

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

**Program # 6**

**1. Name of the Planned Program**

Global Food Security and Hunger: Plant Production

**V(B). Program Knowledge Area(s)**

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
102	Soil, Plant, Water, Nutrient Relationships	50%		10%	
201	Plant Genome, Genetics, and Genetic Mechanisms	0%		40%	
202	Plant Genetic Resources	0%		10%	
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants	0%		30%	
205	Plant Management Systems	50%		10%	
	<b>Total</b>	100%		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	6.0	0.0	10.0	0.0
Actual	7.1	0.0	9.6	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
230736	0	23994	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
230736	0	23994	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
233034	0	1044080	0

**V(D). Planned Program (Activity)**

**1. Brief description of the Activity**

Workshops  
 Conferences  
 Basic and Applied Research  
 Webpages  
 Collaborations with state and federal agencies, grower groups, and agricultural organizations

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

Commerical farmers/producers  
 Agricultural service providers

Home owners and gardeners

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

**1. Standard output measures**

2010	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
<b>Plan</b>	3000	12000	0	0
<b>Actual</b>	4200	10000	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
<b>Plan</b>	2	5	
<b>Actual</b>	3	2	5

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

**Output Target**

**Output #1**

**Output Measure**

- Fact sheets, brochures and newsletters

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2010	35	30

**Output #2**

**Output Measure**

- Web sites developed

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2010	1	3

**Output #3**

**Output Measure**

- Presentations and short courses

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2010	50	145

**Output #4**

**Output Measure**

- News releases and media events

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2010	40	48

**Output #5**

**Output Measure**

- Books and monographs

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2010	1	2

**Output #6**

**Output Measure**

- Workshops and conferences hosted

<b>Year</b>	<b>Target</b>	<b>Actual</b>
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	2010	4	8
<b><u>Output #7</u></b>			
<b>Output Measure</b>			
• Conference abstracts			
	<b>Year</b>	<b>Target</b>	<b>Actual</b>
	2010	1	1

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

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

O. No.	OUTCOME NAME
1	Adoption of recommended BMP approaches by defined targeted industry and growers (% of participating entities)
2	Awareness of recommended BMP approaches by defined participating industry and growers (% of participating entities)
3	Understanding of basic plant production processes (#)

## **Outcome #1**

### **1. Outcome Measures**

Adoption of recommended BMP approaches by defined targeted industry and growers (% of participating entities)

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

- 1862 Extension
- 1862 Research

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

Change in Action Outcome Measure

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

<b>Year</b>	<b>Quantitative Target</b>	<b>Actual</b>
2010	25	40

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

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

Sustainability issues related to greenhouse crop production and marketing are critical for agricultural businesses to be profitable. These issues include business competitiveness, business management, marketing, labor management, greenhouse systems, greenhouse structures, energy conservation, crop production practices, pest management, nutrient management, regulations and compliance, and others.

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

In cooperation with public and private partners, the Northeast Greenhouse Conference (a biennial 2-day conference and trade show with an average total attendance of 1400) was planned and implemented, and the New England Greenhouse Floriculture Guide (a management guide for insects, diseases, weeds, and growth regulators) that provides best management practices (BMPs) for ornamental crop production was developed and published.

Southern New England partners collaborated on a SARE funded project to develop the Greenhouse & High Tunnel Tomato Production conference) and to provide technical training, recommendations & diagnostic services to growers using a variety of tools including on-line outreach services through the New England Greenhouse Update website. The website includes a searchable photo library and a blog that allows participation from Extension educators in different geographic areas to easily post timely updates. (See [http://www.negreenhouseupdate.info/greenhouse\\_update/index.php](http://www.negreenhouseupdate.info/greenhouse_update/index.php)).

Other collaborations were the Evening in the Greenhouse? series, the 2-day winter educational meeting and trade show, and hands-on workshops such as the 2010 Plant Diagnostic Clinic. UConn and Connecticut Agriculture Experiment Station scientists collaborated with Geremia Greenhouses Inc. to develop irrigation methods that reduces root-borne disease and reliance on

plant growth regulators and fungicides while conserving water and nutrients compared to traditional overhead irrigation.

The ornamental plant extension team planned and sponsored the Perennial Plant Conference, the Garden Conference and the pesticide applicators recertification series Winter Bedding Plant meetings. Crop production schedules and BMPs are updated annually as required and soil test interpretation, crop production diagnostics and cultural advice are provided regularly.

### **Results**

Growers in CT are increasingly adopting more sustainable production practices. These include increased use of nutrient and water containment systems in crop production, increased reliance on beneficial organisms (predators and parasites) to control pests, improved diagnostic skills to detect and respond to cultural problems quickly and in accordance with current BMPs, and improved energy conservation practices.

## **4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
102	Soil, Plant, Water, Nutrient Relationships
205	Plant Management Systems

## **Outcome #2**

### **1. Outcome Measures**

Awareness of recommended BMP approaches by defined participating industry and growers (% of participating entities)

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

- 1862 Extension
- 1862 Research

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

Change in Knowledge Outcome Measure

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

<b>Year</b>	<b>Quantitative Target</b>	<b>Actual</b>
2010	15	55

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

**Issue (Who cares and Why)**

Connecticut farmers use greenhouses to grow potted herbs, vegetable bedding plants, tomatoes, annual and perennial flowering plants (from both seed and cuttings), and potted holiday crops. Greenhouse-grown plants are sold to consumers for planting in gardens or landscapes and for use in mixed planters, hanging baskets or for indoor use. Greenhouse vegetables and herbs are sold retail at farmers markets and roadside stand, and wholesale to restaurants and through other markets.

Many farmers in southern New England have added greenhouse crops to their businesses to increase income. Greenhouse and nursery crops comprise more than one-third of all cash receipts received by agricultural producers. Bedding plants and garden plants are the largest sales category. In Connecticut, the greenhouse industry is a significant part of the environmental horticulture industry (production, retail & landscape services) which is a major sector of Connecticut agriculture. The environmental horticulture industry provides many jobs (over 48,000 employed in CT), with plant sales generating over \$583 million. It also helps keep more than 46,000 acres in agriculture of which 23% is open space. Critical issues for farmers wishing to adopt sustainable greenhouse production are prevention of cultural and pest problems (which are increasing due to industry globalization and pest invasion), early diagnosis, and early intervention. More growers are interested in employing biological controls because chemical resistance is making it hard to control many common greenhouse pests. But, it is a very different strategy than conventional control with a different set of skills and knowledge needed. Suppliers and distributors are fighting for a share of this market. It is hard for growers to find reliable unbiased sources of information.

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

Full season IPM hands on training sessions were held at participating growers' greenhouses. During visits, farmers learned how to use tools for early diagnosis, cultural practices to reduce pests and how to use low-risk pesticides and biological controls.

Weekly email updates (information gained from site visits mentioned above) were sent to 500 growers in southern New England with short abstracts, photos and links to additional information via the website (New England Greenhouse Update ([www.negreenhouseupdate.info](http://www.negreenhouseupdate.info)) which is a joint, multi-state effort between UMASS and UCONN.

Full season IPM hands on training sessions were held at the individual grower greenhouses. Fourteen businesses participated in the program directly impacting 14.15 acres (616,428 square feet) of intensive greenhouse production plus 10 acres of outdoor production. A total of 131 infield IPM training sessions were conducted. This sustainable greenhouse health maintenance program was able to provide unbiased information that helped growers to prevent problems and grow their greenhouse crops using sustainable practices and products.

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Pre and post season surveys were conducted to determine changes in pesticide use at

participating farms. All participants increased their adoption of Integrated Pest Management (IPM) practices. For the 14 participating businesses, insecticide use decreased as 14.7 pounds of insecticide active ingredient was saved from application. Crop losses were reduced, cultural practices were improved, and crop quality increased.

Whenever possible, farmers selected more environmentally friendly and or biologically based products with shorter reentry levels, lessening worker exposure to pesticides. Fifty percent of the businesses used biological control agents including beneficial nematodes, and/or predatory mites. Sixty six percent also reduced pesticide use.

#### 4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
205	Plant Management Systems

#### Outcome #3

##### 1. Outcome Measures

Understanding of basic plant production processes (#)

##### 2. Associated Institution Types

- 1862 Research

##### 3a. Outcome Type:

Change in Knowledge Outcome Measure

##### 3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	2	2

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

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

Certified organic growers are challenged by availability and effectiveness of organic fertilizers for greenhouse crops.

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

A research project studied 'Nitrogen Nutrition for Energy Efficient and Certified Organic Cultivation of Greenhouse Crops'. Combinations of pre-plant incorporated and liquid fertilizers were evaluated in trials with tomatoes.

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#### **Results**

Study results indicate that Phosphorous availability is a limiting factor for plant growth with some organic fertilizers. Furthermore, the fact that the sodium nitrate and potassium sulfate (NK) formulation was capable of producing plants equal to the K+ formulatin provides certified organic growers with a method of fertilization that avoids some significant disadvantages of commercial liquid organic fertilizers. Results support efforts to develop improved production procedures compliant with the National Organic Program (NOP) standards. Development of a new liquid fertilizer formulation using ingredients compliant with NOP standards will provide certified organic growers with a more convenient means of fertilizing plants

#### 4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants
205	Plant Management Systems

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

##### External factors which affected outcomes

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

##### Brief Explanation

The economy limits experimentation by growers.

#### V(I). Planned Program (Evaluation Studies and Data Collection)

##### 1. Evaluation Studies Planned

- Before-After (before and after program)
- During (during program)
- Time series (multiple points before and after program)

##### Evaluation Results

{No Data Entered}

##### Key Items of Evaluation

{No Data Entered}