

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

**Program # 2**

**1. Name of the Planned Program**

Climate Change

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
101	Appraisal of Soil Resources		3%		10%
102	Soil, Plant, Water, Nutrient Relationships		2%		5%
111	Conservation and Efficient Use of Water		10%		0%
124	Urban Forestry		60%		0%
131	Alternative Uses of Land		10%		5%
211	Insects, Mites, and Other Arthropods Affecting Plants		0%		35%
212	Diseases and Nematodes Affecting Plants		0%		25%
403	Waste Disposal, Recycling, and Reuse		5%		20%
902	Administration of Projects and Programs		5%		0%
903	Communication, Education, and Information Delivery		5%		0%
	<b>Total</b>		100%		100%

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

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

Year: 2014	Extension		Research	
	1862	1890	1862	1890
<b>Plan</b>	0.0	1.5	0.0	1.0
<b>Actual Paid</b>	0.0	0.5	0.0	2.0
<b>Actual Volunteer</b>	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
0	25633	0	168276
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	19274	0	182353
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	0	33480

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

#### 1. Brief description of the Activity

WVSU Agricultural and Environmental Research Station research efforts are focused on small farmers adopting new varieties and growing techniques to adapt to changing environmental conditions, developing soil ratings for mitigation of runoff, and improving the use of biochar and other byproducts as soil amendments.

WVSU Extension Service will continue to target small-scale producers with education to increase knowledge levels in alternative enterprises that may expand profits for small farm operations in open cropland and forested urban acreage. Home landscape beautification and vegetable gardening are at the center of this heightened resurgence of interest in horticulture.

Commercial growers in the areas of greenhouse and nursery management, cut flower production, and fruit and vegetable production are also seeking marketing and production related advice in order to satisfy growing consumer demands. Some of the projects that are the most often asked about are the identification and/or eradication of plants and pests, the growing cycles of plants, plant maintenance, and alternative gardening techniques.

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

Homeowners, small-farm operators, volunteer organizations, various city, county and municipalities, state government, underserved and minority farmers/landowners, WVDA staff, USDA staff and other agricultural and natural resource focused agencies, undergraduate and graduate students, Bioenergy industry; MS4's municipalities, contractors and landscape architects and designers, private land owners.

#### 3. How was eXtension used?

eXtension was not used in this program

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

**1. Standard output measures**

2014	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
<b>Actual</b>	119	200	3	0

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

**Patent Applications Submitted**

Year: 2014  
 Actual: 0

**Patents listed**

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

**Number of Peer Reviewed Publications**

2014	Extension	Research	Total
<b>Actual</b>	0	4	0

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

**Output Target**

**Output #1**

**Output Measure**

- Workshops on new varieties and growing techniques for small farmers to adapt to changing environmental conditions

**Year**                      **Actual**  
 2014                              2

**Output #2**

**Output Measure**

- Workshops targeted at alternative agriculture endeavors will be held in targeted counties.

**Year**                      **Actual**  
 2014                              3

**Output #3**

**Output Measure**

- WV SU Extension staff will generate media articles and stories related to alternative agriculture.

<b>Year</b>	<b>Actual</b>
2014	4

**Output #4**

**Output Measure**

- Urban clientele, municipalities and government organizations will receive information on the Urban Forestry initiative.

<b>Year</b>	<b>Actual</b>
2014	119

**Output #5**

**Output Measure**

- Work with bio-energy industry to identify need and evaluate properties and use of co-product biochar in soil.

<b>Year</b>	<b>Actual</b>
2014	2

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

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

O. No.	OUTCOME NAME
1	Number of small farmers adopting new varieties and growing techniques to adapt to changing environmental conditions
2	Extension clientele will implement best practices in agriculture and natural resources based on research-based knowledge.
3	Farmers/growers will utilize best practices with alternative agricultural enterprises to diversify their income portfolio.
4	Develop value-added product to pyrolysis process of biomass-to-energy conversion.

## **Outcome #1**

### **1. Outcome Measures**

Number of small farmers adopting new varieties and growing techniques to adapt to changing environmental conditions

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

- 1890 Extension
- 1890 Research

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

Change in Action Outcome Measure

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

<b>Year</b>	<b>Actual</b>
2014	0

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

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

The number of vegetable farms in West Virginia has doubled in the last ten years, with the majority being owned by a family or individual, but the average size is small. This suggests that new WV farms are on the increase, focusing on high-density production of specialty crops, such as vegetables. Crop and variety choices for growers can be overwhelming, leaving many of them to choose the same ones due to lack of information or exposure. This limits their ability to produce the best crops and maximize profitability. Recommendations that are based on local research trials, evaluating production and production costs, will provide the most information for a grower to make informed decisions for their farming operation.

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

A two-year trial of herbaceous ornamentals, organized by the University of Minnesota, finished in the late spring of 2014 with data collected on 44 lines: 24 Chrysanthemum, 4 Monarda, 2 Lamium and 14 Gladiolus. Two new garden mum lines were released in 2014 and were published in HortScience ? Mammoth™ Dark Pink Daisy and Mammoth™ Lavender Daisy. New collaborations with West Virginia University and Kentucky State University faculty/staff were initiated to study productivity and profitability for small growers using high tunnels. An extension faculty at WVU brought WVSU and West Virginia Department of Agriculture together to conceive the WV Agritourism Initiative. IPM faculty at WVU included WVSU in a proposal to the Extension Implementation Program to cover greenhouse and high tunnel IPM. NE SARE funding for the Professional Development Program (PDP) was re-established in 2013. In 2014, technical assistance was provided in the areas of sustainable agriculture and specialty crops. In addition, programming on the topic of the use of social media and marketing was also given as workshops around the state.

### Results

Data from the 2012-2014 study looking at winter hardiness in mum, Monarda, Lamium and Gladiolus were collected and compiled to be sent to our collaborator. A new two-year study of mum (44 lines) and Gladiolus (10 lines) was initiated in the summer of 2014. Funds were secured for the creating schedules for vegetable production focused on maximum profitability and sustainable production with West Virginia University and a second project to develop a high tunnel app to use for small farm growers with Kentucky State University, both over the next three years. Funding was secured for the WV Agritourism Initiative, which began in November of 2014, and included training on the use of computer software in decision making. In addition, funding was obtained for the EIP with WVU and the initial meeting was held in December. More than 30 service providers and over 300 farmers were reached by the programming from the WVSU NE SARE PDP program alone. Some of these trainings were at conferences, requested by agriculture service providers or as part of the WVU NE SARE PDP programming efforts. In addition, SARE website used by the WV NE SARE staff was overhauled (<http://anr.ext.wvu.edu/sustainable-ag/sare>) and use of the Facebook page ?SARE in WV? (<https://www.facebook.com/WVSARE>) was focused on current topics and trainings. The website and Facebook page are clearinghouses for information on sustainable agriculture topics as well as highlighting new sources of information and training in the state and region.

### 4. Associated Knowledge Areas

KA Code	Knowledge Area
211	Insects, Mites, and Other Arthropods Affecting Plants
212	Diseases and Nematodes Affecting Plants

### Outcome #2

#### 1. Outcome Measures

Extension clientele will implement best practices in agriculture and natural resources based on research-based knowledge.

#### 2. Associated Institution Types

- 1890 Extension
- 1890 Research

#### 3a. Outcome Type:

Change in Knowledge Outcome Measure

#### 3b. Quantitative Outcome

Year	Actual
2014	61

### 3c. Qualitative Outcome or Impact Statement

#### Issue (Who cares and Why)

As a change occurs in the realm of agricultural production, a focus on sustainable agricultural production has become more desirable. Based on this demand, Extension based agricultural program efforts out of WVSU have focused on implementing workshops to illustrate best management practices in urban forestry and natural resources to extend the knowledge of the University out to the greater community. Workshops and presentations have been delivered on urban forestry topics to help ensure that the general public as well as the private sector is well educated.

#### What has been done

Workshops were delivered on the topic of tree pruning to help ensure that the general public is aware of the proper tree care techniques and equipment. In pursuit of becoming the first Tree Campus in West Virginia, WVSU Extension Service developed a Campus Tree Board, contracted a campus survey of the existing trees, assisted with Arbor Day/Earth Day celebrations and developed a tree maintenance plan in conjunction with the campus Physical Facilities staff. The Extension Service developed a Tree Memorial Program that was piloted in Ravenswood, WV to plant trees in honor of individuals or organizations in the community. Meetings were attended with the West Virginia Division of Forestry to help foster a relationship with the organizations Urban Forestry Division to better assist with the dissemination of information throughout the state.

#### Results

Three workshops were presented on the topic of tree pruning to 31 participants to help ensure that the general public is aware of the proper tree care techniques and equipment. The campus of WVSU was also designated in April as the first Tree Campus in West Virginia and only the second 1890 University to have been bestowed this honor. The Extension Service facilitated two tree plantings, one in spring and the second in the fall of 2014, dedicating 7 new trees to the Tree Memorial Program that was piloted in Ravenswood, WV. This brings the total to 14 new trees planted to date at the Riverfront Park and the Public Library locations. Over 30 individuals were involved in the tree planting ceremonies and were educated on proper tree planting protocols. Five meetings were attended, along with connections made with 60 individuals, in conjunction with the West Virginia Division of Forestry to help foster a relationship with the organizations Urban Forestry Division to better assist with the dissemination of information throughout the state. Efforts are underway to work together in central and southern WV due to the remote location of the Urban Forestry Division in the most northern region of the state.

### 4. Associated Knowledge Areas

KA Code	Knowledge Area
101	Appraisal of Soil Resources
102	Soil, Plant, Water, Nutrient Relationships
111	Conservation and Efficient Use of Water
124	Urban Forestry
131	Alternative Uses of Land
211	Insects, Mites, and Other Arthropods Affecting Plants
212	Diseases and Nematodes Affecting Plants

403	Waste Disposal, Recycling, and Reuse
902	Administration of Projects and Programs
903	Communication, Education, and Information Delivery

### **Outcome #3**

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

Farmers/growers will utilize best practices with alternative agricultural enterprises to diversify their income portfolio.

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

- 1890 Extension

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

Change in Knowledge Outcome Measure

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

<b>Year</b>	<b>Actual</b>
2014	0

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

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

{No Data Entered}

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

{No Data Entered}

##### **Results**

{No Data Entered}

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

<b>KA Code</b>	<b>Knowledge Area</b>
102	Soil, Plant, Water, Nutrient Relationships
111	Conservation and Efficient Use of Water
124	Urban Forestry
131	Alternative Uses of Land
211	Insects, Mites, and Other Arthropods Affecting Plants

403	Waste Disposal, Recycling, and Reuse
902	Administration of Projects and Programs
903	Communication, Education, and Information Delivery

#### **Outcome #4**

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

Develop value-added product to pyrolysis process of biomass-to-energy conversion.

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

- 1890 Research

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

Change in Knowledge Outcome Measure

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

<b>Year</b>	<b>Actual</b>
2014	2

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

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

Biochar is a charcoal like material composed mainly of recalcitrant carbon. Used as soil amendment, it sequesters the carbon in soil and reduces carbon emission to the atmosphere. Acceptance and wide use of biochar in agriculture depends on its ability to show improvement to soil quality and fertility.

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

We used biochar as a sorbent to remove excess nutrients from anaerobically digested dairy manure, and to improve biochar nutrient content. We conducted a series of lab assays and pot experiments to assess biochar contribution to soil fertility and its effect on plant growth.

###### **Results**

A protocol for development of nutrient enriched biochar was developed. Soil analysis and pot experiments demonstrated the agronomic and horticultural value of nutrient-rich biochar as soil amendment. Study results were presented at SSSA meeting on Nov. 2014 at Long Beach CA.; A book chapter on biochar, and a white paper with the detailed description of the biochar enrichment procedure and results of use as soil amendment published (Hass A., J.M. Gonzalez. 2014. Biochar. p. 95-124 In: Lopez-Valdez F. and Fernandez-Luqueno F. [Eds.], Fertilizers: components, uses in agriculture and environmental impacts. Nova Science Publishers, New York, NY; BiocharG: Improving Fast Pyrolysis Biochar of Agronomic Use - Augmentation. Amir Hass, Dharmesh Patel, and John H. Fike. 25 p.)

#### 4. Associated Knowledge Areas

KA Code	Knowledge Area
101	Appraisal of Soil Resources
111	Conservation and Efficient Use of Water

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

##### External factors which affected outcomes

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

##### Brief Explanation

All research programs have been impacted by the delay in receiving federal funds and a decrease in State matching. McIntire Stennis funding has contributed significantly to this area of research.

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

##### Evaluation Results

The WVSU Vegetable Genomics program is beginning to work in the Climate Change arena.

##### Key Items of Evaluation

The WVSU Vegetable Genomics program is beginning to work in the Climate Change arena.