## V(A). Planned Program (Summary)

**Program # 1**

**1. Name of the Planned Program**

Aquaculture - Aquaponic Systems

### 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 | | | 30% | |
| 307 | Animal Management Systems | | | 35% | |
| 403 | Waste Disposal, Recycling, and Reuse | | | 35% | |
| | **Total** | | | 100% | |

## V(C). Planned Program (Inputs)

**1. Actual amount of professional FTE/SYs expended this Program**

| Year: 2010 | Extension | | Research | |
|---|---|---|---|---|
| | 1862 | 1890 | 1862 | 1890 |
| Plan | 0.0 | 0.0 | 2.0 | 0.0 |
| Actual | 0.0 | 0.0 | 2.0 | 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 | 119458 | 0 |
| **1862 Matching** | **1890 Matching** | **1862 Matching** | **1890 Matching** |
| 0 | 0 | 60255 | 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 and development workers.

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

**1. Standard output measures**

| 2010 | Direct Contacts Adults | Indirect Contacts Adults | Direct Contacts Youth | Indirect Contacts Youth |
|---|---|---|---|---|
| **Plan** | 0 | 0 | 0 | 0 |
| **Actual** | 92 | 0 | 0 | 0 |

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

**Patent Applications Submitted**

Year: 2010
Plan: 0
Actual: 0

**Patents listed**

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

**Number of Peer Reviewed Publications**

| 2010 | Extension | Research | Total |
|---|---|---|---|
| **Plan** | 0 | 0 | |
| **Actual** | 0 | 0 | 0 |

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

**Output Target**

**Output #1**

**Output Measure**

- Abstracts presented at conferences

| Year | Target | Actual |
|---|---|---|

| | | |
|---|---|---|
| 2010 | 1 | 3 |

**Output #2**

**Output Measure**

- Journal articles

| Year | Target | Actual |
|---|---|---|
| 2010 | 1 | 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 | Quantitative Target | Actual |
|---|---|---|
| 2010 | 2 | 0 |

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

**Issue (Who cares and Why)**
Interest in aquaponics is expanding rapidly and the scope is global as indicated by the number of people who took the UVI aquaponics course (92). A former student has been offering aquaponic courses in Hawaii which has led to the development 14 aquaponic farming operations there. A student from Pennsylvania offered an aquaponic training course and will be marketing systems.

**What has been done**
Production of two vegetable crops was evaluated in the aquaponic system. Sorrel (Hibiscus sabdariffa) and chives (Allium schoenoprasum) were grown and marketable product weighed to determined production per square meter. Two harvest strategies were employed for sorrel: weekly for 5 weeks vs. one complete harvest. This was to determine if harvesting mature sepals would stimulate more flowering and higher yield. Chives were grown for either 4 or 5 week periods and the biomass measured for each.

An experiment was conducted to evaluate a swirl separator verses a cylindro-conical settling clarifier for the removal of solid waste from an aquaponic system. The objective was to see if there is a solids removal device that works better and uses less space (i.e., a smaller footprint)than the clarifier. Three replicated aquaponic systems were set up with settling clarifiers and three were set up with swirl separators. Water spinach (Ipomoea aquatica) was grown in the system during the trial. The systems were evaluated over a 10-week production period.

**Results**
Sorrel yielded 2.8 kg/m2 for multiple harvest plants and 2.6 kg/m2 for single harvest plants. The difference is not appreciable compared to the labor required and a recommendation for one single harvest can be made. Chives harvested at 4-week intervals weighed 24 g/bunch vs. 47 g/bunch for plants grown for 5 weeks. This size difference would translate into a different sales price and

higher overall revenues for the farm even with fewer annual harvests each year.

After these two devices were operated for 10 weeks in replicated aquaponic systems, there was no difference between treatments for water quality, fish production or the production of water spinach. Spinach production per unit area was 23 kg/m2 over the duration of the experiment. The swirl separator was simple to operate. Flow rate through the clarifier was low and the device needs to be tested on the Commercial Aquaponic System to test the upper limits of its capabilities.

### 4. Associated Knowledge Areas

| KA Code | Knowledge Area |
|---|---|
| 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 and Data Collection)

### 1. Evaluation Studies Planned

- During (during program)

**Evaluation Results**

**Key Items of Evaluation**