prices gives the farmer planning advantage.</p>	
<p>15.</p>	<p>Microbial Hazards in Food Distribution Centers</p>	<p>Food service distribution centers have come under increased food safety scrutiny in recent years due in part to the passing of the Food Safety Modernization Act and the Preventive Controls for Human Foods Rule. While the majority of products passing through food distribution centers are fully sealed, fresh produce is often not sealed due to quality concerns related to continued respiration post-harvest. Distribution centers need an environmental monitoring program as a part of their environmental or sanitation preventive controls. To address a knowledge gap regarding environmental microbial hazards in distribution centers, UGA food scientists are conducting a swab-a-thon for <i>Listeria</i> spp. concurrently with detailed management interviews to identify similarities and differences in facility designs, sanitation protocols, equipment characteristics, etc. that may contribute to <i>Listeria</i> spp. contamination in produce. To date, the survey has identified potential harborage sites predominantly on floors or items that contact floors, including floor cracks, seams or patches as well as cleaning tools like dust mops and squeegees. This research is actively providing food service and grocery distribution centers, including retailers with guidance to assist in hazard analysis and risk mitigation practices within facilities. This includes the identification of high or low risk practices or factors inherent to the distribution center environment.</p>	<p>Food Safety</p>

<p>16.</p>	<p>Safe Dairy Storage</p>	<p>The presence of harmful microorganisms in milk and dairy products is of great concern for food safety of the public. Most disease outbreaks of dairy products have stemmed from raw, improperly pasteurized milk, post-pasteurization contamination during and after manufacture, and during storage of the products. Longer and improper storage conditions deteriorate shelf-life of dairy products. In this project, the studies will focus on the investigation of food safety, storage stability, nutritional, textural and sensory characteristics of goat milk powder and cheese products during extended storage periods.</p> <p>Specific collaborative arrangements have been made with the USDA/ARS, Eastern Regional Research Center, the University of Georgia, Athens, and North Carolina State University, Raleigh, NC to ensure that the research are conducted and undertaken with due consideration to its ultimate utility and application.</p> <p>The outcomes of this project are to accomplish the NIFA's priority areas such as (i) food safety, (ii) sustainable agriculture of rural communities for 21st century, and (iii) global food security and hunger through the development of dairy products and their quality evaluation. The outcomes of these investigations will also provide essential information on food safety, storage stability and consumer acceptability of dairy goat products, which can promote the profitability and sustainability of the dairy goat industry.</p> <p>This project has shown a new insight that Salmonella pathogen in goat milk powder stored at refrigeration temperature (4°C) apparently could survive better than those samples stored at room temperature (25°C) for 6 months period under the same condition of aw and moisture content of the dehydrated goat milk products.</p> <p>This research project will benefit the dairy products (i.e., powder milk and cheese) consumers, dairy product manufacturers, food safety inspectors, food products distributors and retailers, food scientists, food microbiologists, sensory scientists, nutritionists, milk producers and dairy goat farmers in the state of Georgia, US and around the world. In addition, the specific audiences would be the health-conscious consumers, who are looking for hypoallergenic, healthier and</p>	<p>Food Safety</p>
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		<p>better quality of microbiological, nutritional, textural and sensory characteristics of dairy goat products.</p> <p>This project has provided the graduate student with excellent training opportunities to become a good dairy/food scientist in evaluation of nutritional, microbiological, chemical and sensory characteristics of goat milk Cheddar cheese products. The study was also focused on the evaluation of the microstructure of iron fortified caprine milk Cheddar cheeses through evaluation of microstructures, iron contents and iron foci of the fortified cheeses, water activity, pH, fatty acids and lipid oxidation of the experimental cheeses at different storage temperature and period treatments.</p> <p>The research data of this 4th year of this project have been analyzed statistically, and the resultant outcomes of the research have been disseminated to professional society journals such as journal of food science and dairy science. The research data were also presented at national and international conferences in food science, nutrition and dairy science disciplines.</p>	
<p>17.</p>	<p>Combatting Senior Hunger</p>	<p>Good nutrition is a key factor for older adults to maintain well-being and an independent, healthy lifestyle, and in recovering from an illness or an injury. Reasonably priced, wholesome foods are not always accessible to older adults because of the lack of transportation, health problems and disabilities, and the lack of food stores within close proximity for shopping. The Athens Area Master Gardeners received the Plant-a-Row for the Hungry (PAR) grant. PAR is part of a national movement that began in 1995 by Garden Communicators International, “a communications program encouraging individual gardeners, companies and community gardens to donate fresh vegetables, fruit, herbs and flowers to food agencies and/or soup kitchens to help feed those in need.” This annual endeavor provides fresh produce for the Oconee County Family and Consumer Sciences (FACS) Extension Senior Sense program. The Senior Sense program is comprised of low-income seniors who attend monthly nutrition workshops. Typically, seniors visit the Bishop Community Center each week and peruse the bounty of fresh produce and pack a bag with their choice of vegetables. Then once a month, they attend a session on how to prepare the produce in healthier, low cost ways. However, this year had to be different due to social distancing requirements based on COVID-19. The FACS agent worked with Oconee County</p>	<p>Health & Nutrition</p>

		<p>Master FACS volunteers and the Master Gardeners to provide a drive-through produce distribution for the seniors each week, so that the food could still be distributed while keeping everyone safe. In addition to the weekly produce distribution, local churches and civic clubs provide boxes of non-perishable items, laundry baskets with cleaning supplies, or bags of personal items for each senior. Since May 2020 when the drive-through distribution began, about 1,500 pounds of produce valued at \$4,875 has been provided from the Plant-A-Row garden. Produce includes tomatoes, green onions, bell peppers, banana peppers, jalapeño peppers, yellow squash, zucchini, okra, Irish potatoes, cucumbers, crowder peas, eggplant, sugar snap peas, green beans, sweet potatoes and herbs. Master FACS volunteers logged 103 hours between May and October 2020 through 17 produce distributions.</p>	
18.	Fighting Traumatic Brain Injuries	<p>A traumatic brain injury (TBI) occurs when an external force causes damage to the brain. Each year, on average, TBIs are associated with an estimated 1.1 million emergency department visits, 235,000 hospitalizations, and 50,000 deaths in the United States. Babies, toddlers and young children make up the largest percentage of individuals who experience a concussive TBI, largely due to falls. An animal model more similar to humans may lead to better predictability of a human outcome in response to a therapeutic. To address this need, a UGA animal and dairy science team tested the ability of blunt force trauma in piglets to lead to human-like changes in the brain at a cellular, tissue and functional level. Data suggest that the piglet TBI model is comparable to human patients and will likely be more predictive of human outcomes for drug, device and other therapeutic treatments. The development of a robust and more predictive piglet TBI model will enable more rapid and cost effective development of TBI therapies. This model has broad reaching implications for the study of the pathophysiology of other neurological diseases and injuries.</p>	Health & Nutrition
19.	FVSU CEP FCS	<p>Through grassroots connections, researched based education and personable staff Fort Valley State University Cooperative Extension Program Family and Consumer Sciences Area (FVSU CEP FCS) has been able to empower participants to develop the essential knowledge and skills to increase positive family dynamics, save money and to enhance longevity of life through improved health and nutrition behavioral changes. Healthy homes</p>	Health & Nutrition

		<p>FVSU CEP FCS staff works personally with residents in nearly 35 counties throughout middle, east and south Georgia. Georgia citizens are faced with an above average poverty rate, high unemployment, increased chronic diseases, increased local food deserts and daily challenges compounded with the COVID-19 pandemic. To aid in a healthy future for Georgia families, community-based programs are essential. FVSU CEP FCS provided programs focused on parenting skills, caregiver trainings, youth life-skills, energy efficiency/healthy home workshops and nutrition education programs. These types of programs must be a staple in Georgia. By providing practical, solution-oriented learning opportunities for Georgians outside the formal classroom citizens were able to save money, lower health concerns, cope with stress and increase family resiliency.</p> <p>Key activities provided through FVSU CEP Family and Consumer Science Area were varied; we collaborated with 4-H for youth programs that focused on nutrition, decision making techniques on behavior, soft skills development and physical activity programs. Programs offered to parents consisted of nutrition education, chronic disease, parenting workshops that focused on teaching at home during the pandemic, dealing with stress and technology workshops (email, virtual doctor appointments, and Zoom). With the other adults, caregivers and senior communities we provided programs on fruit/vegetable home gardening, facts on COVID-19 pandemic, energy efficiency, health & wellness and technology workshops.</p> <p>During the period October 1, 2019 - September 30, 2020, the Expanded Food and Nutrition Education Program (EFNEP) serviced 314 homemakers and 71 youth with a 97%/100% graduation rate respectively. Homemakers reported an 88% increase of fruit/vegetable/whole grain consumption. Eighty five percent of the homemakers reported improved usage of their food dollars.</p>	
<p>20.</p>	<p>Improving Health during Pandemic</p>	<p>Prediabetes and diabetes cost Georgia \$9.9 billion annually, and those costs are likely higher in the wake of COVID-19. In the fall of 2019, UGA Extension began delivering the 12-month lifestyle change program called the Diabetes Prevention Program in two counties and then expanded to 13 counties in Winter/Spring 2020. The program was planned for in-person classes, once per week for 16 weeks and then bimonthly or monthly for the remainder of the year-long program. In March 2020, COVID-19 put the country on hold, and challenged Extension agents to help the</p>	<p>Health & Nutrition</p>

		<p>102 participants maintain and even improve their health to resist diabetes and COVID-19. On March 16, 2020, all programs pivoted to offering sessions in a virtual or conference call only format. Family and Consumer Sciences Extension agents held weekly sessions via Zoom and conference calls with the participants to discuss healthy eating, physical activity, problem solving, and stress management. The agents delivered 158 virtual or conference call sessions to 98 participants for more than 15,000 educational contact hours. At each session, participants reported weight and physical activity and discussed problem solving, healthy eating, and active living during a pandemic. Participants lost a total of 429 pounds by the time COVID-19 suspended in-person programming. Since programming transitioned to online and phone only, participants have lost an additional 496 pounds and logged 2,899 hours of physical activity. Forty-five percent of participants have met or exceeded the 5 percent weight loss goal, and for many, they are only halfway through the year-long program. The health benefits of the Diabetes Prevention Program extend beyond the duration of the program. At least one study estimates for a person with type 2 diabetes, losing 5 percent of their body weight and keeping it off saves \$400 per year in medical costs. Thus, the potential value of the first 44 participants meeting their weight loss goals is about \$17,600.</p>	
<p>21.</p>	<p>Just for the Health of It: Home Edition</p>	<p>Since 2017, <i>Just for the Health of It</i> has served as a lunch and learn series that creatively married fun and education for its participants. When the COVID-19 epidemic reached Georgia, the program was adjusted to an online platform to continue delivering important information to citizens. Both Bibb and Clayton counties have poor health rankings in comparison to other counties in Georgia. The elimination of face-to-face programming presented a challenge to the UGA Extension agents for offering health and wellness information. The two counties united to offer <i>Just for the Health of It: Home Edition</i>. The weekly 1 ½ hour webinars, streamed on Facebook live, taught ways to manage and reduce risk of chronic diseases, and offered a cooking demonstration that highlighted the topic of the evening. The four-week series shared tips on healthy habits and food safety during coronavirus, and encouraged the reduction of sodium, fat, and sugar. Participants completed a post webinar survey and received the recipes demonstrated in the series. Series topics included From Breakfast to Dinner, Pantry Roundup, Mom’s Comfort</p>	<p>Health & Nutrition</p>

		Foods, and Kid’s Culinary Cooking Class. The four classes, offered in May, reached over 1,500 viewers. Since the initial postings, <i>Just for the Health of It: Home Edition</i> has been viewed by over 9,000 people in 16 states. Post evaluation surveys indicate over 90 percent of participants felt more knowledgeable about the topics. Over 70 percent of participants planned to use the information provided.	
22.	Stem Cell Therapy for Strokes	Stroke is the number one cause of long term disability and fifth leading cause of death in the United States. An assessment of failed treatments by the Stem Cell Therapies as an Emerging Paradigm in Stroke group, an assembly of leading stroke experts, has identified stem cell therapies as a promising option for the treatment of stroke patients. Induced pluripotent stem cell derived neural stem cells (iNSCs) have the ability to function as a dual therapeutic as they can produce regenerative signaling factors and replace damaged tissue. iNSCs can be derived from the patient’s own body, limiting the potential for rejection. a UGA animal and dairy science research team has found these cells to be highly proliferative and easy to maintain in culture, making them amenable to therapy. Stroked pigs that received the iNSC therapy showed significant improvement in brain metabolism, cerebral blood flow, decreased inflammation, and increased endogenous neural stem cell activity. In addition, iNSCs were capable of forming neuron and glia cell types to replace lost and damaged brain tissue. Animals also showed improved motor function suggesting enhanced recovery. The development of iNSC regenerative cell therapy will lead to the replacement and repair of damaged neural networks in stroke patients. This will lead to improved sensory, motor and cognitive function and improve the patient’s quality of life. This platform technology can also be adapted to other central nervous system injuries such as spinal cord injuries or traumatic brain injury.	Health & Nutrition
23.	Taste Organ Research Project	One project focused on the development and maintenance, degeneration and regeneration of taste organs. During the COVID-19 pandemic, our PhD students and researcher made efforts to overcome challenges and keep a high productivity. In the year of 2020, we had funding support of an active R21 grant, submitted 5 manuscripts (4 published and 1 accepted). We had 4 NIH	Health & Nutrition

		<p>grant submissions (1 R01, 3 R21s), of which one R21 has passed all review processes and been "recommended for funding".</p> <p>One of the publications was inspired by the taste loss in COVID-19 patients. We analyzed our in-house data and did mining of public data in the literature. Our results provided insights into how SARS-CoV-2 virus infection causes taste loss. As soon as published (7/23/2020), the findings became news and were reported all over the world in media. In a short period of time, the article has attracted 1969 views, almetric 271 and 4 citations. https://pubs.acs.org/doi/10.1021/acscptsci.0c00062</p> <p>Another publication was about basic research, it was commented by expert that the findings contribute significantly to knowledge in the field of taste biology. https://pubmed.ncbi.nlm.nih.gov/32098606/.</p>	
<p>24.</p>	<p>Advanced Peanut Genetics</p>	<p>Peanut is a valuable crop but is plagued by diseases and pests. In the U.S. the use of chemical control accounts for over 30 percent of the total cost of crop production. Genetic resistance is the most favorable form of control, but peanut has an exceptionally narrow genetic base and poor sources of resistance to many pests and pathogens. Fortunately, wild peanut species harbor very strong resistances to diseases and pests and adaptation to environmental stresses, which cannot be found in cultivated peanuts. In 2019 UGA crop and soil scientists led an international consortium that sequenced the peanut genome, creating a common internationally recognized reference for peanut genetics. Using this, together with a vastly improved knowledge base on the relationships of wild and cultivated peanut species, they have been incorporating very strong pest and disease resistances from wild peanut species into elite field peanuts. The sequenced peanut genome provides a framework for research results from all over the world to be directly compared, within a context of more than 66,000 genes, identified and characterized within their chromosomal context. This is leveraging research in the U.S. and the world, generating more knowledge and benefits, pure and applied. This work with wild peanut species has now generated peanut lines that are 95 percent or more elite peanut genetics, with 5 percent or less</p>	<p>Plant Production</p>

		<p>wild species that confers pest and disease resistance. Collaboration with peanut breeding programs in the U.S., Brazil, Senegal and Uganda is incorporating these wild species-derived traits into elite local peanut varieties using a combination of traditional breeding and selection using DNA markers. So far, six new varieties have been released in Senegal and three in Brazil. New improved varieties are expected soon in the U.S. This will reduce farmer costs, increase yield, reduce fuel use and lower the environmental impact of farming.</p>	
<p>25.</p>	<p>Backyard Fruit Webinar Series During COVID</p>	<p>During Georgia’s shelter-in-place guidelines brought on by the COVID-19 pandemic, many individuals were staying home and seeking information on growing food crops. The Fannin County Extension agent collaborated with faculty from UGA Extension, LSU Extension, North Carolina State Extension, University of Tennessee Extension and Auburn University to coordinate a multi-state webinar series on backyard fruit production. The series featured crops, including blackberries, blueberries, muscadines, bunch grapes, strawberries, apples, pears, peaches, nectarines, plums and citrus; and specialty fruits, such as figs, persimmons and kiwifruit. Each session included about one hour of instruction coupled with a question-and-answer session at the end. Recordings of each session were captioned and made available on the UGA Extension YouTube Channel, where program participants, as well as those who did not register for the live webinars, could view and share the videos. Additionally, many educators across Georgia, and other states, were seeking opportunities for professional development. So a Certificate of Completion was made available for any program participant who attended all eight sessions, equivalent to eight hours of online learning. The Backyard Fruit Webinar Series garnered national interest and participation. Over the course of the program, 2,152 client contacts were made, 28 states were reached, and attendance ranged from 85 to 74 percent of those who registered, which was an average of about 269 participants per session. Certificates of Completion were furnished to 43 participants. As of October 2020, the videos have been viewed 1,528 times. In a follow-up survey, 84 percent of participants preferred the online learning option over in-person. All of the participants who attended all eight sessions of the program reported they gained a better understanding of the major factors that impact successful backyard fruit production, and planned on using the information presented throughout the program.</p>	<p>Plant Production</p>

<p>26.</p>	<p>Citrus Pest Monitoring and Tracking</p>	<p>Citrus Greening is a serious disease of citrus because it affects all citrus cultivars (orange, lemon, satsuma, grapefruit, etc.) and causes rapid decline of trees, usually leading to death. This disease was once localized primarily to groves in Florida but has since moved into Georgia via its vector, the Asian Citrus Psyllid, which spreads the disease from plant to plant by feeding on young succulent growth. The only reliable means of detection for the insect are (yellow) sticky card traps or visual scouting during periods of pest activity. Foliage, which displays the mottling characteristics, can be tested to provide an indication if the disease is present or not. Therefore, the need for tracking movement of this pest via trapping is paramount. UGA Extension has constructed a team of agents, led by the Bryan County Extension program, who agreed to tackle this project. This team is tasked with deploying and distributing traps to homeowners and growers alike to monitor for the presence of the psyllid. Population levels of the Asian Citrus Psyllid in citrus groves can be estimated to time insecticide sprays and to track the movement of this pest in Georgia. The Bryan County agent created a team of 28 counties and 29 Extension agents across the Southeast and Southwest Districts, which have agreed to carry out trapping efforts in their county. He also secured funding for the project from the Citrus Growers Association. A total of 32 counties now have trapping efforts, spearheaded by UGA Extension, intended to track the movement and presence of ACP across Georgia. Four counties have identified the presence of either the psyllid, disease, or both in citrus plantings. Entering year three of this study, the data collected from this project will lead to an updated map of where psyllid has been found. Counties that have positively identified the problem can then send in samples to UGA Plant Pathology to be tested for Citrus Greening to proactively prepare Georgia citrus groves.</p>	<p>Plant Production</p>
<p>27.</p>	<p>Cotton Profitability and Sustainability</p>	<p>The Miller County Extension agent has established programs to determine which cotton varieties will yield the best in our local climate and soil types and how to manage plant pathogens in cotton. This program is part of a regional effort that encompasses variety trials in several counties in southwest Georgia. The trials help to educate growers in cotton variety decision making as well as how to place and manage certain varieties in environments that will optimize their performance. In addition, the Miller County Extension agent has collected data in support</p>	<p>Plant Production</p>

		<p>of the UGA Cotton Team’s effort to generate a multitude of data to inform growers on how to understand growth potential of new varieties as they come to the marketplace, and how to properly manage growth of these new cotton varieties so that yield potential is not inhibited. Across Miller County in 2020, improper variety selection may collectively cost growers from \$4 million to \$7 million, which is 30-35 percent of the total revenue expected to be generated in Miller County by cotton in 2020. The UGA On-Farm Cotton Variety Performance Evaluation Program is expected to drastically reduce these costs, which returns this money to producers and Georgia's economy. Additionally, the extensive evaluation of plant growth could reduce costs to growers, and provides them the growth management information that could prevent them from implementing unnecessary yield-inhibitory growth management strategies. Growers are also more up-to-date and more cautious when applying their cotton herbicides in 2020. Improper use of synthetic auxin herbicides can cause thousands of dollars in damage to neighboring crops.</p>	
28.	Determining Best-performing Crop Cultivars	<p>UGA's Statewide Variety Testing Program evaluates current and new cultivars of agronomic crops for performance under Georgia growing conditions. The Statewide Variety Testing program (SWVT) evaluated 704 experimental and released crop varieties from July 2019 to June 2020, including peanut (48), cotton (85), corn (87), soybean (103), sorghum (123), millet (8), canola (29), ryegrass (48), barley (5), oats (37), triticale (8), rye (11), and wheat (103). Tests included the harvest of grain, lint, pods, forage and/or silage, depending on the species. Depending on the crop, varieties were tested in one to nine environments to confirm their adaptation to Georgia growing conditions. This allowed top-yielding varieties to be identified and other characteristics to be described. In forage and silage tests, they saw yield advantages of 6 to 22 percent for the top performer compared to the average of varieties tested. Row crops showed even larger differences, ranging from 6 to 38 percent. With the tight profit margins that farmers face, proper variety selection can be the difference between profit and loss.</p>	Plant Production
29.	Farm Cotton Trials	<p>In the past 10 years, several new varieties of cotton have been released, especially with Monsanto’s new molecular breeding program, each trying to gain its share of the market. Each</p>	Plant Production

		<p>has a claim to out yield the others, to have the best traits and fiber quality, and to increase profits. The Clay County Extension agent worked with local producers to initiate a randomized and replicated cotton variety trial. No fewer than 12 varieties have been evaluated for the past 14 years and 15 the past two years. These trials have utilized over 580 acres of cotton in 16 variety trials. Cotton growers in the area can look at multiple years of county data to make a better decision on varieties. Through these variety trials the Extension agent has found varieties with trait packages that yield well and has also discounted others. Producers in Clay County can plant a variety with confidence, knowing it has the potential to give them a profit because they have seen local data on the variety. This advantage saves them time and money. The top yielding varieties from these trials have consistently yielded over 200 pounds of lint per acre over the bottom varieties. By choosing these higher yielding varieties, producers have the potential increase of \$128 per acre at the \$0.64 price, or over \$1.53 million as a county annually.</p>	
<p>30.</p>	<p>Irrigation Scheduling Guide</p>	<p>Row crops require different amounts of water as they grow and mature. Growing multiple crops in combination with various ages can become confusing on a crop’s water needs and timing. UGA Extension specialists have produced crop production guides for each of the major row crops grown in Georgia. UGA Extension researched and tested these checkbook methods of irrigation scheduling to aid in maximizing crop yield with the least amount of applied irrigation water. The issue is carrying the correct guide book to each pivot when scheduling and applying irrigation water. A UGA Extension Water Educator saw the need for farmers to have a durable, waterproof, multi-crop and easy to carry, quick irrigation reference guide. He put together a corn, cotton, peanut and soybean quick reference checkbook method irrigation guide. He also incorporated narrative regarding the importance of pivot application uniformity and issues that may cause poor uniformity and possible corrective suggestions. The guide also promoted the free UGA Extension Mobile Irrigation Lab to come out and test pivots for uniformity. Nearly 1,700 copies were distributed to Extension agents. Agents could visit farms and distribute the guide with a quick tutorial on how to use it. By using the guide, farmers are applying water more efficiently and utilizing our water resources more wisely than blindly irrigating without any sense of actual water needed to produce a great crop.</p>	<p>Plant Production</p>

<p>31.</p>	<p>Peanut seed treatment crisis</p>	<p>All commercial peanut seed is tested by the Georgia Department of Agriculture Seed Laboratory in Tifton to ensure that certain quality standards are met. This winter the seed lab started finding unexpectedly low germination in some seed lots, as well as visible contamination from <i>Aspergillus flavus</i> growing on the seed. All peanut seed are treated with fungicides to help control such issues, and the lab noticed that seed treated with Rancona had less <i>Aspergillus</i> contamination, and in some cases remarkably higher germinations, than did seed treated with Dynasty. UGA plant pathologists collected different seed lots and plated them out to evaluate the mycoflora and try to determine the cause of the problem. It was evident that the majority of the seed lots were heavily contaminated with <i>A. flavus</i>, and that seed treated with Rancona had considerably less colonization from this pathogen. In addition, 70 of the isolates collected were evaluated in the UGA Molecular Diagnostics Lab in Tifton, and 65 percent were found to be highly resistant to azoxystrobin, one of the main ingredients in Dynasty. Another 20 percent were partially resistant. UGA findings were disseminated to the seed industry, and with the rapid approach of planting season they quickly started transitioning to Rancona. This was a huge change for the industry as Dynasty has been the dominant product for many years. The manufacturer of Rancona, UPL, had to run extra shifts in their Valdosta plant to try and meet the sudden demand. They could not produce enough to completely replace Dynasty in the short time prior to planting, but much of the seed for the 2020 peanut crop in Georgia was treated with Rancona.</p>	<p>Plant Production</p>
<p>32.</p>	<p>Pest Monitoring Program Works</p>	<p>The peanut burrower bug (PBB) causes significant economic losses on an annual basis in Georgia. The insect became a serious pest in 2010, and there are few effective management tactics. Choices for reducing risk of PBB injury are deep tillage and/or applying the organophosphate insecticide chlorpyrifos. These practices are expensive, can negatively affect the environment, and have been used without an accurate method to assess actual risk of infestation or injury. The UGA Peanut Entomology Program and county agents in Emanuel and Brooks Counties collaborated on a multifaceted PBB research and Extension project focused on improving our understanding of the insect's biology and reducing losses through better management. The Emanuel County Extension agent initiated a preliminary monitoring program using pit-fall traps</p>	<p>Plant Production</p>

		<p>in 2016. The program continued in 2017 and 2018. Extension agents monitored over 13,000 peanut acres in at least six counties in 2019 and 2020. Since its initiation in 2016, the success rate of the PBB monitoring program is greater than 90 percent. In 2020, more than 1,200 traps were deployed on over 8,000 acres, and there were no reductions in grade due to PBB in any of the monitored fields. Peanut burrower bug monitoring has been widely adopted. The results of the program have far exceeded expectations, and the savings to growers have been significant. Unnecessary insecticide applications have been avoided, and losses due to PBB injury have been reduced significantly. Over the previous two seasons, growers in the program treated 1,100 acres with granular chlorpyrifos in response to trapping data. The estimated return on this investment alone is over \$650,000 in preserved crop quality.</p>	
<p>33.</p>	<p>Pest Monitoring Program Works</p>	<p>The peanut burrower bug (PBB) causes significant economic losses on an annual basis in Georgia. The insect became a serious pest in 2010, and there are few effective management tactics. Choices for reducing risk of PBB injury are deep tillage and/or applying the organophosphate insecticide chlorpyrifos. These practices are expensive, can negatively affect the environment, and have been used without an accurate method to assess actual risk of infestation or injury. The UGA Peanut Entomology Program and county agents in Emanuel and Brooks counties collaborated on a multifaceted PBB research and Extension project focused on improving understanding of the insect’s biology and reducing losses through better management. The Emanuel County Extension agent initiated a preliminary monitoring program using pit-fall traps in 2016. The program continued in 2017 and 2018. Extension agents monitored over 13,000 peanut acres in at least six counties in 2019 and 2020. Since its initiation in 2016, the success rate of the PBB monitoring program is greater than 90 percent. In 2020, more than 1,200 traps were deployed on over 8,000 acres, and there were no reductions in grade due to PBB in any of the monitored fields. Peanut burrower bug monitoring has been widely adopted. The results of the program have far exceeded expectations, and the savings to growers have been significant. Unnecessary insecticide applications have been avoided, and losses due to PBB injury have been reduced significantly. Over the previous two seasons, growers in the program treated 1,100</p>	<p>Plant Production</p>

		acres with granular chlorpyrifos in response to trapping data. The estimated return on this investment alone is over \$650,000 in preserved crop quality.	
34.	Plant Molecular Diagnostic Lab	It is important to have early, economical, and accurate disease diagnostic tools to optimize disease management. The UGA Plant Molecular Diagnostic Lab (MDL) developed novel advanced diagnosis techniques for various plant pathogens across a range of crops. For rapid and accurate diagnosis, the Plant Molecular Diagnostic Lab (MDL) has developed cost-efficient advanced loop-mediated isothermal amplification assays (LAMP) for multiple plant pathogens that have the potential to overcome many of the limitations of traditional diagnostic assays. During 2020, MDL developed advanced LAMP techniques for specific and rapid detection of two important vegetable pathogens (cucurbit leaf crumple virus and Phytophthora capsici) and a pecan root-knot nematode, Meloidogyne partityla, under laboratory and field conditions. The sensitivity of the LAMP assays was 10 to 100 times higher than regular PCR and testing was carried out rapidly (30 min-1 hr) with minimal equipment. Development of the rapid detection techniques facilitates quicker response to disease outbreaks and therefore reduces chemical control costs for growers and agricultural industries. Moreover, this portable rapid detection technique can be used for routine diagnostics, surveillance, biosecurity, and epidemiology studies. This information will be very helpful to increase awareness about emerging disease spread for growers, researchers, and Extension specialists in Georgia.	Plant Production
35.	School Garden Teacher Training	During the Covid-19 crisis, educators were looking for ways to receive continuing education during the summer. In-person opportunities were rare and educators indicated that many counties were not allowing their teachers to leave their counties for training. Also, many teachers indicated they were suffering from on-line training fatigue and did not want an all-day computer-delivered training. University of Georgia Extension offered a hybrid teacher training event, part offered as an online webinar symposium and part as directed at-home activities. The online portion was a five-hour symposium featuring four school garden webinars and a question and answer lunch hour. After the educators attended the symposium they were given four at-home activities to complete. Each activity corresponded to a topic covered during the day: fruit	Plant Production

		<p>plants in the school garden, seed saving, vermicomposting, and pollinators. After an educator completes the at-home activities, proof through photos is sent to the symposium coordinator and a Certificate of Completion is issued. These certificates are often required of teachers through their county education departments. A total of 376 people registered for the symposium. An average of 255 people attended each webinar and an evaluation poll was given after each webinar. Eighty-eight percent of participants indicated they were somewhat or very likely to have their students participate in the 2020 Great Georgia Pollinator Census after receiving the information and training in the webinar. One participant wrote, “This was really great!! Didn’t feel like five hours because it was so much useful information. All of us at Woodward Elementary in DeKalb County were in today, enjoyed it and look forward to getting started with these new tools and the census!”</p>	
<p>36.</p>	<p>Screening of germplasm resources in sorghum</p>	<p>My research program focuses on screening of germplasm resources in sorghum for biotic stress resistance using host-plant resistance. We have been working to identify the sorghum PI lines that are resistant to sugarcane aphid and we are also working to understand soil microbiome that are associated with sorghum and other dicot interaction systems. Sorghum farmers are facing huge losses due to sugarcane aphid problems that also clogs harvest machine combines; some of the sorghum is also used to produce sorghum syrup in northern parts of Georgia.</p> <p>We have evaluated set of Sorghum Association Panel for sugarcane aphid damage. Sorghum microbiome experiments were conducted in the field and greenhouse locations. We have conducted workshops to train students and scientists on use of robots and high-throughput phenotyping for plants in the field.</p> <p>Students and research professional were trained for high-throughput phenotyping and plant-insect interaction studies. The information obtained from plant microbiome and GWAS-Genome Wide Association Studies experiments will help breeders to develop resistant/tolerant varieties of sorghum. These projects enhanced our capacity and collaborations across institutions to conduct field trials for understanding pest problems in sorghum.</p>	<p>Plant Production</p>

<p>37.</p>	<p>Disaster Loan Assistance</p>	<p>COVID-19 took a toll on all agricultural commodity prices as well as market stability and predictability. Beef cattle producers had cattle that were ready to market but could only do so at a greatly reduced price. Holding them led to more loss with increased labor and inputs. Row crop producers were in the middle of securing operating funds and getting prepared to plant. Business plans for these enterprises were impossible to implement due to the effects of COVID-19. The Warren County Extension Coordinator collaborated with the UGA Small Business Development Center to promote a Loan Disaster Assistance Program offered by the United States Small Business administration. These two offices also offered technical assistance to farmers who needed help with the process. A total of 27 farmers applied for loans through this program. These farmers all received grants of \$1,000 for each employee in their agricultural enterprise, whether or not they were granted the loans. Collectively, area grants totaled \$54,000 and the loans totaled \$2,487,000. All applicants were offered loans of various amounts depending on the size of their farming operation and their individual needs. These loans made it possible for farmers to refinance existing loans at lower interest rates, have an extra year before another payment is due and formulate a new business plan.</p>	<p>Sustainability, Conservation & the Environment</p>
<p>38.</p>	<p>How Scary are Food Scares?</p>	<p>Food scares result in severe economic losses in areas of finance, consumption, production, and trade. The H1N1 outbreak yielded a \$200 million market revenue loss for the pork industry over a four-month span, while the 2003 BSE outbreak in the U.S. significantly reduced beef sales for nearly three months. The unpredictable behavior of livestock markets has made decision-making difficult for market participants. Unanticipated events, such as disease outbreaks, have only increased this volatile behavior, thus increasing risk. However, while policies and regulations have been strengthened for preventing recurrence of "known" disease outbreaks, the "new" diseases present an ongoing threat to society and the economy. A study by UGA agricultural and applied economists investigates live cattle and lean hog futures returns and their volatility following three North American BSE cases and one H1N1 flu event by allowing volatility spillover effects between these two livestock markets, as they are substitutes in demand and compete in the usage of feedstuffs. The findings show that food scares contribute to market uncertainty and sharp price fluctuations in livestock futures markets with decreasing returns and increasing</p>	<p>Sustainability, Conservation & the Environment</p>

		<p>volatility. For nearby contracts, the impact of the first BSE outbreak in the U.S. and the 2009 H1N1 flu on returns lasted even after 30 days. As for the volatility, the first BSE case in the U.S. had the strongest effect on nearby cattle variance; and the H1N1 flu had the largest impact on deferred lean hog variance. Volatility in the nearby hog futures market is found to lower the volatility in the live cattle market, indicating that uncertainty in one market stabilized fluctuations in a substitute commodity, consistent with traders anticipating higher demand in a substitute commodity during a serious food scare.</p>	
39.	<p>Impact of COVID-19 to Fresh Food Industry</p>	<p>As soon as the COVID-19 outbreak was declared a pandemic on March 11, 2020, it became imperative to UGA agricultural and applied economists that an economic forecast analysis was necessary for the fresh food industry. This economic forecast report will serve as an educational and professional guide for farmers, researchers and UGA Extension staff, lending agencies, policy makers and others in agriculture to facilitate decision making. It would further provide information on future farming, resource allocation and financial planning for all growers. The economists set out to investigate the impact to the specialty crop industry value and supply chain. Their studies were strictly based on economic theory and empirical evidence. The goal was to capture the actual impact to the agricultural production, producers and consumers in Georgia and the United States. These studies will be useful to growers in their daily decision-making process and for policy implementation by state legislators, stakeholders and congressional representatives, especially in making difficult decisions that would be helpful for the state, fresh food industry, GFVGA, and affected fruits and vegetable farmers. Growers and stakeholders should think of these analyses as an awareness and preparation tool for the post-COVID-19 period. This information will help growers decide whether to increase or reduce acreages or to take out a loan or not. Knowing that there will be a shortage which will eventually increase prices gives the farmer planning advantage.</p>	<p>Sustainability, Conservation & the Environment</p>
40.	<p>Resources for minority forest landowners</p>	<p>Georgia's forest resource creates a \$12.7 billion direct economic impact in the state (Economic Development Institute-GA Tech). There are millions of dollars available in cost-share programs funded by USDA to assist these private landowners in sustaining their natural resource operation. Several research studies have documented that minority and limited resource</p>	<p>Sustainability, Conservation & the Environment</p>

		<p>landowners are often not aware of federal and state opportunities to maintain and/or increase their land productivity.</p> <p>These minority forest landowners in most cases have not received any technical assistance and/or information that will assist them in their operation of maintaining and managing their forestlands to maximize their operation's income.</p> <p>To ensure that the needs of the limited resource and minority landowners are addressed, the FVSU Cooperative Extension Program through this project will collaborate with the University of Georgia Cooperative Extension Program, USDA Rural Development, USDA Forest Service, and the Georgia Forestry Commission, Georgia Heirs Property Law Center, and Georgia Apple Seed, Inc.</p> <p>The overall purpose of this program is to increase outreach, awareness and technical assistance to minority and limited resource forest landowners about land management and its value.</p> <p>Our goal is to increasing outreach, awareness and technical assistance to minority landowners in the areas of sustainable natural resource practices and effective estate planning. It is also to ensuring healthy forest ecosystems by providing trainings to landowners, land managers, and other natural resource professionals on sustainable forest management practices including effective estate planning.</p> <p>The project co-sponsored three (3) educational workshops in the following months: June 2020; August 2020; September 2020. The workshops included sessions on the following: Forest Economics/Understanding Taxes, USDA Cost-share Programs, and Estate Planning. These virtual workshops reached over 800 participants through the platforms of Zoom and Facebook Live.</p>	
<p>41.</p>	<p>Air Quality and Health Risks During the Pandemic</p>	<p>The global financial and commodity markets are facing economic distortions caused by the coronavirus (COVID-19) pandemic. Oil has been dramatically affected due to community lockdown regulations, shutdown of car factories, decline in energy use, and increase in unemployment. However, a decrease in oil consumption may lead to reductions in carbon-dioxide emissions. Air pollution is considered a negative contributor in the coronavirus situation by worsening the susceptibility of infection. A decline in emissions somehow may help prevent</p>	<p>Sustainability, Conservation and the Environment</p>

		<p>mortality temporarily, especially among more vulnerable individuals with underlying health conditions, such as heart and respiratory diseases. A UGA agricultural and applied economist worked with a University of Florida researcher to link the decline in oil consumption to improved air quality. They analyzed the relationship between air quality, pre-existing medical conditions, and vulnerability to COVID-19 infection. Summarizing their conclusions, they said in spite of all the negativity surrounding the pandemic, its environmental consequence of improved air quality is a highly positive note. Interestingly the global community has been trying to accomplish such a feat of attaining better air quality over many years of discussions, policymaking, and policing each other. Unexpectedly, it took a serious pandemic to realize such a feat. The study traces the interplay of reduced oil consumption with economic issues as well as environmental consequences under pandemic conditions. The more imperative issues now lie on the severity of a looming recession and the global economy’s resiliency in transcending the difficult challenges it may bring. Should that happen, will the economic cost burdens be outweighed by the realized environmental gains? Experts may be quick to assert that improved environmental conditions actually may be short-lived as expected resurgence of resumed economic activities may only quickly bring back pre-COVID air conditions. However, proponents of a cleaner world can always draw some inspiration from recent successes in air quality control, especially with the assurance that cleaner air is not necessarily a lofty goal. The challenge in the future lies in achieving such environmental benefit without the need to sacrifice the economic health of the global community.</p>	
<p>42.</p>	<p>Declining flows on Georgia Floodplain Rivers</p>	<p>River floodplains provide numerous ecosystem services to people, including maintaining water quality and enhancing valuable biodiversity. Flow rates in Georgia rivers are declining, and consequently flood pulses that connect the river channel with its floodplain are declining in frequency and magnitude. These flood pulses are crucially important ecological controls to both the river channel and the floodplain, and thus how these linked ecosystems’ function is changing. UGA entomologists are assessing how flood pulses of different magnitudes influence the ecology of Georgia floodplains, and their adjacent river channels, using measurements of water quality and assessment of macroinvertebrates known to be useful indicators of environmental health.</p>	<p>Sustainability, Conservation and the Environment</p>

		Knowledge about how flood pulses affect river and floodplain ecology will help people tasked with managing aquatic resources develop sound water management plans.	
43.	Empowering Biodiversity on Solar Farms	Solar farms are embedded in the agricultural landscape. In addition to electrical power, they can also be used as refuge habitats for pollinators and other beneficial insects. Wildflowers can provide floral provisioning for native pollinating insects. A project by UGA horticulturists focuses on finding the best performing plants, and formulating guidelines, including economics and management of the plant-technology enterprise, for cost-effective, long-term success. In collaboration with private solar companies and two federal agencies, UGA scientists established a research site at the 25-acre Carter solar farm facility in Plains, Georgia. They are testing wildflower species mixes under standard bed preparation methods and recommended maintenance regimes. They are analyzing inputs and measuring habitat establishment and success over several seasons. Species were selected for adaptability to southeastern growing conditions, bloom period, growth habit, annual and perennial life cycle, and high floral provisioning. Data from the year immediately following seeding showed high emergence of Indian blanketflower, black- and brown-eyed Susan and partridge pea. These species also showed great potential for establishing from seed and self-sustaining under the solar panels.	Sustainability, Conservation and the Environment
44.	Estimating Economic Losses from COVID for Poultry Industry	The COVID-19 pandemic had two impacts on the poultry industry. Illnesses forced some poultry processing plants to shut down or slow production, but this effect was much smaller than the impact from the shutdown of much of the food service sector. Disruption in the food service sector (shutdowns of restaurants, school lunch programs, and cafeterias) sharply reduced demand for some poultry products, while increased working from home and consumption of food prepared at home increased demand for other poultry products. This caused some plants to shut down or slow production because they had few or no customers for their (food service-oriented) products. A team of agricultural economists from seven land grant universities in the Southeast combined to estimate the losses to contract poultry growers from this situation. These estimates included losses from abandoned flocks, increased down time between flock placements, smaller flocks, and lower weight targets for completed birds. The estimates	Sustainability, Conservation and the Environment

		<p>suggested that losses for chicken and turkey contract growers were about \$175 million. The estimates were used by the poultry industry to request assistance from the federal government as part of emergency relief legislation or programs. Broiler growers who are not under contract with a processor were included in the Coronavirus Food Assistance Program 2 (CFAP2) program of federal assistance to farmers. While final payment data is not available yet, based on USDA updates, broiler growers have received about \$280 million in compensation from losses associated with the coronavirus. For contract growers to receive compensation, they will need to be included in a future relief bill.</p>	
45.	Cost-saving Lighting Strategies for Greenhouses	<p>The greenhouse industry provides locally-grown vegetables and ornamentals to consumers. For year-round production, it is often necessary to provide supplemental lighting during the winter months, when there is little sunlight. However, the electricity to provide this supplemental lighting is a major expense, up to 30 percent of total production cost. With small profit margins in this industry, the difference between profit and loss can depend on how well this supplemental lighting is managed. In collaboration with UGA engineers, UGA horticulturists have developed hardware and software that control greenhouse lights in a way that assures that the light is provided in the most efficient way possible. They estimated that this can reduce the overall cost of providing supplemental light by up to 40 percent. They are currently conducting trials in UGA greenhouses and a commercial greenhouse in Oglethorpe County to verify these electricity savings.</p>	Urban Agriculture
46.	Food Security	<p>The growth of global population is a great concern for the food security in the world. Traditional farming will not be able to grow enough food to feed the future world population anymore. Therefore, we need to adopt a new farming technology that can increase food crop production significantly.</p> <p>Hydroponics, indoor farming, aeroponics, urban agriculture, and aquaponics are quite promising. It can help to grow crops in cities, patios, rooftop, basement, small space, greenhouse, hoop house and so on.</p> <p>Goals are: (1) to establish a facility with hydroponic systems, (2) to evaluate various specialty</p>	Urban Agriculture

		<p>plants and crop for their growth and production capability in comparison with traditional agriculture, and (3) to train students, community members, farmers and families through workshop. Graduate and undergraduate students will be conducting research on evaluating crop yield in traditional farming vs hydroponics, aeroponics and aquaponics. They will study effects of macro/micro nutrient's on crops and also try to develop new hydroponics systems. We will arrange workshops to provide hands-on-training to K-12 students, teachers, farmers, and community members, to demonstrate hydroponics farming.</p> <p>Established three types of hydroponics systems inside the Specialty Plants Greenhouse (10000 sq. ft greenhouse) occupying around 500 sq. ft area. Three large NFTs (Nutrient Film Techniques) (having 10 ft channels, has capacity of 12 plants/channel and 25 channels in each unit= 300 plants/unit capacity and 900 plants in 3 large NFTs), three small NFTs (5 ft channels, has capacity of 6 plants/channel and 5 channels in each unit= 30 plants/unit capacity. Total 90 plants in 3 small NFTs), three deep water culture and 10 tower gardens (Aeroponics systems) (has approximately one sq. ft round block, total 11 blocks/unit, each block has capacity of 4 plants, total 44 plants/unit. Total 440 plants in Aeroponics system). Beside establishing this capacity, graduate, undergraduate students, community people have been trained in in this modern farming system and compared the pros and cons along with crop yield, and quality with traditional farming systems.</p> <p>Due to COVID-19 pandemic this program could not invite people for workshop in 2020 for training that we did in July 2019, when over 120 people showed up for the training workshop on hydroponics. This year our 10 research students continued their research activities on hydroponics and traditional farming maintaining the CDC guidelines and a few groups of farmers (4-5) visited our facility and got first-hand information on hydroponics systems.</p>	
<p>47.</p>	<p>Georgia Master Gardener Program</p>	<p>The Georgia Master Gardener Program, continuously active for 41 years under the direction of UGA Extension in more than 60 counties across the state, continues to train volunteers to assist agents in Extension educational program delivery. Master Gardener Extension Volunteers (MGEVs) augment the County Extension agents' efforts to help fulfill the mission of Extension of providing quality, relevant outreach and continuing education programs and services to local citizens. In 2019, 25 counties recruited and trained 324 new volunteers to assist Cooperative</p>	<p>Urban Agriculture</p>

		<p>Extension in educational delivery. More than 2,300 MGEVs returned 179,788 volunteer hours at a value of \$4,340,082 to the University of Georgia and their communities. This is roughly equivalent to 86 full-time staff. As a result of educational activities offered by MGEVs, Georgians are able to make environmentally sound gardening decisions. Because MGEVs work with Georgians to answer questions and solve problems, insects and diseases can be treated with appropriate controls, plant choices can be made to enhance landscapes and property values, individuals can grow their own fruits and vegetables, and youth gain exposure to the joy and wonder of gardening. As a result of MGEV efforts, agents are able to devote time to developing targeted educational programs that address local issues and needs. MGEVs ultimately help Extension achieve its mission of helping Georgians become healthier, more productive, financially independent and environmentally responsible.</p>	
<p>48.</p>	<p>Green Industry Trainings</p>	<p>Experts from the University of Georgia Cooperative Extension teach educational sessions at two major annual green industry trade shows. These sessions provide timely education to green industry and landscape management professionals in Georgia. Issues include pruning, pest management, landscape health, marketing, and landscape management. A survey instrument was developed as a collaboration of the Department of Agricultural and Applied Economics, UGA Extension, and the Georgia Center for Urban Agriculture. The surveys were distributed and collected at two major industry events: The Georgia Green Industry Association Wintergreen Horticulture Trade Show and Conference and the Georgia Urban Ag Council Landscape Pro University. A total of 564 surveys were collected, providing valuable data on the effectiveness of training, behavior change, and economic impacts of training. On average, participants at the Wintergreen Trade Show and Conference reported they would save or gain \$23.44 per client/customer as a result of implementing changes related to the information provided from the conference sessions. The total self-reported value of the information presented by UGA Extension was \$680,952. At the Landscape Pro University, 95 percent of the respondents reported they would definitely or probably use the information provided. On average, participants in attendance reported they would save or gain \$20.93 per client/customer as a result of implementing changes related to the information provided from the conference</p>	<p>Urban Agriculture</p>

		<p>sessions. The total self-reported value of the information presented by UGA Extension was \$157,154. The study informs future program planning and provides a better understanding of green industry training and impacts.</p>	
49.	Landscape Irrigation Trainings	<p>As the green industry and metropolitan areas grow, water resources are stretched. Educating the landscapers as they are dealing with water usage is critical. The Georgia Center for Urban Agriculture created an educational program targeting workers in the landscape and nursery industries and municipalities. The training focused on installation and maintenance of irrigation systems as well as landscape watering principles. The Georgia Water Stewardship Act and its implications for water use (including irrigations) were discussed at length. Four trainings were held, one in each of the four Extension Districts in cities across Georgia (Lawrenceville, Savannah, Valdosta and Augusta) to assure easy access by industry workers. Over 100 landscape, nursery and municipal workers were trained, with about 55 percent of trainees from private companies and 45 percent from municipalities. Most of the trainees (91 percent) considered the training on Urban Water Irrigation very useful and 83 percent said they learned something new at this training.</p>	Urban Agriculture
50.	Managing Thatch Accumulation on Golf Courses	<p>Thatch management represents a major expense and challenge for golf course managers, particularly on golf greens. Thatch is a layer of organic matter, including tightly intermingled dead and living leaves, stems, and roots that develop between the soil surface and the green vegetation. Currently, thatch accumulation on golf greens is managed using cultural practices that physically remove thatch and dilute thatch levels by topdressing with sand. Cultural practices such as core aeration, vertical mowing, and topdressing are labor and cost intensive and have disruptive effects on turfgrass surfaces and quality. Many of these industry standard practices involve shutting down the greens for treatment and recovery, making them unavailable to golfers and reducing green fee revenues during and following treatment. Research by UGA crop and soil scientists has verified that periodically spraying an enzyme solution on the surface of the greens can enhance the rate of degradation of organic matter and limit thatch</p>	Urban Agriculture

		<p>accumulation without impacting turf quality. This research indicates that this approach reduces the need for disruptive cultural management practices currently used on golf greens. If 25 percent of all golf courses adopted the enzymatic dethatching method and it eliminated two core aerations a year, this accrues to a direct market value of \$90 million in the U.S. and \$155 million worldwide. If the recovery of lost revenues associated with disrupted play due to core aeration is considered, the potential economic impact is over \$1 billion annually worldwide.</p>	
51.	<p>Mobile Farmers Market COVID-19 Response</p>	<p>The DeKalb County Fresh on DeK Mobile Farmers Market targets communities without access to grocery stores within a one-mile radius. Fresh on DeK also provides an opportunity to learn healthy eating habits and make better decisions about the food that DeKalb County citizens consume. Due to social distancing and food-handling guidelines during the pandemic, Fresh on Dek provided fresh produce at no cost to various strategic drive-through locations, including recreation centers, senior communities, public libraries, churches and Headstart centers. Residents received a range of pre-bagged produce including sweet potatoes, apples, oranges, corn, broccoli, plums and more. Fresh on DeK moved all in-person educational teachings to online food demonstrations and digital healthy-living handouts. Throughout the 16-week 2020 farmers market season, Fresh on DeK Mobile Farmers Market provided fresh produce to 4,319 residents. This equates to the distribution of about 51,000 pounds of fresh fruits and vegetables at nine community sites around DeKalb County. Fresh on DeK reached 10,181 residents with free produce, online educational opportunities and 16 digitally shared recipes. Fresh on DeK estimated around \$50,000 of money saved for families, based on average produce prices.</p>	<p>Urban Agriculture</p>
52.	<p>Turfgrass Diffusion of Innovation</p>	<p>Turfgrass breeding efforts at UGA are focused on the development of stress tolerant grasses that will be more sustainable than older varieties. Recent evaluations using rain-out and shade structures, non-irrigated plots, and reduced fertilizer input have been prioritized. Pesticide applications, including insecticides and fungicides, have been eliminated from routine maintenance programs to aid in the identification of varieties with natural resistances or tolerances. Currently, the program encompasses bermudagrass, centipedegrass and zoysiagrass breeding material from the seedling stage to advanced experimental hybrids that have persisted</p>	<p>Urban Agriculture</p>

		through rigorous testing for over a decade. Over 81 laboratories, greenhouse, and field evaluations are underway to maintain the pipeline that has provided leading turfgrass cultivars for over a half century. Collaboration with other institutions has been important during the past few years and has included work with Purdue University, the University of Tennessee, and the University of Arizona to test advanced turfgrasses for stresses not found in Tifton. In 2015, the turfgrass breeding programs at UGA were awarded a four-year \$4.4 million grant to evaluate hybrids UGA developed for persistence, survival, and recovery under limited irrigation and long-term drought in a partnership with the University of Florida, Texas A&M University, Oklahoma State University and North Carolina State University.	
53.	GAP/GHP	FVSU received the USDA Good Agriculture Practices/Good Handling Practices (GAP/GHP) certification for the following fruit crops: Blueberries, Grapes, and Persimmons. The thrust is to help as many farmers and gardeners as possible to prepare to receive the GAP certificate in an effort to produce a more healthy food product for human consumption. ANR County Agents have been trained to carry out the GAP initiative.	Urban Agriculture
54.	Food to Family Boxes	FVSU participated in four rounds of the USDA Food to Family Boxes program in cooperation with nonprofit and community-based agencies. The program served 26 counties in Georgia.	Urban Agriculture
55.	FVSU 4-H Program	The Fort Valley State University (FVSU) Cooperative Extension 4-H program serves as a critical resource of learning in the local rural central Georgia area, and other underserved communities throughout the state. Annually, according to a 2019 NIFA/USDA report, the USDA produces over 50,000 employment opportunities for people who graduate from college with a degree in agriculture. However, the US only has an average of 36,000 people who graduate annually from college with a degree in agriculture. In an effort to close the agriculture degree deficit gap, the Fort Valley State University Cooperative Extension 4-H program engages youth participants in the process of becoming prepared to meet the Agriculture/STEM challenges of the 21st century. The purpose of the 4-H Science Program is to increase the amount of youth that pursue agriculture/STEM degrees and careers. All learners need and deserve 21st century learning opportunities to thrive as tomorrow's leaders, workers, and citizens. 21st century skills are what students need to succeed in today's globally and digitally interconnected world. A profound gap exists between the knowledge and skills most students learn in school and the knowledge and	Youth & Family Development

		<p>skills they need for success in their communities and workplaces. In an effort to close this gap, the FVSU 4-H program utilizes NIFA/USDA Positive Youth Development Best Practices. Positive youth development involves and engages every element of the community, schools, homes, community members, and others. Young people are valued through this process. Positive youth development is an investment that the community makes in young people. Youth and adults work together to frame the solutions through dissemination of 4-H citizenship/leadership, mentoring and healthy living education. In an effort to stem the national health issues of the 21st century, the Fort Valley State University Cooperative Extension 4-H healthy living program works to ensure that our Georgia’s youth and their families learn how to make healthy decisions related to the personal behaviors in which they engage.</p> <p>The Fort Valley State University Cooperative Extension 4-H Program provides positive youth development and experiential learning opportunities for youth between the ages of 9-19 in the areas of civic engagement/leadership, agriculture, entrepreneurship, college and career readiness, employability, and healthy living, mentoring, life on the farm, and 4-H STEM (science, technology, engineering, and mathematics). With the support of collaborative Georgia county partners, 4-H staff, Life on the Farm program, and 4-H volunteers, Fort Valley State University’s Cooperative Extension 4-H Program worked with a total of 10,866 youth participants during our last federal reporting cycle utilizing NIFA/USDA Positive Youth Development Best Practices.</p> <p>The Fort Valley State University (FVSU) 4-H SERVE Nutrition Education Healthy Living Program reached over 3,000 rural underserved and underrepresented youth and families in Worth, Muscogee, and Twiggs Counties in Georgia. Worth County school System through the FVSU 4-H Village Community Garden Program, George Washington Carver High School students, and Alice Blount Science Academy students also benefit for 4-H STEM education, entrepreneurship education, civic/engagement leadership opportunities, novice agriculture education, and college and career readiness experiential learning opportunities. Over 6,000 youth benefited from the Life on the Farm Cooperative Extension Outreach education learning opportunities. The targeted rural 4th through 12th grades youth populations are: underserved, special needs audiences, housing authority youth and families, 3 counties (Worth, Peach, and Twiggs) school systems youth and families.</p>	
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<p>56.</p>	<p>Georgia 4-H Environmental Education Program</p>	<p>The Georgia 4-H Environmental Education Program provides students with an opportunity to participate in hands-on learning activities in the natural settings of the 4-H facilities located from the mountains to the sea. Since 1979, well trained, professional Environmental Education staff have connected students to nature through our vast natural classrooms without walls. With a variety of lessons, the staff delivers a research-based curriculum that correlates with the Georgia Department of Education standards and utilizes Georgia’s unique and varied ecosystems to teach science and ecology, living history, and more. Georgia 4-H Environmental Education programs are offered at Rock Eagle 4-H Center in Eatonton, Wahsega 4-H Center in Dahlonega, Fortson 4-H Center in Hampton, Burton 4-H Center on Tybee Island, and Camp Jekyll and 4-H Tideland Nature Center on Jekyll Island.</p> <p>Since its inception, Georgia 4-H Environmental Education programs have reached over 1.1 million participants. Typically, during the academic year, youth gather at all five centers with their peers to bring learning to life by exploring science in the context of the environment.</p> <p>Extension programming during the COVID-19 pandemic provides the opportunity for innovative and non-traditional delivery methods. As a response, the Georgia 4-H Environmental Education program created a virtual series, From the Mountains to the Sea. This series highlighted one of the five Georgia 4-H centers each day of the week, and streamed live or recorded videos on Georgia 4-H's social media platforms (archived lessons were closed captioned and available on YouTube).</p>	<p>Youth & Family Development</p>

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		<p>These live lessons covered a range of topics such as herpetology, entomology, and beach or stream ecology. From March to May, From the Mountains to the Sea provided 50 virtual sessions, reaching more than 186,700 people. After launching the program, one teacher stated, "We spent the last couple of weeks of sixth grade remote learning...your videos were great starters for the students who then went outside to do their own tree walks, pond explorations, bug hunts, sunset watches...thanks so much for making these available". This program was so successful, it was reintroduced in the winter months.</p>	
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