

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

**Program # 4**

**1. Name of the Planned Program**

Global Food Security and Hunger

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
102	Soil, Plant, Water, Nutrient Relationships	15%			
205	Plant Management Systems	10%			
213	Weeds Affecting Plants	5%			
216	Integrated Pest Management Systems	10%			
307	Animal Management Systems	15%			
308	Improved Animal Products (Before Harvest)	15%			
503	Quality Maintenance in Storing and Marketing Food Products	10%			
604	Marketing and Distribution Practices	10%			
607	Consumer Economics	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	31.0	0.0	0.0	0.0
Actual Paid Professional	28.0	0.0	0.0	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
715000	0	0	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
513974	0	0	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

The Global Food Security and Hunger has the following goals: 1) increase food supply and quality by improving and promoting animal health, marketing, use of pesticides, use of risk mitigation, and control of predation; 2) engage individuals in the promotion, support, and sustainability of horticulture, 3) expand marketing opportunities for value-added products and develop food systems that support local consumers and local business creation and expansion; 4) enhance the agricultural knowledge so that citizens make informed decisions related to the production of food, fiber and wildlife ecology; and 5) build volunteer capacity related to agriculture within communities.

Animal Production and Management. Activities in this area include those that address animal health, livestock production, animal product marketing, grassland management, and aquaculture. There were **161** educational activities reported, **21,003** direct adult contacts and **213** direct youth contacts. The major initiatives included: feeder cattle marketing program, livestock improvement, grassland management, and aquaculture.

Horticulture - There were **255** educational activities reported in the horticulture (fruits and vegetables) program area, **14,554** direct adult contacts and **1,227** direct youth contacts. The major initiatives included: homeowner and commercial horticulture, the Master Gardener Program and International Conference.

Pest Management - There were **31** educational activities reported in the pest management program area, **1177** direct adult contacts and **84** youth contacts. The major initiatives included: Integrated Pest Management, the White Tailed Deer Damage Program, and Weed Control Management and Master Gardener.

Sustainable Agriculture: Agriculture Business/Small Farm Management - There were **333** educational activities reported in the sustainable agriculture program area, **10,514** direct adult contacts and **335** direct youth contacts. The major initiatives included: West Virginia Small Farms

Conference and Small Farms Website.

Nutrient Management - There were **20** educational activities reported in the nutrient management program area, **1209** direct adult contacts. The major initiatives included fertilizer use and selection, soil sampling, and composting. The major initiatives included fertilizer use and selection, soil sampling, and composting.

Agriculture Literacy - There were **2,206** educational activities reported in the agriculture literacy program area, **8,843** direct adult contacts and **34,137** direct youth contacts. The major initiatives included in this area are Agriculture in the Classroom, 4-H youth agriculture activities including judging, skillathons, and fairs and festivals.

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

The target audience is beef and dairy producers, large and small growers of horticultural products, regional livestock producers, market managers, homeowners, shepherds, aquaculture producers, pesticide applicators, certified nutrient managers, youth livestock exhibitors, volunteers, Extension agents, and Extension specialists.

**3. How was eXtension used?**

One specialist has been involved with the horticulture - Master Gardener Community of Practice.

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

**1. Standard output measures**

2012	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
<b>Actual</b>	56896	3612457	34137	10860

**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**

<b>2012</b>	<b>Extension</b>	<b>Research</b>	<b>Total</b>
<b>Actual</b>	18	5	23

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

**Output Target**

**Output #1**

**Output Measure**

- Number of educational activities

<b>Year</b>	<b>Actual</b>
2012	3012

**Output #2**

**Output Measure**

- Number of educational materials created or updated

<b>Year</b>	<b>Actual</b>
2012	18

**Output #3**

**Output Measure**

- Number of educational materials distributed

<b>Year</b>	<b>Actual</b>
2012	17614

**Output #4**

**Output Measure**

- Number of outside organizations collaborating within this program area  
Not reporting on this Output for this Annual Report

**Output #5**

**Output Measure**

- Number of professional presentations

<b>Year</b>	<b>Actual</b>
2012	21

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

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

O. No.	OUTCOME NAME
1	Number of participants who increase their knowledge
2	Number of participants who improve or increase skills
3	Number of participants who change a behavior or use a new skill
4	Number of people certified or licensed to practice in the field
5	Number of groups or organizations that change their procedures and/or policies
6	Number of new groups or organizations that are established or enhanced
7	Number of physical or social effects, such as disease, pollution, or crime that are reduced or eliminated
8	Number of economic improvements
9	Number of environmental improvements
10	Dollar amounts generated as a result of implementing new techniques or procedures

**Outcome #1**

**1. Outcome Measures**

Number of participants who increase their knowledge

**2. Associated Institution Types**

- 1862 Extension

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

Year	Actual
2012	599

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

**Issue (Who cares and Why)**

Disease emergence, food insecurity, decreasing biodiversity, and public health concerns have been increasingly associated with interactions at the human-wildlife-livestock-ecosystem interface. Food security issues and cultural preferences continue to place pressure on natural resources.

**What has been done**

In 2012, a new wildlife specialist began work at WVU-ES. Educational activities this year related to wildlife ecology and vertebrate natural history included a conservation camp, classes in waterfowl, reptiles and amphibians, mammals, bats of WV, and safety issues such as avoiding snake encounters. Applied research was conducted through the WV Coyote DNA Project and Fall Bat Survey.

**Results**

432 youths gained knowledge of wildlife ecology and vertebrate natural history.

159 adults gained knowledge of wildlife ecology and vertebrate natural history.

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
307	Animal Management Systems

## **Outcome #2**

### **1. Outcome Measures**

Number of participants who improve or increase skills

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

- 1862 Extension

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

Change in Knowledge Outcome Measure

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

<b>Year</b>	<b>Actual</b>
2012	1119

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

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

Producers in West Virginia want to increase their skills related to commodity production such as breeding soundness exams, nutritional needs of herds/flocks, and genetics.

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

WVU-ES specialists and agents conducted workshops, hands-on trainings, and site visits with West Virginia livestock producers. They also conduct applied research projects in livestock production.

#### **Results**

- 1015 producers increased their skill related to livestock improvement
- 104 youths improved their skill related to livestock improvement
- 147 producers increased their skill related to conducting breeding soundness exams
- 147 producers increased their skill related to providing for the nutritional needs of herd/flocks
- 147 producers increased their skill related to genetics
- 11 producers increased their skill related to feeder cattle marketing

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

<b>KA Code</b>	<b>Knowledge Area</b>
307	Animal Management Systems
308	Improved Animal Products (Before Harvest)

### **Outcome #3**

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

Number of participants who change a behavior or use a new skill

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

- 1862 Extension

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

Change in Action Outcome Measure

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

<b>Year</b>	<b>Actual</b>
2012	225

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

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

County Master Gardener (MG) volunteer associations provide an outlet for community horticultural service and extend the WVU ES impact in the state.

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

Trainees from 44 county associations are given core training in botany, propagation, soil science, plant pathology, entomology, communication skills and pest management. Topics include vegetable and fruit production, turf grass and identifying and managing weeds, garden bests, soils, fertilizers and composting, garden systems, bulbs, pruning, cover crops, plant diseases.

##### **Results**

225 individuals were trained and 175 became Certified Master Gardener Volunteers. Gardener participants utilized skills learned through the Master Gardener program to beautify and promote commerce in their 44 communities in West Virginia. Fruits, vegetables, and decorative plants were consumed, exchanged, and sold which added to the informal economy of the state and social well-being of citizens.

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

<b>KA Code</b>	<b>Knowledge Area</b>
205	Plant Management Systems
213	Weeds Affecting Plants
604	Marketing and Distribution Practices

## **Outcome #4**

### **1. Outcome Measures**

Number of people certified or licensed to practice in the field

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

- 1862 Extension

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

Change in Action Outcome Measure

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

<b>Year</b>	<b>Actual</b>
2012	500

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

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

The West Virginia University Pesticide Safety Education Program (PSEP) seeks to promote the safe use of pesticides by community growers as well as professional pesticide applicators.

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

PSEP trainings were conducted in all 55 counties of the state with licensed pesticide users and in three different locations (Morgantown, Beckley and Keyser) on right-of-way workers pesticide applications for re- certification credits. Programs were approved for credits for applicators in forestry, crop tree release, aquatics, and demonstration/research. Videos were produced of demonstrations of safe use of pesticide, disposal and storage.

#### **Results**

Licensed pesticide applicators and Right-of-Way workers were re-certified. Results from pre- and post-test evaluations revealed positive change in the knowledge regarding safe use of pesticide and integrated pest management. Pre-test correct answers were 51.1% whereas post-test correct answers were 85.8%. More than 80% of the respondents mentioned that they would make changes to their pesticide use practices.

Right-of-way workers programs were also very successful for two reasons. They offered a lot of re-certification credits at one time and the presenters shared quality information. The number of participants continued to grow and a core group (about 60%) seems to attend the program every year.

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

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

**Outcome #5**

**1. Outcome Measures**

Number of groups or organizations that change their procedures and/or policies

Not Reporting on this Outcome Measure

**Outcome #6**

**1. Outcome Measures**

Number of new groups or organizations that are established or enhanced

**2. Associated Institution Types**

- 1862 Extension

**3a. Outcome Type:**

Change in Condition Outcome Measure

**3b. Quantitative Outcome**

<b>Year</b>	<b>Actual</b>
2012	4

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

**Issue (Who cares and Why)**

The West Virginia Aquaculture Advisory Board identifies issues facing the aquaculture industry in the state and recommends to the Commissioner of Agriculture measures that should be taken to benefit aquaculture development. The emphasis is on creating transparency, minimizing and perhaps even decreasing the burden on the industry, while establishing authority for regulation of aquatic livestock.

**What has been done**

A WVU-ES specialist has been a leader in this endeavor. In collaboration with representatives from Agriculture, DEP, DNR, and aquaculture producers, he has made a series of recommendations to the Commissioner of Agriculture that describes how the Department should engage aquaculture. He works to lay the foundation for future opportunities and necessary relationships required for the aquaculture project to progress.

**Results**

In 2012, the Aquaculture Forum was held at the Small Farm Conference in Morgantown, WV in an effort to draw participation from a new group of farmers and prospective farmers. This annual

meeting weaves teaching, research, and service together and is featured on the Extension aquaculture web site. This year a special effort was made to raise support for the work at Reymann Memorial Farm starting in the fall of 2013.

The facilities at Reymann Memorial Farm and at Dogwood Lake are being integrated into the Agricultural Experiment Station and make these facilities available to others.

#### 4. Associated Knowledge Areas

KA Code	Knowledge Area
307	Animal Management Systems

#### Outcome #7

##### 1. Outcome Measures

Number of physical or social effects, such as disease, pollution, or crime that are reduced or eliminated

##### 2. Associated Institution Types

- 1862 Extension

##### 3a. Outcome Type:

Change in Knowledge Outcome Measure

##### 3b. Quantitative Outcome

Year	Actual
2012	1

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

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

Research has shown that docking protects sheep and lambs from fly strike, while having no effect on lamb mortality and production. However, producers have a moral and ethical obligation to minimize the pain, stress, and distress that farm livestock experience while they are in our care.

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

Implementation of the Lamb Tail Docking Measurement Policy during the 2011-2012 year continued to have a program emphasis. Data was again collected to assess the effects of implementation of the policy, each county was asked to indicate the number of market lambs and breeding sheep exhibited and the number of market lambs and breeding sheep rejected because of tail dock length.

###### **Results**

A total of 928 market lambs were exhibited in the reporting counties with 2 (0.2%) being rejected. A total of 87 breeding sheep were exhibited statewide with 1 (1.1%) being rejected.

#### 4. Associated Knowledge Areas

KA Code	Knowledge Area
216	Integrated Pest Management Systems
307	Animal Management Systems
604	Marketing and Distribution Practices

#### Outcome #8

##### 1. Outcome Measures

Number of economic improvements

##### 2. Associated Institution Types

- 1862 Extension

##### 3a. Outcome Type:

Change in Condition Outcome Measure

##### 3b. Quantitative Outcome

Year	Actual
2012	3

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

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

The opportunity to integrate aquaculture it into current Extension programming in order to improve economic opportunities in West Virginia is real. WVU-ES will continue to seek the same basic support for fish afforded traditional agricultural livestock.

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

Trout, channel catfish and striped bass continue to perform well at Dogwood Lake. This year we stocked Koi and bullhead catfish. Atlantic sturgeon is the newest species to be grown in the treated mine water at Dogwood Lake. At Pipestem Resort, a trout fishing package was developed for fall and spring. A "Live fish list" has been developed and maintained to help people looking for fish to find WV vendors who can meet their needs and helps local fish producers penetrate markets previously dominated by vendors from other states.

###### **Results**

- Fish produced at the site have been used by faculty and students at WVU, by the WV Department of Agriculture, and for many events.
- We expect to collect production data for a year and the offer them as a new product to several local restaurants.
- The Pipestem Resort is now purchasing locally grown trout to support the program.
- Over 3,000 lb of striped bass were sold to local restaurants in 2012. We also provided fish on a

regular basis to Pierpont Culinary Academy so their students can see the quality and value associated with farm raised fish. Each year they use our products in competition and often win honors.

--In 2012, striped bass produced at Dogwood Lake won honors at the Cast Iron Cook Off.

#### 4. Associated Knowledge Areas

KA Code	Knowledge Area
216	Integrated Pest Management Systems
604	Marketing and Distribution Practices
607	Consumer Economics

#### Outcome #9

##### 1. Outcome Measures

Number of environmental improvements

##### 2. Associated Institution Types

- 1862 Extension

##### 3a. Outcome Type:

Change in Condition Outcome Measure

##### 3b. Quantitative Outcome

Year	Actual
2012	1

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

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

Applying aquaponic methods on a larger scale is expected to yield plants with value, enhance removal of soluble nutrients, improve retention of total settleable solids, shading the pond bottom to retard growth of submerged vegetation, encourage gas exchange with emergent plants so dissolved oxygen, pH, and CO<sub>2</sub> are more stable, and discourage heat transfer to keep the water temperature near 55 F.

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

We use a combination of methods for waste management in our serial reuse spring fed flowing water system. We maximize feed efficiency with high energy feeds fed at 85% of satiation, capture solid waste in the quiescent zone and dewater solids with a geotube, integrate raft aquaponics, and finally utilize polishing pond with a floating wetland.

###### **Results**

Results were presented at a meeting of the Aquaponics Association, and the East Coast Trout Management and Culture Workshop held every five years, and will be presented at a national aquaculture meeting in 2013. The floating wetland was installed in 2012 and has not yet become fully established.

#### 4. Associated Knowledge Areas

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

#### Outcome #10

##### 1. Outcome Measures

Dollar amounts generated as a result of implementing new techniques or procedures

##### 2. Associated Institution Types

- 1862 Extension

##### 3a. Outcome Type:

Change in Condition Outcome Measure

##### 3b. Quantitative Outcome

Year	Actual
2012	8976388

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

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

WV markets almost 70% of their annual production in the fall months. Few WV producers are "students" of the market and have a tendency to react to market signals too late. More producers need to adopt a value added approach to minimize risk while providing opportunities to market calves that are in high demand.

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

WVU-ES and the WV Department of Agriculture assemble the auction market data and summaries of the WV Fall Graded Feeder Cattle Sales, Yearling Board Sales, and the Quality Assurance Feeder Calf Sales. The WV Department of Agriculture provides a third party certification by identifying the cattle with USDA grades. The graded sales have allowed buyers to participate in the auction via the teleauction or in-person and purchase WV feeder cattle due to the volume, larger lot size, and a system that describes the cattle universal to the industry.

###### **Results**

The 2012 marketing season for West Virginia feeder cattle remained strong throughout the year. Producers realized a 15% improvement in prices over 2011.

Results from 6 livestock auction markets conducting 25 graded sale events in September and October 2012. The average price in 2012 across 11,598 head, steers, bulls, and heifers, was \$773.96 per head, \$70.00 /hd more than 2011. The equals \$8,976,388.

The South Branch Livestock Exchange recorded the highest cattle volume (5,921) and at an average price \$/cwt, \$146.58 for steers and \$128.96 for heifers.

In 2012 the auction markets handling the larger volume of calves have a tendency to return the higher receipts of \$109 to \$63 more per head for steers and heifers respectively. However, the 2012 prices in the fall auctions displayed less variability and the prices improved or were steady from October to December. Prices, reflected by average \$/head for a 550 pound calf, ranged from \$499 to \$971 for steers and \$427 to \$752 for heifers.

#### 4. Associated Knowledge Areas

KA Code	Knowledge Area
307	Animal Management Systems
604	Marketing and Distribution Practices
607	Consumer Economics

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

##### External factors which affected outcomes

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

##### Brief Explanation

Two major storms causing power adages and distruction of property.

The market was quite volatile throughout the summer due to the drought and sharp increases in feed cost however the market seemed to stabilize in the fall at the time when most WV producers were marketing calves. The US economy remained uncertain due to the political posturing and the uncertainty of the Farm Bill. The ethanol policy was challenged in the halls of congress due to the demand and short supplies of corn due to the drought and strong export market.

The drought in the southern plains reduced the size of the US cow herd again in 2012 to 1952 inventories. Expansion of the cow herd has been slowed by a slow economy and the uncertainty the weather has pressured the market due to drought, heat and intense storms. The cow herd reduction resulted in more competition for feeder calves and higher prices that benefited WV cow calf producers. Market experts expected 2012 and beyond to be good for cattle prices. If producers keep cost in check they will be able to ride through the market volatility. Continuing to investigate value added opportunities and risk

management options, producers will be able to enjoy several profitable years.

Locally, cattlemen experienced one of the better forage seasons since spring arrived early and in spite of a dry hot June across the state. The rains returned in July providing enough moisture for forage crops and allowed producers to market calves and yearlings in an orderly manner. Hay supplies are adequate underpinning the local demand for lighter calves. There is an abundance of lower quality hay due to drought or late harvest. Wet spring weather delayed the planting of corn and soybeans putting more pressure on feed cost. Cattle producers experienced dramatic increases in production cost associated with preconditioning feed and supplements causing many to question the value of preconditioning feeder cattle.

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

### **Evaluation Results**

In collaboration with the National Center for Cool and Cold Water Aquaculture we evaluated the performance of growth-selected (GS) and unselected (US) rainbow trout. The fish selected for rapid growth did indeed grow more rapidly than the control group. After 24 weeks of dietary treatment there was an interaction ( $p < 0.05$ ) between genetics and feeding strategy for both length and weight. Investigators with the federal lab measured mRNA expression. Their data suggests decreased degradation of protein through proteasomes and capsases could be the cause for increased weight and length of the growth-selected trout. Initial results were presented at the Experimental Biology meeting. Analysis continues and results will be presented at a national aquaculture meeting in 2013.

An evaluation study was undertaken during the 2011-2012 4-H year to determine the usage of Animal Science, Plant Science, Mechanical Science, and Natural Resources and Environment project curriculum enrollment in 4-H Agriculture, and to assess the project completion rates in these project areas. Data indicate project completion rates for the 2011-2012 areas are as follows: Animal Sciences (76%) a decrease of 1%; Plant Sciences (48%), a decrease of 16%; Mechanical Sciences (63%), a decrease of 4%; and Natural Resources (63%), an increase of 2% from the 2010-2011 4-H year; in addition, the overall project completion rate was 73%, an decrease of 2% from 2010-2011.

### **Key Items of Evaluation**