

V(A). Planned Program (Summary)

Program # 8

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
401	Structures, Facilities, and General Purpose Farm Supplies	15%			
402	Engineering Systems and Equipment	10%			
403	Waste Disposal, Recycling, and Reuse	65%			
405	Drainage and Irrigation Systems and Facilities	10%			
	Total	100%			

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2013	Extension		Research	
	1862	1890	1862	1890
Plan	6.1	0.0	0.0	0.0
Actual Paid Professional	6.8	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
353965	0	0	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
123807	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

- Include in our workshops and meetings aspects of alternative or sustainable energy with emphasis on structures, waste management and irrigation equipment, and energy conservation and efficiency.

- Establish collaborations with government agencies (Puerto Rico Electric Power Authority; Environmental Quality Board; Departments of Agriculture, Environmental and Natural Resources, and Education; Puerto Rico Aqueducts and Sewage Authority; USEPA; USDA; NRCS; and others) and with our partners in the University of Puerto Rico and other educational institutions.

- Design and make plans that include and promote energy sustainability and efficiency in structures, waste management systems and irrigation systems (new facilities or improvement to existing facilities).

2. Brief description of the target audience

Extension professionals, government personnel (professional), professionals from the private sector, and farmers.

3. How was eXtension used?

We recommended Extension to clients an excellent source of information

V(E). Planned Program (Outputs)

1. Standard output measures

2013	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	2435	1308	0	0

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

Patent Applications Submitted

Year: 2013
 Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2013	Extension	Research	Total
Actual	0	0	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of workshops and meetings offered which include aspects of alternative energy systems and efficiency.

Year	Actual
2013	20

Output #2

Output Measure

- Number of collaborators from government agencies, partners in the University of Puerto Rico, and other educational institutions.

Year	Actual
2013	22

Output #3

Output Measure

- Number of designs and plans that include and promote alternative energy systems or sustainability and efficiency in structures, waste management systems, and irrigation systems (new facilities or improvement to existing facilities).

Year	Actual
2013	53

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Number of clients that participated in workshops and meetings offered, which include aspects of energy sustainability and efficiency.
2	Number of government agencies and partners in the University of Puerto Rico and other educational institutions that collaborate in projects that promote energy sustainability and efficiency.
3	Number of clients that adopted designs and plans that include and promote energy sustainability and efficiency in structures, waste management systems and irrigation systems (new facilities or improvement to existing facilities).

Outcome #1

1. Outcome Measures

Number of clients that participated in workshops and meetings offered, which include aspects of energy sustainability and efficiency.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	1087

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
401	Structures, Facilities, and General Purpose Farm Supplies
402	Engineering Systems and Equipment
403	Waste Disposal, Recycling, and Reuse
405	Drainage and Irrigation Systems and Facilities

Outcome #2

1. Outcome Measures

Number of government agencies and partners in the University of Puerto Rico and other educational institutions that collaborate in projects that promote energy sustainability and efficiency.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	15

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
401	Structures, Facilities, and General Purpose Farm Supplies
402	Engineering Systems and Equipment
403	Waste Disposal, Recycling, and Reuse
405	Drainage and Irrigation Systems and Facilities

Outcome #3

1. Outcome Measures

Number of clients that adopted designs and plans that include and promote energy sustainability and efficiency in structures, waste management systems and irrigation systems (new facilities or improvement to existing facilities).

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
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2013

57

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

The dairy industry is the most important agricultural industry in Puerto Rico. The last year it has been affected mainly by the continued increase in energy costs. The milk collection process in cowherds still depends on high energy consumption equipment or is inefficient (ie. Cooling systems, vacuum pumps and transfers systems). During 2013, the average Kwh in \$0.276, which is 2.5 times higher than the USA average (except Hawaii) \$0.11/kwh. This has forced several farmers to operate without profit and reduce labor.

What has been done

A training program for agricultural agents was established to disseminate the educational message about efficient use of electricity to the owners of agricultural enterprises. The program include training on energy efficiency and solar energy systems. During the last trimester of 2013, we conducted a survey to the clientele (dairy farmers) to assess the results of this program.

Results

We survey 110 dairy farms from a total of 312 in operation last year in Puerto Rico. As a result, during last year almost 57 dairy farm owners in Puerto Rico established high efficiency equipment, 50 establish variables speed drives in the vacuum line, 21 replace old motor for new more efficient and almost 7 dairy farms establish solar energy on their facilities. Those changes translates into savings of \$900,000.00 annually in the electrical bill, to achieve a reduction of 39% in the use of energy.

4. Associated Knowledge Areas

KA Code	Knowledge Area
401	Structures, Facilities, and General Purpose Farm Supplies
402	Engineering Systems and Equipment
403	Waste Disposal, Recycling, and Reuse
405	Drainage and Irrigation Systems and Facilities

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Economy
- Public Policy changes
- Competing Programmatic Challenges
- Other (Availability economic incentives)

Brief Explanation

Due to high production costs, compared to other States in the nation, energy is one of the priorities of stakeholders in Puerto Rico. We were impacted adversely by the global economic downturn. The effects were observed during the past years, when we are in a declining economy with a low creation rate of well-paid jobs and a high unemployment

rate. Consequently the public in general does not feel economically secure. It was not until 2012, that we saw the economy gradually begin to recover.

However, in part due to the recession, and on the other hand, to competition and the availability of financial incentives, stakeholders were shy or did not dare to invest their money in sustainable technology. Also, high transportation costs, which are added to the costs of equipment, from the US to Puerto Rico make the installation of green technology poorly viable. We understand that, until the Government makes changes in public policy to facilitate the use of this technology and offers greater incentives for their purchase and installation, we will not see a very strong growth in this sector. However, we have managed that our clientele save in energy costs by making small changes like changing light fixtures, using energy-efficient equipment or changing their behavior and using less energy while operating them.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

We survey 110 dairy farms from a total of 312 in operation last year in Puerto Rico. As a result, during last year almost 57 dairy farm owners in Puerto Rico established high efficiency equipment, 50 establish variables speed drives in the vacuum line, 21 replace old motor for new more efficient and almost 7 dairy farms establish solar energy on their facilities. Those changes translates into savings of \$900,000.00 annually in the electrical bill, to achieve a reduction of 39% in the use of energy.

Key Items of Evaluation