

# 2011 University of Puerto Rico Extension Plan of Work

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## I. Plan Overview

### 1. Brief Summary about Plan Of Work

This plan of work of the Puerto Rico Agriculture Extension Service (PRAES), University of Puerto Rico Land Grant College at Mayaguez, covers the FY 2011- 2015. We budgeted an estimate of 173.3 FTE's for the five years covered in this period, a reduction of 11 FTE's from FY 2010-2014 plan of work due to retirement of personnel. during 2008 and 2009. At present we have no plans of increasing this number due to reductions in budget.

The College of Agricultural Sciences (CAS) continued working on the Strategic Plan implementing its mission and vision, analyzing values, searching the external and internal environments, establishing strategic direction objectives and the Plan of Action. Extension maintains close relations with government agencies, decision makers, research scientists, and the clientele helping them to gain insight on what has happened and what is likely to happen during the next years. The staff of the local Extension offices establishes relations with key leaders such as: mayors, senators, representatives, directors, officials of organizations, and business people interested in/or related to Extension's agenda. They invite these stakeholders to participate in Extension activities and in the Stakeholder Input Process meetings and meetings of the Community Resources Development Committee. The collaborators from the public sector are personnel from the departments of Agriculture, Education, Health, Consumer Affairs, Labor and Human Resources, Transportation, Drug Abuse Prevention, and other government agencies (The Police Department, the Water and Sewer Authority, the Electric Energy Service, Forest Services, and the Youth Affairs State office). From the private sector, people from banks, cooperatives, and industry (agricultural, pharmaceutical, textiles, etc.), as well as religious, civic, and social leaders from different organizations, participate in the assessment process determining local needs, offering their collaboration, and involving their organizations in the search of solutions to problems. Extension specialists and administrators also maintain good relations with key leaders at the state level.

We made new coalitions during the past year and expect to make new ones during FY 2011-2015. The Planning and Evaluation Office trained all the professional personnel on the preparation of their plans of work based on clientele needs, supported by up-to-date statistical data and outlook reports and pursuant to federal and state government public policies.

#### **PLANNED PROGRAMS:**

During FY 2009 PRAES consolidated planned programs from 16 to 7 in order to use resources more effectively and reduce the paper burden to comply with the paper reduction act. However, with the emergence of the five new emphasis areas, we had to reorganize our planned programs and refocus priorities to meet the new goals. With the addition of the new goals and refocusing of our consolidated planned programs, some of which had to be split up, we now have 11 planned programs for the sake of this plan of work 2011-2015.

#### **1) Strengthening Youth Life Skills, Leadership and their Community**

The Puerto Rico 4-H and Youth Development Program has identified Youth Development as a mayor emphasis area for its long-range educational program. It is designed to provide youth with positive opportunities to learn and interact with peers and adults, provide leadership development, and focus on the enhancement of life skills through research-based educational programs focusing on Healthy Lifestyles; Science, Engineering and Technology; Citizenship and Leadership. Different activities and methods such as: camps, competitions, meetings, demonstrations, and workshops will be used, but, especially, the development of projects as a strategic learning tool. Furthermore, in-service learning experiences will be promoted to give youngsters the opportunity to reflect on and take action concerning issues that impact them. Through the project the youngsters will acquire and develop life skills in order to identify the most important issues, within a real world situation, through critical thinking, generate emotional consequences, which challenge values and ideas, and support social, emotional and cognitive learning and development. The development of life skills for the prevention of negative high risk conduct will be emphasized in this program.

In the FY 2008-2009 Stakeholders' Input Process the selected youngsters chose the curricular areas of most interest to them. These were: Environmental Education, Leadership and Personal Development, Communication and Expressive Arts, Technology and Engineering. They selected the use of alcohol and drugs, sexuality, and criminality as the areas of most concern to them. Attending these concerns will help make a more interesting and educational program, resulting in increased participation. We should identify creative and innovative strategies to attain a combined balance between the themes of major

interest pointed out by the youngsters and the mission of the 4-H Program. PRAES professionals will use the technical material to reach and satisfy other needs pointed out by the youngsters to develop values and life skills.

During 2008, 44,920 teenagers 15 to 19 years old were not enrolled in school of 300,416. Studies indicate a close relationship between school desertion and juvenile delinquency. One of these studies, by Dora Nevárez-Muñiz, is entitled Crime in Puerto Rico. The Administration for Mental Health and Addiction Control Services (ASSMCA, 2005-2007) revealed that 48% students at the intermediate, and high school levels (includes population 17 years old) from public and private schools drank alcohol in the last year, 29% initiated use during the past year. Alcohol was the substance mostly used among youngsters, followed by tobacco. Other problems are offences committed by these minors against society ([www.tendencias.pr](http://www.tendencias.pr) Source: Puerto Rico Police, Assistant Superintendent in charge of Services to Citizens, Statistics Division, 2008) with a total of 5,366 cases; of these, 367 were sex related. There were 2,182 cases reported that were committed in schools (Puerto Rico Police, Assistant Superintendent Field Operations, School Quality of Life Program, 2008), 38 cases were drug related and 6, sex related. Another serious problem that may lead to school desertion is pregnancy among adolescents. In 2006-2007 there were 151 pregnant students at the intermediate level and 714 at the high school level (Department of Education).

## **2) Plant System**

An economically profitable and progressive agriculture requires efficient crop production management practices, a plant protection program, efficient engineering and biosystems practices and a good planned program in economics, marketing and policy. Through the crop production program we seek ways to help farmers increase the use of improved production practices as well as good agricultural practices (GAP) to achieve better growth management and improved product quality. We will continue to promote the adoption of the best plant protection management practices and to develop IPM systems that protect the environment, conserve the natural resources, and contribute to the competitiveness, profitability, and sustainability of Puerto Rico's agriculture. In engineering our efforts will focus on promoting better irrigation and drainage practices, the effective operation and maintenance of equipment and soil and water conservation practices. Through economic, marketing and policy the farmers will receive the necessary education and technical assistance to strengthen their abilities as managers and entrepreneurs.

The gross agricultural income for FY 2008-2009 was \$793.97 million (Puerto Rico Department of Agriculture). Animal and crop production represents 89% of this total gross income, crop production being second in economic importance. In 2008 - 2009 the value of crops was \$300.48 million (preliminary data PRDA), a decrease of \$25.0 million as compared to 2007 - 2008. The crop commodities include: fruit, vegetables, ornamentals, coffee, bananas, starchy crops, and plantain. The decrease in crop income was caused by flooding and heavy rains during September and October of 2008.

## **3) Family Well-being**

In society, the family is considered the first institution that has the responsibility and commitment to prepare and educate its members. It is where character is formed and values are learned.

The increase in population, as well as social, political, and economic changes impact Puerto Rican families, affecting their vital function. The family structure in Puerto Rico has changed with important implications for the children. Also, financial problems can cause negative effects on individuals, families, and employees. Several researches on family and financial issues conclude that economic stress affects the emotional stability of family members and can affect their mental health, the marital relationship, and parental responsibilities (Dennis, Parke, Scout & Duffy, 2003; Leinonen, Solantaus & Punamaki, 2003; Shaklee, 2007)

The increase in population and social, political and economic changes have impacted Puerto Rican families, affecting their vital function. Households with both parents present comprise 68% of all families on the Island; 31.4% of these families live under the poverty level (income is less than \$10,000 per year) (2000 Census of Population for Puerto Rico) The number of families whose head of household is a women (no man present) is 268,476; 49.8% of these families earn less than \$10,000 year.

The personal income increased from \$51 billion (2006) to \$53 billion (2007), accordingly the personal consumer debt increased from \$21 billion to \$22 billion (Puerto Rico Planning Board, 2008). Family internal factors like unplanned spending and conspicuous consumption seem to worsen the personal debt.

The Consumer Price Index suggests that the rate of inflation was slightly more than 9.6% in the last 12 months (Department of Labor and Human Resources, 2008) and the Puerto Rico Bulletin reported 9,048 bankruptcies for year 2008, 17% more compared with the last year. This suggests hard economic times for individuals and families. Financial problems can cause negative effects on individuals, families and employees.

Another negative impact on families is child abuse. According to the Commonwealth of Puerto Rico's Children and Families Administration, during fiscal year 2007-2008, 16,022 families had active cases involving children maltreatment, which involved 38,149 children. The distribution by type is as follows: negligence (51%), physical abuse (13%), emotional maltreatment (12%), sexual abuse (6%), and for multiple causes (18%).

raising grandchildren, women headed household families, and domestic violence.

Financial education has gained interest among consumers. According to Hogarth (2002), well educated consumers should make better decisions for their families, increasing their economic security and well-being. Financially secure families are better able to contribute to vital, thriving communities, further fostering community economic development.

The above socioeconomic data show the increasing need to help consumers and house hold to deal effectively in a complicated social and economic scenario. Through family and financial literacy, families should develop the appropriate tools for a better decision-making process in the following areas: savings, debt reduction and budget design, while simultaneously promoting behavioral changes that strengthen family relations and values.

To reach this goal, the Family Life and Consumer Education specialists develop through workshops, curriculum, radio programs, bulletins, information centers, and trainings in successful parenting, character traits, values, family strengths and aging aspects, and through competencies such as: how consumer behavior influences decision-making, budgeting, debt reduction, credit wise and savings.

Efforts will be joined through the establishment of coalitions with other agencies in Puerto Rico, such as the Department of Consumer Affairs, the Department of the Family, and the Department of Education and Consumer Credit Counseling.

#### **4) Management of Rangeland and Forestry Resources/Soil, Water, and Air**

The gross agricultural income for FY 2008-20089 was \$793.97 million (Puerto Rio Department of Agriculture). Animal and crop production represent 88% of this total gross income.

Puerto Rico's high population density demands the update and construction of infrastructure to satisfy its needs. As a result, lands available for agriculture have been reduced. Sixty percent (60%) of the cultivated land is more than 20% slopes, with an erosion of 10% annually, and low fertility (Natural Resources Conservation Service). As a result, farmers have to establish conservation practices and a good fertilization program to get reasonable yields.

There is great concern with soil erosion and deforestation of our lands and problems associated with the eutrofication and sedimentation of rivers on the island. Each year risks of flooding increase causing numerous agricultural losses to the local economy.

We have problems with the quality and quantity of the water resources due to turbidity, erosion, sedimentation and the presence of microorganism. The Puerto Rico Agriculture Experiment Station is conducting research on anaerobic digester to respond to this situation in the dairy cattle and swine enterprises. However, there is still much need for research on practices for combined air and water quality that are environmentally sound and economically feasible.

The development of new green areas, tree conservation, and reforestation are some of the alternatives to enhance, improve and promote wildlife in and around the cities. Reforestation and development of green areas in urban and rural areas by non-government entities should be promoted. Rangeland and forestry practices will be improved to prevent the contamination of our natural resources.

The planned program Management of Rangeland and Forestry/Soil, Water and Air is devoted to promoting the education of farmers and people related with agriculture through activities addressed to establish conservation practices to promote the protection of our forests, trees, and watersheds; increase appropriate fertilization practices, conserve water, and mitigate emissions of particles from agricultural practices to the air. We will also emphasize on better soil management on the flood plains, the recharge of groundwater, and new alternatives to ensure compliance of air and water quality regulations.

Puerto Rico Agricultural Extension Service (PRAES) and USDA-NRCS will join efforts to promote the management of rangelands. These collaborative efforts are directed toward the development of educational activities (training, meetings, seminars, follow-up visits and others) geared at implementing the recommended practices to protect the natural resources and the best management practices during farming. Farm demonstrations will be established as educational tools to showcase the desired practices, their benefits, and to stimulate other farmers to adopt the practices. Each farm visit will require a report of the findings and recommendations. Short courses will be offered on improved pasture varieties, fertilization, silage, cover crops, and other related topics. A pre and post test will be administered to measure the knowledge gained.

PRAES programs promote the use of better management practices that seem economically profitable for grazing hay and silage production on agricultural lands. PRAES seeks to promote the management of rangelands to increase the grazing capacity, as well as the production of hay and silage, through the implementation of sustainable management practices using minimum tillage.

#### **5) Animal Systems**

Livestock is the agricultural sector that has contributed the most to Puerto Rico's gross agricultural income. During FY 2008-2009 it contributed \$404,399 million (51%) (Puerto Rico Department of Agriculture, Statistics for 2008-2009). It includes dairy beef, poultry, swine, aquaculture, and small operations such as rabbits, goats, sheep, bees and horses. Of all agricultural activities, it is the sector most prone to the transmission of diseases to humans. Transportation of people, equipment, materials, and goods, increases the risk of carrying diseases from one place to another in a short period of time. This poses a great threat and risk to farm activities involving animals. Farmers should be made aware of the importance

of developing a control and prevention program of animal diseases and of following the recommended production practices to reduce the risk of losses in production and low yields.

On the other hand, local animal production has been impacted by high production costs and limited control of imported products. Improving the efficiency of production allows a greater opportunity for animal producers to increase the rentability of their enterprises and to be at an advantage when competing with imported products.

A cost-effective agriculture also requires efficient engineering practices. The majority of the farms in Puerto Rico have structures that form part of their infrastructure. Biological systems comprise most of the waste management, recycling, and reuse operations in farms with animals in confinement. The Engineering and Biosystems program seeks to improve existing structures and to provide farmers with model plans that comply with permits requirements.

Through this planned program PRAES helps farmers with animals in confinement to prepare waste management systems that meet state and federal requirements. Educational efforts will aim at the effective operation and maintenance of farm equipment and the promotion of water conservation practices.

## **6) Community Resources Development by Means of Fostering Sustainable Communities**

The Community Resources Planning and Development Program of the Puerto Rico Agricultural Extension Service at the UPR Mayagüez Campus, focuses in the delineation of an effective Community Economic Development and Self-management program that will address Puerto Rico's most pressing social issues.

Since agriculture represents only 0.4% of the Puerto Rico GNP (Government Development Bank, 2007), agricultural land has been reduced from 690,689 acres in 2002 to 557,528 acres in 2007 (30.6% to 24.7% of the national territory in a 5-year period) (USDA-NASS Puerto Rico Office); and personal bankruptcies have increased in 46% between 2006 and 2007 ("Corte Federal de Quiebra del Distrito de Puerto Rico"), it is portended that both the agricultural activity and community vitality are in crisis. Accordingly, the Empowering Communities, and Community Economic Development sections of CRD will continue giving special emphasis to community-based agricultural land conservation initiatives and to the generation of sustainable low-scale family or community-based agriculture and other economic initiatives. To achieve these objectives, CRD strategies will continue focusing beyond training activities centered toward specific careers or job areas; rather, it will focus on the identification and development of skills already present in the participants or the communities that might be geared toward activities of economic production, self-employment or the creation of micro enterprises. Accordingly, our program will continue to stress the development of methodological tools that allow participants with various and diverse talents, skills and dexterities to be able to organize economic activities that will allow them to take advantage of these skills for their benefit and subsistence.

In addition, CRD focuses its efforts in guiding community leaders towards self-management and empowerment. In our social and disadvantaged communities, there is a prevalence of families with unequal access to economic and social development, compared to other groups on the island. The community is the focal point where people feel a sense of personal involvement and take pride in their actions. Accordingly, CRD in Puerto Rico works hard developing a sense of community belonging and increased identity in all its programs. The empowerment and self-management of the communities requires information, guidance, education and civic engagement. Strong communities develop programs, anchored in research, education, and in teaching their partners. That is why we have adopted the Participative Action Research methodology as our principal approach to empowering and constructing stronger communities.

Puerto Rico has experienced a sustained poverty level rate close to 50% for the past two decades. Official poverty figures are at a 30 years high. Per capita personal income is just \$17,741 (48% of that of Mississippi, the poorest state in the US). Due to Puerto Rico's government decision to lay off over 30,000 governmental employees during the last year, unemployment figures have skyrocketed from the already high 12.4% to 17% (compared to the prevailing 9.5% in the U.S.). As a result between 2007 and 2009, Puerto Rico has added over 81,000 people to the unemployment rolls. Labor force participation is at a 30 years low of 42.7%, making Puerto Rico the only U.S. jurisdiction where there is more people of the "working age" group out of the labor market than working (Government Development Bank, 2010; Puerto Rico Department of Labor, 2010, U.S. Census Bureau, 2007 American Community Survey). As the previous figures make evident, the leading role of the Puerto Rican government as a principal promoter for the creation of jobs and the generator of economic activity, as it used to be during Operation Bootstrap era in the 1950-60s, is no longer active. The proportion of communities, both urban and rural, that experience long-term spells of poverty and inequality far surpass those in the U.S. In addition, the island is experiencing an uncontrolled process of social decomposition with unmanageable criminality, domestic violence, school dropouts, suicides, drug addiction, and alcoholism rates. Accordingly, our plan of work focuses on holistic educational strategies that will promote self-employment and community oriented initiatives as a means to foster sustainability, self-reliance and empowerment. A participant oriented methodology will be employed (Participatory Action Research), in which participants will take an active role in defining problems and aspirations, seeking possible solutions, implementing strategies, and evaluating the results (Foote, 1991; Greenwood, 1998; Macpherson (et.al.), 2005).

## **7) Food Safety**

The goal of the Food Safety component is "To improve food safety through the control, reduction or elimination of

contamination risks". Its main components are the following: A) The "Fight BAC!" campaign, for consumers; B) The Food Safety Certificate course, for persons in charge of food establishments; and C) Train-the-trainers, for university personnel and professionals from other government agencies and organizations.

Ensuring safe food is an important public health priority. The food supply for Puerto Rico and the USA is safe thanks to a coordinated system of inspection. In 2007 Puerto Rico had 11 confirmed food-borne outbreaks (CDC). The number of notifiable diseases according to CDC 64 cases of Hepatitis Type A, 949 cases of Salmonella, 1 cases of Shiguella, and 24 cases of E. Coli 0157:H7. In a The Center for Disease and Prevention (CDC) recently reported that a long-term decline in food borne illness appears to be stalling, (preliminary data Morbidity and Mortality Weekly Report, April 2008). According to FDA (2004), the ideal retail food program performance indicator should be the level of foodborne illness, but the occurrence of these illnesses is grossly underreported. This makes the incidence of foodborne illness an unreliable program measurement. Research reveal that American consumers are more knowledgeable about food safety, but may have erroneous ideas of which handling practices are effective to reduce foodborne illnesses at a home environment (<http://fsis.gov/OA/rePRAESrch>). Among restaurants, the major difference between those with foodborne disease outbreaks and those with non-outbreaks is the presence of a certified kitchen manager, (Hedberg, C. W., et al., 2006). It was found that food workers are more likely to wash their hands when they are trained in food safety (Green, *et al.*, 2007). The Food Code provides recommended cooking temperatures to ensure that food reaches a temperature high enough to kill pathogens. PRAES' priorities are to offer the Food Safety Certification Course (FSCC) to persons in charge of retail food establishments and to continue offering formal education to professionals that teach or enforce compliance regulations.

## **8) Climate Change**

The global climate is changing, and will continue to change, in ways that affect the planning and day to day operations of businesses, government agencies, and other organizations. The manifestations of climate change include higher temperatures, altered rainfall patterns, and more frequent or intense extreme events such as heat waves, drought, and storms. Natural disasters quadrupled during 1987 to 2007, from 120 to 500 events.

Agricultural production is among the enterprises most vulnerable to these extreme weather conditions.

Puerto Rico Extension personnel need to be more diligent in providing the farmers and the community with information, technologies, and education on how to cope with climate change and ways to contribute to greenhouse gas (GHG) mitigation. They need to engage in the development of the farmers' leadership to enable them to be proactive (risk management practices) and actively involved in decision-making. This is of utmost importance, especially for the resource-scarce small farmers who contribute little to climate change and yet will be among the most affected. Most of our agricultural production comes from small-scale farms which are often family owned and operated.

The logical first step for this plan of work is the development of an appropriate curriculum (What it is - How it affects us - What we need to do), tailored to our local situation and which includes measures proven to be useful in the past, besides providing support with skills to choose the best option to deal with climate uncertainty to make informed decisions. The second step is capacity building to our Extension personnel together with the State Department of Agriculture and other service agencies, geared to the implementation of practices, measures and resources that enable farmers to mitigate and to minimize economic losses.

This effort needs to be supported by work in the community on issues on land-use and the preservation of agricultural land, strategies such as collaborations, development of decision-making skills, and involvement in public policy to ensure the long-term success of the program.

Most of the water reservoirs on the Island are on average 75% filled with sediment, condition that reduces their storage capabilities. This is evidence of soil erosion problems. Often during the months of January to April, when the precipitation rate is lower, brush fires occur mostly intentionally. Although brush fires are widespread around the Island, a study conducted in 2001 showed that the southern part of the Island is they are most common. This part is of the Island is dryer, with grasses, and with vegetables, beef and poultry the main agricultural products. Such practice aggravates the problem of soil erosion, sedimentation and pollution in our water bodies.

There is a natural interaction between soil-water-air (CO<sub>2</sub> cycle). Practices, such as agroforestry, can help reduce greenhouse gas concentrations in small farms, help improve soil composition, prevent soil erosion, improve water infiltration through the soil, and replenish underground water, besides providing value-added wood products and recreation (biodiversity).

Soil erosion and storm water runoff need special attention. Water turbidity in rivers and water bodies is high, severely affecting coastal areas. Despite this fact, there is still a need for research in this area regarding the amount of soil lost and the economic impact at the farm level.

Another problem of great concern is solid waste. Besides the fact of its high generation (greater than in the US), there is the aggravating circumstance that the life expectancy of the landfills is almost over due. The Island's dimensions and critical ecosystems provide virtually no safe area or space where to build new ones. Recycling is still the fastest and cheapest

alternative. Twenty-seven per cent (27%) of the solid waste that gets into the landfills is organic. Its decomposition process generates methane, which contributes 20 times more CO<sub>2</sub> to GHG. We need to work on recycling - incorporating such organic "waste" to the soil or encouraging more composting, alternative uses, and markets.

All levels of government have roles to play in addressing climate change. Some aspects of the climate problem could be addressed at the local level, such as green house gas reduction, by implementing smart growth and adapting to climate impacts. Priorities will be set for water and soil, where sustainable practices will be strongly emphasized. Community volunteers could be trained for water monitoring to create a baseline data to assess progress.

## **9) Sustainable Energy**

The decreases in oil availability, uncertainty in the cost of fuels and its implications in the economic wellbeing of our citizens, have triggered the urgency for energy independence and sustainability. Puerto Rico, having one of the highest costs of fuel in the United States and even though our tropical climate is favorable to the sustainable energy industry, not many projects have passed the planning phases. Our program seeks to increase existing knowledge of our clientele of the sustainable energy technologies, energy conservation, opportunities of financing sustainable energy projects and their cost, and environmental benefits.

The dependence on fossil fuels has affected the economic well-being of the citizens of Puerto Rico for the past decades. At a cost per kilowatt of electricity that fluctuates between 15 and 24 cents, the cost of producing goods in the industrial sector is extremely high. Often potential local and foreign investors are discouraged from establishing business on the Island due to these costs. For the average household, the electric bill takes a big part of the income, personal comfort and the use of basic consumer appliances often need to be limited to be able to pay for utility bills.

The local government has been partially successful at motivating people to invest in sustainable energy technologies like solar heaters, by offering tax incentives. A new program by the federal government, in which a \$200.00 economic incentive is offered to change to more efficient appliances has just started. On the other hand, a recent effort to trade-in old vehicles for newer, more efficient ones by offering economic incentives was cited by the local press as being short of meeting expectancies.

New legislation that requires the local electric utility (Puerto Rico Electric Power Authority) to buy surplus electric power produced by their clients "net metering", has been criticized for requiring high capital investments and being too complicated to be understood by the average client. A new project of the Puerto Rico legislature, in which farmers will have a 20 percent reduction in their electric bill as an incentive for energy conservation plans will go into public hearings in the House of Representatives before the end of the year. This project is expected to be converted into law.

Research results from work in the Agricultural Experiment Station of the UPR, that date back to the decade of 1980, using dairy waste and sugar cane, show that this type of project can be successful under climate conditions in Puerto Rico. A demonstration project using biodiesel in the maintenance of vehicles in the Municipality of Caguas is showing excellent preliminary results. Poultry waste hydrolyzed with slaughterhouse wastewater to produce biogas in Aibonito also improved water quality and produced organic fertilizer.

Our experience with some of the most technically oriented clients in the Puerto Rico Agriculture Extension Service is that they have a desire to learn about technologies like biogas production, solar power, "green roofs" and net metering; but there is a very timid interest in making capital investments without big government incentives. The technologies are too complicated to be understood by the average citizen and they require high initial investments.

There is an imminent need to educate our clientele in all aspects of energy sustainability. Education is needed from the most basic concepts of energy audits and conservation, to the use and demonstration of the technologies. Our program is intended to increase existing knowledge of our clientele of the sustainable energy technologies, energy conservation, and opportunities to finance sustainable energy projects and their cost and environmental benefits.

## **10) Global Food Security and Hunger**

Food security emerged as one of the major risks of the 21<sup>st</sup> century (Global Risk Forum, 2008). Puerto Rico extended supply chains that generated competitive advantage to agribusiness and people also increased vulnerability of the food global system to disruptive risk. The Island has sufficient food available mainly through imports, but the domestic production is less than 20%. Fifty-eight per cent (58%) of the people have access to appropriate foods for a nutritious diet by transfer income benefits, but the population needs continuous orientation on the utilization of food through adequate diet, water, sanitation, and health care. The system's stability is threatened by climate change and economic crisis that increase food costs.

In 2007, the total value of agricultural production was equivalent to 1% of the Gross Domestic Products. There were 15,745 farms on the Island, a decline of an 11% compared to the year 2002, and the average farms size was 39.1 acres. The farmers' average age was 58.2 years old and more than one third were over 65 years old (Census of Agriculture, 2007).

During 2007, only 20% of the food and beverages consumed in Puerto Rico were produced on the Island (External Trade Statistics, 2008). Practically all the cereal, oil and fat, sugar, vegetables, fish and soup consumed were imported as were more than 3/4 of fruit, vegetables, and meat. Most imports were from the United States, but Puerto Rico received food

from more than 50 countries around the world. Local production consisted mainly of milk, eggs, plantain, and coffee.

Some of Puerto Rico's food supply chains' vulnerabilities are: the Island doesn't have a food security policy, the local agricultural production is low with continued agricultural land loss, a high dependence on imported food equivalent to more than 80% of our food consumption, food importers and transport logistics are oligopolies, and sea routes towards the island match the path of Caribbean hurricanes routes.

It should be noted, nonetheless, that within the Caribbean Puerto Rico does not have a high vulnerability index because it has a fairly advanced economic development and receives federal funds in case of emergency from FEMA or Homeland Security, but the food supply chains' stability can be impacted by extreme weather events such as hurricanes (the season runs every year from June 1 to November 30). This could devastate crops and cause severe damage to animal production and transportation logistics, as the island is located in one of the climate change hot zones identified by Intergovernmental Panel on Climate Change (2007), where severe changes—like an increase in the intensity and frequency of hurricanes—are expected. According to some estimates, if operations at port are halted for any reason, provisions to feed the population of almost four million people will be used up in 15 days (Puerto Rico is one of the most densely populated countries in the world with a high dependence on transfer incomes).

Ensuring Puerto Rico's food security presupposes the elimination or reduction of that vulnerability. Even though the Government is in charge of solving any crisis and emergency related to food, the private sector still has to develop innovative strategies to adapt to and handle food supply chain risks.

In December 2009 the national Food Security initiative contact finished her Ph.D. degree and her dissertation was based on Food Supply Chain Vulnerability. As part of her literature review she read FAO, IPCC, World Economic Forum, Latino American Economic Commission and other documents related with the food crisis and risk management. One of her contributions was the development of a protocol to attend the disruption on the food supply chain. One of her conclusions was that the public and private sector need to work together on this matter.

## 1) Childhood Obesity

According to the World Health Organization (WHO), estimates that globally over 1 billion people are currently overweight, 300 million people are clinically obese and the number of overweight children under the age of five is estimated to be over 42 million. More than 2.5 deaths annually are weight related and this could rise to 5 million by 2020. The USA is forecast to spend 19% of GDP on health care by 2014, up from 15% in 2003.

Puerto Rico's childhood obesity prevalence is close to the Hispanics in New York, 22%.

The *Recommended Community Strategies and Measurements to Prevent Obesity in the U.S.* propose the community base strategies that change obesogenic environments. Changes might get access to healthy food and promote free practice of physical activity. Also, this document suggests a push to create public policy that guarantee the equal opportunity for all citizens, avoiding disparities by gender, socioeconomic status, race and ethnicity.

The Planned Program Childhood Obesity pretends to address obesity in children as a major public health problem, working with the following three areas of interest: nutrition knowledge, physical activity, and public policy. These areas promote a holistic view of the situation. Our focus are the changes that influence people's consumption and activity level.

Childhood Obesity planned program will explore how food and nutrition science and a consideration of alternative future might help to address some of the factors underlying the obesity growth in Puerto Rico. We should consider the followings obesity's drivers: social, economic, environmental, technological, and political. For each driver we should consider some trends. For social, we mull over stigma discrimination, sedentary lifestyles, more eating out, responsibility: primacy of personal/family choices. For economic, we ponder profit: food and advertising companies that push consumption, large retailers dominating food supply chain, functional food and food/pharmaceutical profit. For environmental, we contemplate 24 access to energy dense foods, car use and eco-sustainability. For technological, we weigh up teleworking and boost of agriculture. For political, we think over personalized services for health and education and food regulations in Puerto Rico.

Our long-range goal is to stop the progression of obesity in the population of Puerto Rico through community base interventions, providing youngsters and their families tools to develop, adopt, and maintain best behavior practices and lifestyles to protect them against this complex and worldwide epidemic. The educational philosophies supporting our strategies are cooperative learning and learning-by-doing, which involves compromise of all participants.

The Program will allow the inclusion of other agencies as alliances, coordination or agreements. These collaborations will help avoid duplicate efforts, the best use of resources and to share the achievements. Also, it allows us to establish agreements to treat this population with a tailored cultural educational model and determine the accomplishment of 2020 *Healthy People* goals. Although, *Healthy People 2020* is currently under development, we will use it as a standard because it reflects assessments of major determinants of health and wellness, changing public health priorities, and emerging issues related to USA health preparedness and prevention. We want to encourage determine which educational curricula is best for collaboration in the present efforts to fight the obesity prevalence among youth and adults of Puerto Rico during 2010-2015.

**Estimated Number of Professional FTEs/SYs total in the State.**

Year	Extension		Research	
	1862	1890	1862	1890
2011	173.3	0.0	0.0	0.0
2012	173.3	0.0	0.0	0.0
2013	173.3	0.0	0.0	0.0
2014	173.3	0.0	0.0	0.0
2015	173.3	0.0	0.0	0.0

**II. Merit Review Process****1. The Merit Review Process that will be Employed during the 5-Year POW Cycle**

- Internal University Panel
- External University Panel

**2. Brief Explanation**

The Merit Review process is conducted through four committees representing each of the four major programs: Agriculture, Marketing and Natural Resources; Family and Consumer Sciences; Four-H and Youth Development; and Community Resource Development. Each committee is composed of at least five members: Internal University members (the program leader, two specialists--one from the Planning and Evaluation Office and one from the major subject area--and a faculty member from similar disciplines; and external non-University members (representatives of the major government agencies or organizations that work with similar audiences). Members to the different committees are the director of the Family and Consumer Sciences program (UPR), the director of Agricultural Education department (UPR-RUM), and the director of the Institute for Community Development (UPR), a researcher from the Agricultural Experiment Station, as well as representatives from government agencies at the regional or state level, such as: the Department of the Family, the Department of Education, the Governor's Office for Special Communities, the Governor's Office for Youth Issues, the Rural Development Corporation, the Farmers' Association, and the Farm Service Agency, among others. Several private organizations have also become part of the committees. Each committee meets quarterly to evaluate the proposed plan of work for the year. External committee members evaluate the quality and relevance of the activities and programs to the State goals and offer recommendations in order to continue emphasizing critical areas in our programs. A written report is prepared at the end of each fiscal year by the program leader, in accordance with the committee members. The report describes how the committee's recommendations will be addressed.

**III. Evaluation of Multis & Joint Activities****1. How will the planned programs address the critical issues of strategic importance, including those identified by the stakeholders?**

Critical issues will be identified from several sources. Particularly, issues will be identified through the Stakeholder Input Process conducted at the municipal level through the local advisory committees. For the agricultural programs, critical issues will also be identified through joint activities between the PR Agriculture Extension Service and PR Agricultural Experiment Station that are conducted for different commodities. At the state level, in coordination with program leaders, other stakeholder input activities, such as focus groups and surveys of women as heads of households, 4-Hers and community leaders, will take place periodically to complement the process conducted at the local level. Issues of strategic importance will also be collected through collaborative and multidisciplinary efforts between the internal and the external linkages.

The identification of these critical issues has formed the basis for the revision and design of the new planned programs. Continuous revision of these issues will take place through periodic meetings with staff teams in charge of



the Planned Programs in order to evaluate how these issues have been addressed and for new issues, identified educational strategies to attend those critical issues. Educational strategies defined to address critical issues include, but are not limited to, the development of new and updated materials on the new topics and the establishment of special projects.

## **2. How will the planned programs address the needs of under-served and under-represented populations of the**

PRAES planned programs are mainly designed to address the needs of various under-represented populations, particularly low income women, children, youth and families at risk, and small farmers, as well as homeless people. We continue to focus various educational efforts to attend the particular needs of the increasing population of adolescent mothers with planned programs in the areas of family, health, and resource management. PRAES has also placed special attention to the needs of the ever increasing elderly population within the Families and Children planned program, where a new curriculum has been developed. Particular under-served and under-represented populations that PRAES is also targeting are the mentally challenged, as well as the jailed population that is soon to be out in the free community. Collaborative efforts with other state agencies have facilitated our strategies to reach these under-represented populations, as they refer some of this audience to us because of their high priority needs.

## **3. How will the planned programs describe the expected outcomes and impacts?**

Planned programs describe the expected outcomes through the outcome indicator measures, which are focused on changes in action. It is expected that as people increasingly adopt the recommended practices, this will eventually result in improved social, economic, environmental, and civic conditions. As for the five new priorities, emphasis will be placed on improving outcome measures, and data collection to describe changes in condition as programs mature. Impacts of the planned programs will be described in the impact statements. Again, these will focus on changes at the higher levels, action and condition.

## **4. How will the planned programs result in improved program effectiveness and/or efficiency?**

Planned programs are designed to address the needs of our populations. Educational techniques will be constantly evaluated to adapt to the skills levels of the participants and their educational needs, therefore, resulting in increased program effectiveness. Periodic meetings will also be conducted with staff teams to evaluate the effectiveness of their planned programs and identify strategies for improvement when needed. Multi-institutional and integrated activities will contribute to achieve the efficiency of the planned programs.

## **IV. Stakeholder Input**

### **1. Actions taken to seek stakeholder input that encourages their participation**

- Targeted invitation to traditional stakeholder individuals

#### **Brief explanation.**

Stakeholders for the input process consist mainly of traditional participants or clientele of our programs who are members of the Local Advisory Committee. These clientele have vast experience in the four major Extension programs and include farmers, homemakers, youth, and key community leaders. Representatives of state agencies that work with similar clientele, who are also members of the local advisory committees, are invited to participate in the stakeholder input process.

### **2(A). A brief statement of the process that will be used by the recipient institution to identify individuals and groups stakeholders and to collect input from them**

#### **1. Method to identify individuals and groups**

- Use Advisory Committees
- Use Internal Focus Groups

#### **Brief explanation.**

Stakeholders consist mainly of the local advisory committee members.

**2(B). A brief statement of the process that will be used by the recipient institution to identify individuals and groups who are stakeholders and to collect input from them**

**1. Methods for collecting Stakeholder Input**

- Meeting with traditional Stakeholder individuals
- Other (Focus group)

**Brief explanation.**

Input from stakeholders is collected at the meetings conducted by the local advisory committees. Stakeholders are asked about the most critical issues affecting the different areas in our educational programs, including: agriculture, families, youth, and communities. They are also asked to help prioritize these issues. Focus groups will be conducted periodically at the state level with a representative sample of the committee members and other participants of our educational programs. A written report is prepared by the county agents in collaboration with the committee members and sent to the PRAES Planning and Evaluation Office at the State level who collect, which collects and analyzes the data.

**3. A statement of how the input will be considered**

- To Identify Emerging Issues
- Redirect Extension Programs
- In the Staff Hiring Process
- In the Action Plans
- To Set Priorities

**Brief explanation.**

Input collected from the stakeholders are received at the state level and discussed at staff meetings with program leaders, the Planning and Evaluation Office, and the Associate Dean in order to set priorities for our programs. Data collected from stakeholders will also be sent to the specialists, according to the area of needs. Needs related to the area of agriculture will be collected in a report to be sent to PRAES specialists that participate in the commodity joint meetings with the Agriculture Experiment Station. When there are issues which need to be emphasized, programs are redirected to address these issues. New emerging issues are identified through these processes and analyzed according to staff and resources available to address them; when needed, recommendations will be set for hiring staff. At the local level, input offered by the stakeholders is used to set priorities for their local plan of work.

## V. Planned Program Table of Content

S. No.	PROGRAM NAME
1	Strengthening Youth Life Skills, Leadership and their Community
2	Plant System
3	Family Well-being
4	Management of Rangeland and Forestry Resources/Soil, Water, and Air
5	Animal Systems
6	Community Resources Development by Means of Fostering Sustainable Communities
7	Food Safety
8	Climate Change
9	Sustainable Energy
10	Global Food Security and Hunger
11	Childhood Obesity

**V(A). Planned Program (Summary)****Program # 1****1. Name of the Planned Program**

Strengthening Youth Life Skills, Leadership and their Community

**2. Brief summary about Planned Program**

Today's children and youth face a diversity of social problems that can result in risky behavior when kids are poorly equipped with the necessary skills to avoid them. The use and abuse of substances is a major social-medical problem of great impact in the adolescent and young adult population of Puerto Rico. An estimated three quarters of Puerto Rican students have consumed some alcohol in their life time and one third of them have used cigarettes. This can be translated, in many occasions, in school absenteeism, poor academic progress, in physical and emotional change, being sexually active without any responsibility, and poorly accepted social behavior.

All children and youth experience some degree of risk as they progress from birth to adulthood, but an increasing amount of children are at a substantially higher risk for negative outcomes. These children and youth do not have the advantages that promote an optimum, healthy development of body, mind, and spirit and many do not have opportunities to experience positive stimulation for growth or nurturing support from their family, friends and community.

The Puerto Rico 4-H and Youth Development Program has identified Youth Development as a mayor emphasis area for its long-range educational program. It is designed to provide youth with positive opportunities to learn and interact with peers and adults, provide leadership development, and focus on the enhancement of life skills through research-based educational programs focusing on Healthy Lifestyles; Science, Engineering and Technology; Citizenship and Leadership. Different activities and methods such as: camps, competitions, meetings, demonstrations, and workshops will be used, but, especially, the development of projects as a strategic learning tool. Furthermore, in-service learning experiences will be promoted to give youngsters the opportunity to reflect on and take action concerning issues that impact them. Through the project the youngsters will acquire and develop life skills in order to identify the most important issues, within a real world situation, through critical thinking, generate emotional consequences, which challenge values and ideas, and support social, emotional and cognitive learning and development. The development of life skills for the prevention of negative high risk conduct will be emphasized in this program.

**3. Program existence :** Mature (More then five years)

**4. Program duration :** Long-Term (More than five years)

**5. Expending formula funds or state-matching funds :** Yes

**6. Expending other than formula funds or state-matching funds :** No

**V(B). Program Knowledge Area(s)****1. Program Knowledge Areas and Percentage**

<b>KA Code</b>	<b>Knowledge Area</b>	<b>%1862 Extension</b>	<b>%1890 Extension</b>	<b>%1862 Research</b>	<b>%1890 Research</b>
806	Youth Development	100%			
	<b>Total</b>	100%			

**V(C). Planned Program (Situation and Scope)****1. Situation and priorities**

During the FY 2008-2009 Stakeholders' Input Process the youngsters selected the use of alcohol and drugs, sexuality, and criminality as the areas of most concern to them. During 2008, 44,920 teenagers 15 to 19 years old were not enrolled in school of 300,416. Studies indicate a close relationship between school desertion and juvenile delinquency. One of these studies, by Dora Nevárez-Muñiz, is entitled Crime in Puerto Rico. The Administration for Mental Health and Addiction Control Services (ASSMCA, 2005-2007) revealed that 48% students at the intermediate, and high school levels (includes population 17 years old) from public and private schools drank alcohol in the last year, 29% initiated use during the past year. Alcohol

was the substance mostly used among youngsters, followed by tobacco. Other problems are offences committed by these minors against society (www.tendencias.pr Source: Puerto Rico Police, Assistant Superintendent in charge of Services to Citizens, Statistics Division, 2008) with a total of 5,366 cases; of these, 367 were sex related. There were 2,182 cases reported that were committed in schools (Puerto Rico Police, Assistant Superintendent Field Operations, School Quality of Life Program, 2008), 38 cases were drug related and 6, sex related. Another serious problem that may lead to school desertion is pregnancy among adolescents . In 2006-2007 there were 151 pregnant students at the intermediate level and 714 at the high school level (Department of Education).

In the FY 2008-2009 Stakeholders' Input Process the selected youngsters chose the curricular areas of most interest to them. These were: Environmental Education, Leadership and Personal Development, Communication and Expressive Arts, Technology and Engineering. Both studies showed the youngsters' concern over having these subjects dealt with. Attending these concerns will help make a more interesting and educational program, resulting in increased participation. We should identify creative and innovative strategies to attain a combined balance between the themes of major interest pointed out by the youngsters and the mission of the 4-H Program. PRAES professionals will use the technical material to reach and satisfy other needs pointed out by the youngsters to develop values and life skills.

## 2. Scope of the Program

- In-State Extension

### V(D). Planned Program (Assumptions and Goals)

#### 1. Assumptions made for the Program

When we work in an integral form, respecting the competency and potential of each participant, there is a great amount of motivation and disposition on behalf of the youngsters to learn and participate in 4-H, scholastic, and community activities.

The experiences learning-to-know, learning-to-make, learning-to-be and learning-to-live, according to John Dewey's philosophy, have been extensively used by the 4-H program "Learning-by-doing".

There are 1,142 adult volunteers offering support to the 4-H Program working with youngsters in different activities (Youth Enrollment Report 2009).

Life skills prepare people to be successful in life. The goal is that every person learn the necessary skills to succeed.

Life skills are tools that help people to cope with whatever life brings. When integrated into curriculum development, life skills determine how subject matter content is delivered and practiced, when a learner is engaged in an educational activity. Life skills are useful long afterwards in other life situations.

We depend on a dedicated staff that acknowledges the mission of the 4-H Program to address youth needs.

#### 2. Ultimate goal(s) of this Program

Increase the number of youngsters that have improved their life skills for better decision making.

### V(E). Planned Program (Inputs)

#### 1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2011	40.9	0.0	0.0	0.0
2012	40.9	0.0	0.0	0.0
2013	40.9	0.0	0.0	0.0
2014	40.9	0.0	0.0	0.0

Year	Extension		Research	
	1862	1890	1862	1890
2015	40.9	0.0	0.0	0.0

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

**1. Activity for the Program**

- Conferences or workshops training in life skills, leadership, and community services.
- Camping and outdoor activities.
- Curriculum developed in life skills, leadership and community service.
- Participate in mass communication to promote 4-H as a positive organization for youth.
- Projects where youth and adults volunteers can develop skills that will enable them to make a positive contribution to society.
- Competitive activities/events.
- Non-competitive activities/events.

**2. Type(s) of methods to be used to reach direct and indirect contacts**

**Extension**

Direct Methods	Indirect Methods
<ul style="list-style-type: none"> <li>• Workshop</li> <li>• Group Discussion</li> <li>• One-on-One Intervention</li> <li>• Demonstrations</li> </ul>	<ul style="list-style-type: none"> <li>• Web sites</li> <li>• Other 1 (Radio Programs)</li> <li>• Other 2 (Exhibitions)</li> </ul>

**3. Description of targeted audience**

Youth and 4-H members, Extension professionals (agricultural agents and specialists, home economists), professional government personnel, volunteers, and community residents.

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

**1. Standard output measures**

**Target for the number of persons(contacts) to be reached through direct and indirect contact methods**

	Direct Contact Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
2011	6000	0	50000	15000
2012	6000	0	50000	15000
2013	6000	0	50000	15000
2014	6000	0	50000	15000
2015	6000	0	50000	15000

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

**2011:0****2012:0****2013:0****2014:0****2015:0****3. Expected Peer Review Publications**

<b>Year</b>	<b>Research Target</b>	<b>Extension Target</b>	<b>Total</b>
2011	0	0	0
2012	0	0	0
2013	0	0	0
2014	0	0	0
2015	0	0	0

**V(H). State Defined Outputs****1. Output Target**

- Number of training and workshops in life skills and subject matter.

**2011:800****2012:900****2013:900****2014:950****2015:950**

- Number of children/ youth who participated in competitive activities.

**2011:1000****2012:1200****2013:1200****2014:1300****2015:1300**

- Number of children/youth who participated in non-competitive activities.

**2011:6000****2012:6200****2013:6200****2014:6500****2015:6500**

- Number of children/ youth who participated in life skills and subject matter educational programs designed to teach basic life skills.

**2011:5000****2012:5000****2013:5100****2014:5100****2015:5100**

- Number of children/youth who participated in scientific process training.

**2011:800****2012:1000****2013:1000****2014:1100****2015:1100**

**V(I). State Defined Outcome**

O. No.	Outcome Name
1	Number of children/youth who demonstrated thinking managing skills (decision making, problem solving, planning, organization and service learning, according to the Targeting Life Skills Model).
2	Number of children/youth who demonstrated improved relating skills (communication).
3	Number of children/youth who assumed demonstrated improved giving and working skills (leadership, community service volunteering, teamwork).
4	Number of children/youth who demonstrated improved being and living skills (self-esteem and healthy lifestyle choices).
5	Number of individuals applying science process skills, including incorporation of science learning in community service, enrollment in SET related post-secondary education, and entrepreneurship/career success.



**Outcome # 1****1. Outcome Target**

Number of children/youth who demonstrated thinking managing skills (decision making, problem solving, planning, organization and service learning, according to the Targeting Life Skills Model).

**2. Outcome Type : Change in Action Outcome Measure**

**2011:2900                      2012:3000                      2013:3000                      2014:3100                      2015:3100**

**3. Associated Knowledge Area(s)**

- 806 - Youth Development

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome # 2****1. Outcome Target**

Number of children/youth who demonstrated improved relating skills (communication).

**2. Outcome Type : Change in Action Outcome Measure**

**2011:1300                      2012:1500                      2013:1500                      2014:1600                      2015:1600**

**3. Associated Knowledge Area(s)**

- 806 - Youth Development

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome # 3****1. Outcome Target**

Number of children/youth who assumed demonstrated improved giving and working skills (leadership, community service volunteering, teamwork).

**2. Outcome Type : Change in Action Outcome Measure**

**2011:1800                      2012:1900                      2013:1900                      2014:2000                      2015:2000**

**3. Associated Knowledge Area(s)**

- 806 - Youth Development

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome # 4****1. Outcome Target**

Number of children/youth who demonstrated improved being and living skills (self-esteem and healthy

lifestyle choices).

**2. Outcome Type :** Change in Action Outcome Measure

**2011:**1700      **2012:**1800      **2013:**1900      **2014:**2000      **2015:**2000

**3. Associated Knowledge Area(s)**

- 806 - Youth Development

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome # 5**

**1. Outcome Target**

Number of individuals applying science process skills, including incorporation of science learning in community service, enrollment in SET related post-secondary education, and entrepreneurship/career success.

**2. Outcome Type :** Change in Action Outcome Measure

**2011:**800      **2012:**850      **2013:**850      **2014:**900      **2015:**900

**3. Associated Knowledge Area(s)**

- 806 - Youth Development

**4. Associated Institute Type(s)**

- 1862 Extension

**V(J). Planned Program (External Factors)**

**1. External Factors which may affect Outcomes**

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Public Policy changes
- Competing Programmatic Challenges

**Description**

The Island's location in the Caribbean area puts it in the path of tropical hurricanes with heavy winds and heavy rains which cause floods. The people feel that we have an unstable economy, because of the government's inability to solve its budget problems. Changes in the budget assigned to government agencies and changes in public policy due to the situation of the economy are expected.

**V(K). Planned Program (Evaluation Studies and Data Collection)**

**1. Evaluation Studies Planned**

- Retrospective (post program)
- Before-After (before and after program)

### **Description**

A summative evaluation is planned to assess changes in life skills among juniors and seniors 4-Hers. The evaluation will be implemented after completing a full year of diverse activities in the 4-H clubs. A retrospective instrument will be constructed based on Hendrick's Targeting Life Skills Model (1998). It will be validated during FY 2009.

### **2. Data Collection Methods**

- Sampling
- On-Site

### **Description**

A sampling strategy will be defined to identify the participants of the evaluation study. Data will be collected on-site through retrospective questionnaires after completing the educational activities in their club for FY 2010.

## **V(A). Planned Program (Summary)**

### **Program # 2**

#### **1. Name of the Planned Program**

Plant System

#### **2. Brief summary about Planned Program**

An economically profitable and progressive agriculture requires efficient crop production management practices, a plant protection program, efficient engineering and biosystems practices and a good planned program in economics, marketing and policy. Through the crop production program we seek ways to help farmers increase the use of improved production practices as well as good agricultural practices (GAP) to achieve better growth management and improved product quality. We will continue to promote the adoption of the best plant protection management practices and to develop IPM systems that protect the environment, conserve the natural resources, and contribute to the competitiveness, profitability, and sustainability of Puerto Rico's agriculture. In engineering our efforts will focus on promoting better irrigation and drainage practices, the effective operation and maintenance of equipment and soil and water conservation practices. Through economic, marketing and policy the farmers will receive the necessary education and technical assistance to strengthen their abilities as managers and entrepreneurs.

**3. Program existence :** New (One year or less)

**4. Program duration :** Long-Term (More than five years)

**5. Expending formula funds or state-matching funds :** Yes

**6. Expending other than formula funds or state-matching funds :** No

**V(B). Program Knowledge Area(s)**

## 1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
204	Plant Product Quality and Utility (Preharvest)	9%			
205	Plant Management Systems	8%			
211	Insects, Mites, and Other Arthropods Affecting Plants	12%			
212	Pathogens and Nematodes Affecting Plants	9%			
216	Integrated Pest Management Systems	13%			
401	Structures, Facilities, and General Purpose Farm Supplies	7%			
402	Engineering Systems and Equipment	5%			
403	Waste Disposal, Recycling, and Reuse	7%			
405	Drainage and Irrigation Systems and Facilities	8%			
601	Economics of Agricultural Production and Farm Management	5%			
602	Business Management, Finance, and Taxation	5%			
604	Marketing and Distribution Practices	7%			
610	Domestic Policy Analysis	5%			
	<b>Total</b>	100%			

**V(C). Planned Program (Situation and Scope)****1. Situation and priorities**

The gross agricultural income for FY 2008-2009 was \$793.97 million (Puerto Rico Department of Agriculture). Animal and crop production represents 89% of this total gross income, crop production being second in economic importance. In 2008 - 2009 the value of crops was \$300.48 million (preliminary data PRDA), a decrease of \$25.0 million as compared to 2007 - 2008. The crop commodities include: fruit, vegetables, ornamentals, coffee, bananas, starchy crops, and plantain. The decrease in crop income was caused by flooding and heavy rains during September and October of 2008.

Most of our farms are small or medium sized and owner operated. The main crop production problems farmers face are product quality and the poor use of adequate crop cultivation practices. With rising pesticide costs and growing public concerns about pesticide residues in food and the contamination of surface and groundwater supplies, farmers are trying to reduce their reliance on chemicals to control pests and diseases. Integrated Pest Management (IPM) is an ecosystem approach to crop production and protection that combines different management strategies and practices to grow healthy crops. The adoption of IPM is essential to reduce the negative impacts associated with pest control and minimize the use of pesticides. The 300 irrigation systems constructed on the Island after legislation issued in 1995 also affect water quality and need constant maintenance to work effectively. The Department of Natural and Environmental Resources addresses efficient water use and conservation by the agricultural crop production sector in the Water use Plan "Plan Integral de Recursos de Agua de Puerto Rico 2008", (<http://www.drna.gobierno.pr/oficinas/arn/agua/negociadoagua/planagua>), which makes water conservation a key issue. Farmers need to be kept informed and educated on this matter. Also, farmers and agricultural entrepreneurs need knowledge on several areas, such as: how to use planning to prepare for the future, how farm managers make decisions, how to choose enterprises and how to integrate production and marketing management.

**2. Scope of the Program**

- In-State Extension

**V(D). Planned Program (Assumptions and Goals)**

**1. Assumptions made for the Program**

Puerto Rico grows a great diversity of valuable crops that constitute a major source of healthy locally grown production, which contribute to the local and regional economies. It is important to move the farmers to be competitive and export products, with better and more effective crop production practices, to increase the production, quality, postharvest management, and utility of their products. The farmers can expect an increased income with better management practices, development and implementation of IPM programs, good operation of irrigation systems and an educational program that offers the opportunity to obtain information about the economics of agricultural production, marketing and farm management. Farmers who are early adopters of new information can make different product uses (value-added) and have high quality products, which is essential to sell products to niche markets like hotels, restaurants and cruise lines that pay high prices for products of better quality. For 2010 we hope to export the first Rambutan and mangosteen fruits in a new packinghouse.

**2. Ultimate goal(s) of this Program**

The ultimate goal is to improve product quality, increase production, exports, and competitiveness through the use of more effective management system practices, integrated pest management options, irrigation systems, better postharvest and packinghouse management, better practices in drainage and soil conservation, and tools and skills in economics, marketing and policies.

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

**1. Estimated Number of professional FTE/SYs to be budgeted for this Program**

Year	Extension		Research	
	1862	1890	1862	1890
2011	23.5	0.0	0.0	0.0
2012	23.5	0.0	0.0	0.0
2013	23.5	0.0	0.0	0.0
2014	23.5	0.0	0.0	0.0
2015	23.5	0.0	0.0	0.0

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

**1. Activity for the Program**

- Conduct production trainings.
- Conducts postharvest management training
- Conducts Packinghouse management and GAPs
- Conduct workshops
- Visits and guidance to farmers
- Conduct farmers meetings
- Collaborate with local government agencies
- Prepare IPM programs
- Prepare irrigation systems plans
- Prepare cultivation practices plan
- Prepare pest and diseases control plan
- Prepare educational material
- Distribute publications

**2. Type(s) of methods to be used to reach direct and indirect contacts**

**Extension**

<b>Direct Methods</b>	<b>Indirect Methods</b>
<ul style="list-style-type: none"> <li>● Education Class</li> <li>● Workshop</li> <li>● One-on-One Intervention</li> <li>● Demonstrations</li> <li>● Other 1 (Seminars)</li> </ul>	<ul style="list-style-type: none"> <li>● Newsletters</li> <li>● TV Media Programs</li> <li>● Web sites</li> <li>● Other 1 (Radio Programs)</li> <li>● Other 2 (Exhibits)</li> </ul>

**3. Description of targeted audience**

Farmers, packinghouse manager, government professionals, county agents, agricultural entrepreneurs, pesticide applicators, homeowners, landscapers, and professions from the private sector.

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

**1. Standard output measures**

**Target for the number of persons(contacts) to be reached through direct and indirect contact methods**

	<b>Direct Contact Adults</b>	<b>Indirect Contacts Adults</b>	<b>Direct Contacts Youth</b>	<b>Indirect Contacts Youth</b>
<b>Year</b>	<b>Target</b>	<b>Target</b>	<b>Target</b>	<b>Target</b>
2011	15000	25000	1000	500
2012	15000	25000	1000	500
2013	15000	25000	1000	500
2014	15000	25000	1000	500
2015	15000	25000	1000	500

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

**2011:0                      2012:0                      2013:0                      2014:0                      2015:0**

**3. Expected Peer Review Publications**

<b>Year</b>	<b>Research Target</b>	<b>Extension Target</b>	<b>Total</b>
2011	0	3	3
2012	0	4	4
2013	0	3	3
2014	0	3	3
2015	0	3	3

**V(H). State Defined Outputs****1. Output Target**

- Number of persons trained on plant management, products quality, value-added, pesticide use, IPM, pesticide application, and commercial pesticide application.

**2011:12500            2012:12500            2013:13000            2014:13000            2015:13000**

- Number of workshops and meetings offered.

**2011:100            2012:100            2013:100            2014:100            2015:100**

- Number of collaborations established to improve engineering and biological systems infrastructure.

**2011:140            2012:140            2013:145            2014:145            2015:145**

- Number of waste management systems designed.

**2011:50            2012:50            2013:50            2014:50            2015:50**

- Number of plans and specifications for model structures completed and distributed.

**2011:50            2012:50            2013:50            2014:50            2015:50**

- Number of demonstration facilities established.

**2011:2            2012:2            2013:2            2014:2            2015:3**

- Number of trainings, courses and seminars offered.

**2011:350            2012:350            2013:350            2014:350            2015:350**

- Number of farmers and agricultural entrepreneurs trained.

**2011:9375            2012:9450            2013:9450            2014:9450            2015:9450**

- Number of clients that participated in workshops on structures, waste management systems, and drainage and irrigation systems.

**2011:600            2012:600            2013:650            2014:650            2015:650**



**V(I). State Defined Outcome**

O. No.	Outcome Name
1	Number of farmers that adopted one or more recommended practices of the plant management systems in crop commodities.
2	Number of farmers that increased production in crop commodities.
3	Number of farmers that increased the quality in crop commodities.
4	Number of farmers that adopted new value-added practices in crop commodities.
5	Number of farmers that increased their income after having adopted one or more practices of plant management systems and/or product quality.
6	Number of persons that adopted one or more practices after of integrated pest management program.
7	Number of persons that reduced pesticide use after the establishment of an integrated pest management plan.
8	Number of farmers that acquired knowledge after completing a training program in pesticide application.
9	Number of clients that increased their knowledge about improvements to increase the efficiency of structures (new and existing) and compliance with regulations.
10	Number of clients that increased their knowledge about appropriate systems for waste management in their projects.
11	Number of clients that increased their knowledge about drainage or irrigation facilities.
12	Number of clients that adopted one or more of the recommended practices to increase the efficiency of their structures and comply with all permits.
13	Number of clients that adopted one or more practices to improve their drainage or irrigation facilities.
14	Number of farmers that improved their structures (new and existing) and/or comply with permits.
15	Number of waste management systems improved (new or existing).
16	Number of drainage or irrigation facilities improved.
17	Number of farmers that increased their production as a result of improving their structures.
18	Number of farmers that increased their production as a result of improving their waste management systems.
19	Number of farmers that increased their production as a result of improving their drainage or irrigation facilities.
20	Number of farmers and agricultural entrepreneurs that adopted one or more economic practices.
21	Number of farmers and agricultural entrepreneurs that utilize economic tools to make effective economic decisions to improve their business.

**Outcome # 1**

**1. Outcome Target**

Number of farmers that adopted one or more recommended practices of the plant management systems in crop commodities.

**2. Outcome Type : Change in Action Outcome Measure**

**2011:5000                      2012:5000                      2013:5500                      2014:5500                      2015:5500**

**3. Associated Knowledge Area(s)**

- 205 - Plant Management Systems

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome # 2**

**1. Outcome Target**

Number of farmers that increased production in crop commodities.

**2. Outcome Type : Change in Action Outcome Measure**

**2011:600                      2012:600                      2013:650                      2014:650                      2015:650**

**3. Associated Knowledge Area(s)**

- 205 - Plant Management Systems

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome # 3**

**1. Outcome Target**

Number of farmers that increased the quality in crop commodities.

**2. Outcome Type : Change in Action Outcome Measure**

**2011:1000                      2012:1000                      2013:1000                      2014:1000                      2015:1000**

**3. Associated Knowledge Area(s)**

- 204 - Plant Product Quality and Utility (Preharvest)

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome # 4**

**1. Outcome Target**

Number of farmers that adopted new value-added practices in crop commodities.

**2. Outcome Type :** Change in Action Outcome Measure

2011:230                      2012:230                      2013:240                      2014:250                      2015:250

**3. Associated Knowledge Area(s)**

- 204 - Plant Product Quality and Utility (Preharvest)

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome # 5**

**1. Outcome Target**

Number of farmers that increased their income after having adopted one or more practices of plant management systems and/or product quality.

**2. Outcome Type :** Change in Condition Outcome Measure

2011:450                      2012:500                      2013:550                      2014:550                      2015:550

**3. Associated Knowledge Area(s)**

- 205 - Plant Management Systems

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome # 6**

**1. Outcome Target**

Number of persons that adopted one or more practices after of integrated pest management program.

**2. Outcome Type :** Change in Action Outcome Measure

2011:1000                      2012:1000                      2013:1100                      2014:1100                      2015:1100

**3. Associated Knowledge Area(s)**

- 211 - Insects, Mites, and Other Arthropods Affecting Plants
- 212 - Pathogens and Nematodes Affecting Plants
- 216 - Integrated Pest Management Systems

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome # 7**

**1. Outcome Target**

Number of persons that reduced pesticide use after the establishment of an integrated pest management plan.

**2. Outcome Type : Change in Condition Outcome Measure**

**2011:400                      2012:400                      2013:450                      2014:450                      2015:450**

**3. Associated Knowledge Area(s)**

- 211 - Insects, Mites, and Other Arthropods Affecting Plants
- 212 - Pathogens and Nematodes Affecting Plants
- 216 - Integrated Pest Management Systems

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome # 8**

**1. Outcome Target**

Number of farmers that acquired knowledge after completing a training program in pesticide application.

**2. Outcome Type : Change in Knowledge Outcome Measure**

**2011:1900                      2012:1900                      2013:2000                      2014:2000                      2015:2000**

**3. Associated Knowledge Area(s)**

- 211 - Insects, Mites, and Other Arthropods Affecting Plants
- 212 - Pathogens and Nematodes Affecting Plants

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome # 9**

**1. Outcome Target**

Number of clients that increased their knowledge about improvements to increase the efficiency of structures (new and existing) and compliance with regulations.

**2. Outcome Type : Change in Knowledge Outcome Measure**

**2011:300                      2012:350                      2013:300                      2014:400                      2015:400**

**3. Associated Knowledge Area(s)**

- 401 - Structures, Facilities, and General Purpose Farm Supplies

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome # 10**

**1. Outcome Target**

Number of clients that increased their knowledge about appropriate systems for waste management in their projects.

**2. Outcome Type :** Change in Knowledge Outcome Measure

**2011:300                      2012:350                      2013:300                      2014:400                      2015:400**

**3. Associated Knowledge Area(s)**

- 403 - Waste Disposal, Recycling, and Reuse

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome # 11**

**1. Outcome Target**

Number of clients that increased their knowledge about drainage or irrigation facilities.

**2. Outcome Type :** Change in Knowledge Outcome Measure

**2011:100                      2012:150                      2013:200                      2014:250                      2015:250**

**3. Associated Knowledge Area(s)**

- 405 - Drainage and Irrigation Systems and Facilities

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome # 12**

**1. Outcome Target**

Number of clients that adopted one or more of the recommended practices to increase the efficiency of their structures and comply with all permits.

**2. Outcome Type :** Change in Action Outcome Measure

**2011:80                      2012:90                      2013:90                      2014:100                      2015:100**

**3. Associated Knowledge Area(s)**

- 401 - Structures, Facilities, and General Purpose Farm Supplies

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome # 13**

**1. Outcome Target**

Number of clients that adopted one or more practices to improve their drainage or irrigation facilities.

**2. Outcome Type :** Change in Action Outcome Measure

**2011:300                      2012:300                      2013:300                      2014:300                      2015:300**

**3. Associated Knowledge Area(s)**

- 405 - Drainage and Irrigation Systems and Facilities

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome # 14**

**1. Outcome Target**

Number of farmers that improved their structures (new and existing) and/or comply with permits.

**2. Outcome Type :** Change in Action Outcome Measure

**2011:50                      2012:50                      2013:50                      2014:50                      2015:50**

**3. Associated Knowledge Area(s)**

- 401 - Structures, Facilities, and General Purpose Farm Supplies

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome # 15**

**1. Outcome Target**

Number of waste management systems improved (new or existing).

**2. Outcome Type :** Change in Action Outcome Measure

**2011:60                      2012:65                      2013:65                      2014:65                      2015:65**

**3. Associated Knowledge Area(s)**

- 403 - Waste Disposal, Recycling, and Reuse

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome # 16**

**1. Outcome Target**

Number of drainage or irrigation facilities improved.

**2. Outcome Type :** Change in Action Outcome Measure

**2011:10                      2012:12                      2013:12                      2014:15                      2015:15**

**3. Associated Knowledge Area(s)**

- 405 - Drainage and Irrigation Systems and Facilities

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome # 17**

**1. Outcome Target**

Number of farmers that increased their production as a result of improving their structures.

**2. Outcome Type :** Change in Action Outcome Measure

**2011:30                      2012:30                      2013:30                      2014:35                      2015:35**

**3. Associated Knowledge Area(s)**

- 401 - Structures, Facilities, and General Purpose Farm Supplies

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome # 18**

**1. Outcome Target**

Number of farmers that increased their production as a result of improving their waste management systems.

**2. Outcome Type :** Change in Action Outcome Measure

**2011:45                      2012:45                      2013:50                      2014:50                      2015:50**

**3. Associated Knowledge Area(s)**

- 403 - Waste Disposal, Recycling, and Reuse

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome # 19**

**1. Outcome Target**

Number of farmers that increased their production as a result of improving their drainage or irrigation facilities.

**2. Outcome Type :** Change in Action Outcome Measure

**2011:30                      2012:30                      2013:30                      2014:30                      2015:30**

**3. Associated Knowledge Area(s)**

- 405 - Drainage and Irrigation Systems and Facilities

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome # 20**

**1. Outcome Target**

Number of farmers and agricultural entrepreneurs that adopted one or more economic practices.

**2. Outcome Type :** Change in Action Outcome Measure

**2011:350                      2012:350                      2013:350                      2014:400                      2015:400**

**3. Associated Knowledge Area(s)**

- 601 - Economics of Agricultural Production and Farm Management
- 602 - Business Management, Finance, and Taxation
- 604 - Marketing and Distribution Practices
- 610 - Domestic Policy Analysis

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome # 21**

**1. Outcome Target**

Number of farmers and agricultural entrepreneurs that utilize economic tools to make effective economic decisions to improve their business.

**2. Outcome Type :** Change in Action Outcome Measure

**2011:300                      2012:300                      2013:300                      2014:300                      2015:300**

**3. Associated Knowledge Area(s)**

- 601 - Economics of Agricultural Production and Farm Management
- 602 - Business Management, Finance, and Taxation
- 604 - Marketing and Distribution Practices
- 610 - Domestic Policy Analysis

**4. Associated Institute Type(s)**

- 1862 Extension

**V(J). Planned Program (External Factors)**



## 1. External Factors which may affect Outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges
- Populations changes (immigration, new cultural groupings, etc.)

### Description

Puerto Rico, being a tropical island in the Caribbean, can be affected by natural disasters that in turn can have devastating effects on our agriculture. Long periods with too much rain or without rain and hurricanes are common. High winds and rain from tropical storms affect production, product quality, irrigation systems, structures and IMP programs. These events also increase the dependence on imported products.

The government's economic and budget constraints and changes in public policies affect program priorities and outcomes.

## V(K). Planned Program (Evaluation Studies and Data Collection)

### 1. Evaluation Studies Planned

- Before-After (before and after program)
- Case Study
- Other (Surveys)

### Description

Before and after each training a test will be administered to the participants to measure knowledge gained. A survey, administered after the completion of training to PRAES agents and other educators, will evaluate their knowledge and attitudes. Case studies will be used to evaluate different areas of this planned program to gather an in-depth understanding of the factors of the program that have influenced the farmers to adopt the recommended practices.

### 2. Data Collection Methods

- Mail
- Telephone
- On-Site
- Structured
- Unstructured
- Observation

### Description

We will use of qualitative methods, including observations in the projects, and interviews with the clients. The interviews will be non-structured, as themes and issues will emerge through the conversation. We will sample ten clients to gather in-depth understanding of how the program has helped them achieve success in their projects.

**V(A). Planned Program (Summary)****Program # 3****1. Name of the Planned Program**

Family Well-being

**2. Brief summary about Planned Program**

In society, the family is considered the first institution that has the responsibility and commitment to prepare and educate its members. It is where character is formed and values are learned.

The increase in population, as well as social, political, and economic changes impact Puerto Rican families, affecting their vital function. The family structure in Puerto Rico has changed with important implications for the children. Also, financial problems can cause negative effects on individuals, families, and employees. Several researches on family and financial issues conclude that economic stress affects the emotional stability of family members and can affect their mental health, the marital relationship, and parental responsibilities (Dennis, Parke, Scout & Duffy, 2003; Leinonen, Solantaus & Punamaki, 2003; Shaklee, 2007)

The Family Well-being planned program targets families, children, youth, elderly people, new couples, and employees of the public and private sectors. Its goal is to develop educational programs to empower families to nurture, support, and guide their members throughout their lives and motivate them to improve their quality of life and well-being by increasing their financial well-being through knowledge, skills and self-confidence.

To reach this goal, the Family Life and Consumer Education specialists develop through workshops, curriculum, radio programs, bulletins, information centers, and trainings in successful parenting, character traits, values, family strengths and aging aspects, and through competencies such as: how consumer behavior influences decision-making, budgeting, debt reduction, credit wise and savings.

Efforts will be joined through the establishment of coalitions with other agencies in Puerto Rico, such as the Department of Consumer Affairs, the Department of the Family, and the Department of Education and Consumer Credit Counseling.

**3. Program existence :** Intermediate (One to five years)

**4. Program duration :** Medium Term (One to five years)

**5. Expending formula funds or state-matching funds :** Yes

**6. Expending other than formula funds or state-matching funds :** Yes

**V(B). Program Knowledge Area(s)****1. Program Knowledge Areas and Percentage**

<b>KA Code</b>	<b>Knowledge Area</b>	<b>%1862 Extension</b>	<b>%1890 Extension</b>	<b>%1862 Research</b>	<b>%1890 Research</b>
607	Consumer Economics	10%			
724	Healthy Lifestyle	20%			
801	Individual and Family Resource Management	30%			
802	Human Development and Family Well-Being	40%			
	<b>Total</b>	100%			

**V(C). Planned Program (Situation and Scope)****1. Situation and priorities**

The increase in population and social, political and economic changes have impacted Puerto Rican families, affecting their vital function. Households with both parents present comprise 68% of all families on the Island; 31.4% of these families

live under the poverty level (income is less than \$10,000 per year) (2000 Census of Population for Puerto Rico) The number of families whose head of household is a women (no man present) is 268,476; 49.8% of these families earn less than \$10,000 year.

The personal income increased from \$51 billion (2006) to \$53 billion (2007), accordingly the personal consumer debt increased from \$21billion to \$22 billion (Puerto Rico Planning Board, 2008). Family internal factors like unplanned spending and conspicuous consumption seem to worsen the personal debt.

The Consumer Price Index suggests that the rate of inflation was slightly more than 9.6% in the last 12 months (Department of Labor and Human Resources, 2008) and the Puerto Rico Bulletin reported 9,048 bankruptcies for year 2008, 17% more compared with the last year. This suggests hard economic times for individuals and families. Financial problems can cause negative effects on individuals, families and employees.

Another negative impact on families is child abuse. According to the Commonwealth of Puerto Rico's Children and Families Administration, during fiscal year 2007-2008, 16,022 families had active cases involving children maltreatment, which involved 38,149 children. The distribution by type is as follows: negligence (51%), physical abuse (13%), emotional maltreatment (12%), sexual abuse (6%), and for multiple causes (18%).

There was also an increase in the number of divorces, single mothers, adolescents pregnant, stepfamilies, grandparents raising grandchildren, women headed household families, and domestic violence.

Financial education has gained interest among consumers. According to Hogarth (2002), well educated consumers should make better decisions for their families, increasing their economic security and well-being. Financially secure families are better able to contribute to vital, thriving communities, further fostering community economic development.

The above socioeconomic data show the increasing need to help consumers and house hold to deal effectively in a complicated social and economic scenario. Through family and financial literacy, families should develop the appropriate tools for a better decision-making process in the following areas: savings, debt reduction and budget design, while simultaneously promoting behavioral changes that strengthen family relations and values.

## **2. Scope of the Program**

- In-State Extension

### **V(D). Planned Program (Assumptions and Goals)**

#### **1. Assumptions made for the Program**

Our experience working with this program shows that

Coordination and collaboration with government and private agencies and partnerships are important to increase the impact of educational/preventive programs through the intervention of Extension Specialists/Educators. Education to our Extension agents/educators and community leaders will help to disseminate and promote the information to families and children. Clientele is motivated to learn and adopt practices in family relations and related areas to satisfy their essential needs. Submitting proposals and working on special projects to obtain external resources that expand our staff and capabilities. Early exposure to financial concepts may increase comfort and familiarity with financial matters, thereby, removing psychological barriers that impede proper decision-making (Barthein, Garret and Maki (2001). Programs that enable house holds to identify savings rules that are manageable and easy to follow, will help households build wealth (Youn, Montalto and Hanna, 2006) Educating parents to deal properly with any future economic, emotional, or familiar challenge contributes to attenuate the adverse effects of economic hardship

#### **2. Ultimate goal(s) of this Program**

Increase the number of families that support and guide their members throughout their lives.

Decrease child maltreatment, neglect and family violence.

Increase the financial well-being of consumers through Knowledge, skills and self-confidence in competencies such as: how consumers' behavior influences decision making, budgeting, debt reduction, credit wise and savings.

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

**1. Estimated Number of professional FTE/SYs to be budgeted for this Program**

Year	Extension		Research	
	1862	1890	1862	1890
2011	17.0	0.0	0.0	0.0
2012	17.0	0.0	0.0	0.0
2013	17.0	0.0	0.0	0.0
2014	17.0	0.0	0.0	0.0
2015	17.0	0.0	0.0	0.0

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

**1. Activity for the Program**

Participate in radio/TV Programs Write Proposals Curriculum and educational materials development. Training-the-trainers Workshops Establishment of collaborations Consulting Exhibitions (Billboards in malls and public places with informative brochures and other educational material).

**2. Type(s) of methods to be used to reach direct and indirect contacts**

**Extension**

Direct Methods	Indirect Methods
<ul style="list-style-type: none"> <li>● Workshop</li> <li>● Group Discussion</li> <li>● One-on-One Intervention</li> </ul>	<ul style="list-style-type: none"> <li>● Newsletters</li> <li>● Web sites</li> <li>● Other 1 (Radio Programs)</li> <li>● Other 2 (Campaigns &amp; Exhibits)</li> </ul>

**3. Description of targeted audience**

Extension agents, home economists, PRAES specialists, professionals from other agencies, parents, families, children, youth, elder people, volunteers, new couples, and the general public.

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

**1. Standard output measures**

**Target for the number of persons(contacts) to be reached through direct and indirect contact methods**

	Direct Contact Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
2011	12000	0	0	0
2012	12000	0	0	0
2013	12000	0	0	0

	Direct Contact Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
2014	12000	0	0	0
2015	12000	0	0	0

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

2011:0                      2012:0                      2013:0                      2014:0                      2015:0

**3. Expected Peer Review Publications**

Year	Research Target	Extension Target	Total
2011	0	2	2
2012	0	2	2
2013	0	2	2
2014	0	0	0
2015	0	0	0

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

**1. Output Target**

- Number of persons trained in parenting and related areas.  

<b>2011:1500</b>	<b>2012:2000</b>	<b>2013:2000</b>	<b>2014:2000</b>	<b>2015:2000</b>
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- Number of persons trained in aging aspects.  

<b>2011:800</b>	<b>2012:1000</b>	<b>2013:1000</b>	<b>2014:1000</b>	<b>2015:1000</b>
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- Number of consumers that completed the Consumer Education course.  

<b>2011:750</b>	<b>2012:750</b>	<b>2013:1000</b>	<b>2014:1000</b>	<b>2015:1000</b>
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- Total number of consumers that completed individual and family resource management course.  

<b>2011:1000</b>	<b>2012:1000</b>	<b>2013:1500</b>	<b>2014:1500</b>	<b>2015:1500</b>
------------------	------------------	------------------	------------------	------------------
  
- Number of Workshpops, trainings, and meetings offered.  

<b>2011:100</b>	<b>2012:100</b>	<b>2013:100</b>	<b>2014:100</b>	<b>2015:100</b>
-----------------	-----------------	-----------------	-----------------	-----------------
  
- Number of collaborations/established.  

<b>2011:200</b>	<b>2012:200</b>	<b>2013:200</b>	<b>2014:200</b>	<b>2015:200</b>
-----------------	-----------------	-----------------	-----------------	-----------------
  
- Number of persons that completed non-formal health education and health promotion programs.  

<b>2011:2000</b>	<b>2012:2000</b>	<b>2013:2500</b>	<b>2014:2500</b>	<b>2015:2500</b>
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**V(I). State Defined Outcome**

O. No.	Outcome Name
1	Number of persons that reported improved parenting skills.
2	Number of volunteers/persons that gained knowledge in aging aspects.
3	Number of volunteer community leaders trained in family relations and related areas.
4	Number of consumers that adopted the practice of preparing their individual family budget.
5	Number of persons that reduced their risk levels upon the completion of one or more recommended lifestyles.

**Outcome # 1**

**1. Outcome Target**

Number of persons that reported improved parenting skills.

**2. Outcome Type :** Change in Action Outcome Measure

**2011:1000                      2012:1000                      2013:1000                      2014:1000                      2015:1000**

**3. Associated Knowledge Area(s)**

- 802 - Human Development and Family Well-Being

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome # 2**

**1. Outcome Target**

Number of volunteers/persons that gained knowledge in aging aspects.

**2. Outcome Type :** Change in Knowledge Outcome Measure

**2011:300                      2012:300                      2013:400                      2014:400                      2015:400**

**3. Associated Knowledge Area(s)**

- 802 - Human Development and Family Well-Being

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome # 3**

**1. Outcome Target**

Number of volunteer community leaders trained in family relations and related areas.

**2. Outcome Type :** Change in Action Outcome Measure

**2011:100                      2012:100                      2013:120                      2014:120                      2015:120**

**3. Associated Knowledge Area(s)**

- 802 - Human Development and Family Well-Being

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome # 4**

**1. Outcome Target**

Number of consumers that adopted the practice of preparing their individual family budget.



**2. Outcome Type :** Change in Condition Outcome Measure

**2011:400                      2012:400                      2013:600                      2014:600                      2015:600**

**3. Associated Knowledge Area(s)**

- 801 - Individual and Family Resource Management

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome # 5**

**1. Outcome Target**

Number of persons that reduced their risk levels upon the completion of one or more recommended lifestyles.

**2. Outcome Type :** Change in Condition Outcome Measure

**2011:1500                      2012:1500                      2013:2000                      2014:2000                      2015:2000**

**3. Associated Knowledge Area(s)**

- 724 - Healthy Lifestyle

**4. Associated Institute Type(s)**

- 1862 Extension

**V(J). Planned Program (External Factors)**

**1. External Factors which may affect Outcomes**

- Economy
- Public Policy changes
- Competing Programmatic Challenges
- Other (Availability fed., ext. funds)

**Description**

Achievement of goals could be affected by external elements, the economic crisis, and availability of competitive federal and/or external funds.

**V(K). Planned Program (Evaluation Studies and Data Collection)**

**1. Evaluation Studies Planned**

- Retrospective (post program)
- Before-After (before and after program)
- During (during program)
- Time series (multiple points before and after program)

**Description**

The CYFAR PREPAS: NH project evaluation is composed of a yearly evaluation during the complete project

period to measure changes at short and mid stages different points in time and progress throughout the quinquennium. Cross sectional analysis and time series analysis will be performed using descriptive, cause-effect, discriminant, and predictive statistics tools. Major changes will be: in the very short term-satisfaction level, knowledge, skills attitudes, and aspirations related to the topics covered in the project curricula; mid-term comparisons between behavior patterns and adoption and adaption of practices promoted by project educational activities; long-term, initial, and final well-being indices comparisons among participants. Factors for major differentiating analysis will be: demographics, site location, project stage, and level of intervention. Areas to be analyzed will consider project purpose.

A summative evaluation will also be conducted to assess changes in knowledge and practice in the area of financial security (budgeting and savings). A retrospective instrument will be developed and validated during FY 2009.

## **2. Data Collection Methods**

- Sampling
- On-Site
- Observation
- Portfolio Reviews
- Tests
- Journals
- Other (Survey: web-based)

### **Description**

Data collection methods and instruments to be used will vary according to the activities and stages of the CYFAR project. During this project year period: (1) On-site local activities by community faculty: the main instruments and methods to be used are pre-and post tests, reaction sheets, member portfolio, member reflexive diaries and albums review, observations for the whole population; (2) At the complete project level by project evaluator; surveys to participants (on-site), the possibility of web-based surveys exists accordingly to the availability and skills of technology use), interviews of participants and staff in a structured and/or unstructured manner, standardized inventories administered to participants. At the state level, data collection will be from the population and /or from samples.

An on-site survey will be administered to a sample of participants to measure changes in practices after participating in the program. Instruments will be developed and pilot pre-tested during the first phase of the evaluation process. Another on-site survey will be employed with adult participants of the Financial Security course.

## **V(A). Planned Program (Summary)**

### **Program # 4**

#### **1. Name of the Planned Program**

Management of Rangeland and Forestry Resources/Soil, Water, and Air

#### **2. Brief summary about Planned Program**

Puerto Rico Agricultural Extension Service (PRAES) and USDA-NRCS will join efforts to promote the management of rangelands. These collaborative efforts are directed toward the development of educational activities (training, meetings, seminars, follow-up visits and others) geared at implementing the recommended practices to protect the natural resources and the best management practices during farming. Farm demonstrations will be established as educational tools to showcase the desired practices, their benefits, and to stimulate other farmers to adopt the practices. Each farm visit will require a report of the findings and recommendations. Short courses will be offered on improved pasture varieties, fertilization, silage, cover crops, and other related topics. A pre and post test will be administered to measure the knowledge gained.

PRAES programs promote the use of better management practices that seem economically profitable for grazing hay and silage production on agricultural lands. PRAES seeks to promote the management of rangelands to increase the grazing capacity, as well as the production of hay and silage, through the implementation of sustainable management practices using minimum tillage.

There is great concern with soil erosion and deforestation of our lands and problems associated with the eutrofication and sedimentation of rivers on the island. Each year risks of flooding increase causing numerous agricultural losses to the local economy.

The development of new green areas, tree conservation, and reforestation are some of the alternatives to enhance, improve and promote wildlife in and around the cities. Reforestation and development of green areas in urban and rural areas by non-government entities should be promoted. Rangeland and forestry practices will be improved to prevent the contamination of our natural resources.

**3. Program existence** : Intermediate (One to five years)

**4. Program duration** : Medium Term (One to five years)

**5. Expending formula funds or state-matching funds** : Yes

**6. Expending other than formula funds or state-matching funds** : No

**V(B). Program Knowledge Area(s)**

## 1. Program Knowledge Areas and Percentage

<b>KA Code</b>	<b>Knowledge Area</b>	<b>%1862 Extension</b>	<b>%1890 Extension</b>	<b>%1862 Research</b>	<b>%1890 Research</b>
101	Appraisal of Soil Resources	5%			
102	Soil, Plant, Water, Nutrient Relationships	20%			
121	Management of Range Resources	25%			
122	Management and Control of Forest and Range Fires	5%			
123	Management and Sustainability of Forest Resources	15%			
124	Urban Forestry	20%			
133	Pollution Prevention and Mitigation	5%			
141	Air Resource Protection and Management	5%			
	<b>Total</b>	100%			

**V(C). Planned Program (Situation and Scope)****1. Situation and priorities**

Puerto Rico's high population density demands the update and construction of infrastructure to satisfy its needs. As a result, lands available for agriculture have been reduced. Sixty percent (60%) of the cultivated land is more than 20% slopes, with an erosion of 10% annually, and low fertility (Natural Resources Conservation Service). As a result, farmers have to establish conservation practices and a good fertilization program to get reasonable yields.

The gross agricultural income for FY 2008-20089 was \$793.97 million (Puerto Rico Department of Agriculture). Animal and crop production represent 88% of this total gross income.

Intensive use of agricultural lands, deforestation, eutrofication, and sedimentation of rivers increase the risk of flooding, threatening the lives of people and the loss of livestock and crops. We need a better and more efficient use of our lands to improve animal and crop production.

Coffee, plantains, fruit, and starchy crops, are cultivated in the hilly areas. Animal producers consist of small family operated farms with conventional waste management systems, which rely mostly on uncovered lagoons to avoid runoff and possible surface and ground water contamination. The residues are applied to crops or pasture as organic fertilizer. Such practices reduce the nitrogen content of manure by volatilizing nitrogen (ammonia) to the atmosphere with other volatile compounds such as methane, organic and sulfur.

Some animal waste disposal systems in Puerto Rico have never been completed or submitted for approval to the regulatory agencies. Often, there is a lack of adequate systems and those in existence receive little maintenance, causing environmental impacts, such as odors, land and water pollution, and dissemination of pathogens, among others.

We have problems with the quality and quantity of the water resources due to turbidity, erosion, sedimentation and the presence of microorganism. The Puerto Rico Agriculture Experiment Station is conducting research on anaerobic digester to respond to this situation in the dairy cattle and swine enterprises. However, there is still much need for research on practices for combined air and water quality that are environmentally sound and economically feasible.

The planned program Management of Rangeland and Forestry/Soil, Water and Air is devoted to promoting the education of farmers and people related with agriculture through activities addressed to establish conservation practices to promote the protection of our forests, trees, and watersheds; increase appropriate fertilization practices, conserve water, and mitigate emissions of particles from agricultural practices to the air. We will also emphasize on better soil management on the

flood plains, the recharge of groundwater, and new alternatives to ensure compliance of air and water quality regulations.

**2. Scope of the Program**

- In-State Extension

**V(D). Planned Program (Assumptions and Goals)**

**1. Assumptions made for the Program**

**MANAGEMENT OF RANGE RESOURCES:**

Land is in high demand for a variety of uses in Puerto Rico. As a result, natural resources such as land, water, and forest are being reduced in size and quality.

It is often believed that agricultural production is to be blamed for the contamination of the natural resources and their depletion.

If farmers implemented a package of better management practices in their farming operations, they could contribute to the conservation of the natural resources.

**MANAGEMENT AND SUSTAINABILITY OF FOREST RESOURCES:**

Reforestation of steep slope lands can contribute to the conservation of soil and water and the control of sedimentation and erosion.

**URBAN FORESTRY:**

Reforestation projects of non-government entities contribute to improve the natural environment of the communities.

**SOIL, WATER, AND AIR**

Most of the animal farm production is family operated and small in size; they have few options available in terms of adequate waste disposal, considering that such systems require big land areas and are expensive.

We have to train the farmers on land movement and conservation practices in order to reduce the erosion of the soils.

NRCS, the Puerto Rico Departments of Agriculture and Natural Resources and Environment will approve incentives to establish conservation practices, as well as water retention and sedimentation reduction practices.

The Environmental Protection Agency, Puerto Rico Department of Health, the Puerto Rico Environmental Quality Board, and the Puerto Rico Department of Natural Resources and Environment annually report on the regulations and other information which our agricultural agents use to orient our clientele.

If farmers obtain their operation permits and comply with the environmental regulations, the quality of our soil, air, and water will improve.

**2. Ultimate goal(s) of this Program**

To improve the recommended practices on range and forest resources to assure enough forage production for livestock and conserve the forest ecosystems.

To improve the utilization and conservation of soil, water, and air through the adoption of practices and regulations.

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

**1. Estimated Number of professional FTE/SYs to be budgeted for this Program**

Year	Extension		Research	
	1862	1890	1862	1890
2011	6.0	0.0	0.0	0.0
2012	6.0	0.0	0.0	0.0
2013	6.0	0.0	0.0	0.0
2014	6.0	0.0	0.0	0.0
2015	6.0	0.0	0.0	0.0

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

**1. Activity for the Program**

- Collaborate with government agencies (DNRA, USDA-NRCS and others).
- Collaborate with our partners in the University of Puerto Rico and other educational institutions.
- Conduct workshops, short courses and trainings on practices, laws, and regulations related to range management, urban forestry, soil, water, and air.
- On-site farm visits and field trips to demonstration projects.
- Offer advice when clientele visit the office.
- Participate in radio programs.

**2. Type(s) of methods to be used to reach direct and indirect contacts**

**Extension**

Direct Methods	Indirect Methods
<ul style="list-style-type: none"> <li>• Workshop</li> <li>• Group Discussion</li> <li>• One-on-One Intervention</li> <li>• Demonstrations</li> </ul>	<ul style="list-style-type: none"> <li>• Newsletters</li> <li>• Other 1 (Radio Programs, telephone, email)</li> <li>• Other 2 (Exhibitions, publications)</li> </ul>

**3. Description of targeted audience**

Farmers (includes small family farms, large scale farm business operation), farm workers, government professionals, Extension professionals, community residents and youth 13-18 years old.

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

**1. Standard output measures**

**Target for the number of persons(contacts) to be reached through direct and indirect contact methods**

	Direct Contact Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
2011	4500	3500	0	0
2012	4500	4000	0	0
2013	4500	4000	0	0
2014	5000	4500	0	0
2015	5000	4500	0	0

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

2011:0                      2012:0                      2013:0                      2014:0                      2015:0

**3. Expected Peer Review Publications**

Year	Research Target	Extension Target	Total

<b>Year</b>	<b>Research Target</b>	<b>Extension Target</b>	<b>Total</b>
2011	0	2	2
2012	0	2	2
2013	0	2	2
2014	0	0	0
2015	0	0	0

**V(H). State Defined Outputs****1. Output Target**

- Number of farmers trained in range management.

**2011:250                      2012:250                      2013:200                      2014:200                      2015:200**

- Number of people that participated in workshops, conferences or meetings on urban forestry.

**2011:1000                      2012:1000                      2013:1000                      2014:1000                      2015:1000**

- Number of persons trained on forest and rangeland fire prevention.

**2011:50                      2012:50                      2013:50                      2014:75                      2015:75**

- Number of persons trained on pollution prevention and mitigation of natural resources.

**2011:50                      2012:50                      2013:75                      2014:75                      2015:75**

- Number of agency collaborations established.

**2011:50                      2012:50                      2013:65                      2014:65                      2015:70**

- Number of people trained on natural resources and forest conservation.

**2011:175                      2012:175                      2013:200                      2014:200                      2015:250**

- Number of trainings offered on soil, water, and air.

**2011:20                      2012:20                      2013:20                      2014:20                      2015:20**

- Number of farmers trained on agricultural practices for air and water quality.

**2011:225                      2012:250                      2013:250                      2014:275                      2015:275**

- Number of people trained on environmental regulations for soil, air, and water quality.

**2011:400                      2012:450                      2013:500                      2014:675                      2015:675**

- Number of farmers trained on soil fertility.

**2011:250                      2012:275                      2013:275                      2014:275                      2015:275**



- Number of farmers trained on soil conservation practices

2011:300

2012:300

2013:400

2014:400

2015:400

**V(I). State Defined Outcome**

O. No.	Outcome Name
1	Number of farmers that improved their pastures.
2	Number of persons that adopted one or more practices on natural resources and forest conservation.
3	Number of reforestation projects established.
4	Numbers of persons that adopted one or more practices on fire prevention in forests and rangelands.
5	Number of farmers that adopted the recommended range management practices.
6	Number of acres in improved pastures.
7	Number of persons that adopted practices for pollution prevention and mitigation of natural resources.
8	Number of farmers that adopted the recommended practices for air and water quality.
9	Number of farmers that comply with the soil, air, and water regulations.
10	Number of farmers that adopted the fertilization practices.
11	Number of farmers that adopted one or more soil conservation practices.

**Outcome # 1**

**1. Outcome Target**

Number of farmers that improved their pastures.

**2. Outcome Type : Change in Action Outcome Measure**

**2011:100                      2012:100                      2013:100                      2014:110                      2015:110**

**3. Associated Knowledge Area(s)**

- 121 - Management of Range Resources

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome # 2**

**1. Outcome Target**

Number of persons that adopted one or more practices on natural resources and forest conservation.

**2. Outcome Type : Change in Action Outcome Measure**

**2011:150                      2012:150                      2013:200                      2014:200                      2015:250**

**3. Associated Knowledge Area(s)**

- 123 - Management and Sustainability of Forest Resources
- 124 - Urban Forestry

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome # 3**

**1. Outcome Target**

Number of reforestation projects established.

**2. Outcome Type : Change in Condition Outcome Measure**

**2011:25                      2012:25                      2013:30                      2014:30                      2015:30**

**3. Associated Knowledge Area(s)**

- 124 - Urban Forestry

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome # 4**

**1. Outcome Target**

Numbers of persons that adopted one or more practices on fire prevention in forests and rangelands.

**2. Outcome Type :** Change in Action Outcome Measure

**2011:30                      2012:40                      2013:40                      2014:40                      2015:50**

**3. Associated Knowledge Area(s)**

- 122 - Management and Control of Forest and Range Fires

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome # 5**

**1. Outcome Target**

Number of farmers that adopted the recommended range management practices.

**2. Outcome Type :** Change in Action Outcome Measure

**2011:200                      2012:200                      2013:200                      2014:250                      2015:250**

**3. Associated Knowledge Area(s)**

- 121 - Management of Range Resources

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome # 6**

**1. Outcome Target**

Number of acres in improved pastures.

**2. Outcome Type :** Change in Action Outcome Measure

**2011:2000                      2012:2000                      2013:2500                      2014:2500                      2015:2500**

**3. Associated Knowledge Area(s)**

- 121 - Management of Range Resources
- 123 - Management and Sustainability of Forest Resources

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome # 7****1. Outcome Target**

Number of persons that adopted practices for pollution prevention and mitigation of natural resources.

**2. Outcome Type : Change in Action Outcome Measure**

2011:100                      2012:100                      2013:125                      2014:125                      2015:150

**3. Associated Knowledge Area(s)**

- 133 - Pollution Prevention and Mitigation

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome # 8****1. Outcome Target**

Number of farmers that adopted the recommended practices for air and water quality.

**2. Outcome Type : Change in Action Outcome Measure**

2011:150                      2012:150                      2013:200                      2014:250                      2015:250

**3. Associated Knowledge Area(s)**

- 141 - Air Resource Protection and Management

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome # 9****1. Outcome Target**

Number of farmers that comply with the soil, air, and water regulations.

**2. Outcome Type : Change in Action Outcome Measure**

2011:175                      2012:200                      2013:200                      2014:225                      2015:250

**3. Associated Knowledge Area(s)**

- 101 - Appraisal of Soil Resources
- 102 - Soil, Plant, Water, Nutrient Relationships
- 141 - Air Resource Protection and Management

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome # 10**

**1. Outcome Target**

Number of farmers that adopted the fertilization practices.

**2. Outcome Type :** Change in Action Outcome Measure

**2011:200                      2012:200                      2013:225                      2014:250                      2015:250**

**3. Associated Knowledge Area(s)**

- 101 - Appraisal of Soil Resources
- 102 - Soil, Plant, Water, Nutrient Relationships

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome # 11**

**1. Outcome Target**

Number of farmers that adopted one or more soil conservation practices.

**2. Outcome Type :** Change in Action Outcome Measure

**2011:200                      2012:225                      2013:250                      2014:250                      2015:275**

**3. Associated Knowledge Area(s)**

- 101 - Appraisal of Soil Resources
- 102 - Soil, Plant, Water, Nutrient Relationships

**4. Associated Institute Type(s)**

- 1862 Extension

**V(J). Planned Program (External Factors)**

**1. External Factors which may affect Outcomes**

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Other (Avail. econo. incentives )

**Description**

Every year Puerto Rico is subjected to and affected by a variety of natural disasters. Hurricanes, long periods of drought, or extensive periods of rain are the most common. Many agricultural facilities can be severely affected by these atmospheric events, which affect range production, cause floods or mud slides, and increase soil erosion and sedimentation of rivers and watersheds. Changes in public policy and regulations also cause farmers to change their priorities and to postpone projects. The availability of economic incentives for farmers and non-

government entities is important in making decisions requiring capital investments. Any change in priorities set by the administration will have an effect on the program outcomes.

#### **V(K). Planned Program (Evaluation Studies and Data Collection)**

##### **1. Evaluation Studies Planned**

- Before-After (before and after program)
- Other (Surveys)

##### **Description**

Case studies (during third year of the program) will be used to evaluate this planned program and gather information of factors that influence the farmers in adopting the recommended practices. The cases (three) will be individual clients that have succeeded in adopting practices Pre/post tests--two different tests--will be administered to determine knowledge acquisition.

##### **2. Data Collection Methods**

- Whole population
- On-Site
- Unstructured
- Case Study

##### **Description**

Different data collection methods will be used: pre and post tests--to compare and determine effectiveness of the educational programs; informal interviews--to comprehend and understand the situation presented and compared with other municipalities with similar situations; and interviews with farmer--to identify case studies. The agricultural agents will be required to keep a file of the farmers they visit or offer technical assistance to. The file includes a farm development plan and records of all the main practices implemented on the farm, problems, and recommendations, as well as participation in other USDA program assistance.

**V(A). Planned Program (Summary)****Program # 5****1. Name of the Planned Program**

Animal Systems

**2. Brief summary about Planned Program**

Livestock is the agricultural sector that has contributed the most to Puerto Rico's gross agricultural income. During FY 2008-2009 it contributed \$404,399 million (51%) (Puerto Rico Department of Agriculture, Statistics for 2008-2009). It includes dairy beef, poultry, swine, aquaculture, and small operations such as rabbits, goats, sheep, bees and horses. Of all agricultural activities, it is the sector most prone to the transmission of diseases to humans. Transportation of people, equipment, materials, and goods, increases the risk of carrying diseases from one place to another in a short period of time. This poses a great threat and risk to farm activities involving animals. Farmers should be made aware of the importance of developing a control and prevention program of animal diseases and of following the recommended production practices to reduce the risk of losses in production and low yields.

On the other hand, local animal production has been impacted by high production costs and limited control of imported products. Improving the efficiency of production allows a greater opportunity for animal producers to increase the rentability of their enterprises and to be at an advantage when competing with imported products.

A cost-effective agriculture also requires efficient engineering practices. The majority of the farms in Puerto Rico have structures that form part of their infrastructure. Biological systems comprise most of the waste management, recycling, and reuse operations in farms with animals in confinement. The Engineering and Biosystems program seeks to improve existing structures and to provide farmers with model plans that comply with permits requirements.

The farmer is an entrepreneur working in agriculture as his business. He has to make decisions on the use of resources such as land, labor, capital, and management skills. Therefore, he needs business tools to be successful and needs to develop skills to stand up to the increased competition, environmental concerns, new production technologies, and changes in the economy. To help make farm operations more successful the Puerto Rico Agricultural Extension Service (PRAES) will orient farmers through the Animal Production/Animal Protection/Engineering and Biosystems/Economics, Marketing and Policy planned program. Farmers will be oriented on the importance of maintaining farm animals in good health and the preparation of waste management systems that meet state and federal requirements for animals in confinement. Educational efforts will aim at the effective operation and maintenance of farm equipment and the promotion of water conservation practices. This includes keeping the farm facilities clean, establishing a vaccination program, and keeping the animals by age groups, and promoting bio-security among farmers. Modern techniques will also be promoted to improve the efficiency of production. These include farm management, business management, finance and taxation, marketing and distribution practices, and domestic policy analysis.

**3. Program existence :** Intermediate (One to five years)

**4. Program duration :** Medium Term (One to five years)

**5. Expending formula funds or state-matching funds :** Yes

**6. Expending other than formula funds or state-matching funds :** No

**V(B). Program Knowledge Area(s)**

## 1. Program Knowledge Areas and Percentage

<b>KA Code</b>	<b>Knowledge Area</b>	<b>%1862 Extension</b>	<b>%1890 Extension</b>	<b>%1862 Research</b>	<b>%1890 Research</b>
301	Reproductive Performance of Animals	5%			
302	Nutrient Utilization in Animals	5%			
303	Genetic Improvement of Animals	2%			
305	Animal Physiological Processes	2%			
306	Environmental Stress in Animals	5%			
307	Animal Management Systems	10%			
308	Improved Animal Products (Before Harvest)	5%			
311	Animal Diseases	10%			
312	External Parasites and Pests of Animals	5%			
313	Internal Parasites in Animals	5%			
315	Animal Welfare/Well-Being and Protection	5%			
401	Structures, Facilities, and General Purpose Farm Supplies	3%			
402	Engineering Systems and Equipment	3%			
403	Waste Disposal, Recycling, and Reuse	12%			
405	Drainage and Irrigation Systems and Facilities	4%			
601	Economics of Agricultural Production and Farm Management	7%			
602	Business Management, Finance, and Taxation	5%			
604	Marketing and Distribution Practices	5%			
610	Domestic Policy Analysis	2%			
	<b>Total</b>	100%			

**V(C). Planned Program (Situation and Scope)****1. Situation and priorities**

Current trends show a steady decline in the number of farms and an increase in the average size of herds or flocks. At the same time, the number of acres dedicated to forage production at the average dairy farm has been reduced by more than 12% over the past ten years. This reduction has resulted in the farmers' growing dependence on imported ingredients to feed the livestock sector with a consequent increase in the number of animals in confinement or semi confinement and the need of comprehensive nutrient management at the farm level to increase efficiency and reduce the threat of soil and water contamination.

These farmers have to comply with the new regulations concerning farms with animals in confinement (farms that produce more than 5 cubic feet of waste). As a result, they need to be oriented on these new regulations. The waste management systems of many of these farms will have to be modified and, in some cases, relocated to comply with the new regulations. Changes in the local building codes due to our experience with tropical hurricanes during the past two



decades have also affected agriculture. Existing structures, as well as new structures, need to follow efficient engineering practices and comply with the permit requirements of the Puerto Rico Buildings and Regulations Authority and Environmental Quality Board, the Department of Health, and other agencies. Financing and government incentives for new projects are issued pending compliance with all permits. These modifications should be made with the least amount of economic burden on farmers.

New trends in commercial treaties amongst countries make the implementation of bio-security practices indispensable to avoid the spread of diseases. Farmers that have bio-security programs in place need to improve them, and those that still have not implemented them should begin to do so.

Animal production provides us with food, fiber, medicine, and wildlife. Animal health is important in the farm business and needs the support and education of our clientele as diseases can devastate the animal enterprise and affect humans as well. Among these are foot and mouth disease, avian influenza, exotic Newcastle, bovine "spongiform encephalopathy" (mad cow disease), and swine fever.

Through the Animal Systems planned program PRAES will help create awareness of diseases and internal and external parasites in farm animals, to promote their prevention and control and to detect possible highly infectious animal disease agents. To carry out these educational efforts PRAES will continue partnerships with agencies such as APHIS-Veterinary Services, the Puerto Rico Department of Agriculture-Veterinary Division, and local animal associations.

Economic challenges make it necessary for PRAES to continue offering farm management education to farmers to help alleviate their economic situation. Farmers and agricultural entrepreneurs need knowledge on diverse areas, such as: how to use planning to prepare for the future, how farm managers make decisions, how to choose farm enterprises, how to integrate production and marketing management, farm records and accounting system, strategies for risk management, and how to obtain and use agricultural credit. The farmers have received intensive trainings and technical assistance on farm management, finance, taxation, risk, marketing, and agricultural policies.

## **2. Scope of the Program**

- In-State Extension

### **V(D). Planned Program (Assumptions and Goals)**

#### **1. Assumptions made for the Program**

The experience with educational programs indicates that the adoption of production practices by farmers depends on several factors: subsidies from government agencies, laws or regulations that force farmers to adopt or establish certain practices, and the ratio of return from their investment. The increase in size of animal operations observed during the past year is evidence of the tendency of producers to improve economies of scale.

The new environmental regulations and pressures from environmentalists will motivate farmers to improve their waste management practices. To be cost effective, many of the small farmers will try to increase the size of their operations (economies of scale). Success in achieving this goal will depend on obtaining all of the required permits and financing from the lending institutions as the financing packages offered by banks for new projects and for improvements to existing projects require compliance with all permits and insurance companies only insure those structures, which can be guaranteed to comply with the new building code requirements.

The farmers need to be prepared in areas such as the economics of agricultural production and farm management; business management, finance and taxation; marketing and distribution practices, and domestic policy analysis to be competitive. There is a supposition that better educated farmers face new economic challenges with better possibilities of success. Farmers and agricultural entrepreneurs have a strong base to manage their business if they know different strategies.

An educational program needs to offer the opportunity to obtain information about the economics of agricultural production and farm management; recommended production practices, good disease management practices in farm animal and regulations; disease control and prevention program and the regulations established

by local and federal agencies regarding agricultural activities.

**2. Ultimate goal(s) of this Program**

To improve animal production and products through better management practices.

Enhance the prevention and control of diseases at farm level to increase animal health, production, and quality.

To improve agricultural infrastructures and waste disposal management through the effective use of engineering and biological systems.

To increase agricultural business of the farmers and agricultural entrepreneurs through the use of tools and skills in economics, marketing and policies.

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

**1. Estimated Number of professional FTE/SYs to be budgeted for this Program**

Year	Extension		Research	
	1862	1890	1862	1890
2011	19.7	0.0	0.0	0.0
2012	19.7	0.0	0.0	0.0
2013	19.7	0.0	0.0	0.0
2014	19.7	0.0	0.0	0.0
2015	19.7	0.0	0.0	0.0

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

**1. Activity for the Program**

Conduct seminars, meetings, trainings and workshops

Farm visits

Educational material (publications, newsletters, CDs)

Offer counseling and orientation

Work in collaboration with the communications media

Write and submit extension and research proposals

Establish collaborations with government agencies (Environmental Quality Board; State Departments of Health, Agriculture, Environmental and Natural Resources, and Education; Puerto Rico Aqueducts and Sewage Authority; USEPA; USDA; NRCS; and others)

Establish collaborations with our partners in the University of Puerto Rico and other educational institutions

Develop educational material consisting of model plans and educational material (publications, newsletters, CDs)

Collaborate in the construction of demonstration facilities

**2. Type(s) of methods to be used to reach direct and indirect contacts**

**Extension**

Direct Methods	Indirect Methods
<ul style="list-style-type: none"> <li>• Education Class</li> <li>• Workshop</li> <li>• Group Discussion</li> <li>• One-on-One Intervention</li> <li>• Demonstrations</li> </ul>	<ul style="list-style-type: none"> <li>• Public Service Announcement</li> <li>• Billboards</li> <li>• Newsletters</li> <li>• TV Media Programs</li> <li>• Web sites</li> <li>• Other 1 (Publications, Exhibitions)</li> <li>• Other 2 (Radio Programas, Software)</li> </ul>

**3. Description of targeted audience**

Farmers, agricultural entrepreneurs, PRAES professionals, government personnel, community leaders, and professionals from the private sector.

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

**1. Standard output measures**

**Target for the number of persons(contacts) to be reached through direct and indirect contact methods**

	Direct Contact Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
2011	11000	10000	4000	900
2012	11000	10000	4000	900
2013	11000	10000	4000	900
2014	11000	10000	4000	900
2015	0	0	0	0

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

2011:0                      2012:0                      2013:0                      2014:0                      2015:0

**3. Expected Peer Review Publications**

Year	Research Target	Extension Target	Total
2011	0	2	2
2012	0	2	2
2013	0	2	2
2014	0	0	0

Year	Research Target	Extension Target	Total
2015	0	0	0

## V(H). State Defined Outputs

### 1. Output Target

- Number of persons trained in control and prevention of diseases in animals, bio-security programs, control and prevention of internal and external parasites, animal welfare and protection, control of environmental stress on animals, animal production, and animal products.

**2011:1900                      2012:2000                      2013:2100                      2014:2100                      2015:0**

- Number of collaborations established.

**2011:250                      2012:260                      2013:270                      2014:280                      2015:0**

- Number of workshops and meetings offered.

**2011:100                      2012:100                      2013:100                      2014:100                      2015:0**

- Number of clients that participated in the workshop on structures, waste management systems and drainage or irrigation systems.

**2011:900                      2012:900                      2013:900                      2014:900                      2015:0**

- Number of waste management systems designed.

**2011:50                      2012:50                      2013:50                      2014:50                      2015:0**

- Number of plans and specifications for model structures completed and distributed.

**2011:50                      2012:50                      2013:50                      2014:50                      2015:0**

- Number of demonstration facilities established.

**2011:2                      2012:2                      2013:2                      2014:2                      2015:0**

- Number of trainings, courses and seminars offered.

**2011:30                      2012:30                      2013:30                      2014:30                      2015:0**

- Number of farmers and agricultural entrepreneurs trained.

**2011:450                      2012:450                      2013:450                      2014:450                      2015:0**

**V(I). State Defined Outcome**

O. No.	Outcome Name
1	Number of persons that adopted disease control and prevention practices.
2	Number of persons that reduced the number of diseased animals on their farm.
3	Number of persons that adopted a bio-security program.
4	Number of persons that adopted practices in animal welfare and protection.
5	Number of persons that adopted practices for the control of parasites on their farm.
6	Number of peresons that improved efficiency of animal production.
7	Number of persons that adopted one or more practices to control heat stress.
8	Number of persons that improved the quality of their product
9	Number of perosns that improved the animal production practices.
10	Number of persons that improved the nutrient utilization practices in animals.
11	Number of persons that increased animal production after adopting the recommended practices.
12	Number of persons that increased their knowledge about appropriate systems for waste management in their projects.
13	Number of persons that adopted one or more of the recommended practices to increase the efficiency of their structures and comply with all permits.
14	Number of clients that adopted one or more practices to improve their drainage or irrigation facilities.
15	Number of farmeres that improved their structures (new or existing) and comply with permits.
16	Number of waste management systems improved (new or existing).
17	Number of drainage or irrigation facilities improved.
18	Number of farmers that increased their production as a result of improving their structures.
19	Number of farmers that increased their production as a result of improving their waste management.
20	Number of farmers that increased their production as a result of improving their drainage or irrigation facilities.
21	Number of farmers and agricultural entrepreneurs that adopted one or more economic practices.
22	Number of farmers and agricultural entrepreneurs that use economic tools to make effective economic decisions to improve their business.

**Outcome # 1****1. Outcome Target**

Number of persons that adopted disease control and prevention practices.

**2. Outcome Type : Change in Action Outcome Measure**

**2011:350                      2012:375                      2013:400                      2014:400                      2015:0**

**3. Associated Knowledge Area(s)**

- 311 - Animal Diseases
- 312 - External Parasites and Pests of Animals
- 313 - Internal Parasites in Animals

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome # 2****1. Outcome Target**

Number of persons that reduced the number of diseased animals on their farm.

**2. Outcome Type : Change in Action Outcome Measure**

**2011:250                      2012:250                      2013:250                      2014:250                      2015:0**

**3. Associated Knowledge Area(s)**

- 311 - Animal Diseases
- 315 - Animal Welfare/Well-Being and Protection

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome # 3****1. Outcome Target**

Number of persons that adopted a bio-security program.

**2. Outcome Type : Change in Action Outcome Measure**

**2011:70                      2012:70                      2013:70                      2014:70                      2015:0**

**3. Associated Knowledge Area(s)**

- 311 - Animal Diseases
- 315 - Animal Welfare/Well-Being and Protection

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome # 4**

**1. Outcome Target**

Number of persons that adopted practices in animal welfare and protection.

**2. Outcome Type : Change in Action Outcome Measure**

**2011:150                      2012:150                      2013:150                      2014:150                      2015:0**

**3. Associated Knowledge Area(s)**

- 315 - Animal Welfare/Well-Being and Protection

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome # 5**

**1. Outcome Target**

Number of persons that adopted practices for the control of parasites on their farm.

**2. Outcome Type : Change in Action Outcome Measure**

**2011:125                      2012:125                      2013:125                      2014:125                      2015:0**

**3. Associated Knowledge Area(s)**

- 312 - External Parasites and Pests of Animals
- 313 - Internal Parasites in Animals

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome # 6**

**1. Outcome Target**

Number of peresons that improved efficiency of animal production.

**2. Outcome Type : Change in Action Outcome Measure**

**2011:180                      2012:200                      2013:200                      2014:200                      2015:0**

**3. Associated Knowledge Area(s)**

- 301 - Reproductive Performance of Animals
- 302 - Nutrient Utilization in Animals
- 305 - Animal Physiological Processes
- 306 - Environmental Stress in Animals

- 307 - Animal Management Systems
- 308 - Improved Animal Products (Before Harvest)

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome # 7**

**1. Outcome Target**

Number of persons that adopted one or more practices to control heat stress.

**2. Outcome Type : Change in Action Outcome Measure**

<b>2011:50</b>	<b>2012:50</b>	<b>2013:50</b>	<b>2014:50</b>	<b>2015:0</b>
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**3. Associated Knowledge Area(s)**

- 301 - Reproductive Performance of Animals
- 302 - Nutrient Utilization in Animals
- 305 - Animal Physiological Processes
- 306 - Environmental Stress in Animals
- 307 - Animal Management Systems
- 308 - Improved Animal Products (Before Harvest)

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome # 8**

**1. Outcome Target**

Number of persons that improved the quality of their product

**2. Outcome Type : Change in Action Outcome Measure**

<b>2011:50</b>	<b>2012:50</b>	<b>2013:50</b>	<b>2014:50</b>	<b>2015:0</b>
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**3. Associated Knowledge Area(s)**

- 301 - Reproductive Performance of Animals
- 302 - Nutrient Utilization in Animals
- 305 - Animal Physiological Processes
- 306 - Environmental Stress in Animals
- 307 - Animal Management Systems
- 308 - Improved Animal Products (Before Harvest)

**4. Associated Institute Type(s)**

- 1862 Extension



**Outcome # 9****1. Outcome Target**

Number of persons that improved the animal production practices.

**2. Outcome Type : Change in Action Outcome Measure**

<b>2011:80</b>	<b>2012:90</b>	<b>2013:90</b>	<b>2014:90</b>	<b>2015:0</b>
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**3. Associated Knowledge Area(s)**

- 301 - Reproductive Performance of Animals
- 302 - Nutrient Utilization in Animals
- 305 - Animal Physiological Processes
- 306 - Environmental Stress in Animals
- 307 - Animal Management Systems
- 308 - Improved Animal Products (Before Harvest)

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome # 10****1. Outcome Target**

Number of persons that improved the nutrient utilization practices in animals.

**2. Outcome Type : Change in Action Outcome Measure**

<b>2011:120</b>	<b>2012:150</b>	<b>2013:150</b>	<b>2014:150</b>	<b>2015:0</b>
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**3. Associated Knowledge Area(s)**

- 301 - Reproductive Performance of Animals
- 302 - Nutrient Utilization in Animals
- 305 - Animal Physiological Processes
- 306 - Environmental Stress in Animals
- 307 - Animal Management Systems
- 308 - Improved Animal Products (Before Harvest)

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome # 11****1. Outcome Target**

Number of persons that increased animal production after adopting the recommended practices.

**2. Outcome Type : Change in Condition Outcome Measure**

**2011:150                      2012:150                      2013:150                      2014:150                      2015:0**

**3. Associated Knowledge Area(s)**

- 301 - Reproductive Performance of Animals
- 302 - Nutrient Utilization in Animals
- 305 - Animal Physiological Processes
- 306 - Environmental Stress in Animals
- 307 - Animal Management Systems
- 308 - Improved Animal Products (Before Harvest)

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome # 12**

**1. Outcome Target**

Number of persons that increased their knowledge about appropriate systems for waste management in their projects.

**2. Outcome Type : Change in Knowledge Outcome Measure**

**2011:300                      2012:300                      2013:300                      2014:300                      2015:0**

**3. Associated Knowledge Area(s)**

- 403 - Waste Disposal, Recycling, and Reuse

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome # 13**

**1. Outcome Target**

Number of persons that adopted one or more of the recommended practices to increase the efficiency of their structures and comply with all permits.

**2. Outcome Type : Change in Action Outcome Measure**

**2011:125                      2012:125                      2013:125                      2014:125                      2015:0**

**3. Associated Knowledge Area(s)**

- 401 - Structures, Facilities, and General Purpose Farm Supplies

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome # 14**

**1. Outcome Target**

Number of clients that adopted one or more practices to improve their drainage or irrigation facilities.

**2. Outcome Type : Change in Action Outcome Measure**

**2011:5                      2012:5                      2013:5                      2014:5                      2015:0**

**3. Associated Knowledge Area(s)**

- 401 - Structures, Facilities, and General Purpose Farm Supplies

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome # 15**

**1. Outcome Target**

Number of farmeres that improved their structures (new or existing) and comply with permits.

**2. Outcome Type : Change in Action Outcome Measure**

**2011:50                      2012:50                      2013:50                      2014:50                      2015:0**

**3. Associated Knowledge Area(s)**

- 401 - Structures, Facilities, and General Purpose Farm Supplies

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome # 16**

**1. Outcome Target**

Number of waste management systems improved (new or existing).

**2. Outcome Type : Change in Action Outcome Measure**

**2011:150                      2012:150                      2013:150                      2014:150                      2015:0**

**3. Associated Knowledge Area(s)**

- 403 - Waste Disposal, Recycling, and Reuse

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome # 17**

**1. Outcome Target**

Number of drainage or irrigation facilities improved.

**2. Outcome Type :** Change in Action Outcome Measure

2011:5	2012:5	2013:5	2014:5	2015:0
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**3. Associated Knowledge Area(s)**

- 405 - Drainage and Irrigation Systems and Facilities

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome # 18**

**1. Outcome Target**

Number of farmers that increased their production as a result of improving their structures.

**2. Outcome Type :** Change in Action Outcome Measure

2011:0	2012:0	2013:0	2014:0	2015:0
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**3. Associated Knowledge Area(s)**

- 401 - Structures, Facilities, and General Purpose Farm Supplies

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome # 19**

**1. Outcome Target**

Number of farmers that increased their production as a result of improving their waste management.

**2. Outcome Type :** Change in Action Outcome Measure

2011:70	2012:70	2013:70	2014:70	2015:0
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**3. Associated Knowledge Area(s)**

- 403 - Waste Disposal, Recycling, and Reuse

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome # 20**

**1. Outcome Target**

Number of farmers that increased their production as a result of improving their drainage or irrigation facilities.

**2. Outcome Type :** Change in Action Outcome Measure

**2011:3                      2012:3                      2013:3                      2014:3                      2015:0**

**3. Associated Knowledge Area(s)**

- 405 - Drainage and Irrigation Systems and Facilities

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome # 21**

**1. Outcome Target**

Number of farmers and agricultural entrepreneurs that adopted one or more economic practices.

**2. Outcome Type :** Change in Action Outcome Measure

**2011:100                      2012:100                      2013:100                      2014:100                      2015:0**

**3. Associated Knowledge Area(s)**

- 601 - Economics of Agricultural Production and Farm Management
- 602 - Business Management, Finance, and Taxation
- 604 - Marketing and Distribution Practices
- 610 - Domestic Policy Analysis

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome # 22**

**1. Outcome Target**

Number of farmers and agricultural entrepreneurs that use economic tools to make effective economic decisions to improve their business.

**2. Outcome Type :** Change in Action Outcome Measure

**2011:50                      2012:50                      2013:50                      2014:50                      2015:0**

**3. Associated Knowledge Area(s)**

- 601 - Economics of Agricultural Production and Farm Management
- 602 - Business Management, Finance, and Taxation
- 604 - Marketing and Distribution Practices
- 610 - Domestic Policy Analysis

**4. Associated Institute Type(s)**

- 1862 Extension

**V(J). Planned Program (External Factors)**

## 1. External Factors which may affect Outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges
- Other (Focus prog. other agencies)

### Description

Puerto Rico is affected by extremely high temperatures, especially during the Summer months, which can cause heat stress in animals and affect production. Other factors that often have devastating effects on animals, animal production and, consequently, on the economy are natural occurrences, such as hurricanes, which cause heavy rains and high winds during hurricane season (June to November), and long periods of drought during the dry season followed by periods of heavy rains.

Government changes and lack of long-term planning result in an unstable environment in government agencies. This causes changes in the agencies' priorities and their performance in general, resulting in changes and disruption in the projects and affecting program outcomes.

The general feeling that the economy is weak is another factor that makes people put off investing in the improvement of the infrastructure in their farms. When the general feeling is that the economy is strong, people tend to be more aggressive. Also, changes in public policies and regulations cause farmers to change their priorities and to postpone projects. The availability of economic incentives is decisive in making final decisions that require capital investments. Many projects depend on economic incentives to be cost effective.

## V(K). Planned Program (Evaluation Studies and Data Collection)

### 1. Evaluation Studies Planned

- Before-After (before and after program)
- Case Study
- Other (Focal groups)

### Description

A survey among participants prior to initiation of trainings and immediately after their completion will evaluate their knowledge and attitudes about animal production systems. Case studies will be used to evaluate this planned program with the purpose of compiling information about the factors that influence the participants' adoption of recommended practices. Therefore, the evaluation period will depend on the time for adoption. The evaluation will begin approximately by the second year of the program.

### 2. Data Collection Methods

- Sampling
- On-Site
- Unstructured
- Case Study
- Observation
- Other (Focal groups)

### Description

The planned program will use qualitative methods including observation, interviews and case studies to collect the data. Data collection will be done using the four cardinal points as reference. A sampling of every livestock sector will be taken and questions will be discussed to measure the adoption and to know any needs to perform the adoption. Interviews will be non-structured, as themes and issues will emerge through the conversation.

## **V(A). Planned Program (Summary)**

### **Program # 6**

#### **1. Name of the Planned Program**

Community Resources Development by Means of Fostering Sustainable Communities

#### **2. Brief summary about Planned Program**

The Community Resources Planning and Development Program of the Puerto Rico Agricultural Extension Service at the UPR Mayagüez Campus, focuses in the delineation of an effective Community Economic Development and Self-management program that will address Puerto Rico's most pressing social issues.

Since agriculture represents only 0.4% of the Puerto Rico GNP (Government Development Bank, 2007), agricultural land has been reduced from 690,689 acres in 2002 to 557,528 acres in 2007 (30.6% to 24.7% of the national territory in a 5-year period) (USDA-NASS Puerto Rico Office); and personal bankruptcies have increased in 46% between 2006 and 2007 ("Corte Federal de Quiebra del Distrito de Puerto Rico"), it is portended that both the agricultural activity and community vitality are in crisis. Accordingly, the Empowering Communities, and Community Economic Development sections of CRD will continue giving special emphasis to community-based agricultural land conservation initiatives and to the generation of sustainable low-scale family or community-based agriculture and other economic initiatives. To achieve these objectives, CRD strategies will continue focusing beyond training activities centered toward specific careers or job areas; rather, it will focus on the identification and development of skills already present in the participants or the communities that might be geared toward activities of economic production, self-employment or the creation of micro enterprises. Accordingly, our program will continue to stress the development of methodological tools that allow participants with various and diverse talents, skills and dexterities to be able to organize economic activities that will allow them to take advantage of these skills for their benefit and subsistence.

In addition, CRD focuses its efforts in guiding community leaders towards self-management and empowerment. In our social and disadvantaged communities, there is a prevalence of families with unequal access to economic and social development, compared to other groups on the island. The community is the focal point where people feel a sense of personal involvement and take pride in their actions. Accordingly, CRD in Puerto Rico works hard developing a sense of community belonging and increased identity in all its programs. The empowerment and self-management of the communities requires information, guidance, education and civic engagement. Strong communities develop programs, anchored in research, education, and in teaching their partners. That is why we have adopted the Participative Action Research methodology as our principal approach to empowering and constructing stronger communities.

**3. Program existence** : Intermediate (One to five years)

**4. Program duration** : Long-Term (More than five years)

**5. Expending formula funds or state-matching funds** : Yes

**6. Expending other than formula funds or state-matching funds** : No



**V(B). Program Knowledge Area(s)****1. Program Knowledge Areas and Percentage**

<b>KA Code</b>	<b>Knowledge Area</b>	<b>%1862 Extension</b>	<b>%1890 Extension</b>	<b>%1862 Research</b>	<b>%1890 Research</b>
608	Community Resource Planning and Development	40%			
803	Sociological and Technological Change Affecting Individuals, Families, and Communities	30%			
805	Community Institutions, Health, and Social Services	30%			
	<b>Total</b>	100%			

**V(C). Planned Program (Situation and Scope)****1. Situation and priorities**

Puerto Rico has experienced a sustained poverty level rate close to 50% for the past two decades. Official poverty figures are at a 30 years high. Per capita personal income is just \$17,741 (48% of that of Mississippi, the poorest state in the US). Due to Puerto Rico's government decision to lay off over 30,000 governmental employees during the last year, unemployment figures have skyrocketed from the already high 12.4% to 17% (compared to the prevailing 9.5% in the U.S.). As a result between 2007 and 2009, Puerto Rico has added over 81,000 people to the unemployment rolls. Labor force participation is at a 30 years low of 42.7%, making Puerto Rico the only U.S. jurisdiction where there is more people of the "working age" group out of the labor market than working (Government Development Bank, 2010; Puerto Rico Department of Labor, 2010, U.S. Census Bureau, 2007 American Community Survey). As the previous figures make evident, the leading role of the Puerto Rican government as a principal promoter for the creation of jobs and the generator of economic activity, as it used to be during Operation Bootstrap era in the 1950-60s, is no longer active. The proportion of communities, both urban and rural, that experience long-term spells of poverty and inequality far surpass those in the U.S. In addition, the island is experiencing an uncontrolled process of social decomposition with unmanageable criminality, domestic violence, school dropouts, suicides, drug addiction, and alcoholism rates. Accordingly, our plan of work focuses on holistic educational strategies that will promote self-employment and community oriented initiatives as a means to foster sustainability, self-reliance and empowerment. A participant oriented methodology will be employed (Participatory Action Research), in which participants will take an active role in defining problems and aspirations, seeking possible solutions, implementing strategies, and evaluating the results (Foote, 1991; Greenwood, 1998; Macpherson (et.al.), 2005).

**2. Scope of the Program**

- In-State Extension

**V(D). Planned Program (Assumptions and Goals)****1. Assumptions made for the Program**

Holistic training of the field agents, home economists, and community leaders will help disseminate information to the communities that will foster social change.

In order to make an adult education program successful, we must integrate the participants to all aspects of the educational process (i.e., definition of the problems and aspirations, development of possible solutions, implementation and evaluation).

Meaningful long term changes in behavior and attitudes take time to accomplish.

Communities possess the human, cultural and material resources needed for their social and economic development.

Sustainable, self employment and economic development are possible if people possess basic social and entrepreneurial tools that will let them to take advantage of their existing skills and existing opportunities in their communities.

The work of those who have the ministerial duty to serve the communities will be more effective and fruitful if they form strategic alliances that would maximize both institutional and human resources.

Popular knowledge is as essential and valuable as technical knowledge. Both complement each other, both should be promoted and respected to achieve a meaningful improvement in the quality of life of the communities.

To obtain a positive outcome in the program development it is necessary that people work together to address their common interests and goals.

A strong program is developed when the people involved in it are motivated to learn and adopt changes in the implementation of the program

## 2. Ultimate goal(s) of this Program

To increase the communities' well-being, quality of life and sustainability through the establishment of collaborative, community oriented and community-based economic initiatives and enterprises.

To obtain empowered and self-managed communities, thus, improving the social, economic and environmental quality for individuals and families.

### V(E). Planned Program (Inputs)

#### 1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2011	31.8	0.0	0.0	0.0
2012	31.8	0.0	0.0	0.0
2013	31.8	0.0	0.0	0.0
2014	31.8	0.0	0.0	0.0
2015	31.8	0.0	0.0	0.0

### V(F). Planned Program (Activity)

#### 1. Activity for the Program

Community assemblies, gatherings, and other meetings to establish rapport and explore needs and aspirations  
 Conference/training in areas of social investment, marketing, market study and analysis, self-employment opportunities identification, and community-based business

Participative Action Research strategies such as "reading the streets", participant observation, ethnographies, life histories, focal groups, informal interviews, and reflexive diaries

Development of "tool box" material that will empower community participants to take advantage of the endless amount of possibilities for community oriented economic initiatives

Establishment of strategic alliances with government agencies, non-governmental organizations and community institutions to collaborate in the promotion of community-based economic initiatives

Development of radio programs with the participation of community members and field personnel to promote community-based economic initiatives

- Workshops and meetings
- Develop educational material such as curriculum and modules
- Establishment of community coalitions with volunteer organizations, community services organizations, institutions, and other agencies
- Seminars with community services institutions that offer assistance in case of disaster or emergency, including volunteer organizations, non-profit groups and government agencies.

**2. Type(s) of methods to be used to reach direct and indirect contacts**

**Extension**

Direct Methods	Indirect Methods
<ul style="list-style-type: none"> <li>• Education Class</li> <li>• Workshop</li> <li>• Group Discussion</li> <li>• One-on-One Intervention</li> <li>• Demonstrations</li> <li>• Other 1 (Community assemblies, meetings)</li> <li>• Other 2 (Participative Action Research)</li> </ul>	<ul style="list-style-type: none"> <li>• Newsletters</li> <li>• TV Media Programs</li> <li>• Web sites</li> <li>• Other 1 (Radio Programs)</li> <li>• Other 2 (Publications, Exhibitions)</li> </ul>

**3. Description of targeted audience**

Community participants (i.e., individuals and families), community leaders, extension professionals, and other professionals.

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

**1. Standard output measures**

**Target for the number of persons(contacts) to be reached through direct and indirect contact methods**

	Direct Contact Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
2011	1000	500	0	0
2012	1000	500	0	0
2013	1200	750	0	0
2014	1500	750	0	0
2015	1500	1000	0	0

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

**2011:0                      2012:0                      2013:0                      2014:0                      2015:0**

**3. Expected Peer Review Publications**

Year	Research Target	Extension Target	Total
2011	0	1	1

Year	Research Target	Extension Target	Total
2012	0	0	0
2013	0	1	1
2014	0	0	0
2015	0	1	1

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

**1. Output Target**

- Number of persons trained in community-based business.

**2011:150                      2012:150                      2013:175                      2014:200                      2015:200**

- Number of leaders trained on community organization and empowerment (at least four workshops).

**2011:200                      2012:200                      2013:250                      2014:250                      2015:250**

- Number of leaers trained on emergency and disaster situations (at least four workshops).

**2011:200                      2012:200                      2013:250                      2014:250                      2015:250**

**V(I). State Defined Outcome**

O. No.	Outcome Name
1	Number of persons applying the recommended practices in the process of developing a community-based business.
2	Number of community-based businesses established.
3	Number of community projects established to benefit the community.
4	Number of leaders participating actively in the design and implementation of community projects.
5	Number of communities that developed an emergency and safety plan.

**Outcome # 1****1. Outcome Target**

Number of persons applying the recommended practices in the process of developing a community-based business.

**2. Outcome Type : Change in Action Outcome Measure**

2011:100

2012:100

2013:110

2014:125

2015:125

**3. Associated Knowledge Area(s)**

- 608 - Community Resource Planning and Development

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome # 2****1. Outcome Target**

Number of community-based businesses established.

**2. Outcome Type : Change in Condition Outcome Measure**

2011:25

2012:25

2013:30

2014:30

2015:40

**3. Associated Knowledge Area(s)**

- 608 - Community Resource Planning and Development

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome # 3****1. Outcome Target**

Number of community projects established to benefit the community.

**2. Outcome Type : Change in Action Outcome Measure**

2011:40

2012:50

2013:50

2014:50

2015:50

**3. Associated Knowledge Area(s)**

- 805 - Community Institutions, Health, and Social Services

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome # 4****1. Outcome Target**

Number of leaders participating actively in the design and implementation of community projects.

**2. Outcome Type :** Change in Action Outcome Measure

**2011:150                      2012:150                      2013:200                      2014:200                      2015:200**

**3. Associated Knowledge Area(s)**

- 803 - Sociological and Technological Change Affecting Individuals, Families, and Communities

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome # 5**

**1. Outcome Target**

Number of communities that developed an emergency and safety plan.

**2. Outcome Type :** Change in Action Outcome Measure

**2011:30                      2012:30                      2013:35                      2014:35                      2015:35**

**3. Associated Knowledge Area(s)**

- 805 - Community Institutions, Health, and Social Services

**4. Associated Institute Type(s)**

- 1862 Extension

**V(J). Planned Program (External Factors)**

**1. External Factors which may affect Outcomes**

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Public Policy changes
- Competing Public priorities

**Description**

Natural Disasters: Due to the geographic location of Puerto Rico, the island is subject to the possibility of tropical weather extremes such as hurricanes, drought, or flooding.

Economy: The recent establishment of a sales tax in Puerto Rico is especially complicated and onerous for small businesses and self employed individuals; As with any dependent economy, the current worldwide economic crisis has hit Puerto Rico especially hard.

Public Policy Changes and Competing Public Priorities: Puerto Rico's government response to the crisis has been to reduce expenditures, mostly by eliminating government employment and sending thousands of government employees to the welfare rolls (contrary to the current trend in the U.S. government).

**V(K). Planned Program (Evaluation Studies and Data Collection)**

**1. Evaluation Studies Planned**

- Retrospective (post program)
- Before-After (before and after program)
- During (during program)
- Case Study

### **Description**

Pre and post questionnaires will be administered during training and workshop sessions. Case studies will be carried out to illustrate norms that could serve to establish a program model or to illustrate anomalous outcomes that could help establish idiosyncratic or particular aspects to the community development initiative. Evaluation studies will be conducted during the program in order to understand the changes occurring in the communities. Periodic visits to the community will be conducted. A questionnaire has been developed to conduct a post program evaluation.

## **2. Data Collection Methods**

- Sampling
- Structured
- Unstructured
- Case Study
- Observation
- Journals
- Other (Part. Action Res Stra, focus gro)

### **Description**

A sample of five communities, one from each of the PRAES regional districts, will be evaluated. Data will be collected during visits to the communities through the application of Participative Action Research strategies that include "reading the streets", participant observation, ethnographies, life histories, focus groups, informal interviews, and reflexive diaries or journals.



**V(A). Planned Program (Summary)****Program # 7****1. Name of the Planned Program**

Food Safety

**2. Brief summary about Planned Program**

The goal of the Food Safety component is "To improve food safety through the control, reduction or elimination of contamination risks". Its main components are the following: A) The "Fight BAC!" campaign, for consumers; B) The Food Safety Certificate course, for persons in charge of food establishments; and C) Train-the-trainers, for university personnel and professionals from other government agencies and organizations.

**3. Program existence :** Mature (More than five years)

**4. Program duration :** Long-Term (More than five years)

**5. Expending formula funds or state-matching funds :** Yes

**6. Expending other than formula funds or state-matching funds :** No

**V(B). Program Knowledge Area(s)**

## 1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins	100%			
	<b>Total</b>	100%			

**V(C). Planned Program (Situation and Scope)****1. Situation and priorities**

Ensuring safe food is an important public health priority. The food supply for Puerto Rico and the USA is safe thanks to a coordinated system of inspection. In 2007 Puerto Rico had 11 confirmed food-borne outbreaks (CDC). The number of notifiable diseases according to CDC 64 cases of Hepatitis Type A, 949 cases of Salmonella, 1 cases of Shiguella, and 24 cases of E. Coli 0157:H7. In a The Center for Disease and Prevention (CDC) recently reported that a long-term decline in food borne illness appears to be stalling, (preliminary data Morbidity and Mortality Weekly Report, April 2008). According to FDA (2004), the ideal retail food program performance indicator should be the level of foodborne illness, but the occurrence of these illnesses is grossly underreported. This makes the incidence of foodborne illness an unreliable program measurement. Research reveal that American consumers are more knowledgeable about food safety, but may have erroneous ideas of which handling practices are effective to reduce foodborne illnesses at a home environment (<http://fsis.gov/OA/rePRAESrch>). Among restaurants, the major difference between those with foodborne disease outbreaks and those with non-outbreaks is the presence of a certified kitchen manager, (Hedberg, C. W., et al., 2006). It was found that food workers are more likely to wash their hands when they are trained in food safety (Green, *et al.*, 2007). The Food Code provides recommended cooking temperatures to ensure that food reaches a temperature high enough to kill pathogens. PRAES' priorities are to offer the Food Safety Certification Course (FSCC) to persons in charge of retail food establishments and to continue offering formal education to professionals that teach or enforce compliance regulations

**2. Scope of the Program**

- In-State Extension

**V(D). Planned Program (Assumptions and Goals)**

**1. Assumptions made for the Program**

Educating our PRAES agents and community leaders will help disseminate the information to the communities and individuals

Working in different partnerships will help in the development of programs aimed at the promotion of health and the prevention of diseases.

Individuals that enroll or shows up for a course or program are more willing and motivated to learn and adopt changes.

The ability to learn is fundamental to the nature of humans, but there are individual differences. Food safety education, will increase participants knowledge and promote positive attitudes towards food safety practices. Positive attitudes will most likely enhance the adoption of safe food handling behavior.

**2. Ultimate goal(s) of this Program**

To improve food safety handling practices among individuals that prepare and serve food through the control, reduction or elimination of contamination risks.

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

**1. Estimated Number of professional FTE/SYs to be budgeted for this Program**

Year	Extension		Research	
	1862	1890	1862	1890
2011	8.8	0.0	0.0	0.0
2012	8.8	0.0	0.0	0.0
2013	8.8	0.0	0.0	0.0
2014	8.8	0.0	0.0	0.0
2015	8.8	0.0	0.0	0.0

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

**1. Activity for the Program**

Revision of all curriculums: Consumers and Food managers in order to update and include recommendations for adult learning techniques.

Work in collaboration with the communication media.

Continue working in partnership with other agencies to develop educational programs.

Offer Fight BAC! And Protect your baby curriculum to consumers.

Exhibitions, information centers, radio shows, among others.

Offer Food Safety Course to Food Establishment managers.

PRAES and personnel of other agencies

Trainings: Emphasis on institutions that serve At-Risk Population in the Food Code regulations, Hazard Analysis and Critical Control Points, Food Defense, and others.

**2. Type(s) of methods to be used to reach direct and indirect contacts**

**Extension**

Direct Methods	Indirect Methods
----------------	------------------

- Education Class
- Workshop
- Group Discussion
- One-on-One Intervention

- Other 1 (Publications, exhibits)
- Other 2 (Radio Spots)

**3. Description of targeted audience**

Extension professionals and other professionals  
 Parents and persons that plans/buys/prepares food for the family  
 Consumers with an emphasis on At risk Population  
 Persons in Charge of Retail Food Establishments

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

**1. Standard output measures**

**Target for the number of persons(contacts) to be reached through direct and indirect contact methods**

	Direct Contact Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
2011	18000	2000	10000	500
2012	18000	2000	12000	500
2013	20000	4000	12000	500
2014	20000	4000	12000	500
2015	20000	1000	12000	500

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

2011:0                      2012:0                      2013:0                      2014:0                      2015:0

**3. Expected Peer Review Publications**

Year	Research Target	Extension Target	Total
2011	0	2	2
2012	0	2	2
2013	0	2	2
2014	0	0	0
2015	0	0	0

## V(H). State Defined Outputs

### 1. Output Target

- Number of consumers completing one Food Safety educational curriculum for consumers.

**2011:1000**

**2012:1000**

**2013:1000**

**2014:1000**

**2015:1000**

- Number persons in charge of food establishments completing Food Safety Course.

**2011:5000**

**2012:5000**

**2013:5000**

**2014:5000**

**2015:5000**

**V(I). State Defined Outcome**

O. No.	Outcome Name
1	Number of consumers that adopted one or more food handling practices.
2	Number of participants that approved the certification exam.
3	Number of participants that adopted three or more of eight selected food handling practices recommended by the Food Code.

**Outcome # 1**

**1. Outcome Target**

Number of consumers that adopted one or more food handling practices.

**2. Outcome Type :** Change in Action Outcome Measure

**2011:1000                      2012:1000                      2013:1000                      2014:1000                      2015:1000**

**3. Associated Knowledge Area(s)**

- 712 - Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome # 2**

**1. Outcome Target**

Number of participants that approved the certification exam.

**2. Outcome Type :** Change in Knowledge Outcome Measure

**2011:4500                      2012:4500                      2013:4500                      2014:4500                      2015:4500**

**3. Associated Knowledge Area(s)**

- 712 - Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome # 3**

**1. Outcome Target**

Number of participants that adopted three or more of eight selected food handling practices recommended by the Food Code.

**2. Outcome Type :** Change in Action Outcome Measure

**2011:2500                      2012:2500                      2013:2500                      2014:2500                      2015:2500**

**3. Associated Knowledge Area(s)**

- 712 - Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins

**4. Associated Institute Type(s)**

- 1862 Extension

**V(J). Planned Program (External Factors)**

## 1. External Factors which may affect Outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities

### Description

Puerto Rico's location in the Caribbean makes it the object of a variety of natural events, which include hurricanes, heavy winds, droughts, and heavy rainy seasons that can cause floods. A major natural disaster such as a hurricane could completely reorient the government's priorities and make it essential to spend the already scarce resources on recovery rather than health related programs. On the other hand, individuals will be caught up in trying to reestablish their businesses, homes, and assisting their families' needs.

Puerto Rico, as in many other places, is going through a major financial crisis, which may or may not be solved in the near future. We expect changes in the amount of money assigned to our government's budget. This will have a domino effect on agencies and instrumentalities, as well as public policies and regulations.

On occasions, the support needed from the Municipal governments may vary if their interests are different from the ones established by our program; especially when part of the program is based on a different paradigm. It could take time for individuals, including our personnel, to change their attitudes and adopt a new model.

A presented or on-going project could be affected if, for any reason, there are policy and regulation changes. Then we would have to adjust the program's goals and strategy to whatever is established, in order to comply and meet with the new assumptions.

## V(K). Planned Program (Evaluation Studies and Data Collection)

### 1. Evaluation Studies Planned

- After Only (post program)
- Before-After (before and after program)

### Description

Different methods will be employed to measure the extent of the program. These will vary according to the curriculum presented. There will be a test after the Food Safety course. A second pre/post test will be used to identify behavior changes. The instrument is designed and will be validated before administering it in our Food Safety courses.

### 2. Data Collection Methods

- Sampling
- On-Site
- Other (Questionnaire)

### Description

Data collection will vary according to the curriculum. In some cases, data will be collected in a sample of participants through different tests (pre/post, post, and retrospective tests administered on site).

For behavior changes, a validated questionnaire will be administered onsite before and after Food Safety Courses. Data will be reported on the Electronic Reporting System for PRAES.

## **V(A). Planned Program (Summary)**

### **Program # 8**

#### **1. Name of the Planned Program**

Climate Change

#### **2. Brief summary about Planned Program**

The global climate is changing, and will continue to change, in ways that affect the planning and day to day operations of businesses, government agencies, and other organizations. The manifestations of climate change include higher temperatures, altered rainfall patterns, and more frequent or intense extreme events such as heat waves, drought, and storms. Natural disasters quadrupled during 1987 to 2007, from 120 to 500 events.

Agricultural production is among the enterprises most vulnerable to these extreme weather conditions.

Soil erosion, caused by excessive rainfall and inadequate land management practices and urbanism, is one of the most serious environmental and public health problems. Humans obtain more than 99.7% of their food (calories) from the land and less than 0.3% from the oceans and other aquatic ecosystems. Overall soil is being lost from land areas 10 to 40 times faster than the rate of soil renewal imperiling future human food security and environmental quality.

With 9,000 square kilometers and close to 4 million people, Puerto Rico is one of the most densely populated countries in the world and has a long history of ineffective land-use planning. Also, due to its geographical location Puerto Rico is constantly exposed to the effects of natural disasters which negatively affect natural resources such as water and soil. These resources are at stake by their susceptibility to weather changes and by the ever increasing demand and pressure to satisfy the needs of a growing human population.

Urban and housing development are also subjects of frequent attention in Puerto Rico, especially as they refer to urban sprawl, degradation of natural resources like forests, wetlands and watersheds, and the reduction of agricultural lands.

There is still skepticism regarding climate change. Information is available on climate change through different channels, mostly generated from US Universities. However, it needs to be adapted to our tropical conditions and translated into Spanish.

Puerto Rico Extension personnel need to be more diligent in providing the farmers and the community with information, technologies, and education on how to cope with climate change and ways to contribute to greenhouse gas (GHG) mitigation. They need to engage in the development of the farmers' leadership to enable them to be proactive (risk management practices) and actively involved in decision-making. This is of utmost importance, especially for the resource-scarce small farmers who contribute little to climate change and yet will be among the most affected. Most of our agricultural production comes from small-scale farms which are often family owned and operated.

The logical first step for this plan of work is the development of an appropriate curriculum (What it is - How it affects us - What we need to do), tailored to our local situation and which includes measures proven to be useful in the past, besides providing support with skills to choose the best option to deal with climate uncertainty to make informed decisions. The second step is capacity building to our Extension personnel together with the State Department of Agriculture and other service agencies, geared to the implementation of practices, measures and resources that enable farmers to mitigate and to minimize economic losses.

This effort needs to be supported by work in the community on issues on land-use and the preservation of agricultural land, strategies such as collaborations, development of decision-making skills, and involvement in public policy to ensure the long-term success of the program.

**3. Program existence :** New (One year or less)

**4. Program duration :** Medium Term (One to five years)

**5. Expending formula funds or state-matching funds :** Yes

**6. Expending other than formula funds or state-matching funds :** Yes



**V(B). Program Knowledge Area(s)**

## 1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
104	Protect Soil from Harmful Effects of Natural Elements	20%			
111	Conservation and Efficient Use of Water	20%			
112	Watershed Protection and Management	15%			
125	Agroforestry	15%			
131	Alternative Uses of Land	15%			
805	Community Institutions, Health, and Social Services	15%			
	<b>Total</b>	100%			

**V(C). Planned Program (Situation and Scope)****1. Situation and priorities**

In the past Puerto Rico has experienced drought, floods, hurricanes, mudslides, and other weather related events. On average, the normal precipitation fluctuates between 55 to 80 inches, but it often experiences drought at a small scale. Examples of such events occurred in 1967, which affected the Southern Region while in 1994 the Northern Metropolitan area was affected. Drought effects are greatly felt on the economic activity in Puerto Rico. For instance, the 1994 drought caused an economic loss of approximately \$300 million, of which \$165 million were from agriculture.

Most of the water reservoirs on the Island are on average 75% filled with sediment, condition that reduces their storage capabilities. This is evidence of soil erosion problems. Often, during the months of January to April, brush fires occur when the precipitation rate is lowest, mostly intentionally. Although brush fires are widespread around the Island, a study conducted in 2001 showed that they are most common in the southern part of the Island; which is dryer, with grasses, and with vegetables, beef and poultry the main agricultural products. Such practice aggravates the problem of soil erosion, sedimentation and pollution in our water bodies.

There is a natural interaction between soil-water-air (CO<sub>2</sub> cycle). Practices, such as agroforestry, can help reduce greenhouse gas concentrations in small farms, help improve soil composition, prevent soil erosion, improve water infiltration through the soil, and replenish underground water, besides providing value-added wood products and recreation (biodiversity).

Soil erosion and storm water runoff need special attention. Water turbidity in rivers and water bodies is high, severely affecting coastal areas. Despite this fact, there is still a need for research in this area regarding the amount of soil lost and the economic impact at the farm level.

Water pollution degrades surface waters making them unsafe for drinking, fishing, swimming, and other activities. The National Pollutant Discharge Elimination System (NPDES) permits program is authorized by the Clean Water Act (CWA) section 402. The 1987 Water Quality Act (WQA) expanded the program to cover storm water discharges explicitly, both from municipal separate storm sewer systems (MS4) and industrial sources. The main consequences of storm water runoff mismanagement are floods.

The MS4 NPDES permits require regulated municipalities to use Best Management Practices (BMP's) to reduce pollutants to the "Maximum Extent Practicable." To demonstrate compliance, storm water permits typically require facilities to prepare a Storm Water Pollution Prevention Plan and implement BMPs. In Puerto Rico most of the 78 municipalities are not complying with the NPDES program plan due to their critical economical situation and face the risk of costly fines. Extension personnel will be trained to assist in the implementation of (BMP's) for NPDES.

Another problem of great concern is solid waste. Besides its high generation (greater than in the US), there is the aggravating circumstance that the life expectancy of the landfills is almost over due. The Island's dimensions and critical ecosystems provide virtually no safe area or space where to build new ones. Recycling is still the fastest and cheapest alternative. Twenty-seven per cent (27%) of the solid waste that gets into the landfills is organic. Its decomposition process generates methane, which contributes 20 times more CO<sub>2</sub> to GHG. We need to work on recycling - incorporating such organic "waste" to the soil or encouraging more composting, alternative uses, and markets.

All levels of government have roles to play in addressing climate change. Some aspects of the climate problem could be addressed at the local level, such as green house gas reduction, by implementing smart growth and adapting to climate impacts. Priorities will be set for water and soil, where sustainable practices will be strongly emphasized. Community volunteers could be trained for water monitoring to create a baseline data to assess progress.

**2. Scope of the Program**

- In-State Extension

**V(D). Planned Program (Assumptions and Goals)**

**1. Assumptions made for the Program**

From a temporal perspective, adaptation to climate risks can be viewed at three levels, including responses to: current variability (which also reflect learning from past adaptations to historical climates), observed medium and long-term trends in climate, and anticipatory planning in response to model-based scenarios of long-term climate change. The responses across the three levels are often intertwined, and indeed might form a continuum.

There are several ways that the Extension system can help farmers and communities deal with climate change. These include adaptation and contingency measures for what cannot be prevented (i.e., providing advice on how to deal with droughts, floods, and others). Adaptation to current climate variability can also increase resilience to long-term climate change. In a number of cases, however, anthropogenic climate change is likely to also require forward-looking investment and planning responses that go beyond short-term responses to current climate variability.

PRAES can also help with mitigation of climate change, which includes links to new markets, information about new regulatory structures, and new government priorities and policies. Extension can help with adaptation and mitigation through technologies and management information; capacity development; and facilitating, brokering and implementing policies and programs.

1. Technical training to enhance community leaders and farmer's abilities for planning, problem solving, critical thinking, prioritizing, negotiating, building consensus and leadership skills, working with multiple stakeholders and being proactive.
2. Introduce locally appropriate technologies and management techniques that enable community and farmers to adapt to climate change (i.e., rain water harvesting, water storage for irrigation, house shores).
3. Implementing BMPs to control the amount of runoff water and to prevent water Pollution.
4. Risk management education.
5. Sustainable agriculture, profitable and environmentally sound practices.

**2. Ultimate goal(s) of this Program**

1. Enhance resilience and response capacity to extreme weather events while maintaining roductivity and quality of life
2. Protect vital resources (soil and water) by implementing and adopting recommended reventive measures (BMP's)

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

**1. Estimated Number of professional FTE/SYs to be budgeted for this Program**

Year	Extension		Research	
	1862	1890	1862	1890
2011	4.0	0.0	0.0	0.0

Year	Extension		Research	
	1862	1890	1862	1890
2012	4.0	0.0	0.0	0.0
2013	4.0	0.0	0.0	0.0
2014	4.0	0.0	0.0	0.0
2015	4.0	0.0	0.0	0.0

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

**1. Activity for the Program**

- Curriculum preparation
- Capacity building workshops
- Technical training meetings
- Demonstration projects
- Mass media use to disseminate information
- Collaboration with local government agencies
- Technical advisory committees
- Grad students research

**2. Type(s) of methods to be used to reach direct and indirect contacts**

**Extension**

Direct Methods	Indirect Methods
<ul style="list-style-type: none"> <li>• Workshop</li> <li>• Group Discussion</li> <li>• One-on-One Intervention</li> <li>• Demonstrations</li> <li>• Other 1 (Volunteers)</li> <li>• Other 2 (Seminars)</li> </ul>	<ul style="list-style-type: none"> <li>• Public Service Announcement</li> <li>• Newsletters</li> <li>• TV Media Programs</li> <li>• Web sites</li> <li>• Other 1 (Exhibitions)</li> </ul>

**3. Description of targeted audience**

Farmers, communities, government professionals, county Extension personnel, leaders, volunteers, youth

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

**1. Standard output measures**

**Target for the number of persons(contacts) to be reached through direct and indirect contact methods**

	Direct Contact Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
2011	500	750	50	75
2012	800	1000	75	100
2013	1000	1050	80	125

	<b>Direct Contact Adults</b>	<b>Indirect Contacts Adults</b>	<b>Direct Contacts Youth</b>	<b>Indirect Contacts Youth</b>
<b>Year</b>	<b>Target</b>	<b>Target</b>	<b>Target</b>	<b>Target</b>
2014	1500	2000	125	200
2015	2000	3000	300	500

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

**2011:0                      2012:0                      2013:0                      2014:0                      2015:0**

**3. Expected Peer Review Publications**

<b>Year</b>	<b>Research Target</b>	<b>Extension Target</b>	<b>Total</b>
2011	0	0	0
2012	0	0	0
2013	0	0	0
2014	0	0	0
2015	0	0	0

**V(H). State Defined Outputs****1. Output Target**

- Number of training sessions offered on climate change.

<b>2011:3</b>	<b>2012:5</b>	<b>2013:5</b>	<b>2014:5</b>	<b>2015:5</b>
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- Number of people who received capacity development (workshops, seminars, conferences) on climate change.

<b>2011:0</b>	<b>2012:100</b>	<b>2013:250</b>	<b>2014:425</b>	<b>2015:500</b>
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- Number of training sessions offered on water quality, watershed protection, and management.

<b>2011:5</b>	<b>2012:5</b>	<b>2013:5</b>	<b>2014:5</b>	<b>2015:5</b>
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- Number of people who received capacity development (workshops, seminars, conferences) on water quality, watershed protection, and maintenance.

<b>2011:50</b>	<b>2012:75</b>	<b>2013:100</b>	<b>2014:125</b>	<b>2015:200</b>
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- Number of training sessions offered on water collection, storage and re-use for agricultural purposes.

<b>2011:0</b>	<b>2012:2</b>	<b>2013:3</b>	<b>2014:5</b>	<b>2015:5</b>
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- Number of collaborative agreements developed to protect water quality.

<b>2011:0</b>	<b>2012:3</b>	<b>2013:4</b>	<b>2014:4</b>	<b>2015:5</b>
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- Number of training sessions offered in agroforestry, soil erosion, and storm water runoff control.

<b>2011:0</b>	<b>2012:2</b>	<b>2013:3</b>	<b>2014:5</b>	<b>2015:5</b>
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- Number of people who received capacity development in agroforestry, soil erosion, and storm water runoff control.

<b>2011:0</b>	<b>2012:15</b>	<b>2013:35</b>	<b>2014:45</b>	<b>2015:55</b>
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- Number of training sessions on soil erosion and water environmental regulations.

<b>2011:5</b>	<b>2012:5</b>	<b>2013:5</b>	<b>2014:5</b>	<b>2015:5</b>
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- Number of people who received capacity development on soil erosion and water environmental regulations.

<b>2011:25</b>	<b>2012:35</b>	<b>2013:45</b>	<b>2014:55</b>	<b>2015:65</b>
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- Number of non-formal education courses offered on leadership development for professionals to assist in the development of emergency plans.

**2011:0**                      **2012:0**                      **2013:2**                      **2014:5**                      **2015:5**

- Number of conferences offered on natural disasters and emergency management.

**2011:5**                      **2012:8**                      **2013:8**                      **2014:10**                      **2015:10**

- Number of community leaders/people who participated in natural disasters and emergency management conferences.

**2011:35**                      **2012:45**                      **2013:55**                      **2014:60**                      **2015:75**

- Number of people who participated in conferences or capacity development on land-use.

**2011:15**                      **2012:25**                      **2013:35**                      **2014:35**                      **2015:55**

- Number of people who attended public hearings on land-use.

**2011:6**                      **2012:8**                      **2013:10**                      **2014:10**                      **2015:15**

- Number of presentations conducted on public hearings for land-use.

**2011:2**                      **2012:3**                      **2013:5**                      **2014:8**                      **2015:10**

- Number of people who received capacity development on water collection, storage, and re-use

**2011:0**                      **2012:15**                      **2013:25**                      **2014:35**                      **2015:55**

**V(I). State Defined Outcome**

O. No.	Outcome Name
1	Number of people who adopted recommended practices for water quality.
2	Number of people who established watershed protection practices.
3	Number of people who adopted practices to improve water collection, storage, and reuse efficiency.
4	Number of projects developed as a result of a collaboration with other agencies.
5	Number of people who adopted agroforestry practices.
6	Number of people who adopted/implemented soil erosion control measures.
7	Number of people who comply with environmental soil erosion and water requirements.
8	Number of communities that developed an emergency plan.

O. No.	Outcome Name
9	Number of action plans established to follow-up on land conservation.

**Outcome # 1****1. Outcome Target**

Number of people who adopted recommended practices for water quality.

**2. Outcome Type : Change in Action Outcome Measure**

**2011:40                      2012:65                      2013:75                      2014:100                      2015:150**

**3. Associated Knowledge Area(s)**

- 111 - Conservation and Efficient Use of Water
- 112 - Watershed Protection and Management

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome # 2****1. Outcome Target**

Number of people who established watershed protection practices.

**2. Outcome Type : Change in Action Outcome Measure**

**2011:40                      2012:40                      2013:50                      2014:60                      2015:80**

**3. Associated Knowledge Area(s)**

- 111 - Conservation and Efficient Use of Water
- 112 - Watershed Protection and Management

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome # 3****1. Outcome Target**

Number of people who adopted practices to improve water collection, storage, and reuse efficiency.

**2. Outcome Type : Change in Action Outcome Measure**

**2011:10                      2012:20                      2013:30                      2014:40                      2015:50**

**3. Associated Knowledge Area(s)**

- 111 - Conservation and Efficient Use of Water
- 112 - Watershed Protection and Management

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome # 4**

**1. Outcome Target**

Number of projects developed as a result of a collaboration with other agencies.

**2. Outcome Type : Change in Action Outcome Measure**

<b>2011:0</b>	<b>2012:2</b>	<b>2013:2</b>	<b>2014:3</b>	<b>2015:5</b>
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**3. Associated Knowledge Area(s)**

- 111 - Conservation and Efficient Use of Water
- 112 - Watershed Protection and Management

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome # 5**

**1. Outcome Target**

Number of people who adopted agroforestry practices.

**2. Outcome Type : Change in Action Outcome Measure**

<b>2011:0</b>	<b>2012:10</b>	<b>2013:20</b>	<b>2014:25</b>	<b>2015:30</b>
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**3. Associated Knowledge Area(s)**

- 112 - Watershed Protection and Management
- 125 - Agroforestry

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome # 6**

**1. Outcome Target**

Number of people who adopted/implemented soil erosion control measures.

**2. Outcome Type : Change in Action Outcome Measure**

<b>2011:25</b>	<b>2012:35</b>	<b>2013:45</b>	<b>2014:55</b>	<b>2015:65</b>
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**3. Associated Knowledge Area(s)**

- 104 - Protect Soil from Harmful Effects of Natural Elements
- 111 - Conservation and Efficient Use of Water
- 112 - Watershed Protection and Management



- 125 - Agroforestry

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome # 7**

**1. Outcome Target**

Number of people who comply with environmental soil erosion and water requirements.

**2. Outcome Type : Change in Action Outcome Measure**

<b>2011:10</b>	<b>2012:20</b>	<b>2013:40</b>	<b>2014:50</b>	<b>2015:60</b>
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**3. Associated Knowledge Area(s)**

- 104 - Protect Soil from Harmful Effects of Natural Elements
- 111 - Conservation and Efficient Use of Water
- 112 - Watershed Protection and Management
- 125 - Agroforestry

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome # 8**

**1. Outcome Target**

Number of communities that developed an emergency plan.

**2. Outcome Type : Change in Action Outcome Measure**

<b>2011:1</b>	<b>2012:5</b>	<b>2013:15</b>	<b>2014:30</b>	<b>2015:45</b>
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**3. Associated Knowledge Area(s)**

- 805 - Community Institutions, Health, and Social Services

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome # 9**

**1. Outcome Target**

Number of action plans established to follow-up on land conservation.

**2. Outcome Type : Change in Action Outcome Measure**

<b>2011:0</b>	<b>2012:1</b>	<b>2013:3</b>	<b>2014:5</b>	<b>2015:8</b>
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**3. Associated Knowledge Area(s)**

- 104 - Protect Soil from Harmful Effects of Natural Elements

- 111 - Conservation and Efficient Use of Water
- 131 - Alternative Uses of Land
- 805 - Community Institutions, Health, and Social Services

#### **4. Associated Institute Type(s)**

- 1862 Extension

### **V(J). Planned Program (External Factors)**

#### **1. External Factors which may affect Outcomes**

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Programmatic Challenges

#### **Description**

Due to Puerto Rico's geographical location it is constantly exposed to the effects of natural disasters that are expected to become extreme (for example; hurricanes, precipitation, floods, droughts, earthquakes). Climate changes in an island will be expected to negatively affect natural resources such as water and soil and the livelihood of its inhabitants. They are at stake by first its susceptibility to weather changes; secondly, by the high demand and pressure set by an ever increasing demand to satisfy the needs of a growing human population. This population is also increasingly dependent on imported products and goods. Besides, any changes in the world markets are greatly felt on the economic activity in Puerto Rico.

The government has very important roles to play in addressing climate change, mostly in the way public policy is implemented.

### **V(K). Planned Program (Evaluation Studies and Data Collection)**

#### **1. Evaluation Studies Planned**

#### **Description**

{NO DATA ENTERED}

#### **2. Data Collection Methods**

#### **Description**

{NO DATA ENTERED}

**V(A). Planned Program (Summary)****Program # 9****1. Name of the Planned Program**

Sustainable Energy

**2. Brief summary about Planned Program**

The decreases in oil availability, uncertainty in the cost of fuels and its implications in the economic wellbeing of our citizens, have triggered the urgency for energy independence and sustainability. Puerto Rico, having one of the highest costs of fuel in the United States and even though our tropical climate is favorable to the sustainable energy industry, not many projects have passed the planning phases. Our program seeks to increase existing knowledge of our clientele of the sustainable energy technologies, energy conservation, opportunities of financing sustainable energy projects and their cost, and environmental benefits.

**3. Program existence :** New (One year or less)

**4. Program duration :** Long-Term (More than five years)

**5. Expending formula funds or state-matching funds :** Yes

**6. Expending other than formula funds or state-matching funds :** No

**V(B). Program Knowledge Area(s)****1. Program Knowledge Areas and Percentage**

<b>KA Code</b>	<b>Knowledge Area</b>	<b>%1862 Extension</b>	<b>%1890 Extension</b>	<b>%1862 Research</b>	<b>%1890 Research</b>
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%			
	<b>Total</b>	100%			

**V(C). Planned Program (Situation and Scope)****1. Situation and priorities**

The dependency on fossil fuels has affected the economic well-being of the citizens of Puerto Rico for the past decades. At a cost per kilowatt of electricity that fluctuates between 15 and 24 cents, the cost of producing goods in the industrial sector is extremely high. Often potential local and foreign investors are discouraged from establishing business on the Island due to these costs. For the average household, the electric bill takes a big part of the income, personal comfort and the use of basic consumer appliances often need to be limited to be able to pay for utility bills.

The local government has been partially successful at motivating people to invest in sustainable energy technologies like solar heaters, by offering tax incentives. A new program by the federal government, in which a \$200.00 economic incentive is offered to change to more efficient appliances has just started. On the other hand, a recent effort to trade-in old vehicles for newer, more efficient ones by offering economic incentives was cited by the local press as being short of meeting expectancies.

New legislation that requires the local electric utility (Puerto Rico Electric Power Authority) to buy surplus electric power produced by their clients "net metering", has been criticized for requiring high capital investments and being too complicated to be understood by the average client. A new project of the Puerto Rico legislature, in which farmers will have a 20 percent

reduction in their electric bill as an incentive for energy conservation plans will go into public hearings in the House of Representatives before the end of the year. This project is expected to be converted into law.

Research results from work in the Agricultural Experiment Station of the UPR, that date back to the decade of 1980, using dairy waste and sugar cane, show that this type of project can be successful under climate conditions in Puerto Rico. A demonstration project using biodiesel in the maintenance of vehicles in the Municipality of Caguas is showing excellent preliminary results. Poultry waste hydrolyzed with slaughterhouse wastewater to produce biogas in Aibonito also improved water quality and produced organic fertilizer.

Our experience with some of the most technically oriented clients in the Puerto Rico Agriculture Extension Service is that they have a desire to learn about technologies like biogas production, solar power, "green roofs" and net metering; but there is a very timid interest in making capital investments without big government incentives. The technologies are too complicated to be understood by the average citizen and they require high initial investments.

There is an imminent need to educate our clientele in all aspects of energy sustainability. Education is needed from the most basic concepts of energy audits and conservation, to the use and demonstration of the technologies. Our program is intended to increase existing knowledge of our clientele of the sustainable energy technologies, energy conservation, and opportunities to finance sustainable energy projects and their cost and environmental benefits.

## 2. Scope of the Program

- In-State Extension

### V(D). Planned Program (Assumptions and Goals)

#### 1. Assumptions made for the Program

We have found that our clients are motivated by one or more of the following: economic incentives, laws and regulations that require them to make improvements, and a high rate of return in their investment (cost effectiveness). We assume that the economic incentives available for sustainable energy projects will be offered and improved. In addition, we have assumed that there will be pressure by environmental groups for the use of cleaner, "green" energy and that the finance institutions will be willing to finance new projects. PRAES specialists have been working on proposals and special projects to obtain external resources to expand our capabilities. Our program could be expanded if we are successful in attracting external funding and working through our network of county agents and home economists.

#### 2. Ultimate goal(s) of this Program

Increase existing knowledge of our clientele of the sustainable energy technologies, energy conservation, opportunities to finance sustainable energy projects, and their cost and environmental benefits.

### V(E). Planned Program (Inputs)

#### 1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2011	5.0	0.0	0.0	0.0
2012	5.0	0.0	0.0	0.0
2013	5.0	0.0	0.0	0.0
2014	5.0	0.0	0.0	0.0
2015	5.0	0.0	0.0	0.0

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

**1. Activity for the Program**

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

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. Type(s) of methods to be used to reach direct and indirect contacts**

**Extension**

Direct Methods	Indirect Methods
<ul style="list-style-type: none"> <li>• Workshop</li> <li>• Group Discussion</li> <li>• Demonstrations</li> </ul>	<ul style="list-style-type: none"> <li>• Web sites</li> </ul>

**3. Description of targeted audience**

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

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

**1. Standard output measures**

**Target for the number of persons(contacts) to be reached through direct and indirect contact methods**

	Direct Contact Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
2011	1000	1000	0	0
2012	1000	1000	0	0
2013	1000	1000	0	0
2014	1000	1000	0	0
2015	1000	1000	0	0

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

**2011:0                      2012:0                      2013:0                      2014:0                      2015:0**

**3. Expected Peer Review Publications**

Year	Research Target	Extension Target	Total
2011	0	0	0
2012	0	0	0
2013	0	0	0
2014	0	0	0
2015	0	0	0

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

**1. Output Target**

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

**2011:100                      2012:100                      2013:100                      2014:100                      2015:100**

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

**2011:50                      2012:50                      2013:50                      2014:50                      2015:50**

- Number of 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).

**2011:100                      2012:100                      2013:100                      2014:100                      2015:100**

**V(I). State Defined Outcome**

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 Target**

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

**2. Outcome Type : Change in Action Outcome Measure****2011:1000****2012:1000****2013:1000****2014:1000****2015:1000****3. Associated Knowledge Area(s)**

- 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

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome # 2****1. Outcome Target**

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. Outcome Type : Change in Action Outcome Measure****2011:50****2012:50****2013:50****2014:50****2015:50****3. Associated Knowledge Area(s)**

- 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

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome # 3****1. Outcome Target**

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. Outcome Type :** Change in Action Outcome Measure

2011:500                      2012:500                      2013:500                      2014:500                      2015:500

**3. Associated Knowledge Area(s)**

- 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

**4. Associated Institute Type(s)**

- 1862 Extension

**V(J). Planned Program (External Factors)**

**1. External Factors which may affect Outcomes**

- Natural Disasters (drought, weather extremes, etc.)
- Public Policy changes
- Government Regulations
- Competing Programmatic Challenges
- Other (Availability economic incentives)

**Description**

In a tropical island setting, priorities can drastically be affected by natural disasters. Tropical hurricanes are the most common. Many facilities can be affected and under these circumstances the number one priority for our clients is to get back on their feet as quick as possible and energy sustainability will be secondary.

A general feeling that the economy is weak is another factor that precludes people from investing in improving their infrastructures. When the general feeling is that the economy is strong, people tend to be more aggressive. Changes in public policies also make people change priorities and postpone projects. The availability of economic incentives is decisive in making final decisions that require capital investments.

Our program depends on the amount of time that the PRAES county agents and home economists can allocate to it. Any changes in priorities set by the administration will have an effect on the program's outcome.

**V(K). Planned Program (Evaluation Studies and Data Collection)**

**1. Evaluation Studies Planned**

**Description**

{NO DATA ENTERED}

**2. Data Collection Methods**

**Description**

{NO DATA ENTERED}

## **V(A). Planned Program (Summary)**

### **Program # 10**

#### **1. Name of the Planned Program**

Global Food Security and Hunger

#### **2. Brief summary about Planned Program**

Food security emerged as one of the major risks of the 21<sup>st</sup> century (Global Risk Forum, 2008). Puerto Rico extended supply chains that generated competitive advantage to agribusiness and people also increased vulnerability of the food global system to disruptive risk. The Island has sufficient food available mainly through imports, but the domestic production is less than 20%. Fifty-eight per cent (58%) of the people have access to appropriate foods for a nutritious diet by transfer income benefits, but the population needs continuous orientation on the utilization of food through adequate diet, water, sanitation, and health care. The system's stability is threatened by many factors such as climate change and the economic crisis that increase food prices.

In 2007, only 20% of the food and beverages consumed in Puerto Rico were produced on the Island (External Trade Statistics, 2008). Practically all of the cereal, oil, fat, sugar, vegetables, fish, and soup consumed were imported, as were more than 3/4 of fruit, vegetables, and meats. Most imports came from the United States but Puerto Rico received food from more than 50 countries around the world. Domestic production consisted mainly of milk, eggs, plantains, and coffee. From the USA to PR the food miles are an average of more than 2,800 miles, 1,300 are by sea.

Some vulnerabilities of Puerto Rico's food supply chains are: low local agricultural production with continued agricultural land loss, a high dependence on imported food, food importers and transport logistics are oligopolies, the food reserve is not clearly defined, the Island doesn't have food security policy, and sea routes towards the island match the path of hurricanes in the Caribbean. Ensuring Puerto Rico's food security presupposes the elimination or reduction of that vulnerability. Eventhough the Government is in charge of solving any crisis and emergency related to food, the private sector has to develop innovative strategies to guarantee food security.

The Puerto Rico Agricultural Extension Service should help farmers, agro entrepreneurs and the public in general to understand the threats to our food security and to identify strategies to attend these threats. The agency can coordinate the exchange of information between the government, academy, and private sectors to define and adopt strategies. The initiative will promote business culture among farmers as means to encourage the development of local capital and small and medium businesses on the island. In the literature review we can find information about supply chain risk management and how to increase food security by adaptation strategies. To accomplish this goal the agency will use different strategies such as curriculum development, collaboration with the public and private sectors, and the dissemination of information.

**3. Program existence** : New (One year or less)

**4. Program duration** : Medium Term (One to five years)

**5. Expending formula funds or state-matching funds** : Yes

**6. Expending other than formula funds or state-matching funds** : No

**V(B). Program Knowledge Area(s)**

## 1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
111	Conservation and Efficient Use of Water	5%			
131	Alternative Uses of Land	5%			
205	Plant Management Systems	15%			
307	Animal Management Systems	15%			
405	Drainage and Irrigation Systems and Facilities	5%			
501	New and Improved Food Processing Technologies	5%			
603	Market Economics	20%			
606	International Trade and Development	5%			
610	Domestic Policy Analysis	5%			
704	Nutrition and Hunger in the Population	20%			
	<b>Total</b>	100%			

**V(C). Planned Program (Situation and Scope)****1. Situation and priorities**

Food security emerged as one of the major risks of the 21<sup>st</sup> century (Global Risk Forum, 2008). Extended supply chains that generated competitive advantage to agribusiness and people increased vulnerability of the food global system to disruptive risk. According to FAO, food security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life (FAO, Seguridad Alimentaria. *Informe de políticas*, 2006). In 2008, there was a global food crisis that jeopardized this security. Global water crisis, land degradation, dependence on fossil fuel, price setting, and climate change are some of the risks that can affect food security. During the same year a local newspaper in Puerto Rico highlighted *Why is Puerto Rico not prepared for a food crisis?*

In 2007, the total value of agricultural production was equivalent to 1% of the Gross Domestic Products. There were 15,745 farms on the Island, a decline of an 11% compared to the year 2002, and the average farms size was 39.1 acres. The farmers' average age was 58.2 years old and more than one third were over 65 years old (Census of Agriculture, 2007).

During 2007, only 20% of the food and beverages consumed in Puerto Rico were produced on the Island (External Trade Statistics, 2008). Practically all the cereal, oil and fat, sugar, vegetables, fish and soup consumed were imported as were more than 3/4 of fruit, vegetables, and meat. Most imports were from the United States, but Puerto Rico received food from more than 50 countries around the world. Local production consisted mainly of milk, eggs, plantain, and coffee.

Some of Puerto Rico's food supply chains' vulnerabilities are: the Island doesn't have a food security policy, the local agricultural production is low with continued agricultural land loss, a high dependence on imported food equivalent to more than 80% of our food consumption, food importers and transport logistics are oligopolies, and sea routes towards the island match the path of Caribbean hurricanes routes.

It should be noted, nonetheless, that within the Caribbean Puerto Rico does not have a high vulnerability index because it has a fairly advanced economic development and receives federal funds in case of emergency from FEMA or Homeland Security, but the food supply chains' stability can be impacted by extreme weather events such as hurricanes (the season runs every year from June 1 to November 30). This could devastate crops, cause severe damage to animal production and transportation logistics, as the island is located in one of the climate change hot zones identified by Intergovernmental Panel on Climate Change (2007), where severe changes—like an increase in the intensity and frequency of hurricanes—are expected. According to some estimates, if operations at port are halted for any reason, provisions to feed the population of almost four million people will be used up in 15 days (Puerto Rico is one of the most densely populated countries in the world

with a high dependence on transfer incomes).

Ensuring Puerto Rico's food security presupposes the elimination or reduction of that vulnerability. Eventhough the Government is in charge of solving any crisis and emergency related to food, the private sector still has to develop innovative strategies to adapt to and handle food supply chain risks.

In December 2009 the national Food Security initiative contact finished her Ph.D. degree and her dissertation was based on Food Supply Chain Vulnerability. As part of her literature review she read FAO, IPCC, World Economic Forum, Latino American Economic Commission and other documents related with the food crisis and risk management. One of her contributions was the development of a protocol to attend the disruption on the food supply chain and one of her conclusions was that the public and private sector need to work together on this matter.

**2. Scope of the Program**

- In-State Extension

**V(D). Planned Program (Assumptions and Goals)**

**1. Assumptions made for the Program**

In Puerto Rico many people assume that there are no problems with our food security because there are continuous food supplies, but they are unaware that these are mainly imported (more than 80 %) and that a lot of people use transfer income to buy this. The food reserve, the food miles, and the threats to the food supply chain is also unknown.

In the management of food security the Agricultural Extension Service should help farmers, agro entrepreneurs and public in general to understand threats to our food security and to identify strategies to attend these threats. The exchange of information between the government, the academy, and the private sectors is required for strategies definition and adoption. The initiative will promote business culture among farmers as a way to encourage the development of local capital and the small and medium businesses in the island. But will also work with the government and the private sector because food security is a multi sectors issue. They need to coordinate work together. Some of the strategies that can be promoted are: increase local agricultural production, develop risk management plans, monitor food supply chain's vulnerability and risks, evaluate and adjust the infrastructure and transportation systems (like irrigation and storage systems), promote food security public policy, and establish public private partnerships to attend this situation.

**2. Ultimate goal(s) of this Program**

1. Use land and water resources more efficiently.
2. Establish a network of enterprises working as a food supply chain system and not as individual enterprises that negotiate together.
3. Increase local food production and competitiveness.
4. Reduce food miles.
5. Increase food security at the national and household levels.

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

**1. Estimated Number of professional FTE/SYs to be budgeted for this Program**

Year	Extension		Research	
	1862	1890	1862	1890
2011	6.0	0.0	0.0	0.0
2012	6.0	0.0	0.0	0.0
2013	6.0	0.0	0.0	0.0
2014	6.0	0.0	0.0	0.0

Year	Extension		Research	
	1862	1890	1862	1890
2015	6.0	0.0	0.0	0.0

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

**1. Activity for the Program**

- Prepare Curriculum and educational material
- Capacity building workshops
- Technical training meeting
- Establish collaboration between the government, the private sector and the academia
- Mass media use to disseminate information

**2. Type(s) of methods to be used to reach direct and indirect contacts**

**Extension**

Direct Methods	Indirect Methods
<ul style="list-style-type: none"> <li>• Education Class</li> <li>• Workshop</li> <li>• Group Discussion</li> <li>• One-on-One Intervention</li> </ul>	<ul style="list-style-type: none"> <li>• Billboards</li> <li>• Newsletters</li> <li>• Other 1 (Radio Programs)</li> </ul>

**3. Description of targeted audience**

County Extension professionals, farmers, agro entrepreneurs, government professionals, housewives

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

**1. Standard output measures**

**Target for the number of persons(contacts) to be reached through direct and indirect contact methods**

	Direct Contact Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
2011	10000	2000	5000	500
2012	10000	2000	5000	500
2013	15000	3000	6000	500
2014	15000	3000	6000	500
2015	15000	3000	6000	500

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

**2011:0                      2012:0                      2013:0                      2014:0                      2015:0**

**3. Expected Peer Review Publications**

Year	Research Target	Extension Target	Total
2011	0	2	2
2012	0	1	1
2013	0	0	0
2014	0	0	0
2015	0	0	0

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

**1. Output Target**

- Number of individuals that were oriented about global food security.

**2011:6000**

**2012:10000**

**2013:15000**

**2014:15000**

**2015:16000**

**V(I). State Defined Outcome**

O. No.	Outcome Name
1	Number of feasibility studies for agricultural enterprises,
2	Number of individuals that increased their knowledge about international trade and development.
3	Number of public policy issues related with national food security that were reviewed or proposed.
4	Number of marketing agreements established between local farmers and distributors or other components of the food supply chain.
5	Percentage increased in agricultural production.
6	Number of farmers that established sustainable agricultural systems.
7	Number of fallow "cuerdas"(acres) sowed or prepared for animal production.
8	Number of drainage or irrigation facilities improved or established according to recommended practices.
9	Number of farmers that adopted one or more recommended post harvest practices.
10	Number of consumers that adopted the food basket as a guide for food security at the household level.
11	Number of domestic and community gardens established.



**Outcome # 1****1. Outcome Target**

Number of feasibility studies for agricultural enterprises,

**2. Outcome Type : Change in Action Outcome Measure**

<b>2011:20</b>	<b>2012:30</b>	<b>2013:40</b>	<b>2014:40</b>	<b>2015:50</b>
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**3. Associated Knowledge Area(s)**

- 205 - Plant Management Systems
- 307 - Animal Management Systems

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome # 2****1. Outcome Target**

Number of individuals that increased their knowledge about international trade and development.

**2. Outcome Type : Change in Knowledge Outcome Measure**

<b>2011:30</b>	<b>2012:30</b>	<b>2013:40</b>	<b>2014:40</b>	<b>2015:50</b>
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**3. Associated Knowledge Area(s)**

- 606 - International Trade and Development

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome # 3****1. Outcome Target**

Number of public policy issues related with national food security that were reviewed or proposed.

**2. Outcome Type : Change in Action Outcome Measure**

<b>2011:1</b>	<b>2012:1</b>	<b>2013:1</b>	<b>2014:1</b>	<b>2015:1</b>
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**3. Associated Knowledge Area(s)**

- 610 - Domestic Policy Analysis

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome # 4**

**1. Outcome Target**

Number of marketing agreements established between local farmers and distributors or other components of the food supply chain.

**2. Outcome Type : Change in Action Outcome Measure**

<b>2011:5</b>	<b>2012:5</b>	<b>2013:10</b>	<b>2014:10</b>	<b>2015:10</b>
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**3. Associated Knowledge Area(s)**

- 603 - Market Economics

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome # 5**

**1. Outcome Target**

Percentage increased in agricultural production.

**2. Outcome Type : Change in Action Outcome Measure**

<b>2011:5</b>	<b>2012:5</b>	<b>2013:5</b>	<b>2014:5</b>	<b>2015:5</b>
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**3. Associated Knowledge Area(s)**

- 111 - Conservation and Efficient Use of Water
- 131 - Alternative Uses of Land
- 205 - Plant Management Systems

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome # 6**

**1. Outcome Target**

Number of farmers that established sustainable agricultural systems.

**2. Outcome Type : Change in Action Outcome Measure**

<b>2011:50</b>	<b>2012:100</b>	<b>2013:100</b>	<b>2014:200</b>	<b>2015:200</b>
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**3. Associated Knowledge Area(s)**

- 205 - Plant Management Systems
- 307 - Animal Management Systems

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome # 7**

**1. Outcome Target**

Number of fallow "cuerdas"(acres) sowed or prepared for animal production.

**2. Outcome Type : Change in Action Outcome Measure**

**2011:1000                      2012:1000                      2013:2000                      2014:2000                      2015:2000**

**3. Associated Knowledge Area(s)**

- 205 - Plant Management Systems
- 307 - Animal Management Systems

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome # 8**

**1. Outcome Target**

Number of drainage or irrigation facilities improved or established according to recommended practices.

**2. Outcome Type : Change in Action Outcome Measure**

**2011:10                      2012:20                      2013:30                      2014:20                      2015:30**

**3. Associated Knowledge Area(s)**

- 205 - Plant Management Systems
- 307 - Animal Management Systems
- 405 - Drainage and Irrigation Systems and Facilities

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome # 9**

**1. Outcome Target**

Number of farmers that adopted one or more recommended post harvest practices.

**2. Outcome Type : Change in Action Outcome Measure**

**2011:50                      2012:100                      2013:150                      2014:200                      2015:250**

**3. Associated Knowledge Area(s)**

- 501 - New and Improved Food Processing Technologies

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome # 10**

**1. Outcome Target**

Number of consumers that adopted the food basket as a guide for food security at the household level.

**2. Outcome Type : Change in Action Outcome Measure**

<b>2011:200</b>	<b>2012:300</b>	<b>2013:400</b>	<b>2014:500</b>	<b>2015:600</b>
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**3. Associated Knowledge Area(s)**

- 704 - Nutrition and Hunger in the Population

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome # 11**

**1. Outcome Target**

Number of domestic and community gardens established.

**2. Outcome Type : Change in Action Outcome Measure**

<b>2011:100</b>	<b>2012:200</b>	<b>2013:200</b>	<b>2014:300</b>	<b>2015:300</b>
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**3. Associated Knowledge Area(s)**

- 704 - Nutrition and Hunger in the Population

**4. Associated Institute Type(s)**

- 1862 Extension

**V(J). Planned Program (External Factors)**

**1. External Factors which may affect Outcomes**

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Public Policy changes
- Competing Public priorities

**Description**

Puerto Rico is located in the Caribbean and is identified by the IPCC as a hot zone because it has a lot of threats related with climate changes like droughts, increase in sea level and extreme weathers.

**V(K). Planned Program (Evaluation Studies and Data Collection)**

**1. Evaluation Studies Planned**

**Description**

{NO DATA ENTERED}

**2. Data Collection Methods**

**Description**

{NO DATA ENTERED}

## V(A). Planned Program (Summary)

### Program # 11

#### 1. Name of the Planned Program

Childhood Obesity

#### 2. Brief summary about Planned Program

This Planned Program on Childhood Obesity pretends to address childhood obesity as a major public health problem, working with the following three areas of interest: nutrition knowledge, physical activity, and public policy. These areas promote a holistic view of the situation. Our focus are the changes that influence people's consumption and activity level.

The Program will explore how food and nutrition science and a consideration of alternative future might help to address some of the factors underlying the obesity growth in Puerto Rico. We should consider the following obesity drivers: social, economic, environmental, technological, and political. For each driver we should consider some trends. For social, we mull over stigma discrimination, sedentary lifestyles, more eating out, responsibility: primacy of personal/family choices. For economic, we ponder profit: food and advertising companies that push consumption, large retailers dominating food supply chain, functional food and food/pharmaceutical profit. For environmental, we contemplate 24 access to energy dense foods, car use and eco-sustainability. For technological, we weigh up teleworking and boost of agriculture. For political, we think over personalized services for health and education and food regulations in Puerto Rico.

Our long-range goal is to stop the progression of obesity in the population of Puerto Rico through community base interventions, providing youngsters and their families tools to develop, adopt, and maintain best behavior practices and lifestyles to protect them against this complex and worldwide epidemic. The educational philosophies supporting our strategies are cooperative learning and learning-by-doing, which involves compromise of all participants.

The Program will allow the inclusion of other agencies as alliances, coordinations or agreements. These collaborations will help avoid duplicate efforts, the best use of resources and to share the achievements. Also, it allows us to establish agreements to treat this population with a tailored cultural educational model and determine the accomplishment of *2020 Healthy People* goals. Although, *Healthy People 2020* is currently under development, we will use it as a standard because it reflects assessments of major determinants of health and wellness, changing public health priorities, and emerging issues related to USA health preparedness and prevention. We want to encourage determine which educational curricula is best for collaboration in the present efforts to fight the obesity prevalence among youth and adults of Puerto Rico during 2010-2015.

To identify achievements we will use with some educators the participatory research in which they are participants of the interventions, seeking similar goals, as their clients from the community. However, in all cases, for the evaluation process, we will use the logic model.

The *significance* of this program is:

1. Establish an educational program community for families that detains the progression of obesity prevalence in Puerto Rico's population.
2. Establish an overall strategy to address obesity that will allow future interventions and public policy to the accomplishment of 2020 goals i.e. < 15% of overweight for youngsters and adults adapted to Puerto Rico as a preventive strategy to diminish chronic diseases.

The Specific Aims are:(a) To compare different educational curricula to be implemented with meal patterns of Puerto Rico's population, food shopping behavior, planning cooking practices and physical activity that protect against obesity; (b). To determine community needs that better allow the inclusion of physical activity to detain the prevalence of obesity, gathered among individuals classified as participants and educators.

The Program stimulates the inclusion of the agronomists as educators, because one of the recommendations requires harvest production that also engages knowledge about nutrition and physical activity. Another theme to be taught is Puerto Rico's Food Basket, which is directly related to food security that assures cultural adequacy of the food supply because it considers the local agricultural production.

- 3. **Program existence** : New (One year or less)
- 4. **Program duration** : Long-Term (More than five years)
- 5. **Expending formula funds or state-matching funds** : Yes
- 6. **Expending other than formula funds or state-matching funds** : No

**V(B). Program Knowledge Area(s)**

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
703	Nutrition Education and Behavior	50%			
704	Nutrition and Hunger in the Population	20%			
724	Healthy Lifestyle	30%			
	<b>Total</b>	100%			

**V(C). Planned Program (Situation and Scope)**

**1. Situation and priorities**

According to the World Health Organization (WHO), estimates that globally over 1 billion people are currently overweight, 300 million people are clinically obese and the number of overweight children under the age of five is estimated to be over 42 million. More than 2.5 deaths annually are weight related and this could rise to 5 million by 2020. The USA is forecast to spend 19% of GDP on health care by 2014, up from 15% in 2003.

Nearly one in three youngsters in the U.S.A. is overweight, and approximately 17 percent are dangerously obese. Twenty-five percent of children ages 5 to 10 already have elevated cholesterol levels and high blood pressure. 32% of children with Type 2 Diabetes are obese (10<sup>th</sup> times increment, between years 1982-1994) These conditions put them at risk of heart disease, diabetes and sleep disorders as they grow older. Because of overweightness and Type 2 Diabetes it could possible the first child generation which life expectant was lower than their parents.

Puerto Rico's childhood obesity prevalence is close to the Hispanics in New York, 22%.

The *Recommended Community Strategies and Measurements to Prevent Obesity in the U.S.* propose the community base strategies that change obesogenic environments. Changes might get access to healthy food and promote free practice of physical activity. Also, this document suggests push to create public policy that guarantee the equal opportunity for all citizens, avoiding disparities by gender, socioeconomic status, race and ethnicity.

**2. Scope of the Program**

- In-State Extension

**V(D). Planned Program (Assumptions and Goals)**

**1. Assumptions made for the Program**

- Children are raised on high-calorie food.
- Parent don't have time and energy to prepared home-cooked meal or even to serve family dinner.
- Electronic technologies enable sedentary forms of socializing and recreation.
- Increase of food cost stimulate the worst food purchasing.

**2. Ultimate goal(s) of this Program**

Reduce obesity prevalence among a selected population.  
 Increase physical activity levels among selected population.

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

**1. Estimated Number of professional FTE/SYs to be budgeted for this Program**

Year	Extension		Research	
	1862	1890	1862	1890
2011	10.6	0.0	0.0	0.0
2012	10.6	0.0	0.0	0.0
2013	10.6	0.0	0.0	0.0
2014	10.6	0.0	0.0	0.0
2015	10.6	0.0	0.0	0.0

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

**1. Activity for the Program**

Promote breastfeeding during first 12 months of babies' life to prevent overweight and illness (help to enforce breastfeeding public policy, Bill 239).

Develop and offer courses on nutrition and physical activity education for children/youth over 85 BMI percentile and their parents.

Develop educational curricula for lower school grades as little harvest that includes nutrition and physical activity

Develop joint action at community level to promote and implement physical activity programs and nutrition education for parents and kids.

Teach about school breakfast, lunch, and snacks in schools and other institutions to comply with communication 2-2007-2008 that rules expenditure and consumption of food and beverages minimum nutritional value.

Teach retailers close to schools about best food offers according to the Puerto Rico's Kids Food Pyramid to help them comply with Bill No. 91, August 20, 1997, Free School Zone that prohibits expenditure of food with lower nutritional value close to schools.

Promote discretionary calories food control.

**2. Type(s) of methods to be used to reach direct and indirect contacts**

**Extension**

Direct Methods	Indirect Methods
<ul style="list-style-type: none"> <li>● Education Class</li> <li>● Workshop</li> <li>● Group Discussion</li> <li>● One-on-One Intervention</li> <li>● Demonstrations</li> </ul>	<ul style="list-style-type: none"> <li>● Public Service Announcement</li> <li>● Newsletters</li> <li>● TV Media Programs</li> <li>● Web sites</li> </ul>

**3. Description of targeted audience**

Puerto Rican children/youngsters and their families; PRAES educators



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

**1. Standard output measures**

**Target for the number of persons(contacts) to be reached through direct and indirect contact methods**

	Direct Contact Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
2011	5000	2000	5000	2000
2012	7000	5000	7000	5000
2013	10000	6000	10000	6000
2014	10000	6000	10000	6000
2015	10000	6000	10000	6000

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

**2011:0                      2012:0                      2013:0                      2014:0                      2015:0**

**3. Expected Peer Review Publications**

Year	Research Target	Extension Target	Total
2011	0	1	1
2012	0	0	0
2013	0	1	1
2014	0	1	1
2015	0	3	3

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

**1. Output Target**

- Number of persons that completed non-formal nutrition and physical activity education.

**2011:1380                      2012:1500                      2013:1700                      2014:2000                      2015:2000**

- Number of persons that completed non-formal harvest course and physical activity education.

**2011:200                      2012:500                      2013:1000                      2014:1000                      2015:1000**

**V(I). State Defined Outcome**

O. No.	Outcome Name
1	Number of persons that reduced their risk levels for obesity prevalence.
2	Number of persons that reduced their obesity prevalence.
3	Number of persons that increased their physical activity level.
4	Number of persons that practice physical activity daily.
5	Number of persons that are harvesting and consuming nutritious foods from their own home or community garden.

**Outcome # 1**

**1. Outcome Target**

Number of persons that reduced their risk levels for obesity prevalence.

**2. Outcome Type :** Change in Action Outcome Measure

**2011:900                      2012:1000                      2013:1100                      2014:1300                      2015:1300**

**3. Associated Knowledge Area(s)**

- 703 - Nutrition Education and Behavior
- 724 - Healthy Lifestyle

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome # 2**

**1. Outcome Target**

Number of persons that reduced their obesity prevalence.

**2. Outcome Type :** Change in Action Outcome Measure

**2011:130                      2012:150                      2013:250                      2014:300                      2015:300**

**3. Associated Knowledge Area(s)**

- 703 - Nutrition Education and Behavior
- 724 - Healthy Lifestyle

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome # 3**

**1. Outcome Target**

Number of persons that increased their physical activity level.

**2. Outcome Type :** Change in Action Outcome Measure

**2011:200                      2012:500                      2013:1000                      2014:1000                      2015:1000**

**3. Associated Knowledge Area(s)**

- 703 - Nutrition Education and Behavior
- 724 - Healthy Lifestyle

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome # 4**

**1. Outcome Target**

Number of persons that practice physical activity daily.

**2. Outcome Type : Change in Knowledge Outcome Measure**

**2011:60                      2012:150                      2013:300                      2014:300                      2015:300**

**3. Associated Knowledge Area(s)**

- 703 - Nutrition Education and Behavior
- 724 - Healthy Lifestyle

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome # 5**

**1. Outcome Target**

Number of persons that are harvesting and consuming nutritious foods from their own home or community garden.

**2. Outcome Type : Change in Action Outcome Measure**

**2011:50                      2012:150                      2013:500                      2014:500                      2015:700**

**3. Associated Knowledge Area(s)**

- 704 - Nutrition and Hunger in the Population

**4. Associated Institute Type(s)**

- 1862 Extension

**V(J). Planned Program (External Factors)**

**1. External Factors which may affect Outcomes**

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Appropriations changes
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges

**Description**

Puerto Rico's location in the Caribbean area makes it the object of natural events, which include hurricanes, heavy winds, droughts and heavy rainy seasons that can cause floods. Also, it is in earthquake risk zone, as was demonstrated in the case of Haiti. A major natural disaster could completely reorient the government's priorities and make it essential to spend scarce resources on recovery rather than health related programs. On the other hand, individuals will be caught up in trying to reestablish their business, homes and assisting their families' needs.

Puerto Rico is passing through a major financial crisis, which may not be solved in the near future. We have a reduced government budget. This has a domino effect on agencies and instrumentalities, as well as public policies and regulations.

On occasions the support needed from the Municipal Government may vary if it's interests are different from the ones established by our Program. Moreover, this project could be affected if policy and regulation change. We would then have to adjust the program's goals and strategies to whatever is established in order to comply and meet with the new assumptions.

#### **V(K). Planned Program (Evaluation Studies and Data Collection)**

##### **1. Evaluation Studies Planned**

- Before-After (before and after program)
- During (during program)

##### **Description**

We will do pre/post test to evaluate knowledge and behavior changes with a selected sample. Another evaluation will be the completion of a portfolio for a selected sample to identify changes in body measurements that certify the reduction in obesity prevalence. We will also document changes in physical activity. These strategies will be structured to allow the inclusion of the educators as part of the subjects that get accomplishments related to obesity prevalence and physical activity practice.

##### **2. Data Collection Methods**

- Sampling
- On-Site
- Structured
- Portfolio Reviews

##### **Description**

An on-site survey will be used to collect information on a sample of participants about changes in behavior.