

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

**Program # 2**

**1. Name of the Planned Program**

Food and Agriculture

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	10%			
205	Plant Management Systems	10%			
211	Insects, Mites, and Other Arthropods Affecting Plants	10%			
212	Pathogens and Nematodes Affecting Plants	10%			
213	Weeds Affecting Plants	10%			
216	Integrated Pest Management Systems	15%			
307	Animal Management Systems	10%			
315	Animal Welfare/Well-Being and Protection	10%			
601	Economics of Agricultural Production and Farm Management	15%			
	<b>Total</b>	100%			

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

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

<b>Year: 2013</b>	<b>Extension</b>		<b>Research</b>	
	<b>1862</b>	<b>1890</b>	<b>1862</b>	<b>1890</b>
Plan	18.0	0.0	0.0	0.0
Actual Paid Professional	16.0	0.0	0.0	0.0
Actual Volunteer	5.0	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
320704	0	0	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
320704	0	0	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
2572019	0	0	0

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

**1. Brief description of the Activity**

Extension provides educational and technical support to NH's farms, greenhouses and the landscape industry. We do applied research, offer workshops and resources as well as provide diagnostic services to homeowners and growers.

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

Farmers/producers, people who work in agriculture-related fields, homeowners, nursery/greenhouse managers

**3. How was eXtension used?**

eXtension resources help Master Gardener volunteers find quick and accurate answers to call center inquiries in gardening, landscaping and small scale livestock and poultry production. In addition, staff have not only presented, but participated in several eXtension-sponsored webinars.

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

**1. Standard output measures**

2013	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
<b>Actual</b>	24378	133577	482	280

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

**Patent Applications Submitted**

Year: 2013  
 Actual: 0

**Patents listed**

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

**Number of Peer Reviewed Publications**

2013	Extension	Research	Total
Actual	0	0	0

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

**Output Target**

**Output #1**

**Output Measure**

- Number of people attending pasture walks  
Not reporting on this Output for this Annual Report

**Output #2**

**Output Measure**

- Number of farm/site visits, including kitchen table meetings and private consultations

Year	Actual
2013	4197

**Output #3**

**Output Measure**

- Number of people reached with agriculture information via radio and TV spots

Year	Actual
2013	133577

**Output #4**

**Output Measure**

- Number of people who attend twilight grower meetings  
Not reporting on this Output for this Annual Report

**Output #5**

**Output Measure**

- Number of phone consultations regarding agricultural practices, home horticulture and miscellaneous agriculture topics

Year	Actual
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2013 5733

**Output #6**

**Output Measure**

- Number of Pesticide Applicators attending recertification training

<b>Year</b>	<b>Actual</b>
2013	1303

**Output #7**

**Output Measure**

- Number of soil and plant analyses conducted by diagnostic labs

<b>Year</b>	<b>Actual</b>
2013	3042

**Output #8**

**Output Measure**

- Number of people reached through educational Workshops - Single & multi-day educational events such as grower schools, state-wide grazing events, etc.

<b>Year</b>	<b>Actual</b>
2013	13274

**Output #9**

**Output Measure**

- Number of people reached though conferences: Farm & Forest, Producer Association Meetings  
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	Number of NH growers who adopt practices that improve farm productivity, quality of life, environmental conditions, and/or profitability.
2	Number of NH growers who submit soil and/or tissue tests to determine crop nutrient needs
3	Number of NH growers who formulate plans to guide their crop production, pest management, nutrient allocation, or farm management decisions
4	Number of NH growers who increase their knowledge, awareness, and/or skills in crop production practices
5	Number of NH growers who increase knowledge, awareness, and/or skills in pest management practices and technologies.
6	Number of participants in home horticulture programs who gain skills that improve self-esteem, enable them to grow and preserve crops, adopt IPM practices and protect and enhance their environment.
7	Number of NH growers who increase their skills, knowledge or awareness in practices or methods related to dairy, livestock or equine production methods.

**Outcome #1**

**1. Outcome Measures**

Number of NH growers who adopt practices that improve farm productivity, quality of life, environmental conditions, and/or profitability.

**2. Associated Institution Types**

- 1862 Extension

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

<b>Year</b>	<b>Actual</b>
2013	309

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

**Issue (Who cares and Why)**

**What has been done**

**Results**

**4. Associated Knowledge Areas**

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

**Outcome #2**

**1. Outcome Measures**

Number of NH growers who submit soil and/or tissue tests to determine crop nutrient needs

**2. Associated Institution Types**

- 1862 Extension

### 3a. Outcome Type:

Change in Action Outcome Measure

### 3b. Quantitative Outcome

Year	Actual
2013	3042

### 3c. Qualitative Outcome or Impact Statement

#### Issue (Who cares and Why)

Over-application of fertilizers can negatively impact water quality as well as plant growth, and is expensive. Under-application of fertilizers results in poor plant growth and loss of potential yields and profits. Soil tests and plant tissue tests (for perennial fruit crops) are tools that help growers determine nutrient availability and crop needs.

#### What has been done

During the 12 month period from October 2012 to September 2013, UNHCE issued recommendations for:

- 1823 home grounds and gardens samples
- 184 commercial fruit growers' samples
- 114 commercial corn, forage and pasture samples
- 243 commercial vegetable growers' samples
- 307 non-commercial hay and forage samples

Along with other types of samples, recommendations were issued to approximately 1500 farmers, land managers, or citizens for 3042 samples during this period. This reflects a 6% increase over the number of samples done during the previous year. The largest increase was a 42% increase in commercial fruit samples; there was also an increase of 20% in commercial corn, forage and pasture samples. Home grounds and gardens samples increased by 3%.

#### Results

The overwhelming majority of respondents to a survey asking about soil testing, found it useful, followed the soil test recommendations, and would not only use the service again, but would also recommend it to others.

Specific impacts, homeowner soil tests:

- 94% (119 people) felt that soil test recommendations from UNHCE were useful
- 88% (112 people) followed the recommendations and based fertilizer decisions on test results.
- 27% (45 people) did something different than they would have done if they had not soil tested, e.g. applied less or more fertilizer.
- 80% (102 people) planned to test their soil on a regular basis
- 100% (127 people) would recommend soil testing to others
- 3% (4 people) chose not to plant vegetables because their test showed very high levels of lead.

Specific impacts, commercial soil tests:

- 82% (32 farmers) felt that soil test recommendations from UNHCE were useful
- 74% (29 farmers) followed the recommendations and based fertilizer decisions on test results.
- Farmers were not able to estimate whether more or less material was used than would have been used without tests, since they base application decisions on soil tests.
- 79% (31 farmers) planned to test their soil on a regular basis, every 1-3 years.
- 90% (35 people) would recommend soil testing to others.

#### 4. Associated Knowledge Areas

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

#### Outcome #3

##### 1. Outcome Measures

Number of NH growers who formulate plans to guide their crop production, pest management, nutrient allocation, or farm management decisions

##### 2. Associated Institution Types

- 1862 Extension

##### 3a. Outcome Type:

Change in Action Outcome Measure

##### 3b. Quantitative Outcome

Year	Actual
2013	678

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

**Issue (Who cares and Why)**

**What has been done**

**Results**

#### 4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships

205	Plant Management Systems
211	Insects, Mites, and Other Arthropods Affecting Plants
212	Pathogens and Nematodes Affecting Plants
216	Integrated Pest Management Systems

#### **Outcome #4**

##### **1. Outcome Measures**

Number of NH growers who increase their knowledge, awareness, and/or skills in crop production practices

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

- 1862 Extension

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

Change in Knowledge Outcome Measure

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

<b>Year</b>	<b>Actual</b>
2013	281

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

**Issue (Who cares and Why)**

**What has been done**

**Results**

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

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

#### **Outcome #5**

##### **1. Outcome Measures**

Number of NH growers who increase knowledge, awareness, and/or skills in pest management practices and technologies.

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

- 1862 Extension

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

Year	Actual
2013	348

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

**Issue (Who cares and Why)**

Pests (weeds, insects and pathogens) can limit farm profitability through reduced yields. Research-based information about how to identify, diagnose or prevent pest problems can reduce costs and environmental impact of pest control strategies. This requires 1) correct identification of pests, and 2) an understanding of how pest and crop life cycles interact. Cultural controls including growing practices that favor crops while hindering pests. Chemical controls vary widely in terms of impacts on non-target organisms such as beneficial insects or humans, and the environment. Reduced-risk pesticides include both biological controls as well as chemicals that have fewer off-target effects than conventional pesticides. The New Hampshire vegetable industry is extremely interested in reducing pesticide use while improving or at least maintaining crop quality. The use of Integrated Pest Management (IPM) practices, as presented by UNH Cooperative Extension (UNHCE), has helped growers attain this goal of decreased pesticide use and maintaining quality of the crop.

The goal of the Integrated Pest Management (IPM) program is to teach farmers how to manage pest problems in a more appropriate manner, without compromising crop yield or quality. We emphasize a 3 component approach: 1) monitoring conditions and pest populations 2) using cultural methods to suppress pest populations, and 3) prioritizing controls with the least environmental impact first.

Sweet corn is the #1 vegetable crop grown in New Hampshire in terms of total acreage dedicated for fresh market production. In 2012 there were 1,500 acres planted with a yield of nearly 706 dozen ears per acre, with a value of \$4.8 million dollars in sales based on USDA National Agricultural Statistics Service (NASS) statistics. Summer squash, winter squash and pumpkins are the #2 vegetable crops group grown in NH in terms of total acreage dedicated for fresh market production. In 2012, pumpkins yielded 9,100 pounds/acre and were worth \$3,185/acre.

**What has been done**

Twenty growers participated in the sweet corn insect pest IPM program. UNHCE secured a grant to hire an IPM scout to work with the growers during the growing season. Traps specific for each pest were placed in fields at 22 locations in southern New Hampshire, and then checked weekly for the presence and number of the specific insect pest. Based on trap numbers and scouting damage of the corn in the field, spray recommendations were generated for each given farm.

This information in the format of special bulletins was posted and accessible to all farms in New

Hampshire, so farms that did not have traps on site were still aware of when the insect population was increasing. Throughout the summer at UNHCE-sponsored twilight meetings, updates were made to growers attending the meetings on the status of the sweet corn insect complex. Three informational fact sheets were developed for growers to use and were placed on the UNHCE website.

An additional grant was secured for traps and monitoring for squash crops. Traps specific to squash vine borer were placed in fields at 14 locations in southern NH, and then checked weekly for the presence and number of the specific insect pest. Based on trap numbers, spray recommendations were generated for each farm. Again, information was posted and accessible to all farms in New Hampshire, so farms that did not have traps on site were still aware of when the insect population was increasing.

### **Results**

As a result, sweet corn growers using the IPM program sprayed 1.8 fewer sprays than they did prior to the current IPM program. This saving was a value of \$10,912 for pesticide and \$13,094 for labor and equipment costs. The reduction in sweet corn cull rate from insect damage due to the IPM program as reported by the participating growers resulted in increase of \$294,949 in crop sales. Total sweet corn impact: \$318,955.

Reported in the end of season survey, eighteen of nineteen sweet corn growers stated they were confident in the spray recommendations based on the IPM trapping program. Twenty growers stated that the IPM program changed the way they sprayed their crops compared to prior to the start of the current IPM trapping and scouting program and some stated they had lower plant losses. Fifteen growers reported that they shared their trapping information with another forty-two growers who benefited from the program.

This year, pressure from squash vine borer was considered to be average. The fourteen growers participating in the squash vine borer IPM program reported they sprayed less than they usually do prior to the IPM program. An average of 2.14 sprays on 214 acres of summer squash, winter squash and pumpkins were not applied based on the IPM program. Growers noted no plant loss due to squash vine borer. This savings equaled over 60 gallons of pesticides that were not applied saving \$5,435 for pesticide and \$12,937 for labor and equipment costs.

## **4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
211	Insects, Mites, and Other Arthropods Affecting Plants
212	Pathogens and Nematodes Affecting Plants
216	Integrated Pest Management Systems

**Outcome #6**

**1. Outcome Measures**

Number of participants in home horticulture programs who gain skills that improve self-esteem, enable them to grow and preserve crops, adopt IPM practices and protect and enhance their environment.

**2. Associated Institution Types**

- 1862 Extension

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

<b>Year</b>	<b>Actual</b>
2013	5733

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

**Issue (Who cares and Why)**

**What has been done**

**Results**

**4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
205	Plant Management Systems
216	Integrated Pest Management Systems

**Outcome #7**

**1. Outcome Measures**

Number of NH growers who increase their skills, knowledge or awareness in practices or methods related to dairy, livestock or equine production methods.

**2. Associated Institution Types**

- 1862 Extension

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

<b>Year</b>	<b>Actual</b>
2013	294

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

**Issue (Who cares and Why)**

In recent years, the cost of purchased feeds has risen dramatically, especially for purchased concentrates. This has had an especially hard effect on dairy producers, who rely heavily on purchased concentrates. High-quality forages produced on the farm are much less expensive, and they can significantly offset the amount of grain required in rations.

**What has been done**

In the last year, UNHCE has highlighted forage production that emphasizes not only increasing crop yields but also improving quality. At events such as the fall corn and forage meetings and the spring crop meetings, we have brought in speakers that have demonstrated the effect that improving forage quality has on farm profitability. In a related area, we have introduced the concept of double cropping small grains with silage corn, which has the potential to increase the total yield of forages on the farm. Collaborating with USDA-Natural Resources Conservation Service and with UNH College Of Life Science and Agriculture faculty, three Extension staff are involved with an on-farm demonstration project to measure dry matter yields and feed quality with a double-cropping system compared to those of conventional, continuous silage corn.

**Results**

In interviews conducted during farm visits and via phone, a number of farms are adopting practices that they learned. Specifically, there are several farms that have gone on to take steps to improve forage quality and yield. In the past year, at least five farms across the state comprising over three hundred acres have either harvested forage from small grains double-cropped with corn, or they've seeded down cornfields in order to harvest forage from them next spring. One farm in Grafton County, sowed winter triticale on 100 acres as a trial in the fall of 2013, and is looking to sow a total of 350 acres next fall. Another farm that has used cover crops for a long time harvested 30 acres this spring in order to increase his forage inventory; his cows performed well enough on the feed that he intends to do it again in subsequent years. In future interviews, we will be able to learn if the feed they harvested has had a significant impact on their feed purchases and farm profitability. It's also worth noting that these efforts have increased the ground planted to cover crops after harvesting corn. While we have not measured specific impacts in this area, it is well accepted that having ground cover during the winter reduces soil erosion dramatically; helps retain plant nutrients, and generally improves soil health.

In addition, three farms have begun wide swath mowing in an effort to promote more rapid wilting to conserve forage quality. While they have not yet taken feed samples to determine the effect on feed value, these farms report that the practice did reduce the time required from mowing to

harvesting. One farm pointed out that despite the rainy weather we saw in June and July, being able to get his feed harvested in 24-36 hours instead of 48+ hours gave him enough flexibility to keep up with the crop instead of letting it get over-mature in the field.

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

<b>KA Code</b>	<b>Knowledge Area</b>
315	Animal Welfare/Well-Being and Protection

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

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

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

##### **Brief Explanation**

Invasive pests and changes in climate will continue to impact NH agriculture.

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

##### **Evaluation Results**

Surveys, focus groups and end of session questionnaires provide impact data.

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