

V(A). Planned Program (Summary)

Program # 5

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
101	Appraisal of Soil Resources	10%	0%		
102	Soil, Plant, Water, Nutrient Relationships	20%	0%		
216	Integrated Pest Management Systems	20%	0%		
402	Engineering Systems and Equipment	20%	0%		
403	Waste Disposal, Recycling, and Reuse	20%	0%		
603	Market Economics	10%	0%		
	Total	100%	0%		

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2014	Extension		Research	
	1862	1890	1862	1890
Plan	1.0	0.0	0.0	0.0
Actual Paid	1.0	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
10587	0	0	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
20152	0	0	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
108418	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

The project consisted of programs and demonstrations that 1) increased production of energy feedstocks (corn, soybeans, rapeseed, cottonseed, wheat and biomass); 2) worked with local governments to produce biodiesel from used cooking oil; 3) worked with entrepreneurs to develop renewable energy manufacturing plants; 4) worked with, farmers and the general public to increase usage of renewable fuels; 5) worked on renewable energy opportunities and 6) increased crop production fuel efficiency.

2. Brief description of the target audience

The activities of the sustainable Energy Program target the following groups of stakeholders 1) feedstock producers and their representative groups that include, but are not limited to, the Alabama Soybean Producers, the Alabama Wheat and Feed Grains Producers, the Alabama Soybean and Corn Association and the Alabama Forestry Association; 2) fleet managers; 3) energy entrepreneurs; 4) municipalities, county governments and other public organizations; 5) feedstock production advisors including ACES agents and specialist, public and private agronomy advisors; 6) public policy makers requesting energy information; 7) governmental agency personnel including ADECA, DOE, USDA and NRCS; and 8) homeowners and others interested in energy conservation. All educational programming efforts target audiences without exclusion or discrimination, as specifically defined by ACES policy guidelines.

3. How was eXtension used?

Certified Biomass Procurement Specialist/Switchgrass and Certified Biomass Procurement Specialist/ Short Rotation Woody Crops. These free eXtension online courses are funded by a grant from the United States Department of Agriculture's National Institute of Food and Agriculture. The courses are part of the Southeastern Partnership for integrated Biomass Supply Systems. These courses are designed to train students to work with farmers and landowners to produce switchgrass or short rotation woody crops that will be used as the feedstock for a biorefinery. The idea for this program came from observing the poultry industry. In the poultry industry, poultry companies contract with growers to grow the chickens they need. Farmers cannot show up at the processing plant any time they want with whatever kind and size of chicken they happen to have. The poultry companies hire specialists that work with the growers. These specialists make sure that they have the exact type and the exact size of chicken the processor needs at the time they need it. As a certified biomass procurement specialist, graduates will work for a biorefinery that's making fuel or other bio-products. Like the poultry field specialist, graduates insure that their employer has the inputs it needs to keep the plant running. Graduates will work with the farmers and landowners to produce switchgrass or short rotation woody crops in an environmental and socially

accountable way that meets the specifications of the biorefinery. These specifications are sure to include size, amount and delivery time. The course consists of four separate two hour units with the objective of giving students a working understanding of the fundamentals of sustainable feedstock production practices. There is a test on each unit and students that make 80 or above on the test receive a certificate.

Precision Agriculture eXtension Course: With crop production costs at record highs, farmers must get the most out of every bag of seed, every jug of crop protection products, and every tank of fuel. It is essential that farmers adopt Precision Agriculture technology to get the highest return out of the money spent to make a crop. Precision Agriculture of the Southeast: This nine lesson online course is funded by the Alabama Soybean Producers and the Alabama Wheat and Feed Grain Producers. This nine unit course is designed for farmers and farm service industry professionals.

V(E). Planned Program (Outputs)

1. Standard output measures

2014	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	1201	37000	0	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
Actual	12	0	12

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Participants reached
 Not reporting on this Output for this Annual Report

Output #2

Output Measure

- videos produced
Not reporting on this Output for this Annual Report

Output #3

Output Measure

- web pages developed
Not reporting on this Output for this Annual Report

Output #4

Output Measure

- Number of Participants reached

Year	Actual
2014	1980

Output #5

Output Measure

- Number of Videos produced

Year	Actual
2014	10

Output #6

Output Measure

- Number of web sites developed and maintained

Year	Actual
2014	2

Output #7

Output Measure

- Number of Energy Tree Production Sites

Year	Actual
2014	2

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Knowledge gained
2	recomendations adadopted
3	Energy saved and produced
4	Potential increase in \$/acre soybean production income
5	Potential increase in \$/acre soybean production income due to adoption of recommended planting practices.
6	% Increase in Biomass Produced by Identified New Clones

Outcome #1

1. Outcome Measures

Knowledge gained

Not Reporting on this Outcome Measure

Outcome #2

1. Outcome Measures

recomendations addopted

Not Reporting on this Outcome Measure

Outcome #3

1. Outcome Measures

Energy saved and produced

Not Reporting on this Outcome Measure

Outcome #4

1. Outcome Measures

Potential increase in \$/acre soybean production income

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	14

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

The high cost of seed, fertilizer and crop protection chemicals has increased the need for farmers to know all the agronomic and economic benefits associated with each input decision they make. Soybeans are the dominate feedstock for biodiesel production. The more soybeans that are produced the more soybean oil will be available for biodiesel.

What has been done

An educational program was conducted to inform soybean producers of what was discovered with the soybean production test on fertilization.

Results

\$14 per acre added profit due to using the data from these test.

4. Associated Knowledge Areas

KA Code	Knowledge Area
101	Appraisal of Soil Resources
102	Soil, Plant, Water, Nutrient Relationships
216	Integrated Pest Management Systems
402	Engineering Systems and Equipment
403	Waste Disposal, Recycling, and Reuse
603	Market Economics

Outcome #5

1. Outcome Measures

Potential increase in \$/acre soybean production income due to adoption of recommended planting practices.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	2

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Soybean seeding rates. Producers want to cut production cost and maximize yield by adopting correct seeding rate.

What has been done

An educational program was conducted to inform soybean producers of what was discovered with the seeding rate and row spacing field test.

Results

Almost a two bushel per acre increase in yield. That is an additional three gallons of biodiesel capacity.

4. Associated Knowledge Areas

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

Outcome #6

1. Outcome Measures

% Increase in Biomass Produced by Identified New Clones

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	20

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

The nation has a mandate that requires significant quantities of advanced biofuels. Based on USDA analysis, 10.5 billion gallons will come from the South. Grains and grasses are being used for the production of fuels and chemicals and hybrid poplar is emerging as a feedstock candidate due to its fast growth and short rotation traits.

What has been done

To assess biomass yield of new clones for commercial plantation development hybrid popular cloning screening trial with four replications of eleven clones is being conducted in two sites in Alabama.

Results

The clones are measured for height and diameter and each clone is analyzed for their chemical composition showing significant difference between clones. A clone was identified that yielded 20% more biomass than current genetic material. This will be critical information in choosing clones for biorefinery feedstock plantations.

4. Associated Knowledge Areas

KA Code	Knowledge Area
101	Appraisal of Soil Resources
102	Soil, Plant, Water, Nutrient Relationships
216	Integrated Pest Management Systems
402	Engineering Systems and Equipment

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Appropriations changes
- Public Policy changes
- Other (Natural gas and oil discoveries.)

Brief Explanation

Discovery of abundant natural gas and oil has decreased the demand for renewable fuels.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Certified Biomass Procurement and Precision Agriculture eXtension Courses - Five test students took the courses and found several glitches. These glitches were corrected.

Key Items of Evaluation

To assess biomass yield of new clones for commercial plantation development hybrid popular cloning screening trial with four replications of eleven clones is being conducted in two sites in Alabama. The clones are measured for height and diameter and each clone is analyzed for their chemical composition showing significant difference between clones. A clone was identified that yielded 20% more biomass than current genetic material. This will be critical information in choosing clones for biorefinery feedstock plantations.