

Annual Report for Accomplishments and Results Guam FY2000

Location: University of Guam
College of Agriculture and Life Sciences
UOG Station
Mangilao, Guam 96923

Contact: Dr. Lee S. Yudin, Interim Associate Dean/Director
Email - lyudin@uog9.uog.edu
Voice - (671) 735-2004
Fax - (671) 734-6842

(1) Executive Summary

Goal 1. An Agricultural system that is highly competitive in the global economy. Through research and education, empower the agricultural system with knowledge that will improve competitiveness in domestic production, processing and marketing

Goal 1 Summary. There has been a substantial amount of work by both the Agriculture Experiment Station (AES) scientists and our Cooperative Extension Service specialists and agents with particular knowledge that has improved competitiveness in production and marketing on Guam and in the region. Some of this year's projects were joint efforts between AES and CES combining both Hatch and Smith Lever funds. This also includes collaborative work with other government agencies (i.e., Guam Department of Agriculture and US Natural Resources Conservation Service NRCS) and inter-regional cooperation among other Land Grant Institution in the Western Pacific. We have worked on such key themes as tropical agriculture, plant health, innovative farming techniques, aquaculture, agricultural competitiveness and profitability, value added to new and old products, plant germplasm, and ornamental horticulture to name a few. We have conducted numerous workshops and provided training material for handouts and for extension and journal publications. We realize that small island nations such as Guam will only contribute to a very small portion of the overall competitiveness in the global economy, however, we continue to encourage our farmers both in agriculture and aquaculture to strive for being the best they can be.

Some of the successes that have had the most significant change during this past year have been in the collaborative efforts with NRCS, Guam's Department of Agriculture, and CES. One of these projects promoted the use of soil management practices of farm organic matter production and wind breaks for small-scale tropical farms. From Hatch funds, one project screened 6 different cultivars of bananas that are expressing resistant potential to certain banana diseases in this part of the world. Another AES project looked at specific germplasms that could have potential worldwide benefits to many island nations who depend on traditional root crops such as sweet potato, taro, and cassava. In CES, there were great strides to improve our MIS marketing system that is used across our region. In aquaculture,

CES agents integrated small-scale farming and aquaculture to increase both the awareness of fish and farming alternatives.

On Guam, benefits are not measured by numbers alone but by measuring the increased knowledge gained from working with our scientists and agents. Twelve farmers working with sweet sop, *Annona squamosa* who have adopted better pruning techniques to increase production may perhaps have a greater impact towards the future of Guam's tropical fruit production than teaching hundreds of citrus farmers the same technique in California. The same can be said about distributing and planting 10,000 tree seedlings for wind breaks on Guam in the protection of over 45 acres of farmland has a greater impact here than those same numbers planted in other mainland areas. One particular aquaculture activity called Pond to Table focused on produce, government agencies, institutional markets and restaurants that detailed the steps involved to increase sashimi tilapia from ponds to the consumer.

Total expenditures for Goal 1 was \$751,301 (Federal and State) with \$509,000 for Research (Federal \$391,538 and State \$117,462) and \$242,301 for Extension (Federal \$186,385 and State \$55,916). Total FTE 16.3 with **Research 10.4** (Prof 3.2, ParaProf 0.6, Staff 6.0, and Admin. 0.6) and **Extension 5.9** (Prof 3.0, ParaProf 0.5, Staff 2.0, and admin 0.4)

Goal 2. A safe and secure food and fiber system. To ensure an adequate food and fiber supply and food safety through improved science based detection, surveillance, prevention, and education

Goal 2 Summary. There has been a visible amount of work by the Cooperative Extension Service specialists and agents and a limited amount of work by the Agriculture Experiment Station (AES) scientists to ensure an adequate food and fiber and food and safety detection, surveillance, prevention, and education on Guam. However, the need to place more emphasis towards this goal is becoming more and more relevant due to the new HACCP regulations. Most of this year's projects were specific to CES or AES. However, collaborative work with other government agencies were explored and these include work with the Department of Agriculture, Guam Society of Food Service Association's cafeteria managers and workers, Department of Public Health and Social Services, Guam's Restaurant Association, Guam Environmental Protection Agency and local farmers on Guam. The key themes this year were gear towards Food Safety/HACCP, Farm Safety, and Food Security.

Some of the successes that have had the most significant change during this past year have been in the number of individuals on Guam (419) that have received training for the first time with respect to HACCP rules and regulations. The statistical increase between the pre and post test results have shown excellent learning measures in what have accompanied HACCP training. These same individuals all have completed the training and have received certification in health awareness. With regards to farm safety, a very positive step has been directed to increase and promote the science of Agriculture in the school and home by teaching proper and safe use of tools in our K to 12 educational curriculum. In addition, to promote farm safety to backyard gardeners, farmers private and commercial operations. Lastly, research data was generated to determine the residue of carbaryl insecticide on commonly grown cole crops on Guam.

Benefits to Guam's clientele have centered on knowledge learned by attending the HAACP and Farm Safety workshops. The reality that HAACP and Farm Safety will play a very important role in how food on Guam is grown, stored, transported, marketed and prepared in food stands, local markets (public and private), and restaurants. We as a University community realize that our role as Extension and Research faculty will be tasked to take a closer look at the HAACP guidelines. We must make sure the steps from growing, selling, cooking, and consumption of local foods will adequately address the food supply and food safety laws. This can be done through improved science based detection, surveillance, prevention, and education on Guam

Total expenditures for Goal 2 was **\$231,917** (Federal and State) with \$105,500 for Research (Federal \$81,154 and State \$24,346) and \$126,417 for Extension (Federal \$97,245 and State \$29,172). Total FTE 5.1 with **Research 2.2** (Prof 0.5, ParaProf 0.4, Staff 1.0, and Admin. 0.3) and **Extension 2.9** (Prof 1.0, ParaProf 0.5, Staff 1.0, and admin 0.4)

Goal 3. A healthy, well-nourished population. Through research and education on nutritious foods, enable people to make health-promoting choices

Goal 3 Summary. The families, 4H, and nutrition offer youth and families educational programs that build lifelong human development skills and instill a sense of the benefits of good nutrition. These programs provide the essential foundations that empower people, in cooperation with their communities, to meet life's challenges with a certain amount of optimism. CES took the lead role in this national goal and established very crucial links in the community some of these linkages include the Department of Public Health and Social Services, Guam Memorial Hospital, The American Cancer Society, the Catholic Social Services, the Guam Diabetes Association, the American Association of Retired Person, the Widowed Support Group, Department of Education, and Headstart - to mention a few. The key themes this year were centered around decisions for health, reaching limited resource individuals and families, the Expanded Food and Nutrition Program, and collaboration through volunteerism.

Some of the successes that have had the most significant change during this past year provided nutrition information and education that promoted a healthful lifestyle. Issues included how to improve the overall quality of dietary intake, how to make nutritionally sound food choices, and the role of diet and physical fitness in the prevention of chronic diseases such as type 2 diabetes, heart disease, and cancer. EFNEP on Guam continues to provide nutrition and food resource management education for a variety of community groups. WIC, Catholic Social Services, Headstart, and Food stamp participants are among the participant groups served by EFNEP. EFNEP clients consistently exhibit improved ability to manage food resources and choose a healthful diet.

Benefits to Guam this year have centered on providing elementary school children instruction and materials that promoted the Dietary Guidelines for Americans and the national '5-a-day' message. High school students received information regarding nutrition needs for teens and six-hundred twenty-one adults received training/information on chronic disease prevention and improved food choices. A "Money 2000" program has been very successful. Individuals and families with limited resources have increased their skills not only for themselves but also for their extended families. They have increased

their self-worth and confidence among themselves and were encouraged to buy foods that are nutritious in value. An average of 104 adults, 2088 youth were enrolled in EFNEP sponsored programs. Of the EFNEP classes 56% of 1040 youth increased knowledge of essential human nutrition.

Total expenditures for Goal 3 was **\$263,551** (Federal and State) with \$21,250 for Research (Federal \$16,346 and State \$4,904) and \$242,301 for Extension (Federal \$186,385 and State \$55,916). Total FTE 6.15 with **Research 0.25** (Prof 0.25, ParaProf 0.0, Staff 0.0, and Admin. 0.0) and **Extension 5.9** (Prof 3.0, ParaProf 0.5, Staff 2.0, and admin 0.4)

Goal 4. Greater harmony between agriculture and the environment. Enhance the quality of the environment through better understanding of and building on agriculture and forestry's complex links with soil, water, air, biotic resources

Goal 4 Summary. There has been an extensive amount of work by both the Agriculture Experiment Station (AES) scientists and our Cooperative Extension Service specialists and agents with enhancing the quality of the environment through better understanding of Guam's agriculture as it relates to soil, water, air, and biotic resources. Some of this year's projects were joint efforts between AES and CES combining both Hatch and Smith Lever funds. This also includes collaborative work with other government agencies (i.e., Guam Department of Agriculture, US Natural Resources Conservation Service NRCS, Navy, Air Force, Water Conservation Districts of Guam, and Guam EPA) and inter-regional cooperation among other Land Grant Institution in the Western Pacific. We have worked on such key themes as land use, sustainable agriculture, forest resource management, agricultural waste management, integrated pest management, soil quality and erosion and wildfire management just to name a few. We have conducted numerous workshops and provided training material for handouts and for extension and journal publications. Living on a small island with a very fragile ecosystem, both Hatch and Smith Lever funds provide an essential means to help reduce the threat to our water, air, and soil. We continue to work each day throughout our community to preserve the integrity of our island's environment.

Some of the successes that have had the most significant change during this past year have been concentrated on watershed enhancement and protection, water quality and soil conservation by CES through Smith Lever funds. River waters and their impact as they carry sediment into Guam's reef waters have very sensitive environmental concerns. Activities in these watersheds include tree planting and the establishment of buffer strips and fire breaks. Another CES project worked with growing mushrooms on recyclable farm and household waste materials. Extension programming was introduced to increase the use of green manure crop, sunn hemp, *Crotalaria juncea*. One combined area of study with US-NRSC and CES was in the continuation of numerical data for erosion prediction model to be used on Guam. An area of success using McIntire Stennis funds dealt with the tissue culture of Brazilian bananas in grasslands to help contain a large amount of water and therefore slow down the spread of grassfires. A very common occurrence on Guam in the dry season (April to June). Another AES scientist had been trained off island in molecular biology techniques that he has used to develop a more sensitive analysis for a rare disease of coconut. This analysis is more sensitive to a disease of

coconut called the Coconut Tinangaja Viroid. This particular disease has the potential to destroy vast areas of coconut forests and increase the potential of soil erosion and soil infertility on Guam.

Benefits to Guam this year have consisted of planting over 50 acres of land in the Ugam watershed with *Accacia* seedlings for long term soil management. Public awareness statement that plant health is important to us because our coconut trees are critical to our island's overall environmental stability. The impact of producing mushrooms as a source of household income and utilizing household waste and animal waste in the reduction of pollutants in and around our homes. The awareness of Green manure's that potentially increase soil fertility by planting sunn hemp on fallow farmlands.

Total expenditures for Goal 4 was **\$450,161** (Federal and State) with \$250,000 for Research (Federal \$192,308 and State \$57,692) and \$200,161 for Extension (Federal \$153,970 and State \$46,191). Total FTE 10.5 with **Research 5.6** (Prof 1, ParaProf 1.0, Staff 3.0, and Admin. 0.6) and **Extension 4.9** (Prof 2.0, ParaProf 0.5, Staff 2.0, and admin 0.4)

Goal 5. Enhanced economic opportunity and quality of life for Americans. Empower people and communities, through research-based information and education, to address economic and social challenges facing our youth, families, and communities

Goal 5 Summary. The College of Agriculture and Life Sciences is so named due to the fact that a very large part of our college mission is to enhance the quality of life for our islanders. Guam's CES mission is to empower its people and communities and to address both the economic and social challenges facing our island youth, families and communities. Even though we don't have a large research base under this specific national goal there is a vast amount of effort that CES has work on during this past year. Some of this year's projects were joint efforts between CES and public and private agencies. This includes collaborative work with Department of Youth Affairs, Guam Superior Courts, Department of Mental Health and Substance Abuse, Department of Health and Social Services, Department of Education, and the Mayors Council. We have worked on such key themes as Children, Youth, and Families at Risk, Community Development, Conflict Management, Impact of Change and Rural Communities, Leadership Training and Development, Informational Technologies, and Youth Development/4H.

Some of the successes that have had the most significant change during this past year have been with distant education programs that are not only empowering people on Guam but with neighboring Community Colleges in Micronesia. We have conducted applied research projects with public agencies on risk behaviors among Guam's school age youth. In response to the alarming number of adolescent suicides in Guam and in Micronesia, CES developed an "Adolescent Suicide Intervention and Prevention Needs Assessment." In another CES role a four month training provided professionals the tools and processes which were able to enhance their effectiveness in child welfare services. A manual titled, "Wellsprings - A manual of Group Facilitation: Addressing Issues of Abuse in a Culturally Sensitive Manner" was produced this past year. In addition, a poster titled, "Storyboard of Micronesian Peoples: A navigation Chart to Better Understanding" was produced that emphasized individual identification, interpersonal mannerism and other key philosophical expressions. Teacher

mentors were trained to implement the Life Skill model of their 4H reading enhancement program. 4H activities were numerous however some of the key were in carpentry enrichment program, a one month fishery workshop, Commit to Life, and the CYFAR program.

Benefits to Guam this year have quite tangible in many of our efforts to address economic and social challenges facing our youth, families, and communities. Seven over-the-air seminars were conducted to help distance education in Micronesia via PEACESAT links. Guam Superior Court used CES/AES data in efforts to develop and secure federal funding for the juvenile courts. Data collected from our needs assessment program is being used to develop an Adolescent Suicide Manual. Sixty percent of teacher mentors increased their knowledge about drug free lifestyle. Twenty training sessions over a 17 week period for 35 Bureau of Social Service employees provided insights and training towards children/families suffering from the impact of physical/sexual abuse and neglect.

Total expenditures for Goal 5 was **\$266,026** (Federal and State) with \$23,725 for Research (Federal \$18,250 and State \$5,475) and \$242,301 for Extension (Federal \$186,385 and State \$55,916). Total FTE 6.15 with **Research 0.25** (Prof 0.25, ParaProf 0.0, Staff 0.0, and Admin. 0.0) and **Extension 5.9** (Prof 3.0, ParaProf 0.5, Staff 2.0, and admin 0.4)

(2) Planned Programs by Key Themes, Impacts

Goal 1 An Agricultural system that is highly competitive in the global economy. Through research and education, empower the agricultural system with knowledge that will improve competitiveness in domestic production, processing and marketing

Key Theme – Plant Health/Plant Production Efficiency

a. Extension/Research program – Extension in collaboration with NRCS, provides technical assistance to extension paraprofessionals and NRCS technicians on making nutrient management recommendations, which are based on crop, needs, soil tests and contributions from organic residues. The program is designed to enhance soil productivity by using plant and animal residues in the nutrient management plans while addressing animal waste issues, organic matter enhancement and water quality. The program is aimed primarily at EQUIP participants and all farmers wishing to incorporate organic residues including animal wastes into their nutrient management systems. The program incorporates crop needs with soil test results for organic matter, P & K plus P buffers based on soil pH, and nutrient credits for the organic residues.

b. Impact – Fourteen farmers are currently signed up for the EQUIP program. Three of the farmers raise hogs and grow crops simultaneously. Ten of the farmers only raise livestock with plans for applying some or all manure to pasture areas for the hogs or to dispose of the manure by allow for last farmer to pick up the manure and utilize it on his fruit and vegetable farm. Nutrient management plans have been developed for the major vegetable crops for three fruit crops being grown by the EQUIP farmers.

- c. Source of federal Funds – Smith-Lever, NRCS and EQUIP
- d. Scope of Impact – State

Key Theme – Innovative Farming Techniques/Soil Quality

a. Extension/Research program – Extension, in collaboration with NRCS and the forestry Division at the Department of Agriculture promotes the use of soil management practices, on farm organic matter production and windbreaks in small-scale tropical production systems. Extension and NRCS provides technical support and education efforts while Forestry provides plant material for the island farmers.

b. Impact – Over 10,000 tree seedlings were produced and distributed to island farmers of the establishment of windbreaks resulting in the protection of over 45 acres of farmland. Eleven farmers have inquired and received information on using various species for windbreaks and green manure crops.

- c. Source of Federal Funds – Smith-Lever and NRCS
- d. Scope of Impact – State

Key Theme – Aquaculture

a. Extension specialist has continued to work with advisory group and develop the group to the point of organizing into a formal association. Working with this group and the Aquaculture industry Advisory Committee, comprised of producers and government representatives, we have provided input for a strategic government plan for the development of aquaculture in Guam (Vision 2005).

Extension specialist has developed aquaculture demonstration facility on campus, integrating aquaculture and hydroponics and working with other extension specialists to develop and Extension Demonstration Center to showcase small-scale agriculture and aquaculture activities for the community. The Center also serves as a popular site for school field trips.

Extension specialists held 4 workshops in aquaculture to groups of producers, teacher and general public. Ratings exceeded 8 out of 10.

Extension specialists have worked with producers, especially new small-scale producers to evaluate their systems and help overcome problem areas in production cycle. They work closely with the Guam Department of Commerce, the lead government agency for aquaculture development as well aquaculture projects for their clientele.

b. Impact – More than 500 youth toured the Extension Demonstration Center and provided satisfactory rating for the system. Over 15 adult interested in pursuing aquaculture production toured the Extension Demonstration and 5 of these people have started or are in the process of starting an aquaculture system.

- c. Source of Federal Funds – Smith-Lever
- d. Scope of Impact – State Specific

Key Theme – Plant Health

a. A total of 3,000 healthy banana propagules were produced in the plant pathology laboratory, comprising 6 different cultivars of local importance, or possessing resistance to banana diseases of local importance. Additionally, the staff trained 10 individuals in banana tissue culture techniques. This included people from Palau, FSM, Saipan, and Guam, Department of Agriculture and UOG students and research assistants working for our lab and other Agricultural Experiment Station (AES) labs.

b. Impact – A tissue culture workshop was offered to the public with 14 people attending. A publication was prepared for this workshop and distributed along with planning material. Numerous farmers and home growers obtained disease-free planting stock of 6 different banana cultivars. They saved money in what it would have otherwise cost them to lose planting stock to diseases caused by nematodes, viruses, and fungi, and the fertilizers and pesticides applied to these, plus labor cost. The participants in the tissue culture workshop learned the basic concepts of plant tissue culture and took home a publication outlining the step-by-step procedure plus their choice of planting material, and learned also about the importance of plant health in banana production. Among these participants were individuals considering the possibility of starting their own small business.

- c. Source of Federal Funds – Smith-Lever
- d. Scope of Impact – Local and Regional

Key Theme – Agricultural Competitiveness/Agricultural Profitability

a. Extension and Research faculty developed, introduced and supported a new version of the regionally (American Affiliated Pacific Governments/Land Grants) accepted Production Monitoring System (ADAPMIS System). This version supports many changes requested by the island entities using the system. It also includes an important change requested by the Farm Service Agency (FSA), the ability to enter actual yields by farm or a given time period and allocate these yields over the farms individual plantings. This system serves as both a production monitoring system and market information system for the Pacific Islands. As years of data are collected it will also serve as a decision-making tool for local government decisions on agricultural prioritization. In Guam a farmer advisory committee is being consulted and is active in recommending improvements to the project.

b. Impact – The system is used across the American Pacific and has been adopted as the official production monitoring/recording system by the FSA for the American Territories in the Pacific. It has been fully adopted by several Land Grant Institutions and Departments of Agriculture in the region. Trainings were held in Guam, CNMI, Pohnpei and American Samoa over the past year. As yield data is collected and will provide proven yields for typhoon and other disaster assessments and for better farm planning and management. This is a collaborative project between Extension and Research faculty among the Land Grants across the Pacific.

- c. Source of Federal Funds – Agricultural Development in the American Pacific (ADAP)
- d. Scope of Impact – Regional across the American Pacific

Key Theme – Tropical Agriculture/Innovative Farming Techniques

- a. Extension/Research program – Extension personnel demonstrated a tree management scheme for the production of two *Annona* species and a production cycling scheme for *A. squamosa* (sweet sop) Tree training and management was demonstrated on two farms for *A. squamosa* and *A. muricata* (sour sop). Open center and central leader systems were demonstrated on *A. squamosa* while only the central leader system was demonstrated on *A. muricata*. Pruning and defoliation was used to cycle the production of *A. squamosa*.
- b. Impact – Two farmers, their workers and two extension assistants for a total of twelve people learned proper pruning techniques for developing an open center and a central leader system for the production of two tropical fruit species. The systems are being applied on about three acres of *A. Squamosa* and on about 1.5 acres of *A. muricata*. One farmer has adopted the fruit cycling system for *A. aquamosa* on about half an acre of mature sweet sop trees.
- c. Source of Federal Funds – Smith-Lever
- d. Scope of Impact – Specific to Guam

Key Theme – Adding Value to New and Old Agricultural Products

- a. Research Program – Forms of value-added products of traditional root crops such as sweet potato (*Ipomoea batatas*), taro (*Colocasia* and *Xanthosoma*) and cassava (*Manihot esculenta*) were examined by reviewing information on internet and by conducting a telephone interview survey and visitation to local vendors. The survey indicated that the most popular form of processed sweet potato and taro sold on Guam were chips while cassava was often used to make tamales, a local dish. A concept test was conducted to determine the preferred forms of sweet potato, taro and cassava currently consumed on Guam. Approximately 200 consumers participated in this survey which determined the purchase interest and liking of various processed products. The most popular taro products were chips and tamales. Sweet potato chips and breads were favorite processed products made from sweet potato. In the same research project, more than 15 germplasm lines of sweet potato were evaluated in Yigo Experimental Farm for their field performance and characteristics of tuberous roots.
- b. Impact – Consumers were shown new ways of consuming traditional root crops. The majority of respondents have indicated they would buy produce. Results of survey and field trials also encourage creating new forms of processed products. Establishment of such post-harvest activities will help increase demand for root crops.
- c. Source of Federal Funds – TSTAR
- d. Scope of Impact – Local and regional

Key Theme – Plant Germplasm/Plant Production Efficiency

- a. Research Program – Vegetable germplasms were collected and evaluated in the Vegetable Research Unit of the Agricultural Experimental Station. Crops included sweet potato (*Ipomoea batatas*), vegetable soybean (*Glycine max*), tomato (*Lycopersicon esculenta*), and cassava (*Manihot esculenta*). Those plant accessions were originally obtained from the Asian Vegetable Research Development Center (AVRDC) in Taiwan and University of Georgia, various seed companies in U.S. mainland, and local farms on Guam. Including two accessions from Rota, sweet potato germplines were evaluated for their adaptability to tropical climate in Guam cobbly clay soil. Plant growth parameters examined in this study included growth habit, leaf shape, the date of flowering, and disease and pest rating. Harvest date included plant stand, plant biomass, total yield and marketable yield. Soybean accessions and tomato cultivars are also being evaluated in Guam cobbly clay soil.
- b. Impact – Superior vegetable accessions would be selected and recommended to extension agents to disseminate information to community on Guam. This research project would help improve local production of vegetables. Releasing soybean cultivar is now in progress. Tissue culture of selected sweetpotato lines would be used for multiplication of clean planting materials and plantlets would be available to farmers on Guam.
- c. Source of Federal Funds – Hatch
- d. Scope of Impact – Local and Regional

Key Theme – Ornamental/Green Horticulture

- a. Local terrestrial orchids are being germinated aseptically from collected seed.
- b. Impact – The methodology for successfully germinating the local orchid species allows for quantities of the plants to be made available for use in the landscape. Also the methodology is transferable, allowing nurseries and hobbyists to propagate the orchids. The terrestrial species are usable as ground covers and as specimen plants in the landscape.
- c. Source of Federal Funds – Hatch
- d. Scope of Impact – Regional across the American Pacific

Key Theme – Ornamental/Green Horticulture

- a. The out-of-print publication “Plants of Guam” was digitized, to make an electronic version that is available on the web and on the PEOPLE CD.
- b. Impact – This publication is a valuable resource highlighting some of the common plants found in Guam. The information helps in identifying plants and distributing information is also included, if

available. This information has educational value from elementary school through University level classes.

- c. Source of Federal Funds – TSTAR
- d. Scope of Impact – Regional across the American Pacific

Key Theme – Ornamental/Green Horticulture

- a. Germplasm of Heliconia cultivars is being collected and grown for evaluation for use as a cut flower and as a landscape plant. The methodology for propagating by tissue culture is being developed. Surveys were conducted in Hawaii and Guam to determine which diseases occur in Hawaii and Guam. Methods for controlling the significant diseases are being developed.
- b. Impact – This genus is suited to growing in our environment. The importation of heliconias is currently restricted. Developing propagation methods makes the plant material available in viable quantities to allow its use as a commercial crop in Guam. Developing information on how to best use selected cultivars will help growers in selecting which cultivars to grow.
- c. Source of Federal Funds – TSTAR
- d. Scope of Impact – Regional across the American Pacific

Key Theme – Aquaculture/Adding Value to New and Old Agricultural Products

- a. Pond To Table – The latest aquaculture anchor program promoting general collaboration amongst local producers, institutional markets, and consumers. Its key purpose is to improve key aquaculture linkages from producer to end market. This mechanism also provides a venue to promote new aquaculture products through exhibits and demonstrations, taste testing and value-added. Such activities contribute towards expanding the potential for new enterprises and opportunities for new products and marketing. The Guam community was also exposed to the first aquaculture industry public service promotion. The ancillary benefits to consumers include alternatives for fish consumption and increases import substitution.
- b. Impact – The Pond to Table program exposure is community wide. The focus on producers (7), government agencies (4) and institutional markets (Guam Chef's Association Membership with (20) restaurants participating in the key sponsored events presented below). In the first seafood extravaganza a total of (25) industry participants directly co-hosted the charter day event. The introduction of Guam's first "saltwater conditioned" sashimi tilapia was well received. Over (200) general endorsements were made supporting Guam's aquaculture industry and the taste-testing trials of the new product and comparisons with other sashimi samplers. The continued exposure carried over through the continued showcasing of the pond to table theme in the islands annual Guam Micronesian Affair. This is a community wide and regional venue.
- c. Source of Federal Funds – Smith Lever

d. Scope of Impact – Guam

Goal 2. A safe and secure food and fiber system. To ensure an adequate food and fiber supply and food safety through improved science based detection, surveillance, prevention, and education

Key Theme - Food Safety/HACCP

a. Extension Program - The training workshops include food service managers, Department of Education Food service managers and cafeteria workers, and those who prepare food for their families. Workshops were conducted through the Center of Continuing Education and Outreach Programs, but the majority of the workshops were conducted in Guam through CES outreach programs to help empower homemakers and food handlers to improve the quality of life for themselves and their families. A great deal of collaboration was with the Department of Education on Guam.

b. Impact - 10 HACCP workshops were held during the course of the year. Each workshop had a pre and post test with respect to the management sanitation and training and health certification. Over 340 people were trained and they included - individual homemakers, food service workers, public food service workers, service managers, and restaurant managers. Most of the pre test scores were below 50 percent while the post scores averaged close to 88 percent a 38 percent increase in basic knowledge obtained after the workshop was completed.

c. Source of Federal funds - HACCP

d. Scope of Impact - specific to Guam

Key Theme - Farm Safety Program

a. Extension Program - The Guam Farm Safety Program (GFSP) works to promote the science of agriculture in the School and Home by teaching the proper, and safe use of gardening tools and equipment to instructors and students in our K – 12 educational system. As more teachers expand their classroom curriculum to include gardening, there emerges the need to protect the children by educating them on how to avoid or minimize hazards associated with gardening around the home. The information disseminated is presented in its applicability to the home environment with a conscious effort made to identify and correct existing hazards around the home.

b. Impact - As a rural community, it is quite the norm for Guam residents to maintain a backyard farm or garden as a means of added family income. Since anyone can purchase “General Use Pesticides” over the counter and use them on home grown fruits and vegetables to be consumed, regulated by nothing more than the product label. Topics on: “Safe storage and handling of pesticides”, “Personal Protective Equipment”, “Breaking the Pesticide Habit”, “The Low to NO Pesticide Approach” General “Pesticide Safety in the Home and Garden”, and “Fertilizer and chemical Storage at Home” were addressed during public workshops. Other topics covered in the 21 workshops and presentations conducted include: “Ergonomic use of Gardening and Farm Tools”, “Skin Care for the Ergonomic use of Gardening and Farm Tools”, “Skin Care for the Young and Old”, the Importance of

Proper Tools For The Job”, “Safe Pruning”, “Taking the pain out of gardening” were covered in 21 workshops and presentations to promote “Making the Home a Safer Place To Live”.

- c. Source of Federal funds - SmithLever
- d. Scope of Impact - Local

Key Theme – Food Security

- a. Research Program – The carbaryl residue on pakchoi (*Brassica rapa*) was determined by a commercial ELISA (Enzyme Linked Immuno Sorbent Assay) kit. More carbaryl was detected on plants that received irrigation water at the base of plant and the pesticide application with an additive of spreader than those plants that received overhead irrigation without spreader.
- b. Impact – A graduate student in Environmental Science Program expanded this study, wrote her MS thesis, and earned her degree in May 2000. This research project demonstrated successful use of commercial ELISA kit without sophisticated analytical lab equipment.
- c. Source of Federal funds – NAPIAP
- d. Scope of Impact – Local and Regional

Goal 3. A healthy, well-nourished population. Through research and education on nutritious foods, enable people to make health-promoting choices

Key Theme - Human Nutrition

- a. Extension/Research program - Extension personnel provided nutrition information and education that promoted a healthful lifestyle. Specific issues addressed included how to improve the overall quality of dietary intake, how to make nutritionally sound food choices, and the role of diet and physical fitness in the prevention of chronic diseases such as type 2 diabetes, heart disease, and cancer. Education was provided by both formal and non-formal presentations, health fairs, and cooking demonstrations. Written materials were also distributed.
- b. Impact - Seventy-nine elementary school children received instruction and materials that promoted the Dietary Guidelines for Americans and the national ‘5 -a-day’ message. Ninety high school students received information regarding nutrition needs for teens. Six hundred and twenty-one adults received training/information on chronic disease prevention and improved food choices.
- c. Source of Federal Funds - Smith-Lever
- d. Scope of Impact - Specific to Guam

Key Theme - Human Health

a. Extension program. The EFNEP program continues to provide nutritional and food resource management education for a variety of community groups. Women, Infant, and Children Supplemental Food Program (WIC), Catholic Social Services, Headstart, Public and Private schools, Sanctuary, Food Stamp participants, and the Salvation Army are among the participant groups served by EFNEP.

b. Impact - The total number of EFNEP program families is 140 and the new numbers enrolled is 95. 50 families are enrolled in one or more food assistance programs as a result of EFNEP assistance or recommendation. The number of persons in program families is 468. Eighteen percent of the EFNEP clients are pregnant and nursing. The age range of adult female homemaker is between 18 - 59 and the male age between 21 - 60 and over.

EFNEP clients consistently exhibit improved ability to manage food resources and choose a healthful diet. Furthermore, EFNEP graduates often become recruiters of new clients and volunteers in classes given at community based sites.

c. Source of Federal Funds – Smith-Lever (EFNEP)

d. Scope of Impact – State

Key Theme - Human Nutrition/Money 2000

a. Extension Program. Money 2000 program promoted the importance of personal financial literacy and money management. As a part of this training families in needs provided guidelines of how to spend their moneys on food especially those food of nutritional importance.

b. Impact - Educating families of how to budget their limited resources when buying food to feed their families. Nutritional information was provided with respect to certain food products, the essentials and non-essential items, and the importance on family nutrition and using your money wisely.

c. Source of Federal Funds - Smith-Lever

d. Scope of Impact - Specific to Guam

Goal 4. Greater harmony between agriculture and the environment. Enhance the quality of the environment through better understanding of and building on agriculture and forestry's complex links with soil, water, air, biotic resources.

Key Theme – Land Use (Riparian Management / Soil Erosion / Water Quality)

a. Extension/Research program. The Guam Water Planning Committee (WPC), of which Extension is a partner with the Guam EPA, the Navy, the Air Force, NRCS, Water Energy and Environment Institute, DOA, Forestry and Aquatic Wildlife Divisions and the Soil and Water Conservation Districts develops policies and administers the Clean Water Action Plan for the island. The EPC provides educational mater and programs related to environmental awareness and all issues affecting water resources. Educational efforts are currently concentrated on watershed enhancement

and protection, water quality and soil conservation. The watershed enhancement activities are concentrated in the Talofofu and Ugum watersheds. Activities in these watersheds include tree planting, ground cover establishment, riparian plantings and establishment of buffer strips and fire breaks.

b. Impacts – Over 50 acres of land in the Ugum watershed have been planted with Accacia seedlings for long term soil management. Funds are currently earmarked for the planting of another 150 acres and the planting of ground covers in the original 50+ acres. The Ugum watershed has been designated a primary watershed, which results in heightened protection against fires and other destructive activities in the watershed. Numerous news paper and television spots have featured the efforts in the Ugum watershed and the community involvement in the watershed restoration efforts. Over a hundred area students from the nearby middle school participated in the tree planting and other follow up activities in the watershed. The schoolteacher who organized the student efforts, was given an award for environmental protection by the Guam EPA.

c. Source of Federal Funds – Smith-Lever, NRCS, Forestry and EPA

d. Scope of Impact – State

Key Theme – Sustainable Agriculture – Professional Development Program

a. Recent surveys revealed that government workers involved in livestock production programs lack the basic knowledge and skills to deliver Extension and Research programs to animal producers. These surveys also indicated that the very basic management procedures remain unknown to the producers leading to low but costly production. As a result, poor service to the animal producers in the region is encountered. Most of these workers have never had the chance to attend training and staff developments in swine production and management.

A grant from SARE-PDP was approved to develop a training program for livestock personnel and hog producers in Micronesia. Correspondence and workshops are being utilized to educate and train participants. Factsheets will be produced from the pork Industry handbook and local publications from University of Hawaii and University of Guam. These educational materials are mailed on a monthly basis to participants. Two workshops will be held on Guam. Selected participants from CNMI, Yap, Chuuk, Pohnpei and Kosrae will be chosen to attend the workshop.

Another proposal has also been submitted to SARE-PDP on distance diagnosis for animal and plant diseases in Micronesia. If this proposal will be approved, it will run from 2002 to 2004.

b. Impact – There are 55 participants from the region who are receiving these factsheets. Nine lessons have been mailed and a breeding facility (gestating stalls and farrowing crate) was set up in Kitti, Pohnpei.

Feedback from participants is very encouraging. They find the information and photos in the factsheet interesting and educational. Information is presented in a simple format and language. Most of the photos are also taken from local farms. Additional participants are being added in the mailing list

- c. Source of Federal Funds – SARE
- d. Scope of Impact – Guam and Micronesia

Key Theme – Forest Resource Management

a. Researchers were able to obtain new instrumentation and training in molecular biology to develop more sensitive detection and analysis techniques for plant pathogens. An RT-PCR technique was successfully developed and tested in our plant pathology lab which is more sensitive than our previous molecular hybridization technique for the detection of CtiVd, the Coconut Tinangaja Viroid. This technology has been transferred to one other individual in the lab. Results from previous experiments have been reviewed with new analysis instruments and we have been able to obtain more and more accurate information from them. Some basic techniques in molecular biology have been transferred to four (4) students. Numerous molecular biology demonstrations have taken place in our lab to visiting high school students. One publication came out of our viroid work last year.

b. Impact - Numerous visitors, over 300 come yearly through the lab are receiving the public awareness statement that plant health is important to us because our coconut trees are of critical importance to our island's environment. Our visitors are also receiving the message that molecular biology gives us the capability of dealing with invisible pathogens such as viroids. Our publications relay the message of our capabilities and our research findings to the scientific community interested in coconut research.

- c. Source of Federal Funds – TSTAR
- d. Scope of Impact – Local and Regional

Key Theme – Agricultural Waste management Yard Waste/Composting

a. Small-scale production methods for two (2) tropical mushrooms were refined. Straw mushrooms were produced in a low-input method with dried banana leaves. Tropical oyster mushroom was produced using two methods, low-input and higher-input. Two publications and one video were prepared, one publication on the small-scale production of tropical mushrooms, and the other on spawn preparation. Mushroom production was possible from recycling farm and household waste materials. Straw mushroom was produced from dried mushrooms and chicken manure, while tropical oyster mushroom was grown from recycling coffee grounds and waste paper. Numerous homeowners found an opportunity to make some money on the side, or to pick up a new hobby. Production of edible mushrooms from organic waste is a way of recycling materials that would otherwise find their way to the island wide dump or that might alternatively get burned in the small farm and contribute to air pollution. The side product of mushroom production is organic waste that can be used to amend the soil in the farm or garden.

b. Impact – Three (3) workshops were given and a total of 105 participants attended. Several individuals who attended our workshops were successful in implementing our technology and producing

home-grown tropical mushrooms. One individual is involved in mushroom production and spawn production and supply growers on Guam and Palau. Technology transfer has thus been successful.

- c. Source of Federal Funds – SARE
- d. Scope of Impact – Local and Regional

Key Theme – Integrated Pest Management

a. Extension and research specialists tested the efficacy of using sprayed trap crops to control pumpkin beetle. Spraying a trap crop of squash has been shown to be effective in reducing beetle infestation in watermelon in Oklahoma and Texas. The spray trap crop method was not effective on Guam. Watermelons are the most valuable crop grown commercially on Guam. Methods that have been shown to reduce cost and pesticides need to be tested on Guam before recommendations are made to local farmers.

b. Impact – Cucurbit crops, such as watermelon, cucumber, melon, and squash account for nearly 70% of the farmer sold produce on Guam. The impact of making ineffective recommendations for one of Guam's major pests on Guam's number one family of crops would be damage the agriculture industry and damage the credibility of the CES.

- c. Source of Federal Funds – Smith-Lever
- d. Scope of Impact – Local and Regional

Key Theme – Soil Quality

a. Extension program was introduced to increase the use of the green manure crop, sunn hemp, *Crotalaria juncea*, a nitrogen-fixing legume is a versatile non-cash crop used to improve the soil, feed livestock, reduce nematodes, and control soil erosion. An article was written for the local newspaper and was ran in the weekly garden section. A short video on growing sunn hemp was produced for use in agriculture classes and for the College of Agriculture and Life Sciences web site.

b. Impact – Thousands of people have subscriptions to the newspaper in which the sunn hemp article appeared. Three hundred and twenty pounds of seed were purchased by the public at three hardware and feed stores on Guam. Over 90 flyers on the benefits of growing sunn hemp were distributed with the seed.

- c. Source of Federal Funds – Western Region Sustainable Agriculture Research and Education Grant.
- d. Scope of Impact – Local and Regional

Key Theme – Soil Erosion

- a. Research Program – Three-year project was continued to produce numerical data for erosion prediction model that would be developed by the USDA - Natural Resources Conservation Services (NRCS) personnel. Plant growth and decomposition studies were conducted for petsai (*Brassica rapa*), eggplant (*Solanum melongena*), cassava (*Manihot esculenta*) and common farm weeds.
- b. Impact – Annual and quarterly reports were submitted to NRCS personnel for their development of the soil erosion equations. Having one cooperating farmer in this project would help understand actual farming situation and soil erosion process in a cropping system.
- c. Source of Federal Funds – USDA NRCS
- d. Scope of Impact – Local and Regional

Key Theme – Sustainable Agriculture

- a. Research Program – The original inocula of a vesicular – arbuscular mycorrhizal fungus, *Glomus aggregatum*, were obtained from University of Hawaii. They have been maintained at the Vegetable Horticultural Laboratory, University of Guam. Phenological response of sweet corn (*Zea mays*) with the mycorrhizal fungus was evaluated. The result indicated that corn plant developed more vigorously with *G. aggregatum* indicating that the fungus improved the uptake of nutrients from roots.
- b. Impact – The project would increase in knowledge of symbiotic relationship between mycorrhiza and tropical vegetable crops. It would also assist in development of an environmentally sound crop production system through the reduction of chemical fertilizers. The result of sweet corn study was disseminated as a factsheet of Agricultural Experiment Station report. A graduate student in the Environmental Science Program co-authored the publication and gained the knowledge of Mycorrhiza.
- c. Source of Federal Funds – TSTAR
- d. Scope of Impact – Local and Regional

Key Theme – Sustainable Agriculture

- a. Research Program – Nitrogen fixing hedgerow plants are being evaluated in three different soil regimes on Guam for their adaptability to tropical agro-climate and susceptibility to diseases and pests with an emphasis of production of biomass. To date all tested plants produced fair amount of biomass in Barrigada with the slightly alkaline soil. *Flemingia macrophylla* and *Desmodium rensonii* showed their adaptability to acid soil while *Sesbania sesban* and *Leucaena leucocephala* grew well in calcareous alkaline soil. *Cajanus cajan* adapted growing in a wide range of soil types.
- b. Impact – The project promotes hedgerow inter cropping as a part of a farming practice in a sustainable agriculture on tropical islands in the western Pacific. Hedgerow inter cropping enhances productivity of limited farm lands by preventing soil erosion, providing barriers for disease and pest spread, weed suppression by mulching, and providing nutrients by addition of green manure and by

biological nitrogen fixation. Plants can be used as animal feeds. Hedgerow inter cropping also reduces the amount of fertilizer and pesticide use which potentially contaminates the island environment. Two farmers are participating in this 3-year project as co-operators. One farmer has been using selected leguminous plants as animal feeds. Collaboration with NRCS personnel would help dissemination of this cropping practice.

- c. Source of Federal Funds – SARE
- d. Scope of Impact – Local and Regional

Key Theme – Wildfire Science and Management

a. Research Program – Tissue-cultured Brazilian bananas (*Musa* spp.) were planted in grassland of Akina soil in Ija Experimental Farm to monitor for the ir growth and effects of wildfire. Although there was no natural fire occurred within the time frame of the project, this fast growing plants containing a large amount of water were expected to slow down the spread of grass fire in the southern part of Guam. Planting those bananas along borders of farmlands adjacent to the wild land would be expected to use as barrier of bush fire as well as wind break.

b. Impact – Tissue culture plantlets were sent to the Island of Palau for their study in natural resources and farm management.

- c. Source of Federal Funds – McIntire Stennis
- d. Scope of Impact – Local and Regional

Key Theme – Forest Crops

a. A list of local plants was developed from which some were selected to evaluate for use as landscape plants. Seeds and cutting of the selected material were collected. Propagation the various species by seed and cuttings were compared. Selected plants were propagated for screening for their use in the landscape.

b. Impact – These plants are adapted to our environment. Many are attractive and suitable for use in the landscape reducing the importation of exotic plants. This reduction in importation helps reduce the risk of importing aggressive weeds and insect pests and diseases. Identifying species available in Guam increases the variety of plants local nurseries can grow.

- c. Source of Federal Funds – MacIntire-Stennis
- d. Scope of Impact – Regional across the American Pacific

Goal 5 Enhanced economic opportunity and quality of life for Americans. Empower people and communities, through research-based information and education, to address economic and social challenges facing our youth, families, and communities.

Key Theme – Information Technologies

a. A regional policy forum was organized and conducted. Key stakeholders from both the public and private sector developed and reached closure concerning elements to be included as a part of a regional distance education policy frame work. Provisions were included to ensure that future distance education initiatives in the region are delivered in ways that are both sustainable and equitable.

Video conferencing equipment and related infrastructure have been secured and installed in six (6) locations across the region. Fourteen (14) technicians and operators have been trained to operate this equipment. The capability now exists to deliver educational programming into remote parts of the region on a regular basis through the use of video conferencing technology.

A regional distance education coalition has been formed involving three of the four community colleges in the region and the University of Guam. This coalition is now positioned to direct the future course of distance education in the region.

Representatives from post-secondary educational institutions in the participating jurisdictions developed a sense of shared ownership over the regional distance-education delivery system. Felt needs and wants have been clearly articulated and plans to achieve self-reliance and sustainability are progressing on schedule.

b. Impact – Seven (7) over-the-air seminars were conducted to help distance education program managers in the region, design and conduct high quality distance learning activities in their respective jurisdictions.

c. Source of Funds – Smith-Lever

d. Scope of Impact – Multistate Integrated Research and Extension (Regional)

Key Theme – Children, Youth and Families at Risk

a. Applied research projects have been conducted in collaboration with public agency programs to collect, analyze, and distribute findings of data on risk behaviors among Guam's school age youth. Accomplishments during the past year have included completion of the Guam 1999 Youth Risk Behavior Study (YRBS) and publication of a monograph reporting its major findings. Numerous fact sheets, newsletter articles and bulletins on specialized research analyses of data have been produced. Some of these have been made available on the internet-web for increasing a wider range of accessibility.

b. Impact – Guam Superior Court and a coalition of related programs used the data in efforts to develop and secure federal funding for the juvenile court system. The Department of Youth Affairs which oversees Guam's Safe & Drug Free Schools/ Communities Grant program has used the data in conferences and meetings to strengthen networking among non-government organizations delivering youth risk-prevention programs. The data has been central in strengthening linkages between

HIV/AIDS prevention programs at Guam's Department of Public Health and those at the Department of Education.

- c. Source of Funds – Smith-Lever
- d. Scope of Impact – Multistate Integrated Research and Extension (Regional)

Key Theme – Children, Youth and Families at Risk

- a. Extension/Research Program – Served as the program evaluator for the USDA's CSREES funded project titled, "Addressing the problems of Children, Youth and Families Living in At-Risk Situations Throughout the Pacific Islands Region."
- b. Impact – As a result of UOG's extension efforts, our collaborators from other land-grant institutions within the Western Pacific Region have completed training on Evaluation Collaboration. We have submitted data in a uniform format over the past four years, which has enabled us to monitor program implementation and document success at various sites. The uniform data collected was made possible by the development of a Pacific Partners Accountability form developed by the writer. Thus, data were compiled indicating the Five Year Involvement in CYFAR Pacific Partnership by Year, Topic and Site (e.g., American Samoa, Chuuk, Guam, Majuro, Palau, Pohnpei, Rota, Yap, and Kosrae)
- c. Source of Funds – Smith-Lever
- d. Scope of Impact – Multistate Integrated Research and Extension (Regional)

Key Theme – Children, Youth and Families at Risk & Community Development

- a. Extension/Research Program – In response to the alarming number of adolescent suicides in Guam and the Micronesia region, collaborative relations were established with the local Department of Education, specifically the Emotional Disabilities Program, and the University of Guam's college of Education, specifically the Guidance Counseling Program. As a result, an "Adolescent Suicide Intervention and Prevention Needs Assessment" was developed.
- b. Impact – Approximately four hundred survey forms were completed by service professional and youth in the region. Attention was given to ensure participants of the annual events such as both of the Youth for Youth conference and the Too Cool To Do Drugs Conference, which are organized by youth for youth. Data collected from the need assessment is being used to develop an Adolescent Suicide Manual that will address prevention, intervention and postvention elements of suicide. A working group is currently in place. The targeted date for completion is September 2001.
- c. Source of Funds – Smith-Lever
- d. Scope of Impact – Multistate Integrated Research and Extension (Regional)

Key Theme – Children, Youth and Families-At-Risk & Community Development

a. Extension/Research Program – Guam’s Department of Public Health and Social Services’ “Bureau of Social Services Administration (BOSSA) Personnel Training” was conducted by the University of Guam’s Cooperative Extension Service. The focus of which was to increase the competence of professionals in child welfare services and provide tools and processes, which enhance the effectiveness of agencies and organizations. Guam’s Cooperative Extension Service provided the needed expertise to implement and supplement the curriculum to enhance the knowledge and skills gained by forty BOSSA employees.

The four-month training provided the opportunity to meet objectives set in Guam’s Five-Year State Plans for family preservation and family support services. Recognizing the broad-based community involvement that is reflected in the five year plan, the training benefited not only the cadre of service providers, but also elevated the level of service provided by our island’s care giving system.

b. Impact – A pre- and post-survey were administered titled, DPHSS BOSSA Training Needs Assessment. This was done to establish a crude profile of the participants and to ascertain the impact of the training. Participants were asked to rank their knowledge of the topics before and after the training. The cumulative scores were then compiled and the difference ascertained. Specifically, the rate of change is 2,449 – 2,332, or 116. Thus, there was a 5% improvement in the participants’ knowledge after the training.

c. Source of Funds – Smith-Lever

d. Scope of Impact – Multistate Integrated Research and Extension (Regional)

Key Theme – Children, Youth and Families-At-Risk & Conflict Management

a. Extension/Research Program – A manual titled, “Wellsprings – A Manual for Group Facilitation: Addressing Issues of Abuse in a Culturally Sensitive Manner.” In addition to the program format, a number of bilingual educational pamphlets are also included in the English/Chamorro, English/Chuukese, and English/Palauan languages. The topics include: [1] Domestic Violence in the Family; [2] How to Deal with Anger in the Family; [3] How to Deal with Substance Abuse in the Family; [4] Positive Parenting; and [5] How to Use Your Extended Family as a Resource.

b. Impact – Twenty copies were distributed to all CYFAR Pacific Partners for use on their respective islands. Additional copies of the manual were provided to a number of local service providers such as the Department of Mental Health and Substance Abuse, the Department of Education, the Department of Public Health and Social Services, the Superior Court of Guam’s Client Services and Family Counseling Division.

Furthermore, the manual will be used during the Summer 2001 semester as the text for a course that will be made available to interested individuals. Class size will be limited to 25 participants.

c. Source of Funds – Smith-Lever

d. Scope of Impact – Multistate Integrated Research and Extension (Regional)

Key Theme – Children, Youth and Families, At-Risk & Impact of Change on Rural Communities

- a. Extension/Research Program – In an effort to assist human service providers and educators alike who work with people of Micronesian ethnicity, a social organization chart was developed. Going beyond the elements of social organization, the chart informs the reader of the impact traditional communities have undergone as a result of modernization. The poster is titled, Storyboard of Micronesian Peoples: A navigation Chart to Better Understanding. The elements specifically outlined include: individual identification, interpersonal mannerism, languages spoken, forms of expression, philosophical expression, philosophical outlook, religion and spirituality, healing approaches, modes of sustenance, and division of labor.
- b. Impact – Five hundred copies have been distributed throughout our land grant partners and other human service providers in the region, including educational facilities, health care agencies and grass - root organizations. Copies have also been provided to our mainland counterparts.
- c. Source of Funds – Smith-Lever
- d. Scope of Impact – Multistate Integrated Research and Extension (Regional)

Key Theme – Children, Youth, and Families at Risk Life Skill Mentorship Training Program/Drug Free Schools

- a. Extension Programming - With an MOU with Governor's Office, extension personnel developed and implemented Life Skill workshops for at risk youth in the schools and non-profit organizations. Teacher mentors were trained to implement the Life Skill model in their 4 -H Reading Enhance Program.
- b. Impact – Program reached 6,141 students from 4 elementary, 2 middle, and 2 high schools, 8-community outreaches to villages, and public displays during community sponsored events. 60% of participants increased their knowledge about a drug free lifestyle by incorporating the life skills they learned in daily living.

Three accredited schools (Daniel L. Perez Elementary, F.B. Leon Guerrero Middle and Simon Sanchez High School's) adopted Mentorship Model to implement a reading development program over a 3 - year period. 60 Peer Mentors (20 each from elementary, middle and high) were trained in the life skills; 15 teacher mentors completed a 60 hour C.E.U. training in Adolescent Youth Development and Life Skills to facilitate their role in the mentoring process. Peer Mentors served as youth leaders, working together with teachers to develop their schools reading mentorship program. Mentors will participate in school programs to improve reading skills as well as life skills. The impact of training resulted in each school developing their "Peer Mentorship Reading Program" which incorporated input from students from their perspective grade levels.

- c. Source of Federal Funds –Smith Level
- d. Scope of Impact –Local and Regional

Key Theme – Volunteer Development Training/Character/Ethics Education

- a. Extension Programming - Extension Agent prepared and incorporated a training series for volunteers on Youth Development and Life Skills. Venues for incorporating training include DOE System, 4-H Volunteers and Center for Continuing Education.
- b. Impact –Delivered a “Youth Development and Life Skills Training Series” to 135 school educators/youth service workers. Training venues include “2000 Educators Academy”, 5 training workshops for 5 different schools for “Faculty Development Day” and 7 training workshops for youth service workers from 3 non-profit organizations. Evaluations reports that training efforts increased their knowledge about Youth Development and the construction of in class activities to enrich their subject matter and promote life skills. Youth service workers have incorporated their training with existing programs to enhance social skill and peer-family relationship development. The impact of training resulted in incorporating the model into subject matter and program objectives.
- c. Source of Federal Funds –Smith-Lever
- d. Scope of Impact – Specific to Guam

Key Theme – Youth Development 4-H Clubs

- a. Extension Programming –Extension Agent implemented 4-H Carpentry and Information Technology Curriculum. Curriculums were modified to meet specific needs of students. 11 volunteers were recruited to implement the projects.
- b. Impact –The Carpentry Program was a three-week enrichment program. Eight volunteers were recruited to provide education for 12 enrolled students. As a result of the program, students learned the importance and multiple uses of wood and the environment. Students learned skills to apply to basic woodworking projects. Specific life skills learned to apply to daily living are teamwork and self-esteem.

The Untalan Middle School 4-H Information Technology Club has 15 members and 3 adult leader. Activities enhance basic education in computer skills, meeting management, leadership and teamwork and to promote positive peer relationships. Students meet weekly.

- c. Source of Federal Funds – Smith-Lever
- d. Scope of Impact – Specific to Guam

Key Theme – Youth Development/Department of Youth Affairs Project: Incorporating the Life Skills in Existing Youth Development Programs

- a. Extension Programming – “Train the Trainer” model for 6 staff of DYA. Training includes the Youth Development Model and Life Skills Model. Staff will incorporate training into existing programs. Training aimed at impacting after care programs in 3 villages or Community Resource Sites.
- b. Impact – None at this time. Still meeting with DYA officials to complete training program.
- c. Source of Federal Funds – Smith-Lever
- d. Scope of Impact – Specific to Guam

Key Theme – Training Social Service Providers

- a. Extension Programming – Extension Agents collaborated with Department of Public Health and Social Services to deliver a curriculum based training program on Family Based Approaches. Case workers servicing children and youth of child neglect and abuse.
- b. Impact – Twenty training sessions over a 17 week period for 35 Bureau of Social Service Employees providing services to children/families suffering from the impact of physical/sexual abuse or neglect. This training increased their knowledge and performance based skills for family based services. Employees incorporated information and materials into their service plans and began utilizing the information to involve greater family participation.
- c. Source of Federal Funds – Smith-Lever and Department of Public Health and Social Services.
- d. Scope of Impact – Specific to Guam

Key Theme – Leadership Training and Development

- a. Extension Programming – Extension Agent utilized 4-H leadership curriculum to train youth leaders. Youth leaders from clubs and organizations requested specific information in how to delegate and conduct effective meetings.
- b. Impact – Eight workshops were conducted specifically for youth leaders. 32 youth leaders were trained in leadership, problem solving and communication skills. Leaders applied their training with group functions and school activities. Adult volunteers continue to offer support and guidance as they “proactive” these skills with their peers.
- c. Source of Federal Funds – Smith-Lever
- d. Scope of Impact – Specific to Guam

**Key Theme – Children, Youth, and Families at Risk/Youth Youth Suicide Prevention:
“Commit To Life” Workshops**

- a. Extension Programming – Extension Agent and paraprofessional coordinated suicide prevention education outreach (“Commit To Life”) with schools. Prevention outreach efforts utilized the following

models: community based networking, life skills and experiential model. Community were involved for “break out” sessions to talk about coping with daily living and importance of life.

b. Impact – Three schools (one in which was Rota) with an estimated number of 4,500 reached. More than 350 community folks participated in the events. Students asked questions, discussed their stresses with adult volunteers. Students received support from teachers and counselors. Students’ awareness raised as to the importance of life, where to get help and how to provide peer support. Print media (PDN) covered events raising the awareness of suicide prevention education.

c. Source of Federal Funds – Smith-Lever

d. Scope of Impact – Guam and Region

Key Theme - Youth Development 4-H/Adult Volunteer Leader Training: 2000 WRLF Regional Forum

a. Extension Programming – CALS co-sponsored this annual event and funded two agents and two volunteers. Regional direction was discussed of projected 4-H programs and various activities in the region.

b. Impact – Guam 4-H program was highly recognized throughout this forum and thus adding awareness of Guam 4-H among regional representatives. 4-H volunteers participated in workshops and shared current programs on Guam; 4-H volunteers took back their training and sponsored 12 training workshops for their two respective clubs with a total of 45 members combined. Agents developed professional ties with other agents and today continue to collaborate on various 4-H programs.

c. Source of Federal Funds – Smith-Lever JC Penny

d. Scope of Impact – Guam and regional partners

Key Theme – Youth Development 4-H/Professional Development: Adolescent Growth and Development Training

a. Extension Development – Two agents planned a development training with intention to train youth service providers on Adolescent Growth and Development. Training involved approximately 40 - extension agents' from across the country. Training consisted with Youth At Risk, Communication Skills, Teamwork, Leadership Development and Training.

b. Impact – Extension Agents developed a Guam Plan for a training network. 150 educators and 15 agents have obtained training in various components in the AG&D Curriculum. On - going training will continue through the next year.

c. Source of Federal Fund – Smith-Lever and CYFAR

d. Scope of Impact – Guam and Region

Key Theme – Youth Development 4-H/Developing Non-Profit Organization: “I.M.P.A.C.T. TODAY”

- a. Extension Programming – Provided youth development training for faith based organization forming non-profit organization to promote family wellness, parenting skills, and youth - adult partnerships.
- b. Impact – Trained 6 community organizers over a two-month period on a bi-weekly basis about the 4-H model and core values in youth development. Model to serve as the basis of their services for youth development programming.
- c. Source of Federal Funds – Smith-Lever
- d. Scope of Impact – Guam

(3) Stakeholder Input Process

In years past, the University of Guam Agricultural Experiments Station and Cooperative Extension generated stakeholder input by conducting periodic Island-wide Needs Assessment Survey and by maintaining an advisory board. While it has been awhile since a “needs assessment survey” was conducted, stakeholder input continues within various aspects of community involvement, including organizations, associations, government agencies and one-on-one contacts. The input we receive are continually considered and incorporated into our research project design and extension program development and delivery. This past year however, the University held an island-wide Congress for all of its stakeholders. There was a very wide concern towards issues that concern nutrition, children, youth, and families at risk. In addition, our Resident Instruction Program a three day retreat with its community business stakeholders and a great deal of information was gathered with regards to educational desires that employers are looking for in future graduate students. Below is a list of the organizations and associations in which our professionals have membership and/or connection in one form or another:

Northern and Southern Guam Soil and Water Conservation Districts

Guam Resource and Conservation District Board

Association of Pest Control Operators

Golf Course Superintendent association

Guam Department of Agriculture

NRCS, USDA

Team Nutrition (A school meals and children’s nutrition group.)

Diabetes Education Workgroup

“IFamiliata Finenen’a” (Translated: Our Family. A family preservation and support group.)

Guam Community College Early Childhood Education Advisory Group

Island-wide Breastfeeding Coalition

Healthy Mother, Healthy Babies task Force

Consumer and Family Sciences and Agriculture Student Major Organizations

Women and Gender Studies Core

WIC Farmer's Market Planning Committee
Sanctuary Inc. (A home for troubled, abused and runaway youth.)
Department of Mental Health & Substance Abuse
Client and Family Services, Superior Court of Guam
Department of Public Health and Social Services
Department of Youth Affairs
Guma Mami, Inc.
Department of Education

(4) Update of the **Program Review Processes**, not applicable for Guam at this time

(5) Evaluation of the success of multistate, multi-institutional, and multidisciplinary activities, joint research and extension activities

The College of Agriculture and Life Sciences participates in several Multistate research projects and coordinating committees. We have participated in the W-185 project, Biological Control in Pest Management Systems of Plants, since at least 1992. In this project, the comprehensive surveys of aphids and associated natural enemies, emphasizing hymenopteran parasitoids, have been scaled back to monthly examinations of parasitoid release sites. Personnel from Northern Marianas College on Saipan and from the Department of Natural Land Resources continue to survey aphids and aphid parasitoids from Saipan, Tinian and Rota. A single mummy was observed on *Toxoptera citricida* a year after initial *A. colemani* releases were made in a lemon orchard on the Kagman Peninsula on Saipan. *Lysiphlebus testaceipes* appears to be well established on *Aphis gossypii* on Rota.

Because of the apparent lack of establishment of *A. colemani* on Guam, no further releases of *A. colemani* have been performed in Micronesia. Rather *Lysiphlebus japonicus* originating from southern Japan via Petre Stary's insectary in the Czech Republic and was placed in quarantine at Washington State University. The initial colony did not establish in the quarantine laboratory and efforts are currently underway to establish a second colony. *L. japonica* is congeneric with *Lysiphlebus testaceipes*, which has been very successful against several aphid species on Guam.

Ants associated with aphid colonies that may be affecting aphidiid parasitism in aphids on Guam have been collected sent to Dr. Laurel Hansen in Washington state for identification. Additional ants from the University of Guam's reference insect collection have been sent to Dr. J. Wetterer in care of Harvard University's Museum of Comparative Zoology for identification.

Surveys of aphid and whitefly natural enemies continue to be conducted throughout Guam and the CNMI. To date no whitefly parasitoids have been observed in this extensive sampling program which has extended over a year in all cucurbit-growing areas of Guam. This contrasts with previous whitefly parasitoid surveys on Guam where *Encarsia* species were regularly observed using the same techniques we employ.

We have participated in the W-128 project, Micro_Irrigation: Management Practices to Sustain Water Quality and Agricultural Productivity since 1994. In this project, Five microirrigation schedules were tested for vegetable crop Head Cabbage, variety F-1 hybrid Scorpio, grown on shallow Guam Cobbly Clay soil from October 26, 99 to January 25, 2000. The schedules were evaluated with respect to deep percolation, water use efficiency, and yield Two of the five schedules were - to daily

deliver 3.5mm (seasonal average pan evaporation: Ep) and 7mm (2Ep) of irrigation water in a fixed schedule. The remaining three schedules used in-situ soil moisture sensors (switching tensiometers) set at 10, 30, and 50 centibar (cb) to schedule irrigation (to turn on and to turn off automatically). Deep seepage from the 1m x 1m drainage lysimeters was checked daily. Treatments were imposed four weeks after transplanting the seedlings in the field.

There was a significant difference in head cabbage yield. The highest mean yield of 15.72 Mg/ha was obtained for B treatment, and the driest treatment (50cb) yielded the lowest at 13.62 Mg/ha. The wettest treatment 2Eo had the lowest water use efficiency at about 2.43 Mg/kL of water used. The 30cb treatment had the highest water use efficiency at 4.27 Mg/kL of water used. Deep seepage occurred after the first harvest (January 13, 2000) due to rains. The fixed schedule 2Eo produced about 1.4 times the deep seepage obtained for treatment A.

We have participated in the NC-142 project since 1994. In this project we have continued to study the influence of defoliation of papaya plants on its subsequent recovery through analysis of non-structural carbohydrates in taproot, lateral structural root and stem tissue. Papaya is a large herbaceous plant with abundant non-woody storage tissue and initial analysis indicated that carbohydrates is the oldest plants demonstrated the greatest response to defoliation. Stem and taproot sucrose content declined within two weeks of defoliation and remained low while foliage was being replaced. Fructose and glucose content were more stable throughout the study. Net photosynthesis increased and remained elevated for about 80 days during the period of recovery.

We have recently joined the S-009 project. Work on this project will center on the tropical root crops, particularly sweet potato, taro, cassava and yam. We expect that our main interactions through this multistate project will be with researchers in the 1890 institutions and the two territorial land grants in the Southern Region. We will attend the S-009 meetings for the first time this year.

We participate in several Western Regional Coordinating Committees: WCC-011 Turfgrass Research, WCC-067 Western Coordinating Committee for Sustainable Agriculture, WCC-205 Integrated Water Quality Research and Extension Programs for the Western United States, and WCC-206 Pacific Basin Tropical Agriculture. Our membership in these Multistate coordinating committees is important to both the Cooperative Extension Service and to the Agricultural Experiment because it allows our agents and scientists to interact with their counterparts from within the region and across the country. The Multistate projects and committees allow agents and scientists to interact with personnel from other government agencies and institutions and for a small isolated institution like ours, these interactions are vital to the continuing professional development of our faculty.