

2010 West Virginia State University Research Annual Report of Accomplishments and Results

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I. Report Overview

1. Executive Summary

West Virginia State University (WVSU), via the Gus R. Douglass Institute's (GRDI) Agricultural and Environmental Research Station (AERS), continues to deliver land-grant related research programs that are responsive to the needs of the University, the State, and the Nation's stakeholders.

Since regaining land-grant status in 2000, GRDI continues to expand research capacity and works to integrate research, teaching and outreach programs. As the University builds research infrastructure and capacity, and is able to secure additional funding sources, existing research programs are further strengthened and new programming is developed to better serve the needs of the University's stakeholders.

The establishment of the MS graduate program in Biotechnology within the College of Natural Sciences and Mathematics has further benefited the development and maturation of research programs. Split appointments of graduate research faculty within GRDI have permitted the increased participation of undergraduate and graduate students in the agricultural and environmental research.

The following report details the programs supported by Evans-Allen funds appropriated to the 1890 Institutions and matching funds provided by the State of West Virginia. The corresponding National Institute of Food and Agriculture Priority Program will be identified for each Planned Program.

Total Actual Amount of professional FTEs/SYs for this State

Year: 2010	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	0.0	0.0	16.0
Actual	0.0	0.0	0.0	12.0

II. Merit Review Process

1. The Merit Review Process that was Employed for this year

- Combined External and Internal University External Non-University Panel

2. Brief Explanation

All research projects are subjected to both an internal and external annual review. The internal review consists of quarterly or semester reports that detail work accomplished during that time period, including research progress, student involvement, publications and presentations, collaborations, and stakeholder involvement. This information is also summarized in the annual CRIS report and impact statements. The reports are reviewed by the Associate Director of Research and are integral to the

evaluation process. The College of Natural Sciences and Mathematics sponsors the annual WVSU Research Symposium during which all students and research faculty make presentations of their work. This permits a feedback mechanism among and within the WVSU community.

In the spring and fall of each year Research Advisory Council is convened to review the research program. The Advisory Council is composed of stakeholders external to WVSU representing university faculty, local community and business leaders, farmers and other entrepreneurs with and interest in our program.

III. Stakeholder Input

1. Actions taken to seek stakeholder input that encouraged their participation

- Targeted invitation to traditional stakeholder groups
- Targeted invitation to non-traditional stakeholder groups
- Targeted invitation to traditional stakeholder individuals
- Targeted invitation to non-traditional stakeholder individuals

Brief explanation.

Potential stakeholders were identified and invited to participate on the review panel to evaluate the land-grant research programs at the University. The invitation stressed the importance and requirement of our programs to have and input reviewed processed by a diverse stakeholder group.

Research administrators and scientists sought individuals and groups within a specific area of expertise or understanding to provide input and guide the direction of the research programs in order to better address the needs of those individuals and groups.

Several collaborations have been formed as a result of these activities. Traditional stakeholder groups include industry, departments of agriculture, and farmers (e.g. small farmers). Non-traditional groups include non-profit organizations, alternative energy groups and under-served landowners who have been impacted by mineral extraction.

2(A). A brief statement of the process that was used by the recipient institution to identify individuals and groups stakeholders and to collect input from them

1. Method to identify individuals and groups

- Use Advisory Committees
- Other (Researcher Interactions)

Brief explanation.

Research administrators and research scientists sought individuals and groups within a specific area of expertise or understanding to provide input and guide the direction of the research programs in order to better address the needs of our targeted stakeholders. These individuals and organizations were invited directly to participate through a written invitation. Other individuals were encouraged by previous members or other University staff. Thus the research advisory committee consisted of several individuals representing the different areas addressed by the research programs.

Target areas were defined based on the research portfolio at the institution. Within each target area, individuals were identified and invited to participate in the advisory process. These individuals

advised the scientists on possible stakeholders and issues important to those stakeholders. Also all individual research scientists attended professional seminars, special interest meetings and other relevant conferences, and have identified stakeholders through interactions with groups or individuals interested in their research programs.

2(B). A brief statement of the process that was used by the recipient institution to identify individuals and groups who are stakeholders and to collect input from them

1. Methods for collecting Stakeholder Input

- Meeting with traditional Stakeholder groups
- Meeting with traditional Stakeholder individuals
- Meeting specifically with non-traditional groups

Brief explanation.

The goal of the Research Advisory Council is to have one or two individuals on the council who are in a position to provide analysis and feedback on each of the planned programs. Potential council members are recommended each year by administrators, faculty and researchers and non-participating members are dropped to maintain a functioning council.

As a major component of the semiannual research advisory meetings, advisors, faculty, staff, and administrators engaged in a dialog to discuss major observations or issues the advisors put in front of the University's programs. Also, input in writing was collected after or during the two semiannual reviews. Specific questions formulated in a survey format were handed out before and during the meeting for the advisors to answer. Finally, to document all the discussions that took place during the meetings from committee participants, minutes were assembled and all survey information collected, analyzed and used to guide the programming process of the following research year.

3. A statement of how the input will be considered

- To Identify Emerging Issues
- Redirect Research Programs
- To Set Priorities

Brief explanation.

All input received from the research advisory committee was collected in writing as well as from verbal discussion during those meetings. This feedback was used to guide the programming process of the following year's research programming cycle. This input has normally an effect on the distribution of efforts or overall share of research programs. Seldom has this input resulted in the total elimination of a planned research program but it is strongly considered if the recommendation is provided.

Brief Explanation of what you learned from your Stakeholders

The focus of this year's advisory council was a better integration of the research and extension programs. Rather than have an individual advisory council for research and extension, the councils were combined for the first time. This enabled feedback from not only the external council members, but research and extension faculty were able to provide feedback and explore ways to better

integrate their efforts. All future advisory council meetings will be integrated in nature.

IV. Expenditure Summary

1. Total Actual Formula dollars Allocated (prepopulated from C-REEMS)			
Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
0	0	0	1407119

2. Totaled Actual dollars from Planned Programs Inputs				
	Extension		Research	
	Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
Actual Formula	0	0	0	1380737
Actual Matching	0	0	0	954258
Actual All Other	0	0	0	0
Total Actual Expended	0	0	0	2334995

3. Amount of Above Actual Formula Dollars Expended which comes from Carryover funds from previous				
Carryover	0	0	0	649378

V. Planned Program Table of Content

S. No.	PROGRAM NAME
1	Sustainable Energy - formerly Sustainable Environment and Renewable Resources
2	Global Food Security and Hunger- formerly Competitive and Sustainable Agricultural
3	Childhood Obesity - formerly Food Systems, Nutrition and Wellness
4	Climate Change - formerly Sustainable Environment and Renewable Resources
5	Food Safety

V(A). Planned Program (Summary)**Program # 1****1. Name of the Planned Program**

Sustainable Energy - formerly Sustainable Environment and Renewable Resources

V(B). Program Knowledge Area(s)**1. Program Knowledge Areas and Percentage**

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
403	Waste Disposal, Recycling, and Reuse				100%
	Total				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	0.0	0.0	0.0	0.3
Actual	0.0	0.0	0.0	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
0	0	0	165688
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	0	114511
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**

Integration of agricultural waste utilization and bioenergy production using anaerobic digestion - a long term experiment was continued which tests the efficiency of the digester to co-digest poultry litter and cattle waste. Respicate laboratooory digesters were used to test progressively larger percentages of stillage in co-digestion and resilience of digesters following co-digestion. Microbial population responses to changes in substrate are being examined by targeting rDNA markers with pyrosequencing. Revision of the ADM1 model of anaerobic digester performance was conducted to incorporate acetic acid utilizing

bacteria.

2. Brief description of the target audience

Scientists and engineers who study anaerobic digestion; farmers and industries which use digestion to treat diverse wastes; undergraduate and graduate students.

V(E). Planned Program (Outputs)

1. Standard output measures

2010	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	0	0	0	0

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

Patent Applications Submitted

Year: 2010

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2010	Extension	Research	Total
Actual	0	2	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Scientific presentations and publications
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	Increased awareness of soil remediation technology among stakeholders (%)
2	Development of a novel technique for soil remediation (% completion)
3	Increase restoration of reclaimed land and its use via this technique (%)
4	Increase digester efficiency (%)
5	Develop techniques for digester control (% completion)
6	Increase knowledge of anaerobic bacteria (%)
7	Increase knowledge of microbial biomass-to-bioenergy conversion process (%)

Outcome #1

1. Outcome Measures

Increased awareness of soil remediation technology among stakeholders (%)

Not Reporting on this Outcome Measure

Outcome #2

1. Outcome Measures

Development of a novel technique for soil remediation (% completion)

Not Reporting on this Outcome Measure

Outcome #3

1. Outcome Measures

Increase restoration of reclaimed land and its use via this technique (%)

Not Reporting on this Outcome Measure

Outcome #4

1. Outcome Measures

Increase digester efficiency (%)

2. Associated Institution Types

- 1890 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	0	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Farmers and industries can use digestion to treat multiple wastes, but the performance of the digester with different wastes needs to be determined experimentally.

What has been done

Conducted co-digestion experiment with poultry litter and cattle waste in a pilot plant thermophilic CSTR digester.

Results

These two wastes were effectively co-digested but at 80% cattle waste digester performance was diminished. Co-digestion experiments with poultry waste and stillage in laboratory scale digesters showed that biogas production increased until 80% stillage which caused a reduction in performance.

4. Associated Knowledge Areas

KA Code	Knowledge Area
403	Waste Disposal, Recycling, and Reuse

Outcome #5

1. Outcome Measures

Develop techniques for digester control (% completion)

2. Associated Institution Types

- 1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	0	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Digester operators could benefit from greater knowledge of the digester processes.

What has been done

ADM1 model has been modified to incorporate a major fatty acid.

Results

ADM1 has been updated.

4. Associated Knowledge Areas

KA Code	Knowledge Area
403	Waste Disposal, Recycling, and Reuse

Outcome #6

1. Outcome Measures

Increase knowledge of anaerobic bacteria (%)

2. Associated Institution Types

- 1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	0	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Environmental biotechnologists, microbiologists are interested in anaerobic decomposition and microbial energy conversion

What has been done

We have tracked population dynamics in replicate digesters that treated poultry litter and stillage in order to understand how the microbes respond to environmental perturbations.

Results

We found the majority of bacteria under co-digestion conditions are unique organisms in this thermophilic digester.

4. Associated Knowledge Areas

KA Code	Knowledge Area
403	Waste Disposal, Recycling, and Reuse

Outcome #7

1. Outcome Measures

Increase knowledge of microbial biomass-to-bioenergy conversion process (%)

2. Associated Institution Types

- 1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	0	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Engineers in the bioenergy industry and farmers/digester operators who want to recover more energy from organic waste.

What has been done

Observing changes in microbial populations during increases and decreases in biogas production during co-digestion.

Results

We conducted in depth sampling with pyrosequencing and found that the microbial community structure was altered by the new substrate and became dominated by a single unique population.

4. Associated Knowledge Areas

KA Code	Knowledge Area
403	Waste Disposal, Recycling, and Reuse

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Economy
- Public Policy changes
- Government Regulations
- Competing Public priorities

Brief Explanation

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

Evaluation Results

Key Items of Evaluation

V(A). Planned Program (Summary)

Program # 2

1. Name of the Planned Program

Global Food Security and Hunger- formerly Competitive and Sustainable Agricultural Systems

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
201	Plant Genome, Genetics, and Genetic Mechanisms				19%
202	Plant Genetic Resources				18%
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants				10%
204	Plant Product Quality and Utility (Preharvest)				3%
211	Insects, Mites, and Other Arthropods Affecting Plants				7%
212	Pathogens and Nematodes Affecting Plants				10%
302	Nutrient Utilization in Animals				33%
	Total				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	0.0	0.0	0.0	0.0
Actual	0.0	0.0	0.0	7.0

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	0	0	1104590
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	0	763406
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

Research efforts have focused on: aquaculture, genetic mapping and field trials of several vegetables. Feeding trials using two protein levels and three fat levels were conducted to look at effects on the growth and performance of rainbow trout. [Eya]

In an effort to develop DNA markers and map respective genetic populations for crops that include peppers, watermelon, melon, bittergourd, squash and pumpkins, progenies have been characterized and combined with the favorable alleles that can produce larger fruit size with enhanced quality and resistance in melons and watermelons. [Padma, Reddy]

Biomass traits in plants are the basis for selection of bioenergy and harvest index to improve yield parameters in various crop plants. Whole genome sequence and genome wide genetic maps are not yet available in many useful crop plants that can be exploited for bioenergy or to improve yields by understanding source sink relationships at molecular levels of vegetative traits and reproductive traits. Arabidopsis can be a unique model to clone genes of interest for growth and reproductive traits. [Reddy, Padma]

Continued work on tomato breeding included selecting advanced lines for organoleptic traits, plant habit, early ripening, and late blight molecular markers. Variety trials for tomatoes, peppers (sweet and hot), cucumbers and specialty melons were conducted. [Liedl]

2. Brief description of the target audience

Aquaculture - Feed manufacturers, federal agencies (ARS) involved in rainbow trout breeding, and rainbow trout farmers.

Plant Genomics - Horticulturalists, plant genetics researchers, plant breeders, graduate and undergraduate students, high school students and teachers, farmers/growers, germplasm curators, extension specialists and agents.

V(E). Planned Program (Outputs)

1. Standard output measures

2010	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	250	325	40	100

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

Patent Applications Submitted

Year: 2010

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2010	Extension	Research	Total
Actual	1	6	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Scientific publications and/or presentations

Year	Actual
2010	0

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Increase profitability of vegetable and tomato crops(%)
2	Genetic maps and genes for vegetable crops(#)
3	Increased small farm profitability(%)
4	Increase profitability of aquaculture operations(%)
5	Reduce nitrogen and phosphorus in discharge water(%)
6	Lower aquaculture feed costs(%)

Outcome #1

1. Outcome Measures

Increase profitability of vegetable and tomato crops(%)

Not Reporting on this Outcome Measure

Outcome #2

1. Outcome Measures

Genetic maps and genes for vegetable crops(#)

2. Associated Institution Types

- 1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	0	3

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

DNA markers and genetic maps for identifying nutraceutical, pest and disease resistance, yield and quality traits are indispensable tools for crop improvement. This knowledge will be immensely useful for plant breeders and geneticists. Farmers and consumers will get benefitted from the products with resistance and other value added traits.

What has been done

In this program, our goal was to develop DNA markers for the crops including peppers, watermelon, melon, bittergaurd, squash, pumpkins, and tomato and map them in respective genetic populations. When mapped these markers, we identified markers linked to various traits including yield, fruit qualities and disease resistance in watermelon, melon and peppers.

Results

We have characterized progenies combined with the favorable alleles that can produce larger fruit size with enhanced quality and resistance in melons, watermelons, and tomato. We used genomics to further decipher natural variation for biomass related traits as well as source sink relationships by understanding gene networks in vegetative traits vs. reproductive traits.

4. Associated Knowledge Areas

KA Code	Knowledge Area
201	Plant Genome, Genetics, and Genetic Mechanisms
202	Plant Genetic Resources

Outcome #3

1. Outcome Measures

Increased small farm profitability(%)

Not Reporting on this Outcome Measure

Outcome #4

1. Outcome Measures

Increase profitability of aquaculture operations(%)

Not Reporting on this Outcome Measure

Outcome #5

1. Outcome Measures

Reduce nitrogen and phosphorus in discharge water(%)

Not Reporting on this Outcome Measure

Outcome #6

1. Outcome Measures

Lower aquaculture feed costs(%)

Not Reporting on this Outcome Measure

V(H). Planned Program (External Factors)

External factors which affected outcomes

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

Brief Explanation

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

Evaluation Results

Key Items of Evaluation

V(A). Planned Program (Summary)

Program # 3

1. Name of the Planned Program

Childhood Obesity - formerly Food Systems, Nutrition and Wellness

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
703	Nutrition Education and Behavior				100%
	Total				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	0.0	0.0	0.0	0.0
Actual	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	0	0	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	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

This program is still being planned.

2. Brief description of the target audience

This program is still being planned.

V(E). Planned Program (Outputs)

1. Standard output measures

2010	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	0	0	0	0

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

Patent Applications Submitted

Year: 2010

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2010	Extension	Research	Total
Actual	0	0	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Scientific publications and/ presentations
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	Outcomes are still being defined.

Outcome #1

1. Outcome Measures

Outcomes are still being defined.

Not Reporting on this Outcome Measure

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Economy

Brief Explanation

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

Evaluation Results

Key Items of Evaluation

V(A). Planned Program (Summary)

Program # 4

1. Name of the Planned Program

Climate Change - formerly Sustainable Environment and Renewable Resources

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%
112	Watershed Protection and Management				10%
123	Management and Sustainability of Forest Resources				20%
206	Basic Plant Biology				10%
403	Waste Disposal, Recycling, and Reuse				35%
	Total				100%

V(C). Planned Program (Inputs)

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

Year: 2010	Extension		Research	
	1862	1890	1862	1890
Actual	0.0	0.0	0.0	2.0

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	0	0	110459
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	0	76341
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

Influence of poultry litter amendments and seed mixtures on the soil quality and vegetation of a reclaimed surface coal mine in WV - Four different vegetation treatments and six soil amendment treatments were installed in a replicated factorial setting at a mountaintop removal site. Soil sampling of the plots was conducted and analyzed for physical, chemical, and biological properties. Plant surveys and suitability for a tree-compatible mix for forestry are also being conducted.

2. Brief description of the target audience

Surface mine reclamation operators, waste management and poultry farm owners and operators; ecological and environmental groups and scientific communities.

V(E). Planned Program (Outputs)

1. Standard output measures

2010	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	0	0	0	0

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

Patent Applications Submitted

Year: 2010

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2010	Extension	Research	Total
Actual	0	0	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Scientific presentations and publications
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	Increase restoration of reclaimed land and its use via this technique (%)
2	Increased awareness of soil remediation technology among stakeholders (%)
3	Development of a novel technique for soil remediation (% completion)

Outcome #1

1. Outcome Measures

Increase restoration of reclaimed land and its use via this technique (%)

Not Reporting on this Outcome Measure

Outcome #2

1. Outcome Measures

Increased awareness of soil remediation technology among stakeholders (%)

Not Reporting on this Outcome Measure

Outcome #3

1. Outcome Measures

Development of a novel technique for soil remediation (% completion)

2. Associated Institution Types

- 1890 Research

3a. Outcome Type:

Change in Action 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)

Each year in West Virginia, thousands of acres of forests are disturbed by extractive industries such as coal mining. With an increasing demand for productive land for food, fiber and biomass, Proper mountaintop reclamation practices can result in productive land that will provide economic value to the coal mining regions.

What has been done

Four vegetation experiments and six soil experiments were installed in a replicated factorial setting, at a reclaimed minesite near Charleston, WV, in 2007.

Results

Study is ongoing, geared toward providing performance insight in 5 year timeframe.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
403	Waste Disposal, Recycling, and Reuse

V(H). Planned Program (External Factors)

External factors which affected outcomes

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

Brief Explanation

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

Evaluation Results

Key Items of Evaluation

V(A). Planned Program (Summary)

Program # 5

1. Name of the Planned Program

Food Safety

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
501	New and Improved Food Processing Technologies				100%
	Total				100%

V(C). Planned Program (Inputs)

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

Year: 2010	Extension		Research	
	1862	1890	1862	1890
Actual	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	0	0	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	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

This program is still being planned.

2. Brief description of the target audience

This program is still being planned.

V(E). Planned Program (Outputs)

1. Standard output measures

2010	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	0	0	0	0

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

Patent Applications Submitted

Year: 2010

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2010	Extension	Research	Total
Actual	0	0	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Scientific presentations and publications
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	Outcomes still being defined.

Outcome #1

1. Outcome Measures

Outcomes still being defined.

Not Reporting on this Outcome Measure

V(H). Planned Program (External Factors)

External factors which affected outcomes

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

Brief Explanation

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

Evaluation Results

Key Items of Evaluation