

V(A). Planned Program (Summary)

Program # 1

1. Name of the Planned Program

Global Food Security and Hunger - Milk and Meat Production Systems

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
202	Plant Genetic Resources			4%	
205	Plant Management Systems			22%	
301	Reproductive Performance of Animals			8%	
302	Nutrient Utilization in Animals			15%	
303	Genetic Improvement of Animals			12%	
306	Environmental Stress in Animals			8%	
308	Improved Animal Products (Before Harvest)			15%	
311	Animal Diseases			4%	
313	Internal Parasites in Animals			4%	
601	Economics of Agricultural Production and Farm Management			8%	
	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	0.0	0.0	10.0	0.0
Actual Paid Professional	0.0	0.0	3.7	0.0
Actual Volunteer	0.0	0.0	2.4	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
0	0	1345252	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	726250	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	72730	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Research conducted in support of the local dairy industry included topics in nutrition: effects of different proportions of ingredients in and schedules of feeding concentrate feeds to cows in confinement; (2) heat stress: alleviation of hyperthermia in a tropical climate by means such as dietary supplements with social emphasis on reproductive efficiency; (3) internal parasitism: confirmation of the existence of anthelmintic-resistant nematodes in dairy replacement heifers of local herds; (4) mastitis: initial work on the use of IRT for early detection of udder inflammation; (5) raw milk quality: development of the capacity to carry out sophisticated methodology and initial use thereof to evaluate the raw milk from local herds in biochemical-enzymatic-microbiological terms and relate these characteristics to SCC and shelf life after pasteurization; (6) farm management : data collection in a survey of management practices currently in use at private dairy operations, aimed at creating a manual in non-technical language to help farm managers improve their efficiency. Research with beef cattle included: testing of grass-fed crossbred Senepol X Charolais and Senepol X Bos indicus heifers for growth performance and carcass and meat characteristics; collaboration with the USDA-BEGL to study genes associated with the slick hair trait in Senepol and Holstein cattle; comparison of varying lengths of postmortem aging on meat tenderness forage research topics encompassed: evaluation of Pennisetum hybrids, including one of great interest to local farms, Maralfalfa; propagation and use of bush-type species for browsing by small ruminants; use of inoculants to improve silage fermentation characteristics and aerobic stability; weed control in pastures; and testing of diverse leguminous genotypes. An appreciable portion of this work was either conducted at stakeholder farms or involved analyses of material samples or data originating at such farms, thus fostering stakeholder interest and trust in the practicality of the results.

2. Brief description of the target audience

- (1) Commercial-scale producers of livestock and related products including: milk and cheese from bovines and small ruminants; replacement dairy cattle, beef cattle, meat-type sheep and goats, swine rabbits, poultry for eggs and meat and commercialized forages.
- (2) Personnel of the Agricultural Extension Service of UPRM-Administrator Specialist and County Agents.
- (3) Pertinent professionals of the Puerto Rico Department of Agriculture and of USDA.

- (4) Government policy makers at the Commonwealth and Federal levels.
- (5) Personnel of financial institutions that make loans to the producers listed above.
- (6) Self-employed professional providing consulting services.
- (7) Non-research faculty members with interests in animal production.
- (8) University undergraduate and graduate students in agriculture.
- (9) Students of Vo-Ag High Schools.
- (10) International colleagues and visitors with related interests.
- (11) Members of the general public.

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2013	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	0	0	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	7	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of meetings held with stakeholders to discuss the industry's situation and research priorities

Year	Actual
2013	4

Output #2

Output Measure

- Number of popular (non-refereed) publications based on research results.

Year	Actual
2013	3

Output #3

Output Measure

- Number of field days held in research facilities and/or private farms to demonstrate RMPs based on research results.

Year	Actual
2013	7

Output #4

Output Measure

- Number of publications in refereed scientific journals.

Year	Actual
2013	7

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Number of livestock producers participating in field days willing to adopt the RMPs demonstrated.
2	On farm income from sale of livestock and related products, as percentage of base year 2010-2011.

Outcome #1

1. Outcome Measures

Number of livestock producers participating in field days willing to adopt the RMPs demonstrated.

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Under the present difficult economic situation producers must increase their knowledge of and attitude toward adopting RMPs to improve the biological efficiency and profitability of their operations.

What has been done

Three field days were carried out: one on the forage Maralfalfa, another on weed control in pastures, and a third on artificial insemination in swine.

Results

It was not possible obtain quantitative information of this sort, but at the three field days held keen interest was evident among a considerable part of the nearly 100 producers in attendance.

4. Associated Knowledge Areas

KA Code	Knowledge Area
202	Plant Genetic Resources
205	Plant Management Systems
301	Reproductive Performance of Animals
302	Nutrient Utilization in Animals
601	Economics of Agricultural Production and Farm Management

Outcome #2

1. Outcome Measures

On farm income from sale of livestock and related products, as percentage of base year 2010-2011.

Not Reporting on this Outcome Measure

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Economy
- Appropriations changes
- Other (Loss of agricultural lands)

Brief Explanation

Economy

The so-called long recession that began in Puerto Rico in 2006 and worsened after 2008 has now lasted approximately 8 years and shows no sign of ending soon. At present there is a crisis of Commonwealth Government financing, that has been several decades in the making and will be very difficult to overcome, which threatens to reduce considerably the operating funds (including those for agricultural research and extension) of UPR.

Appropriation changes

Both governments (Puerto Rican and USA) experienced great difficulty with unbalanced budgets and partisan pickering over how to cut expenses in 2013. Neither were private sources of funding as abundant as they once were. The resulting reduced level of funding obviously had an impact on research and extension under this Program Area. However, continued progress was made in improvements to physical facilities such as the dairy at the Lajas Substation, and the research projects were able to continue although with less than planned scope in some cases.

Other factors

Continuing in 2013 was the decades-long loss of farmland to non-agricultural uses in Puerto Rico that has had a major negative influence on the local agriculture in general and especially so with regard to land available for grazing or harvesting forages. Urgent action is required, but this is a matter of public policy beyond our reach. Additionally, much of the still available farmland is owned by people with no inclination to undertake agricultural activities. As for human resources, the number of young people choosing productive agriculture as their occupation is inadequate to meet the present and future needs. Another negative factor is the unregulated importation of food products, which is especially harmful to the local beef cattle industry. High costs of productive inputs, especially in recent years ingredients for concentrate

feeds and synthetic fertilizers, put Puerto Rico at a competitive disadvantage relative to other lower cost countries

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Research and outreach carried out under this Program Area covers a broad collection of fields. Below is a brief summary of the major issues brought about in the meetings of the subsectors where the program was evaluated. The program coordinator also included his comments on areas where little research activity takes place. The information is subdivided as follows:

(1) Milk production and milk quality - Closing of the dairy operation at the Gurabo Substation precluded further studies on milk production with heavy reliance on grazing well-managed pastured, while pasture improvement at the Lajas Substation has hardly made any progress. Feeding experiments with confined cows at Lajas produced some useful results on supplementation of fair quality conserved forages, but progress on the production and utilization of highly nutritious forages has been slow. Otherwise the Lajas dairy facilities have been underutilized based on the amount of research conducted there. Work on slick-haired Holsteins is promising, but still at an early stage. Preparations to use sophisticated technology has undergone perfecting and useful results on early detection of mastitis and characterization of the raw milk produced in Puerto Rico are anticipated in the post 2013 years. Gathering of data on how private dairy farms are functioning is serving to increase contact with stakeholders and should lead to improved farm management in the future.

(2) Bovine meat production and meat quality- The Work Group on Bovine Meat Production has consistently maintained close contact and communication with producers and pertinent government authorities and rendered valuable consulting services. The unique asset of Montaña Farm and its Senepol herd has seen continued development recognized by stakeholders in their evaluations. Research has been conducted on evaluation of crossbred animals and procedures for raising grass-fed beef and on carcass and meat quality, with assistance of molecular markers. Although some progress have been made there is still a backlog of research results pending publication.

(3) Forages- This field is outstanding for the research published and MS theses completed on diverse forage topics. Germplasm of tropical grasses, legumes and bush-type non-leguminous plants has been evaluated agronomically and as feed for ruminants (often including sheep and goats), whether when grazed or cut green or conserved as silage, haylage or hay. Small-scale experimental silos have served this purpose well and in 2013 machinery was acquired and began functioning to fill industrial-scale silos at Lajas. This will make possible future experimentation with large numbers of animals. Producers participating in field days where the program was evaluated were enthusiastic about the perspectives these results open for improving animal nutrition and production.

(4) Meat production from other farm animals- For many years research conducted by this institution with poultry, swine and rabbits has had little funding or FTE of scientists. It has consisted mostly of some MS thesis projects but with few peer reviewed papers published and little application on producers' farms.

Key Items of Evaluation

- Work on slick-haired Holsteins is promising, but still at an early stage. Continued research in dairy cows crossbreeding to provide better breeds tolerant to heat stress is one of the long-term strategically important directions emphasized in our 2015 combined POW with Extension.
- The improved forage resources evaluated under this program are promising for the design of alternative feeding strategies important for dairy producers experiencing increases in the price of imported high-energy feeds.