

# 2012 University of the Virgin Islands Research Annual Report of Accomplishments and Results

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## I. Report Overview

### 1. Executive Summary

The work conducted by AES scientists is production oriented. The small size of AES and limited physical and fiscal resources limit our ability to expand into new research areas. One way of addressing this issue is developing collaborations with other departments and institutions. AES has continued to collaborate with the other insular land grant institutions to obtain funds for student support in AES labs. The Resident Instruction funds at UVI are used to support students who conduct research projects in AES labs and present their results at local, regional and national conferences. In FY 11 the local government instituted an 8% salary reduction for any agency receiving local funds, and this included the University, which severely impacted faculty/staff morale, hiring and retention. In April 2012 the Hovensa oil refinery on St Croix closed resulting in a loss of 2,000 jobs and an as yet undetermined financial impact on the territory. This, accompanied by the downturn in the national and local economies, has negatively impacted the funding available to UVI and AES from the territorial government. AES has undergone contraction to four research programs and 3.2 faculty in order to deal with budget cuts and restrictions. The four programs in AES currently are Agronomy, Animal Science, Biotechnology & Agroforestry, and Horticulture & Aquaculture. The Director of AES has an 80/20 split between administration and research (Animal Science). A more equitable distribution of human resources within AES has been undertaken in an attempt to provide each program with adequate support staff to conduct their research activities. It is hoped that by providing support staff to each program will allow the faculty to have time to publish their research results in a timelier manner as projects are completed. In addition, each faculty member and some upper level support staff (MS level Research Specialists) have publication of a paper listed in their annual performance evaluation criteria.

The Agronomy program received one new grant and initiated research trials in conjunction with the two grants received the previous year. On-Farm research funded by the Southern SARE Program was initiated at Sejah Farms and examined cover crop and green manure systems to evaluate tropical cover crop management strategies using roller-crimper technology. The Southern SARE Research and Education Program funded a multi-state research initiative with the University of Florida, Horticulture program and the University of Puerto Rico, Mayaguez Campus, Agronomy Program to evaluate tropical cover crop mulch systems for low-external-input crop production in the U.S. Virgin Islands, Puerto Rico, and Florida. The USDA Southeastern Sun Grant project at UVI was initiated to evaluate the sustainability of integrated biofuel feedstock production systems in the southeast and is a collaborative project with the University of Tennessee.

The Animal Science faculty continued collaboration with CES colleagues at the University of Hawaii to conduct livestock production workshops in the Northern Marianas Islands as part of a USDA Office of Advocacy and Outreach grant (Outreach and Assistance in Tropical Pasture and Livestock Management for Pacific Islanders). Using information generated at UVI, cattle producers in the Marianas Islands were trained in artificial insemination using Senepol semen to increase the genetic diversity of their cattle herds. Calves were in Spring 2012 and more are being bred as part of the project. Two undergraduate students were mentored in the Animal Science program research lab with support from the Insular Grants Program for Resident Instruction. The students conducted work that was part of an ongoing USDA-NIFA TSTAR project and a multistate research project (W-2173). In an effort to continue research in the area of heat stress and livestock adaptation, a grant was submitted to USDA-NIFA-AFRI with collaborators from

University of Arizona and Cornell University. A Research Specialist was hired in the program to help with ongoing and future research projects, grant writing and publications, especially in light of the increased administrative demands on the faculty members time.

The Biotechnology & Agroforestry program concentrated on phenology, seed germination and drought/water use efficiency of seven native tree species. An undergraduate student assisted and learned the scientific method, how to set up a replicated research trial, data collection and controlled watering. The student was supported by a USGS-WRRI grant. The Biotechnology & Agroforestry program was successful in securing grants from USGS-WRRI, USDA-SCBG and a private source. These grants involved collaboration with the local botanical garden, local crop farmers, UVI-CES, USDA, VI Department of Agriculture and Ventria Bioscience. Five UVI undergraduate students conducted independent research ranging from water use efficiency of native tree species, evaluation of reciprocal crosses in *Hibiscus sabdariffa* for hybrid vigor, second generation segregating populations of sorrel for leaf traits and fruit color. All students presented their results at local symposia and national scientific conferences. Hybrid sorrel was found to exhibit increased vigor and larger fruit.

The Horticulture & Aquaculture program was awarded grants from the USGS-WRRI, USDA-SCG, and a new Hatch project. These research projects are in collaboration with UVI-CES, the VI Department of Agriculture, local farmers and USDA to work on crop production and improvement in fruits and vegetables to address the challenges to the farming community. During the year, three UVI undergraduate students and a stateside graduate student conducted independent research projects in the Horticulture and Aquaculture program. The projects involved evaluation of tomatoes and pepper cultivars for growth, high yielding and pest and disease resistant characteristics. Water use efficiency in cucumber production evaluated and use of drip irrigation in vegetable production conducted. A study on use of pre emergence herbicides in weed control in eggplant and watermelon accomplished. Results of the projects presented in UVI research symposium and also in national and regional conferences. The Horticulture & Aquaculture program conducted its 6 session of the UVI Aquaponic Workshop. This year's workshops were attended by 78 participants from the US Virgin Islands, Puerto Rico, USA, Canada and Caribbean Region islands of Antigua, Bahamas, Barbados, BVI, Dominican Republic and Trinidad & Tobago.

#### **Total Actual Amount of professional FTEs/SYs for this State**

| Year: 2012 | Extension |      | Research |      |
|------------|-----------|------|----------|------|
|            | 1862      | 1890 | 1862     | 1890 |
| Plan       | 0.0       | 0.0  | 13.0     | 0.0  |
| Actual     | 0.0       | 0.0  | 8.2      | 0.0  |

## **II. Merit Review Process**

### **1. The Merit Review Process that was Employed for this year**

- Combined External and Internal University External Non-University Panel

### **2. Brief Explanation**

All Hatch project are submitted for Merit Review to knowledgeable people in the field of study. These individuals can be within the University or external to the University in the agriculture community. Each proposal is reviewed by at least three reviewers. A copy of the proposal along with a response form is sent to the individual with a cover letter explaining the purpose of the review and the individual is asked to sign the form indicating their approval or disapproval of the project. Copies of these forms are maintained in

the administrative offices of AES.

### **III. Stakeholder Input**

#### **1. Actions taken to seek stakeholder input that encouraged their participation**

- Use of media to announce public meetings and listening sessions
- Targeted invitation to traditional stakeholder groups
- Targeted invitation to non-traditional stakeholder groups
- Targeted invitation to traditional stakeholder individuals
- Targeted invitation to non-traditional stakeholder individuals
- Targeted invitation to selected individuals from general public

#### **Brief explanation.**

The AES Advisory Council meets to discuss issues of concern to the agriculture community and AES scientists continued to work in close contact with farmers as part of several research projects. The Advisory Council is composed of individuals involved in several aspects of agriculture (horticulture, livestock, and farmer's co-ops) from both St. Croix and St. Thomas. When needed, new members are recruited by the AES Director based on suggestions of the research faculty and existing members of the council. Research faculty present information on current projects and members of the Advisory Council express their concerns and opinions about what they see as the needs of the agriculture community. Issues are prioritized within discipline based on the input of the Advisory Council members in their role as representatives of the agriculture community.

Specific issues within a field of study brought up by the Advisory Council are discussed with the appropriate research faculty. Research faculty use the feedback from the council when developing future grants and research projects. Priority is given to those ideas that are researchable within the capabilities of the research programs at AES and funding sources. Because of the small staff size and limited scope of our programs not all areas can be addressed. In cases where the topic is outside of the AES faculty area of expertise efforts are made to get information for the stakeholders from other sources and put the stakeholders in contact with other people, either within UVI or outside, who can provide assistance. The small community and high level of contact with farmers help to provide continuous input and feedback from the community regarding the work being done by AES as well as providing a means for identifying the concerns of the agricultural community. The demographics of the USVI are such that all of our stakeholders would qualify as under-served or under-represented populations based on factors such as race, gender, economic status and farm size.

Because of the small size of the agriculture community in the USVI, anyone who contacts AES regarding information on agriculture is considered a stakeholder. In most cases, input from stakeholders is directed at a specific program and the program leader is charged with deciding how to consider the input and what action to take. The response may be just a simple matter of providing information to the stakeholder in the form of verbal communication or technical bulletins. In other instances it may involve a visit to the farm to provide technical assistance with a crop (plant or livestock) in conjunction with the appropriate CES personnel.

**2(A). A brief statement of the process that was used by the recipient institution to identify individuals and groups stakeholders and to collect input from them**

**1. Method to identify individuals and groups**

- Use Advisory Committees

**Brief explanation.**

AES is available to any individual or group who approaches AES with a question or a proposed research idea. Some of these ideas come through the Advisory Council, whose members are on other community groups or co-ops and bring them forward at the meetings. In some cases AES faculty have to mention that we are here for research and we direct people with questions or concerns about outreach activities to the appropriate Cooperative Extension Service staff.

An example of how the stakeholder input was used is the sorrel project. Sorrel has traditionally been available only during the Christmas Holiday season. Research conducted in the Biotechnology and Agroforestry program has identified varieties of sorrel that bear fruit earlier as well as later in the season due to new cultivar introductions, thus expanding the market. The local consumers have increased the demand and now they expect fresh sorrel most of the year. The local growers have expanded their sorrel production with the new cultivars and hybrids to try and meet the increasing demand. This project has complimented a previous farmer-involved sorrel project by releasing the five best sorrel for enhanced production. The seeds from these selections were supplied in quantity to the VI Department of Agriculture who grew seedling for farmers and backyard gardeners.

**2(B). A brief statement of the process that was used by the recipient institution to identify individuals and groups who are stakeholders and to collect input from them**

**1. Methods for collecting Stakeholder Input**

- Meeting with traditional Stakeholder groups
- Meeting with traditional Stakeholder individuals
- Meeting with the general public (open meeting advertised to all)
- Other (Clients contact AES with specific requests)

**Brief explanation.**

Stakeholder input is collected by the pertinent program, depending on the source and area of interest. In many cases stakeholders come to AES faculty and staff with questions or concerns and we can provide an answer in short order. In other cases we are able to get them the information after doing a bit of searching. We are also able to direct them to outside resources such as the VI Department of Agriculture or other federal agencies or NGOs that may have the information they are seeking.

**3. A statement of how the input will be considered**

- To Identify Emerging Issues
- Redirect Research Programs

**Brief explanation.**

Input is used when developing future research projects. In some cases an idea is not really researchable but we make an effort to provide some feedback to the stakeholder on these topics. In other cases where there is a researchable idea brought to us we can incorporate it into current projects or into new projects. Sometimes the lag time between getting an idea and being able to

implement the research project to come up with an answer is frustrating to the stakeholders, but when the information is finally generated they are glad to have it.

### Brief Explanation of what you learned from your Stakeholders

Stakeholders are very interested in expanding locally grown products for sale in the local restaurant and tourist market. One obstacle to this is providing a product consistent in quantity and quality. Because of the small size of our farms no one producer can meet the needs of local retailers and the attempts at developing co-ops have not succeeded. Another area of interest is biofuels, but due to our limited land mass and season rainfall (limiting water availability) we face the issue of an economy of scale to make this a viable option locally. There is no local facilities for converting plant material to energy of any kind so a lack of infrastructure limits this as well.

Stakeholder input was considered when developing the project to develop sorrel varieties that bear fruit out of season. Local growers wanted to expand the market beyond the traditional Christmas season and work done in the Biotechnology & Agroforestry program developed several varieties that fruit earlier in the fall season to provide a longer market for this product.

### IV. Expenditure Summary

| 1. Total Actual Formula dollars Allocated (prepopulated from C-REEMS) |                |          |             |
|-----------------------------------------------------------------------|----------------|----------|-------------|
| Extension                                                             |                | Research |             |
| Smith-Lever 3b & 3c                                                   | 1890 Extension | Hatch    | Evans-Allen |
| 0                                                                     | 0              | 1047682  | 0           |

| 2. Totaled Actual dollars from Planned Programs Inputs |                     |                |          |             |
|--------------------------------------------------------|---------------------|----------------|----------|-------------|
| Extension                                              |                     |                | Research |             |
|                                                        | Smith-Lever 3b & 3c | 1890 Extension | Hatch    | Evans-Allen |
| Actual Formula                                         | 0                   | 0              | 538350   | 0           |
| Actual Matching                                        | 0                   | 0              | 265157   | 0           |
| Actual All Other                                       | 0                   | 0              | 0        | 0           |
| Total Actual Expended                                  | 0                   | 0              | 803507   | 0           |

| 3. Amount of Above Actual Formula Dollars Expended which comes from Carryover funds from previous |   |   |   |   |
|---------------------------------------------------------------------------------------------------|---|---|---|---|
| Carryover                                                                                         | 0 | 0 | 0 | 0 |

## V. Planned Program Table of Content

| S. No. | PROGRAM NAME                                  |
|--------|-----------------------------------------------|
| 1      | Animal Science - Beef Cattle                  |
| 2      | Animal Science - Small Ruminants              |
| 3      | Agronomy - Mixed Cover-Crop Livestock Systems |
| 4      | Plant Germplasm Conservation and Enhancement  |
| 5      | Aquaculture - Aquaponic Systems               |
| 6      | Plant Biotechnology                           |
| 7      | Horticulture                                  |
| 8      | Irrigation                                    |
| 9      | Aquaculture - Biofloc Systems                 |
| 10     | Childhood Obesity                             |
| 11     | Sustainable Energy                            |
| 12     | Climate Change                                |
| 13     | Food Safety                                   |
| 14     | Global Food Security and Hunger               |

**V(A). Planned Program (Summary)****Program # 1****1. Name of the Planned Program**

Animal Science - Beef Cattle

☒ 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 |
|---------|-------------------------------------|-----------------|-----------------|----------------|----------------|
| 301     | Reproductive Performance of Animals |                 |                 | 20%            |                |
| 305     | Animal Physiological Processes      |                 |                 | 20%            |                |
| 306     | Environmental Stress in Animals     |                 |                 | 50%            |                |
| 307     | Animal Management Systems           |                 |                 | 10%            |                |
|         | <b>Total</b>                        |                 |                 | 100%           |                |

**V(C). Planned Program (Inputs)****1. Actual amount of FTE/SYs expended this Program**

| Year: 2012               | Extension |      | Research |      |
|--------------------------|-----------|------|----------|------|
|                          | 1862      | 1890 | 1862     | 1890 |
| Plan                     | 0.0       | 0.0  | 2.0      | 0.0  |
| Actual Paid Professional | 0.0       | 0.0  | 1.1      | 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              | 48377          | 0              |
| 1862 Matching       | 1890 Matching  | 1862 Matching  | 1890 Matching  |
| 0                   | 0              | 23828          | 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
- Present data at conferences
- Collaborate with other members of multistate project

### 2. Brief description of the target audience

Beef producers in the tropics, greater Caribbean, Central and South America and the southern US.

### 3. How was eXtension used?

eXtension was not used in this program

## V(E). Planned Program (Outputs)

### 1. Standard output measures

| 2012   | Direct Contacts<br>Adults | Indirect Contacts<br>Adults | Direct Contacts<br>Youth | Indirect Contacts<br>Youth |
|--------|---------------------------|-----------------------------|--------------------------|----------------------------|
| Actual | 0                         | 0                           | 0                        | 0                          |

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

#### Patent Applications Submitted

Year: 2012

Actual: 0

#### Patents listed

### 3. Publications (Standard General Output Measure)

#### Number of Peer Reviewed Publications

| 2012   | Extension | Research | Total |
|--------|-----------|----------|-------|
| Actual | 0         | 0        | 0     |

## V(F). State Defined Outputs

### Output Target

#### Output #1

#### Output Measure

- Abstracts

| <b>Year</b> | <b>Actual</b> |
|-------------|---------------|
| 2012        | 2             |

**Output #2**

**Output Measure**

- Journal articles  
Not reporting on this Output for this Annual Report

**Output #3**

**Output Measure**

- Student research project  
Not reporting on this Output for this Annual Report

**V(G). State Defined Outcomes**

**V. State Defined Outcomes Table of Content**

| O. No. | OUTCOME NAME                                              |
|--------|-----------------------------------------------------------|
| 1      | Using hair coat as a selection criteria in Senepol cattle |
| 2      | Selecting cattle for external parasite resistance         |

## **Outcome #1**

### **1. Outcome Measures**

Using hair coat as a selection criteria in Senepol cattle

### **2. Associated Institution Types**

- 1862 Research

### **3a. Outcome Type:**

Change in Knowledge Outcome Measure

### **3b. Quantitative Outcome**

| <b>Year</b> | <b>Actual</b> |
|-------------|---------------|
| 2012        | 0             |

### **3c. Qualitative Outcome or Impact Statement**

#### **Issue (Who cares and Why)**

Hair coat plays a role in the tropical adpatation of Senepol cattle. A gene contolling hair coat has been indentified and animals with this gene have lower body temperatures. By selecting for the slick hair phenotype prodcuers can improve the adaptation of their cattel to hot and humid climates.

#### **What has been done**

Hair coat phenotype has been evaluated at key points in the production cycle of cows and young animals.

#### **Results**

Slick cows were heavier and had higher condiction scores than non-slick cows further supporting the hypothesis that slick cattle are more suited to the tropical environment. Hair coat phenotype of calves did not impact gain up through a year of age.

### **4. Associated Knowledge Areas**

| <b>KA Code</b> | <b>Knowledge Area</b>           |
|----------------|---------------------------------|
| 305            | Animal Physiological Processes  |
| 306            | Environmental Stress in Animals |

## **Outcome #2**

### **1. Outcome Measures**

Selecting cattle for external parasite resistance

### **2. Associated Institution Types**

- 1862 Research

### **3a. Outcome Type:**

Change in Knowledge Outcome Measure

### **3b. Quantitative Outcome**

| <b>Year</b> | <b>Actual</b> |
|-------------|---------------|
| 2012        | 0             |

### **3c. Qualitative Outcome or Impact Statement**

#### **Issue (Who cares and Why)**

External parasites are of concern due to their ability to transmit disease and negatively impact animal health and growth.

#### **What has been done**

Senepol cows and calves were evaluated for tick burdens at key points during the production cycle.

#### **Results**

Weaning weight and average daily gain were higher in calves with no ticks than in calves with a high tick burden. Tick burden can have an influence on Senepol calf weights up through yearling age. Tick burden had no influence on cow weight or condotun score.

### **4. Associated Knowledge Areas**

| <b>KA Code</b> | <b>Knowledge Area</b>           |
|----------------|---------------------------------|
| 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**

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Appropriations changes
- Other (Culling within the herd)

## **V(I). Planned Program (Evaluation Studies)**

### **Evaluation Results**

Selecting cattle that have lower tick burdens and/or slick hair coats is of interest to local cattle producers and the Senepol breed association. These traits will make the breed more marketable in the tropics where they are already popular.

### **Key Items of Evaluation**

- Tick burden can have a greater influence than hair coat phenotype on Senepol calf weights up through yearling age.
- Tick burden had no influence on weight or condition score, but slick cows were heavier and had higher condition score than non-slick cows further supporting the hypothesis that slick cattle are more suited to the tropical environment.

**V(A). Planned Program (Summary)****Program # 2****1. Name of the Planned Program**

Animal Science - Small Ruminants

☒ 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 |
|---------|-------------------------------------|-----------------|-----------------|----------------|----------------|
| 301     | Reproductive Performance of Animals |                 |                 | 20%            |                |
| 303     | Genetic Improvement of Animals      |                 |                 | 30%            |                |
| 307     | Animal Management Systems           |                 |                 | 50%            |                |
|         | <b>Total</b>                        |                 |                 | 100%           |                |

**V(C). Planned Program (Inputs)****1. Actual amount of FTE/SYs expended this Program**

| Year: 2012               | Extension |      | Research |      |
|--------------------------|-----------|------|----------|------|
|                          | 1862      | 1890 | 1862     | 1890 |
| Plan                     | 0.0       | 0.0  | 1.0      | 0.0  |
| Actual Paid Professional | 0.0       | 0.0  | 1.1      | 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              | 54216          | 0              |
| 1862 Matching       | 1890 Matching  | 1862 Matching  | 1890 Matching  |
| 0                   | 0              | 26703          | 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 Experiments
- Publish results
- Present data at conferences

## 2. Brief description of the target audience

The target audience is hair sheep producers in the tropics and the southern US.

## 3. How was eXtension used?

eXtension was not used in this program

## V(E). Planned Program (Outputs)

### 1. Standard output measures

| 2012   | Direct Contacts<br>Adults | Indirect Contacts<br>Adults | Direct Contacts<br>Youth | Indirect Contacts<br>Youth |
|--------|---------------------------|-----------------------------|--------------------------|----------------------------|
| Actual | 0                         | 0                           | 0                        | 0                          |

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

### Patent Applications Submitted

Year: 2012  
Actual: 0

### Patents listed

## 3. Publications (Standard General Output Measure)

### Number of Peer Reviewed Publications

| 2012   | Extension | Research | Total |
|--------|-----------|----------|-------|
| Actual | 0         | 1        | 0     |

## V(F). State Defined Outputs

### Output Target

#### Output #1

#### Output Measure

- Abstracts presented at conferences
- Not reporting on this Output for this Annual Report

**Output #2**

**Output Measure**

- Journal articles

| <b>Year</b> | <b>Actual</b> |
|-------------|---------------|
| 2012        | 1             |

**Output #3**

**Output Measure**

- Student research project

| <b>Year</b> | <b>Actual</b> |
|-------------|---------------|
| 2012        | 1             |

**V(G). State Defined Outcomes**

**V. State Defined Outcomes Table of Content**

| O. No. | OUTCOME NAME                                                     |
|--------|------------------------------------------------------------------|
| 1      | Number of local farmers using late weaning in their sheep flocks |

## **Outcome #1**

### **1. Outcome Measures**

Number of local farmers using late weaning in their sheep flocks

Not Reporting on this Outcome Measure

### **V(H). Planned Program (External Factors)**

#### **External factors which affected outcomes**

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

#### **Brief Explanation**

- Natural Disasters (drought, weather extremes, etc.)
- Other (Parasites)
- Economy (local appropriations)

### **V(I). Planned Program (Evaluation Studies)**

#### **Evaluation Results**

Based on stakeholder feedback, anything that reduces the use of expensive, imported feed for livestock is viewed favorably. This project has now reached its end and a new project to evaluate the parasite burdens of lambs is being initiated.

#### **Key Items of Evaluation**

The ability of the producer to save \$13/lamb in feed costs by weaning at 120 days compared to weaning at 63 days.

**V(A). Planned Program (Summary)****Program # 3****1. Name of the Planned Program**

Agronomy - Mixed Cover-Crop Livestock Systems

☒ 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 |
|---------|------------------------------------------------|-----------------|-----------------|----------------|----------------|
| 101     | Appraisal of Soil Resources                    |                 |                 | 20%            |                |
| 204     | Plant Product Quality and Utility (Preharvest) |                 |                 | 30%            |                |
| 205     | Plant Management Systems                       |                 |                 | 30%            |                |
| 302     | Nutrient Utilization in Animals                |                 |                 | 10%            |                |
| 307     | Animal Management Systems                      |                 |                 | 10%            |                |
|         | <b>Total</b>                                   |                 |                 | 100%           |                |

**V(C). Planned Program (Inputs)****1. Actual amount of FTE/SYs expended this Program**

| Year: 2012               | Extension |      | Research |      |
|--------------------------|-----------|------|----------|------|
|                          | 1862      | 1890 | 1862     | 1890 |
| Plan                     | 0.0       | 0.0  | 2.0      | 0.0  |
| Actual Paid Professional | 0.0       | 0.0  | 1.0      | 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              | 99363          | 0              |
| 1862 Matching       | 1890 Matching  | 1862 Matching  | 1890 Matching  |
| 0                   | 0              | 48940          | 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 project
- Present data at conferences
- Publish results in scientific journals
- Conduct local and regional seminars

### 2. Brief description of the target audience

The target audience consists of local and regional farmers.

### 3. How was eXtension used?

eXtension was not used in this program

## V(E). Planned Program (Outputs)

### 1. Standard output measures

| 2012   | Direct Contacts<br>Adults | Indirect Contacts<br>Adults | Direct Contacts<br>Youth | Indirect Contacts<br>Youth |
|--------|---------------------------|-----------------------------|--------------------------|----------------------------|
| Actual | 0                         | 0                           | 0                        | 0                          |

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

#### Patent Applications Submitted

Year: 2012

Actual: 0

#### Patents listed

### 3. Publications (Standard General Output Measure)

#### Number of Peer Reviewed Publications

| 2012   | Extension | Research | Total |
|--------|-----------|----------|-------|
| Actual | 0         | 1        | 0     |

## V(F). State Defined Outputs

### Output Target

**Output #1**

**Output Measure**

- Abstracts presented at conferences

| <b>Year</b> | <b>Actual</b> |
|-------------|---------------|
| 2012        | 1             |

**Output #2**

**Output Measure**

- Articles published in scientific journals

| <b>Year</b> | <b>Actual</b> |
|-------------|---------------|
| 2012        | 0             |

**V(G). State Defined Outcomes**

**V. State Defined Outcomes Table of Content**

| O. No. | OUTCOME NAME                                                                                                                                                                                                                                    |
|--------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1      | Outcomes will be measured by the number of local farmers that utilize cover crop technologies in mixed crop-livestock production systems and the number of farmers who use the tested cover crops for soil improvement and as livestock forage. |

## **Outcome #1**

### **1. Outcome Measures**

Outcomes will be measured by the number of local farmers that utilize cover crop technologies in mixed crop-livestock production systems and the number of farmers who use the tested cover crops for soil improvement and as livestock forage.

### **2. Associated Institution Types**

- 1862 Research

### **3a. Outcome Type:**

Change in Action Outcome Measure

### **3b. Quantitative Outcome**

| Year | Actual |
|------|--------|
| 2012 | 2      |

### **3c. Qualitative Outcome or Impact Statement**

#### **Issue (Who cares and Why)**

Small farm holders operating under limited external input farming conditions depend on the production of a diversity of farm products to be sold and consumed on the farm and in the extended family community. This includes agronomic, horticultural, and livestock products that are produced in mixed crop-livestock systems. Cover crops can provide a crucial link between organic farming and livestock production. When planted during fallow periods between main crops, cover crops can improve soil physical, chemical, and biological properties and consequently lead to improved soil health and yield of principal crops. Livestock incorporation can provide valuable additional revenue to small holder farmers and can serve as a primary source of organic fertilizer through added manure production. This will result in closed system nutrient cycling where the farm is recycling nutrients from cover crop to livestock to cash crop. Therefore, cover crops may be able to serve to build and improve soils for cash crop production, as well as provide forage in the form of principle grazing, stored hay, cut and carry forage, or green chop for livestock production.

There is a high demand for *Crotalaria juncea* seed in the United States of America for use as a cover crop yet there are limited seed supplies available to farmers for planting and 98% of *C. juncea* seed is imported. This could become a viable cash crop for Virgin Island farmers. Research needs to be conducted to determine if *C. juncea* can be grown as a cover crop, forage crop, and for seed production.

#### **What has been done**

Loss of access to off campus land interrupted progress. Land has been identified on campus and plot are being re-established. Once crops have established sufficiently data will be collected.

#### **Results**

Because of the relocation and loss of initial plantings no data was collected. Subsequent plantings were done but crops were not established long enough to collect data.

#### **4. Associated Knowledge Areas**

| <b>KA Code</b> | <b>Knowledge Area</b>                          |
|----------------|------------------------------------------------|
| 101            | Appraisal of Soil Resources                    |
| 204            | Plant Product Quality and Utility (Preharvest) |
| 205            | Plant Management Systems                       |
| 302            | Nutrient Utilization 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**

Because the project was initiated on non-university land, and access to the land was removed the project was interrupted. Crops have been replanted on campus and data collection will resume.

#### **V(I). Planned Program (Evaluation Studies)**

##### **Evaluation Results**

Because the project was interrupted no evaluation was conducted.

##### **Key Items of Evaluation**

Not applicable for reasons stated above.

**V(A). Planned Program (Summary)****Program # 4****1. Name of the Planned Program**

Plant Germplasm Conservation and Enhancement

☒ 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 |
|---------|--------------------------|-----------------|-----------------|----------------|----------------|
| 202     | Plant Genetic Resources  |                 |                 | 80%            |                |
| 205     | Plant Management Systems |                 |                 | 20%            |                |
|         | <b>Total</b>             |                 |                 | 100%           |                |

**V(C). Planned Program (Inputs)****1. Actual amount of FTE/SYs expended this Program**

| Year: 2012               | Extension |      | Research |      |
|--------------------------|-----------|------|----------|------|
|                          | 1862      | 1890 | 1862     | 1890 |
| Plan                     | 0.0       | 0.0  | 1.0      | 0.0  |
| Actual Paid Professional | 0.0       | 0.0  | 1.0      | 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              | 59300          | 0              |
| 1862 Matching       | 1890 Matching  | 1862 Matching  | 1890 Matching  |
| 0                   | 0              | 29207          | 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 projects

- Sell papaya seeds to local farmers
- Prepare information sheet on sweet potato
- Distribute sorrel seed
- Present data at conferences
- Develop fact sheets for local growers
- Publish results in scientific journals

## 2. Brief description of the target audience

The target audiences are the local crop farmers and back yard growers. These producers normally have less than two acres under production. The Virgin Islands has only three producers with total production acreage over two acres.

## 3. How was eXtension used?

eXtension was not used in this program

## V(E). Planned Program (Outputs)

### 1. Standard output measures

| 2012   | Direct Contacts<br>Adults | Indirect Contacts<br>Adults | Direct Contacts<br>Youth | Indirect Contacts<br>Youth |
|--------|---------------------------|-----------------------------|--------------------------|----------------------------|
| Actual | 0                         | 0                           | 0                        | 0                          |

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

### Patent Applications Submitted

Year: 2012

Actual: 0

### Patents listed

## 3. Publications (Standard General Output Measure)

### Number of Peer Reviewed Publications

| 2012   | Extension | Research | Total |
|--------|-----------|----------|-------|
| Actual | 0         | 1        | 0     |

## V(F). State Defined Outputs

**Output Target**

**Output #1**

**Output Measure**

- Number of publications

| Year | Actual |
|------|--------|
| 2012 | 0      |

**V(G). State Defined Outcomes**

**V. State Defined Outcomes Table of Content**

| O. No. | OUTCOME NAME                                             |
|--------|----------------------------------------------------------|
| 1      | Number of local farmers growing selected plant varieties |

## **Outcome #1**

### **1. Outcome Measures**

Number of local farmers growing selected plant varieties

### **2. Associated Institution Types**

- 1862 Research

### **3a. Outcome Type:**

Change in Action Outcome Measure

### **3b. Quantitative Outcome**

| <b>Year</b> | <b>Actual</b> |
|-------------|---------------|
| 2012        | 0             |

### **3c. Qualitative Outcome or Impact Statement**

#### **Issue (Who cares and Why)**

Local farmers and consumers have increased expectations for locally grown quality produce. Due to economic situation of the islands, an increased focus by local people to grow their own and want information and planting material to fulfill the need.

#### **What has been done**

Sweet potato varieties were screened for weevil resistance. Weevil traps were installed in research plots to monitor weevil populations. Fifteen sweet potato varieties from the USDA germplasm collection were evaluated for date to maturity, weevil tolerance and tuberous root quality. A workshop was also conducted to show growers the new sweet potatoes being evaluated.

Sorrel was grown on five local farmer plots and at the university to evaluate germplasm on-farm. Data was collected and plant growth habit, production and quality of fruit recorded.

#### **Results**

Weevil populations increase during the first four weeks of sweet potato production and then stabilize at a high population through harvest. Four varieties were found to be either very weevil susceptible and/or have poor quality tuberous root production. Virus-free material had stronger vigorous growth and increased production. A taste panel was used to evaluate the preference for the new sweet potato varieties. Special interest was for the purple-colored flesh variety both for novelty and nutritional properties.

Sorrel production has been completely changed in the Virgin Islands as a result of the introduction of day neutral darker red varieties. Old traditional small fruited red varieties have been replaced over the past four years with varieties that extend the production season and have larger high quality fruit. The sorrel production season has increased from two month to eight month with the introduction and use of new sorrel varieties.

#### **4. Associated Knowledge Areas**

| <b>KA Code</b> | <b>Knowledge Area</b>    |
|----------------|--------------------------|
| 202            | Plant Genetic Resources  |
| 205            | Plant 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**

None

##### **Key Items of Evaluation**

None

**V(A). Planned Program (Summary)****Program # 5****1. Name of the Planned Program**

Aquaculture - Aquaponic Systems

☒ 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 |
|---------|--------------------------------------|-----------------|-----------------|----------------|----------------|
| 205     | Plant Management Systems             |                 |                 | 60%            |                |
| 307     | Animal Management Systems            |                 |                 | 20%            |                |
| 403     | Waste Disposal, Recycling, and Reuse |                 |                 | 20%            |                |
|         | <b>Total</b>                         |                 |                 | 100%           |                |

**V(C). Planned Program (Inputs)****1. Actual amount of FTE/SYs expended this Program**

| Year: 2012               | Extension |      | Research |      |
|--------------------------|-----------|------|----------|------|
|                          | 1862      | 1890 | 1862     | 1890 |
| Plan                     | 0.0       | 0.0  | 2.0      | 0.0  |
| Actual Paid Professional | 0.0       | 0.0  | 1.0      | 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              | 99076          | 0              |
| 1862 Matching       | 1890 Matching  | 1862 Matching  | 1890 Matching  |
| 0                   | 0              | 48798          | 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 project
- Provide training
- Present data at conferences
- Publish results in scientific journals

## 2. Brief description of the target audience

The audience for this research consists of local farmers as well as national and international farmers, entrepreneurs, researchers, extension agents, development workers and teachers.

## 3. How was eXtension used?

eXtension was not used in this program

## V(E). Planned Program (Outputs)

### 1. Standard output measures

| 2012   | Direct Contacts<br>Adults | Indirect Contacts<br>Adults | Direct Contacts<br>Youth | Indirect Contacts<br>Youth |
|--------|---------------------------|-----------------------------|--------------------------|----------------------------|
| Actual | 0                         | 0                           | 0                        | 0                          |

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

### Patent Applications Submitted

Year: 2012  
Actual: 0

### Patents listed

## 3. Publications (Standard General Output Measure)

### Number of Peer Reviewed Publications

| 2012   | Extension | Research | Total |
|--------|-----------|----------|-------|
| Actual | 0         | 1        | 0     |

## V(F). State Defined Outputs

### Output Target

### Output #1

#### Output Measure

- Abstracts presented at conferences

| <b>Year</b> | <b>Actual</b> |
|-------------|---------------|
| 2012        | 0             |

**Output #2**

**Output Measure**

- Journal articles

| <b>Year</b> | <b>Actual</b> |
|-------------|---------------|
| 2012        | 0             |

**V(G). State Defined Outcomes**

**V. State Defined Outcomes Table of Content**

| O. No. | OUTCOME NAME                                                 |
|--------|--------------------------------------------------------------|
| 1      | Number of new farmers anywhere adopting aquaponic technology |

## **Outcome #1**

### **1. Outcome Measures**

Number of new farmers anywhere adopting aquaponic technology

### **2. Associated Institution Types**

- 1862 Research

### **3a. Outcome Type:**

Change in Action Outcome Measure

### **3b. Quantitative Outcome**

| Year | Actual |
|------|--------|
| 2012 | 0      |

### **3c. Qualitative Outcome or Impact Statement**

#### **Issue (Who cares and Why)**

Interest in aquaponics is expanding rapidly and the scope is global. More people are interested in producing a portion of their food in the poor economy and they see aquaponics as a means to do that.

#### **What has been done**

The Aquaculture Project conducted research in the production of Cucurbitaceae cultivars. Members of this plant family include cucumbers, melons and gourds. Varieties selected were from USDA germplasm resources as well as commercially available types. Seven seedlings of each variety were transplanted to the aquaponic system at a spacing of 25 cm and allowed to grow over a raft area of 2.97 m<sup>2</sup>. Growth patterns and production varied widely among they types. Some covered over the raft with vegetation and expanded beyond the designated area. Others could be contained on the raft. Harvest occurred 3 times each week for 4 weeks and a total of 11 harvests. At this point insect infestation and viral infection had caused production to decline.

The Aquaculture Project conducted 6 training workshops. The 3-day workshop attracted 78 participants from the USA and its territories, Canada and a number of Caribbean islands.

#### **Results**

Production of crops of the Malvaceae family, Hibiscus sabdariffa (roselle) and Corchorus capsularis (jute) was conducted to evaluate yield of marketable product. Roselle is a short-day crop, flowering and producing marketable calyx as day length shortens in the fall. The calyx is used to make a red colored beverage for Christmas celebrations and is highly marketable for this cultural connection. Jute is a fiber crop and could be produced by a farmer to remove nitrogen waste from an aquaponic system.

### **4. Associated Knowledge Areas**

| <b>KA Code</b> | <b>Knowledge Area</b>                |
|----------------|--------------------------------------|
| 205            | Plant Management Systems             |
| 307            | Animal Management Systems            |
| 403            | Waste Disposal, Recycling, and Reuse |

**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**

None

**Key Items of Evaluation**

None

**V(A). Planned Program (Summary)****Program # 6****1. Name of the Planned Program**

Plant Biotechnology

☒ 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 |
|---------|------------------------------------------------|-----------------|-----------------|----------------|----------------|
| 201     | Plant Genome, Genetics, and Genetic Mechanisms |                 |                 | 10%            |                |
| 204     | Plant Product Quality and Utility (Preharvest) |                 |                 | 45%            |                |
| 206     | Basic Plant Biology                            |                 |                 | 45%            |                |
|         | <b>Total</b>                                   |                 |                 | 100%           |                |

**V(C). Planned Program (Inputs)****1. Actual amount of FTE/SYs expended this Program**

| Year: 2012               | Extension |      | Research |      |
|--------------------------|-----------|------|----------|------|
|                          | 1862      | 1890 | 1862     | 1890 |
| Plan                     | 0.0       | 0.0  | 1.0      | 0.0  |
| Actual Paid Professional | 0.0       | 0.0  | 1.0      | 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              | 59747          | 0              |
| 1862 Matching       | 1890 Matching  | 1862 Matching  | 1890 Matching  |
| 0                   | 0              | 29428          | 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 project
- Develop genetically enhanced plants
- Develop efficient micro-propagation systems
- Present data at conferences
- Develop fact sheets for the local population
- Publish results in scientific journals

### 2. Brief description of the target audience

The target audiences are the local crop farmers and back yard growers. These producers normally have less than two acres under production. The Virgin Islands has only three producers with total production acreage over two acres

### 3. How was eXtension used?

eXtension was not used in this program

### V(E). Planned Program (Outputs)

#### 1. Standard output measures

| 2012   | Direct Contacts<br>Adults | Indirect Contacts<br>Adults | Direct Contacts<br>Youth | Indirect Contacts<br>Youth |
|--------|---------------------------|-----------------------------|--------------------------|----------------------------|
| Actual | 0                         | 0                           | 0                        | 0                          |

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

##### Patent Applications Submitted

Year: 2012

Actual: 0

##### Patents listed

#### 3. Publications (Standard General Output Measure)

##### Number of Peer Reviewed Publications

| 2012   | Extension | Research | Total |
|--------|-----------|----------|-------|
| Actual | 0         | 0        | 0     |

### V(F). State Defined Outputs

#### Output Target

**Output #1**

**Output Measure**

- Number of publications

| Year | Actual |
|------|--------|
| 2012 | 0      |

**V(G). State Defined Outcomes**

**V. State Defined Outcomes Table of Content**

| O. No. | OUTCOME NAME                                                                             |
|--------|------------------------------------------------------------------------------------------|
| 1      | Number of local farmers growing micro-propagated sweet potato, cassava and hybrid papaya |

## **Outcome #1**

### **1. Outcome Measures**

Number of local farmers growing micro-propagated sweet potato, cassava and hybrid papaya

### **2. Associated Institution Types**

- 1862 Research

### **3a. Outcome Type:**

Change in Action Outcome Measure

### **3b. Quantitative Outcome**

| <b>Year</b> | <b>Actual</b> |
|-------------|---------------|
| 2012        | 0             |

### **3c. Qualitative Outcome or Impact Statement**

#### **Issue (Who cares and Why)**

Consumers want and demand more locally grown fruits and vegetables. The cost of fertilizer continues to increase causing less fertilizer to be used in papaya production. Consumers want to know what minimum fertilizer levels are needed for papaya production on calcareous soils. In sweet potato, they notice production decreasing and the plants looking sick from viruses. Growers are looking for clean disease-free material to plant.

#### **What has been done**

A papaya plot was established on calcareous soils which have a natural high potassium level and trials were conducted to evaluate amount of supplemental potassium needed for production. Virus-free sweet potato lines were obtained from the USDA germplasm collection. Sweet potatoes were tissue culture micropropagated to maintain clean disease-free material. Clean sweet potatoes were established under field conditions and made available to local growers.

#### **Results**

Papaya plant growth and production data was collected over time from three levels of potassium applied fertilizer. No significant difference was observed in plant growth and fruit set from 0, 50% or 100% recommended potassium levels.

Sweet potatoes grow more vigorously and set tuberous roots earlier on virus-free plant. The vigorous growth helps in suppressing weed populations. Production that is one month earlier can be obtained from the clean sweet potato material.

### **4. Associated Knowledge Areas**

| <b>KA Code</b> | <b>Knowledge Area</b>                          |
|----------------|------------------------------------------------|
| 201            | Plant Genome, Genetics, and Genetic Mechanisms |
| 204            | Plant Product Quality and Utility (Preharvest) |

### **V(H). Planned Program (External Factors)**

#### **External factors which affected outcomes**

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Appropriations changes
- Other (Fed certification of transgenics)

#### **Brief Explanation**

Hurricanes are a yearly threat to research on plant material and institutional infrastructure. Being a small island, the economy is greatly influenced by the closure of the few key local industries. Reduction in appropriations results in less supplies and man-power to complete goals. Regulations to work with transgenic material in research has become extensive and excessive paperwork is now required which is time consuming and provides little information or environmental benefit.

### **V(I). Planned Program (Evaluation Studies)**

#### **Evaluation Results**

None

#### **Key Items of Evaluation**

Customer use of technology  
Customer satisfaction  
Customer suggestions for improvement

**V(A). Planned Program (Summary)****Program # 7****1. Name of the Planned Program**

Horticulture

☒ Reporting on this Program**V(B). Program Knowledge Area(s)****1. Program Knowledge Areas and Percentage**

| <b>KA Code</b> | <b>Knowledge Area</b>                      | <b>%1862 Extension</b> | <b>%1890 Extension</b> | <b>%1862 Research</b> | <b>%1890 Research</b> |
|----------------|--------------------------------------------|------------------------|------------------------|-----------------------|-----------------------|
| 102            | Soil, Plant, Water, Nutrient Relationships |                        |                        | 25%                   |                       |
| 202            | Plant Genetic Resources                    |                        |                        | 30%                   |                       |
| 205            | Plant Management Systems                   |                        |                        | 30%                   |                       |
| 213            | Weeds Affecting Plants                     |                        |                        | 10%                   |                       |
| 216            | Integrated Pest Management Systems         |                        |                        | 5%                    |                       |
|                | <b>Total</b>                               |                        |                        | 100%                  |                       |

**V(C). Planned Program (Inputs)****1. Actual amount of FTE/SYs expended this Program**

| <b>Year: 2012</b>        | <b>Extension</b> |             | <b>Research</b> |             |
|--------------------------|------------------|-------------|-----------------|-------------|
|                          | <b>1862</b>      | <b>1890</b> | <b>1862</b>     | <b>1890</b> |
| Plan                     | 0.0              | 0.0         | 1.0             | 0.0         |
| Actual Paid Professional | 0.0              | 0.0         | 1.0             | 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)**

| <b>Extension</b>               |                       | <b>Research</b>       |                       |
|--------------------------------|-----------------------|-----------------------|-----------------------|
| <b>Smith-Lever 3b &amp; 3c</b> | <b>1890 Extension</b> | <b>Hatch</b>          | <b>Evans-Allen</b>    |
| 0                              | 0                     | 64889                 | 0                     |
| <b>1862 Matching</b>           | <b>1890 Matching</b>  | <b>1862 Matching</b>  | <b>1890 Matching</b>  |
| 0                              | 0                     | 31960                 | 0                     |
| <b>1862 All Other</b>          | <b>1890 All Other</b> | <b>1862 All Other</b> | <b>1890 All Other</b> |
| 0                              | 0                     | 0                     | 0                     |

**V(D). Planned Program (Activity)****1. Brief description of the Activity**

- Conduct research
- Present data at conferences
- Publish result in scientific journals

**2. Brief description of the target audience**

The target audiences are the local crop farmers and back yard growers. These producers normally have less than two acres under production. The Virgin Islands has only three producers with total production acreage over two acres.

**3. How was eXtension used?**

eXtension was not used in this program

**V(E). Planned Program (Outputs)****1. Standard output measures**

| 2012          | Direct Contacts<br>Adults | Indirect Contacts<br>Adults | Direct Contacts<br>Youth | Indirect Contacts<br>Youth |
|---------------|---------------------------|-----------------------------|--------------------------|----------------------------|
| <b>Actual</b> | 0                         | 0                           | 0                        | 0                          |

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

Year: 2012

Actual: 0

**Patents listed****3. Publications (Standard General Output Measure)****Number of Peer Reviewed Publications**

| 2012          | Extension | Research | Total |
|---------------|-----------|----------|-------|
| <b>Actual</b> | 0         | 3        | 0     |

**V(F). State Defined Outputs****Output Target**

**Output #1**

**Output Measure**

- Research publications

| <b>Year</b> | <b>Actual</b> |
|-------------|---------------|
| 2012        | 1             |

**Output #2**

**Output Measure**

- Abstracts presented at conferences

| <b>Year</b> | <b>Actual</b> |
|-------------|---------------|
| 2012        | 3             |

**V(G). State Defined Outcomes**

**V. State Defined Outcomes Table of Content**

| O. No. | OUTCOME NAME                                      |
|--------|---------------------------------------------------|
| 1      | Selection of pest and disease resistant cultivars |

## **Outcome #1**

### **1. Outcome Measures**

Selection of pest and disease resistant cultivars

### **2. Associated Institution Types**

- 1862 Research

### **3a. Outcome Type:**

Change in Action Outcome Measure

### **3b. Quantitative Outcome**

| Year | Actual |
|------|--------|
| 2012 | 0      |

### **3c. Qualitative Outcome or Impact Statement**

#### **Issue (Who cares and Why)**

Tomato, peppers, eggplant and okra are high value vegetable crops and grown for fresh market. Varieties needed to be evaluated to recommend those most appropriate for the Virgin Islands. Tomato is heat sensitive crop and pests are issue in eggplants and peppers. Cultivar trials are an important tool for increasing production efficiency. Improved cultivars of selected vegetables for yield, quality, weed control and adaptability in the local soil and climatic conditions needed to the growers.

#### **What has been done**

Variety trials were conducted throughout the growing seasons of 2011. Twenty seven varieties of tomato, peppers and eggplant obtained from commercial seed companies evaluated at the Agriculture Experiment Station for adaptability in the Virgin Islands soil and climatic conditions. Four tomato varieties `Celebrity?`, `Keepsake?` and `Sunmaster?` and PSS01522942 evaluated in growing season of 2011-2012. A variety trial on hot peppers conducted in replicated plots utilizing 8 varieties. Thirteen varieties of peppers (bell types, banana and cherry types) planted in replicated field plots in late fall season. Three varieties of eggplant were evaluated in summer season. A trial on heat tolerant cultivars of tomato conducted in summer using 4-CPA growth regulator.

#### **Results**

All tomato and pepper varieties performed well in the high pH calcareous soils throughout the year. Hornworms, armyworms, stink bugs, and leaf miner was observed in tomato. Venom and Malathion were effective in keeping the pest population low. `Caribbean Red?` was hottest peppers (24,289 heat units) among all the varieties tested and had a higher marketable value. `Caribbean Red?` may be suitable for a hot pepper sauce industry considering its high pungency level. In bell type peppers, `White King?` was the early maturity cultivar and produced the higher marketable yield. `Aristotle?`, `Vanguard?` and `Jupiter?` were the other promising peppers. In

eggplant 'Hansel' variety was high yielding and high in production of marketable fruits number. Spider mites infestation in eggplant was noticeably occurred in the field. A growth regulator 4 Chlorophenoxy acetic acid (4-CPA) evaluated in heat tolerant cherry and beefsteak tomato varieties in summer season of 2012. In beefsteak types, two varieties 'Red Deuce' and 'Better Boy' that were treated with 4-CPA resulted in larger fruit sets, however, produced more culls. In cherry tomatoes, higher yields and marketable fruit numbers obtained in 4-CPA treated plants. Data were collected on plant growth, marketable fruits, size, yield, acidity, firmness, and brix.

#### 4. Associated Knowledge Areas

| KA Code | Knowledge Area          |
|---------|-------------------------|
| 202     | Plant Genetic Resources |

#### 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

Stakeholders continued to see and gathered information on the varieties with superior agronomic characteristics.

##### Key Items of Evaluation

**V(A). Planned Program (Summary)****Program # 8****1. Name of the Planned Program**

Irrigation

☒ Reporting on this Program**V(B). Program Knowledge Area(s)****1. Program Knowledge Areas and Percentage**

| <b>KA Code</b> | <b>Knowledge Area</b>                          | <b>%1862 Extension</b> | <b>%1890 Extension</b> | <b>%1862 Research</b> | <b>%1890 Research</b> |
|----------------|------------------------------------------------|------------------------|------------------------|-----------------------|-----------------------|
| 102            | Soil, Plant, Water, Nutrient Relationships     |                        |                        | 15%                   |                       |
| 111            | Conservation and Efficient Use of Water        |                        |                        | 25%                   |                       |
| 132            | Weather and Climate                            |                        |                        | 15%                   |                       |
| 205            | Plant Management Systems                       |                        |                        | 20%                   |                       |
| 405            | Drainage and Irrigation Systems and Facilities |                        |                        | 25%                   |                       |
|                | <b>Total</b>                                   |                        |                        | 100%                  |                       |

**V(C). Planned Program (Inputs)****1. Actual amount of FTE/SYs expended this Program**

| <b>Year: 2012</b>        | <b>Extension</b> |             | <b>Research</b> |             |
|--------------------------|------------------|-------------|-----------------|-------------|
|                          | <b>1862</b>      | <b>1890</b> | <b>1862</b>     | <b>1890</b> |
| Plan                     | 0.0              | 0.0         | 1.0             | 0.0         |
| Actual Paid Professional | 0.0              | 0.0         | 1.0             | 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)**

| <b>Extension</b>               |                       | <b>Research</b>       |                       |
|--------------------------------|-----------------------|-----------------------|-----------------------|
| <b>Smith-Lever 3b &amp; 3c</b> | <b>1890 Extension</b> | <b>Hatch</b>          | <b>Evans-Allen</b>    |
| 0                              | 0                     | 53382                 | 0                     |
| <b>1862 Matching</b>           | <b>1890 Matching</b>  | <b>1862 Matching</b>  | <b>1890 Matching</b>  |
| 0                              | 0                     | 26293                 | 0                     |
| <b>1862 All Other</b>          | <b>1890 All Other</b> | <b>1862 All Other</b> | <b>1890 All Other</b> |
| 0                              | 0                     | 0                     | 0                     |

**V(D). Planned Program (Activity)****1. Brief description of the Activity**

- Conduct research projects
- Present data at conferences
- Publish results in scientific journals

**2. Brief description of the target audience**

The target audiences are the local crop farmers and back yard growers. These producers normally have less than two acres under production. The Virgin Islands has only three producers with total production acreage over two acres.

**3. How was eXtension used?**

eXtension was not used in this program

**V(E). Planned Program (Outputs)****1. Standard output measures**

| 2012          | Direct Contacts<br>Adults | Indirect Contacts<br>Adults | Direct Contacts<br>Youth | Indirect Contacts<br>Youth |
|---------------|---------------------------|-----------------------------|--------------------------|----------------------------|
| <b>Actual</b> | 0                         | 0                           | 0                        | 0                          |

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

Year: 2012

Actual: 0

**Patents listed****3. Publications (Standard General Output Measure)****Number of Peer Reviewed Publications**

| 2012          | Extension | Research | Total |
|---------------|-----------|----------|-------|
| <b>Actual</b> | 0         | 1        | 0     |

**V(F). State Defined Outputs****Output Target**

**Output #1**

**Output Measure**

- Abstract presented at conference

| <b>Year</b> | <b>Actual</b> |
|-------------|---------------|
| 2012        | 1             |

**Output #2**

**Output Measure**

- Research publications

| <b>Year</b> | <b>Actual</b> |
|-------------|---------------|
| 2012        | 0             |

**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 |

## **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**

| <b>Year</b> | <b>Actual</b> |
|-------------|---------------|
| 2012        | 0             |

### **3c. Qualitative Outcome or Impact Statement**

#### **Issue (Who cares and Why)**

Water is a rare commodity on a semiarid island and the Virgin Islands stakeholders are concerned to use this precious resource as efficiently as possible. Fertigation and chemigation are new technologies for utilizing a drip irrigation system to apply fertilizer and pesticides.

#### **What has been done**

Cucumber (*Cucumis sativus*) var. 'Eureka' was started in seedling tray and planted into replicated field plots of 3 rows of twelve plants per row at two foot in row spacing. Microirrigation was used to supply both fertilizer and insecticide. Plots were maintained to control weeds. Three moisture levels (-30pka, -60pka and -90pka) in the field provided.

#### **Results**

Moisture level -30pka produced highest yield compared to -60pka and -90pka. -90pka moisture level was high and produced low marketable fruits. Frequent rainfall and insect pests damage was an issue and trial needs to be repeated in order to collect data and results.

### **4. Associated Knowledge Areas**

| <b>KA Code</b> | <b>Knowledge Area</b>                          |
|----------------|------------------------------------------------|
| 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 |
|------|--------|
| 2012 | 0      |

### **3c. Qualitative Outcome or Impact Statement**

#### **Issue (Who cares and Why)**

Water is a precious commodity on a semiarid island and the Virgin Islands stakeholders are concerned to use this rare resource as efficiently as possible. Fertigation and chemigation are new technologies for utilizing a drip irrigation system to apply fertilizer and pesticides. In the Virgin Island there is no dormant period for pest. Pest and disease management is a constant battle for the water melon. Aphids, melon worm, leaf minors anthracnose and downy mildew are constant problems.

#### **What has been done**

One crop of watermelon was planted in the spring 2012 with variety `Jubilee?. The purpose of the trial was to determine growth and yield of transplanted watermelon using microirrigation. Also, the effectiveness of pre-emergence herbicide applications of Bensulide and Halosulfuron on transplanted watermelon using the cultivar ?Jubilee? evaluated. Both treatments were applied separately.

#### **Results**

Bensulide treatment caused over 2% injury to watermelon, however, seedlings recovered by 2 to 3 weeks after planting. Bensulide treatments controlled 100% of broadleaf weeds (milkweed, purslane, Amaranthus, etc.), at least 98% of grasses (goosegrass, crab grass and Johnson?s grass) and up to 90% of sedges (yellow nut sedge). Although Halosulfuron caused over 7% seedling stunting, watermelon seedlings recovered by weeks 3 to 4 after planting and yield was similar to that of untreated plots. Control of grasses was at least 97%, control of sedges was up to 87% and there was 100% control of sedges in Halosulfuron treatments. There was no significant difference in yield (number of fruits from each treatment) and quality (sweetness and firmness) of watermelon in either treatment in comparison to non-treated plots.

### **4. Associated Knowledge Areas**

| <b>KA Code</b> | <b>Knowledge Area</b>                          |
|----------------|------------------------------------------------|
| 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 |

#### **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**

Stakeholders continued to see and gathered information on the fertigation and chemigation system. High cost in the beginning is concern though water and fertilizer management is more efficient.

##### **Key Items of Evaluation**

**V(A). Planned Program (Summary)****Program # 9****1. Name of the Planned Program**

Aquaculture - Biofloc Systems

- ☐ Reporting on this Program  
     Reason for not reporting  
     This program was discontinued.

**V(B). Program Knowledge Area(s)****1. Program Knowledge Areas and Percentage****V(C). Planned Program (Inputs)****1. Actual amount of FTE/SYs expended this Program**

| Year: 2012               | Extension         |                   | Research          |                   |
|--------------------------|-------------------|-------------------|-------------------|-------------------|
|                          | 1862              | 1890              | 1862              | 1890              |
| Plan                     | 0.0               | 0.0               | 2.0               | 0.0               |
| Actual Paid Professional | {NO DATA ENTERED} | {NO DATA ENTERED} | {NO DATA ENTERED} | {NO DATA ENTERED} |
| Actual Volunteer         | {NO DATA ENTERED} | {NO DATA ENTERED} | {NO DATA ENTERED} | {NO DATA ENTERED} |

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

| Extension           |                   | Research          |                   |
|---------------------|-------------------|-------------------|-------------------|
| Smith-Lever 3b & 3c | 1890 Extension    | Hatch             | Evans-Allen       |
| {NO DATA ENTERED}   | {NO DATA ENTERED} | {NO DATA ENTERED} | {NO DATA ENTERED} |
| 1862 Matching       | 1890 Matching     | 1862 Matching     | 1890 Matching     |
| {NO DATA ENTERED}   | {NO DATA ENTERED} | {NO DATA ENTERED} | {NO DATA ENTERED} |
| 1862 All Other      | 1890 All Other    | 1862 All Other    | 1890 All Other    |
| {NO DATA ENTERED}   | {NO DATA ENTERED} | {NO DATA ENTERED} | {NO DATA ENTERED} |

**V(D). Planned Program (Activity)****1. Brief description of the Activity**

- Conduct research
- Conduct training

- Present data at conferences
- Publish results in scientific journals

## 2. Brief description of the target audience

The audience for this research consists of local farmers as well as national and international farmers, entrepreneurs, researchers, extension agents, development workers and teachers.

## 3. How was eXtension used?

{No Data Entered}

## V(E). Planned Program (Outputs)

### 1. Standard output measures

| 2012   | Direct Contacts<br>Adults | Indirect Contacts<br>Adults | Direct Contacts<br>Youth | Indirect Contacts<br>Youth |
|--------|---------------------------|-----------------------------|--------------------------|----------------------------|
| Actual | 0                         | 0                           | 0                        | 0                          |

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

### Patent Applications Submitted

Year: 2012

Actual: {No Data Entered}

### Patents listed

{No Data Entered}

## 3. Publications (Standard General Output Measure)

### Number of Peer Reviewed Publications

| 2012   | Extension | Research | Total |
|--------|-----------|----------|-------|
| Actual | 0         | 1        | 0     |

## V(F). State Defined Outputs

### Output Target

### Output #1

#### Output Measure

- Abstracts presented at conferences

|  | Year | Actual |
|--|------|--------|
|  | 2012 | 0      |

**Output #2**

**Output Measure**

- Journal articles

|  | Year | Actual |
|--|------|--------|
|  | 2012 | 0      |

**V(G). State Defined Outcomes**

**V. State Defined Outcomes Table of Content**

| O. No. | OUTCOME NAME                                               |
|--------|------------------------------------------------------------|
| 1      | Number of new farmers anywhere adopting biofloc technology |

## **Outcome #1**

### **1. Outcome Measures**

Number of new farmers anywhere adopting biofloc technology

### **2. Associated Institution Types**

- 1862 Research

### **3a. Outcome Type:**

Change in Action Outcome Measure

### **3b. Quantitative Outcome**

| <b>Year</b> | <b>Actual</b> |
|-------------|---------------|
| 2012        | 0             |

### **3c. Qualitative Outcome or Impact Statement**

#### **Issue (Who cares and Why)**

{No Data Entered}

#### **What has been done**

{No Data Entered}

#### **Results**

{No Data Entered}

### **4. Associated Knowledge Areas**

| <b>KA Code</b> | <b>Knowledge Area</b> |
|----------------|-----------------------|
| {No Data}      | null                  |

### **V(H). Planned Program (External Factors)**

#### **External factors which affected outcomes**

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

#### **Brief Explanation**

{No Data Entered}

**V(I). Planned Program (Evaluation Studies)**

**Evaluation Results**

{No Data Entered}

**Key Items of Evaluation**

{No Data Entered}

**V(A). Planned Program (Summary)****Program # 10****1. Name of the Planned Program**

Childhood Obesity

☐ Reporting on this Program

Reason for not reporting

We are not conducting any research under this area. We feel that using our actual research program names better reflects what areas we are working in. This will be reflected in the Plan or Work document.

**V(B). Program Knowledge Area(s)****1. Program Knowledge Areas and Percentage****V(C). Planned Program (Inputs)****1. Actual amount of FTE/SYs expended this Program**

| Year: 2012               | Extension         |                   | Research          |                   |
|--------------------------|-------------------|-------------------|-------------------|-------------------|
|                          | 1862              | 1890              | 1862              | 1890              |
| Plan                     | 0.0               | 0.0               | 0.0               | 0.0               |
| Actual Paid Professional | {NO DATA ENTERED} | {NO DATA ENTERED} | {NO DATA ENTERED} | {NO DATA ENTERED} |
| Actual Volunteer         | {NO DATA ENTERED} | {NO DATA ENTERED} | {NO DATA ENTERED} | {NO DATA ENTERED} |

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

| Extension           |                   | Research          |                   |
|---------------------|-------------------|-------------------|-------------------|
| Smith-Lever 3b & 3c | 1890 Extension    | Hatch             | Evans-Allen       |
| {NO DATA ENTERED}   | {NO DATA ENTERED} | {NO DATA ENTERED} | {NO DATA ENTERED} |
| 1862 Matching       | 1890 Matching     | 1862 Matching     | 1890 Matching     |
| {NO DATA ENTERED}   | {NO DATA ENTERED} | {NO DATA ENTERED} | {NO DATA ENTERED} |
| 1862 All Other      | 1890 All Other    | 1862 All Other    | 1890 All Other    |
| {NO DATA ENTERED}   | {NO DATA ENTERED} | {NO DATA ENTERED} | {NO DATA ENTERED} |

**V(D). Planned Program (Activity)****1. Brief description of the Activity**

No activities planned

## 2. Brief description of the target audience

No activities planned

## 3. How was eXtension used?

{No Data Entered}

## V(E). Planned Program (Outputs)

### 1. Standard output measures

| 2012   | Direct Contacts<br>Adults | Indirect Contacts<br>Adults | Direct Contacts<br>Youth | Indirect Contacts<br>Youth |
|--------|---------------------------|-----------------------------|--------------------------|----------------------------|
| Actual | 0                         | 0                           | 0                        | 0                          |

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

#### Patent Applications Submitted

Year: 2012

Actual: {No Data Entered}

#### Patents listed

{No Data Entered}

### 3. Publications (Standard General Output Measure)

#### Number of Peer Reviewed Publications

| 2012   | Extension | Research | Total |
|--------|-----------|----------|-------|
| Actual | 0         | 0        | 0     |

## V(F). State Defined Outputs

### Output Target

#### Output #1

##### Output Measure

- {No Data Entered}

**V(G). State Defined Outcomes**

**V. State Defined Outcomes Table of Content**

**Outcome #1**

**1. Outcome Measures**

{No Data Entered}

**V(H). Planned Program (External Factors)**

**External factors which affected outcomes**

**Brief Explanation**

{No Data Entered}

**V(I). Planned Program (Evaluation Studies)**

**Evaluation Results**

{No Data Entered}

**Key Items of Evaluation**

{No Data Entered}

**V(A). Planned Program (Summary)****Program # 11****1. Name of the Planned Program**

Sustainable Energy

☐ Reporting on this Program

Reason for not reporting

We are not conducting any research under this area. We feel that using our actual research program names better reflects what areas we are working in. This will be reflected in the Plan or Work document.

**V(B). Program Knowledge Area(s)****1. Program Knowledge Areas and Percentage****V(C). Planned Program (Inputs)****1. Actual amount of FTE/SYs expended this Program**

| Year: 2012               | Extension         |                   | Research          |                   |
|--------------------------|-------------------|-------------------|-------------------|-------------------|
|                          | 1862              | 1890              | 1862              | 1890              |
| Plan                     | 0.0               | 0.0               | 0.0               | 0.0               |
| Actual Paid Professional | {NO DATA ENTERED} | {NO DATA ENTERED} | {NO DATA ENTERED} | {NO DATA ENTERED} |
| Actual Volunteer         | {NO DATA ENTERED} | {NO DATA ENTERED} | {NO DATA ENTERED} | {NO DATA ENTERED} |

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

| Extension           |                   | Research          |                   |
|---------------------|-------------------|-------------------|-------------------|
| Smith-Lever 3b & 3c | 1890 Extension    | Hatch             | Evans-Allen       |
| {NO DATA ENTERED}   | {NO DATA ENTERED} | {NO DATA ENTERED} | {NO DATA ENTERED} |
| 1862 Matching       | 1890 Matching     | 1862 Matching     | 1890 Matching     |
| {NO DATA ENTERED}   | {NO DATA ENTERED} | {NO DATA ENTERED} | {NO DATA ENTERED} |
| 1862 All Other      | 1890 All Other    | 1862 All Other    | 1890 All Other    |
| {NO DATA ENTERED}   | {NO DATA ENTERED} | {NO DATA ENTERED} | {NO DATA ENTERED} |

**V(D). Planned Program (Activity)****1. Brief description of the Activity**

No Activities planned

## 2. Brief description of the target audience

No Activities planned

## 3. How was eXtension used?

{No Data Entered}

## V(E). Planned Program (Outputs)

### 1. Standard output measures

| 2012   | Direct Contacts<br>Adults | Indirect Contacts<br>Adults | Direct Contacts<br>Youth | Indirect Contacts<br>Youth |
|--------|---------------------------|-----------------------------|--------------------------|----------------------------|
| Actual | 0                         | 0                           | 0                        | 0                          |

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

#### Patent Applications Submitted

Year: 2012

Actual: {No Data Entered}

#### Patents listed

{No Data Entered}

### 3. Publications (Standard General Output Measure)

#### Number of Peer Reviewed Publications

| 2012   | Extension | Research | Total |
|--------|-----------|----------|-------|
| Actual | 0         | 0        | 0     |

## V(F). State Defined Outputs

### Output Target

#### Output #1

##### Output Measure

- {No Data Entered}

**V(G). State Defined Outcomes**

**V. State Defined Outcomes Table of Content**

**Outcome #1**

**1. Outcome Measures**

{No Data Entered}

**V(H). Planned Program (External Factors)**

**External factors which affected outcomes**

**Brief Explanation**

{No Data Entered}

**V(I). Planned Program (Evaluation Studies)**

**Evaluation Results**

{No Data Entered}

**Key Items of Evaluation**

{No Data Entered}

**V(A). Planned Program (Summary)****Program # 12****1. Name of the Planned Program**

Climate Change

☐ Reporting on this Program

Reason for not reporting

We are not conducting any research under this area. We feel that using our actual research program names better reflects what areas we are working in. This will be reflected in the Plan or Work document.

**V(B). Program Knowledge Area(s)****1. Program Knowledge Areas and Percentage****V(C). Planned Program (Inputs)****1. Actual amount of FTE/SYs expended this Program**

| Year: 2012               | Extension         |                   | Research          |                   |
|--------------------------|-------------------|-------------------|-------------------|-------------------|
|                          | 1862              | 1890              | 1862              | 1890              |
| Plan                     | 0.0               | 0.0               | 0.0               | 0.0               |
| Actual Paid Professional | {NO DATA ENTERED} | {NO DATA ENTERED} | {NO DATA ENTERED} | {NO DATA ENTERED} |
| Actual Volunteer         | {NO DATA ENTERED} | {NO DATA ENTERED} | {NO DATA ENTERED} | {NO DATA ENTERED} |

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

| Extension           |                   | Research          |                   |
|---------------------|-------------------|-------------------|-------------------|
| Smith-Lever 3b & 3c | 1890 Extension    | Hatch             | Evans-Allen       |
| {NO DATA ENTERED}   | {NO DATA ENTERED} | {NO DATA ENTERED} | {NO DATA ENTERED} |
| 1862 Matching       | 1890 Matching     | 1862 Matching     | 1890 Matching     |
| {NO DATA ENTERED}   | {NO DATA ENTERED} | {NO DATA ENTERED} | {NO DATA ENTERED} |
| 1862 All Other      | 1890 All Other    | 1862 All Other    | 1890 All Other    |
| {NO DATA ENTERED}   | {NO DATA ENTERED} | {NO DATA ENTERED} | {NO DATA ENTERED} |

**V(D). Planned Program (Activity)****1. Brief description of the Activity**

No Activities planned

## 2. Brief description of the target audience

No Activities planned

## 3. How was eXtension used?

{No Data Entered}

## V(E). Planned Program (Outputs)

### 1. Standard output measures

| 2012   | Direct Contacts<br>Adults | Indirect Contacts<br>Adults | Direct Contacts<br>Youth | Indirect Contacts<br>Youth |
|--------|---------------------------|-----------------------------|--------------------------|----------------------------|
| Actual | 0                         | 0                           | 0                        | 0                          |

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

#### Patent Applications Submitted

Year: 2012

Actual: {No Data Entered}

#### Patents listed

{No Data Entered}

### 3. Publications (Standard General Output Measure)

#### Number of Peer Reviewed Publications

| 2012   | Extension | Research | Total |
|--------|-----------|----------|-------|
| Actual | 0         | 0        | 0     |

## V(F). State Defined Outputs

### Output Target

#### Output #1

##### Output Measure

- {No Data Entered}

**V(G). State Defined Outcomes**

**V. State Defined Outcomes Table of Content**

**Outcome #1**

**1. Outcome Measures**

{No Data Entered}

**V(H). Planned Program (External Factors)**

**External factors which affected outcomes**

**Brief Explanation**

{No Data Entered}

**V(I). Planned Program (Evaluation Studies)**

**Evaluation Results**

{No Data Entered}

**Key Items of Evaluation**

{No Data Entered}

**V(A). Planned Program (Summary)****Program # 13****1. Name of the Planned Program**

Food Safety

☐ Reporting on this Program

Reason for not reporting

We are not conducting any research under this area. We feel that using our actual research program names better reflects what areas we are working in. This will be reflected in the Plan or Work document.

**V(B). Program Knowledge Area(s)****1. Program Knowledge Areas and Percentage****V(C). Planned Program (Inputs)****1. Actual amount of FTE/SYs expended this Program**

| Year: 2012               | Extension         |                   | Research          |                   |
|--------------------------|-------------------|-------------------|-------------------|-------------------|
|                          | 1862              | 1890              | 1862              | 1890              |
| Plan                     | 0.0               | 0.0               | 0.0               | 0.0               |
| Actual Paid Professional | {NO DATA ENTERED} | {NO DATA ENTERED} | {NO DATA ENTERED} | {NO DATA ENTERED} |
| Actual Volunteer         | {NO DATA ENTERED} | {NO DATA ENTERED} | {NO DATA ENTERED} | {NO DATA ENTERED} |

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

| Extension           |                   | Research          |                   |
|---------------------|-------------------|-------------------|-------------------|
| Smith-Lever 3b & 3c | 1890 Extension    | Hatch             | Evans-Allen       |
| {NO DATA ENTERED}   | {NO DATA ENTERED} | {NO DATA ENTERED} | {NO DATA ENTERED} |
| 1862 Matching       | 1890 Matching     | 1862 Matching     | 1890 Matching     |
| {NO DATA ENTERED}   | {NO DATA ENTERED} | {NO DATA ENTERED} | {NO DATA ENTERED} |
| 1862 All Other      | 1890 All Other    | 1862 All Other    | 1890 All Other    |
| {NO DATA ENTERED}   | {NO DATA ENTERED} | {NO DATA ENTERED} | {NO DATA ENTERED} |

**V(D). Planned Program (Activity)****1. Brief description of the Activity**

No Activities planned

## 2. Brief description of the target audience

No Activities planned

## 3. How was eXtension used?

{No Data Entered}

## V(E). Planned Program (Outputs)

### 1. Standard output measures

| 2012   | Direct Contacts<br>Adults | Indirect Contacts<br>Adults | Direct Contacts<br>Youth | Indirect Contacts<br>Youth |
|--------|---------------------------|-----------------------------|--------------------------|----------------------------|
| Actual | 0                         | 0                           | 0                        | 0                          |

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

#### Patent Applications Submitted

Year: 2012

Actual: {No Data Entered}

#### Patents listed

{No Data Entered}

### 3. Publications (Standard General Output Measure)

#### Number of Peer Reviewed Publications

| 2012   | Extension | Research | Total |
|--------|-----------|----------|-------|
| Actual | 0         | 0        | 0     |

## V(F). State Defined Outputs

### Output Target

#### Output #1

##### Output Measure

- {No Data Entered}

**V(G). State Defined Outcomes**

**V. State Defined Outcomes Table of Content**

**Outcome #1**

**1. Outcome Measures**

{No Data Entered}

**V(H). Planned Program (External Factors)**

**External factors which affected outcomes**

**Brief Explanation**

{No Data Entered}

**V(I). Planned Program (Evaluation Studies)**

**Evaluation Results**

{No Data Entered}

**Key Items of Evaluation**

{No Data Entered}

**V(A). Planned Program (Summary)****Program # 14****1. Name of the Planned Program**

Global Food Security and Hunger

☐ Reporting on this Program

Reason for not reporting

We are not conducting any research under this area. We feel that using our actual research program names better reflects what areas we are working in. This will be reflected in the Plan or Work document.

**V(B). Program Knowledge Area(s)****1. Program Knowledge Areas and Percentage****V(C). Planned Program (Inputs)****1. Actual amount of FTE/SYs expended this Program**

| Year: 2012               | Extension         |                   | Research          |                   |
|--------------------------|-------------------|-------------------|-------------------|-------------------|
|                          | 1862              | 1890              | 1862              | 1890              |
| Plan                     | 0.0               | 0.0               | 0.0               | 0.0               |
| Actual Paid Professional | {NO DATA ENTERED} | {NO DATA ENTERED} | {NO DATA ENTERED} | {NO DATA ENTERED} |
| Actual Volunteer         | {NO DATA ENTERED} | {NO DATA ENTERED} | {NO DATA ENTERED} | {NO DATA ENTERED} |

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

| Extension           |                   | Research          |                   |
|---------------------|-------------------|-------------------|-------------------|
| Smith-Lever 3b & 3c | 1890 Extension    | Hatch             | Evans-Allen       |
| {NO DATA ENTERED}   | {NO DATA ENTERED} | {NO DATA ENTERED} | {NO DATA ENTERED} |
| 1862 Matching       | 1890 Matching     | 1862 Matching     | 1890 Matching     |
| {NO DATA ENTERED}   | {NO DATA ENTERED} | {NO DATA ENTERED} | {NO DATA ENTERED} |
| 1862 All Other      | 1890 All Other    | 1862 All Other    | 1890 All Other    |
| {NO DATA ENTERED}   | {NO DATA ENTERED} | {NO DATA ENTERED} | {NO DATA ENTERED} |

**V(D). Planned Program (Activity)****1. Brief description of the Activity**

No Activities planned

## 2. Brief description of the target audience

No Activities planned

## 3. How was eXtension used?

{No Data Entered}

## V(E). Planned Program (Outputs)

### 1. Standard output measures

| 2012   | Direct Contacts<br>Adults | Indirect Contacts<br>Adults | Direct Contacts<br>Youth | Indirect Contacts<br>Youth |
|--------|---------------------------|-----------------------------|--------------------------|----------------------------|
| Actual | 0                         | 0                           | 0                        | 0                          |

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

#### Patent Applications Submitted

Year: 2012

Actual: {No Data Entered}

#### Patents listed

{No Data Entered}

### 3. Publications (Standard General Output Measure)

#### Number of Peer Reviewed Publications

| 2012   | Extension | Research | Total |
|--------|-----------|----------|-------|
| Actual | 0         | 0        | 0     |

## V(F). State Defined Outputs

### Output Target

#### Output #1

##### Output Measure

- {No Data Entered}

**V(G). State Defined Outcomes**

**V. State Defined Outcomes Table of Content**

**Outcome #1**

**1. Outcome Measures**

{No Data Entered}

**V(H). Planned Program (External Factors)**

**External factors which affected outcomes**

**Brief Explanation**

{No Data Entered}

**V(I). Planned Program (Evaluation Studies)**

**Evaluation Results**

{No Data Entered}

**Key Items of Evaluation**

{No Data Entered}