V(A). Planned Program (Summary)

Program # 6

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
102	Soil, Plant, Water, Nutrient Relationships	25%			
123	Management and Sustainability of Forest Resources	30%			
124	Urban Forestry	10%			
125	Agroforestry	20%			
605	Natural Resource and Environmental Economics	15%			
	Total	100%			

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2013	Extension		Research	
	1862	1890	1862	1890
Plan	3.0	0.0	0.0	0.0
Actual Paid Professional	3.0	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**
200000	0	0	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
18230	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

In 2013, the Climate Change planned program at West Virginia University Extension worked towards developing an agriculture system that maintains high productivity in the face of climate changes. It helps producers plan for and make decisions to adapt to changing environments and sustain economic vitality and take advantage of emerging economic opportunities offered by climate change mitigation technologies.

Objectives addressed in this program area include:

- Decrease risk and loss to farming operations through use of risk mitigation tools and control of predation
- Improve woodlot conditions and expand forest and non-timber product production
- Improve the business and management competencies of forest/wood industry businesses.
- Increase compliance with and knowledge of the WV Best Management Practices for controlling soil erosion and sedimentation from logging operations.
- Increase the capacity of local communities and landowners in nutrient management and sustainability

Activities under several categories including: composting and utilization, nutrient management, forestry, logging and milling, hay production, grassland management. Topics include: agricultural and cover crop, calibration methods & demonstration, WV GreenUp logging, forage economics, forage sampling and testing, nutrient management, grassland management, risk mitigation.

2. Brief description of the target audience

Target audiences include private forestland owners, forestry professionals, researchers, general public.

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2013	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	6426	134539	1810	5430

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	8	3	11

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of educational climate control educational activities

Year	Actual
2013	177

Output #2

Output Measure

- Number of educational materials about climate control created or updated

Year	Actual
2013	4

Output #3

Output Measure

- Number of professional presentations about climate control

Year	Actual
2013	3

Output #4

Output Measure

- Number of educational materials about climate control distributed

Year	Actual
2013	7132

Output #5

Output Measure

- Number of current year climate control relevant research programs
  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 participants who increase their knowledge of management practices under climate variability and change
2	The number that adopted recommended adaptation strategies for production agriculture and natural resources management, including invasive species, pest management, pollutant loads, wetlands.
3	Number of participants who adopt recommended climate mitigation practices.
4	Number of groups or organizations that change their procedures and/or policies regarding climate control
5	Number of economic improvements
6	Number of environmental improvements
7	Number of participants who increase their knowledge of management practices under climate variablility and change.
8	Number of groups or organizations that change their procedures and/or policies regarding climate control.

Outcome #1

1. Outcome Measures

Number of participants who increase their knowledge of management practices under climate variability and change

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	230

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The purpose of the Renewable Resources Extension Act (RREA) at WVU Extension is to support programs in West Virginia that put landowners in touch with natural resources professionals and to educate citizens about forests, wildlife, and water resources.

What has been done
RREA played an important role in building woodland owners networks, groups of individuals that participate in "Walks in the Woods" and other natural resources seminars. In 2013, over 230 woodland owners, nature enthusiasts, and interested citizens participated in these educational opportunities.

Results
230 landowners and interested citizens gained knowledge about the importance of natural resources and how these resources can be managed to assure that they are available for current and future use.

4. Associated Knowledge Areas

KA Code	Knowledge Area
123	Management and Sustainability of Forest Resources
605	Natural Resource and Environmental Economics

Outcome #2

1. Outcome Measures

The number that adopted recommended adaptation strategies for production agriculture and natural resources management, including invasive species, pest management, pollutant loads, wetlands.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	4

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Farm prices have changed in recent years due to the ethanol tax credit. Corn prices have increased and a significant portion of the corn crop is going into ethanol production. This has resulted in feeder calf prices being relatively weak compared to fed-cattle prices, fertilizer prices increasing and supplemental protein and energy prices increasing compared to previous years.

What has been done
Due to these added pressures on net income for feeder calves we develop the Low-Cost Cow-Calf Production in West Virginia project to help farmers fine tune their management of feed production, crop and livestock nutritional management, and livestock marketing and cow efficiency. This project provided training for 360 farmers in best management practices (BMPs) for low cost cow-calf production. In addition, we are worked with eight producers on six farms to help them reduce livestock production costs by using recommended BMPs.

Results
One producer established improved feeding of hay on meadows and was able to save $100/cow/year by recycling plant nutrients in hay back on meadows instead of purchasing commercial fertilizer. Another operator found it advantageous to give up rented land that could not be used in a sustainable manner through winter feeding programs. A third farm is evaluating land usage relative to forage quality and nutrient cycling but has not made changes at this time. Farm number four did not change the magnitude of their fertilizer budget but targeted the application of phosphorus, potassium, and lime to those fields where soil test showed it was needed. This farm dropped the application of nitrogen on fields containing adequate percentage of clover and reported no loss in forage yield. Thus the fertilizer budget was used to purchase plant nutrients such as phosphorus, potassium, calcium, and magnesium which can be used over and over again through nutrient cycling versus a nutrient such as nitrogen which has limited recycling ability.

4. Associated Knowledge Areas

KA Code	Knowledge Area
605	Natural Resource and Environmental Economics

Outcome #3

1. Outcome Measures

Number of participants who adopt recommended climate mitigation practices.

Not Reporting on this Outcome Measure

Outcome #4

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	2500

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The West Virginia State Division of Forestry needed a system to track, inspect, and enforce forestry laws on all logging operations.

What has been done
Extension specialist developed the LONIE system (logging operation notification, inspection, and enforcement system) that revolutionized the State Division of Forestry to track, inspect, and enforce forestry laws on all logging operations inspections entered into the system.

Results
The LONIE system is used by State Forestry Foresters who entered 2500 operations and over 10,000 inspections into the system this year.

4. Associated Knowledge Areas

KA Code	Knowledge Area
123	Management and Sustainability of Forest Resources

Outcome #5

1. Outcome Measures

Number of economic improvements

Not Reporting on this Outcome Measure

Outcome #6

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
2013	1

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Beavers had built a dam and blocked water below an earthen dam in their commons area. This earthen dam is regulated by the WV Department of Environmental Protection. Per regulations water levels in the plunge pool must be maintained at least 3-6 inches below the outflow pipe. Beavers had built a dam in the stream below the plunge pool raising the water level above the outflow pipe.

What has been done
The homeowners association held a meeting to discuss possible management options. WVU Extension provided background information on several options available to the homeowners association to help manage the damage caused by beaver activity. Once the association decided the appropriate management strategy, Extension assisted in its implementation. Extension provided the association with instructions on how to build a Clemson Beaver Pond Leveler and a

supply list of materials. Extension also assisted in dam removal and installation of the leveler into the dam.

Results
The homeowner's association's maintenance crew constructed the leveler. Once installed, volunteers monitored water levels and functionality of the leveler. The installation of the leveler effectively lowered water levels to meet DEP requirements.

4. Associated Knowledge Areas

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

Outcome #7

1. Outcome Measures

Number of participants who increase their knowledge of management practices under climate variablility and change.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	28

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
It is important to take the classroom outside to allow students to uncover several live specimens of wildlife in their natural habitat.

What has been done
A WVU specialist developed a neotropical ecology field trip to Nicaragua in 2013. This course immersed Master Naturalists into neotropical ecology and natural history of Nicaragua while exploring the impacts of ecotourism on conservation. An off-campus Wildlife Field Camp course for beginning wildlife and fisheries students was also implemented to immerse wildlife and fisheries student into the art and science of collecting data on wildlife and fishes and their habitats.

Results
22 undergraduate wildlife students successfully completed our wildlife summer camp.

6 WV Master Naturalist students successfully observed 160 bird species, 15 mammals, and 24 reptiles and amphibians in Nicaragua.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
123	Management and Sustainability of Forest Resources

Outcome #8

1. Outcome Measures

Number of groups or organizations that change their procedures and/or policies regarding climate control.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	1

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Based on forage analysis of plastic wrapped baleage WVU-ES faculty found that baleage often has not fermented adequately to develop the acidity needed to protect the forage from bacterial contamination. This can result in livestock death due to botulism poisoning. The best management practices (BMPs) needed to make high quality baleage are reported in the agriculture research/extension literature.

What has been done
A survey of West Virginia farmers producing baleage to determine how well they are implementing BMPs needed to produce well fermented baleage was implemented. The results helped Extension faculty determine how well producers know of, understand, and implement BMPs that affect the fermentation in baleage. Surveys were submitted by 84 farmers from 19 counties.

Results
The majority of farmers are using recommended BMPs that increase forage quality, promote good wilting, and lead to producing dense bales. However, there are major management short falls in

implementing BMPs required for good oxygen exclusion leading to good fermentation that can be addressed through Extension educational activities. Of surveyed farmers only 36% bale forage at 50-60% moisture, 21% wrap within 2-hours, and 50% use 4.8 mils or less plastic. During the storage period only 12% inspect baleage for damaged plastic weekly. These four BMPs need to be addressed by producers to improve the quality of fermentation in their baleage. Forage moisture can be monitored using hand held or machine mounted electronic moisture meters. Labor and machinery management is needed to ensure wrapping within 2-hours and bales are inspected weekly. Proper wrapper monitoring and adjustment is needed to ensure 6 or more mils of plastic cover the bales.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
605	Natural Resource and Environmental Economics

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Economy
- Competing Public priorities
- Competing Programmatic Challenges

Brief Explanation

V(I). Planned Program (Evaluation Studies)

Evaluation Results

None

Key Items of Evaluation