

## FY 2020 Annual Report of Accomplishments and Results

Ohio

Central State University 1809 Land-Grant Extension and Research

### 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)

In the State of Ohio during the month of March 2020, a series of Director's Orders from Dr. Amy Acton in the Department of Health and with the support of the Governor, Mike DeWine, pursuant to the authority granted in the Ohio Revise Code 3701.13 to "make special orders ... for the preventing the spread of contagious or infectious diseases" ordered that mass gatherings are prohibited to prevent the spread of COVID-19 throughout the state of Ohio. These orders were the guiding factors that prompted state agencies, including Central State University, to prohibit non-essential travel and in-person meeting or sessions to take place. These guidelines have greatly impacted the scope of the work that was planned to be accomplished during the FY 2020 since the majority of them included a modality that was prohibited by the Health Department. For example, the Hemp Trade Show, a statewide tradeshow for hemp growers to connect with processors and suppliers was cancelled. Also, the Seed to Bloom Botanical and Community Garden had to cancel the community garden's project for community members to have a plot in the garden area. Due to these and a plethora of other activities being forced to cancel, CSU Extension began to revise their programs' offerings to include virtual/distant activities. Ultimately, most of the "Accomplishments and Results" that are included in this annual report either occurred prior to the pandemic or modified to be virtual/distant.

On the positive side of the influences of the pandemic, our Extension updates also included:

- Increased engagements with community partners, state and federal agencies, and co-programming with Ohio State University Extension.
- CSUE staff, Regional Extension Associates, and fellow Educators across the four program areas of Family Consumer Sciences, Agriculture and Natural Resources, 4-H, and Community and Economic Development started working in tandem with each other, sharing information and planning a cohesive POW.
- Virtual platforms (Microsoft Teams, Zoom) are imperative to conduct meetings, programming, conferences, and all interfacing with the general public.

Beyond the impact of COVID-19, these additional items occurred in the FY 2020:

- The increase of new hires across CSUE made it essential to create and adhere to staff roles and assignments.
- Continue to include educational programs that will strengthen the capacity of communities, while developing their skills in the area personal and professional advancement, business development programs, business assistance tools, and workplace (career) development.
- Increased marketing and social media presence to showcase CSUE information, programs, features, and announcements.
- Expanded entrepreneurial opportunities for small businesses and agri-businesses development through effective training modules and subject matters experts who can provide first-hand experience and assistance.

## II. 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
1. The <u>Merit Review Process</u>	No changes.
2. The <u>Scientific Peer Review Process</u>	No changes.

### III. 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>These are the additional items that occurred beyond the previously stated “Actions to Seek” in the FY 2020 Institutional Profile POW:</p> <ul style="list-style-type: none"> <li>• Reviewed available fact sheets regarding CED subject matters.</li> <li>• Utilized effective communication channels with community partners, municipalities, state and government entities, community action groups, surveys &amp; questionnaires, local community centers and churches, news outlets, and community newspapers.</li> <li>• Created virtual information sharing tools with community partners to be kept abreast of new and continued issues that either benefitted or hindered communities that we served.</li> <li>• Established weekly discussions with fellow Program Leaders to understand what programs they were involved with and where potential partnership opportunities existed.</li> <li>• Created communication channels with CSU researchers on any developments that were germane to community and economic development.</li> <li>• E-mails to teachers, Phone calls to teachers and day care centers, answering requests, Conducted Teacher In-Services. Responded to requests via e-mail phone calls, and in-person.</li> </ul>
<p>2. Methods to identify individuals and groups and brief explanation.</p>	<p>These are the additional items that occurred beyond the previously stated “Methods to Identify” in the FY 2020 Institutional Profile POW:</p> <ul style="list-style-type: none"> <li>• Within the area of Community and Economic Development, there is only one Extension Educator within Cuyahoga County. There is a future date for 4 Extension Educators to be hired in October/2020 for the regions of NE, NW, and SE.</li> <li>• National 4-H goals include reaching out to vulnerable audiences – We reached out to Youth in Foster Care, We also responded to requests to assist with the Greene County (Juvenile Court) Youth Intervention Center activities.</li> </ul>
<p>3. Methods for collecting stakeholder input and brief explanation.</p>	<p>These are the additional items that occurred beyond the previously stated “Methods to Collect” in the FY 2020 Institutional Profile POW:</p> <ul style="list-style-type: none"> <li>• Verbal requests, Listening Sessions with Greene County Children Services Youth in Foster Care Director, listening sessions with teachers, teacher in-services, Local News and the 2019-2020 4-H STEM in the Classroom Enrollment Summary Form (These form includes a listing of program options and an area to indicate “Other Needs” as well).</li> </ul>
<p>4. A Statement of how the input will be considered and brief explanation of what you learned from your stakeholders.</p>	<p>No changes.</p>

#### IV. Critical Issues Table of Contents

No.	Critical Issues in order of appearance in Table V. Activities and Accomplishments
1.	Plant Systems
2.	Animal Systems
3.	Food Nutrition and Health Systems
4.	Natural Resources and Environmental Systems
5.	Engaging Communities and Transforming Lives
<b>Updated 11/26/2019</b>	
6.	Health and Wellness
7.	Economic Vitality
8.	Food Security and Production
9.	Environmental Quality and Sustainability
10.	Thriving Across the Lifespan
<b>Updated 5/21/2020</b>	
11.	Supporting Small & Medium-sized Farms
12.	Building New Farmers, Supporting Limited-resource & Urban Farms
13.	Promoting Food Nutrition & Health for Socially-disadvantaged Communities
14.	Preparing our Youth for the Future
<b>Updated 6/1/2020</b>	
15.	Advanced Technologies & Commercialization Systems

#### 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.

#	Project or Program Title	Outcome/Impact Statement	Critical Issue Name or #
1.	<b>Enhancement Of Farm Productivity; Conservation And Sustainable Utilization Of Natural Products</b>	<p>Growing a diverse selection of crops can expand the small farmer’s markets and offset commodity price swings. Profits will not depend exclusively on any one market example, such as corn or soybeans. Therefore, strategic diversification improves the overall economic picture of the small farmer. However, help is needed to determine which alternative crop would be the best. The project aims to identify and test novel native and exotic plants which have non-conventional uses like medicinal plants, anti-bacterial and anti-allergic properties. Apiary could be a multi-pronged benefit to the small farmer and aid the diversification. It not only produces honey wax and propolis but also enhances pollination and increases fruit tree production. Small animals for fiber production could also add to the diversification, such as the fiber-yielding English Angora rabbit. The Ohio climate is ideal for Angora rabbits and the ease with which it is grown makes it an ideal product for diversification on an animal farm. In order to make the small farmer sustainable, it is essential to conserve natural prairies and wetlands in the area. Ninety percent (90%) of the native prairies and wetlands are lost to land-use pattern changes in Ohio; therefore, what remains has to be carefully conserved and managed in order to play a role in the environment. Natural wetlands, apart from cleaning up the water and providing a stock of underground water, also harbor rare plants and animals that aid in the sustainability of the farmer.</p> <p>This project proposes to develop methods to measure the biological integrity of the wetlands through long-term monitoring. It is envisaged to expand the research capability of CSU in order to 1) develop novel plant-based products and suggest alternative crops for small farmers. 2) Identify varieties of rabbits for fiber and 3) develop winter-hardy, mite-resistant honey bees. It is the small farmer, federal and state agencies, that manage prairies and wetlands that will most benefit from this research project.</p> <p><u>Background and Major Goals of the Project</u></p> <p>The major goal of this project is to enhance the productivity of the Ohio farmer, especially small holding farmers while encouraging sustainability. The way to achieve this goal is to diversify the small farmer by turning alternative crops like native and exotic plants into crops that have natural product value and to increase the small farmer’s sustainability by conservation of local wetlands and enhancing pollinators. Presently, there is an increased interest among people nationwide to use alternative medicine and integrated health systems (REF). The NCCIH, a NIH institution, lists over 50 plants that can be utilized as medicinal herbs. Many of the plants are already taken for pharmaceutical production. Thus, exploring the potential of the native plants that can be used for medicinal purposes would be beneficial to the local farmers as the demand for these plants and animal products increases. One of the goals in this proposal is to prospect for novel native and exotic medicinal plants and animal products as alternative crops for the small Ohio farmer. For example, the former tobacco farmers in Kentucky are now cashing in on sweet potatoes, grossing up to \$7,000 per acre, which are the results of new research and outreach from the University of Kentucky Extension. St. John's Wort, Turmeric, and Centella Asiatica are plant species that will be tested at CSU. Other plants suggested by Sustainable Agriculture Research and Education (SARE) will be tested too.</p> <p>It is well known that natural pollinators increase crop tree productivity by way of enhanced pollination. Due to land use pattern changes, Ohio lost most of its natural prairies and wetlands to corn, soya cultivation, or wooded areas, resulting in the local extinction of many of the natural pollinators. The goal of this project is to enhance natural prairies and wetlands to increase native plants and pollinator populations and to establish healthy beehives to enhance pollinators. The cultivated beehives would</p>	1

		<p>supplement the suitability of small farmers and also increase farm yield. Small animal farming is a well-known alternative farm produce in Ohio, and it is a perfect model for diversifying the small farmer to introduce novel species or enhance existing species. This proposal suggests using English Angora rabbits, Silver Fox varieties. The 6a agriculture zone suit fits Angora farming, which is known to yield good fiber (yarn).</p> <p>The overarching goal for this research is to diversify the small farmer, conserve the local prairie and wetlands, and develop better socio-economic sustainable communities. The <u>Central State University Land Grant Center (CSULGC)</u> serves as an umbrella for the overall land grant program. Through the Land Grant Program, CSU will establish a valuable niche research area in alternative and specialty crops by developing both food and non-food that are economically viable options for these crops.</p> <p>Research focus areas will include:</p> <ul style="list-style-type: none"> <li>• Selecting plants from native and available exotic plants to develop alternative products (prospecting), medicinal or commercial.</li> <li>• Enhancing knowledge about the active ingredients of the plant products,</li> <li>• Conserving local prairies and wetlands, and</li> <li>• Diversifying small farms with alternative crops or animal farming.</li> </ul> <p>The project aims to serve anyone currently involved or those identifying novel opportunities in the production, development, processing, marketing, and delivery of natural products and specialty products that would be of interest to:</p> <ol style="list-style-type: none"> <li>1. Consumers looking for alternative food and medicine choices that can help control disease and physiological wellbeing like blood sugar regulation. Parties interested in a number of other health benefits resulting from a growing body of research in digestive health and overall physical and mental wellness reinforced by plant-based consumption</li> <li>2. Commercial and prospective producers of hemp for grain and fiber and SMEs considering the more labor-intensive production of metabolite hemp as well as the cannabis industry for industrial and therapeutic uses.</li> <li>3. Beekeepers, bee farmers, honey products, pollination service industry, producers of crops pollinated by insects.</li> <li>4. End-users are interested in developing novel materials including composite material of biopolymers to meet the need for biodegradable packaging material currently being promoted and mandated in many parts of the world.</li> </ol> <p>Specifically, this project aims to support rural and urban communities with options for commodity crops that are currently in demand and limited in supply. In Ohio this could be particularly of interest to those currently involved in small-scale agriculture where the production of traditional commodities have either consolidated (dairy), use has diminished (tobacco), or are projected to diminish as demand changes (corn/soy).</p>	
<p><b>2.</b></p>	<p><b>Enhanced Crop Production Efficiency through Mechanized</b></p>	<p>Agriculture producers have long sought cost-effective, labor-friendly methods to maximize crop yield by controlling weeds and pests sustainably as part of an integrated pest management strategy. This is especially true for specialty crop and organic producers. Current research into pest management strategies and precision agriculture at Central State University includes smart vision machines to kill weeds using directed energy - a non-chemical, high-energy method of eradication. This research will develop and evaluate precision agriculture, sensors, and smart vision, robotics, and automation technologies. Central State University intends to extend current research from a Capacity Building Grant into a mechatronics, integrated pest management research program. New, non-chemical methods for controlling weeds, such as directed energy, will be evaluated and tested for</p>	<p>1, 4</p>

<p><b>Integrated Pest Management Strategies</b></p>	<p>use in agricultural and conservation settings. Directed energy mimics the power of the sun with artificial light (40-80 times sun power) to kill weeds. Research into pest management machinery and weed identification software will continue to be integrated with a smart vision to allow machines to distinguish weeds from crop plants to improve the efficiency of mechanized weed control. Alternate uses for this technology will be evaluated for controlling tree crop diseases of the bark including bacterial, insect, and viral infections.</p> <p><u>Background and Major Goals of the Project</u></p> <p>The overarching goals for this research are 1) Improving Agriculture, Plants, and Economics, and 2) Developing Better Social Economic Sustainable Communities. Agricultural producers have long sought cost-effective, labor-friendly methods to maximize crop yields by controlling weeds and pests sustainably. This is especially true for specialty and organic crop producers. The proposed research will develop and evaluate possible enhancements to precision agriculture involving sensors and smart vision, as well as robotics and automation technologies to increase the efficiency of current pest management strategies. These technologies are being tested at Central State University (CSU) and relevant information will be extended into a mechatronics, integrated pest management research program. New, non-chemical methods for controlling weeds, such as directed energy, will be evaluated and tested for use in agricultural and conservation settings. Directed energy mimics the power of the sun with artificial light (40-80 times sun power) to kill weeds. As an outgrowth of a capacity-building grant, research into pest management machinery and weed identification software will continue to be integrated with a smart vision to allow machines to distinguish weeds from crop plants to improve the efficiency of mechanized weed control. Alternate uses for this technology will be evaluated for controlling tree bark diseases including bacterial, insect, and viral infections.</p> <p><u>Research Objectives:</u></p> <ol style="list-style-type: none"> <li>1. Develop novel, field-ready, scalable, integrated pest management strategies for agriculture, forestry, and other land management needs.</li> <li>2. Expand field testing and the range of plants/applications for current directed-energy, mechanized weed control systems already being tested at CSU.</li> <li>3. Demonstrate the economic benefit of these non-chemical alternatives versus traditional chemical weed control.</li> <li>4. Develop, test, and apply business models that take advantage of these benefits to small/specialty farms (existing and new farmers, producers).</li> <li>5. Adapt the underlying technology platform to new applications, informed by outcomes and potential new uses identified from CSU's existing (capacity building) research.</li> </ol> <p><u>Accomplishments &amp; Results</u></p> <p><b>Research Goal 1:</b> Develop novel, field-ready, scalable, integrated pest management strategies for agriculture, forestry, and other land management needs.</p> <p>The team is developing an automated organic weed control system using directed energy and deep learning. The directed energy device is called the distributed array (DA), which is developed by a local small company, Global Neighbor Inc. We also use transfer learning to fine-tune a number of pre-trained neural networks and develop customized neural networks to distinguish various weeds from crops. The system is implemented using two languages: MATLAB and Python (with Tensorflow library) and is tested on three platforms: PC, Android Device and Raspberry PI.</p> <p>In order to train deep learning recognition of crop plants (versus weeds) for automated systems, three databases of sweet corn, soybean, and hemp were developed. The soybean database was started in 2017 and in 2019-2020, 33,000 new soybean images</p>
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	<p>were added and this database was manually cleaned by deleting redundant images. The cleaned database was downsized to approximately 50,000 images and the original database has been archived. For the hemp database, an additional 14,000 images were added.</p> <p>The Central State University-made robot designated AGI1 had a flat tire during field operation. During repairs, a number of software and hardware upgrades are made to AGI1 to improve its functionality. The software was upgraded by optimizing functionality by 1) adding an auto-resizing feature to the GUI interface 2) identifying and fixing alignment issues with video capture program GUI; 3) fixing 'broken' buttons in the software to switch between cameras in preview mode, and 4) imaging sync functionality to AGI1. The robot was rebuilt including a circuitry rewire, sensor recalibration, controller reprogramming, and upgrading, tire replacement, and battery cage patching. Industry partner, Global Neighbor, Inc. developed a new LED-directed energy light system based on predominantly blue and infrared wavelengths rather than broad-spectrum light wavelengths. The energy consumption is reduced by 70% and the operational temperature of the new LED light is much lower. The light is small and can be armed with tempered glass, which means improved safety and toughness. However, the empirical lethality seems to be lower. The new recipe works better on seedlings than on grown plants.</p> <p>A new object-detection-based study of weed identification was initialized. In this approach, we trained YOLO (you only look once) to detect one or more custom objects in the scene using Google's free online GPU resource. This study can lead to a more precise weed localization when they are sparsely distributed in the field.</p> <p><b>Research Goal 2:</b> Expand field testing and the range of plants/applications for current directed-energy, mechanized weed control systems already being tested at CSU.</p> <p>The Central State University greenhouse control room was rewired and software was upgraded so to make the software/server control suite operational to monitor and control climate controls in each grow room. The temperature-controlled growth chamber also was fixed so that it may be used for future research.</p> <p>In 2019 on the Central State Experimental Farm, directed energy was shown to stimulate soybean growth in the field. In 2020 on a farm in Wellington, Ohio, this experiment was repeated. Field-grown soybeans were designated to a random plot design were treated with directed energy for 2, 5, and 10-sec duration under both wet and dry field conditions; and at the VC/V1 stage versus the V2/V3 stage. Growth was both stimulated and plants reached more advanced growth stages faster compared to control when plants at the V2/V3 stage were treated for 10 sec with directed energy in dry soil.</p> <p>Directed energy also was evaluated for weed seed control at harvest. Chaff was collected during harvest from a waterhemp infested field in Lac qui Parle County, MN. Chaff was treated with 4 W/cm<sup>2</sup> of directed energy from a metal halide light source (340-2000 nm) for 15 or 30 sec using either quartz (transmitting UVA/UVB) or borosilicate glass (blocking UVA/UVB) plate. After treatment, seeds were separated from the chaff and germinated at 90 degrees F in the dark with 100 seeds per dish, 3 dishes per treatment, and control for a total of 1500 seeds. Control germination rates averaged 35%. There was no difference in germination rates (<math>p &lt; 0.05</math>) among treatments up to 15 days. The total number of seeds germinated ranged from 26% (glass, 15 sec) down to 4% (glass, 30 sec). Seeds from each treatment and control were planted in seed mix in pots with 50 seeds per pot, 4 pots per treatment. No seeds germinated from the glass treatment at 30 sec, while other treatments germinated similarly to the petri dish experiments. Directed energy from high-intensity discharge lamps with a broad light spectrum does work to kill waterhemp seeds in chaff and prevents viable seeds from entering the seed bank. Experiments are underway to test this directed energy treatment on other non-shattering broadleaf weed seeds collected after harvest from agricultural fields in Greene County, Ohio including marestail, evening primrose, burdock, and poison hemlock.</p>	
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		<p><b>Research Goal 5:</b> Adapt the underlying technology platform to new applications, informed by outcomes and potential new uses identified from CSU's existing (capacity building) research.</p> <p>We are expanding the potential use of directed energy as an organic integrated pest management strategy in residential areas to agricultural fields and natural areas. Directed energy, broad-spectrum light that includes UVA/UVB and IR have been shown effective against recently germinated broad-leaf and grass weeds. It also has been shown effective to kill weed seeds from non-shattering weeds such as waterhemp in chaff post-harvest. On an entirely new possibility, directed energy with increased IR has been shown to increase the growth and potentially the yield of field-grown soybeans. Delivery systems are being developed to better field test these new applications.</p> <p><b>Target Audience</b></p> <p>The target audience included the public, engineers, scientists, college professors, graduate students, and undergraduate students. The following information was shared:</p> <ul style="list-style-type: none"> <li>• Database collection and plant classifiers at the virtual annual conference American Society for Engineering Education (ASEE).</li> <li>• The significance of directed energy killing weed seeds in corn and wheat chaff was shared at the in-person annual conference of the Weed Science Society of America.</li> <li>• Video produced by Ohio Country and aired on cable TV on non-chemical means of killing weeds and the importance of cover crops in integrated pest management strategies - <a href="https://www.youtube.com/watch?v=BAE6XdB1rWw">https://www.youtube.com/watch?v=BAE6XdB1rWw</a></li> <li>• Graduate students at the University of Cincinnati and University of Dayton who participated in the design of automated field prototypes to deliver directed energy to kill weeds.</li> <li>• Undergraduate students who participated in processing pictures for databases; and in the design of experiments and testing of directed energy in killing weeds, weed seeds and enhancing growth and yield in soybeans.</li> </ul>											
<p><b>3.</b></p>	<p><b>Hemp Field Day</b></p>	<p>Field day for hemp growers to see and discuss research plots at Central State University.</p> <ol style="list-style-type: none"> <li>1) the issue and its significance (e.g. who cares and why); Hemp is a new crop in Ohio and growers are not familiar with the attributes of various varieties to make a decision on the type that would perform on their farm.</li> <li>2) a brief description of key activities undertaken to achieve the goals and objectives; Field day that showcased the research plots for fiber, grain and CBD hemp.</li> <li>3) changes in knowledge, behavior, or condition resulting from the project or program's activities; Hemp growers learned about varietal differences in hemp crops</li> <li>4) who benefited and how - Hemp crops.</li> </ol> <table border="1" data-bbox="373 1242 1171 1425"> <tr> <td>Total Number of Participants:</td> <td>14</td> </tr> <tr> <td>% of African Am.</td> <td>50</td> </tr> <tr> <td>% of Hispanic</td> <td></td> </tr> <tr> <td>% of Caucasian</td> <td>40</td> </tr> <tr> <td>% of Female</td> <td>60</td> </tr> </table>	Total Number of Participants:	14	% of African Am.	50	% of Hispanic		% of Caucasian	40	% of Female	60	<p>1</p>
Total Number of Participants:	14												
% of African Am.	50												
% of Hispanic													
% of Caucasian	40												
% of Female	60												
<p><b>4.</b></p>	<p><b>Name that Bug</b></p>	<p>Opportunity for community members to bring bugs for identification and management/control ideas.</p> <ol style="list-style-type: none"> <li>1) the issue and its significance (e.g. who cares and why); Opportunity to engage with a new community</li> </ol>	<p>1</p>										

2020 Annual Report of Accomplishments and Results (AREERA)

		<p>2) a brief description of key activities undertaken to achieve the goals and objectives; Provided a way for people to have insects in their house identified and provide no chemical alternatives for control</p> <p>3) changes in knowledge, behavior, or condition resulting from the project or program’s activities; Awareness of Central State Extension expertise regarding insect identification and management/control options</p> <p>4) who benefited and how. Trotwood residents</p> <hr/> <p>Total Number of Participants: 2</p> <p>% of African Am. 50</p> <p>% of Hispanic _____</p> <p>% of Caucasian 50</p> <p>% of Female 50</p>	
5.	<b>Raising Vegetables Series</b>	<p>Provide training to Trotwood residents on planning and growing a vegetable garden. Held Starting Seeds Indoors Session. All other session were cancelled due to COVID including Planning a Vegetable Garden, Lasagna Gardening, and Pest Management.</p> <p>1) the issue and its significance (e.g. who cares and why); Central State Extension had a new facility in Trotwood and the programming was providing outreach to the community and to provide training for residents interested in starting a vegetable garden</p> <p>2) a brief description of key activities undertaken to achieve the goals and objectives; Series of programming focusing on vegetable gardening. Only one session was held as COVID stopped the in-person classes. Further presentations were recorded and posted on You Tube.</p> <p>3) changes in knowledge, behavior, or condition resulting from the project or program’s activities; Increased knowledge on starting seeds indoors for a vegetable garden.</p> <p>4) who benefited and how. Trotwood residents interested in starting a vegetable garden.</p> <hr/> <p>Total Number of Participants: 13</p> <p>% of African Am. 100</p> <p>% of Hispanic _____</p> <p>% of Caucasian _____</p> <p>% of Female 92</p>	1, 5
6.	<b>Champaign County Farmer Workshop</b>	<p>Meeting sponsored by Champaign County Farm Bureau about new innovations in farming. Invited presenter to provide talk about opportunities and regulation regarding hemp production for central Ohio growers.</p> <p>1) the issue and its significance (e.g. who cares and why); Farmers were interested in learning more about growing hemp including the state regulations.</p> <p>2) a brief description of key activities undertaken to achieve the goals and objectives; Part of a panel of speakers talking about new opportunities and technologies in agriculture</p> <p>3) changes in knowledge, behavior, or condition resulting from the project or program’s activities; Raised awareness of CSU Extension and communicated risks associated with hemp with uncertain markets.</p> <p>4) who benefited and how. Farmers in central Ohio interested in new opportunities and technologies.</p> <hr/> <p>Total Number of Participants: 25</p>	1, 7

<p>7.</p>	<p><b>Expanded Food and Nutrition Education-Adult</b></p>	<p>The Expanded Food and Nutrition Education Program (EFNEP) is a community-based, relationship-driven, hands-on educational approach. EFNEP directly impacts economic, obesity, and food insecurity challenges that hinder the nutritional health and well-being of Ohio’s most vulnerable families. The program targets limited resource families with children. Central State University Extension’s (CSUE) EFNEP is located in two counties, Montgomery and Cuyahoga counties. The program uses an evidence based curriculum, Eating Smart –Being active. It is a 9 week series that addresses improving diet quality, food safety, resource management, physical activity, food preparation and food insecurity. The lesson titles:</p> <ul style="list-style-type: none"> <li>• Welcome to Eating Smart • Being Active (overview of lesson series; relationship building between educator and participants)</li> <li>• Get Moving! (physical activity is part of a healthy lifestyle)</li> <li>• Plan, Shop, \$ave (how to stretch your food dollars)</li> <li>• Fruits &amp; Veggies: Half Your Plate (how to increase amount and variety of fruits and vegetables)</li> <li>• Make Half Your Grains Whole (identify whole grain foods and why whole grains are beneficial)</li> <li>• Build Strong Bones (calcium rich foods and weight bearing activity help build strong bones)</li> <li>• Go Lean with Protein (choosing lean sources of protein and how to keep food safe)</li> <li>• Make a Change (choosing foods low in fat, sugar, and salt)</li> <li>• Celebrate! Eat Smart and Be Active (review of key concepts, celebrate what we’ve learned and how to involve family in good food choices)</li> </ul> <p>Participants receive a small incentive and learn to prepare a healthful recipe that corresponds to the lesson being taught. Upon completion of the series participants receive a certificate and a small appliance curtesy of a grant from Buckeye Health. EFNEP has a rigorous evaluation process with pre and post surveys and 24 hr recalls for all enrolled participants. 82% of the participants improved in one or more diet quality indicators, 55% improved in one or more physical activity behaviors, 64% improved in one or more food safety practices, 32% showed improvement in food security indicators and 82% improved in one or more food resource management practices. 60 participants were enrolled and 22 completed the entire series of classes. In FY2020 program started face to face by mid-March 2020, the state was shut down due to the COVID-19 pandemic. The EFNEP team quickly jumped in to action producing 6 video’s each a shortened version of a regular class to assist those participants currently enrolled in course completion. The pandemic forced us to cancel 13 adult programs scheduled for the spring of 2020. However, by summer the staff began conducting virtual programs and health fairs reaching an additional 208 adults. In addition a series of virtual recipe demonstrations were created using YouTube:</p> <ol style="list-style-type: none"> <li>1. Central State University Extension Presents-Physical Activity - 5 views <a href="https://www.youtube.com/watch?v=99prQsV6_mY">https://www.youtube.com/watch?v=99prQsV6_mY</a></li> <li>2. CSU Plan, Shop &amp; Save Fruits &amp; Vegetables 0420 mp4 - 15 views <a href="https://www.youtube.com/channel/UCXyd9dkKhwrA6UoAM3-lvbg/videos">https://www.youtube.com/channel/UCXyd9dkKhwrA6UoAM3-lvbg/videos</a></li> <li>3. Basic Vinaigrettes - 282 views (Coit Market and CSU Facebook page) <a href="https://www.youtube.com/watch?v=eTul_2MmBKc">https://www.youtube.com/watch?v=eTul_2MmBKc</a></li> <li>4. Veggie Lasagna + Beef Potatoes - 123 views (Coit Market and CSU Facebook page) <a href="https://www.youtube.com/watch?v=Ea3BbeotYuU">https://www.youtube.com/watch?v=Ea3BbeotYuU</a></li> <li>5. Knife Skills - 120 views (Coit Market and CSU Facebook page) <a href="https://www.youtube.com/watch?v=uopyED_w3cY">https://www.youtube.com/watch?v=uopyED_w3cY</a></li> <li>6. Pasta Salads – 171 views (Coit Market and CSU Facebook page) <a href="https://www.youtube.com/watch?v=sIPwHrX6Uu8">https://www.youtube.com/watch?v=sIPwHrX6Uu8</a></li> <li>7. Easy Marinara Sauce – 102 views Coit Market and CSU Facebook page) (<a href="https://www.youtube.com/watch?v=6dljefGPbrk">https://www.youtube.com/watch?v=6dljefGPbrk</a>)</li> <li>8. Grain Bowls –107 views ( Coit Market and CSU Facebook page) <a href="https://www.youtube.com/watch?v=RWB0ZzQYdUY">https://www.youtube.com/watch?v=RWB0ZzQYdUY</a></li> </ol>	<p>3, 8, 10, 13</p>
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		% of African Am. <u>77%</u> % of Hispanic <u>                    </u> % of Caucasian <u>13%</u> % of Female <u>85%</u>	% 20s & 30s <u>55%</u> % 40s & 50s <u>8%</u> %60s+ <u>35%</u>			
8.	<b>Approaches for Wellness Enhancement through Integrated Research on Food, Nutrition, and Health</b>	<p><b>Background:</b> The health of an individual as well as the health of communities are affected by many things. Behavioral aspects for an individual are related to their choices such as what they eat, how much they move, whether they smoke or drink to excess. For communities, behavioral aspects involve things such as assessing the walkability to encourage more physical activity or developing programs making access to fresh foods easily and affordable. Economics of both individuals and communities encompass available household money for healthy food and community access to gardens or other economical food sources. Educational opportunities within a community also relate to the health of individuals within that community, but what about those individuals who are rural and not able to attend group meetings? The development of new methods of teaching and disseminating health information are imperative to reaching those in need. Nutrigenomics is another promising area of research where individuals will be able to determine, through genetic testing, what types of foods and exercise programs can help them achieve the goal of health. Diseases related to obesity, inactivity, and concern about the availability of food are major health concerns, especially in rural areas. One of the goals of the Food, Nutrition, and Health project is to figure out ways to decrease the differences in the health of individuals in rural and underserved communities. Given the health benefits of unprocessed fruits and vegetables, lean meats, and dairy products, along with regular physical activity, finding ways to provide access to educational materials and social support will go a long way to improving the health of communities as well as individuals. This research will look primarily at new sources of nutrients, different ways of delivering education on nutrition and foods, and providing exercise programs by different methods. <b>Our major goal is to have a positive effect on the health of rural and underserved communities through the development of wellness programs through cooperative research.</b> Expected outcomes include (1) figuring out new food production and storage methods to help provide a sustainable food supply that can be accessed by everyone, (2) recommending exercise and ways to become more physically active for those individuals who cannot access typical methods such as fitness centers or personal trainers, (3) figure out cost-effective and motivational educational products that rural individuals can tap into to help their understanding of health and what they can do to improve theirs, (4) develop a place within this area that can be available for those individuals to come for personal nutrition and exercise guidance. This will include assessing overall health and providing guidance either in person, over the phone, or electronically.</p> <p><b>Goal 1:</b> New foods are being introduced into our food supply daily. Agriculture researchers are looking for ways to increase financial benefits to producers and nutrient content for consumers. Examples include hemp, sea vegetables, and bee pollen. This work will how processing affects food nutrient content and determines better ways to produce healthier food that lasts longer with the intention of providing healthier food to rural and underserved communities.</p> <p><b>Goal 2:</b> Individuals with chronic diseases or developmental issues tend to be less physically active than typical individuals. This can have long-term effects on their overall health and ability to live independently. This project will work on ways to maintain or decrease symptoms that occur in chronic diseases such as multiple sclerosis or autism. It will also look at how exercise can be used to get individuals with developmental diseases involved in their communities either through work or volunteering, and also to keep them as independent as possible for as long as possible.</p>			3, 6	

		<p><b>Goal 3:</b> Research has shown that individuals with chronic diseases, and those at risk for chronic diseases, lack understanding of what constitutes healthy eating and safe physical activity recommendations. Many programs can show an increase in understanding of healthy lifestyles but few show long-term changes occurring. This project will work on determining the methods of giving information to individuals which will produce actual change in behaviors. While this will be different for everyone, understanding what makes individuals change their behaviors will help lead to better programs.</p> <p><b>Goal 4:</b> All individuals are different and research is beginning to show that our DNA can be utilized to help understand why some individuals are affected by certain foods different from others. This research is designed to look at an individuals' DNA and provide specific nutrition recommendations based on that profile.</p> <p><b>Goal 5:</b> Individuals in rural communities often travel great distances to health and fitness professionals to obtain assessment and guidance on health behaviors. This project will set up a health and fitness center that will be available to individuals in the surrounding rural community to obtain assessments of health parameters and guidance from trained health and fitness professionals. This center will also be available for those underserved populations who may not be able to pay for this type of service from for-profit centers. This is an attempt to help reduce the amount of health inequity that exists in rural communities and underserved populations.</p> <p>In summary, the food, nutrition, and health group is trying to affect healthy change within communities by determining methods of providing healthy food, health information, and physical activity guidelines in ways that will promote long-term behavior change.</p> <p><b>Target Audience</b> Fellow researchers through publications in peer-reviewed journals. This research, although not specifically land grant type of research, corresponds to Goal 3. Through manipulation of macronutrient intake, it was found that muscle strength could be compromised. This information will be translated to the general population of underserved individuals.</p>	
9.	<p><b>Expanded Food and Nutrition Education Program - Youth</b></p>	<p>The youth EFNEP works with at risk youth in schools, after school programs, and summer camps. The CSU Extension EFNEP targets primarily youth in middle and high school because the OSU EFNEP team focuses their efforts on younger youth. Several evidence based curriculum are used to address making healthful food choices, food safety, resource management and physical activity. For the middle and high school programs we use Teen Cuisine, a series of six classes addressing the following topics:</p> <p>Lesson 1: Eat Smart Lesson 2: You Are What You Eat Lesson 3: Power Up with Breakfast Lesson 4: Find the Fat Lesson 5: Kick the Sugar Habit Lesson 6: Snack Attack</p> <p>For younger students we utilize the MYPlate curriculums for grades 1 and 2, 3 and 4, 5 and 6, all address making wise food choices, eating more fruits and vegetables, food safety and physical activity, all conducted in 5 to 6 lessons. The Youth EFNEP has a pre and post survey for the different grade levels. Summary data indicates 81% of the youth improved their abilities to choose healthful foods, 63% improved their food handling practices, 65% improved their physical activity practices and 47% improved their ability to prepare simple affordable snacks.</p>	3, 8, 10, & 13

2020 Annual Report of Accomplishments and Results (AREERA)

		<p>In FY2020 program started face to face by mid-March 2020, the state was shut down due to the COVID-19 pandemic. 21 youth programs had to be cancelled in the spring, however several virtual camps were conducted, engaging an additional 157 youth.</p> <table border="1"> <tr> <td>% of African Am.</td> <td>95%</td> </tr> <tr> <td>% of Hispanic</td> <td></td> </tr> <tr> <td>% of Caucasian</td> <td>5%</td> </tr> <tr> <td>% of Female</td> <td>39%</td> </tr> </table>	% of African Am.	95%	% of Hispanic		% of Caucasian	5%	% of Female	39%	
% of African Am.	95%										
% of Hispanic											
% of Caucasian	5%										
% of Female	39%										
10.	<b>Mobile Food Pantry/ Mobile Grocery Store</b>	<p>Food Insecurity and food desserts are all too common in the communities served by Central State University Extension. To address this issue the EFNEP and FCS team partner with Foodbanks to assist with mobile food pantries. In Cuyahoga County Food Strong holds Car Van Events where food is distributed and the CSU EFNEP PA provides short talks on nutrition and demonstrations on how to utilize the products being provided. In Montgomery County the EFNEP PA partners with Homefull as they launched their new mobile grocery store in food desert communities in Dayton, Ohio. Homefull’s Mobile Grocery launched in September 2020 serving neighborhoods throughout Dayton. The store provides quality, staple grocery items such as meats, produce, dairy, frozen foods, household items, and cleaning supplies, patrons can utilize their SNAP benefits. The EFNEP PA met with participants shopping at the mobile market and provided them with brief educational talks on healthy food selections meal prep ideas and provided recipes from our eating smart being active curriculum. In addition I discussed our new upcoming Eat Smart Move More program series.</p> <p>The Central State Mobile Food Pantry launched in August 2018, CSUE partners with the Dayton Food Pantry to bring their trucks to the CSU campus once a month. The Dayton Food Pantry identified the Wilberforce community as a pocket of poverty in Greene County. Wilberforce, hosts two Universities, Wilberforce University and Central State University and a small residential community. It is well know that college campuses have many students who are food insecure. During our monthly food distribution, CSU Extensions staff, CSU faculty and staff as well as student volunteers help to distribute the food items being provided. The CSU Mobile Food pantry assist up to <b>150 individuals each month</b> plus all of their family members. The CSU Mobile pantry had to stop operating as a result of the COVID pandemic.</p>	3, 8, 10, 13								
11.	<b>Fresh Start Record Sealing Clinic</b>	<p>Through a partnership with local Public Defender’s Office, Prosecutor’s Office, Ohio Justice Policy Center, and the Legal Aid Society, qualified participants are informed of their legal rights and available options if they have a criminal record (misdemeanors and felony 3 or more charges). During this virtual clinic (to avoid COVID-19), the participant is partnered with a volunteer attorney to prepare the required court documents for record sealing (criminal record removed from the general public) consideration through the local courts. Targeted population: Alarming number of individuals with misdemeanor and felony charges, in particular, persons of color and low-income status residents who have barriers to personal and professional endeavors.</p> <table border="1"> <tr> <td>Total Number of Participants:</td> <td>141 (Montgomery County)</td> </tr> <tr> <td>% of African Am.</td> <td>94%</td> </tr> <tr> <td>% of Hispanic</td> <td>n/a</td> </tr> <tr> <td>% of Caucasian</td> <td>6%</td> </tr> </table>	Total Number of Participants:	141 (Montgomery County)	% of African Am.	94%	% of Hispanic	n/a	% of Caucasian	6%	3
Total Number of Participants:	141 (Montgomery County)										
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% of Caucasian	6%										
12.	<b>High School Equivalency</b>	<p>Provide virtual learning opportunity for participants seeking to obtain their high school diploma through classroom training in English, mathematics, social studies, and other subject matters. Targeted Population: Increase the number of individuals who do not have a GED or high school diploma.</p>	3								

	<b>(GED) Program</b>	Total Number of Participants: <u>3</u> % of African Am. <u>100%</u> % of Hispanic <u>n/a</u> % of Caucasian <u>0%</u> % of Female <u>2</u>	
13.	<b>Optimal Agronomic Practices To Reduce Nutrient Loading In Ohio's Water Bodies</b>	<p>The Great Miami River basin is characterized by non-point source pollution due to runoff from agricultural runoff and urbanization. The river basin is also home to two lakes - Indian Lake and Lake Loramie. These lakes are heavily used for recreation. Toxic algal blooms in the watershed have caused serious problems for users of River (upper) in Logan, Shelby, Mercer, Auglaize, Darke, Champaign, Hardin, and Miami counties watershed in western Ohio. Land use in the Great Miami River (upper) watershed is comprised of 71 percent cultivated crops, 8 percent pasture and hay, 9 percent forest and 9 percent developed land. The project aims at developing solutions for reducing Nitrogen (N) and Phosphorous (P) in the runoff from, primarily the agricultural areas in the watershed by recommending appropriate agronomic practices for the farmers considering the climate and hydrological conditions in the watershed. Farmers are expected to benefit from the recommendations on optimal agronomic practices along with appropriate timelines that will consider the effects of runoff-producing events under conditions of climate change. Water quality in the streams and lakes is expected to improve with the adoption of these practices which in turn will lead to better conditions for humans using the streams and lakes and the aquatic life in the system.</p> <p><u>Background and Major Goal of the Project</u></p> <p>Ohio water bodies, streams, and lakes alike are suffering from an overload of nutrients both due to agronomic practices and wastewater streams from cities. Hazardous algal bloom (HAB) in Ohio's water bodies has impacted negatively and has been recorded. Phosphate overloading also has impacted Ohio's streams. The deleterious consequences of nutrient overloading have impacted people, particularly around lakes in Ohio. Public groups, water consumers, and people who make use of Ohio's lakes for different purposes including recreation have complained about this situation. Media outlets have highlighted the unsatisfactory water quality situation in Ohio. The State legislature is taking efforts to support research institutions in Ohio to find solutions to improve the water quality situation in water bodies with particular reference to nutrients. Nutrient loading is a nationwide problem and solutions towards solving this problem can be useful for the whole US. Technologies developed can also be adopted internationally. Central State University (CSU) is in an excellent position to address this problem with the research work it has conducted in the past in Lake Erie which is continuing.</p> <p>The major goal of this research effort is to develop an overall strategy for reducing nutrients that lead to harmful consequences for humans and aquatic life in the water bodies of Ohio, considering the different sectors of the State economy, agricultural in particular. The expected solution will be a dynamic algorithm that will enable agronomic practice recommendations for farmers in the study area using Geographic Information Systems (GIS) that will incorporate a variety of data sets with input from farmers, agronomists, hydrologists, water quality experts, agricultural economists, and others. The dynamic algorithm will be calibrated and validated for the Great Miami (Upper) River basin in Western Ohio. The Great Miami River (upper) basin is 748 square miles in extent, with 71% of the area under cultivated crops, 8% pasture and hay, 9% forest and 9% developed. The river basin includes the Indian Lake and Lake Loramie where toxic algal bloom problems have been identified since 2010. There is consensus on the fact that a solution has to be developed on a long-term and sustainable basis. This effort will be in collaboration with the Ohio State University (OSU) and it is expected that the algorithm will be adaptable to all watersheds in the entire State of Ohio.</p>	4

	<p><u>Research Objectives</u></p> <p>The research objectives will include the following:</p> <p><b>(i)</b> Develop a GIS-based methodology to assess statewide agronomic practices in a dynamic manner in collaboration with different agencies and institutions.</p> <p>This effort will produce a GIS database of the agronomic practices of farmers in the watershed that will include variables such as timelines for tillage, fertilizing, planting, applications of chemicals for crop health and harvesting. The yield output cost input data would be included. Historic data on farmers’ management practices with regard to tillage, fertilization, crop health, residue management will be captured through this effort with the ability to summarize the practices of individual farmers in the area. Small and disadvantaged farmers will be identified and the characteristics will be documented in the study.</p> <p><b>(ii)</b> Develop an integrated methodology to study the impacts of hydrology on nutrient loading under the current agronomic practices in the Great Miami (Upper) River Basin.</p> <p>This effort will result in generating a GIS-based, monthly rainfall predictive model using stochastic hydrology adjusted for climate change scenarios under prescribed levels of reliability around timelines of agronomic events such as tillage, fertilizing, and other chemical applications.</p> <p>Develop recommendations for optimal agronomic practices considering constraints on Total Maximum Daily Loads (TMDL) in streams and considering nutrient limits that would prevent Hazardous Algal Blooms in the lakes in the watershed. This effort will generate a model for steam nutrient loading with a special focus on Nitrogen (N) and Phosphorus (P) in appropriate units (total and composites) under historic agronomic practices under historic norms of hydrologic inputs for calibration purposes and for validation This model will have the ability to do "what if" scenarios and will consider surface flow and sub-surface flow along with the transport of N &amp; P through these modes of water transport. The scenarios of consideration will include climate change situations and fluctuations in economic conditions as well. There will be a focus on small farmers so that their practices and the impacts on them will be included in the study.</p> <p><b>(iii)</b> Develop a methodology for comparatively studying the contributions to nutrients from different sources - farms, municipal wastewater plants, discharges from industries.</p> <p>This effort will generate a predictive model for effluents for municipal wastewater plants and discharges from industries, any, in the region. The outputs from this model with reference to N and P will be compared with contributions from the farms in the Greater Miami (Upper) watershed obtained under Objective # iii.</p> <p><b>(iv)</b> Develop GIS-based, agronomic practice guidelines for farmers in Ohio that would lead to healthier streams and lakes in Ohio. An optimization study using the simulation models developed under Objectives i and iii will be conducted to control the nutrients loading in the stream under varied conditions of agronomic practices. The GIS-based optimization algorithm would guide the farmers and the wastewater treatment plant operators as to the steps that need to be taken to control the N &amp; P loading in the streams. It is expected the solutions would be cost-optimal for farmers since it would reduce the levels of fertilization application in the fields. This initial algorithm will be based on stochastic modeling of rainfall input using historic data. As again, there will be a special focus on small farms and disadvantaged farmers.</p> <p><b>(v)</b> Develop a methodology for studying the impacts of stochastic conditions of hydrological inputs, climate variables and produce storage patterns under climate change on the best, optimal practices for farmers and integrate the results to devise optimal practices for farmers. Droughts in the region also is being studied heavily by scientists in the region.</p>	
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		<p>The main focus of this study is to develop guidelines for farmers and other stakeholders and State planners to indicate crop production scenarios under climate change scenarios. The algorithm developed under Objective # V will be tested under extreme conditions of each event and in combination at different levels of probability to develop production estimates. The study will also identify the impacts on small farmers.</p> <p><b>Accomplishments</b>          Southwestern Ohio Farming Practices Survey: A random subset of thousand FSA program participants were identified to send out the farming practices survey. The survey packet including all associated materials has been assembled for Institutional Review Board (IRB) approval. The project personnel completed the required IRB training as a part of the application process.          Wetlands Monitoring: The water samples collected from the inlet and outlet locations of the four wetlands in the study area were analyzed for nitrate and phosphate concentrations. The data were summarized to map the trends in water quality impacts across the different wetlands.          Caesar Creek Collaborative: The project director has teamed with Warren County and Greene County soil and water conservation district and with other local stakeholders to create an Ohio-EPA Nine-Element Nonpoint Source Implementation Strategies (9-Element NPS-IS) for two HUC 12s in the Caesar Creek watershed in the Little Miami River Basin. The plan involves the identification of hydrologically sensitive areas in the watersheds and the implementation of best management practices that improve water quality in the study watersheds.</p> <p><b>Target Audience</b>          The target audience for this reporting period includes Greene County and Warren County Soil and Water Conservation District, undergraduate student researchers, Hoorman soil health services, extension agents, crop advisors, university researchers, and Montgomery County Environmental Services.</p>	
14.	<p><b>Innovative Soil and Water Resources Management Strategies for Ohio</b></p>	<p><b>1. Caesar Creek Watershed Soil and Water conservation:</b>          We have been working with Warren County, Greene County, and Clinton Soil and Water Conservation districts on the implementation of soil and water conservation practices on five HUC12s in the Caesar Creek watershed. We formed a collaborative to address soil and water conservation problems in these watersheds. As an outcome of this collaboration, the team was awarded funding from Ohio-EPA to complete a nine-element nonpoint source strategic plan for this region. For the nine-element plan, Dr. Subburayalu and his team completed running agricultural conservation planning framework (ACPF) model for the target watersheds. The outputs of this model include target locations for various in-field and edge-of-field practices such as grassed waterways, denitrifying bioreactors, buffer strips, and water and sediment control basins with the goal of improving agricultural productivity and environmental stewardship. We are working with a team of ACPF modelers in Ohio to standardize the process of running the ACPF model for all 1,538 HUC 12 watersheds in Ohio. We shared our experiences running the model with the larger community and are collectively developing a standard operating procedure for ACPF model runs. The partners include The Nature Conservancy, Ohio-Kentucky-Indiana regional council of governments, Miami Valley Regional Planning Commission, The Ohio State University, Little Miami Conservancy, Ohio Farm Bureau, Ohio NRCS, and Ohio Department of Agriculture</p> <p><b>2. Beaver Creek Wetlands Monitoring</b></p>	4

	<p>We have been collecting grab water samples from three wetlands managed by the non-profit BW Greenway in the Beaver creek watershed. The samples are collected once a month at the inlet and outlet of these wetlands and are being analyzed for nitrogen and phosphorus concentrations in the samples. The results so far reveal a varied response regarding the effectiveness of wetlands in reducing nutrient concentrations. Nitrogen continues to be a bigger problem in the Ohio River basin. The data collection is still in its initial phase and it would require additional data to make any statistical inferences from it.</p> <p><b>3. Little Miami River Monitoring</b>          We have been collecting water quality data (Dissolved Oxygen, TDS, and thermal conductivity) at 4 locations along the Little Miami River. We are using YSI sondes to monitor water quality at 15-minute intervals around the year. In addition to the sonde data, on a monthly basis, we are also collecting grab water samples at these locations and analyzing for Nitrogen and Phosphorus concentrations in the water. We are working with the Little Miami Conservancy on this project. We are using this temporal water quality data to predict dissolved oxygen and thermal conductivity in rivers and streams at spatially explicit scales using remotely sensed imagery. We are using Sentinel and Landsat data to achieve this goal.</p> <p><b>4. Tecumseh Land Trust: (TLT) and Community Solutions:</b>          We are working with TLT and Community solutions (both non-profit organizations) on the Jacoby Creek and Yellow Springs Creek sub-watersheds within the larger Little Miami Watershed to identify agricultural best management practices in this region. We are partnering with producers who are signing up for NRCS EQUIP practices to monitor soil health and water quality outcomes. We have collected baseline soil samples from participating farms and will be studying the impact of target BMPs on soil health and water quality. During the summer of 2020, we collected over 1,100 soil samples from 10 participating farm locations in the Little and Great Miami watersheds. The samples were processed in the newly renovated Agricultural and Natural Resources Information and Management (ANRIM) lab at Central State University. Samples were analyzed for soil pH in water and calcium chloride. Soil samples have also been prepared for carbon, nitrogen, and nutrient analysis.</p> <p><b>5. Farming Practices Survey</b>          During this reporting period, we also sent a Southwestern Ohio Farming Practices survey instrument to thousand randomly chosen producers in the 21 County region in the Great Miami and Little Miami watershed. The survey instrument was 20 pages long with 40 questions related to field characteristics, conservation plan participation, cropping history, conservation practices, commercial fertilizer application, and manure application. We received a 6 percent response. We found that the data gathered to be very informative about the farming practices in the region. Student researchers were actively involved throughout the project. A peer-reviewed publication is being prepared to disseminate the results of this survey.</p> <p><b>6. Ohio 590 Nutrient Management Standards Revision</b>          Dr. Subburayalu served on a 19-member sub-committee of the NRCS State Technical Committee (590 Task Force) comprising of several stakeholders in the State over a six-month period to update nutrient management standards in Ohio with a goal of protecting Ohio's soil and water resources. The revised standards were approved by Ohio NRCS for use by producers, agencies, and other stakeholders in Ohio. The 590 Task Force included representatives from the following organizations: State of Ohio ODA National Wildlife Federation Ohio Farm Bureau State of Ohio ODNR The Nature Conservancy Ohio Livestock Industries State of</p>	
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		<p>Ohio EPA Lake Erie Foundation Ohio Commodity Groups Ohio Lake Erie Commission Ohio Ag Business Association Ohio Certified Crop Advisers Ohio State University Central State University Ohio Ag Producers Ohio Soil and Water Conservation Commission Ohio Federation of Soil and Water Conservation Districts</p> <p><b>7. Montgomery County Environmental Services Partnership</b>                  A smart hydraulic model was developed to manage the environmental services offered by the Montgomery Environmental Services for the residents of Montgomery County located in Dayton, Ohio. The model monitors both water distribution and sewer networks with the help of flow sensors strategically placed within the distribution networks. Through these efforts, the Environmental Engineering students at Central State University had undergone practicum in water supply, wastewater reclamation, management of sewer systems, and watershed assessment on the release of nutrient loads into the Great Miami River. Students received experiential learning in monitoring and control of water distribution and sewer systems for wastewater disposal from a predominantly rural watershed by shadowing operators and engineers working on these systems.</p>	
15.	<b>Tree Talk</b>	<p>Monthly discussion of forestry release in Southeast Ohio and other forestry-related topics for woodland owners, managers, and enthusiasts. Central State presented on sessions for: Women Owning Woodlands; Wayne National Forest and Ohio Bird Conservation Initiative; Fall Color, Celebrating Smokey's 75th Birthday. Tree Talk is recorded/filmed at OSU South Centers in Piketon Ohio and posted on You Tube.</p> <p>Total Participants: 368 views</p> <p>Awareness of Central State Extension and dissemination of Oak/Hickory regeneration research.</p> <ol style="list-style-type: none"> <li>1) the issue and its significance (e.g. who cares and why): Discussion of forestry research and its relevance for woodland owners and managers.</li> <li>2) a brief description of key activities undertaken to achieve the goals and objectives: Virtual programming to increase access for woodland owners and managers</li> <li>3) changes in knowledge, behavior, or condition resulting from the project or program's activities: Awareness of Central State Extension and dissemination of Oak/Hickory regeneration research</li> <li>4) who benefited and how: Relevant information for woodland owners and managers</li> </ol>	4
16.	<b>A Day in the Woods: Research Program</b>	<p>Field day for woodland owners, managers, and enthusiasts to view and discuss ongoing research on oak/hickory regeneration. Location: Vinton Furnace State Forest</p> <p>Participants: 37</p> <ol style="list-style-type: none"> <li>1) the issue and its significance (e.g. who cares and why); Oak/Hickory regeneration is important to the future forest health and economic opportunity in Southeastern Ohio.</li> <li>2) a brief description of key activities undertaken to achieve the goals and objectives; Field day with stops at various forest research plots to help woodland owners and managers understand impact on forest health and productivity</li> <li>3) changes in knowledge, behavior, or condition resulting from the project or program's activities; Knowledge gains included: acorns and hard mast info; seed dispersal in oak; timber rattlesnake conservation; oak forest trends. Woodland owners attending represented over 1200 acres of woodlands.</li> <li>4) who benefited and how. Woodland owners, managers, and enthusiasts</li> </ol>	4

17.	<b>Women Owning Woodlands – Southeast Chapter</b>	<p>Forest outreach and engagement with women woodland owners. Sessions included: Environmental Quality Incentive Program: EQIP; 2020 Planning Meeting; Objectives and Priorities 101 for Your Woodland.</p> <p>4 programs in FY 2020</p> <ol style="list-style-type: none"> <li>1) the issue and its significance (e.g. who cares and why); Forestry program audiences are often a high percentage of men and research has shown that women landowners feel uncomfortable asking questions and attending these programs. Women Owning Woodlands provides an environment more engaging for women to help them feel comfortable to increase their engage in the subject matter.</li> <li>2) a brief description of key activities undertaken to achieve the goals and objectives; Programs focused on topics identified by women woodland owners as important in an environment conducive for women to feel comfortable</li> <li>3) changes in knowledge, behavior, or condition resulting from the project or program’s activities; Discussion of forest-related topics and research in an environment more conducive to engagement with women landowners.</li> </ol> <p style="text-align: right;">Location(s): <u>Various locations: Athens, Piketon, Hocking, and Virtually</u></p> <p style="text-align: right;">Region(s): <u>Southeast</u></p> <p style="text-align: right;">Total Number of Participants: <u>176</u></p> <p style="text-align: right;">% of Female: <u>100</u></p>	4
18.	<b>Presentations on Oak/Hickory Regeneration</b>	<p>Two presentations: (1) The Bourbon Barrel Connection: Revitalizing Appalachian Ohio Economies and Oak-Dominated Forests, (2) Woodland Owner Tips.</p> <ol style="list-style-type: none"> <li>1) the issue and its significance (e.g. who cares and why); Oak/Hickory regeneration is important to forest health and the economy of Southeastern Ohio.</li> <li>2) a brief description of key activities undertaken to achieve the goals and objectives; Programs to discuss with woodland owners and manager how to focus on oak/hickory regeneration.</li> <li>3) changes in knowledge, behavior, or condition resulting from the project or program’s activities; Raised awareness of CSU Extension and communicated risks associated with hemp with uncertain markets</li> <li>4) who benefited and how. Woodland owners and managers</li> </ol> <p style="text-align: right;">Location(s): <u>Environmental Professionals Network– Columbus; OSU Small Farm College - Newark</u></p> <p style="text-align: right;">Region(s): <u>Southeast</u></p> <p style="text-align: right;">Total Number of Participants: <u>197</u></p>	4, 7
19.	<b>Creepy Animals</b>	<p>Outreach program on animal conservation with partner, Wild Hearts.</p> <ol style="list-style-type: none"> <li>1) the issue and its significance (e.g. who cares and why); Conservation to protect animals is a natural resources topic</li> <li>2) a brief description of key activities undertaken to achieve the goals and objectives; Wild Hearts is a partner with Central State and brought endangered and protected animals to communicate about conservation efforts.</li> <li>3) changes in knowledge, behavior, or condition resulting from the project or program’s activities; Increased knowledge about strategies to protect vulnerable wildlife</li> <li>4) who benefited and how. Xenia and Trotwood residents interested in wildlife.</li> </ol>	5

2020 Annual Report of Accomplishments and Results (AREERA)

		Location(s): <u>Central State Extension – Xenia and Trotwood</u> Region(s): <u>Southwest</u> Total Number of Participants: <u>32</u> % of African Am. <u>30</u> % of Hispanic <u>1</u> % of Caucasian <u>60</u> % of Female <u>50</u>		
<b>20.</b>	<b>Central State Tours for Black Farming Conference</b>	Partnered with Antioch University and Community Solutions for tours as part of the Black Farming Conference. 1) the issue and its significance (e.g. who cares and why); Our partners hosted a conference for black farmers and Central State provided tours as part of the conference. 2) a brief description of key activities undertaken to achieve the goals and objectives; Tours with demonstration and research areas at Central State including aquaponics, beekeeping, corn breeding, hemp and natural products 3) changes in knowledge, behavior, or condition resulting from the project or program’s activities; Raise awareness among black farmers of research plots and extension demonstrations at Central State. 4) who benefited and how. African American farmers in Ohio. Location(s): <u>Central State University, Wilberforce Campus</u> Total Number of Participants: <u>14</u> % of African Am. <u>70</u> % of Caucasian <u>30</u> % of Female <u>60</u>	5,	11
<b>21.</b>	<b>Diabetes Empowerment Education Program</b>	Diabetes Empowerment Education Program (DEEP) Diabetes is one of the leading causes of death across Ohio. The Diabetes Empowerment Education Program targets adults with prediabetes, diabetes and/or relatives who need information about diabetes self-care. The program empowers participants to take control of their diabetes with improved life skills to prevent future complications. The program has 8 sessions: 1. Understanding the Human Body 2. Understanding Diabetes and its Risk Factors 3. Monitoring Your Body 4. Get Up and Move! Physical Activity and Diabetes 5. Health Management Through Meal Planning 6. Diabetes Complications: Identification and Prevention 7. Learning about Medications and Medical Care 8. Living with Diabetes: Mobilizing Family and Friends The series is presented face to face with a short survey about knowledge gained after each class, 6 programs were delivered in early FY2020, reaching 52 participants. In the fall of FY2020 we learned the licensing agency CSU Extension was participating under was no longer contracted to provide this service. We began to process of becoming a licensed entity to continue providing the DEEP series. We had to stop programming until the license was established with the University of Illinois – Chicago. We	6	

2020 Annual Report of Accomplishments and Results (AREERA)

		<p>received our license in January 2020. Classes were scheduled to begin in February, could not be completed due to the pandemic. The FCS staff have all been trained to conduct the DEEP program virtually as well as face to face and scheduling has begun for FY2021.</p> <table border="1" data-bbox="373 293 1171 477"> <tr> <td>Total Number of Participants:</td> <td>52</td> </tr> <tr> <td>% of African Am.</td> <td>50%</td> </tr> <tr> <td>% of Hispanic</td> <td></td> </tr> <tr> <td>% of Caucasian</td> <td>50%</td> </tr> <tr> <td>% of Female</td> <td>75%</td> </tr> </table>	Total Number of Participants:	52	% of African Am.	50%	% of Hispanic		% of Caucasian	50%	% of Female	75%	
Total Number of Participants:	52												
% of African Am.	50%												
% of Hispanic													
% of Caucasian	50%												
% of Female	75%												
<p><b>22.</b></p>	<p><b>Healthy Living Series – Video and narrated presentations</b></p>	<p>In response to the COVID-19 pandemic and the increase in mental health issues and other day to day problems Ohioian’s were experiencing the FCS team created fact sheets, narrated presentations and videos to help address issues people were experiences as well as raise awareness on other issues.</p> <p>Topics included:</p> <ol style="list-style-type: none"> <li>1. Stress Management Fact sheet</li> <li>2. Covid-19 Resources – narrated presentation</li> <li>3. Couch Conversations – Narrated Presentation             <ol style="list-style-type: none"> <li>a. Helping Children and Teens Cope with COVID-19</li> <li>b. Helping College Students Cope with COVID-19</li> <li>c. Helping Parents/Adults Cope with COVID-19</li> <li>d. Helping Seniors Cope with COVID-19</li> </ol> </li> </ol> <p>Healthy Living Videos</p> <ol style="list-style-type: none"> <li>1. Suicide prevention: 20 views. Link: <a href="#">CSUE Healthy Living Series-Suicide Prevention - YouTube</a></li> <li>2. COVID-19 Vaccine Video- 16 views. Link: <a href="#">Central State University Extension Healthy Living Series-Covid 19 Vaccine - YouTube</a></li> <li>3. Flu vaccine video- 14 views. Link: <a href="#">CSUE Healthy Living Series-The Flu - YouTube</a></li> <li>4. Naloxone video- 6 views. Link: <a href="#">Central State University Extension Healthy Living Series-Naloxone - YouTube</a></li> <li>5. Shingles Vaccine- 8 views Link: <a href="#">Central State University Extension Healthy Living Series-Shingles Vaccine - YouTube</a></li> <li>6. SIDS-Sudden Infant Death Syndrome- 4 views. Link: <a href="#">SIDS-Sudden Infant Death Syndrome-Central State University Extension - YouTube</a></li> <li>7. Stress management video- 7 views. Link: <a href="#">Central State University Extension Healthy Living Series Tip # 4-Reducing Stress - YouTube</a></li> <li>8. The Flu (management)- 4 views. Link- <a href="#">Central State University Extension Healthy Living Series-The Flu - YouTube</a></li> </ol>	<p>6, 7, &amp; #10</p>										

<p><b>23.</b></p>	<p><b>COVID-19 Education, Caring, Coping, Citizenship and Kindness through hands-on STEM activities</b></p>	<p>Packaged Activities for Virtual or In-Person Learning were provided to address needs created by COVID-19. Activities focused on developing skills for the youth’s hands, heart, head and health...the basic tenets of the 4-H program and pledge. These activities provided hands on learning with no sharing of materials and low or no screen time. Needs also indicated a concern of too much sitting and lack of structured recess time (some schools do not have funding for Physical Education Teachers. Students were provided with educational (paper) <b>handouts that referenced the CDC</b>. Students learned how to make, wear and take off a face mask, practice good handwashing and how to Social (Physical) Distance. Targeted Population: Greene County (Greene County Intervention Center, Youthland Academy Daycare) - Franklin County (Educational Academy for Boys and Girls, Cesar Chavez Preparatory School) - Clark County (Fulton Elementary Springfield City Schools Afterschool Program).</p> <table border="1" data-bbox="373 487 1911 747"> <tr> <td>Total Number of Participants:</td> <td>424</td> <td></td> </tr> <tr> <td>% Non-Hispanic more than one race</td> <td>6</td> <td></td> </tr> <tr> <td>% of African Am.</td> <td>51</td> <td></td> </tr> <tr> <td>% of Hispanic</td> <td>33</td> <td></td> </tr> <tr> <td>% of Caucasian</td> <td>10</td> <td></td> </tr> <tr> <td>% of Female</td> <td>49</td> <td>% non-college grad 100</td> </tr> </table> <p><b>More than 1400 fun hands on STEM “Packaged Activities” were distributed</b>  <b>Teachers comments included:</b></p> <ul style="list-style-type: none"> <li>• Loved the rocks of kindness. It tied into my Rocks and Minerals Unit, Language Arts (writing about kindness), citizenship, and art.</li> <li>• Students love the exercise dice. They are a great break, especially after testing.</li> <li>• I am planning a "show us your mask" event for virtual learning.</li> <li>• Liked “activity” away from computers and Artistic Outlet</li> <li>• Liked having materials for EACH student</li> </ul> <p><b>Teachers indicted they “strongly agreed” the materials provided:</b></p> <ul style="list-style-type: none"> <li>• Helped them meet COVID 19 teaching protocols by providing program materials with the flexibility to teach face to face or virtually</li> <li>• Helped them provide new fun ways of physical exercising for their students</li> <li>• Helped them to increase the amount of time their students exercise daily</li> <li>• Helped them with teaching materials that did not include screen time and did not require internet access</li> </ul> <p><b>What was learned? Short term impact(s) How to wear a face mask and how to socially distance 6 feet apart?</b></p>	Total Number of Participants:	424		% Non-Hispanic more than one race	6		% of African Am.	51		% of Hispanic	33		% of Caucasian	10		% of Female	49	% non-college grad 100	<p>6, 14</p>
Total Number of Participants:	424																				
% Non-Hispanic more than one race	6																				
% of African Am.	51																				
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% of Caucasian	10																				
% of Female	49	% non-college grad 100																			

		<p><b>Packaged Activities included:</b> How to Make a Face Mask Without a Sewing Machine; Engineering Your Own Social Distancing Apparatus; Engineering a Wire Art Creation; Painting Rocks of Kindness; Trees are <i>Treemendous</i> - Tree Cookies; Exercise Dice Challenge; and Outdoor Games &amp; Beach Ball Activities.</p>													
24.	<p><b>Discovering 4-H Kits</b></p>	<p>Discovering 4-H Kits - These packaged 4-H activities were in response to COVID-19 to provide fun, safe, hands-on 4-H STEM activities that did not require internet access, had simple easy to follow instructions, did not require a lot of adult supervision, involved getting up and moving (getting exercise) and contained all materials to complete the activity. Targeted Population: Greene County Dept. of Job and Family Services – Youth in Foster Care</p> <p>Green County Children services has appreciated the cooperation and partnership to extend 4-H opportunities to youth in foster care and kinship care, who many times have societal inequities, through no fault of their own.</p> <table border="1"> <tr> <td>Total Number of Participants:</td> <td>32</td> </tr> <tr> <td>% Non-Hispanic more than one race</td> <td>18</td> </tr> <tr> <td>% of African Am.</td> <td>10</td> </tr> <tr> <td>% of Hispanic</td> <td>0</td> </tr> <tr> <td>% of Caucasian</td> <td>72</td> </tr> <tr> <td>% of Female</td> <td>47</td> </tr> </table> <p><b>Packaged Activities included:</b> How to Make a Face Mask Without a Sewing Machine; Engineering Your Own Social Distancing Apparatus; Engineering a Wire Art Creation; Painting Rocks of Kindness; Trees are <i>Treemendous</i> - Tree Cookies; Exercise Dice Challenge; and Outdoor Games and Beach Ball Activities.</p> <p>Activities focused on developing skills for the youth’s hands, heart, head and health...the basic tenets of the 4-H program and pledge.</p>	Total Number of Participants:	32	% Non-Hispanic more than one race	18	% of African Am.	10	% of Hispanic	0	% of Caucasian	72	% of Female	47	6, 14
Total Number of Participants:	32														
% Non-Hispanic more than one race	18														
% of African Am.	10														
% of Hispanic	0														
% of Caucasian	72														
% of Female	47														
25.	<p><b>Urban Gardening (Tower Gardens)</b></p>	<p>Youth participated in hands on PBL (Project Based Learning) experiences about food systems and discovered methods of growing lettuce/herbs. The Hydroponic/Aeroponic tower grows plants in an air/mist environment without the use of soil. Using aeroponic (the same technology NASA uses) the Tower Garden grows plants with only water, light and nutrients. Part of the STEM experience is assembling the Tower Garden structures. Students in 2 schools Assembled 6 tower gardens (3 TG per school) and provided maintenance to plant seeds, harvest and manage 3 (extended) tower gardens in their classrooms. For the majority of Youth it was the first time they had planted a seed and had the opportunity to eat something they had grown. Withrow High School students also had a business agreement to produce basil for a local business. Target Population: Withrow High School (Hamilton County) and Xenia Schools (Greene) County</p> <table border="1"> <tr> <td>Total Number of Participants:</td> <td>254</td> </tr> </table>	Total Number of Participants:	254	8, 14										
Total Number of Participants:	254														



		<p style="text-align: center;">                 % Non-Hispanic more than one race <u>11</u>                  % of African Am. <u>73</u>                  % of Hispanic <u>5</u>                  % of Caucasian <u>19</u>                  % of Female <u>33</u> </p> <p>Xenia school Teacher comments:                  "Our kids loved the tower garden so much, they asked their middle school teacher if they could grow food for other kids in their class that didn't have lots of food at home~very touching to be a part of this."</p> <p>" I loved watching our kids get excited about learning how to grow food from a seed to something they could eat. So many of our students don't get the opportunity to grow anything.</p> <p style="text-align: center;"><b>Students increased their knowledge in the following areas:</b></p> <ul style="list-style-type: none"> <li>▪ Different ways of growing food other than in soil.</li> <li>▪ How to assemble a hydroponics aeroponic tower garden</li> <li>▪ The requirements for seed germination</li> <li>▪ What the terms Aeroponic and Hydroponic mean</li> <li>▪ Some ways to increase food production in food insecure areas and Urban (city) areas where access to land and fresh food is limited.</li> <li>▪ Business entrepreneurship–by producing food products for a local business.</li> </ul> <p>Students learned how to operate a Hydroponic aeroponic growing system and were exposed to new Agricultural terms.                  Students were challenges to think about:</p> <ul style="list-style-type: none"> <li>• What can we do to produce food more efficiently/effectively?</li> <li>• What can we do to increase food production in urban areas?</li> </ul>	
<p><b>26.</b></p>	<p><b>Ohio Pesticide Exam Preparatory Class</b></p>	<p>Workshop team taught with Trevor Corboy, OSU Extension Greene County, to teach IPM and pesticide safety for applicators preparing for the state test.</p> <p>1) the issue and its significance (e.g. who cares and why); An Ohio pesticide applicator license is necessary for some business owners and those pursuing a job or promotion in the industry.</p>	<p>7, 9</p>

		<p>2) a brief description of key activities undertaken to achieve the goals and objectives; The class provided instruction to help prepare those preparing the exam. The State of Ohio provides self-study guides to prepare for the test, but this class provided in-person instruction to help those who have a learning style more adapted to interacting with an instructor.</p> <p>3) changes in knowledge, behavior, or condition resulting from the project or program’s activities; Participants were able to prepare for the exam with increased knowledge for success on the licensing exam.</p> <p>Location(s): <u>Central State Extension – Xenia location</u></p> <p>Region(s): <u>Southwest</u></p> <p>Total Number of Participants: <u>3</u></p> <table border="0" style="width: 100%;"> <tr> <td style="width: 50%;"><u>% of African Am.</u></td> <td style="width: 20%;"><u>33</u></td> <td style="width: 10%;"></td> <td style="width: 10%;"><u>% 20s &amp; 30s</u></td> <td style="width: 5%;"><u>33</u></td> </tr> <tr> <td><u>% of Hispanic</u></td> <td></td> <td></td> <td><u>% 40s &amp; 50s</u></td> <td><u>67</u></td> </tr> <tr> <td><u>% of Caucasian</u></td> <td><u>67</u></td> <td></td> <td><u>%60s+</u></td> <td></td> </tr> <tr> <td><u>% of Female</u></td> <td><u>0</u></td> <td></td> <td></td> <td></td> </tr> </table>	<u>% of African Am.</u>	<u>33</u>		<u>% 20s &amp; 30s</u>	<u>33</u>	<u>% of Hispanic</u>			<u>% 40s &amp; 50s</u>	<u>67</u>	<u>% of Caucasian</u>	<u>67</u>		<u>%60s+</u>		<u>% of Female</u>	<u>0</u>				
<u>% of African Am.</u>	<u>33</u>		<u>% 20s &amp; 30s</u>	<u>33</u>																			
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<u>% of Caucasian</u>	<u>67</u>		<u>%60s+</u>																				
<u>% of Female</u>	<u>0</u>																						
<p><b>27.</b></p>	<p><b>Display at Ohio Ecological Farm and Food Association Conference</b></p>	<p>Display booth promoting research and Extension activities at CSU including beginning farmers, forestry, aquaponics, hemp, honeybees, and natural products.</p> <p>Population: 1,100 people attended the conference</p> <ol style="list-style-type: none"> <li>1) the issue and its significance (e.g. who cares and why); As a new Extension service, Central State needs to increase awareness of the programs available to Ohio farmers</li> <li>2) a brief description of key activities undertaken to achieve the goals and objectives; Opportunity to provide information about Central State Extension programs and information</li> <li>3) changes in knowledge, behavior, or condition resulting from the project or program’s activities; Increased the Central State mailing list by 20 farmers interested in Central State Extension programs</li> <li>4) who benefited and how. Ohio farmers attending the OEFFA conference</li> </ol>	<p>11</p>																				
<p><b>28.</b></p>	<p><b>Aquaponic Twilight Tour</b></p>	<p>Farmers invited to see progress on the aquaponics system and ask questions about the layout and design. Tour included both the Aquaponic Demonstration Center system and the research system in the CENS Greenhouse. Speakers included Dr. Alcinda “Cindy” Folck, Dr. Kumar Nedunuri and Matt Smith (OSU Extension).</p> <p>Participants: 9</p> <ol style="list-style-type: none"> <li>1) the issue and its significance (e.g. who cares and why); Farmers are interested in aquaponics, but need information on how the system works, is maintained, and provides income</li> <li>2) a brief description of key activities undertaken to achieve the goals and objectives; Gave farmers opportunity to see a working system and a system that was under construction to highlight how the systems work and what’s involved in constructing and operating a system.</li> <li>3) changes in knowledge, behavior, or condition resulting from the project or program’s activities;</li> </ol>	<p>12</p>																				

2020 Annual Report of Accomplishments and Results (AREERA)

		-43% of attendees were very interested in learning about aquaponics systems as none of the attendees had a current system. -71% of the attendees indicated information presented at the workshop was helpful for their farm. 4) who benefited and how. Farmers contemplating an aquaponic system.	
29.	<b>National 4-H Youth Science Challenge – Game Changers</b>	Youth were provided with Game Changers curriculum kits to teach computer coding in a fun hands on experiential learning environment. Students learned about computer coding. Targeted Population: 2 schools in Franklin County	14
		Total Number of Participants: 86	
		% Non-Hispanic more than one race 3	
		% of African Am. 51	
		% of Hispanic 40	
% of Caucasian 6			
% of Female 59			

<b>OPTIONAL Youth Development Expenditures (dollars)</b>	
State and/or Institution:	FY 2020 Expenditures (\$)
1862 Smith-Lever	
1890 Extension	