PUERTO RICO: ANNUAL REPORT OF ACCOMPLISHMENTS AND RESULTS

OVERVIEW

The following report covers the period from October 1, 2000 to September 30, 2001. During this period the Puerto Rico Agricultural Extension Service (PRAES) used a total of 189.75 FTE's.

PRAES jointed efforts with the local governments of 78 municipalities of Puerto Rico.

During this fiscal year multiple agreements and/or collaborative efforts were made throughout the island. Public entities, non-profit organizations, public and private universities in and outside Puerto Rico, local, state, and federal organizations, community organizations, radio and television stations, and newspapers participated with PRAES to achieve many different goals ranging from agriculture to family and community concerns.

Goal 1 – An agricultural system that is highly competitive in the global economy accounted for a total of 78.86 FTE's.

During this fiscal year, agriculture shows signs of recuperation. Animal and starchy crops and vegetables production have increased according to statistical reports of the Puerto Rico Department of Agriculture for fiscal year 2000-2001.

The new facilities constructed after the last hurricane and the implementation of technology on production practices have been key factors in increasing operational efficiency. This gives us a better margin to compete with imported goods.

The dairy sector holds the first position by income of all the agricultural sectors contributing 27% of the gross income. As the result of continuous technical support by Extension personnel in the dairy cattle enterprise, the Grade A classification was maintained. Of a total of 398 dairy farmers, 175 participated of the dairy herd improvement program. A total of 390 farmers met the parameters for somatic cells and bacterial counts.

Three hundred and sixty-six (366), or 67% of the beef producers, adopted the recommended production practices. Fifty-five (55) producers improved their facilities and another 55 increased their herd size.

A total of 404 farmers adopted the recommended practices for forage production and 78 producers planted 1,197 acres of forage.

Of 1,910 coffee producers that were oriented, 1,048 (54.8%) adopted the recommended production practices. A total of 996 acres were planted of coffee. Two hundred and forty-four (244) coffee producers increased their production per acre. Average coffee yield increased from 9.3 to 10.8 qq/acre.

Eight hundred and ninety-nine (899) vegetable producers, or 71%, adopted the recommended production practices and 159 adopted the recommended production practices for hydroponics.

One hundred and three (103), producers of grain and legumes (42%) adopted the recommended production practices.

One thousand and fifty-nine (1,059) farmers adopted the recommended production practices for starchy crops. Eight thousand five hundred and sixty-two (8,562) acres were planted of starchy crops: 6,659 of plantains and bananas and 1,904 of starchy root crops.

As for poultry, 33 producers adopted the recommended production practices. Of these, 29 improved their farm facilities.

One hundred and eighty seven (187) swine producers adopted the recommended production practices and 63 established new production facilities.

A total of 22,845 persons were oriented by Extension personnel on the suitable practices for a high efficiency production in all crops.

Goal 2 – A safe and secure food and fiber system accounted for a total of 3.83 FTE's.

PRAES developed ongoing food safety programs at different levels with "from the farm to the table" approach. There are multi-county cooperation and Extension personnel cooperating and disseminating research results to clientele.

The HACCP seafood and meat regulations and the Good Agricultural Practices guidelines are recent examples where the agencies have identified the need for Extension outreach efforts.

One thousand one hundred and ninety-eight (1,198) persons in charge of food services approved requirements for the 12-lesson certification course, auto-evaluated practices using a pre-post evaluation form, and demonstrated the adoption practices of HACCP as stated in the 2001 Food Code.

During fiscal year 2000-2001, 432 professionals from other institutions were trained on food safety, foodborne risk, and illnesses. Thirty (30) teachers of the Department of Education were offered a train-the-trainer course on the FDA curriculum for science teachers. Eighteen (18) professionals from other agencies trained their employers.

Three hundred and thirty (330) dairy farms maintained bacteria counts below 100,000 units of colonies per milliliter, complying with the federal requirements. These dairy farms also surpassed USDA milk parameters and somatic cell and crioscopic levels. A significant effort was made to offer training to farmers in the areas of mastitis control and other related topics. Three hundred and sixty farmers adopted the practices.

Normally the island has food supply backup of 12 days. This supply could be affected by an emergency (war, major natural disaster, among others) involving the United States and the subsequent reduction of the food exported to Puerto Rico.

During this year, 70 short courses about an assured food supply were offered. Three hundred and thirty five (335) persons completed short courses of five or more lessons. Two hundred and fifty-one (251) children and youth planted one or more vegetables or herbs.

Two thousand four hundred and two (2,402) farmers were oriented on IPM practices for different crops. Two hundred and fifty (250) persons completed non/formal education on pest control in structures. The early and correct diagnosis of pests in the PRAES Plant Diagnostic Clinic saved farmers $350,000.

Goal 3 – A healthy well-nourished population, accounted for a total of 28.44 FTE's (this does not include EFNEP, as it is a 3(d) funded program).

PRAES continued training personnel to prepare them to conduct nutrition and health promotion education projects. The personnel implemented health projects aimed towards children and youth using different curricula developed by the specialist. Seven hundred and forty-nine (749) children and youth completed a non-formal health education program. Of these, 598 adopted one or more of the recommended practices after completing the course.

Puerto Rico was the demonstration site of the 4-H project Health Rocks. Twelve persons from California and Philadelphia were trained. Twenty-two (22) leaders out of the 50 trained, delivered the program in their communities and offered 3,600 volunteer hours.

PRAES, in partnership with the Puerto Rico Health Fraud Prevention Commission, developed a fraud prevention program targeted to individuals affected or infected by HIV/AIDS, which focused on adults and the elderly. Seven hundred (700) health professionals received orientation in this area, and 170 individuals were trained to deliver the program.

During fiscal year 2000-2001, 3,755 persons participated in a course for participants of the Nutrition Assistance Program (NAP), in coordination with the Program to Improve Nutrition in Puerto Rico (PIN/MeNu). Of these, 2,494 persons completed the course, 2,311 planned to change one or more practices, and 780 reported that they had managed to change one or more practices six months after completing the course.

Five hundred and seven (507) people who participated in the short PIN/MeNu course and were non-NAP, reported that they decreased their consumption of salt and added fat, while 532 reported that they eat meals instead of nibbling.

There are 5,034 families enrolled in EFNEP in Puerto Rico. Of these, 4,694 were graduated, 3,044 received food checks, and 1,882 participated in the WIC program.

Three hundred and sixty-nine (369) pregnant EFNEP mothers were oriented on the importance of breastfeeding and adequate prenatal care for healthier babies.

During the reporting period, 263 babies were born to EFNEP mothers and four died during their first month of life. Of the mothers enrolled in EFNEP, 121 were breastfeeding their babies.

Five thousand nine hundred and seventy-six (5,976) EFNEP youth are enrolled in the program. As a result of the nutrition educational experiences, 4,781 persons reported they are eating a variety of food and are making good use of their allowance to obtain nutritious food.

Eight hundred and forty five (8,45) volunteers helped in some stages of the program. Of these, 405 work with youth and 440 work with adults. Six thousand eight hundred and thirty two (6,832) volunteer hours were dedicated to youth and 5,089 volunteer hours to families. This represents an economic impact of $35,184.40 and $26,208.35, respectively that were saved by the use of volunteers.

Goal 4 – To achieve greater harmony (balance) between agriculture and the environment, accounted 7.48 FTE's.

The PRAES water quality program provides informal education and information to the communities in order to create awareness of the maintenance to operate rural aqueducts and to ensure the safety of the water. The assistance give to the communities was focused on how to get organized and connected with the appropriate agencies that can help them besides evaluating their actual situation. The program also deals with waste management.

During this period, 358 clients received information for the improvement of their animal production facilities. One thousand seven hundred and twenty-three (1,723) farmers were trained on adequate waste management practices in farms. Of these, 647 improved their existing waste management systems or established new ones.

Educational efforts on sustainable agriculture have been implemented in Puerto Rico during the past years. PRAES works closely with Sustainable Agriculture Research and Education (SARE) through proposals that allow the planning and coordination of educational activities to train agricultural personnel and farmers. Integrated Pest Management (IPM) is a key component of environmentally compatible technologies.

A Spanish quarterly newsletter on sustainable practices is circulated to 700 persons, mostly farmers. Five hundred (500) persons attended the First Agricultural Congress in which the sustainable approach and its importance were emphasized.

Two booklets were published on sustainable agricultural practices: one for coffee and the other for plantain.

At present, there is and agreement between the Forest Service and PRAES for the continual educational and professional improvement regarding forest management to respond to the environmental conditions in the Caribbean. The 6th Caribbean Urban Forestry Conference, held in San Juan, June 2001, emphasized emergency management and prevention practices to minimize tree damage. Two hundred and twenty (220) persons from Puerto Rico, the US Virgin Islands, and the Dominican Republic participated of the conference.

The Forest Health project was implemented by PRAES to identify and manage weeds, insects, nematodes and diseases that commonly affect trees and shrubs in forests and urban environments. Two publications on the identification and management of pests of importance to the forest system in Puerto Rico were prepared.

Six greenhouses that produce shrubs and trees for urban reforestation used and adopted three IPM practices. Forty-five (45) samples were processed in the Diagnostic Plant Clinic with a direct impact of at least $30,000 saved as a result of identifying the pest correctly.

Goal 5 – To enhance opportunities and the quality of life among families and communities accounted for a total of 71.12 FTE's.

Efforts of PRAES and the local government were combined to educate families in financial management, family budget, parenting skills, child development, consumer education, community development, family resource management, home-based business education, value of household work, energy conservation, and youth development life skills. Also, limited income

families and rural communities were assisted on how to develop themselves in order to increase the income of the families and to encourage healthy behavior of individuals, families, and communities to achieve better lifestyles to be "Healthy People and Healthy Communities".

Extension agents trained parents, families and childcare providers on parenting skills and child development at childcare centers. Two thousand and ninety-four (2,094) parents adopted child development skills and changed attitudes toward responsible parenting. Four hundred and twenty-seven (427) persons working in childcare centers were trained in childcare development. Four hundred and twenty-six (426) parents adopted skills on childcare and development.

During this fiscal year PRAES continued developing educational home-based programs to help families use their own resources and start home-based businesses to increase their family income. Six hundred and eighty eight (688) persons were trained in home-based business and 133 individuals completed the non-formal education program in which 69 persons were certified as artisans.

Eight hundred and thirty-three (833) families adopted money management and budget planning skills.

Extension agents and community leaders aim to provide a knowledge base to community development efforts geared towards increasing employment opportunities including self-employment. One thousand two hundred and forty five (1,245) persons were oriented in self-efficiency and responsibility. Five hundred and seventy-four (574) community leaders were trained on leadership and the development of community projects. Sixty-two (62) persons left their dependence on government economic assistance.

Base Programs

The Four-H Youth Development base program continued focusing on youth at risk with an increase in activities, competitiveness and projects. Fiscal year 2000-2001 accounted for 28.38 FTE's in this area.

The staff and volunteers of the 4-H program promoted the adoption of healthy lifestyles and skills that allow youth to make adequate decisions. During these periods 31,691 youth were contacted through 4-H clubs, EFNEP youth and special projects.

Four-H competitions continue to be effective methods to reach youth enrolled in the program. Twenty-six (26) competitions were celebrated at regional and state level.

Puerto Rico was the demonstration site of the 4-H project Health Rocks. Twelve (12) persons from California and Philadelphia were trained. Five hundred (500) youth and children were enrolled in the Health Rocks tobacco prevention project and reported the adoption of one or more recommended practices after completing the programs. Twenty-two (22) leaders, out of 50 trained, delivered the program in their communities. They offered 3,600 volunteer hours to the project.

During fiscal year 2000-2001, we began the project tilted RAP (Spanish for "Resaltando tu Apariencia Personal"), Enhancing your Personal Appearance, co-sponsored by the Johnson & Johnson Co. and targeted towards students grades 7 to 12. The goal of the project is to develop skills about personal hygiene and offer other information to meet the young people's individual

needs. Twenty-five (25) PRAES agents and volunteers were trained to make a pilot study with 600 students.

Three thousand six hundred and twenty-six (3,626) youth participated in after school enrichment programs, 2,393 youth developed skills and knowledge in vocational exploration.

Coalitions with the private sector were implemented to sponsor 4-H program efforts. Special recognition was given to Molinos de Puerto Rico and the Cooperative of Employees of Agricultural Agencies, which sponsored a 4-H contest and made it possible for 10 winners to travel to the National 4-H Congress.

The Community Resource Development Program (CRD) accounted 11.43 FTE's during FY 2000-2001.

Rural, urban, and suburban areas in Puerto Rico are in continuous development and evaluation. The problems and needs of the communities in these areas are many and variable, ranging from better facilities and resources, effective and efficient trade systems, and prevention of school desertion, to salubrity, among others.

During fiscal year 2000-2001, 1,792 volunteers were registered in the Community Resource Development committees in 65 local communities.

CRD trained 574 leaders on how to develop and organize a community. Seven hundred and twenty three (723) community leaders were trained on leadership and development of community projects. One hundred and nineteen (119) community projects were developed.

Groups, associations, cooperatives, and 317 small farmers were organized. These organized groups received $1,442,020 in funding.

Through PRAES education programs 179 persons improved their economic status and 52 communities established recycling projects.

The Third Home Garden Festival was celebrated at Gurabo. During this activity conferences were offered, exhibitions were presented, and volunteers leaders were awarded.

GOAL 1 – AN AGRICULTURAL SYSTEM THAT IS HIGHLY COMPETITIVE IN THE GLOBAL ECONOMY

OVERVIEW

Three years after Hurricane Georges, which is considered the most damaging hurricane of the past century that has passed through Puerto Rico in terms of agricultural losses, fiscal year 2000-2001 shows signs of recuperation. Animal, starchy crops, and vegetable production have increased. The new facilities constructed and the implementation of new technology are key factors in increased operational efficiency. This gives us a better margin to compete with imported goods.

The Land Authority privatized the pineapple and the sugar processing facilities. Pineapple processing has been successful, however, sugar operations have not achieved the expected results. The 2001 sugar season was cancelled due to lack of working capital to fix the machinery, for planting, and to cover administration. One hundred and ten thousand (110,000) tons of sugarcane were imported to supply the domestic and commercial demand.

The Puerto Rico Department of Agriculture is working in coordination with the Agricultural Extension Service to develop a plan to organize the agricultural activities of special projects like ornamentals, vegetables, starchy crops, coffee, fruits, livestock, aquaculture, and cassava with the intent to increase production, consumption, and competition with imported goods. In addition, there are plans to develop some agricultural conglomerates to develop projects in oranges, pineapple, coffee, avocado, passion fruits, and West Indian cherry.

It is expected that with the coordination of production, the participating farms will be able to organize their production to gather their products and to elaborate some of them for an effective marketing and increase their income.

As part of the reorganization of the marketing structure, imported goods will receive a more aggressive verification to avoid the entrance of products that do not meet the requirements established by law. Also, the Puerto Rico Department of Agriculture is promoting the consumption of local products through a school lunch program. The products that are part of the menu of the school lunch program are beef, poultry, starchy vegetables, fruits, dairy products, and eggs.

The Agricultural Experiment Station is collaborating with the Department of Agriculture to educate farmers on production practices, marketing, and organization of groups of farmers in order to increase the local production and farmers' income.

I. KEY THEME - AGRICULTURAL COMPETITIVENESS

A. The agricultural sector includes coffee, sugarcane, vegetables, starchy vegetables, fruit, grains, legumes, and livestock. Intensive training in recommended sustainable coffee propagation, production and post harvest practices were emphasized. One thousand nine hundred ten (1,910) coffee farmers were trained in production, propagation and handling of the green coffee bean.

The starchy crops sector increased production due to the use of pest resistant varieties and better harvesting and post harvesting techniques. A total of 5,089

farmers were trained in recommended starchy crops practices to make them more efficient.

The fruit sector is still recovering from Hurricane Georges. The temporarily damaged trees and the replacements of the permanently damaged ones are not yet in full production. Bigger efforts were put on the application of the recommended production practices. A total of 5,053 farmers were trained in the latest production practices in quality, post harvesting, and disease prevention.

The vegetable sector is growing rapidly. A total of 1,261 farmers were trained in the recommended production practices and 2,011 were trained in hydroponics systems.

The production of grains and legumes has been growing in the northern and southern part of the island. A group of farmers has shown interest in planting pigeon peas in the mountain region. A total of 248 farmers were trained in the recommended production practices.

The government privatized the sugarcane sector to make the operation more efficient and self-sufficient. The farmers are organizing the sugar mill operation. Eighty-four (84) sugarcane producers were oriented during the season in production and farm management practices.

The livestock sector includes poultry, swine, beef, forage, and dairy. Poultry increased production in the layers sector. New projects began operation and others increased their business. There was an increase of 719,000 dozen eggs. The broiler sector is in the process of increasing its participation in the local market. A total of 207 farmers were trained in the recommended production practices, business administration, and farm safety.

The swine sector increased production by 2.8 percent from the previous year. The uncontrollable number of imports has affected the development of this sector. A total of 400 swine producers were oriented in the recommended production practices.

The beef sector is still facing continuous competition from imports, which decrease the participation in the local market. A total of 547 beef farmers were trained in the recommended production practices.

The forage sector was increased to reduce dependency on concentrated feed. A total of 1,755 farmers were oriented in the recommended production practices.

The dairy sector holds the first position by income of all the agricultural sectors. As a result of continuous technical support by Extension personnel in the dairy cattle enterprise the Grade A classification was maintained. Of 398 dairy farmers, 175 participated of the dairy herd improve program. A total of 390 dairy farmers meet the parameters for somatic cells and bacterial count.

Small farmers are dedicated to the production of other livestock like honeybees, sheep and goats, horses, and rabbits. Extension personnel are working with this

sector to make it more profitable. A total of 581 producers were trained in the recommended production practices.

A total of 22,845 persons were oriented by Extension personnel on the suitable practices for a high efficiency production in all crops.

B. Impact – Of 1,910 coffee producers oriented, 1,048 (54.8%) adopted the recommended production practices. A total of 996 acres were planted of coffee. Two hundred forty-four (244) increased their production per acre. The average coffee yield increased from 9.3 to 10.8 qq/acre.

Sixty-three (63) farmers adopted recommended sugarcane production practices out of a total of 84 farmers oriented.

One thousand and fifty-nine (1,059) farmers adopted the recommended production practices in starchy crops, 8,563 acres were planted: 6,659 of plantains and bananas and 1,904 of starchy root crops.

Three hundred and seventeen (317) acres were planted of different fruits. Ninety (90) fruit producers increased their production per acre and 170 adopted post-harvesting practices.

Of all vegetable farmers oriented, 899 (71%) adopted the recommended production practices and 159 adopted the recommended hydroponics practices.

One hundred and three (103) producers (42%) of grains and legumes adopted the recommended production practices and 17 increased their income.

A total of 51 poultry producers were oriented in the recommended production practices; of these, 33 adopted practices and 29 improved farm facilities.

One hundred eighty seven (187) swine producers adopted the recommended swine production practices, 74 increased their income, and 63 established new production facilities.

Three hundred and sixty-six (366) or 67% of the beef producers adopted the recommended production practices. Fifty-five (55) improved their facilities and another 55 producers increased their herd size.

A total of 404 farmers adopted the recommended practices for forage production. Seventy-eight (78) producers planted 1,197 acres of forage.

Three hundred and ninety (390) dairy producers adopted the recommended dairy practices and 178 improved their dairy facilities. Eighty-three (83) farmers registered in the dairy herd improvement program increased their production efficiency per cow. For all farmers in DHIP, there is an average increase of 384 pounds of milk per cow.

A total of 160 livestock producers (honeybees, sheep and goat, rabbits and horses) adopted the recommended practices.

C. Source of Federal Funds – Smith Lever 3(b), 3(c) Funds

D. Scope of Impact – State specific

II. KEY THEMES: AQUACULTURE

A. The aquaculture sector is growing and is considered a profitable enterprise. There is a high demand for fish and shrimp. This enterprise is promoted through educational activities and the distribution of printed material. A total of 343 farmers were oriented in management and business financing.

B. Impact – A total of 29 farmers improved their facilities. Forty-four (44) farmers were trained in farm business administration and 50 increased their income.

C. Source of Federal Funds – Smith Lever 3(b), 3(c) Funds

D. Scope of Impact –State Specific

III. KEY THEMES: ORNAMENTAL/GREEN AGRICULTURE

A. The ornamentals sector is growing and is in great demand. However, local production does not meet the increase in demand. The lack of organized production among producers has created a market disruption. There is a lot of unplanned production creating an overstock. A total of 130 ornamental producers were trained in the recommended production practices.

B. Impact – A total of 60 ornamental producers adopted the recommended production practices. Twelve (12) producers improved their facilities and 20 increased their income.

C. Source of Federal Funds – Smith Lever 3(b), 3 (c) Funds

D. Scope of Impact – State Specific

KEY PROGRAM COMPONENT(S)

The agricultural sector faces a series of challenges related to production, marketing, and safety. To deal with this several activities were developed and offered to the public. One of the methods to provide information in an organized way is through training on several topics, such as the use of safety equipment, personal protective equipment, proper use of pesticides, health and occupational safety laws, and safe use of agricultural machinery. These trainings are offered to agronomists, farmers, and crop producers. Different means of communication used are radio, newspapers, brochures, and electronic mail. In addition, demonstration farms and field tests are also established.

Another strategy to help face agricultural challenges is to develop technical guides in management and marketing practices. The College of Agricultural Sciences coordinates and

develops research activities and is responsible to implement the program and divulge research results. Product classification and packaging techniques were established for marketing purposes.

Several ideas were developed to ensure the quality of products is enhanced. One of them entails the utilization of genetically improved plants to increase yields and make them resistant to pests and diseases. A weed control program was established, along with an effort to emphasize soil and environment protection. Furthermore, superior breeders are being imported to introduce superior traits. New structural designs for breeding farms are being used to improve efficiency and management. Seminars are offered to improve product quality, involving both government and the private sectors.

INTERNAL AND EXTERNAL LINKAGES

Internal

Personnel of the College of Agricultural Sciences, the PR Agricultural Extension Service, the Agricultural Experiment Stations, and the Sea Grant Program help with trainings, research, and information sharing.

External

The Puerto Rico Department of Agriculture helps with technical assistance and incentive programs, the Natural Resources and Conservation Service helps in the implementation of practices to save the natural resources and the environment, and the Department of Labor is a key contributor in divulging information regarding labor laws and the importance of safety at the work place.

The private sector also contributes as part of this educational effort; among these are various associations, food importers and distributors, as well as food processors and farmers. The United States Department of Agriculture is also part of this challenge by contributing its technical knowledge and research information.

Several proposals were submitted to the Southern Agriculture Research and Education (SARE), on livestock management disposal, to Rangeland Research Grant Program, and to McInter Stains for germoplasm storage and production. Other external collaborators are the Department of Animal Industry of the University of Florida, the Caribbean Basin Administrative Group (CBAG), and the National Science Foundation.

TARGET AUDIENCES

The target audiences are farmers, and farm personnel, agricultural entrepreneurs, packers, 4-H members, members of agricultural and professional associations, people from the private sector, and personnel from agencies such as the Department of Agriculture, the Natural Resources and Conservation Service, and the College of Agricultural Sciences.

EVALUATION SUMMARY

Question 1: What were the reactions of participants toward the training?

Question 2: What is the level of attitude, skills and aspirations of participants regarding the adoption of adequate agricultural practices?

Question 3: What is the level of adoption of agricultural practices among participants of non-formal education training?

Evaluation Source: Methodology: Farmer interviews and observations of recommended practices and implementation during farm visits.

Starchy Crops

Question 1: A total of 5,089 farmers were trained, and 8,816 acres of starchy crops were established.

Question 3: A total of 555 farmers increased their agricultural production. About 810 farmers adopted recommended practices. According to the State Extension Annual Report (2000-2001), 1,059 farmers adopted recommended farming practices. Ninety-nine (99) persons increased their income as a result of adopting agricultural management practices. One hundred and eighty (180) persons increased their value added of agricultural products. Out of 613 farmers trained, 183 adopted safety practices in agriculture. This represents a 30% adoption rate in one year.

Fruit

Question 1: A total of 5,033 farmers were trained. Three hundred and seventeen (317) new acres were established. Twenty-six (26) farmers were trained regarding value added.

Question 3: Ninety (90) farmers increased their agricultural production per acre. One hundred and seventy (170) farmers adopted post-crop practices in fruits. Two hundred and twenty-two (222) farmers adopted pest and disease control practices. Fifty-six (56) farmers adopted new technologies for the production of fruit and 26 farmers increased the value added of their products.

Vegetables

Question 1: A total of 1,261 farmers received orientation in recommended vegetables production practices.

Two thousand and eleven (2,011) persons received training in hydroponics cops production. As a result, 104,609 bundles of lettuce and 307,633 bundles of coriander were produced using hydroponics production methods. A total of 124 acres were planted of tomatoes, 477 of peppers, 1,091 of pumpkin, 269 of sweet peppers, 175 of onions, 77 of white cabbage, 195 of coriander, and 400 of other vegetables, and 11 of aromatic spices. Six hundred and thirty-seven (637) home gardens were established.

A total of 589 persons were trained in the concept of managing change in agriculture. Two hundred and fourteen (214) individuals were trained in aspects related to risk management in vegetable production and 321 farmers were oriented in practices of farm safety. Four hundred and thirty-three (433) persons were trained in the concept of value added for their products.

Question 2: Three hundred and ninety-six (396) persons increased their knowledge regarding value added of agricultural products. Two hundred and thirty-six (236) farmers changed their attitudes and increased their knowledge in the area of farm safety.

Question 3: One hundred and twenty (120) persons adopted risk management practices in agriculture.

Grains and Legume

Question 1: A total of 248 farmers were trained in recommended practices of grain and legumes production. Nineteen (19) persons were trained in the concept of change management in agriculture. Eight (8) were trained in the concept of value added in agriculture. Seventeen persons (17) received training in risk management. Twenty-two (22) persons were trained in farm safety practices. One hundred three (103) acres were planted of beans, 508 of corn, and 160 of pigeon peas.

Question 2: Five (5) persons changed attitudes and increased their knowledge in farm safety.

Question 3: One hundred and three (103) farmers (42%), of 248 trained, adopted recommended production practices for grains and legumes. Five (5) farmers increased the agricultural value added of their products. Twenty-four (24) persons developed a new business and 20 persons adopted new technology. Seventeen (17) farmers increased their income after adopting the recommended practices in change management in agriculture.

Coffee

Question 1: One thousand nine hundred and ten (1,910) farmers were trained.

Question 2: Three hundred and eighty one (381) farmers increased their knowledge in the area of farm safety.

Question 3: Two hundred forty-four (244) farmers increased their coffee production per acre in 622 acres. Seventy-two (72) farmers improved the quality of their coffee and 32 increased their income. Twenty-three (23) farmers improved their coffee processing facilities. Thirty (30) farmers established or improved their waste disposal systems. One hundred and sixty-three (163) farmers adopted risk management practices in coffee.

Sugarcane

Question 1: A total of 84 farmers received training in sugarcane management practices. Twenty-five (25) farmers received orientation regarding the use of farm records. Forty (40) farmers received training on agricultural finance.

Question 3: Sixty-three (63) farmers adopted recommended management practices. Twenty (20) farmers adopted the use of farm records in their business. Fifteen (15) farmers identified changes and established new goals in their farming business.

Aquaculture

Question 1. A total of 288 farmers were trained. Forty-four (44) farmers adopted risk management techniques. Forty-three (43) farmers were oriented in the concept of change in

agriculture towards the conservation of natural resources. Three hundred and sixty-eight (368) persons were benefited through educational material distributed.

Question 3: Twenty-nine (29) farmers established new facilities or improved existing ones. Forty-four (44) farmers adopted risk management techniques. Fifty (50) farmers increased their income by adopting the recommended risk management techniques in aquaculture.

Poultry Production

Question 1: Fourteen (14) farmers were oriented regarding structures for egg production.. Nineteen (19) farmers were oriented on the recommended management practices to increase egg production and 32 on the recommended practices for meat production. Fourteen (14) farmers were trained on waste management practices.

Question 3: Twenty six (26) farmers adopted recommended management practices for meat production. Twenty-one (21) farmers improved their infrastructure for poultry meat production. Fourteen (14) farmers improved their waste management system regarding poultry meat production. Seven (7) farmers adopted recommended management practices for egg production and eight (8) farmers improved their infrastructure for egg production. Three (3) farmers improved their waste management in their egg production system.

Swine

Question 3: One hundred and twenty-three (123) farmers improved their swine production. Seventy-four (74) farmers increased their net income and improved their marketing practices for swine. Sixty-three (63) farmers improved their existing facilities or established modern structures and used new technologies for the production of swine. Eighty-two (82) farmers improved their swine waste management systems complying with federal environmental regulations.

Goats and Sheep

Question 1: A total of 218 farmers were trained in recommended production practices goats and sheep. Seventy-two (72) farmers were oriented about the establishment of new facilities or the improvement present facilities. Twenty-six (26) farmers were oriented in the concept of "Managing Change in Agriculture". Twenty (20) educational activities were developed throughout the island. Six thousand (6,000) persons were benefited by orientation received through TV and radio programs.

Question 2. Five hundred (500) farmers acquired knowledge in educational activities.

Question 3: Sixty-three (63) persons adopted the recommended management practices. Twenty-three (23) farmers identified changes and established new goals for their business. Sixty (60) farmers adopted recommended risk management practices in their enterprise.

Beef Production

Question 1. Four hundred and nineteen (419) beef producers were trained in the recommended beef production practices. One hundred and sixty-three (163) beef producers were oriented about the establishment of new facilities or the improvement of existing ones.

Question 2. Thirty-eight (38) farmers changed their attitudes and improved their knowledge regarding farm safety.

Question 3. One hundred and fifty seven (157) farmers adopted the recommended meat production practices. Fifty-five (55) farmers established news facilities or improved their existing ones. Fifty-five (55) farmers increased the amount of animals in their farm. Sixty-six (66) farmers identified changes and established new goals. Five (5) farmers developed new businesses. Ten (10) farmers adopted new technology and two (2) persons adopted new safety practices.

Forage

Question 1: A total of 1,755 forage producers were trained regarding recommended forage production practices.

Question 3. Two thousand two hundred and thirty three (1,233) acres of forage were planted . A total of 83 farmers adopted the recommended forage practices. Four hundred and four (404) farmers adopted practices of forage management. Seventy-eight (78) farmers renewed and planted new acres. Eighty-five (85) farmers adopted practices of erosion and water contamination prevention.

Ornamental/Green Agriculture

Question 1. One hundred and thirty (130) farmers were oriented regarding ornamentals production techniques and 20 regarding tree production techniques. One hundred and fifty-two (152) persons were oriented about the establishment of nurseries. Ninety (90) persons were oriented about change management in agriculture and 79 about risk management.

Question 3. A total of 12 persons established their own nurseries. Twenty (20) persons increased their income. Sixty (60) individuals adopted production techniques regarding ornamentals and 10 regarding trees. Sixty-four (64) persons identified changes and established new agricultural goals. Eighteen (18) individuals established new agricultural enterprises. Seventy-four (74) persons adopted risk management practices for the production of ornamentals, for an adoption rate of 94%. Twenty (20) persons increased their income after adopting change management practices in agriculture for a success rate of 22%.

Dairy Production

Question 1. Eighty-nine (89) dairy farmers were trained regarding the use of production records for their agricultural business.

Question 3. Eighty-three (83) dairy producers in the dairy herd improvement program increased the efficiency of milk production per cow. One hundred and seventy-eight (178) milking facilities were improved.

Rabbits

Question 1. A total of 228 farmers were oriented recommended management practices. About 97 farmers received orientation about how to establish new facilities or improve their present ones. Around 20 educational activities were developed. Seventy five thousand (75,000) persons benefited from the educational material distributed regarding the prevention of accidents in the work place. About 2,000 persons participated in exhibitions, field days, and information centers. Three thousand (3,000) persons benefited from information offered through radio programs.

Question 2. Three hundred (300) persons acquired knowledge through educational activities.

Question 3. Thirty-three (33) farmers increased their income. Forty-nine (49) farmers improved their waste management systems or established new ones. Twenty-four (24) persons adopted recommended risk management practices in this enterprise.

OBJECTIVES, PERFORMANCE GOALS AND OUTPUT AND INPUT INDICATORS

OBJECTIVE 1
To produce new and value-added agricultural products and commodities.

PERFORMANCE GOAL 2
To annually increase agricultural producer awareness, understanding, and information regarding the production of new and value-added commodities and products in U.S. agriculture in which CSREES partners and cooperators play and active research, education, or extension role.

INDICATOR 1

A. The total number of persons completing non-formal education programs on production of new and value-added commodities and products. (output)

B. The total number of these persons who actually adopt one or more recommended practices or technologies within six months after completing one or more of these programs. (outcome)

Year	Indicator 1A (Output)		Indicator 1B (Outcome)	
	Target	Actual	Target	Actual
2000	1286	1080	235	134[1]
2001	1316	1714	243	253
2002	1343	0	252	0
2003	1372	0	257	0
2004	1374	0	261	0

[1]The low amount of people adopting the recommended practices is due to market changes and imports of the products.

OBJECTIVE 2
To increase the global competitiveness of the U.S. agricultural production system.

PERFORMANCE GOAL 2

To increase agricultural producer awareness, understanding, and information on improving the productivity and global competitiveness of the U.S. agricultural production system in which CSREES partners and cooperators play and active research, education, or extension role.

INDICATOR 1

A. The total number of persons completing non-formal education programs to improve the productivity and global competitiveness of the U.S. agricultural production system. (output)

B. The total number of these persons who actually adopt one or more new production techniques or strategies within six months of completing one or more of these programs. (outcome)

Year	Indicator 1A (Output)		Indicator 1B (Outcome)	
	Target	Actual	Target	Actual
2000	20066	22747	11216	9873
2001	20461	22845	11517	11792
2002	20828	0	11955	0
2003	21106	0	12264	0
2004	21403	0	12621	0

OBJECTIVE 4

To improve decision-making on public policies related to the productivity and global competitiveness of the U.S. agricultural production system.

PERFORMANCE GOAL 2

To annually increase the effectiveness of constituent and citizen participation on public policy issues affecting the productivity and global competitiveness of the U.S. agricultural production system.

INDICATOR 1

B. The total number of persons annually completing non-formal education programs on topics related to public policy issues affecting the productivity and global competitiveness of the U.S. agricultural production system. (output)

C. The total number of those persons who make use of such knowledge within six months of completing one or more of these programs. (outcome)

Year	Indicator 1A (Output)		Indicator 1B (Outcome)	
	Target	Actual	Target	Actual
2000	986	762	400	149[1]
2001	978	492[1]	406	189[1]
2002	1007	0	418	0
2003	1000	0	423	0
2004	1015	0	424	0

[1]The adoption of new practices are more difficult to implement due to factors like new environmental laws, climate, economical impact in farmers, families and global economy competition.

PROGRAM DURATION

Long Term (5 years)

ALLOCATED RESOURCES

	Resources			
Fiscal Year	State	Federal	Others Federal	Total
2000		$2,196,388.17	$75,070.00	$2,271.458.17
2001		$2,560,027.20		$2,560.027.20
2002				
2003				
2004				

ESTIMATED FTE COMMITMENT

Year	Professional			Paraprofessional		
	1862	1890	Other	1862	1890	Other
2000	79.99					
2001	78.86					
2002						
2003						
2004						

EDUCATION AND OUTREACH PROGRAMS

PRAES developed two agricultural programs in the crop and livestock area. These programs are composed by two major commodities: 1) crops, which include coffee, sugarcane, starchy vegetables, fruit, grains and legumes, and ornamental plants; and 2) livestock, which includes

honey bees, aquaculture, poultry, goats and sheep, horses, swine, rabbits, beef, dairy cattle, and forage.

Extension county agents, through the educational and outreach programs, transfer new technology developed by the Agricultural Experiment Station to farmers and the general public. They use mass media communications, farm demonstrations, leaflets, brochures, and short courses to disseminate the information to the public.

CONTACTS

Carlos A. Nazario (Prog)
Extension Poultry Specialist
PO Box 9031
Mayagüez PR 00681-9031
Voice phone: 1 787-832-4040 Ext 2221
Fax phone: 1 787-265-4130
Electronic mail: C_NAZARIO@SEAM.UPR.CLU.EDU

GOAL 2 – A SAFE AND SECURE FOOD AND FIBER SYSTEM

OVERVIEW

Secure Food

According to the Economic Report to the Governor for 1996, agriculture represents only 0.67% of the internal gross product. During the year 2000 there were approximately 1,158,288 acres of agricultural land in Puerto Rico. The island is 3,435 square miles of land with 3.9 million persons (Census of Puerto Rico 2000). The agricultural crisis in Puerto Rico has forced the island to import 70% of the food from the United States. Normally the island has a backup supply of 12 days of food. Food security in Puerto Rico could be affected by an emergency (war, mayor disaster, change in public policy, etc.) involving the United States and the subsequent reduction of the food exported to Puerto Rico. If this happened, hunger would occur, however, as food supplies in stores are adequate, consumers are virtually unaware of the problem. The government and the people are not prepared to face such a crisis.

It is indispensable that local food production be increased in a competitive manner. This includes government planning to preserve agricultural land. It is necessary to create awareness within the government at state and local levels, as well as with public and private entities, of the urgent need of increasing agricultural production for the stability and development of Puerto Rico. It is especially important to get this message across to children who in the future will be the most affected if our agriculture continues diminishing.

Puerto Rico, as a territory of the United States, benefits from USDA federal food and nutrition assistance programs (Nutrition Assistance Program, Child Nutrition Programs, School Lunch and Breakfast Programs, the Supplemental Nutrition Program (WIC), and others) to assure children and low-income families access to a healthy diet. According to Socioeconomic Indicators by Municipality of the Puerto Rico Planning Board (1993), more than 45% of the population (490,813 families and 1,413,539 individuals) received aide from the Nutritional Assistance Program (NAP) to enable them to buy food. Thus, it becomes imperative for families to receive adequate education regarding the use of affordable and nutritionally appropriate foods by using the Puerto Rico Food Pyramid as a basis for their selection. This education should increase skills already acquired by the participants.

According to the Puerto Rico Department of the Family, the money available to low-income families is minimal to provide an adequate diet. In October of 1998, PRAES initiated a project as a new area with a food security affordability component to help low-income families become more conscious of food security by improving their use of available funds. These people attended a 6-session course dealing directly with the issues of food affordability including menu planning, food selection and buying practices, as well as the use of locally grown foods.

The Puerto Rico Agricultural Extension Service (PRAES) developed ongoing food safety programs at different levels with a from the farm to the table approach. There are multi-county cooperation and Extension personnel cooperating and disseminating research results to clientele. The seafood and meat HACCP regulations and the Good Agricultural Practices Guidelines are recent examples where the agencies have identified the need for extensive outreach affords. PRAES, as part of the University of Puerto Rico, participated in a memorandum of understanding with the United States Department of Health and Human Services, the Food and Drug Administration, and the United States Department of Agriculture Food Safety and Inspection

Service. The purpose of this agreement is to establish a framework for the parties to collaborate on mutually agreed upon activities in the scientific and regulatory areas.

Integrated Pest Management (IPM) systems can help restore the environment and provide alternatives on more effective pest control to improve yield, quality, and safety of food and fiber. IPM strategies emphasize areas of impact such as safe pesticide use in the farm and control of pests in homes and food service establishments. According to FDA evaluation on food safety standards, 80% of the establishments have poor compliance with pest management strategies. Therefore, IPM emphasizes areas of impact such as households, food service establishments, and others.

The milk industry in Puerto Rico includes 398 dairy farmers. Although they are in full compliance with FDA/IMS Sanitary Standards, mastitis is still a concern at the farm level where management, and climatic elements sometimes play an important role in the development of the disease. Statistics for 2000-2001of the Puerto Rico DHIA (Dairy Herd Improvement Association) and Puerto Rico Dairy Health Project show that 98% of the dairy herds reached somatic cell counts below 400,000 cells/ml., and bacteria counts below 100,000/ml. According to research, about 30-40% of our milking cows may have some form of mastitis, requiring treatment with intra-mammary infusions either during lactation or the dry period.

Consumer: PRAES strengthened coordination with inspecting agencies and those that serve high-risk clientele to continue the Partnership for Food Safety Education to develop and support the educational campaign *Fight BAC!* Eight government agencies and the principal supermarket of the island integrate the partnership. The PR Fight BAC Campaign focused on the theme *Be Cool Chill Out* and the *Listeriosis, serious and of great concern to some consumers.*

Persons in Charge of Food Establishments - PRAES has worked this project in partnership with the Puerto Rico Department of Health, Food Establishment Hygiene Program. Food Safety and HACCP certification courses were offered to persons in charge of food establishments. The main reference of this course is the FDA Food Code, which was translated into Spanish as part of Project No. *96 - EFSQ - 1 - 4171*. This Code was adopted and approved as the Food Hygiene Regulation No. 6090 of the Puerto Rico Department of Health on February 2000. As part of this regulation all persons in charge of food establishments must a Food Safety Certification Course. The project director prepared the contents and the art of these twelve lessons and revises them every year since 1996.

I. KEY THEME – FOOD SECURITY OF SUPPLIES

A. This program uses a 5-lesson course designed for children and youth to help them understand the importance of agriculture in Puerto Rico.

B. Impact – During fiscal year 2000-2001, 70 short courses about an assured food supply were offered. Three hundred and thirty five (335) persons completed a short course of 5 or more lessons. Eighty-three (83) children and youth became aware of the impact of urban expansion on agriculture.

Two hundred and fifty one (251) children and youth planted one or more vegetables or herbs. One hundred and fifty four (154) children and youth tried foods that they previously had not eaten, 84 expressed their concern about the

security of foods for the island, and 36 adopted one or more practices to improve food security on the island.

C. Source of Federal Funds: Smith Lever 3(b), 3(c) Funds.

D. Scope of Impact: State Specific

II. KEY THEME- FOOD SECURITY: AFFORDABILITY

A. In 1998 a 6-session short course was developed to improve supermarket strategies, the use of resources to obtain food, and to improve nutrition among NAP participants and non-NAP participants. The course includes sessions to assess the current situation in terms of eating behaviors with emphasis on what they are doing right, meal planning, shopping behaviors, and food preparation.

B. Impact – During FY 2000-2001, 3,755 people participated in the course. Of these, 2,494 completed the course, 2,311 planned to change one or more practices, and 780 reported that they had managed to change one or more practices six months later. Two hundred and twenty three (223) volunteers offered 2,018 hours of volunteer service.

C. Source of Federal Funds: Smith Lever 3(b), 3(c) Funds

D. Scope of Impact: State Specific

III. KEY THEME – FOOD SAFETY- INTEGRATED PEST MANAGEMENT

A. Two thousand four hundred and two (2,402) farmers were oriented on IPM practices. Nine hundred and seventy one (971) farmers adopted one or more IPM practices in coffee, 222 in fruits, 1,059 in starchy crops, banana and plantain, and 150 in vegetable crops. The recommended IPM practices were based on visits and monitoring of pests in the farms.

Diseased samples were processed and diagnosed at the Plant Diagnostic Clinic and a written report made to farmers with the IPM practices they had to establish to maintain adequate pest control.

B. Impact – Two hundred and fifty (250) persons completed non/formal education courses on pest control practices in structures. Of 250 persons that completed non/formal education on pest control practices in structures, 201 were examined and 169 approved the course. Of these, 95 adopted one or more practices on pest control.

The early and correct diagnosis of pests in the PRAES Plant Diagnostic Clinic saved farmers $350,000. Approximately 100 to 150 farmers were oriented in IPM through visits to the farm and reports with IPM recommendations. About 1,018 persons (including farmers, agricultural agents, homeowners, agronomists and ornamental producers) received educational IPM materials.

C. Source of Federal Funds – Smith Lever 3(b), 3(c) Funds

D. Scope of Impact – State Specific

IV. KEY THEME – FOODBORNE PATHOGEN PROTECTION MASTITIS PREVENTION PROGRAM

A. Three hundred and thirty (330) dairy farms maintained bacteria counts below 100,000 units of colony per milliliter and somatic cells below 400,000 cell/ml.

Three hundred and sixty (360) dairy farmers were taught how to reduce antibiotic residues in milk.

B. Impact – Three hundred and sixty (360) dairy farmers actually adopted the practices.

C.Source of Federal Funds – Smith Lever 3(b), 3(c) Funds

D. Scope of Impact – State Specific

III. KEY THEME - FOOD SAFETY FOR CONSUMERS

A. PRAES records show that a total of 11,295 persons benefited of Food Safety for Consumers. Of the persons benefited of Food Safety for Consumers 3,095 attended 1-day educational activities, 5,858 consumers and 2,342 children and youth were contacted through non-formal short courses, and 10,092 persons demonstrated the adoption of one or more recommended practices. Two hundred and forty five (245) volunteers of the Family and Community Education Association collaborated in these activities.

It is difficult for PRAES to measure the actual number of persons reached and the number that changed behavior as a result of its educational efforts, due to the fact that personnel of other related government agencies also send out educational materials to their local offices (78 municipalities) and develop activities to promote awareness, understanding, and information among the clientele. In addition, the brochures *Enfriar rápidamente* (Be cool, chill out) and *Listeriosis: grave y preocupante para algunos consumidores* (Listeriosis: serious and of great concern to some consumers) were available through the main supermarket chains in Puerto Rico and other activities offered by health professionals. The member of the Partnership participated in various radio and TV programs, and many professionals wrote press articles in local newspapers.

B. Impact – Consumers that completed a course and fulfilled auto-evaluations demonstrated the adoption of the following recommended practices: 1,172, reduced cross contamination of foods; 2,692, improved their hand washing practices; 1,290, increased their sanitation of surfaces; 620, maintained an adequate temperature in the refrigerator; and 1,312, improved their cooking practices so that microorganisms would not survive.

C. Source of Federal Funds – Smith Lever 3(b), 3(c) Funds

D. Scope of Impact – State Specific

I. KEY THEME - FOOD SAFETY: FUTURE CHEFS COMPETITION

A. The "Future Chef's" consists of a 5-lessons course offered by PRAES personnel at local level to children and youth. Participants learn safety food handling procedures while learning nutrition and practicing food preparation. The best were selected to participate in a food preparation competition at regional and state level.

B. Impact – Two hundred and thirty (230) children and youth participated in the Regional Future Chefs Competition (five regions) and demonstrated the following good food handling practices: wash their hands every time they change from one food preparation to another, separate ready to eat from raw foods, avoid cross contamination, maintain perishable food in refrigerators, and cook at the recommended temperature.

C. Source of Federal Funds – Smith Lever 3(b), 3(c) Funds and State

D. Scope of Impact – State Specific

II. KEY THEME - FOOD SAFETY CERTIFICATION COURSE

A. The Food Safety Certification Course was continued in six municipalities of the San Juan and Caguas regions, and developed for the first time in three additional municipalities. Nine home economists and two specialists were the instructors (FTE of 2.8).

B. Impact – One thousand one hundred and ninety eight (1,198) persons in charge of food services approved the course requirements that were: attended the twelve lessons, approved certification tests with scores over 70%, auto-evaluated practices using a pre-post evaluation form, and demonstrated the adoption of the following practices related to HACCP as staged in the 2001 Food Code:

Practices evaluated	Before taking FSCC %	After taking FSCC %
1. Refuses perishable foods over 45°F during receiving	12	58
1. Employees washing their hands often	66	95
2. Disinfecting of work surface in contact with foods before food preparation and service	65	95
3. Facility has separate cutting table and utensils for meat and for vegetable and fruit	23	89

Practices evaluated	Before taking FSCC	After taking FSCC
%	22	77
%		
1. Compliance with cross contamination avoidance		
	73	100
2. Utilized correct method to defrost		
3. Disinfecting of work surface in contact with foods before food preparation and service	65	95
4. Facility has separate cutting table and utensils for meat and for vegetable and fruit	23	89
5. Compliance with cross contamination avoidance	22	77
6. Utilized correct method to defrost	73	100
7. Cook at the recommended temperature	88	100
1. Used one or both of the following methods to maintain hot food to 140°F or more		
– Use thermometer and/or	12	77
– Use time	12	89
1. Used measure to cool hot foods quickly to lower from 140°F to 41°F in six or less hours	8	82
1. Used gloves and utensils while preparing and serving ready to eat food	50	89
2. Reheat cooked foods in the stove or oven at the internal temperature of 165°F or more	33	93
3. Wash utensils with hot water and soap, rinse, and in the third compartment used a solution of chlorine, iodine or quaternary	65	94
4. Utilized a certified exterminator to keep pest management program	50	75