

**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
131	Alternative Uses of Land	25%		5%	
402	Engineering Systems and Equipment	0%		43%	
403	Waste Disposal, Recycling, and Reuse	50%		5%	
404	Instrumentation and Control Systems	0%		9%	
511	New and Improved Non-Food Products and Processes	0%		35%	
512	Quality Maintenance in Storing and Marketing Non-Food Products	25%		3%	
	<b>Total</b>	100%		100%	

**V(C). Planned Program (Inputs)**

1. Actual amount of FTE/SYs expended this Program

Year: 2013	Extension		Research	
	1862	1890	1862	1890
Plan	4.0	0.0	6.7	0.0
Actual Paid Professional	0.3	0.0	4.4	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
7679	0	141967	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
7679	0	141967	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
11562	0	986902	0

**V(D). Planned Program (Activity)**

**1. Brief description of the Activity**

Research and extension efforts regarding biofuel development focused on using Louisiana-produced crops, crop residues, or agricultural byproducts to produce and utilize fuels such as ethanol, biodiesel, and other next generation alternative fuels. A USDA-AFRI funded project accelerated AgCenter goals as state-wide research and extension programs not only targeted Louisiana clientele but had a more regional impact.

**2. Brief description of the target audience**

Agricultural producers in Louisiana and southeast United States; consumers; renewable and natural resource energy production industries, LSU AgCenter faculty. The USDA-AFRI project has commercial partners, which has broadened the target audience from past years.

**3. How was eXtension used?**

Where appropriate, eXtension resources were used to enhance educational experiences, provide a source of reference information for problem-solving and identify research gaps. For the USDA-AFRI project, the AgCenter is cooperating in the development of a Bioenergy CoP.

**V(E). Planned Program (Outputs)**

**1. Standard output measures**

2013	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
<b>Actual</b>	527	0	98	0

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

**Patent Applications Submitted**

Year: 2013

Actual: 2

**Patents listed**

Device for Degassing Liquids  
 Biomass Pyrolysis and bio-Oil Upgrading

**3. Publications (Standard General Output Measure)**

**Number of Peer Reviewed Publications**

2013	Extension	Research	Total
Actual	3	9	12

**V(F). State Defined Outputs**

**Output Target**

**Output #1**

**Output Measure**

- Number of agricultural producers providing biomass as feedstock for fuels  
 Not reporting on this Output for this Annual Report

**Output #2**

**Output Measure**

- Number of workshops conducted  
 Not reporting on this Output for this Annual Report

**Output #3**

**Output Measure**

- Number of Web page visits

Year	Actual
2013	91319

**Output #4**

**Output Measure**

- Number of Web page views

Year	Actual
2013	111523

**V(G). State Defined Outcomes**

**V. State Defined Outcomes Table of Content**

O. No.	OUTCOME NAME
1	Increased knowledge regarding the use of agricultural feedstocks to generate biofuels.
2	Identification of crops and cropping systems capable of producing biomass.
3	Farmers, processors, potential feedstock producers and industry partners increase their knowledge regarding the use of agricultural feedstocks to generate biofuels.
4	Extension faculty and research scientists increase knowledge regarding feedstock generation and biofuel production

**Outcome #1**

**1. Outcome Measures**

Increased knowledge regarding the use of agricultural feedstocks to generate biofuels.

Not Reporting on this Outcome Measure

**Outcome #2**

**1. Outcome Measures**

Identification of crops and cropping systems capable of producing biomass.

Not Reporting on this Outcome Measure

**Outcome #3**

**1. Outcome Measures**

Farmers, processors, potential feedstock producers and industry partners increase their knowledge regarding the use of agricultural feedstocks to generate biofuels.

**2. Associated Institution Types**

- 1862 Extension
- 1862 Research

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

<b>Year</b>	<b>Actual</b>
2013	0

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

The concepts for biofuel production in Louisiana are relatively new to most agricultural producers in Louisiana and the surrounding region. In order for this initiative to be successful, growers will need to understand and appreciate not only the importance of biofuel production to the country's future but also their role in providing agricultural feedstock for conversion into biofuels and chemicals

**What has been done**

An electronic survey was conducted to establish baseline data regarding the current levels of knowledge, attitudes and opinions of farmers, processors and potential feedstock producers regarding bioenergy production and processing in Louisiana. These data from this survey were combined with that of a similar previous mail-out survey to yielded input from 601 respondents representing 36 parishes and six of the state's key field crops: rice, sugarcane, soybeans, corn, forage, cotton and sweet potatoes. This information was shared at a recent Sustainable Bioproducts Initiative Summit and will be used to further develop educational programs and identify research needs to move this statewide initiative forward.

### **Results**

Key findings of the study include the following: 75% of respondents believe that biomass used for energy production can help supplement the state's energy needs while 67% believed that agricultural biomass is a viable energy alternative to fossil fuels. Slightly over one-half of the respondents recognize that harvesting biomass does not negatively impact wildlife, water quality or soil quality. 86% indicated they would be willing to participate in management activities for biomass production such as short rotation crops and 62% indicated they would be willing to participate in a biomass to bioenergy market. The majority of respondents believe that tax credits, government subsidies, grants, secured loans and other incentives should be provided for this effort. There is a deficit in knowledge regarding actual practices such as labor, equipment and storage required for biomass production. Overall, there appears to be interest in producing feedstock for biofuel generation among Louisiana farmers.

### **4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
131	Alternative Uses of Land
403	Waste Disposal, Recycling, and Reuse
511	New and Improved Non-Food Products and Processes

### **Outcome #4**

#### **1. Outcome Measures**

Extension faculty and research scientists increase knowledge regarding feedstock generation and biofuel production

#### **2. Associated Institution Types**

- 1862 Extension
- 1862 Research

#### **3a. Outcome Type:**

Change in Knowledge Outcome Measure

#### **3b. Quantitative Outcome**

<b>Year</b>	<b>Actual</b>
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2013

0

### 3c. Qualitative Outcome or Impact Statement

#### Issue (Who cares and Why)

The technical hurdles that impair biofuel production in Louisiana include identifying feedstocks and range of production areas for year round delivery, creating tools for producers and processors to determine the value of these crops, developing processing technologies for biofuel production and evaluating supplemental high value products to improve the economics of biofuel production. Formation of a regional multidisciplinary consortium of agricultural scientists, biotechnologists, engineers, economists and educators through the USDA-AFRI project has facilitated the conversion of these regionally appropriate crops into a portfolio of bio-based fuels and chemicals.

#### What has been done

The Louisiana Institute for Biofuels and Bioprocessing (LIBBi) was created to foster collaboration on the conversion of agricultural feedstock into biofuels and chemicals. Most laboratory and pilot scale research on biofuels and biochemicals has been conducted by the Audubon Sugar Institute (ASI). The USDA-AFRI grant has now moved biofuels research, education, and extension efforts into several other AgCenter units. ASI has researched pretreatment options for multiple crop feedstocks.

#### Results

The joint efforts of LIBBi resulted in the procurement of NIFA AFRI-CAP funding for "A Regional Program for Production of Multiple Agricultural Feedstocks and Processing to Biofuels and Biobased Chemicals". The objectives of the grant are broad in scope. Breeding and crop production research was initiated at north Louisiana research stations to expand the range of energy cane variety selection and low-input sustainable crop production systems. Demonstration areas were planted at these northern locations to augment education efforts to a new clientele base. Modifications to existing pilot biorefinery facilities have been completed. The pilot plant will process multiple feedstock crops (energycane and sweet sorghum initially) and pursue cutting edge processing technologies to demonstrate conversion of monomeric sugars to butanol, gasoline, and isoprene. The AgCenter is also a participant in two Sun Grant projects that involve variety testing for energycane and sweet sorghum.

### 4. Associated Knowledge Areas

KA Code	Knowledge Area
131	Alternative Uses of Land
402	Engineering Systems and Equipment
403	Waste Disposal, Recycling, and Reuse
404	Instrumentation and Control Systems
511	New and Improved Non-Food Products and Processes
512	Quality Maintenance in Storing and Marketing Non-Food Products

**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**

{No Data Entered}

**Key Items of Evaluation**

{No Data Entered}