

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

**Program # 15**

**1. Name of the Planned Program**

Global Food Security and Hunger - Plants and Plant Products

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

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
102	Soil, Plant, Water, Nutrient Relationships	15%	10%	10%	33%
201	Plant Genome, Genetics, and Genetic Mechanisms	10%	15%	15%	0%
202	Plant Genetic Resources	10%	10%	10%	0%
205	Plant Management Systems	10%	10%	10%	67%
216	Integrated Pest Management Systems	15%	15%	15%	0%
403	Waste Disposal, Recycling, and Reuse	10%	10%	10%	0%
511	New and Improved Non-Food Products and Processes	10%	10%	10%	0%
601	Economics of Agricultural Production and Farm Management	10%	10%	10%	0%
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins	10%	10%	10%	0%
	<b>Total</b>	100%	100%	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	30.0	0.5	7.5	3.0
Actual	26.1	0.8	27.6	3.0

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

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
805232	84564	563495	904686
1862 Matching	1890 Matching	1862 Matching	1890 Matching
913441	93217	1899546	1011119
1862 All Other	1890 All Other	1862 All Other	1890 All Other
2240286	22000	6923706	86355

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

#### 1. Brief description of the Activity

Conduct research experiments on genetic improvement and manipulation of plants, bioprocessing, production systems, and BMP effectiveness. Contribute presentations and scholarly publications to regional, national, and international scientific organizations. Engage with clientele to adapt research products to the production environment. Conduct multi-county and in-depth educational programs and short courses on new plants and plant products, their management, food safety issues, and associated BMPs. Collaborate with other state specialists to develop regional publications in these areas. Maintain demonstration plots of cultural practices, techniques and germplasm adaptability of selected crops. Publish (listserv, web, and mailing) newsletters to provide practical information on pest management, cultural practices, and other research-based aspects of plant management.

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

The target audience includes Extension educators, commercial producers, policy makers, small businesses, pesticide applicators, homeowners and other plant and food product consumers. Youth, their parents and limited income consumers are targeted through 4-H horticulture programs and community gardening efforts.

### 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>	130000	236300	30000	6500
<b>Actual</b>	143258	313355	34708	1191

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

##### Patent Applications Submitted

Year: 2010  
 Plan: 2  
 Actual: 0

**Patents listed**

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

**Number of Peer Reviewed Publications**

<b>2010</b>	<b>Extension</b>	<b>Research</b>	<b>Total</b>
<b>Plan</b>	10	26	
<b>Actual</b>	6	28	34

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

**Output Target**

**Output #1**

**Output Measure**

- Number of educational presentations conducted

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2010	600	867

**Output #2**

**Output Measure**

- Number of volunteers

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2010	5000	24090

**Output #3**

**Output Measure**

- Number of research studies completed on biofuels or novel biobased products

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2010	12	4

**Output #4**

**Output Measure**

- Number of research publications on biofuels or novel bio-based products  
Not reporting on this Output for this Annual Report

**Output #5**

**Output Measure**

- Number of research citations

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2010	100	130

**Output #6**

**Output Measure**

- Number of outreach citations  
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 commercial producers educated about new plants, cultivated varieties, production techniques or BMPs
2	Number of commercial producers adopting new plants, cultivated varieties, production techniques, or BMPs
3	Number of noncommercial gardeners/producers educated about new techniques or BMPs
4	Number of noncommercial gardeners adopting new techniques or BMPs
5	Number of new cultivated varieties released
6	Increased number of acres dedicated to vegetable and berry specialty crops to enhance agricultural profitability.
7	Promoting Raspberry Production Among Small Farmers in Virginia

## **Outcome #1**

### **1. Outcome Measures**

Number of commercial producers educated about new plants, cultivated varieties, production techniques or BMPs

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

- 1862 Extension
- 1890 Extension
- 1862 Research
- 1890 Research

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

Change in Knowledge Outcome Measure

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

<b>Year</b>	<b>Quantitative Target</b>	<b>Actual</b>
2010	11000	11000

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

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

Weed management is one of the most costly expenditures in nursery production and in landscape maintenance. Weeds are commonly managed through preemergence and postemergence herbicide application. Proper use of these chemical control options is needed for environmental stewardship, including minimizing any adverse impact on the Chesapeake Bay. Nonchemical control options needs to be integrated into management strategies used by producers and landscapers.

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

Through horticulture weed research program, evaluations have been made of the integration of nonchemical and chemical control strategies for doveweed reed, one of the newest invasive plant species in container nursery production. Control measures have been evaluated for chamberbitter, phyllanthus, and mulberryweed, three of the newest invasive weeds to infest nursery and landscape plantings in Virginia. Control strategies for yellow nutsedge, an aggressive weed in container and field nursery production as well as landscape maintenance was investigated. Results were published in one refereed journal article, five papers presented at professional meetings, and in 9 research reports. A research report containing five articles on the findings were distributed to the attendees at the 2010 Virginia Turfgrass field day.

#### **Results**

Over 2,000 individuals were trained on the use of nonchemical and chemical control options. Attendees learned the benefits of nonchemical weed control options, resulting in fewer pesticide

applications to lawns, landscape bed, and in production areas. Practitioners utilizing the results from my integrated research and extension program will increase the effective use of nonchemical weed control measures. This will result in a decrease in unnecessary pesticide applications.

#### 4. Associated Knowledge Areas

<b>KA Code</b>	<b>Knowledge Area</b>
102	Soil, Plant, Water, Nutrient Relationships
201	Plant Genome, Genetics, and Genetic Mechanisms
202	Plant Genetic Resources
205	Plant Management Systems
216	Integrated Pest Management Systems
403	Waste Disposal, Recycling, and Reuse
601	Economics of Agricultural Production and Farm Management
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins

#### Outcome #2

##### 1. Outcome Measures

Number of commercial producers adopting new plants, cultivated varieties, production techniques, or BMPs

##### 2. Associated Institution Types

- 1862 Extension
- 1890 Extension
- 1862 Research
- 1890 Research

##### 3a. Outcome Type:

Change in Action Outcome Measure

##### 3b. Quantitative Outcome

<b>Year</b>	<b>Quantitative Target</b>	<b>Actual</b>
2010	700	700

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

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

Ambrosia beetles are pests of ornamental, fruit, and nut trees throughout the central and eastern US, and can cause significant damage particularly in nurseries. Infested trees often die from early spring attack.

**What has been done**

Nursery operations in Goochland, Accomac, Northampton, Isle of Wight counties and cities of Chesapeake and Suffolk that had experienced losses in past years participated in a pest monitoring and trapping evaluation program.

**Results**

None of the nurseries that used the monitoring results to properly time insecticide applications sustained any losses from ambrosia beetles.

**4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
102	Soil, Plant, Water, Nutrient Relationships
202	Plant Genetic Resources
205	Plant Management Systems
216	Integrated Pest Management Systems
403	Waste Disposal, Recycling, and Reuse
511	New and Improved Non-Food Products and Processes
601	Economics of Agricultural Production and Farm Management

**Outcome #3**

**1. Outcome Measures**

Number of noncommercial gardeners/producers educated about new techniques or BMPs

**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	300000	300000

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

**Issue (Who cares and Why)**

Over 1,000 Master Gardener (MG) volunteers provide research-based horticulture and environmental educational programs through Virginia Cooperative Extension (VCE) in the 19 county Northern District (ND). According to a 2007 University of Minnesota MG study of potential

public benefits, the identified top three were improving the natural environment, reduction of the spread of hazardous plants, insects and disease, and an increase in the effectiveness of community public service organizations. In Prince William County, Public Works?

Watershed Management Branch and the VCE-Prince William's Environment and Natural Resources program determined the most important environmental issue is protecting water quality. Educational programs administered through the local Virginia Cooperative Extension office help the locality maintain their VPDES permit.

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

In 2010, Prince William County MG volunteers and staff educated 1247 residents through 63 classes held free to the public. Some of the class topics included the Basics of Gardening Series, the Sustainable Vegetable Gardening Series, Pruning, Teaching Garden Yours, Summer Quest at local libraries, two classes on stormwater management, six Saturday in the Garden programs, and five classes on lawn care.

#### **Results**

As a result of these programs, 84% of attendees returning surveys reported the intent to adopt recommended water quality practices provided in the lectures on post surveys. Surveys sent out to the same attendees three months after these programs indicate that 90% of environmental education participants had adopted the recommended best management practices provided in the lecture they attended.

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

<b>KA Code</b>	<b>Knowledge Area</b>
102	Soil, Plant, Water, Nutrient Relationships
201	Plant Genome, Genetics, and Genetic Mechanisms
202	Plant Genetic Resources
216	Integrated Pest Management Systems
403	Waste Disposal, Recycling, and Reuse
511	New and Improved Non-Food Products and Processes

#### **Outcome #4**

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

Number of noncommercial gardeners adopting new techniques or BMPs

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

- 1862 Extension
- 1862 Research

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

Change in Action Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2010	2000	2500

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

**Issue (Who cares and Why)**

The Henrico County Extension Office is situated in a county with an estimated population of 296,419 according to the 2009 US Census Bureau. Reaching a population of this size could be a daunting task. The Henrico Master Gardeners are an important resource for educational outreach and are essential in day-to-day interactions with Henrico citizens who call needing solutions. With the focus on water quality and the environment, it is essential that Henrico citizens are provided with up-to-date, research-based information on topics such as insect and disease management, wildlife issues, and turf and landscape care. Very often pesticides and fertilizers can be misapplied or applied at incorrect rates by well-meaning homeowners.

**What has been done**

The Henrico Master Gardeners provide outreach through a number of venues. Master Gardeners have interactions with Henrico residents through the Horticulture Helpline manned by Henrico Master Gardener volunteers. They provide valuable information to Henrico citizens who visit one of the plant clinics manned by Master Gardener Volunteers in locations within the county. They provide pertinent and timely information to clients at information booths at events in Henrico County and surrounding areas. Henrico Master Gardeners educated citizens who attended their Educational Sessions in conjunction with the Lewis Ginter Plant Sale. The Henrico Master Gardener Speakers Bureau share knowledge through talks to local groups. The Henrico Master Gardeners provided information while serving as docents in the Gillette House Garden.

**Results**

Master Gardeners volunteered 1,326.75 hours on the helpline during 2010 resulting in 800 direct and indirect contacts. Master Gardeners processed or diagnosed 27 samples through the Henrico Extension Diagnostic Lab.

On a survey of helpline callers, 93% of respondents noted that they received a prompt response to their question. 65% of respondents noted that they used the information or advice provided by the Master Gardener. 51% of respondents said that they have changed something that they do as a result of information or advice they received. Some of the behaviors respondents noted they would change include using the proper pesticide, reading pesticide directions before application and learning the proper way to plant and grow a garden. Overall, 97% of respondents are likely to contact the Master Gardener helpline with other questions in the future. Master Gardeners presented a total of 22 educational presentations to approximately 631 attendees from community and civic groups in Henrico County in 2010. 95% of participants noted that they were provided with new information they can use, while 92% noted that they will likely change something they do as a result of the information presented; and, 94% would recommend the same speaker to another group.

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
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102	Soil, Plant, Water, Nutrient Relationships
202	Plant Genetic Resources
205	Plant Management Systems
216	Integrated Pest Management Systems
403	Waste Disposal, Recycling, and Reuse
511	New and Improved Non-Food Products and Processes

## **Outcome #5**

### **1. Outcome Measures**

Number of new cultivated varieties released

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

- 1862 Extension
- 1862 Research
- 1890 Research

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

Change in Action Outcome Measure

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

<b>Year</b>	<b>Quantitative Target</b>	<b>Actual</b>
2010	5	5

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

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

The PVQE is a key step towards development and release of Virginia-type peanut for Virginia, North Carolina, and South Carolina. In the PVQE small- and large- plot tests, our research group comparatively evaluate performance of all commercial varieties presently grown and 30 to 40 advanced breeding lines developed at North Carolina State University and Virginia Tech. These peanut genotypes are compared under optimum growth conditions and management practices for yield potential, grade and quality characteristics. As a result of this activity, one or two of the best performing peanut lines are released as new varieties every year. Research shows that location and year have a significant effect on lines' performance; therefore, replicated test plots are conducted at multiple locations and for at least three years before cultivar release. The PVQE is a multi-state project funded by the Virginia Tech, North Carolina State University, V-C Peanut Association, and the SC Peanut Growers; it addresses the CALS mission to increase profitability and environmental sustainability through development of better adapted and better yielding peanut varieties for V ? C region.

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

Because its effectiveness in development of Virginia-type peanut varieties, the PVQE project has been around for over 35 years. Because of its importance, the PVQE was extended in the past few years to include South Carolina through collaboration with researchers and extension agents at Clemson University. Results of the PVQE project are equally used by breeders, researchers, growers, shellers and peanut processors, and constitute a base for education of county agents, growers and industry on varietal selection. Educational activities include various field days and presentations at professional and non-professional meetings every year. Over the years, a number of peanut varieties were released by Virginia Tech through this program. They are widely grown in V ? C region: NC-V 11, Wilson, VA ? 98R and, more recently, CHAMPS. This way, not only that financial contribution of the project?s participants is secured, but additional dividends are annually collected for the university, Tidewater AREC, and the PVQE & Crop Physiology program.

### **Results**

Field trials in Virginia, North Carolina, and South Carolina were planted this year at six locations. Each trial had 36 genotypes of peanut replicated 3 times. Results show a couple of VT lines with good yield potential and crop value that could be released as varieties in the future. These varieties are uniform at all locations for yield, value and grade factors, and use environmental conditions efficiently. Because they could secure up to \$200/acre more for the farmer than older varieties, agricultural profitability can be achieved through this program. The 2010 results of the PVQE trials are well received every year by over 200 participants. Based on these results, decisions on what varieties to be planted in the following year and what new varieties to be released are formulated. In 2010, two new peanut cultivars were selected for release, one from VT and one from NSCU breeding program. VT 9506083-3 is a VT line with a high percent of extra large kernels and very suitable for gourmet and green boiling peanut markets. VT 9506083-3 was released as 'Titan'. Certified seed will be produced by the Virginia Seed Foundation.

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

<b>KA Code</b>	<b>Knowledge Area</b>
102	Soil, Plant, Water, Nutrient Relationships
201	Plant Genome, Genetics, and Genetic Mechanisms
202	Plant Genetic Resources
216	Integrated Pest Management Systems
601	Economics of Agricultural Production and Farm Management
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins

### **Outcome #6**

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

Increased number of acres dedicated to vegetable and berry specialty crops to enhance agricultural profitability.

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

- 1862 Extension
- 1890 Extension
- 1862 Research
- 1890 Research

### 3a. Outcome Type:

Change in Condition Outcome Measure

### 3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	28838	45000

### 3c. Qualitative Outcome or Impact Statement

#### Issue (Who cares and Why)

In response to rising consumer demand for locally/regionally grown products, horticultural production in the Shenandoah Valley continues to experience marked growth in both direct and wholesale markets. Keeping up with that demand is challenging and means finding ways to increase total volume and expand into new niche markets, while remaining profitable. From the extension perspective, developing educational programming that addresses all aspects of horticultural production from actual production methods to season extension to harvest/post-harvest handling, as well as sound marketing strategies is crucial, as is recognizing that growers represent various levels of experience from beginning farmers to both small- and larger-scale growers.

#### What has been done

To establish a stronger extension presence in horticulture in the Valley, the first step has been to build and foster partnerships with local/regional stakeholders such as the Produce Auction, direct market growers, and other local food system proponents. Through informal interviews and feedback, educational needs and gaps have been identified, and working strategies formulated to find the best ways to meet those needs and gaps. On-going evaluation of program activities and input from growers has provided opportunities to tailor education to reflect changing priorities. Over the last three years a number of workshops and farm tours have been held related to vegetable production, season extension, direct marketing, and food safety issues for existing farmers. To address the needs of aspiring and emerging farmers, a beginner grower assessment tool is currently being developed. The tool will provide the framework for an upcoming emerging farmers workshop, and will also be integrated into curriculum being developed for new farmers statewide as part of a beginner farmer and rancher coalition.

#### Results

Through this outreach, a greater extension presence has been developed in the Valley, and to date, close to 800 farmers and extension educators have attended educational events, several of which were repeat attendees. Participants have stated these events have encouraged them to try new innovations, such as high tunnels, greenhouse technologies, and plastic mulches; to increase their production because of new strategies learned; to follow better IPM programs; to be

more equipped to know the changing regulatory scene; to assess and develop whole farm business plans for their produce operations; and have offered an excellent opportunity to network with other growers and buyers. Further, the impact of these efforts have expanded beyond the region through the training of educators attending the events. Invaluable feedback regarding future education has been garnered which will guide continuing educational efforts to strengthen horticulture viability and profitability in the region and beyond.

#### 4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
202	Plant Genetic Resources
205	Plant Management Systems
216	Integrated Pest Management Systems
601	Economics of Agricultural Production and Farm Management

#### Outcome #7

##### 1. Outcome Measures

Promoting Raspberry Production Among Small Farmers in Virginia

##### 2. Associated Institution Types

- 1890 Extension

##### 3a. Outcome Type:

Change in Condition Outcome Measure

##### 3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	{No Data Entered}	0

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

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

Over the past several years, demand for fresh berries has grown significantly due to increased consumer awareness of their health benefits. Today's consumers are looking for convenient and healthy berries that are available year round. In the United States, during 2001-2007, fresh blueberry consumption increased by 65%, fresh raspberry by nearly 300%, and fresh strawberry demand by 45%. This increase in consumer demand has kept prices strong and has encouraged farmers to expand production acreage.

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

The Virginia State University Horticulture Program assisted in developing a Virginia berry industry. High tunnels have a market advantage by which farms can extend the growing season, selling

products year-round. Through research and grant funding, a more complete production system for high tunnel raspberry production was developed in 2010, including variety selection, pruning, pests and disease management. An Extension Fact Sheet publication is being finalized to provide information for growers' use. In addition to a USDA grant obtained in 2009 to promote the production of raspberry among 20 Virginia growers, a second USDA funded grant for a total value of \$180,000.00 was obtained to work with 10 additional growers in 2010.

### **Results**

To date, 10 small farms have built high tunnels and planted berries. For the first time, five small growers in Virginia are producing and marketing high tunnel grown raspberries to local markets. The total estimated volume of fresh raspberries for 2012 is 18,000 of ½ pint clamshell container with a combined value of \$53,820 per year.

## **4. Associated Knowledge Areas**

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

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

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

- Economy
- Appropriations changes

#### **Brief Explanation**

The current economic situation has effected new home building as well as upkeep of existing new homes. Both of these factors have a significant effect on the number of ornamental plants produced and sold. Also, there have been Virginia Tech Extension and Research personnel that has been lost to early buyouts; thus, there has been a reduction in service to the stakeholders.

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

#### **1. Evaluation Studies Planned**

- Retrospective (post program)
- Before-After (before and after program)
- During (during program)
- Case Study

#### **Evaluation Results**

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