V(A). Planned Program (Summary)

Program # 2

1. Name of the Planned Program

Climate Change

☑ Reporting on this Program

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
102	Soil, Plant, Water, Nutrient Relationships			15%	
111	Conservation and Efficient Use of Water			15%	
132	Weather and Climate			10%	
205	Plant Management Systems			15%	
305	Animal Physiological Processes			10%	
306	Environmental Stress in Animals			10%	
307	Animal Management Systems			15%	
405	Drainage and Irrigation Systems and Facilities			10%	
	Total			100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2013	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	0.0	2.0	0.0
Actual Paid Professional	0.0	0.0	2.1	0.0
Actual Volunteer	0.0	0.0	0.0	0.0

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	**1890 Extension**	**Hatch**	**Evans-Allen**
0	0	32027	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
0	0	15774	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
0	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

- Conduct research
- Publish results in scientific journals
- Present data at conferences
- Collaborate with other members of multistate project

2. Brief description of the target audience

- Beef cattle producers in the tropics, greater Caribbean, Central and South America and the southern US.
- Local crop farmers and back yard growers.

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2013	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	0	0	0	0

2. Number of Patent Applications Submitted (Standard Research Output)

Patent Applications Submitted

Year: 2013

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2013	Extension	Research	Total
Actual	0	1	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Abstracts presented at conferences

Year	Actual
2013	1

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Number of farmers adopting irrigation strategies based on soil moisture
2	Knowledge of fertigation and chemigation use in vegetable crop production
3	Determine traits for heat tolerance by using indirect measures.

Outcome #1

1. Outcome Measures

Number of farmers adopting irrigation strategies based on soil moisture

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	6

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The "Challenge of the 21st century" will be coping with water scarcity according to the Food and Agriculture Organization of the United Nations (FAO) Director-General, Dr. Jacques Diouf. Much effort will be required to meet food and freshwater demands for an anticipated 2030 global population of 8.1 billion. Fresh water is presently a scarcity in the US Virgin Islands since there are no flowing rivers and stream so that municipal water is derived from desalination. The US Virgin Islands also has an extended dry season during five months of the year. Microirrigation is the most efficient use of water for crop production. The vine crops that comprise the cucurbits are important vegetable in the US Virgin Islands and the use of fertigation has potential to increase crop production and water use efficiency.

What has been done
Three different types of drip irrigation were tested during the production of 4 different vegetable crops. Polyhose and T-Tape with varying drip emitter spacing was tested at different row spacings to minimize water loss and decrease weed development. Standard fertilizer levels were applied as fertigation through the various microirrigation arrangements tested. Findings of the projects are currently being analyzed for dissemination and fact sheet publication. A low-external-input water delivery system was built that utilizes pedal power to pump water from a reservoir to an elevated holding tank. Gravity then delivered the water through microirrigation to vegetable plots. This system was demonstrated to small farmers and home gardeners as a low input water delivery system

Results
Data collected from the 2013 eggplant and okra trials are currently being analyzed and results will be disseminated to local farmers.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
111	Conservation and Efficient Use of Water
132	Weather and Climate
205	Plant Management Systems
405	Drainage and Irrigation Systems and Facilities

Outcome #2

1. Outcome Measures

Knowledge of fertigation and chemigation use in vegetable crop production

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	4

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Issue (Who cares and Why)
The "Challenge of the 21st century" will be coping with water scarcity according to the Food and Agriculture Organization of the United Nations (FAO) Director-General, Dr. Jacques Diouf. Much effort will be required to meet food and freshwater demands for an anticipated 2030 global population of 8.1 billion. Fresh water is presently a scarcity in the US Virgin Islands since there are no flowing rivers and stream so that municipal water is derived from desalination. The US Virgin Islands also has an extended dry season during five months of the year. Microirrigation is the most efficient use of water for crop production. The vine crops that comprise the cucurbits are important vegetable in the US Virgin Islands and the use of fertigation has potential to increase crop production and water use efficiency.

What has been done

Fertigation experiments were conducted in 2013 to determine the best management practices for fertigation of vegetable crops under different drip irrigation systems and emitter type/spacing. Systems were specifically designed and evaluated for use in low external input farming to reduce

fertilizer loss.

Results
Data collected from the 2013 eggplant and okra trials are currently being analyzed and results will be disseminated to local farmers.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
111	Conservation and Efficient Use of Water
132	Weather and Climate
205	Plant Management Systems
306	Environmental Stress in Animals

Outcome #3

1. Outcome Measures

Determine traits for heat tolerance by using indirect measures.

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Adaptation to a tropical climate is a trait that most livestock in the UVI possess. Determining how the physiology of these animals is impacted can be used when making management decisions ro when selecting for these traits in breeding programs.

What has been done
Multiparous, pregnant STX and DRPX ewes were evaluated at 126 d of gestation and 46 d postpartum over 4 d in the shade and in the sun. Each ewe had a spot on her right flank shaved prior to data collection (Shaved). The right side of the coat was left intact (Unshaved). Temperature data loggers, programmed to record vaginal temperature (VT) at 10-min intervals,

were removed after 96 hr. Rectal temperature (RT) was also measured. Eye temperature was measured using infrared images (IREYE). Surface temperature over Shaved and Unshaved areas was measured using a hand-held infrared thermometer (IRR). Respiration rate was measured as breaths per minute (bpm) using visual observation (RR) and sweating rate (SWR) was measured at Shaved and Unshaved areas of each ewe

Results

Mean temperature, relative humidity, THI and solar radiation during the data collection were 27.4 °C, 84 %, 79.1 and 232 W/m2, respectively. Surface temperature of Shaved was higher in STX than in DRPX ewes (37.0 ± 0.1 vs. 37.7 ± 0.1 °C, respectively). Unshaved surface temperature was 35.2 °C for both breeds. Surface temperature of Shaved was higher ($P < 0.0001$) than Unshaved for both STX (37.0 ± 0.1 vs. 35.2 ± 0.1 °C) and DRPX (37.7 ± 0.1 vs. 35.2 ± 0.1 °C) ewes. Ewes had higher RR and surface temperature of Shaved and Unshaved in the sun than in the shade. Eye temperature was higher in the sun than in the shade for DRPX ewes but there was no difference in STX ewes. Sweating rate was higher in STX ewes in the sun than in the shade but there was no difference between DRPX ewes. VT was higher in DRPX ewes compared to STX ewes

4. Associated Knowledge Areas

KA Code	Knowledge Area
132	Weather and Climate
305	Animal Physiological Processes
306	Environmental Stress in Animals
307	Animal Management Systems

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Appropriations changes

Brief Explanation

V(I). Planned Program (Evaluation Studies)

Evaluation Results

The AES advisory council assists as an external evaluator of our results.

Key Items of Evaluation