2019 Annual Report of Accomplishments and Results

U.S. Virgin Islands
University of the Virgin Islands
Agricultural Experiment Station and Cooperative Extension Service
[insert name of Institution reporting in this document]
[insert name of Institution reporting in this document]

I. Report Overview

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

1. Executive Summary (Optional)

During the second year of recovery since two devastating category 5 hurricanes in September 2017, the Agricultural Experiment Station is awaiting FEMA funding to repair storage sheds, greenhouses, aquaculture and animal facilities. This has hampered research during the year, but progress was made as best as possible under these conditions.

A new Dean of Agriculture Programs was hired and will also serve as Director of AES and CES. Existing faculty and staff positions, as well as current vacancies will be evaluated and modified where feasible to develop joint appointments between AES, CES and the Academic unit.

II. Merit and Scientific Peer Review Processes

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

Process	Updates
1. The Merit Review Process	
2. The Scientific Peer Review Process	

III. Stakeholder Input

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

Stakeholder Input Aspects	Updates
1. Actions taken to seek stakeholder input that encouraged their participation with a brief explanation	
2. Methods to identify individuals and groups and brief explanation.	
3. Methods for collecting stakeholder input and brief explanation.	
4. A Statement of how the input will be considered and brief explanation of what you learned from your stakeholders.	

IV. Planned Program Table of Contents

No.	Program Name in order of appearance
1.	Small Livestock and Beef Production
2.	Livestock Production
3.	Computer Training and Technology
4.	Sustainable Agriculture
5.	Urban Gardening
6.	Urban Forestry
7.	Marketable Skills for Limited Resource Families, Youth and Communities
8.	Food Safety Education
9.	A Healthy, Well-Nourished Population
10.	4-H - Youth and Volunteer Development
11.	Water Quality
12.	Natural Resources and Environmental Management
13.	Aquaculture
14.	Agronomy - Cover Crops
15.	Biotechnology - Plant Breeding

V. Planned Program Activities and Accomplishments

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

No.	Title or Activity Description	Outcome/Impact Statement	Planned Program Name/No.
1.	Hatch: Evaluation of artificial insemination in sheep with liquid semen #VI-17-0001 Multistate Hatch: Impacts of stress factors on performance health and well-being of farm animals #W3173	A study was conducted to evaluate the quality of extended hair sheep ram semen stored as a liquid at 5°C. St Croix White (STX; n =6) and Dorper x STX (DRPX, n = 5) rams were collected weekly for 3 wk using estrus ewes fitted with an intravaginal collection vial. Semen was kept at 32°C during transport to the lab and during processing. Semen was evaluated for percent motility (MOT), viability (LIVE) and concentration. Semen was extended to a final concentration of 250 x 10^6/mL in a one-step dilution with a skim UHT milk extender with 10% egg yolk by volume and packaged into 0.5 mL straws. Straws were stored at 5°C for 96 h, or in an Equitainer® set up using the manufacturer's instructions, for 24 h at which time they were transferred to the 5°C storage for 72 h. Semen was evaluated for MOT and LIVE at -1, 0, 24, 48 72 and 96 h relative to cooling. The MOT decreased from 81.7 ± 2.9 % at -1 h to 52.2± 2.9% at 96 h. The LIVE decreased from 83.1 ± 3.6% at -1 h to 50.4 ± 3.6% at 96 h. These results show that ram semen stored as a liquid at 5°C can maintain motility and viability for 96 h. A study was conducted to evaluate the impact of pregnancy on body temperature of hair sheep. Multiparous St. Croix White ewes (n = 9) were evaluated over 4 d at 128 d of gestation (PREG) and 45 d postpartum (PP) while lactating. A set of non-pregnant, non-lactating (DRY) ewes (n = 9) were evaluated at each time. Temperature data loggers recorded vaginal temperature (VT) at 10-min intervals for 96 h. Mean temperature and solar radiation were 26.3 °C and 212.3 W/m_2, respectively. Ewe VT was lowest in PREG ewes compared to DRY or PP ewes (38.38 ± 0.02 vs 38.76 ± 0.02 vs 38.77 ± 0.02, °C, respectively). The VT of PREG ewes was lower than that of DRY ewes during 0 to 0480 and 1920 to 2400 h, but there was no difference between 0480 and1920 h.	Small Livestock and Beef Production #1

		There was no difference in VT between PP and DRY ewes at any time of the day . The lower VT of PREG ewes compared to PP and DRY ewes may be a protective mechanism for the developing fetus.	
	Small Livestock Production	The "Buy Local, Eat Fresh" program promoted the consumption of locally produced animal products. The external parasite monitoring program continued for livestock farms to document parasite populations as an aid in tick control programs. Test sites were restored and monitored for forage evaluation in pastures during recovery from the devastation caused by Hurricanes Irma and Maria. The program continued, as circumstances allowed due to the destruction of livestock housing by the hurricanes, to demonstrate to producers the health and financial advantages of proper housing for livestock. Limited methods of nutrition evaluation were demonstrated to producers so that they could determine the effects of nutrition on reproduction and performance. Information exchange between established and developing farmers continued through farm visits to see what can be done to improve livestock management and production The issues facing livestock farmers include: promotion and demonstration of using drought-resistant forage species with high nutritional content for pastured livestock; decreasing animal losses due to parasites and poor nutrition; increasing the sales and consumption of locally produced livestock products (such as meat and eggs); increasing the number of livestock herds/flocks using complete identification and recordkeeping practices; and increasing the number of pig farmers who are raising their livestock in recommended facilities. Farmers want more improved pastures with forages that have a high nutritional value and are drought resistant. Agriculture professionals (including extension staff), farmers, consumers and the general public are interested in healthier animals being raised locally to increase the quality and value of livestock and livestock products. Youth are interested in learning about livestock and the local livestock industry. Farmers and the public care about recordkeeping and the proper identification of farm animals. The target audience was comprised of livestock producers, extension staff and other agriculture professionals, consumers, youth and the public.	Small Livestock and Beef Production #1

		Ten Workshops (including demonstrations) were conducted on the management, nutrition, housing, and identification of livestock to increase farmer knowledge about the best management practices to improve local livestock production. Poultry production was featured as becoming a popular activity in the Virgin Islands. Three on-farm demonstration sites were maintained and monitored to observe and display the performance of selected improved grass varieties under farmer-managed conditions for pastured livestock. Maintenance of pastures, breed selection and de-worming of animals were utilized as practices to reduce losses due to parasites, resulting in increased livestock production and sales. During the year six farms were monitored. Farms were visited for general evaluation of management techniques including parasite monitoring and assessment. During these visits, to fifteen farms, counseling and other technical advice were provided. The implementation of a "Buy Local' campaign continued encouraging consumers to support local farmers and the local economy by buying locally produced meats and other livestock products. Overall, the program had 720 direct and 1,500 indirect adult contacts along with 500 direct and 1,200 indirect youth contacts. As farmers continue the process of rebuilding and restoring their facilities, including perimeter fencing, they are provided with technical advice and other assistance from extension staff and other partnering agencies. Farmers are slowly recovering and working diligently to get their farms fully functional again following the ravages of the hurricanes. Farmers observed and received information about the performance of drought resistant forages with high nutritional value. The selected varieties are being promoted to other farmers. As the recovery continued, farmers are slowly being able to increase the number of animals raised and available for sale. With increased use of proper animal identification, farmers were more able to locate their roaming animals. Technical assistance and advice were provided to livestock producers following the destruction of perimeter fencing on their farms.	

		The destruction caused by two category 5 hurricanes, in 2017, still lingers and continued to affect the outcomes of the planned programs. The recovery efforts are ongoing, slower than expected in some areas. The local economy and agriculture industry are still adversely affected.	
2.	Multistate Hatch: Enhancing sustainability of beef cattle production in Southern and Central US through genetic improvement #S1086	Due to hurricane Maria recovery still occurring, there has been no new activity regarding thermotolerance studies on this project. Plans are being made to conduct studies in the next reporting period.	Livestock Production #2
3.	Computer Training and Technology	There is a large adult population, in the Virgin Islands, that do not possess basic computer, MS Excel, and PowerPoint skills. Some of these individuals need to acquire these computer skills in order to get employment to increase their household income and take advantage of new technology. In this fast-moving technological world, these skills are needed so that persons do not get left behind. Low-income adults residing in the Virgin Islands, who do not have adequate basic computer, MS Excel and PowerPoint skills. Some need these skills to become more marketable when seeking employment or to advance in their jobs, which would ultimately improve their household income. There are other individuals who desire improving their technological skills to accomplish their day-to-day tasks more effectively. Four seven-week Basic Computer Training Courses were conducted. These classes taught how to use Microsoft Windows, Microsoft Word, E-mail, and the World Wide Web. Three six-day workshops were conducted that focused on increasing participant's knowledge and usage of MS Excel. Two four-day workshops were conducted that focused on increasing participant's knowledge and usage of MS PowerPoint. 95% of the 31 participants indicated that they acquired/increased their knowledge and/or usage of Microsoft Windows.	Computer Training and Technology #3

		97% of the 79 participants indicated that they acquired/increased their knowledge and/or usage of Microsoft Word. 98% of the 79 participants indicated that they acquired/increased their knowledge and/or usage of E-mail. 97% of the 57 participants indicated that they acquired/increased their knowledge and/or usage of MS Excel. 98% of the 35 participants indicated that they acquire/increase their knowledge and/or usage of MS PowerPoint.	
4.	Sustainable Agriculture	Producers in the U.S. Virgin Islands need increased knowledge and awareness regarding the principles and practices of sustainable agriculture. Some of the specific areas of need include farm recordkeeping and business management, natural resource conservation, and food safety. The program's target audience consisted of crop and livestock producers, outreach professionals from public agencies and academic institutions, students, and young adults who aspire to be farmers. The training participants are typically socially disadvantaged, limited resource individuals. • Based on this need, nine interactive training sessions (short courses and workshops) were conducted throughout the territory that focused on record keeping and farm business management. • A two-week hands-on short course was conducted to train mentor farmers about the cooperative business model. • The CES team and its partners conducted four training sessions on the Food Safety Modernization Act. • The CES staff conducted eight school visits and an agriculture focused summer enrichment program during which information about sustainable agricultural principles and practices was disseminated. • The CES team organized and participated in five fairs, exhibits, and demonstrations during which information about sustainable agricultural practices was disseminated. • The CES staff issued 14 announcements and shared technical information regarding sustainable agriculture through print and electronic media. • Conducted six training sessions on value-added agricultural practices.	Sustainable Agriculture #4

		As a result of our planned activities, 1,260 producers (i.e. contacts) increased their level of awareness and knowledge regarding sustainable agricultural principles and practices. These practices included micro-irrigation technology, water harvesting, crop rotation and appropriate practices regarding the Food Safety Modernization Act. The CES staff made a total of 250 contacts via farm visits, office appointments, telephone and on-line communications with producers to respond to inquiries regarding micro-irrigation technology, pest identification and management, and cultural practices in general. During the implementation period, 350 producers (i.e. contacts) increased their level of knowledge regarding value-added agricultural practices. As a result of the planned activities, 300 producers increased their knowledge regarding recordkeeping and farm business management and 400 students (youth) increased their knowledge regarding the principles and practices of sustainable agriculture.	
5.	Hatch: Vegetable performance trials in the USVI #VI-201015 Multistate Hatch: Scaling microirrigation technologies to address the global water challenge #W3128 Hatch: Evaluation of Native Hylocereus sp and Pitaya Varieties #VI-201019	Watermelon is an important crop in the US Virgin Islands. A new yellow watermelon variety was evaluated under multiple growing conditions. TVI-201015 these included no till, conventional, seaweed, grass/hay mulch, weed barrier and plastic mulch. The replicated yellow watermelon trial was grown during the summer months which is the dry season in the US Virgin Islands. Data was collected on number of fruits per plant, fruit length, fruit width, fruit weight, rind thickness and soluble sugar content. A scheduling system was developed for yellow watermelon production. This system incorporated a solar power source with battery back-up, soil moisture sensors and a data controller. A yellow watermelon variety was grown during the summer months. Mulch, no-till and permeable weed-barrier were also involved in the technological system. The two severe hurricanes had a strong impact on the Pitaya plot. Major pruning of damaged stems was required. Limited production and data were obtained during this recovery year.	Urban Gardening #5
	Urban Gardening	An increased number of residents expressed an interest in establishing home gardens to enhance their health and well-being in addition to reducing their domestic food costs.	Urban Gardening #5

		The target audience consisted of homeowners, public housing residents, schoolteachers, students, senior citizens, gardening groups, and employees of public agencies. • Based on this need, 15 educational classes were conducted to disseminate information regarding the benefits and basic principles of gardening. • A total of 12 workshops and demonstrations were conducted to disseminate information regarding the benefits and principles of urban gardening. • Based on this need, educational displays were delivered during 4 exhibits and fairs that featured the principles of urban gardening and composting. • In order to promote the benefits of urban gardening, 175 announcements were issued via print and electronic media. • In order to promote the benefits of urban gardening, 8 garden plots were established. As a result of the activities conducted a total of: 500 participants increased their knowledge of the benefits of urban gardening; 400 students/youth increased their knowledge about the benefits and principles of urban gardening; 425 residents, representatives of organizations, and members of public and private entities increased their knowledge of the benefits of composting; 800 residents increased their knowledge regarding the most efficient and energy efficient practices in crop and urban gardening production; at least 300 clients reported establishing or expanding urban garden projects, resulting in domestic cost savings for their purchase of food. An estimated 425 clients reported increased knowledge and practice of composting an estimated 100 clients implemented some level of micro-irrigation usage as a part of their urban gardening efforts.	
6.	McIntire Stennis: Establishing trees using active and passive irrigation on arid sites #VI-MS-1601	Three experimental treatments were conducted: trees planted in mulch filled shallow basins, trees planted in the conventional fashion, and trees planted with a PVC pipe with holes drilled into the side closest to the tree. The pipes are approximately 30 cm long with a diameter of 5 cm. Every	Urban Forestry #6

		two weeks a gallon (3.8 L) of water is poured into the pipes. This is considered the active irrigation treatment. The passive irrigation treatment is the use of mulch filled basins to accumulate and conserve rainwater. Each species block consists of 27 trees assigned one of the 3 experimental treatments. Monitoring height growth and survival has occurred since November of 2018. The project got a late start due to the destruction of the greenhouses and their contents by Hurricane Maria in 2017. Therefore, plant production needed to start over in order to have plants for this experiment.	
	Urban Forestry	Partnerships were established, strengthened and continued with public/private agencies, community leaders and groups to provide education, information, and technical advice to the general population. Our educational programs continued to focus on recovery from the destruction caused by the two 2017 Category 5 hurricanes. The primary focus was the revitalization and resurgence of the urban forests. Emphasis was placed on resilience in anticipation of future climate change events including tropical storms. The community is now much more acutely aware of the value of trees/forests and what they provide to the local economy. Now that so many trees have been lost, the valuable contributions they make to the quality of life of residents continues to be evident. The Virgin Islands Agriculture and Food Fair, which attracts thousands of attendees, returned to its normal schedule and provided us the opportunity to share information and increase the knowledge and awareness of the target audience. The devastation, of the urban forests, caused by the 2017 Category 5 hurricanes and urban expansion continues to negatively impact and reduce forested areas in the Virgin Islands. These factors clearly demonstrate the importance of educating the public about the role of trees in the environment, particularly in urban communities. Recovery efforts are ongoing but the economic downturn in the Virgin Islands endures. Many residents continue looking for opportunities to	Urban Forestry #6

		supplement their income. Trees and parts of trees (trunks, stems and branches) are being recycled into moneymaking art pieces. Educating residents, with an emphasis on our young people, is strategic to ensuring that the next generation can be involved in the management of trees in urban and other forest communities. Artisans, homeowners, landowners, persons interested in earning additional income, policymakers, youth, educators, persons concerned about the environment and the general public should all care about the contributions made by urban and suburban forests. As the recovery efforts continue, the focus of restoring the urban forest should be included in those activities. Replanting, proper pruning and management of trees along with planting the right tree in the right place reduces the likelihood of trees conflicting with roads, buildings, utilities lines and other structures. Correcting the problems associated with these conflicts can be costly, not only to the government and property owners but could also result in actions that can be detrimental to the trees. Homeowners, businesses, and organizations who plant trees for symbolic, therapeutic, environmental, and other reasons should care about appropriate tree care and management. Proper planting of trees ensures a good establishment of the tree and increases the likelihood of the root system adapting favorably to the soil environment in which it is growing. Elected and other public officials, arborists, forestry professionals, landscape architects, public planners and residents should all be concerned and care about planting trees in the urban and suburban forests. They should all recognize the importance of trees and other vegetation for improving communities through the social, economic and ecological benefits they provide, especially in this era of climate change. The target audience reached by the project consisted of landowners, natural resource professionals, extension professionals, certified	

		arborists, urban foresters, forestry/arboriculture professionals, policymakers, utility employees/linemen, public works officials, other governmental agency personnel, other UVI personnel, NGO's, youth groups, forestry council members, agriculture advisory groups, private sector landscapers, property managers, homeowners, community groups, and residents. Our educational programs sustained their focus on the recovery efforts from the ravages of two Category 5 hurricanes. The revitalization and resurgence of the forests, especially the urban forests, continued to be the primary focus of the programs. Emphasis was placed on resilience in anticipation of future climate change events. The Virgin Islands now have a tree ordinance. After decades of deliberations, the state legislature passed the Community and Heritage Tree Law. During the process, the Cooperative Extension Service was involved in educating the public about the proposed legislation. The new law protects all public trees, which are those within the right-of-way of public roads and on publicly owned land. The new law (Act 8149) aims to help preserve unusual, historically significant, large or beautiful trees as "heritage trees" and preserve green space. It also creates a process for deciding whether to prune or remove such trees. The Cooperative Extension Service in collaboration with The Botanical Garden of the Virgin Islands and the Community Foundation of the Virgin Islands launched the 'Trees for St. Croix Project' to educate the public on the importance of having trees in both the home and urban landscape. The project will grow and distribute thousands of trees and involve a community-based initiative to collect seeds of local native trees to deposit in a seed bank. The sorting and chipping of the extremely large volumes of hurricane debris - wood and green waste (mainly fallen tree trunks, branches and limbs) generated from the storms continued. Based on the information	

		provided by the Cooperative Extension Service selected fallen trees were identified and set aside for Virgin Islands woodworkers/artisans. Wood waste was converted to mulch and made available for distribution. The chipped materials were collected by the public for use as mulch and for composting. The territorial long-term recovery efforts are ongoing including the recovery of the urban forest. As this happens the valuable contributions that trees make to the tourism industry and the quality of life of residents continues to be evident. The community is constantly being made aware of the value of trees/forests and what they provide to the local economy. Arborist workshops were held focusing on selecting quality trees, planting and establishment of trees, preventative pruning and restoring trees - with special reference to recovering from hurricane damage. The workshops were conducted on St. Croix and St. Thomas and included hands-on demonstrations. The attendees (49) who increased their knowledge consisted of extension professionals, governmental agency personnel, NGO's, natural resources professionals, urban foresters, utility employees/linemen, forestry professionals, private sector landscapers, landowners, property managers and residents. Hundreds of private landowners and homeowners increased their knowledge about a variety of tree-related issues through technical assistance and advice during onsite visits and other communications. Staff served as members of the Virgin Islands Urban and Community Forestry Council and the Virgin Islands Forest Stewardship Council. Assistance and technical advice were provided to Urban and Community Forestry projects. The Cooperative Extension Service helped develop post-hurricane plans for restoring/replacing damaged/destroyed vegetation in VI coastal recreational areas in partnership with local government agencies (VI	

		Department of Agriculture, VI Department of Tourism, Territorial Park managers), community groups (Island Green Builders Assoc., Hull Bay community association, VI Conservation Service), businesses and University of the Virgin Islands partners. Our program facilitated the training and certification of new arborists in the Virgin Islands. Three persons passed the ISA Certified Arborist Exam. Following the devastation caused by the passage of two Category 5 hurricanes, the Virgin Islands continue facing serious economic challenges. The level of funding provided by the central government to the university and partner governmental agencies will continue to be affected. Continued budget cuts and staff shortages are expected to affect the accomplishment of some objectives during this period. Adjustments might have to be made regarding planned goals and objectives and how they will be accomplished.	
7.	Marketable Skills for Limited Resource Families, Youth and Communities	Basic sewing and batik skills provide opportunities for creativity, skill development, creating a personal garment, and ultimately using newly developed skills to earn additional income and explore entrepreneurship The target audience comprised of low-income, at-risk, underserved youth and adults interested in clothing construction and batiking. Conducted three (3) eight-week clothing construction short courses; a summer program for teens, two adult short courses Conducted two batik workshops • 18 teens participated in a summer day camp program and 16 adults completing a basic clothing construction course • learned and used basic clothing construction terms, • identified parts and operated a sewing machine	Marketable Skills for Limited Resource Families, Youth and Communities #7

		• used basic sewing tools and equipment • selected a pattern • created and modeled a personal garment • 12 adults (55%) completed a basic clothing construction course, decided to develop their sewing skills further and enroll in an intermediate clothing construction course where they • reinforced basic clothing construction skills • learned fundamental stitching and basting stitches • put in hems, waist bands, zippers, darts and buttonholes • applied knowledge gained and skills learned to • created a simple personal outfit • saved on average $50/outfit • 14 adults (57% took part in both workshops) participated in two (2) hands-on workshops to introduce and teach batik as a cultural art learning • learned and applied basic batiking techniques • 100% created at least one personal garment or piece of art • 1 adult returned to assist instructor with 2nd workshop External Factors • Recovery and repairs needed due to hurricanes Irma and Maria remain a challenge to offering educational programs to the fullest A total of sixty (60) low-income, at-risk, underserved youth and adults completed an 8-week short course in basic and/or intermediate clothing construction and the art of batiking. All (100%) of participants created at least one simple garment; 55% of participants chose to apply knowledge and skills learned at the entry, applying those skills and broadening their skill to craft a simple outfit or batik craft. One (1) adult shared what she learned as a volunteer to assist instructor with second batik workshop.	

		As estimated cost savings of $50 was reported by the 12 participants in the intermediate clothing construction short course.	
8.	Food Safety Education	Providing food safety and nutrition education outreach via the Expanded Food and Nutrition Education Program (EFNEP) continues to be a high priority due to the fact that the territory is plagued a very high rate of obesity, diabetes and heart disease. These illnesses can be mitigated through proper nutrition, healthy diets, and more active lifestyles. In addition, food is one of the primary forms of cultural expression; issues with avoiding cross contamination, holding and serving food at the proper temperature, and storing food following best practices is important to minimize food borne illnesses. The target audience was comprised of low-income, at-risk, underserved youth and adults residing in public housing communities, or attending public schools, food vendors that take part in events sponsored by the Cooperative Extension Service, and the general public. What has been done? • "Eating Smart, Being Active," engages adult EFNEP clientele in exploring nutrition, diet and health, while promoting increased physical activity • "Show Me Nutrition," leads youth EFNEP participants through a nutrition lesson, hands on healthy snack demonstration, and physical activity • Organize annual food safety training for food vendors participating in annual World Food Day event • Promote EFNEP, food safety and healthy living at CES events and programs, 4-H activities, local fairs Result • 39% of target number of adult contacts, completed "Eating Smart, Being Active"	Food Safety Education #8

		• Partnered with WIC (Women, Infants and Children) Supplemental Nutrition Program, Frederiksted Health Center and 11 public housing communities • 52 adult participants attended Closing Program to receive Completion Certificate • Adopted at least one food safety practice • Identified and placed foods in appropriate food group • developed a family food budget • created a healthy, well-balanced menu • used a grocery shopping list to help control spending • selected a recipe and made a healthy dish • exercised at least 3 times/week • 489 youth participants (61% of the established target of 800) completed a six-week series of EFNEP lessons using "Show Me Nutrition" for their respective grade levels • learned fundamental of MyPlate • identified and placed foods in the appropriate food group • 66% indicated that increased their consumption of fresh produce • located serving size and calories on a food label • reported that they were more likely to choose water to drink • 85% adopted at least one food safety practice • 18 adult food vendors participated in a food safety workshop • Created and presented educational/promotional nutrition and food safety displays at four (4) CES sponsored events; partnered with SNAP-Ed to deliver nutrition education to 3 head start programs as part of Week of the Young Child; provided nutrition information at UVI Health Fairs External Factors	

		• Recovery and repairs still in progress due to hurricanes Irma and Maria were challenges that prevented reached the target # of clientele NARRATIVE SUMMARY A total of 546 low-income, at-risk, underserved youth and adults completed EFNEP programming either via an 8-week series of lessons using "Eating Smart, Being Active", or a 6-week, in-school program using "Show Me Nutrition." All (100%) learned about good nutrition, a healthy diet, the health benefits of increased physical activity, and food safety best practices; 85% reported adopting at least one of the practices learned. In addition to direct nutrition and food safety education taught as part of EFNEP, 18 food vendors received food safety training in preparation for UVI-CES World Food Day. Educational displays and demonstrations promoting nutrition and food safety best practices were present at fairs, events and other venues.	
9.	A Healthy, Well-Nourished Population	A healthy, well-nourished population positively impacts the quality of life, life expectancy, health care, economy, and environment of the territory. Awareness of and access to fresh, nutritious, locally grown produce contributes to a well-nourished population. The UVI Cooperative Extension Service, in partnership with local departments of Agriculture, Education, Health, Human Services, Housing Authority and other public and private agencies and programs, works to provide, relevant, research-based nutrition workshops, short courses and programs that help the public achieve a healthy lifestyle. The target audience was comprised of all Virgin Islands children, youth and families with special attention given to high-risk groups at-risk for diabetes, hypercholesterolemia, hypertension, and obesity. What has been done?	A Healthy, Well-Nourished Population #9

		• "Eating Smart, Being Active," engages adult EFNEP clientele in exploring nutrition, diet and health, while promoting increased physical activity • "Show Me Nutrition," leads youth EFNEP participants through a nutrition lesson, hands on healthy snack demonstration, and physical activity • Promote healthy lifestyles at CES events and programs, 4-H activities, local fairs Result • 587 individuals received nutrition education materials • 300 individuals reported increased awareness of the relationship between food intake, physical activity, stress management and disease prevention. • 35 individuals reported improvement in personal health indicators (e.g. Blood sugar, cholesterol) and awareness of the relationship between parents' dietary practices and childhood obesity. • 489 youth learned about basic nutrition and physical fitness; 85% adopted at least one healthy habit and exercise activity External Factors • Recovery and repairs still in progress due to hurricanes Irma and Maria were challenges that prevented reached the target # of clientele NARRATIVE SUMMARY With the goal of achieving a healthy, well-nourished Virgin Islands, the UVI Cooperative Extension Service partnered with a wide array public, private and	

		parochial programs and agencies to share relevant, research-based information and best practices with the territory's children, youth and families. This collaborative approach resulted in 1,411 children and adults learning more about how to lead a healthy lifestyle; 489 school-aged youth participated in the Expanded Food and Nutrition Education Program (EFNEP) with 416 (85%) adopting at least one healthy practice. Thirty-five individuals reported that their blood sugar and cholesterol improved after participating in CES Nutrition Education Workshops. Over 800 individuals received information and applied their knowledge to improve their own nutrition, diet and health.	
10.	4-H - Youth and Volunteer Development	Providing exceptional, positive youth development programs, events and activities is contingent upon a highly trained team of staff, and youth and adult volunteers. Empowering volunteers through mentoring, training to lead vibrant 4-H clubs, after- and in-school 4-H programs, and special interest clubs is key to our success and the ability to engage Virgin Islands youth in meaningful, interest-motivated programs. The target audience was school-aged children and youth in the Virgin Islands; some programs specifically focus resources on low-income, at-risk, underserved youth. What has been done? • Recruit and train youth and adult volunteers • Facilitate establishment of 4-H clubs and special interest groups in communities, schools and after-school programs • Secure external funding to support healthy living and our work with military youth • Organize and implement exceptional, positive youth development programs, events and activities • Foster partnerships with government agencies, educational programs and non-profit organizations to bring additional resources, volunteers and training to enhance 4-H initiatives Results	4-H - Youth and Volunteer Development #10

		• 159 adults and 72 teens were recruited, trained and supported in their work with 4-H • 10 clubs were established and carried out 4-H project work • 3,325 youth were enrolled; 466 were enrolled in 4-H clubs, 2,111 were engaged through the 4-H Healthy Habits program, and 748 youth participated in eleven (11) positive youth development programs, events and activities (39% of target number of adult contacts) completed "Eating Smart, Being Active" • $38,997 supported 4-H Healthy Habits, 4-H Military Partnership, and Career and Workforce Exploration initiatives • $150,000 supported 47 at-risk youth were enrolled in the Children, Youth and Families at Risk (CYFAR) Program explored nutrition, gardening, and physical activity while receiving homework assistance in a safe, nurturing, afterschool program at Croixville Apartments. External Factors Recovery and repairs still in progress due to hurricanes Irma and Maria impeded, but did not deter our ability to meet and exceed target goals NARRATIVE SUMMARY A total of 231 adult and teen leaders engaged 3,325 youth enrolled in 10 4-H units and special interest programs. In addition, 47 at-risk youth were supported via the CYFAR program. Youth enrolled in 4-H clubs explored 4-H project work in small livestock, arts and crafts, culinary arts, environmental science, entrepreneurship, leadership, and citizenship and community service. Over 2,000 youth engaged in the 4-H Healthy Habits program received at least 6 hours of healthy living programming provided by 48 teens as teachers and health ambassadors. Teens, using their leadership skills, planned and implemented a Hunger Banquet leading 117 youth and their teachers through an experiential learning opportunity to explore hunger, poverty, and food access, equity and security.	

11.	Water Quality	The topography of the U.S. Virgin Islands is mountainous with rapid stormwater runoff potentially causing non-point source pollution of wetlands and nearshore coastal waters. The Virgin Islands soil types are classified as unsuitable for traditional septic tank absorption fields, according to the USDA Soil Survey of the United States Virgin Islands (2000). It is critically important to raise awareness of the health risks associated with water quality impairment caused by inadequate and poorly maintained onsite wastewater treatment systems [OWTSs]), especially the common locally used "soaker style" septic systems. Homeowners learnt how various household substances (i.e. fat/oil/grease and Pharmaceuticals and Personal Care Products [PPCPs], etc.) also can negatively affect OWTSs, water resources, marine life and human health. Requests for site visits and CES Healthy Home Program assessments and presentations increased. Excess nutrification and contamination of surface, groundwater and coastal waters from leaking septic systems are major problems in the Virgin Islands. Nonpoint Source Pollution from defective septic systems impacts human health and marine resources. Negative effects caused by exposure to toxic household products can negatively affect users including custodial professionals, business owners, school students, and the general public, as well as pollute the natural environment. Watershed residents, government agencies, resource managers, and other partnering academic institutions require scientific information utilizing oceanographic and GIS technology in order to better understand the patterns of stormwater runoff and the impacts of sediment and nutrient-laden runoff. The target audience consisted of Virgin Islands K-12 students and educators, farmers, local and federal government personnel, watershed residents, partnering academic institutions, Virgin Islands Territorial Park managers and other natural resource managers, pesticide application professionals and trainees, custodial workers, environmental consultants, environmental/conservation NGOs, businesses, and the general public. A UVI Health and Climate team led by CES conducted a "Water Quality home uses/safe drinking water" filtration and testing promotional effort and provided low-tech drinking water purification filtration devices to 500 Virgin	Water Quality #11

		Islands residents and trained more than 50 volunteers in EPA Citizen Science WQ standards and protocols. Also, CES partnered with the VI Department of Health and the Center for Disease Control to create micro water-testing sites and conducted more than 50 drinking water quality home tests to provide data for a study setting new Virgin Islands WQ protocols. In partnership with the UVI Physics and Chemistry Departments, the CES Water Ambassador Program (WAP) K-12 outreach program introduced Virgin Islands teachers and students to the causes of water impairment problems in Virgin Islands watersheds and methods of testing water quality. The Cooperative Extension Service (CES) promoted the use of non (or less)-toxic household products and integrated pest management products through the Healthy Homes Program and WAP presentations to schools, churches, NGOs, businesses, housekeeping staffs, government agencies, environmental groups, pesticide application professionals and trainees, etc. Requested Healthy Homes Program presentations were made to over 250 church parishioners. The presentations included the distribution of 150 CES Healthy Homes Program publication. Healthy Homes presentations were also made to 30 Virgin Islands Rotary Club members, 30 Virgin Islands Division of Personnel attendees in two "Farm to Table" workshops, and over 50 Virgin Islands Dept. of Human Services employees attending a "Mental Health and Wellness Day" event. Healthy Homes Program staff participated in several conference calls with the National Healthy Homes team to discuss the content for a new regional Healthy Homes publication. The CES constantly updated product information presented to the public and promoted cistern care and other CES publications (i.e., Help Yourself to a Healthy Caribbean Home, Recipes for a Non-toxic Household, and Cycle of Water coloring book). The WAP distributed 500 Cycle of Water coloring books to students in WQ programs; lessons in the coloring book range from a basic curriculum targeting grades K-4 with more advanced lessons targeting grades 5-12. Teachers were trained how to effectively use the coloring book for WQ and STEM education by the WAP. The CES collected, digitized and forwarded to USDA 150 years of rainfall data to be used by the United States Drought Monitor mapping program to further study precipitation patterns; this data was registered by the US Environmental Historic Trust, and University of Indiana Data Science graduate students are reviewing and analyzing the data. The CES provided technical assistance to	

		the UVI Coordinator of STEM Curriculum Development K-12 Coordinator regarding the "Blue Space" initiative and worked with the Department of Education math Coordinators to increase interest in Water Quality and include water quality education as part of the Virgin Islands Next Generation of Stem Standards. Clients were encouraged to adopt at least one Healthy Home Program recommended practice such as the use of non-toxic household products, etc., and homeowners to improve cistern water quality by following CES recommendations. Virgin Islands youth became aware of the vital connections between human activities and water quality, that land-based activities affect coastal water quality, how tools like precipitation indicators can help monitor stormwater runoff and why watershed protection is important to them and their health. Youth and volunteer involvement in water quality protection and resource conservation increased. Two hundred fifty WAP students learned water sampling research techniques and collected samples in Virgin Islands watersheds. Twelve (12) student interns trained by WAP presented sampling methods and research objectives at various public events. K-12 students participants in WAP shared information about the causes of water quality impairment with parents through various ways including the Cycle of Water coloring books (Spanish-English) created by a WAP partner, the University of Puerto Rico – Mayaguez and Water Quality testing and soil testing training videos (English-Spanish). The WAP received many requests throughout the Territory for additional presentations and requests for increased participation territory-wide. The success of WAP's water quality education outreach in schools allowed the program to increase its outreach to 1,000 students. The WQ Equipment Loan Program in the Virgin Islands, initiated by WAP, was able to expand WQ testing outreach services to both the St. John and St. Croix Environmental Associations, and Rotary Clubs on the three main Virgin Islands in partnership with the NGO "Love City Strong". 54 individuals completed WAP's WQ "train the trainer" instruction in EPA's Citizen Science WQ training. CES 1990 maps inventorying plant locations in a forested area of the St. Thomas Magen's Bay Territorial Park were incorporated into an updated GIS map by UVI graduate students conducting research projects related to the effects of land-based activities on Virgin Islands coastal waters.	

12.	Natural Resources and Environmental Management	Few places in the world show the vital connections between land and sea resources as clearly as the U.S. Virgin Islands (VI). The VI economy depends on a strong tourism market supported by a healthy natural environment and scenic beauty. Best Management Practices for environmental management master plans are recommended by CES for adoption by natural resource managers. Successful plans can become prototypes for other critical habitats or areas designated as part of the VI Territorial Park. After attending CES educational programs, persons are expected to adopt recommended landscaping practices, incorporate native plants into their landscapes, protect and/or enhance soil resources for agriculture, construction, and landscaping and/or adopt practices that protect native plant habitats because of their increased understanding of the human effects on native ecosystems. The target audience consisted of Virgin Islands Territorial Park managers and other natural resource managers, farmers, VI Dept. of Agriculture and other local and federal government personnel, educators and students, environmental professionals, environmental/conservation NGOs, hotel managers, developers or private landowners with natural conservation areas, VI arborists, St. Thomas post-hurricane Recovery Team, engineers, architects and the general public who need CES technical assistance related to native plants and environmental management practices to protect their properties and critical natural resource habitats. They also want recommendations to restore hurricane-damaged natural landscapes/ecosystems, develop resilience planning, and/or create a culture of preparedness related to food security through sustainable agriculture and urban gardening/landscaping plans. Many clients want to increase their understanding of VI native plants/natural ecosystems and the effects of human alterations on natural ecosystems. They also want to prevent off-shore pollution and seek research-based information to be able to make the best decisions regarding watershed protection. The VI has an economy based on tourism attracted by the natural and cultural resources and scenic beauty. Both residents and tourists rely on the high-quality management and conservation of these valuable resources. VI resource managers, tourism-related businesses, residents, and especially youth, need exposure to science-based environmental education, as well as guidance in career development that supports environmental management and protection.	Natural Resources and Environmental Management #12

		The target audience consisted of Virgin Islands Territorial Park managers, natural resource managers, farmers, VI Dept. of Agriculture and other local and federal government personnel, educators, students and businesses. CES continued to help develop and implement plans to recycle and distribute hurricane wood waste debris partnering with federal and local government agencies. Through site visits and consultations, CES provided technical assistance to restoration plans for hurricane-damaged plant communities in coastal recreational areas. CES continued to help develop and implement plans to restore native plant landscapes in urban, park and/or watershed areas and contributed to start-up plans for environmentally sustainable community garden projects. Through site visits, CES Facebook page and publications, permit evaluations and other direct and indirect contacts, CES delivered information about how humans impact native plants and their habitats to various stakeholder groups. CES Water Ambassador Program enabled the distribution of soil testing kits and the creation of videos in English and Spanish to increase awareness of soil health. The Water Ambassador Program secured and digitized USVI rainfall data from 1852 to present. USDA and the Nation Environmental History Trust were provided with this data and it was used in a national effort to reconstruct precipitation index figures for the Drought Monitor mapping program, to inform farmers and the general public. The Water Ambassador Program delivered information about watershed/ecosystem protection and current threats through contacts with VI schools outreach) and government personnel during site visits, class presentations, and advisory committee meetings. Similar contacts were made with community groups, resource managers, UVI faculty, UVI EPSCoR and UVI Green Technology Center. CES continued to incorporate research-based GIS mapping information about VI watersheds into its outreach efforts. This data may be supplied by UVI science faculty and students, VI-EPSCoR affiliates, UVI Center for Green Technology and/or VI-DPNR CZM GIS personnel. Over 2,500 Virgin Islanders agreed to partake in the free processed hurricane green debris wood waste mulch by filling out forms distributed by CES and	

		partners. Based on a distribution plan developed by the VI Dept. of Agriculture and CES, an estimated 120 VI farmers and others collected 600 cubic yards of wood waste mulch from designated collection sites. The mulch was used to improve agricultural and damaged landscapes. An estimated 215 CES clients made progress restoring hurricane-impacted natural landscapes and critical watersheds on public and private lands. Five Arborists used CES input to restore damaged forest and park landscapes. Collaboration with VOAD's (St. Thomas Recovery Team, SURGE capacity in disasters-NSF, VI Conservation Society) resulted in two start-ups of island-wide emergency response and recovery projects incorporating recommended landscaping practices (i.e., Community Food Garden Project, St. Thomas Recovery Team project). Two UVI students seeking careers as natural product chemists indicated that a CES publication on traditional medicinal plants provided useful information and helped them select their research plants. CES publications prompted 55 client requests for information about native plant and marine ecosystems, including plant identifications and questions about native plant use. CES publications and Facebook interactions prompted requests from five St. Thomas farmers and others for information about native plant communities in riparian areas ("guts") on their properties. UVI students and faculty continued to use a field guide of VI plant and marine communities produced by UVI Conservation Data Center and CES for watershed research and to better understand the interconnections between terrestrial and marine systems. VI tour and other websites recommended CES publications about VI natural & cultural history and native plant & marine ecosystems. One client has agreed to put some porous pavement parking on her property. Based upon evaluation results, more than 600 VI K-12 students learned about the valuable protective role of plants from the VI Water Cycle coloring book produced and distributed by WAP. Students and teachers indicated that they gained awareness of the land-sea connections that affect watershed health by learning how to test and monitor surface water in riparian and wetland areas and by visiting a distance-learning WQ link (in English/Spanish) focusing on resource conservation. Quantitative WQ data collected in VI guts and converted into GIS maps by WAP student workers informed various watershed managers and residents.	

		Resource managers, beach stakeholders, environmental consultants, educators and community groups responded favorably to CES's post-hurricane strategies for improving damaged coastal vegetation areas near public beaches. Fifteen UVI environmental management graduate students, one environmental consultant, three resource managers and 30 beach stakeholders indicated that they learned about detecting natural and human impacts to critically important watershed coastal forests that protect coastal waters by identifying and documenting damage to native plants during tours of Magens Bay Arboretum Territorial Park and St. Thomas public beach areas. Additional CES information regarding watershed protection was incorporated into the UVI Master of Marine and Environmental Science 2-year research and restoration planning project in the St. Thomas Magens Bay watershed basin. As a result of CES site visits, tours and other direct consultations, an estimated 90 clients indicated that their awareness of issues addressed by watershed research affecting terrestrial resources was increased. CES in cooperation with STT Territorial Park managers and 15 UVI Marine and Environmental Science students/faculty, continued to make progress in developing ways to showcase various ecotourism features in public parks with a goal of increasing career training and opportunities for local tour guides and other support staff. The State Historic Preservation Office, local businesses, and a VI arborist continued to incorporate CES recommendations into plans to restore natural landscapes in VI historic urban areas to enhance ecotourism and opportunities for current or potential tour guides.	
13.	Hatch: Use of the UVI Commercial Aquaponics System to improve food security in the USVI #VI-201012	Since hurricane Maria passed SW of St. Croix USVI the night of September 19-20, 2017, a category 5 storm. Major components of the UVI-AES Aquaculture facility were destroyed. The facilities were not repaired in the reporting period and progress was made towards the goal 5. A home-scale aquaponic system was built following plans from FAO of the UN. "Small-scale aquaponic food production" Technical Paper 589.	Aquaculture #13
14.	Hatch: Evaluation of Integrated Tropical Cover Crop Systems #0216068	The use of *Callisia repens*, a native plant to the U.S. Virgin Islands, as a living mulch cover crop in a newly established plantain field. As a living mulch, this groundcover species is intended to reduce weed establishment and weed management inputs, protect the soil beneath the plantain canopy, promote biodiversity within the agroecosystem, and increase soil moisture. Callisia were planted by transplanting vegetative cuttings around the base of the recently germinated plantain plants on May 10, 2019. Callisia performance and weed suppression data was collected nine	Agronomy - Cover Crops #14

		months after transplanting by cuttings at plantain flowering. On-farm labor for mechanical weed management was reduced by 95% compared to the adjacent plantain field without Callisia. This resulted in an estimated cost savings in labor of $300 USD per month per acre at local labor costs. After nine months of establishment, Callisia provided 100% soil coverage, effectively suppressed weeds, had an average thickness of six inches, and a fresh average biomass of 1,491 lb/ac. Sunn hemp and lablab was planted on August 4, 2019 in a randomized complete block design, 2 treatment levels (crops) and 4 replications for 8 total plots. Both cover crops were planted at a rate of 90 kg/ha for sunn hemp and 50 kg/ha for lablab. Lablab was planted as a cover crop by broadcast seeding during the previous rainy season (October 2018) at a seeding rate of 50 kg/ha. This experiment will evaluate the effectiveness of terminating lablab established by broadcast seeding with an under cutter in the absence of an herbicide prekill treatment. Lablab failed to perform well and did not establish a viable stand due to heat and water stress. Due to poor establishment of lablab, weed pressure was high and the lablab portion of the 2019 planting was terminated. Once crops had achieved either 90% flowering rate or 50% senescence rate, biomass harvest was performed for that crop only on the date of assessment. Three 0.25 m2 quadrats per plot were randomly placed and all above-ground biomass of crops and weeds in the quadrat were sampled and counted per-plant. Weeds were categorized by grass weed and broadleaf weed classes. Samples were dried to constant weight and weighed to determine total cover crop and weed biomass.	
15.	Multistate Hatch: Plant Genetic Resources Conservation and Utilization #S009	Sweetpotato lines were used in breeding to develop a better purple variety. A purple variety 'VIP' was crossed with the weevil resistant/tolerant line from the USDA 'Ruddy'. Selections from this cross were then crossed into commercial white varieties with excellent production and ovoid shape. Seedlings were evaluated for purple flesh, high yield and weevil resistance/tolerance. Two lines from these seedlings have gone into advanced trial evaluation with commercial sweetpotato varieties.	Biotechnology - Plant Breeding #15