

V(A). Planned Program (Summary)

Program # 9

1. Name of the Planned Program

Sustainable Energy

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
112	Watershed Protection and Management	0%		8%	
202	Plant Genetic Resources	0%		1%	
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants	20%		0%	
204	Plant Product Quality and Utility (Preharvest)	0%		15%	
401	Structures, Facilities, and General Purpose Farm Supplies	0%		10%	
402	Engineering Systems and Equipment	70%		8%	
403	Waste Disposal, Recycling, and Reuse	10%		0%	
511	New and Improved Non-Food Products and Processes	0%		43%	
601	Economics of Agricultural Production and Farm Management	0%		15%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2012	Extension		Research	
	1862	1890	1862	1890
Plan	0.3	0.0	1.0	0.0
Actual Paid Professional	1.0	0.0	0.4	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
26685	0	38263	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
26685	0	48346	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	2777300	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Development of sustainable energy production systems based on renewable biofuels is one of the great challenges of the 21 century and is essential for attaining energy independence for the nation. Development of low input biomass crops that do not compete with food crops, harvesting and transporting systems, and conversion technologies are central to creation of a biofuels economy. This program area includes research and extension activities carried out with the goal of developing biomass used for biofuels, design of optimum technologies for processing forest products and crops for bioenergy production, and production of alternative energy.

2. Brief description of the target audience

Target audience will be agricultural producers, home owners and energy developers.

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2012	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	1303	65	0	0

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

2012	Extension	Research	Total
Actual	0	16	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of people attending workshops, short courses, etc.

Year	Actual
2012	228

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Number of producers adopting new practices due to research/extension recommendations.

Outcome #1

1. Outcome Measures

Number of producers adopting new practices due to research/extension recommendations.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	46

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Advanced transportation fuels can be produced from a wide variety of renewable biomass products, however, to be economically and environmentally sustainable biofuels systems must be based on high yielding biomass crops that can be readily grown on land not otherwise used for food production, economically harvested and transported to processing facilities and converted to biofuels with a life-cycle carbon footprint less than conventional fossil fuels.

What has been done

Working through the Sustainable Energy Research Center, MSU scientists in the: 1) Department of Plant and Soil Sciences are developing and evaluating advanced bioenergy crops as an energy source, 2) Forest and Wildlife Research Center are using Fast Pyrolysis to thermally decompose wood and other biomass in the absence of oxygen at ~500C producing bio-oil, and 3) Department of Agriculture and Biological Engineering developed a process using fewer steps and novel catalyses that produces more fuel per unit biomass than conventional approaches.

Results

The use of renewable plants and trees to grow energy will result in less dependence upon foreign oil and reduce greenhouse emissions. Outcomes include development, patenting, and licensing of an improved variety of giant miscanthus, development of varieties of switchgrass with substantively higher germination and superior yield, and testing of varieties of energy cane with greater cold-hardiness, allowing them to be cultivated at more northern latitudes. The pyrolytic conversion process has been optimized for various biomass types including southern yellow pine and giant miscanthus. A 4-ton/day pilot plant, located at the Energy Institute, has been constructed for research and demonstration. This technology is currently being licensed for commercial application.

4. Associated Knowledge Areas

KA Code	Knowledge Area
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants
402	Engineering Systems and Equipment
403	Waste Disposal, Recycling, and Reuse

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Public Policy changes
- Government Regulations
- 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 will be initiated and utilized for collecting evaluation information to determine program outputs and outcomes (see impact statements for examples).

In FY 2012, 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.

MAFES scientists operate research programs under an approved Hatch or Hatch-Multistate CRIS project plan of work. Outputs, outcomes, target audiences, and impacts are reported annually through the CRIS (REEport) system. Annual and project termination reports are developed by scientists and reviewed by Department Heads and the Director's office before submission to USDA-NIFA through REEport.

Key Items of Evaluation