V(A). Planned Program (Summary)

Program # 5

1. Name of the Planned Program

Environmental Systems and Sustainability

☑ 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	0%		4%	
102	Soil, Plant, Water, Nutrient Relationships	5%		38%	
104	Protect Soil from Harmful Effects of Natural Elements	0%		3%	
111	Conservation and Efficient Use of Water	10%		18%	
112	Watershed Protection and Management	5%		15%	
132	Weather and Climate	5%		1%	
133	Pollution Prevention and Mitigation	5%		21%	
205	Plant Management Systems	10%		0%	
206	Basic Plant Biology	5%		0%	
211	Insects, Mites, and Other Arthropods Affecting Plants	10%		0%	
212	Pathogens and Nematodes Affecting Plants	5%		0%	
213	Weeds Affecting Plants	5%		0%	
214	Vertebrates, Mollusks, and Other Pests Affecting Plants	5%		0%	
215	Biological Control of Pests Affecting Plants	5%		0%	
216	Integrated Pest Management Systems	5%		0%	
403	Waste Disposal, Recycling, and Reuse	5%		0%	
405	Drainage and Irrigation Systems and Facilities	5%		0%	
721	Insects and Other Pests Affecting Humans	5%		0%	
903	Communication, Education, and Information Delivery	5%		0%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

	Extension	Research

Year: 2013	1862	1890	1862	1890
Plan	8.4	0.0	10.0	0.0
Actual Paid Professional	11.8	0.0	4.0	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**
302254	0	647450	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
302254	0	113303	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
0	0	1905447	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Varied activities, services, and products are anticipated. These include formation of state and regional advisory groups; assignment of work groups to address specific issues and tasks associated with environmental systems and sustainability; participation of targeted audiences, such as agricultural producers, in environmental education programs; and development of publications, fact sheets, web pages and other educational materials as program support, and reporting documents. Specific programs targeted toward agricultural producers in this plan include environmental stewardship programs, waste pesticide collection and disposal programs, recycling and solid waste management programs, development of agricultural water conservation practices to protect and maintain water resources, pharmaceutical and household chemical management and disposal programs and other initiatives related to water quality and nutrient management.

As related to environmental systems, research and extension programming will be conducted in many IPM areas, including the following:

1. urban entomology and plant pathology
2. plant disease and nematode diagnostics
3. cotton and corn pest management
4. greenhouse tomato pest management
5. soybean management by application of research and technology
6. public health issues related to vector control

2. Brief description of the target audience

Stakeholders and customers of research and extension programs represent a broad section of audiences, including agricultural producers and other rural audiences, agricultural support groups, environmental and water quality agencies, public health agencies and consumers.

3. How was eXtension used?

The resources provided through eXtension were used to supplement and enhance our public learning experiences provided by MSU Extension agents and specialists. eXtension was also used as a resource in state-based planning processes. Overall, 233 MSU employees are eXtension users, with 12 new registrations during this reporting period. Further, MSU Extension has 77 employees that serve on one or more of the 78 Communities of Practice (COPs); MSU Extension employees are members of 45 COPs. 13 MSU Extension employees serve as a leader for a COP, leading 9 COPs. 2 MSU Extension personnel are members of the Imported Fire Ants COP. 1 MSU Extension employee is a member of the Urban Integrated Pest Management COP.

V(E). Planned Program (Outputs)

1. Standard output measures

2013	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	68064	150140	0	0

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

Patent Applications Submitted

Year: 2013

Actual: 3

Patents listed

1. System and Method for pest reduction
2. Phenoxyalklyl Pyridinium Oxime Therapeutics for treatment of Organophosphate poisoning
3. Engineering the production of a conformational Variant of Occidiofungin that has inhibitory activity against Candida Species

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2013	Extension	Research	Total
Actual	2	85	0

V(F). State Defined Outputs

Output Target

<u>Output #1</u>

Output Measure

- Number of clientele attending workshops, seminars, short courses, and demonstrations.

Year	Actual
2013	36367

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Number of producers adopting new technologies, strategies, or systems.
2	Number of producers reporting increased income or profits/decreased expenses based on practice changes.
3	Number of producers reducing environmental impacts of pesticide use.
4	Number of producers adopting new practices based on research/extension recommendations
5	Number of producers improving their environmental stewardships

Outcome #1

1. Outcome Measures

Number of producers adopting new technologies, strategies, or systems.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	3637

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
In Mississippi in 2012, 60 fatal injuries were reported as being transportation incidents, followed by violence and other injuries by persons and animals and contact by objects and equipment; together these three major categories accounted for 80% of Mississippi's total fatal work injuries. Though none have been fatal to the Wayne County area there have been accidents on the work site.

What has been done
In response to this issue, the Wayne County Extension Service devised a series of safety workshops. In this program, there were workshops offered in chainsaw, fire, heat-related injuries, impaired driving, hypothermia, shop and tractor, disaster preparedness, and first aid.

Results
After applying the workshops to everyday work, there has been an increase in safety awareness. The Wayne County Board of Supervisors purchased safety equipment for all city workers. This is a program that will have an impact not only on the work environment, but it is also helping the City of Waynesboro economically with lowering insurance premiums for the city and with worker compensation cases due to injuries.

4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems
206	Basic Plant Biology
211	Insects, Mites, and Other Arthropods Affecting Plants

212	Pathogens and Nematodes Affecting Plants
213	Weeds Affecting Plants
214	Vertebrates, Mollusks, and Other Pests Affecting Plants
215	Biological Control of Pests Affecting Plants
216	Integrated Pest Management Systems

Outcome #2

1. Outcome Measures

Number of producers reporting increased income or profits/decreased expenses based on practice changes.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	5819

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Conventional fertilizer application to warm season pastures is a common practice among Mississippi cattle producers to increase forage biomass and forage quality. It is unclear to what extent these nutrient applications actually benefit livestock production. Many producers apply these nutrients without actually measuring impacts on productivity. Additionally environmental concerns may soon limit the ability of producers to apply these nutrients. More efficacious use of producer's resources might increase productivity and reduce environmental impact.

What has been done
A three-year study was conducted to evaluate the more efficient N delivery system in grazing beef cattle: no added fertilizer and no supplement; conventional fertilizer; or a supplemental feedstuff fed three times weekly to beef cattle. Data indicate that fertilization of pastures had no impact on performance of beef cattle, minimal increase in forage biomass, and an increase in pasture quality. However, supplementing feed to beef cattle resulted in improved performance, and no difference in pasture quality.

Results
Based upon the data observed, by not applying N in the form of a fertilizer a producer might save an additional $100 acre over the summer. Additionally, by providing N directly to the animal in the

form of a supplement rather than via conventional fertilizer a 7 fold improvement in cost of gain was noted. These types of savings can significantly impact beef cattle producers that utilize warm season pasture as their base program.

4. Associated Knowledge Areas

KA Code	Knowledge Area
111	Conservation and Efficient Use of Water
132	Weather and Climate

Outcome #3

1. Outcome Measures

Number of producers reducing environmental impacts of pesticide use.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	1454

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Under Federal and State laws and regulations, pesticide applicators must be certified to apply restricted use pesticides. Also, anyone who applies any pesticide for a fee must be licensed by the state of Mississippi. If the individual does not comply with the federal and/or state laws and regulations the individual could face a fine and/or imprisonment. Without the Pesticide Safety Education Program thousands of individuals would be unemployed, thus having a negative impact on the economy of the state.

What has been done
MSU Extension, through the Pesticide Safety Education Program, offers and conducts courses of training to individuals to become certified or recertified. The program provides self-study manuals to those individuals who are seeking first time Commercial certification. The program also conducts certification workshops in each County Extension office for Private Applicators (producers); they are required to take a recertification class every three years. These applicators can attend one of twenty scheduled classes in the state.

Results

In 2013, the Pesticide Safety Education Program trained 2,965 (2,120 private applicators and 845 commercial applicators) pesticide applicators in 272 meetings, totaling 467 hours of training. An additional 17 statewide recertification and certification workshops were conducted for stakeholders, such as electric power associations, city and county maintenance crews, community colleges, Mississippi Department of Transportation, aerial aviation association, and other agencies. These workshops allowed these agencies and stakeholders to stay in compliance with state and federal laws and regulations. The Commercial workshops allowed the individuals to stay employed and Private workshops allowed producers to continue producing food and fiber not only for MS but for the world.

4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems
211	Insects, Mites, and Other Arthropods Affecting Plants
212	Pathogens and Nematodes Affecting Plants
213	Weeds Affecting Plants
214	Vertebrates, Mollusks, and Other Pests Affecting Plants
215	Biological Control of Pests Affecting Plants
216	Integrated Pest Management Systems

Outcome #4

1. Outcome Measures

Number of producers adopting new practices based on research/extension recommendations

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	3636

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Peanuts are a relatively new crop in Mississippi and the areas in which they are grown are expanding. Peanuts are susceptible to many diseases, and no plant pathologist had been working with Mississippi growers.

What has been done
MSU Extension activities for Mississippi peanut growers included: working with the Mississippi Peanut Promotion Board; surveying fields for disease from planting to harvest; contacting growers and their consultants about fungicide usage and problems they were encountering; establishing disease test plots in grower fields; posting news about peanut diseases on a web-based blog; writing newsletter articles; and organizing a set of disease images linked to a calendar.

Results
Activities showed that growers and almost all consultants were unable to distinguish "dangerous" leaf spot pathogens from innocuous ones. Similarly, they could not distinguish Sclerotium rolfsii (southern stem rot) from a similar fungus. Poor disease recognition resulted in unneeded sprays. Conversely, some growers were not spraying at all, and failed to recognize the introduction of a serious pathogen. About 85,000 acres were planted in the last two years. MSU Extension activities directly influenced sprays on ca. 30% of this acreage. Unneeded sprays helped the environment and saved growers ca. $382,500. Advice to spray impacted about 2% of the acreage.

4. Associated Knowledge Areas

KA Code	Knowledge Area
111	Conservation and Efficient Use of Water
132	Weather and Climate

Outcome #5

1. Outcome Measures

Number of producers improving their environmental stewardships

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	1455

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Erosion caused by wind, water, and wave action results in loss of residential and commercial property, reduction of storm buffering capacity, aquatic and terrestrial habitat loss, increased suspended solids, and water quality degradation. To combat these effects, property owners often erect bulkheads or seawalls. While these methods are effective, they also tend to alter, or create a loss of, natural habitat. Living shorelines present an ecological and economic alternative that may be viable for low and moderate erosional settings.

What has been done

MSU Coastal Research and Extension Center's "Living Shorelines" program educates the public, state, and federal regulatory agencies and private contractors about the benefits of installing natural erosion control structures as alternatives to seawalls and bulkheads to protect shoreline properties. Since 2007, Extension and outreach personnel have planned and conducted 6 Living Shorelines workshops in MS, AL, and FL; published 3 Extension publications related to natural erosion control structures and 2 policy reports; and made numerous presentations.

Results

The Mississippi General Permit for Living Shorelines (MSGP-03-Living Shorelines) was approved by the U.S. Army Corps of Engineers Mobile District on April 12, 2013. This general permit allows for the installation of native wetland plants and breakwaters composed of approved construction material if wave attenuation is needed for project success. This general permit will expedite approval of living shoreline type projects and creates a level permit approval process for living shorelines and hard structures. Since 2010, 44,859 linear feet of shoreline has been protected using alternative shoreline erosion control principles. These alternative options include using native marsh grass plants, dune plants, coir fiber logs, and offshore wave attenuation devices.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
111	Conservation and Efficient Use of Water
403	Waste Disposal, Recycling, and Reuse
405	Drainage and Irrigation Systems and Facilities

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges

Brief Explanation

{No Data Entered}

V(I). Planned Program (Evaluation Studies)

Evaluation Results

MSU Extension agents and specialists, as well as MAFES faculty, used a variety of recommended methods to gather needed information. Specific strategies were initiated and utilized for collecting evaluation information to determine program outputs and outcomes (see impact statements for examples). In FY 2013, MSU Extension agents and specialists were required to submit four quarterly reports (January, April, July, and September). This quarterly report collects information about the number of contacts, types of contacts, and number of programs conducted in each Priority Planning Area. In addition, two narrative Accomplishment Reports are required from each MSU Extension employee each year. Finally, a specific request for impact statements is also made. The evaluation results are a combination of this quantitative and qualitative data.

Our Planned Program Areas (PPAs) changed in 2013 - a reduction from over 20 PPAs in 2012 to 10 for this current reporting cycle. Previous PPAs of Integrated Pest Management, Environment/Nutrient Management, Sustainable Energy, Farm and Home Safety: Biosecurity, Farm and Home Safety: Commercial Pesticide Applicator Training, and Farm and Home Safety: Private Pesticide Applicator Training were combined into Environmental Systems and Sustainability. Given the time it takes to adapt an electronic reporting system and ensure all end-users are trained and understand how to report in new ways and new PPAs, our outcome data matching process required modification for 2013. As a result, some of our numbers may appear skewed from previous ones. This reduction of PPAs and thus combination of outcomes led to some outcomes within each PPA being very similar for 2013. Our reporting system would not allow us to make detailed distinctions at this point in time, so numbers were evenly distributed across those similar outcomes when appropriate. As our data collection system evolves over the next year or two, we will be able to more clearly align the various data elements within the system to resolve this issue.

Key Items of Evaluation