

Texas (Prairie View A&M University) Annual Report - FY2022

Report Status: Approved as of 07/06/2023

Contributing Organizations

Prairie View A&M University

Executive Summary

Overview

The Cooperative Extension Program (CEP) is operated through the Prairie View A&M University Land-Grant in partnership with the federal, state, and local governments. Cooperative Extension educators or agents translate science for the public, engage the public to act, prepare people for a better life, provide rapid response in disasters, develop partnerships, and connect people online. Extension agents are supported by program specialists to offer disciplinary and interdisciplinary programming efforts to address priority issues. Extension agents implement innovative and progressive programs that meet clientele and community needs in throughout 56 Texas counties. Texas data records shows: 196,976 direct and indirect contacts were involved by way of 74,870 educational events. More than 50 new collaborators joined with Extension specialists, coordinators and program leaders to address the needs of youth, adults and communities. Also, virtual training sessions, workshops and youth camps reached new participants, 59,595 post the COVID program delivery transition. Extension staff and volunteers played a major role in reaching diverse audiences through well-planned educational outreach activities, local advisory committee support and strategic marketing platforms. As emerging and county needs were identified, staff pursued external funding opportunities to provide relevant programs and services to underserved families and communities.

The Cooperative Agricultural Research Center (CARC) focuses on pursuing original, innovative, and impactful scientific studies for the research mission in the College of Agriculture and Human Sciences (CAHS) at the land -grant institution Prairie View A&M University (PVAMU). Scientists at CARC conduct both fundamental and applied research in the areas of animal, plant, food, natural resources and environmental systems, and social systems and allied research. The research aims at the high-priority research areas that are aligned with the strategic plans of USDA NIFA and CAHS. The researchers pursue transformative and translational studies to generate new knowledge and science-based solutions for grand challenges in all of the above five systems with a positive impact on science and society in the nation and the world. Prominent researchers in Animal Systems use goats, cattle, and poultry to conduct original studies in ruminant nutrition, reproductive biology, growth and development, functional genomics, and meat science. Studies in the Plant Systems include medicinal plants, purple sweet potato, Texas hemp characterization, and germplasm management, new plant species, pollinator-friendly plants, and new crop varieties and underutilized food crops. Research in Social Sciences and Allied Key Research includes family and community well-being, health disparities, food security/insecurity, small farms/ranches profitability, and quality of life. Food Systems address real-world challenges in food security and safety, healthy foods, bioactive antioxidants, dairy chemistry, structural-functional relationships, rheological modeling, and the microbiome. Research in Plants and Natural Resources and Environmental Systems encompasses remote sensing, climate change monitoring, water resources management, soil health, smart technologies (drones, sensors), organic amendments, and microbiome.

Critical Issue: Environmental Management (1890)

1890 Extension:

The “Renewable Forest Resource” program is a major constituent of the Environmental Management (1890) critical issue. The Renewable Forest Resources programs include the AgroForestry, Wildlife, and Controlling Feral Hog Virtual Workshop and two Forestry Production and Management virtual workshops. Attendees included forest landowners, farmers, ranchers, and others interested in agriculture and related fields. The Renewable Resources Extension Act (RREA) grant program supported the developing and implementing outreach/educational programs. Focus areas include: (1) Ensuring Healthy Ecosystems; (2) Enhancing Economic Benefits, (3) Building Capacity Through Enhanced Connections; and (4) Forest Stewardship and Health.

1890 Research:

Patterns of Nutrient Dynamics within and below the Rootzone of Collard Greens Grown under Different Organic Amendment Types and Rates

Dynamics of nutrients sourced from organic amendment types (chicken manure, dairy manure, and Milorganite™) applied at different rates (0, 168, 336, 672 kg total N/ha) were monitored within and below the rootzone of collard greens cultivated on a sandy loam soil in Prairie View, TX, USA. Macro- and micronutrients (e.g., TN: total nitrogen, P: phosphorous, K: potassium, Na: sodium, Ca: calcium, Mg: magnesium, B: boron, Cu: copper, Fe: iron, and Zn: zinc) were analyzed from soil solution samples collected during six sampling periods from within and below the rootzone. The organic amendment types and rates significantly ($p < 0.05$ and/or 0.01) affected nutrient dynamics within and below the crop rootzone. Chicken manure released significantly more TN, P, K, Na, Ca, Mg, B, Cu, and Fe than the other two amendments. The application of chicken manure and Milorganite™ resulted in higher below-the-rootzone leachate concentrations of TN, Na, Mg, and Ca than in the leachates of dairy manure. Dairy manure treatments had the lowest concentrations of TN, Ca, and Mg; whereas, Milorganite™ had the lowest concentrations of P, K, Na, B, and Cu in the collected leachates.

Climate change-induced variations in blue and green water usage in U.S. urban agriculture

We investigated the influence of local climate change on irrigation requirements, and green and blue water usages for turf grass and three common urban agriculture crops (carrots, spinach, and sweet corn) in eight mid-sized U.S. cities. Baseline (1980–2010) and Future (2040–2050) daily climate data were combined with site-specific crop water uptake data to calculate irrigation requirements using the Irrigation Management System Model, IManSys, a numerical simulation model that uses a water balance approach. On the east coast, increases in summer precipitation during the crop growing seasons result in relatively small increases in blue water contributions (<222%) to crop water demands. On the west coast, though, decreases in precipitation lead to more drastic increases in blue water contributions (>222%) for these same crops. The energy requirements and greenhouse gas footprints of urban agriculture were weakly correlated to the blue water portion of the IRRs in individual cities but were largely impacted by the source of the water used.

Crop Growth, Air and Water Quality, Yield, and Economic Benefits of Sweet Corn in Response to Organic Amendment Types and Rates

The objectives of this project are to (i) evaluate and quantify the effect of organic amendments types and rates on crop yield components and nutrient and water use efficiency; (ii) quantify the effects of these treatments on soil organic carbon (SOC), CO₂ emission, soil moisture, and nitrogen dynamics within and below the root zone; (iii) define, compare, and correlate critical factors that contribute to crop yield, nutrient- and water-use efficiencies, SOC sequestration, soil CO₂ emissions, and NO₃⁻ leaching; (iv) formulate environmentally sound and economically viable organic production (OP) practices; and (v) conduct an outreach program to demonstrate organic cultural practices to different stakeholders. A field experiment was conducted in a factorial design with three replications of its treatments of two types of manure (chicken and dairy), three manure applications rates (0, 224, and 448 kg total N ha⁻¹), and two rates of biochar (2.5 and 5 t ha⁻¹) at Prairie View A&M University Research Farm, Texas. Plant height, cob length, cob diameter, and ear height were significantly affected by manure rate. Sweet corn produced tassels and silks earlier in chicken manure-treated plots than in dairy manure-treated plots. The sugar content was affected by both biochar and manure rate. The manure type, rates, and growth stages significantly affected SPAD and NDVI values, but no interaction effects among treatment variables were detected. The maximum soil CO₂ emissions are observed in the plot with chicken manure (448 kg total N ha⁻¹) and biochar (5 t ha⁻¹). Air temperature positively correlated with the recommended rate of organic manure (chicken and dairy) and biochar. The soil moisture showed a positive correlation with all types of treatment, indicating an increasing soil CO₂ emission with increasing soil moisture.

Addressing the challenges of natural resources and environmental management

A hydrological modeling framework using SWAT (Soil and Water Assessment Tool) was developed to investigate the spatiotemporal patterns of flood across the Navasota River Basin (NRB), the long-term precipitation and streamflow trends and step trends before and after the dam construction in the Navasota River basin. The Navasota River basin study results showed an increasing trend ($p < 0.01$) of streamflow in the 10-year moving average of the annual and monthly peak flow in the Navasota river basin near Easterly, Texas station. However, there were no statistically significant differences ($p > 0.05$) in the annual and monthly peak flow. Results of the change-point detection analysis showed that there were peak flow changes in 1988 after the dam construction. The impact of Uri on drought severity, soil profile moisture content, and vegetation cover (Normalized Difference Vegetation Index, NDVI) throughout Texas was examined. There was a reasonably strong correlation between the Snow Water Equivalent (SWE) contribution of Uri and the increase of the rootzone soil moisture. Overall, Texas NDVI values seriously decreased due to Uri.

Soil Compaction Spatial Variability in the Wockley Soil in PVAMU Student Garden

The objectives of this project were to 1) measure soil compaction for 126 soil depths from 6 soil sites and 3 replicates (triplicates) at each soil site; 2) compare and contrast the soil compaction data by soil layer depth using descriptive statistics to determine spatial variability; and 3) use inferential statistics to analyze soil compaction within and across 6 soil sites. The soil compaction data were collected in the field at 6 locations (S1, S2, S3, S4, S5, S6) with triplicate (3) satellite locations, within a 1-meter radius of the location center point, in the PVAMU Student Garden, at the following depths (inches): a) 0-2; b) 4-6; c) 8-10; d) 12-14; e) 16-18; f) 20-22, and g) 24-26, to measure soil compaction in the surface and subsurface zones. Conclusions: 1) Lowest average soil compaction value at Site S6 (229) compared to the highest value at Site S4 (263) with a difference of 32 psi; 2) Shallowest root limiting layers occurred at Sites 4 and 5 (-3.5) with deepest root limiting layer at Site 6 (-6.5); a difference of 3 inches; 3) The Grand Average Root Limiting Depth was (-4.8) which differed by (-7.2) from the Ideal Root Depth of 12 inches; and 4) The Grand Average Root Limiting Depth was 58.7% lower than the Ideal Root Depth which impacts plant growth, vigor, and yield potential.

Critical Issue: Adult and Community Leadership (1862)

It is an 1862 Institution Critical Issue. However, we are an 1890 Institution; therefore, this section is not applicable.

Critical Issue: Agriculture Production (1862)

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Critical Issue: Community and Economic Development (1862)

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Critical Issue: Community and Economic Development (1890)

Within this critical issue, we highlight the Small Business Training & Assistance workshop. Staff in El Paso, Willacy, Jefferson, Harris, and Hidalgo Counties; along with State Headquarters Specialists, conducted workshops across the State in the areas of small business start-up, business financing, business planning, and State contract opportunities through multiple workshops. These were successfully completed in addition to the popular Businesses In Development (BID) training series. Over 384 trainings were completed, and 1037 training hours were served. Small business/small farm loan applications totaled - \$3,125,050 and there were 69 HUB profiles reviewed.

The Community & Economic Development (CED) Rural Home Loan Packaging Program (RHLP) provided informative training and packaging assistance to promote and advance successful homeownership. Staff conducted 29 housing-related workshops reaching 1,082 consumers and referring 210 consumers to lenders for housing financing. Staff also conducted nine disaster trainings and assisted over 100 families with new furniture.

The Rural Workforce Academy, through 41 workshops and group trainings, 248 pre-apprentices were trained and 210 employed through work-based learning (WBL) and/or Apprenticeship opportunities through our employee partners. Also offered were opportunities for the unemployed and underemployed in Basic Construction, Nursing, Cybersecurity, and Organic farming. 800 adult participants received wraparound services; WBL participants pay received \$432,000; training scholarships approved for participants \$86,000; and daycare scholarships for participants \$28,000.

Critical Issue: Connecting Agriculture and Health (1862)

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Critical Issue: Crop Production and Utilization (1890)

1890 Extension:

Within the Crop Production and Utilization (1890) critical issue, the Small Farm Institute unit launched the Urban Agriculture Program in November of 2021 aimed at reaching underserved farmers and producers in urban areas. In 2022 an Urban Agriculture Convention was held in Houston with experts in the fields of agriculture, climate change, clean eating, conservation, production equity, and sustainable agriculture. In addition to this convention grants, supplies, and demonstrations were conducted to extend the education efforts. On PVAMU the farm a USDA demonstration plot was created.

1890 Research:

High-value niche crops/emerging new crops are potential alternative crops for small-acreage farmers to explore to improve their farm incomes and enhance the sustainability of their operations. Despite the presence of a market and suitable climate conditions for their production in Texas there is little production in the state.

Field and greenhouse trials were conducted on selected high-value specialty crops and as well as hemp which is considered as an emerging crop to identify the best performing cultivars/varieties/genotypes to recommend to farmers alongside best management practices for their production. High-value vegetable and small fruits investigated under varied production environments include vegetable amaranth, Egyptian spinach, Malabar spinach, cocoyam, purslane and goji berries. While vegetable amaranth, Egyptian spinach, Malabar spinach were grown under both open field and high tunnel environments, cocoyam and purslane were grown in the greenhouse. Goji berry experiments were done in the open field only. These field trials were replicated experiments and were conducted using plasticulture and drip irrigation. Landscape fabric was used instead for Goji berry field plots. Hemp genotypes investigated include sweet sensi, cherry wine, cherry blossom, an unknown genotype and America Victory 1. Their performance was evaluated in the greenhouse. Field trials were unsuccessful because of harsh weather conditions at the time of field establishment using transplants. Plant microbe interactions and metagenomics studies were also conducted for the hemp genotypes investigated.

The better performing specialty crop cultivars identified include red beauty and red leaf vegetable amaranth, Asian and African cultivars of Egyptian spinach, green Malabar spinach, cocoyam (*Xanthosoma sagittifolium*), Phoenix Tears and Sweet Life Goji berry and Goldberg Golden purslane. While nutrient management studies are ongoing, the use of plastic mulch or landscape fabric coupled with mechanical weed control are effective for weed management. Neem and Chrysanthemum based products like Azaguard and Pyganic have been effective for insect pest management in these crops. For hemp, sweet sensi and cherry blossom were identified to be the better performing genotypes in the greenhouse. Soil, root, stem and leaf microbe bioflora have been identified and they show different characteristics in different genotypes. Potential diseases and insect pests have also been identified.

Collectively, a total of ten students were provided experiential research training from these projects. Two postdocs also received research training. In person and virtual training workshops conducted to share the opportunities and challenges associated with growing these crops and other sustainable agricultural production practices like the incorporation of cover crops into crop production systems reached a total of 60 farmers and potential farmers. While work on manuscripts for submission to peer-review journals are ongoing, research presentations done by scientists and student trainees based on data generated from these studies are presented below:

1. Morphological and phytochemical diversity of grain-type industrial hemp:(*Cannabis sativa* L.). Association of 1890 Research Directors (ARD) Biennial Research Symposium, Atlanta, GA, April 2-5, 2022.
2. Exploration of Cannabis wax using as edible coating in perishable fruits and vegetables. Association of 1890 Research Directors (ARD) Biennial Research Symposium, Atlanta, GA, April 2-5, 2022.
3. Microbial community structure of retting *Cannabis sativa* L. inoculated by an undefined microbial culture. Association of 1890 Research Directors (ARD) Biennial Research Symposium, Atlanta, GA, April 2-5, 2022.
4. Effect of nitrogen application on the growth and yield of Egyptian Spinach. ASA, CSSA, SSSA International Annual Meeting, Baltimore, MD, Nov. 6-9, 2022.
5. Nitrogen response of Malabar spinach in Southeast Texas. ASA, CSSA, SSSA International Annual Meeting, Baltimore, MD, Nov. 6-9, 2022.
6. Performance of Egyptian spinach under high tunnel and open field environments in southeast Texas. Association of 1890 Research Directors (ARD) Biennial Research Symposium, GA, April 2-5, 2022.
7. Response of vegetable amaranth to nitrogen fertilization. Association of 1890 Research Directors (ARD) Biennial Research Symposium, Atlanta, GA, April 2-5, 2022.
8. The effects of nitrogen rate on the growth of green Malabar spinach (*Basella alba* L.) in sandy loam soil in southeast Texas. Association of 1890 Research Directors (ARD) Biennial Research Symposium, Atlanta, GA, April 2-5, 2022.
9. The effects of nitrogen rate on the growth of green Malabar spinach (*Basella alba* L.) in a high tunnel in southeast Texas. Association of 1890 Research Directors (ARD) Biennial Research Symposium, Atlanta, GA, April 2-5.

Critical Issue: Disaster Management & Outreach (1890)

The theory “social vulnerability to disasters” identified how marginalized status within a society creates inequitable risk and consequences from disasters. Disasters, natural and man-made, have a considerable impact on communities. Experience, projects, and programs have revealed enormously positive effects of education for vulnerability reduction and disaster risk management. The Cooperative Extension Program is unique in structure and functions as a nationwide educational network with county or regional staff

members in every state. Because disaster work cuts across multiple programs areas – Agriculture & Natural Resources, Family & Consumer Sciences, Community Resource and Economic Development, and 4-H/Youth Development – there are vast roles that the Cooperative Extension System can play in collaboration with researchers as related to disaster response and relief.

The 1890 EDEN Advisory Group was formed to foster better 1890 land-grant participation in Extension Disaster Network (EDEN) and help devise a coordinated strategy to create and deliver effective research-based educational programs and training that targets limited resource audiences. Fourteen of the nineteen 1890 Land Grant Universities currently participate in the 1890-EDEN Advisory Group. This Advisory Group carried out a needs assessment in 2017 to gather baseline information focused on current disaster management programming within the 1890 land-grant system. This needs assessment further identified curriculum development, training, and technical assistance as critical areas within the 1890 network that need capacity. This project aims to engage the network of 1890 institutions—particularly their Cooperative Extension programs – as partners in providing research-based disaster education to vulnerable populations and their communities. Specifically, this project will integrate research and extension by focusing on the following areas:

- Conduct an interdisciplinary and multi-state assessment of needs, issues, and capabilities in disaster management for vulnerable populations.
- Develop educational programs and materials specific to disaster education that address the needs of vulnerable populations and limited resource audiences.
- Promote community-based projects that explore innovative preparedness solutions.
- Foster collaboration in disaster management among 1890 LGUs and EDEN partner institutions.

In 2022 the Advisory Group submitted a CBG proposal with PVAMU as the lead institution through PVAMU's internal system, but it was not selected for final submission to NIFA. To address the need for training and improved disaster education, the Advisory Group has approached the problem through the lens of enhancing the cultural competency of limited resource audiences in emergency management. PI Estwick works with a team of 1890 partners to develop training materials used in the project. The team was supposed to conduct training in the Spring of 2022, but it was postponed due to the COVID-19 pandemic. In September 2022, the team conducted training in Chicago for Extension Personnel and non-profit organizations, and over 24 people participated. The Advisory Group is currently developing instructor and student manuals to widen the scope and availability of the training.

Critical Issue: Food Safety and Education (1890)

1890 research:

Treated soil organic amendments alter produce phyllosphere microbiome but do not increase the risk of contamination with foodborne pathogens:

Organic soil amendments are applied to soils to improve plant growth and maintain soil quality and health. However, the improper handling and application of organic soil amendments, especially in their raw or undertreated form or applying manure at the wrong time, may result in contamination of fresh produce with foodborne pathogens (FBP). Additionally, there is limited data on the effect of treated/composted manure-based biological soil amendments on the survival and persistence of FBP originating from intestinal reservoirs in the soils and potential FBP contamination of produce grown in such soils.

This study assessed the response of phyllosphere microbiome of collard greens to organic soil amendments including composted dairy and poultry manures and treated sewage sludge (milogranite).

A significant increase in alpha-diversity was observed with produce grown in the amended soils compared to the control based on the observed OTUs ($p \leq 0.05$). PCoA ordination plot of Weighted UniFrac distance shows distinct separation of cow manure-treated soils from untreated controls and chicken/milogranite treated soils. Proteobacteria and Gammaproteobacteria populations significantly increased in phyllosphere of collard greens grown in the treated soils ($p \leq 0.05$) but potential foodborne pathogenic genera and species such as Salmonella, and Escherichia spp were not enriched. In conclusion, while organic amendments improve soil microbial health, potential bacterial pathogens originated from the livestock intestines may enrich in the amended soils. This might increase the risk of transfer of bacterial pathogens to produce grown in such soils. However, efficient composting substantially reduces the risk of contamination of produce with FBPs.

Harnessing the value of goats to food Safety and human health :

This research is highly important and relevant. Human health is closely connected to the health of farm animals like goats. Zoonotic diseases can be spread between animals and people.

Brucellosis, listeriosis, salmonellosis, sore mouth infection, and mastitis are common diseases in goats.

Antibiotics are used to treat the majority of these diseases. However, our research team is currently looking for alternatives to antibiotics.

Critical Issue: Food Security in Texas Communities (1890)

Modulating shoot branching to increase crop yield and alleviate food insecurity

Food production should be increased by more than 50% from the current to feed ten billion people by 2050. Most of the global caloric needs are obtained from the major grain crops such as wheat, maize, rice, and sorghum that are grown in large acreage in Texas. The genetic yield potential of these crops did not increase during the past three decades, while the cost of crop production increased, making growing these crops in the US less profitable for farmers. Therefore, the genetic yield potential of the major grain crops should be improved to ensure profitable crop production systems in the US and global food security.

Plant shoot architecture is a major yield component of grain crops such as wheat, rice, and sorghum. It is determined by the number of shoot branches and their position. Shoot branches develop from axillary buds. The buds either grow into branches or remain dormant. Most of the buds in the currently cultivated crops grow into branches. A higher proportion of the branches die before reaching the reproductive stage and giving yield. Resources, including water and nutrients from the soil, used by these unproductive branches are considered as wasted. In addition, the unproductive branches compete with the productive branches for light, water, and nutrients. The competition impairs the growth and final yield of the productive branches. Therefore, we are investigating to identify the optimal number of branches that maximizes resource use efficiency and yield and strategies to develop new crop types that develop the desired number of branches.

Since branches develop from buds, we are investigating factors that control the dormancy and growth fates of buds in mutants and the corresponding near-isogenic wild-type genotypes of sorghum, maize, and wheat obtained from Cornell University, Donald Danforth Plant Science Center, and the Commonwealth Scientific and Industrial Research Organization (CSIRO, national lab equivalent to USDA) in Australia. The mutant lines produce either a higher or lower number of branches than the normal wild-type plants. We investigated the shoot branching of the sorghum mutant and its near-isogenic wild-type genotypes grown under controlled conditions in our state-of-the-art plant growth chamber equipped with light-emitting diodes of various wavelengths. The growth chamber enabled us to change the light quality and intensity to simulate the competition for light in the field and alter sugar production by the plants. Our results revealed that both light quality and reduced photosynthesis induce bud dormancy (thus reducing shoot branching) by limiting the sugar supply to the buds. However, our results also indicated that light quality and reduced photosynthesis induce bud dormancy through distinct molecular mechanisms and genes. Therefore, our next goal is to understand better the distinct molecular mechanisms and genes that induce bud dormancy by limiting sugar supply to the buds. The long-term goal of our project is identifying a suite of agriculturally important shoot branching genes and modulating their function to optimize shoot branching as desired and increase yield.

Nutraceuticals and Functional Foods

Very important. Dietary fiber (i.e., oat bran), probiotics (*Lactobacillus rhamnosus*), prebiotics (i.e., inulin), omega-3 fatty acids (i.e., DHA, EPA), plant polyphenols (i.e., catechins from green tea, and spices (i.e., curcumin) are examples of nutraceuticals and functional foods.

Functional foods are recommended to be consumed as part of the diet and not in supplement form (i.e., not as tablets or capsules). Functional foods, pharmafoods, and nutraceuticals are synonyms for foods that can prevent and treat diseases.

Our research team has published the use of nutraceuticals such as lutein and fucoxanthin for use in value-added dairy foods (milk, yogurt). Modulating shoot branching to increase crop yield and alleviate food insecurity.

Critical Issue: Fostering Strong Families (1890)

In 2019-2020, 20.78% of adults were experiencing a mental illness. There are approximately 50 million Americans who experience mental illness. However, many are reluctant to seek help or don't know where to turn for care. The majority of individuals within the U.S. with substance abuse disorder are not receiving treatment. Recognizing mental health and substance use challenges can be difficult, which is why it's so important for everyone to understand the warning signs and risk factors. Even when friends and family of someone developing a mental illness recognize something is amiss, they may not know how to intervene or direct the person to proper treatment.

Additionally, 1 in 10 youth in the U.S. experience depression, which impairs their ability to function at school or work, at home, with family, or in their social life. Mental Health First Aid encourages early detection and intervention by teaching participants about the signs and symptoms of specific illnesses like anxiety, depression, schizophrenia, bipolar disorder, eating disorders, and addictions. The

program offers concrete tools and answers key questions like “What can I do?” and “Where can someone find help?” Participants are introduced to local mental health resources, national organizations, support groups, and online tools for mental health and addiction treatment and support.

Due to the stress of many youth and adults struggling with mental health, the Prairie View A&M University Cooperative Extension Program (CEP) Program Specialist conducted a training for 12 county staff on Healing Trauma and Mind Matters to be conducted virtually within their counties. Within 6 CEP counties, agents are teaching the *Healing Trauma* curriculum for adults. *Healing Trauma* is an evidence-based, gender-responsive, six-session (90-minute sessions) curriculum for women, especially designed for settings in which a short-term intervention is needed. Examples, where agents are teaching this curriculum include a domestic violence shelter, a homeless shelter, and individuals who are experiencing traumatic life events. The curriculum uses psychoeducational and cognitive-behavioral therapy (CBT) techniques, expressive arts, body-focused exercises, mindfulness, and relational therapy.

Youth participated in the Mind Matters – Overcoming Adversity and Building Resilience curriculum. Individuals experiencing trauma and toxic stress often have difficulty regulating their emotional responses when facing challenges in school, life, and relationships. Mind Matters’ lessons teach people aged 12 and up to heal from Adverse Childhood Experiences (ACEs) and other negative experiences with innovative methods based on current research. These skills give individuals a way to take charge of their emotions and improve their states of mind. Additionally, one of the agents has used YOGA to expose these individuals to exercise and relaxation. CEP agents incorporated “Healing Trauma” for about 280 participants for 6 sessions and 12 lessons on Mind Matters for about 420 Youth. Participants have stated that they have learned how to deal with various life situations, their past and communicate with others.

Adults who participated in the Healing Trauma curriculum:

- 85% of participants state that they can recognize the signs that someone may be dealing with a mental health problem or crisis as a result of this course.
- 93% of participants stated that they can reach out to someone who may be dealing with a mental health problem or crisis as a result of taking this course.
- 95% of participants stated that they can now assist a person who may be dealing with a mental health problem or crisis to connect with the community, peer, and personal support as a result of this course.

The youth provided testimonials similar to other participants in previous workshops. They stated that they benefitted – identify negative information on social media and how to seek help when encountering traumatic experiences.

Critical Issue: Health and Wellness (1862)

It is an 1862 Institution Critical Issue. However, we are an 1890 Institution; therefore, this section is not applicable.

Critical Issue: Healthy Lifestyles (1890)

Our “Live Well, Eat Well, and Be Active with Diabetes” program is a major outcome of the Healthy Lifestyles critical issue. This program assessed the effectiveness of the Live well, Eat well, be Active with Diabetes curriculum with digital support via a mobile application. Target audiences consisted of African American and Hispanic populations in four counties to enhance diabetes management. A total of 1,341 contacts were reached through on-site programs, virtual program sessions, Facebook live streaming sessions, recipe videos, and other videos pertaining to health and wellness. At each location/site a series of 6 one-hour classes that promoted diabetes education, awareness, and prevention, controlling diabetes through nutrition, risk factors, and complications of diabetes.

Critical Issue: Natural Resources and the Environment (1862)

It is an 1862 Institution Critical Issue. However, we are an 1890 Institution; therefore, this section is not applicable.

Critical Issue: Preparing Youth for Life and Work (1890)

Preparing Youth for Life (1890) critical issue is the prominent goal of our 4-H unit. The 4-H Youth Development unit prepares youth for life and work through leadership development, college preparation and career exploration in the areas of science, health, and civic engagement. They had 15,802 contacts with youth through educational series and had an additional 154,168 via outreach. Of the participants surveyed (n=424), 68% and 53% respectively were more aware or interested in Agriculture/STEM related careers. After engaging in Heroes 4-Health, 63% (n=893) intended to adopt practices leading to a healthy lifestyle such as physical activity. Ninety-two percent (n=193) of youth reported increases in their leadership skills, with at least 80% improving organizational skills and more than 70% having better decision-making, self-esteem, ability to problem solve, goal setting and motivation.

Critical Issue: Sustainable Livestock Management (1890)

1890 Extension:

This very salient critical issue, “Sustainable Livestock Management,” lead us to form a highly impactful collaboration. Through the exemplary partnership with Merck Animal Health, we assisted over 125 limited-resource, historically underserved cattle ranchers to take the first step in protecting their animals and their bottom line. It is estimated that Texas cattle producers saved nearly \$70,000 in cost due to our programmatic efforts.

1890 Research:

The goat is a primary source of protein and income for many of the world's limited-resource farmers and indigenous peoples. Increasing the efficiency of production and reproduction in livestock will add value to our stakeholder’s livestock operations.

Research in the areas of both reproductive and feed efficiency has been conducted to improve the meat and dairy production of goats.

Studies on the failure of the goat corpus luteum to support early pregnancy have resulted in the alteration of estrous synchronization protocols, which improved the success rate by 20%. This improvement will allow the acceleration of genetic improvement in the goat through artificial insemination. Residual feed intake (RFI) studies have validated the use of the GrowSafe system in the goat and allow the use of RFI to evaluate its effect on numerous reproduction and production traits.

Critical Issue: Youth Development and Leadership (1862)

It is an 1862 Institution Critical Issue. However, we are an 1890 Institution; therefore, this section is not applicable.

Merit and Scientific Peer Review Processes

Updates

No changes

Stakeholder Input

Actions to seek stakeholder input that encouraged their participation with a brief explanation

"None"

Methods to identify individuals and groups and brief explanation

"None"

Methods for collecting stakeholder input and brief explanation

"None"

A statement of how the input will be considered and brief explanation of what you learned from your stakeholders

Stakeholder input generates support in addressing concerns identified by partners, sponsors, and customers when there is evidence of public value. Program interpretation highlights changes and practices that positively impact the well-being of families, the community, the economy, and the State.

Highlighted Results by Project or Program

Type	Projects / Programs
Projects / Programs without a Critical Issue	0
Not Provided	