Annual Report of Accomplishments and Results

Research and Extension Programs

College of Micronesia Land Grant Program

Fiscal Year 2006 (October 1, 2005 – September 30, 2006)

Table of Contents

ANNUAL REPORT OF ACCOMPLISHMENTS AND RESULTS FOR COLLEGE OF MICRONESIA FOR FY 2006:

GENERAL OVERVIEW

In FY 2006, integrated research and extension programs continued on economic, social, and environmental issues that are critical to the livelihood of people and communities in Micronesia and providing new knowledge and technologies to sustain and improve the quality of life of Micronesian citizens.

With a mostly rural population that lives on mostly low-lying coral atolls, Micronesian farming of both crops and livestock are mostly on a subsistence nature. Aquaculture/mariculture demonstration projects are continuing with new advances in technology to transfer the technical know-how to Micronesians to enable them to start to actively engage in projects that would support the local economy and provide for employment to the indigenous population.

Research and development activities to help improve agricultural productivity, self-sufficiency, provide for food security, and enhance quality of life are continuing. The potential of simplified hydroponics to improve health and the economy, and utilization, processing and development of new products from banana, taro, breadfruit and cassava that are acceptable to the native population and in the local markets are ongoing projects. The trials on taro varieties (Cyrtosperma spp. & Colocasia spp.) for their suitability to grow under atoll conditions and the trials on banana varieties resistant to the black leaf streak (BLS) and other diseases and the micro propagation of elite (disease-free and high yielding) of certain banana varieties that will improve the quality and quantity of certain banana varieties for the export market are also continuing. A research project has looked at determining comparative resistance of different taro varieties to the taro leaf blight disease. Other ongoing research projects are the germplasm of staple root crops, namely sweet potato, cassava and taro, has ensured the genetic conservation of these valuable resources for future generations. This has also facilitated the continue supply of planting materials to growers and allow in-vitro multiplication of other food crops such as breadfruit and pandanus.

Activities are ongoing on resistant crop varieties and practical biological pest control measures to provide useful tools to the stakeholders for combating crop pests and diseases and increase productivity of tropical food crops. The biological control of the melon aphid and mile-a-minute is progressing well with the successful control of gallflies and mired bugs with *Chromolaena* and taro leafhopper. Activities are ongoing for the biological control of the *Mimosa diplotricha,* which is still growing along roadsides through the use of the psyllid insects.

The developing technology for the farming of pearl oyster has enabled the establishment of pilot farms in Pohnpei and the Marshall Islands and plans are underway for the transfer of this technology to other parts of Micronesia. The pearl oysters project will encourage local pearl oyster production that will benefit farmers, develop pearl oyster culture industries, create job opportunities, and support national revenues. Two new aquaculture projects involving the development of locally available feed ingredients for mass culture of giant fresh water prawn and the culture of rabbit fish also have been progressing.

Outreach programs continued to focus on a wide range of critical issues ranging from food safety and quality, health and nutrition, food security, soil management, environmental education, strengthening families and developing youth, developing leadership and

volunteerism, and managing limited natural resources and the environment. The nutrition, diet and health programs continued through a consortium of the five land-grant institutions in the American-Pacific region to stress the importance of healthy lifestyles, which include behavioral changes (physical activity and consumption of safe, nutritious local food) to combat the ever rising tide of obesity, diabetes and heart diseases and other NCDs among both children and adult. A project on endangered species of banana is trying to multiply these rare banana varieties to help with the nutritional needs for Vitamin A among both children and adult.

The youth development programs at the schools and with out-of-school children provided information to increase their knowledge and appreciation of marine and terrestrial flora and fauna. Summer programs also provided information on basic survival skills on small island communities and home economics and appropriate island lifestyles. More and more students are now exposed to computers through computer training programs at schools that provided the opportunity for children to use the Internet as an introduction to electronic connectivity and information gathering.

Water quality education programs continued in some of the island communities as collaborative efforts with international and regional organizations, government agencies, and community groups on monitoring and surveillance testing of water sources in selected areas continued. Sustainable agriculture and integrated pest management programs continued to provide farmers awareness, understanding, and information regarding the adoption of sound agricultural production practices that sustain or protect the fragile island ecosystem integrity and biodiversity.

Multi-state, multi-institutional and multi-disciplinary efforts continued through the consortium of the American-Pacific land-grant universities and colleges through the Agricultural Development in the American Pacific (ADAP) Project and with the College of Tropical and Subtropical Aquaculture (CTSA) on aquaculture projects. A cost-sharing agreement with Pohnpei State Government continues, whereby Extension Agents from the Agriculture Station have been working side-by-side with Pohnpei CES staffs.

There is still a continuing shortage of necessary human resources and professional staff, therefore human resource and capacity building efforts continued to be a top priority. Several programs and activities toward developing this area included a Financial Assistance & Scholarship Program for high school students through a summer research/extension apprenticeship program and financial assistance for college students enrolled in agriculture and home economic courses.

Other capacity building activities included sustainable agriculture workshops, pesticide application, tissue culture and nursery practice, integrated pest management, cooking demonstrations, and basic sewing attended by farmers, producers, homemakers, the youth and adult sectors of the society and the underprivileged and underrepresented.

GOAL 1 - TO ACHIEVE AN AGRICULTURAL PRODUCTION SYSTEM THAT IS COMPETITIVE IN THE GLOBAL ECONOMY.

A. Goal Accomplishment Narrative

PCC-CRE:

Four key themes were addressed this year, namely: plant germplasm, innovative farm techniques, aquaculture and value added products from root crops.

The root crops germplasm collection of taro, cassava and sweet potato was maintained at the PCC Research and Development Station. This has ensured the conservation of these valuable genetic resources for the future generation. Planting materials obtained from this germplasm collection have also been distributed to farmers. Moreover, mass propagation of high yielding and disease-resistant taro planting materials by tissue culture has provided disease-free taro planting materials for distribution to farmers. Likewise, maintenance of the taro germplasm collection in vitro ensures the preservation of Palau's indigenous taro varieties against harsh environmental stresses, as well as pests and diseases. Planting materials of different varieties of sweet potato and cassava have been distributed free to farmers in Palau. In addition, 9,250 taro planting materials were distributed free to farmers at the R & D Station and during special events in Palau.

Demonstration of various production technologies such as integrated pest management and nutrient management in the different taro production systems in Palau provided a showcase on innovative techniques for improving taro production. The application of compost, manure and fertilizer has been adopted by local farmers, thereby increasing crop yield and farmers' income.

Research and demonstration plots on the effect of fertilizer on the growth and yield of banana have been established in the fields of three farmer cooperators in Airai, Ngaremlengui, and Melekeok States.

On aquaculture, rabbitfish were reared in tanks at the Marine Resource Division and some have been released onto the reef.

Thirty-six new products from root crops were standardized. Ten (10) rootcrop processed food products were introduced in the global market during the 2006 Foodex Japan Expo. Rootcrop food products were served to 1,296 clients during their visit to the R & D Station and special events and festivals in Palau. This has enhanced potentials for local food producers to embark on a food microenterprise that will serve the needs of tourists in Palau, as well as to meet the needs of quality and nutritious foods for Palauans.

CMI-CRE:

Research and extension programs continued to address important agriculture and aquaculture issues affecting small island communities. Programs were augmented with the completion of a research and development station for pearl farming. There are now research and extension projects on Black-Lip Pearl Oyster *Pinctada margaritifera* on all aspects of hatchery production of spat, nursery rearing and grow-out husbandry. Extension training via hatchery production of spat for the industry and training of local and outer island people in different aspects of pearling are ongoing.

The agriculture researcher and his research aide were involved in a collaborative study with the Development of Sustainable Agriculture in the Pacific (DSAP) Project to determine the effect of NPK fertilizer, compost and charcoal on corn growth in field condition.

COM-FSM/CRE:

Yap Site:

Two Hatch Projects were in operation to address some key concerns of the State agriculture community and other stakeholders.

Simplified hydroponics continued and micro-gardens using simplified hydroponics gardening techniques are receiving increased attention from stakeholders in the context of small-scale horticulture solutions for emergencies.

Pacific island communities are known for their vegeculture characterized by a pattern of culturally selected traditional crops. However, over the years this pattern has changed as many people started depending on imported foods. Today, a noteworthy feature of many of the islanders is the poor intake of quality vegetables. One prime reason for the poor consumption is non-availability of these vegetables in the market. This has been a challenge in many small islands owing to poor soil quality or unusual weather patterns. In Yap Island, the simplified micro-garden concept has become handy and based on the concept, we have standardized several low cost vegetable cultivation techniques utilizing local resources and imported nutrients. Overall results of the project indicate that the method is feasible in the island environment.

The project activities tailored into three phases namely, inception phase, pilot phase and replication phase based on the set timeline. We have successfully achieved the goals of the project, and low cost techniques for the production of tomatoes, sweet peppers, okra, vegetable amaranth and lettuce were successfully standardized. The technical knowledge generated is being transmitted to stakeholders, homeowners and backyard gardeners on a continued basis.

The success with this project facilitated the receipt of a competitive grant from the US Department of Agriculture under the program for Outreach Assistance for Socially Disadvantaged Farmers at Gargey settlement for the benefit of displaced neighboring island community.

Another project was focusing on the damage potential of plant parasitic nematodes affecting crop plants. Plant parasitic nematodes are microscopic worms that exist in all cultivated lands. There are different ways they harm the plants. Some plant-parasitic nematodes like *Radopholus similis* can cause severe damage that can result in yield decrease as in swamp taro. As part of this project, we have conducted periodic surveys to assess the damage potential of parasitic nematodes affecting various food crops across Yap. Results help to formulate appropriate cultivation strategies to minimize the yield loss. The study has particular relevance in the wake of recent report from this laboratory on the nematode species causing corm rot disease of swamp taro, island's staple crop. Plant parasitic nematodes are a limiting factor in crop production and it is important to gather information through survey and assessment of plant and soil samples. Few records on the existence of nematodes are available on Yap.

ANR and home economic extension agents conducted survey visits to individual farmers around the proper island to determine winner to a food crop rehabilitation program to address the issue of typhoon Sudal damage to food crops. Results of the competition were announced during

2006 Yap-Day. The 2nd place award was given to a client while 1st prize for the youth category was received by one of the 4-H Youth Clubs.

An extension staff for a Secretariat of the Pacific Communities (SPC) Development of Sustainable Agriculture in the Pacific (DSAP) visited to follow-up on a Participatory Rural Appraisal (PRA) survey last October 2005. The DSAP representative conducted training to Extension and Agriculture and Forestry staffs to enlighten and broaden their knowledge and skills in agriculture extension field activities. She also met with eight (8) community groups, a 4-H group to demonstrate how to make nurseries, compost, and seeds germination.

Chuuk Site:

Six gardening demonstration plots and nurseries were maintained at four different islands. The demonstration gardens are the source of seeds, seedlings, suckers and cuttings for homemakers and farmers. Varieties of tapioca, breadfruit, colocasia taro, sweet potato and banana are available.

Use of seaweed as organic fertilizer to improve soil fertility was taught and demonstrated to farmers. Dead seaweeds are in abundance on the shorelines and people were encouraged to use them to improve soil fertility and to cleanup the shorelines.

Based on results of a survey conducted on agricultural needs in the communities, the ANR agent has conducted a series of trainings that integrate crop and pig farming. Trainings in the communities were held in the lagoon islands and about ten percent of the training participants have started preparing sites for their home garden.

A farmer's participatory appraisal was conducted with the leadership of the Secretariat of the Pacific Communities (SPC) Development of Sustainable Agriculture Program (DSAP). The exercise included discussion of problems and issues, prioritization, and possible solutions. Seeds from DSAP were germinated and distributed to farmers. Venues for technical assistance included farmers meeting, farm visitation, and farmers visiting the garden demonstrations. A farmer with 5-acre grassland seeking technical assistance was assisted with information and tips in raising pigs in the open.

A pilot project on using preserved breadfruit as pig feed is being implemented. A training plan has been developed for pig raisers and other interested individuals. Data on pig population was collected for the purpose of proposals for FAO and the Western Region SARE. The livestock survey was completed in three communities, which provided information on the needs and issues relating to swine production. The survey enabled Extension the opportunity to provide adequate responses to farmers and producers.

Pohnpei Site:

The project on taro (Colocasia spp.) aimed at introducing taro leaf blight resistant varieties from SPC Regional Germplasm Collection (SPC RGC) has been initiated. Disease resistance/tolerance field performance evaluation of 20 Colocasia taro varieties under the local conditions continued. SPC RGC collected the varieties from their origins of Samoa and Papua New Guinea in the South Pacific and Southeast Asia (Indonesia, Malaysia, Thailand, Philippines) and conducted field performance evaluation and selection for TLB resistance. The field performance evaluation on the characteristics of the varieties and corm quality in other locations is no guarantee that the same characteristics and quality will be retained when varieties are grown locally. Sensory evaluation of the varieties for taste preference will be conducted locally. Field performance of Colocasia taro varieties selected for leaf vegetable from

Hawaii and Japan (also germplasm collection in RGC SPC) are also being field-tested. The taro varieties for leaf vegetable suitable for growing based on the evaluation will be promoted for future nutritious food on the island.

Another project on banana was focusing on the rare traditional nutritious Pohnpeian varieties, the *Utin Iap*, *Akadahn Weitahta*, and the promising commercial variety, *Macau* continued. The varieties so far collected in numbers were Akadahn Weitahta and Utin Iap (not as many as Akadahn Weitahta) and established in the field. The few 'Macau' suckers collected are being grown and maintained in drums in the field. The other two varieties were planted and being maintained in the cooperator's home garden.

A new project funded by the Agricultural Development in the American Pacific (ADAP), Better Crops in the Pacific, aimed at identifying source of the tropical vegetable seeds, to grow and varieties suited to cultivate in the Pacific Islands. The project includes sourcing of disease resistant varieties of vegetables specifically from tropical seed companies and UH Seed Laboratory for screening/trial to determine the best varieties suited for Pohnpei. Seeds were germinated starting late March 2006 and on staggered basis until July 2006 for sweet pepper, the last crop to grow in the trial. Field performance evaluation of the varieties continued until October 2006. Harvesting was done twice per week for duration of six to 12 weeks priming depending on the crop except for pechay and head cabbage (once-over harvesting) with the assistance of the farm workers. Data on yield and number of fruits if appropriate were recorded. Field plots monitoring and technical assistance on field operations were conducted.

Extension agents assisted the FSM National Government in the planning and implementation of swine artificial insemination programs where frozen boar semen of eight improved breeds imported from the U.S. Mainland including Hampshire, Chesnut White, Land Race, Duroc, Spotted Duroc, Yorkshire, Casion's Blazer, and Walsh.

In collaboration with FSM Quarantine and SPC, extension agents took active role in training/workshops including awareness and development of contingency plans for the Avian Influenza. Training/workshops were conducted in the region of the Freely Associated States (FAS) of Palau, FSM, and the Marshall Islands. Target groups included Agriculture, EPA, Public Safety, Quarantine, Custom, Public Health, and NGOs.

Kosrae Site:

The staffs of the Micronesia Plant Propagation Research Center (MPPRC) concentrated on staple food crops and traditional medicinal plants of Kosrae like banana, taro, sweet potato and noni. On-going research focused on improving micropropagation protocols and nursery techniques for mass multiplication of different varieties of banana, taro, sweet potato and noni. More than 25,000 seedlings of different varieties of banana, taro, sweet potato and noni were produced and distributed. Extension activities continued to address important agricultural issues such as limited availability of planting material and technical assistance through increased seedling production and farm visits. Total of 17,218 seedlings of different varieties of banana, taro, sweet potato and noni were distributed to 254 local farmers. MPPRC also acquired different varieties of sweet potato and banana germplasm from regional sources.

B. Key Themes:

Key Theme – Adding Value to Agricultural Products

a). Description of Activity – [Processing of Root Crops in the Republic of Palau] - The project addressed the problem of low agricultural productivity and large importation of foods in Palau, causing self-insufficiency and lack of food security. Production and utilization of local foods like taro, tapioca, and sweet potato will result in self-sufficiency enhancing food security in the Republic. For FY 2006, 36 processed foods were standardized, broken down into 18 taro, 8 tapioca, and 10 sweet potato products. Ten (10) root crop processed food products were introduced in the global market during the 2006 Foodex Japan Expo on March 14-17, 2006. Root crop food products were served to 1,296 clients during their visit to the R & D Station and during special events and festivals in Palau.

b). Impacts/Accomplishments–Development and consumer taste tests of processed taro products resulted in the warm acceptance of such novel food items by a range of tasters. This enhances potentials for local food producers to embark on a food microenterprise that will serve the needs of tourists in Palau, as well as to meet the needs of quality and nutritious foods for Palauans.

c). Source of Funding – Hatch Act

d). Scope of Impact – County Specific (Palau)

Key Theme – Agricultural Competitiveness

a). Description of Activity – Activities on the colocasia taro resistant to black leaf streak project continued. In vitro multiplication using TDZ involving four stages with duration of four weeks in each stage were conducted. The second cycle of multiplication was completed and more than 300 cultures of five varieties for the trial on the alternative multiplication media using energy source substitute was done. Plantlets showed more vigor (turgid) and recovered quickly during transfers with substituted energy source specifically during decontamination and plantlets showing hyperhydricity. Two kinds of energy source and gelling agent substitute were tested for the alternative multiplication protocol. Alternative in vitro multiplication showed comparable response with the standard sucrose. Nursery establishment of plantlets. Acclimatization and hardening of 200 plantlets of the taro varieties were conducted. Individual acclimatized and hardened plantlets were potted after each cycle. Potted plants were maintained until distribution and planting. TLB resistance/tolerance field evaluation. The field planted taro varieties were maintained. Field/plots operation included hand weeding twice monthly and monthly fertilization with complete (N-P-K) fertilizer, composted manure (commercial chicken manure) and micronutrient application until two months before harvest. Leaf blight disease of the leaves for resistance/tolerance evaluation of the varieties was monitored and ratings collected two months before harvest. Had identified five farmer cooperators for the germplasm-farmer-linkage access and field trials using the traditional practices. Distributed and planted 144 plants for the trials in two farmer cooperators field. Leaf vegetable varieties were also distributed to homemakers in collaboration with the nutrition program.

b). Impact/Accomplishments - Thirty to more than 50 plantlets depending on the variety resulted in the two cycles of in vitro multiplication using substitutes (energy source and gelling agent). This would generate the protocol for in vitro multiplication using substitutes for easier sourcing and reducing cost for volume multiplication needs. Trials on TLB resistant/tolerant varieties evaluation in the field being conducted will generate added knowledge base information on taro. Eleven or 12 varieties were considered candidates as resistant/tolerant varieties based on morphological observations. Data on disease ratings were collected two months before harvest, corm yield and taste preference, after harvest.

c). Source of Funds – Hatch Act

d). Scope of Impact – County Specific (Pohnpei)

Key Theme – Agricultural Competitiveness

a). Description of Activity – [Collection, Micropropagation and Field Establishment of Bananas in Pohnpei] - The collected varieties of *Akadahn Weitahta* and *Utin Iap* (not as many as Akadahn Weitahta) were planted and being maintained in the cooperator household garden in the lowland. The collected 'Macau' suckers were planted and are being maintained in drums in the field. So far, suckers of Akadahn Weitahta, Utin Iap and others (Karat, three varieties for comparison) were sourced, collected and explanted. Surface sterilization of explants using hot water and usual protocol using 70% ethyl alcohol was conducted. Different concentrations of AS, Th, KdHP and BAP were tested as MS media supplements for Akadahn Weitahta and others to evaluate explanting response of the varieties. Energy source substitution in the media was also conducted. The multiplication of regenerated plantlets of Akadahn Weitahta using higher levels of the PGR (four BAP concentrations tested) was also done. Response was extremely slow and seemed abnormal. To set-up the in vivo multiplication of banana and determine the modified procedure of PIF (stem fragments explants for stocks multiplication). A modified PIF procedure germinator greenhouse will be established.

b). Impact/Accomplishments - One variety responded to the explanting media with higher concentration of BAP, AS, KdHP and Th. Regenerated Akadahn Weitahta banana plantlets transferred to multiplication media with varying high levels of BAP tested showed extremely slow response. Tissues of subsequent subcultures were not responding.

c). Source of Funding – Hatch Act

d). Scope of Impact – County Specific (Pohnpei)

Key Theme – Agricultural Competitiveness

a). Description of Activity - Experiments involving preparation of new media combinations along with altered culture conditions to improve multiplication rate and germplasm conservation of different varieties of banana, taro and sweet potato are in progress. MPPRC also acquired sweet potato and banana

germplasm from Regional Germplasm Center, Secretariat of Pacific Community in Fiji.

b). Impacts/Accomplishments - The new media combinations and culture conditions will improve the multiplication rate and germplasm conservation of different varieties of banana, taro and sweet potato. New proposals would lead to address some of the major issues related with agriculture in Kosrae state. Acquired sweet potato and banana germplasm would result in availability of new varieties for distribution to the farmers.

c). Source of Funds – Hatch, Smith Lever & Local Match

d). Scope of Impact – County Specific (Kosrae)

Key Theme – Animal Health

a). Description of Activity – For swine improvement, extension agents conducted onsite demonstrations on castration, proper feeding and watering, use of antibiotics and parasite treatment, diarrhea treatment, tooth clipping, and provided tips on proper housing, how to recognize parasites based on clinical signs, and stock selection. Four training workshops were conducted in different communities.

b). Impact/Accomplishments – There were more telephone calls relating to animal health, however, about half of the calls did not require extension agent to visit as farmers were able to carryout treatment based on recommendation over the phone. Through demonstrations and training extension agents were able to increase awareness on swine production to more than 390 farmers and homemakers. There was evidence of improved performance of animals and some farmers reported generating extra income from sales of live pigs.

c). Source of Federal Funds – Smith-Lever

d). Scope of Impact – County Specific (Pohnpei)

Key Theme – Animal Production Efficiency

a). Description of Activity – Extension agents conducted a series of training around the island to introduce and promote artificial insemination as a means to improve the local breeding stock. The trainings were necessary to inform potential program participants about what they need to do to improve pigpen, how to recognize pigs in heat, and to be aware of proper feeding and other management practices. After the training activities, interested farmers visited the office or contacted agents directly to sign up for the program. Participants were selected after agents visited their pigpens to verify if such pigpens are adequate and meet recommended requirements. Implementation of the program included the initial visit to determine adequacy of pigpen, administration of the semen, testing for pregnancy, and response to needs of individual participants.

b). Impact/Accomplishments – At reporting, 10 sows successfully produced an average of seven litters each. With better bloodline, pig performance will be

improved and animals should have better feed conversion ratio, and higher weaning weight. Farmers with first generation litter reported satisfaction in the quality of piglets and with better-feed conversion ratio and higher weaning weight the cost to feed weaners and growers is estimated to 20% less. Some reported saving enabled other essential farm activities. Manure and effluent from pigpens are being used as compost or fertilizer. Some farmers are able to earn money in exchange for manures. The ongoing selling price for live pigs is $2.00 per pound. With the quality of the offspring of the artificial insemination, one producer reported selling as high as $2.75.

c). Source of Federal Funds – Smith-Lever & Local Match

d). Scope of Impact – County Specific (Pohnpei)

Key Theme – Aquaculture

a). Description of Activity – The COM pearl project has been working actively on the Phase 3's objectives for a commercialization process (developing pearl farming business models, demonstrating small-scale commercial pearl production, making a framework on marketing strategies for the "Micronesian-brand" black pearls and pearl-related products, and collaborating with various agencies, organizations and institutions in sustainable pearl industry development. The project has been providing hatchery-produced pearl oysters as well as technical advises on oyster grow-out for those private and community-based pilot farms. In addition to the existing demonstration farms at Nett Point and Pakin Atoll, the project helped to deploy line-culture system for one private farm in Pohnpei lagoon (Nahlap Island) and two of the outer islands (Ahnt Atoll and Mwoakilloa Atoll) before the end of September 2006.

A pearl seeding operation for the pearl quality experiments continued by harvesting pearls in July 2006, from which the oysters had been seeded both in August 2004 and September 2005. The harvest operation was conducted for 1372 oysters from 04S2 group including 236 oysters with chemical-treated nucleus (FNC-group) from the test-harvest in 2005. Test-harvest of 2005 group of oysters (05S3, 05S7 and 05BR) was also conducted. In addition, the harvest of 100 re-seeded oysters, "the seconds", was made to conduct a preliminary "circle reduction" trial. As a part of continuous pearl quality improvement effort, further seeding operation was carried out in August 2006 for 500 re-seeding, "the seconds", including 260 oysters which had produced "circled" pearls for a circle-reduction trial.

Among 1372 of S2 group oysters, which had been seeded in 2004 and kept culturing after the test-harvested in 2005, 88.1% of FNC-group and 94.1% non-FNC group survived to the harvest in 2006. This indicates that the seeded oysters became stabilized and maintained their survival rate higher in the second year, compare to the first year (78.4% and 78.4%). 499 pearls which exclude non-nucleus pearls or "Keshi" were produced from 04/06S2 group resulting 45.8% pearl production success rate or "nucleus retention" rate. Survival rate of the wild-caught oysters 05BR-FNC was the highest, in which 97.5% of 320 oysters survived at the time of test-harvest in 2006, compared to the wild-caught

oysters seeded in the previous two years (67.2% in 2003-2004 and 52.0% in 2004-2005).

The results of the post-seeding survival rate and pearl success rate at the test-harvest of 05S3 group show promising outlook for 2007 harvest; FNC and non-FNC, and combined FNC and non-FNC groups, 81.3% , 79.3% and 80.7% out of 3440 seeded in 2005; and pearl success rate for 112 oysters of 05/06S3FNC was 70.5%. A small number of 150 S7-group oysters aged 21-month-old had been seeded in 2005, which resulted 76.7% post-seeding survival rate with 36.5% pearl success rate.

During the harvest in 2005, 100 oysters that produced pearls of various qualities were chosen randomly for re-seeding “the seconds” test. After 10 months cultivation, those re-seeded oysters were harvested in July 2006. A comparison of pearl quality was conducted between the specimens from the harvested “seconds” and the 2005’s “firsts”, each of which had matching tag numbers for individual quality examination. 48 “seconds” were produced from 100 “firsts”, of which 60.4% (29 pearls) became more rounded than those from the previous harvest, such as from baroque/circle/drop/semi-round to round, 10.4% became less rounded and 29.2% were similar shape as the “firsts”. 15 out of 29 (51.7%) oysters, which had produced “circled” pearls, were able to produced round-pearls by loosing circle marks. Further re-seeding experiments were carried out in August 2006 for a “circle-test” using 260 oysters, which had produced circled pearls, and 240 oysters, which had produced other shapes of pearls i.e. round/semi-round/drop/baroque. Other quality elements are being under examinations for the result obtained from 2004-2006 experiments.

The project’s hatchery and farm skill training programs continued to produce a small-scale spat production at Nett Point and to employ casual farmhands at Pakin Atoll farm. All the hatchery work has been operated by the project’s five Micronesian staff with minimum supervision by a pearl expert. During the seeding operation in August 2005, two of the project staff received formal skill training of the half-pearl seeding from a “Master Seeding Technician’, which may continue for the next few years if a further funding is available.

b). Impact/Accomplishment – As suggested from the previous results in 2003-2005 experiments, chemical-treated nucleus (FNC) in 04/06S2 group and 05/06S3 group oysters also showed similar post-seeding survival rates against non-FNC nucleus; 88.1% of FNC group and 94.1% non-FNC group, and 81.3% and 79.3%, respectively. 60.4% of the re-seeded oysters showed improvement in shape, more rounded than those pearls from “the firsts” or “virgin oysters”.

Flaw or blemish, so-called “circle” and/or “spot” marks are commonly found in a significantly large proportion (i.e. 60 % - 95 %) of total pearl production in the black pearl farming, which has been a bottleneck for profitability in farming business. The results of the harvest of the re-seeded oysters suggested a possible improvement of pearl shape, which is one of important quality elements, by a re-seeding technique. The oysters produced 15 “circled” pearls were able to produced round-pearls from “the seconds” (the oysters re-seeded right after harvesting “virgin oysters”) and additional 3 oysters which had produced “circled” pearls were able to produce more rounded pearls as “the seconds” such as

drop/baroque. The pearl quality could be improved though a certain farm management by utilizing the oysters which had produced “circled” pearls for further re-seeding operations without abandoning the oyster resources. Applying the chemical-treated nucleus also indicated pearl quality improvement, as in the previous experiments, on reducing flaw such as circle marks/spots. The combination of both techniques could contribute greater quality improvements of the black pearls.

As the Project’s hatchery and grow-out skill training continue, more oysters could be available for various research in future, such as genetic studies using the hatchery-produced oysters with know age and culture history been separated as different family groups. Two of the Project staffs are learning “half-pearl” or “mabe” seeding technique from the Project’s master seeding technician, which is regarded as the first step to become a round-pearl seeding technician after several years of practices.

c). Source of Funds – Hatch Act & DOI Funds

d). Scope of Impact – County Specific (Pohnpei)

Key Theme – Aquaculture

a). Description of Activity - Lamer Village Fish & Freshwater Prawn Projects as pilot demonstration project is being maintained. Small-scale demonstration projects will test the feasibility of growing tilapia, two species of rabbitfish, and freshwater prawn (Macrobrachium Lar) in tanks and ponds. These community-based projects were focusing on producing and sustaining these species of fish to supplement the local diets and for the export market. These species of fish are also popular with the local Filipino community and other foreigners.

b). Impacts/Accomplishments – Thirteen farmers are showing interest and requested technical assistance on pursuing small aquaculture projects in their villages. This resulted in the writing of a group proposal seeking funding cost for these new projects. Four individuals have already started a small sea cucumber business on the neighboring islands. Sea cucumber will be harvested and processed in the outer islands and sold to a local vendor in Yap for export overseas.

c). Source of Funding – Smith Lever & WSARE

d). Scope of Impact – County Specific (Yap)

Key Theme – Aquaculture

a). Description of Activity – The project entitled “Setting up of a demonstration cum training pearl farm in Majuro, Republic of the Marshall Islands (Phase I)” has been completed in October 2005. This project studied the factors affecting spat growth and survival with the set up of demonstration pearl farms and the refining of grow-out technology. The project was successful in its objectives like looking into ways which could enhance the percentage survival and growth of spat production in the farms by using more efficient rearing methods, reduction of fouling, predation, etc. The new settlement substrate feedback from the industry

has been good and it is being further refined to increase its efficiency. This information eventually would be a great boon to the more refinement and success of the commercial black pearl oyster culture in the Marshall Islands. From the industry hatchery perspective, firstly the project has been successful in producing a million spat in the first attempt and several hundred thousands thereafter with collaborative partnership with a CTSA project on pearl oysters for the industry and the community on a consistent basis for the first time in three years. This project has gone a long way into looking into ways, which could increase the percentage of spat production in the hatchery by using more efficient rearing methods.

b). Impacts/Accomplishments - This research project had a definite impact on the black pearl hatchery and farming industry of RMI. From a general perspective, the project has increased the awareness of pearl hatchery and farming potential to outer island pristine lagoon environment. Outer island people now know about the economic potential that the industry will have on the economy, generating an income for the outer islands/atolls.

c). Source of Federal Funds – Hatch

d). Scope of Impact – County Specific (Marshall Islands)

Key Theme – Aquaculture

a). Description of Activity - Project entitled “Studies on the Reproductive Cycle of the Black-Lip Pearl Oyster *Pinctada margaritifera* in selected atolls of the Republic of the Marshall Islands” completed in October 2005. Preliminary data has yielded valuable results that showed that the oysters spawn bi-monthly every odd moth to be precise. Water quality parameter was constantly monitored throughout the year and it was observed that oysters held on the farm had the tendency to mature and ripen faster than the ones held on the coral reef.

b). Impact/Accomplishments - The results of this project on spawning seasons where the results have confirmed that the oysters in Majuro lagoon spawn on the odd months of the year. These findings has had an immediate impact on the black pearl hatchery and farming industry of RMI where the knowing of the reproductive season in the selected atolls of the Marshall Islands has given the industry a better idea to plan things because knowing the spawning season has given the commercial hatchery industry more time to plan their run and get more healthy spat without inducing artificial spawning using hazardous chemicals and also for the pearl implantation industry where they can avoid implantation of the oysters during those times as there is every possibility of rejection of the nucleus if implanted during those times. These results are also vital from a management perspective because it would allow the current legislation to be modified to accommodate the non-harvesting of oysters during the spawning seasons.

c). Source of Federal Funds – Hatch

d). Scope of Impact – County Specific (Marshall Islands)

Key Theme – Aquaculture

a). Description of Activity - Research and development in black-lip pearl oyster (*Pinctada margaritifera*) grow-out technologies in the atolls of the Marshall Islands – Phase I continued in five atolls. Selected trainees from these 5 atolls were trained in both hatchery and farming techniques at the CMI CRE facility. The first spawning was conducted in October 2005. Prior to delivering the live spats to the 5 atolls, the pearl farming materials were first shipped. Between November, 2005 to April 2006, the pearl farms were set up in the five atolls and live pearl oyster spats were transported to these new farms and held there for monitoring their growth and survival rates. No significant mortality due to the transport or the new environment was noticed. The spats were healthy and growing fine. The preliminary data obtained from the test sites for growth and survival was promising and there is slightly variable in different atolls. Due to logistical reasons, first year data collection was delayed from these different test sites. Once data is available and analyzed, a proper understanding will be available whether there will be significant difference in the growth and survival of oysters in these different test sites.

Water quality parameters that were monitored during the study indicated there was not much variation in the water quality parameters like temperature, salinity, dissolved oxygen and pH.

b). Impact/Accomplishments - Due to activities of the CMI-CRE aquaculture team in the last three years, there has been a sustained interest in pearl farming from the outer atoll communities. It is with this interest in mind and requests by the respective Mayors of these atolls that this research project was written, approved and implemented. 1st phase has completed where trainees from these five atolls were trained on hatchery and pearl farming techniques by the CMICRE and CTSA Aquaculture Scientists. Satellite pearl farms were set up and live spats were transported to the farms. Trainees and CMICRE aquaculture staff communicated via cb radio to update one another on spats' progress and other related issues. We have received ongoing requests from interested Mayors and Senators who want to participate in the project.

c). Source of Funds - Hatch, Smith-Lever, CTSA, IFAFS, MSI, Rongelap Atoll Local Government

d). Scope of Impact – County Specific (Marshall Islands)

Key Theme – Diversified/Alternative Agriculture

a). Description of Activity – The objectives of this project were to develop, test and standardize suitable protocols for growing vegetables using local resources, incorporating simplified hydroponics micro-garden concept and to train interested community members in establishing low cost home hydroponics gardening systems. Project activities were undertaken in three activity phases to achieve the best outcome. Seeds and seedlings of a variety of vegetable crops were distributed to homeowners and backyard gardeners.

b). Impact/Accomplishments - Field trials utilizing simplified hydroponics micro-

garden concept focused on standardization of low cost vegetable production methods. Overall results of this research indicate that vegetable production utilizing micro-garden concept is feasible in tropical islands and has great potential. One of the sweet pepper trials involving fifteen plants produced fruits worth $734.00 in the local market. Another research on beta-carotene rich cherry tomatoes was successful in introducing an ideal salad vegetable with very high beta-carotene content for the vitamin A deficient island population. Each plant on an average produced up to 300 fruits that contain about 7070 micrograms/100 g of beta-carotene. Production techniques of tomato, sweet peppers, okra, lettuce and red vegetable amaranth disseminated and over 70 tomato and sweet pepper seedlings and seeds distributed to homeowners and backyard gardeners. Local radio and Internet served as additional means to reach information to a wider audience. Followed by the success of this project, USDA approved a follow up mission to establish a simplified micro-garden for the displaced neighboring island community at Gargey settlement.

c). Source of Federal Funds – Hatch Act

d). Scope of Impact – County Specific (Yap, FSM)

Key Theme – Emerging Infectious Diseases

a). Description of Activity - The Highly Pathogenic Avian Influenza (HPAI) is a threat to the poultry industry and birds in the islands of Micronesia. The livestock specialist took active roles in trainings and workshops on awareness and development of contingency plans in case there is an outbreak of Avian Influenza in the region. The trainings and workshops took place in each of the Micronesia islands including the Marshall Islands, Kosrae, Yap, Palau and Chuuk and involving staff from Agriculture, EPA, Public Safety, Quarantine, Custom, Public Health and NGOs. Training participants were involved in the development of a contingency plan for respective sites that included hands-on, sample collection, processing, and shipping samples for proper identification.

b). Impact/Accomplishments - A total of 94 individuals increased knowledge and awareness in Highly Pathogenic Avian Influenza (HPAI) and now have the skills to take counter action in case there are accidental introduction or an outbreak of highly pathogenic avian influenza I the region. Program participants at respective sites were able to do sample collection, processing, and shipping of samples for proper identification.

c). Source of Funds – Smith Lever

d). Scope of Impact – County Specific (FSM)

Key Theme – Home Gardening

a). Description of Activity – Seedling production of different varieties of vegetables including cabbage, eggplant, bell pepper, tomatoes, watermelon, green onion and cucumber was a major activity in this program. Individual and group sessions were conducted in the communities on basic agriculture methods, focusing on site selection, seedling preparation, planting, spacing, watering, mulching, pest

management and harvesting. Onsite monitoring and technical assistance were provided to clienteles when necessary.

b). Impacts/Accomplishments - Throughout the year, a total of 23 gardeners have engaged in the program and repeatedly replanted their garden sites every four to six months after harvesting. Total of 1,230 seedlings of different varieties of vegetables were distributed to 23 gardeners and four elementary schools represented by nine graders. Two out of 23 gardeners have established their nurseries. They have applied the skills acquired from the program by preparing the seedlings to supply and maintain their gardens. During the community fair events more than 60 clienteles from previous years involved in the crop competition and received goods and cash awards.

c). Source of Federal Funds – Smith-Lever

d). Scope of Impact – County Specific (Kosrae)

Key Theme – Home Gardening

a). Description of Activity – The Extension Agent continued to collaborate with the Taiwan Agricultural Technical Mission on a green leafy vegetable project and worked with local farmers in helping them to establish backyard green leafy vegetable gardens. The Taiwanese Mission provided gardening tools and seeds while extension staff provided information and teaching materials. Thirty-seven farmers had established their own backyard gardens and were successful in growing cucumber, corn, bell pepper, cabbage, green beans, tomatoes and eggplants.

b). Impact/Accomplishments - A local farmers association was established and officers have been elected. They were successful after meeting with the local bank for micro-loans to allow them to continue sustain their activities. There is a new farmer's market site where they can sell their produce. Some farmers are now self-employed as they managed to market their own fresh produces. .

c). Source of Federal Funds – Smith Lever

d). Scope of Impact – County Specific (Marshall Islands)

Key Theme - Innovative Farming Technique

a). Description of Activity – [Demonstration, Preservation and Improvement of Taro Production Systems in Palau] – Demonstration plots on frequency of fertilizer application in upland taro production (sers) in two planting seasons revealed that application of manure and fertilizer every two months produced the biggest plants and corms. In wetland conditions (mesei), application of manure and fertilizer at planting time had greatly improved corm yield. Moreover, control of taro leafhopper in the field was effectively achieved with the use of the mirid bug as biological control agent.

b). Impact/Accomplishments – Demonstration of various production technologies such as integrated pest management and nutrient management in the different

taro production systems in Palau provides a showcase on innovative techniques for improving taro production. These were adopted by local farmers, thereby increasing corm yield and farmer's income.

c). Source of Federal Funds – Smith-Lever

d). Scope of Impact – County Specific (Palau)

Key Theme - Plant Germplasm

a). Description of Activity - [Maintenance of Root Crop Germplasm Collection of Palau] – The germplasm collection consisting of 24 accessions of sweet potato, 53 accessions of cassava and 90 accessions of taro are currently being grown and maintained at the PCC Research and Development Station in Ngermeskang, Ngaremlengui. They are continuously being replanted to preserve and maintain these germplasm collections as planting materials of these vegetatively propagated crops cannot be stored. Likewise, fertilization at planting time and regular weeding were done to ensure good growth of the crops in the field. Planting materials of different varieties of sweet potato and cassava have been distributed to farmers in Palau. Four thousand seven hundred thirteen (4713) taro planting material were distributed free to farmers at the R & D Station and during special events in Palau.

b). Impacts/Accomplishments – The maintenance of the root crops germplasm collection of taro, cassava and sweet potato ensures the conservation of these valuable genetic resources for the future generation. Moreover, the PCC R & D Station serves as a national repository of these crops, which are the staple food in Palau. The people have also become aware of the genetic diversity of these root crops in Palau. In addition, planting materials of taro, cassava and sweet potato have been distributed to farmers to help increase root crops production in Palau.

c). Source of Federal Funds – Smith-Lever

d). Scope of Impact – County Specific (Palau)

Key Theme – Plant Germplasm

a). Program Description – [Micropropagation and In Vitro Conservation of Taro *Colocasia esculenta L. Schott* in the Republic of Palau] – Mass propagation of nineteen (19) popular taro varieties in Palau by shoot tip culture was done by continuous subculture in multiplication medium in the laboratory. There were 181 initial cultures of taro established, 4062 cultures of taro have been maintained in multiplication medium in the laboratory. In the greenhouse, 2014 taro plantlets were transferred to potted soil in plastic cups for acclimatization and 4302 taro plants have been transferred to plastic bags. A total of 4,537 tissue cultured taro plants have been distributed to farmers from the different states of Palau. For germplasm conservation, 27 varieties of taro are currently being maintained in slow growth medium in the laboratory.

b). Impacts/Accomplishments - Mass propagation of high yielding and disease-resistant taro planting materials by tissue culture has provided disease-free taro planting materials for distribution to farmers. This has ensured greater productivity of this important staple food in Palau. Likewise, maintenance of the taro germplasm collection in vitro ensures the preservation of Palau's indigenous taro varieties against harsh environmental stresses, as well as pests and diseases.

c). Source of Funding - Hatch Act Funds

d). Scope of Impact - County Specific (Palau)

Key Theme – Small Farm Viability

a). Description of Activities – The ANR Agent worked with four groups of farmers (total 37) on small-scale farming throughout the year. Onsite training included crop choices and seeds, nursery and transplanting, weeding, mulching, compost making, raised-bed making, intercropping and crop diversification, agroforestry, plant diseases, harvesting and marketing. The training took place in collaboration with the Development of Sustainable Agriculture in the Pacific (DSAP) project with SPC. The participants were encouraged to use the farm produce in family meals and to sell excess for cash income or donate to community activities. A nursery for propagation of planting materials was built with funding from DSAP.

b). Impacts/Accomplishments - More than 70% of clients now use fundamental sustainable strategies, adequate compost plus crop rotation for their vegetable gardens to maintain the soil fertility. These small farms produced enough fresh food primarily for family consumption. Engaging in vegetable gardening resulted in additional household income and improved diet and health for participating families. More farmers displayed vegetables and local food crops during the last Yap-Day Celebration than prior years. Twelve homemakers received certificate of completion of training in sustainable gardening.

c). Source of Federal Funds – Smith-Lever

d). Scope of Impact – County Specific (Yap)

Key Theme – Sustainable Agriculture/Food Security

a). Description of Activity – Eight thousand banana plantlets of eight varieties were multiplied through tissue culture at Micronesia Plant Propagation Research Center, and 6,500 banana plantlets were acclimatized in the greenhouse, which produced 6,000 elite banana seedlings of eight varieties. A total of 3,217 banana seedlings of eight varieties were distributed to 106 local farmers during the reporting year. Nine thousand noni seedlings were also produced through nursery technique and 5,135 noni seedlings of two varieties were distributed to 26 local farmers. Eleven thousand taro plantlets were multiplied through tissue culture and nursery technique and 8,514 taro seedlings of one variety were distributed to 109 local farmers. One thousand three hundred sweet potato plantlets of twelve varieties were multiplied through tissue culture and 372 sweet potato seedlings of seven varieties were distributed to 13 local farmers.

Farm visits were organized with agriculture division to provide on-site help, recommendations and critical information on land preparation, planting material preparation, planting material storage, methods of planting, time and distance of planting, replanting, fertilizer application, cultivation, weeding and harvesting etc). Farm visits were also conducted to collect germplasm of different varieties of banana, taro and noni.

b). Impact/Accomplishments - Mass-scale production of planting material and distribution of seedlings is helping to solve the issue of availability of limited planting material. On-site help, recommendations and critical information through farm visits will increase farmers' knowledge and skills, which ultimately would lead to the development of sustainable agriculture and food security.

c). Source of Funds – Hatch, Smith Lever & Local Match

d). Scope of Impact – County Specific (Kosrae)

Key Theme – Tropical Agriculture

a). Description of Activity - Field trials was conducted on varieties of common vegetables to assess varieties that best suited local conditions. Preliminary field evaluation has been completed indicating local constraints to specific crop or variety. Management techniques and pests control methods were developed in response to conditions as encountered. Field plots monitoring and plots maintenance technical assistance continued. Field performance evaluation is continuing. Records on yield are being collected.

b). Impact/Accomplishments - Based on the preliminary yield results of field trials and marketability of the crops, the farmer cooperator would like to procure seeds for commercial planting of all varieties of bitter gourd, cucumber, head cabbage, pechay, sweet pepper, and okra. A 200-head pigpen will be established in the farm for the manure as source of organic fertilizer.

c). Source of Federal Funds – Hatch, Smith-Lever & ADAP

d). Scope of Impact – County Specific (Pohnpei)

Key Theme – Tropical Agriculture

a). Description of Activity - Agriculture extension agents assisted in selection of farmers who participated in the on-going yam project. Ten farmers again were selected from each of the five municipalities and were provided with 100 pounds of yam. Agents assisted in selection of sites for the yam plantings and visited regularly to monitor growth and disease incidents as well as other problems associated with the project. At harvest time, extension agents were on hand to collect yield data.

b). Impacts/Accomplishments - More than 100 farmers participated in the program with many of them reporting improved production and generating additional income from marketing of yam. Almost 8,000 pounds were harvested from 30 of

the 50 yam program participants. Many of the farmers reported selling some of their harvest at a market price of $1.00 per pound). Two of the 20 yam farmers in one of the five municipalities have completed the first and 2nd cycle sold their yams for $1,447.00. As a result of the project, farmers are able to provide more and larger yams during the traditional activities.

c). Source of Funds – SPC/Smith Lever

d). Scope of Impact – County Specific (Pohnpei)

C. Allocated Resources

Fiscal Resources

Extension

Year	Federal	State	Local	Other
2000	300,953	107,483	21,479	0
2001	276,931	55,193	69,225	0
2002	237,954	47,378	71,599	0
2003	223,165	47,727	37,879	0
2004	270,308	12,304	24,209	0
2005	281,783	16,411	33,317	0
2006	281,783	16,411	33,317	0

Research

Year	Federal	State	Local	Other
2000	407,240	85,470	10,055	0
2001	291,492	71,817	59,143	0
2002	405,333	102,846	96,796	0
2003	323,303	6,437	19,589	0
2004	364,101	14,924	14,054	0
2005	324,809	9,064	18,402	0
2006	324,809	9,064	18,402	0

Summary of FTE Allocation:
Expenditures from formula funds from Hatch and Smith-Lever 3b&c and local matching funds were used to fund research, extension and integrated research and extension projects. In general, these monies were used for salaries and wages and fringe benefits of research, extension, and administrative staffs. International travels for program personnel to participate in workshops, meetings and conferences designed for exchange of information, ideas and forming regional collaboration in projects were also funded. Domestic travels were for monitoring progress on research and extension projects throughout the vast region that programs are situated. Publication/printing costs on published articles in local newspapers, scientific journals and manuals; proceedings, pamphlets and brochures were part of the total expenditures. Communication within the COM region and to offices collaborating with the College through phone calls, faxes, e-mails and regular mails was also an expense.

Human Resources (FTEs)

Extension FTEs

Year	Professional			Paraprofessional		
	1862	1890	Other	1862	1890	Other
2000	3.60	0.0	0.0	18.70	0.0	0.0
2001	4.80	0.0	0.0	17.00	0.0	0.0
2002	3.30	0.0	0.0	13.20	0.0	0.0
2003	4.10	0.0	0.0	13.70	0.0	0.0
2004	4.05	0.0	0.0	13.20	0.0	0.0
2005	4.05	0.0	0.0	13.20	0.0	0.0
2006	4.05	0.0	0.0	13.20	0.0	0.0

Research SYs Only

Year	Scientist Years			Research Assistants		
	1862	1890	Other	1862	1890	Other
2000	6.17	0.0	0.0	3.00	0.0	0.0
2001	5.40	0.0	0.0	3.12	0.0	0.0
2002	4.80	0.0	0.0	3.25	0.0	0.0
2003	4.40	0.0	0.0	3.12	0.0	0.0
2004	4.20	0.0	0.0	3.20	0.0	0.0

2005	3.70	0.0	0.0	3.20	0.0	0.0
2006	3.70	0.0	0.0	3.20	0.0	0.0

Of the FY 2006 total FTE of 73.50, 24.15 have been assigned to programs/projects that support Goal 1, representing 33% of the total FTE for all programs. The FY2006 budget allocated to support programs and activities under Goal 1 takes into account this FTE distribution, plus how Goal 1 integrates with other programs conducted by COM as a whole.

GOAL 2 - A SAFE, SECURE FOOD AND FIBER SYSTEM.

Goal Accomplishment Narrative

PCC-CRE:

Palau's economy is stable, but due to large food importation, the Gross Domestic Product (GDP) contributed by agriculture and fisheries has declined lately. Consumer taste test of local processed food products developed from available resources showed warm acceptance of such novel food items from tourists and locals alike. These results show potentials of embarking on food microenterprises that will serve the food needs of people, foods that are safe, nutritious, and affordable.

CMI-CRE:

Extension programs continued to serve communities in several outer islands, sharing information on safe, secure food and fiber system.

Involvement in the ADAP Healthy Living in the Pacific Islands project continued with the successful implementation of planned activities by the EFNEP Extension Agent with the cooperation and collaboration of the Director of the Youth to Youth in Health program, a local NGO that worked closely with our program to ensure that programs reach a wider area and serve a diverse audience.

COM-FSM/CRE:

Yap Site:

Pacific island communities are known for its vegeculture characterized by a pattern of culturally selected traditional food crops. However, over the years the pattern has changed as many people stated depending on imported processed foods. Today, a noteworthy feature of many of the island population is poor intake of quality and green leafy vegetables. Production of quality vegetable is always challenging in many small islands owing to poor soil quality or unusual weather patterns. In Yap Island, the simplified micro-garden concept has become handy, and based on this concept several low cost vegetable cultivation techniques were standardized utilizing local resources and imported nutrients. Overall results of the project indicated that the method is feasible in the island environment.

The project was implemented in three stages namely, inception phase, pilot phase and replication phase based on the set timeline. Goals of the project were successfully achieved and low cost techniques for the production of tomatoes, sweet peppers, okra, vegetable amaranth and lettuce successfully standardized). The technical knowledge regarding field trials is being transmitted to stakeholders, homeowners and backyard gardeners.

The HE agent continued her partnership with Yap Interagency Nutrition Education Council (YINEC) to target clients in nutrition education. The nutrition training included home gardening and other agriculture related activities. As part of the interagency activities, a team consisting of two public health personnel, two sanitation staffs, one agriculture staff, and the HE agent visited some of the outer islands. In addition to presentations on mother-child-health and Non-communicable Diseases (NCD), Immunization, cooking demonstration and home gardening demonstrations were also conducted.

Chuuk Site:

Nutrition education staffs were involved in the World Food Day celebrations held at the college campus. Stakeholders that included farmers, homemakers, students and the entire public attended the celebrations. Some farmers and homemakers used the opportunity to sell agriculture produce and processed foods. Nutrition staffs provided cooking demonstrations of nutritious local recipes.

Extension staffs conducted Food Handlers Training to participants representing 15 food establishments, including hotels, restaurants, department stores, takeouts, bakery, fish and food markets. Participants were taught how to serve quality foods and ways to prevent food borne illnesses. These include safe food handling and preparation, food selection, rules and regulations for the food establishments, personal hygiene and microorganisms. The training was a joint sponsorship with the Environmental Health and Sanitation, DOHS. Women leaders also learned about food safety during the meeting of the Chuuk Women's Association.

Food safety programs were conducted to food helpers and homemakers in five municipalities. Food safety programs were targeting food service at takeout and fast food businesses and tempura and coffee shops.

Pohnpei Site:

Food safety lessons were incorporated into nutrition education programs conducted to homemakers, young mothers and other clients in the communities. The food safety lessons were reinforced by hands on cooking demonstrations on local recipes. Program participants were taught how to plan meals and proper food choices with respect to food safety to prevent or reduce occurrence of diseases. Nutrition education program participants were also taught home gardening techniques to ensure food and fiber safety and food security. Homemakers in six different villages participated in these trainings.

Home gardening has become an important family activity and it helped in addressing food safety and security issues. It was done in various ways, including small backyard plots, intercropping with other crops, e.g. black pepper, and growing in containers. Extension agents were promoting home gardening during nutrition training programs and conducted demonstrations in the communities, Head Start centers, and to individuals. Presentations were also made during visits to elementary schools around the island. More and more people are becoming health-conscious as a result of nutrition education programs. Many of these people are seeking for technical assistance in starting home gardening for home consumption and sale of excess produce.

Kosrae Site:

Nutrition and agriculture staffs were focusing on four major goals namely, home gardening, human nutrition, sustainable agriculture and community resource development. Various awareness activities were carried out in the communities to groups, individuals and in schools

through workshops and home visits. These programs were conducted to improve knowledge and skills on local food production, food choices, food selection, food preparation and preservation to improve health and provide for food security for the island population affected by food related diseases such as diabetes, vitamin A deficiency, anemia, cancer and other food related diseases.

Total of 1,230 seedlings of different varieties were distributed to 23 gardeners engaged in the program. They had learned the skills necessary to produce vegetable seedlings and maintain their gardens by using local compost replacing the commercial fertilizers.

B. Key Themes:

Key Theme - Food Accessibility and Affordability

a). Description of Activity – Extension agents provided tips on how to improve production of traditional food crops through improved farm management practices. Program participants from both the proper and outer islands were encouraged to use harvests from their backyard gardens for food safety and food security and to stop relying on imported processed foods. In addition, program participants were encouraged to include certain crops in their gardens for sources of vitamins and minerals. Garden tools were distributed to more than 200 families and 4-H club members as part of the typhoon recovery program. As a component of the project, 25 Japanese mango seedlings were prepared and ready for distribution to interested farmers or homemakers. For demonstration CES extension agent is maintaining traditional crops in the new demonstration plot located at the agriculture station.

b). Impact/Accomplishments – Some of the program participants indicated they were able to provide for the family diet and make additional income by selling their excess produce in the market. Ten home garden program participants were able to participate in exhibits and local produce competition during the annual Yap Day. Three farmers planted 55 orange trees and 25 mango seedlings.

c). Source of Federal Funds – Smith-Lever & Local Match

d). Scope of Impact – County Specific (Yap)

Key Theme - Food Handling

a). Description of Activity - In collaboration with the Environment Health and Sanitation Division and the Department of Health Services, the nutrition staff conducted training to more than 30 food handlers representing restaurants, bakeries, takeouts, fish and produce markets, and department stores. Invitation letters were sent to the operators of food establishments who were happy to send their staff to participate in the training. The information sharing methodologies included lectures, discussions both by the facilitators and participants, cooking demonstrations, practicum by the participants, and pre and posttests. The lessons included food safety program rules and regulations in food establishments, microorganisms, foodborne diseases, personal hygiene, food selection, food handling and preparation.

b). Impact/Accomplishments - More than 30 food handlers increased their knowledge in food safety issues and applications. The knowledge and skills learned will impact 15 food establishments around the island. Posttest showed a significant improvement on knowledge gained as compared to the pre test both on food handling practices – true and false and on identifying the mistakes in the picture – “Dirty Diner”.

c). Source of Funds – Smith Lever & Local Match

d). Scope of Impact – County Specific (Chuuk)

Key Theme - Food Safety

a). Description of Activity - Two groups of adult participants from different communities and one group of high school students from Bethania High School received 10 hours of home food safety and food handling practices. The lessons in the training program addressed such food safety practices as personal hygiene, safety tips in the kitchen and safe food handling and storage practices. All together, fifty-two participants including thirty-one adults and twenty-one youths completed the required number of hours of the home food safety and food handling program. Some of the participants in this program also participated in the EFNEP training programs.

b). Impact/Accomplishments – The ERS Summary report under food safety practices showed that 68% (21 participants) more often followed the recommended practices of not allowing meat and dairy foods to sit out for more than two hours. Furthermore, 68% (21 participants) always followed the recommended practice. Under number of practices improved, 94% (29 participants) showed improvement in one or more of the food safety practices (i.e. thawing and storing foods properly) and 58% (18 participants) showed improvement in both of the food safety practices (i.e. thawing and storing foods properly).

c). Source of Federal Funds – Smith-Lever 3b&c

d). Scope of Impact – County Specific (Palau)

Key Theme - Food Safety/Food Security

a). Description of Activity – The HE agent conducted presentations on nutrition lessons that included food safety and food security to farmers and homemakers in various communities, including the outer islands. The programs were conducted in collaboration with the Yap Interagency Nutrition Education Council (YINEC). In addition to lessons on nutrition, diet and health and demonstrations of local nutritious recipes, monthly meetings were held in various communities to promote food safety and safe food handling practices to individuals and families. The program continued to emphasize the use of local foods as oppose to imported processed food for good health, food safety and good eating habits.

b). Impact/Accomplishments – More than 150 program participants increased their awareness in food safety and in home gardening as a means for food security.

Seven food safety awareness activities were conducted this year representing an increase of about 45%. The collaborative effort has impacted the population in the outer islands that has been largely neglected due to distance and difficulty in developing appropriate programs. One accomplishment is the fact that all age groups participated in program activities.

c). Source of Federal Funds – Smith-Lever/EFNEP/Local Match

d). Scope of Impact – County Specific (Yap)

Key Theme – Food Safety

a). Description of Activity - Food safety lessons and demonstrations were incorporated into nutrition education programs conducted to homemakers in both urban and rural communities. Documentation of program participants and administration of 24-hour food recall to participants were done prior to program exit. Delivery of programs included presentation of the 12 EFNEP lessons, which were reinforced by cooking demonstrations of local nutritious recipes. Discussions between staffs and clients and hands-on were components of training program activities. The program aimed to provide clients with tips and knowledge on food safety and food security. The nutrition agents conducted food safety training to food handlers in collaboration with the Department of Education.

b). Impact/Accomplishments - As indicated by 24-hour food recall at entry and exit, almost 80% of program participants were able to prepare and process certain food items, utilizing food safety and security practices. One outlet market is now preparing and selling banana vinegar. Hot lunch packaged lunches were prepared at and delivered to preschool centers. The practices greatly enhanced quality and safety of food handling.

c). Source of Funds – Smith Lever

d). Scope of Impact – County Specific (Pohnpei)

Key Theme – Food Security

a). Description of Activity – Three out of the four proposed atolls in this project already had been visited by agriculture staffs. The staffs worked with interested individuals and farmers in demonstrating how to set up 21 ft. length x 17 ft. width backyard gardens, along with providing information on soil improvement through composting using local biodegradable materials. The program also provided seedlings of vegetables and planting materials of local food crops, such as taro and sweet potato. Agriculture extension agents showed participants how to produce seeds and planting materials from existing crops.

b). Impact/Accomplishments – A total of 85 backyard gardens were established in the three atolls visited. A follow up visit was conducted to all three atolls and was observed that the yields were higher, where harvested tubers weighed between 6 – 8 pounds. Because of the geographical location of these atolls, they are not able to sell their produce. Instead, produce were used mostly for family

consumption as demonstrated by the EFNEP Extension Agent on different local and nutritious recipes.

c). Source of Funds – Smith-Lever

d). Scope of Impact – County Specific (Marshall Islands)

Key Theme – Food Security

a). Description of Activity - [Product Development for Food Security in Palau] - Development of local foods in Palau, such as fish, coconuts and banana in addition to root crops will help reduce large food importation and enhance food security contributing to the Gross Domestic Product (GDP) of the Republic. It also supports the tourism industry by providing tourists with local foods, which they can consume and patronize. This project is in support of the New Product Development Committee created by the President of Palau. For the year 2006, six processed foods were standardized, namely 3 fish, 2 coconut, and 1 banana products. A workshop on "Business Opportunities from Product Development of Local Foods" was conducted on October 27, 2005, which was attended by 20 participants. Food Technology classes were conducted with 68 participants in Melekeok State (17 participants); Airai State (17 participants); Airai Esisbangiau Women's Group (17 participants), and Koror State (18 participants).

b). Impacts/Accomplishments – The introduction of new processed foods to tourists, visitors, and local people resulted in many requests at CRE for further information on how to avail of the extension services for learning to process the products. Beneficiaries consisting of women food entrepreneurs who were trained by CRE for business opportunities, as well as for food security.

c). Source of Federal Funds – Hatch Act

d). Scope of Impact – County Specific (Palau)

C. Allocated Resources

Fiscal Resources

Extension

Year	Federal	State	Local	Other
2000	121,461	43,379	8,676	0
2001	111,280	22,179	27,817	0
2002	104,556	20,818	31,460	0
2003	112,836	24,132	19,152	0
2004	133,195	6,063	11,929	0
2005	138,849	8,086	16,417	0
2006	138,849	8,086	16,417	0

Research

Year	Federal	State	Local	Other
2000	71,807	15,071	1,773	0
2001	92,374	22,759	18,743	0
2002	37,764	9,582	9,018	0
2003	32,244	642	1,954	0
2004	37,927	1,555	1,464	0
2005	35,305	985	2,000	0
2006	35,305	985	2,000	0

Summary of FTE Allocation:

Funds from formula funds and other sources like local matching funds were expended as planned in each specific research, extension and integrated research and extension projects. In general, these funds were utilized for the salaries and wages and fringe benefits of research, extension and administrative staff. International travels were conducted as key program and management staffs participated in international workshops, meetings and conferences designed for exchange of information, ideas and forming regional collaboration in projects. Domestic travels were for monitoring of research and extension projects. Publication/printing costs for

publishing articles in local newspapers, scientific journals and manuals, proceedings, pamphlets and brochures were part of the total expenditures. Communication within the COM region and to offices collaborating with the College through phone calls, faxes, e-mails and regular mails was part of the total cost of this Goal.

Human Resources (FTEs)

Extension FTEs

Year	Professional			Paraprofessional		
	1862	1890	Other	1862	1890	Other
2000	2.90	0.0	0.0	6.10	0.0	0.0
2001	2.56	0.0	0.0	6.20	0.0	0.0
2002	2.20	0.0	0.0	5.05	0.0	0.0
2003	2.90	0.0	0.0	6.10	0.0	0.0
2004	2.50	0.0	0.0	6.00	0.0	0.0
2005	2.50	0.0	0.0	6.00	0.0	0.0
2006	2.50	0.0	0.0	6.00	0.0	0.0

Research SYs Only

Year	Scientist Years			Research Assistants		
	1862	1890	Other	1862	1890	Other
2000	1.94	0.0	0.0	0.30	0.0	0.0
2001	2.20	0.0	0.0	0.50	0.0	0.0
2002	0.30	0.0	0.0	0.45	0.0	0.0
2003	0.30	0.0	0.0	0.45	0.0	0.0
2004	0.30	0.0	0.0	0.45	0.0	0.0
2005	0.30	0.0	0.0	0.45	0.0	0.0
2006	0.30	0.0	0.0	0.45	0.0	0.0

From the FY2006 total FTE of 73.50, 9.25 had been assigned under Goal 2, representing 13% of FTE

input. The FY2006 budget allocated to Goal 2 programs and activities takes into account this FTE distribution plus how Goal 2 integrates with other programs conducted by COM as a whole.

IV. GOAL 3 - A HEALTHY, WELL-NOURISHED POPULATION.

A. Goal Accomplishment Narrative

PCC-CRE:
The non-communicable disease rates are in fact overtaking the communicable disease rate in Palau. People's diets are still very high in sugars and saturated fats and very low in fruits and vegetables. The end result is that there will be more cases of cardiovascular diseases, obesity, hypertension and significant disability from these chronic diseases. Health services staffs and other programs like EFNEP continued to work very hard to change people's diets and health.

CMI-CRE:
A publication on local medicinal plant was completed and now with the print shop.

Research and extension staff continued their collaborations with staff from other agencies on activities that promote good health.

COM-FSM/CRE:

Yap Site:
Nutrition education programs were addressing issues of change in lifestyle that has become a major health problem. Diets have been changed from healthier and more fibrous local product to mostly fortified commercial products imported from other countries. Obesity and malnutrition are on the rise in the islands. Physical fitness in addition to use of local food were part of programs delivered to people in the communities. YINEC regular meetings continued to discuss possible ways of turning this changing lifestyles around.

Chuuk Site:
More than 400 adults and youths participated in nutrition education programs conducted in different communities and at the Extension office. With the use of entry and exit reports, program staffs were able to determine impacts of programs in the communities. Program participants were taught methods and ways of preparing local foods to ensure proper nutrition to infants and children. They also learned about non-communicable diseases, namely diabetes, heart diseases, hypertension and gout that have always been a problem in both adults and youths. Besides homemaker's participants, Head Start program staffs and cooks attended these training programs.

A brochure on NCD was developed to advice the general public on how diet plays a very important role in preventing, controlling and curing NCDs. A syllabus and module was prepared for school nutrition project. A project proposal was prepared for the training of volunteers and this module and syllabus for the said training. EFNEP registration form has been translated into the local vernacular for a faster and easier registration. Recipes and lessons are being translated also into the local vernacular. In addition to training a physical fitness activity started in collaboration with Public Health at CES.

Pohnpei Site:
Imported processed foods that are generally low in micronutrients have been used in most households today. This has led to serious health problems, including micronutrient deficiency

and chronic diseases such as diabetes, heart disease, and cancer. In addition, there is concern about the loss of traditional knowledge and biodiversity. Nutrition education programs in the communities provided clients with tips and information on preparing healthy meals for families using locally available food crops. Cooperative Extension Service, on its own and in collaboration with other agencies and NGOs has been promoting locally grown island foods, particularly micronutrient-rich cultivars and varieties, focusing on their many benefits-food security, health, culture, income, and environment.

More than 300 adults and youths participated in nutrition training and awareness programs conducted to homemakers and other participants in six villages or communities. The nutrition staffs also conducted similar program to schoolchildren, out of school youths, women groups and pre-school cooks. Trainings for children and youths, and for women groups were structured based on the needs of the groups. Lessons and demonstrations are designed to increase awareness on the nutritional value of crops for health. A total of fourteen groups including youth groups, adults, parents and school children, and women groups participated in human nutrition education program. Program delivery included presentation, discussions, and cooking demonstrations.

Kosrae Site:

A total of 204 participants in all the seven sites actively attended nutrition education programs. It is very important that food preservation techniques are taught to every woman and homemaker. Some of these nutrition programs were conducted in collaboration with government agencies.

Nutrition education programs were also conducted to students and teachers at two schools, which included lessons on Vitamin A-rich local foods followed by cooking demonstration using three recipes.

B. Key Themes:

Key Theme – Human Health

a). Description of Activity – Information sharing sessions and distribution of cooking recipes during programs were strategies staff used to reach out to clients in both urban and rural communities. Emphasis during program delivery was to attain a healthy population and the benefits of maintaining a healthy family. Local food recipes were components of cooking demonstrations. Staff developed a non-communicable diseases (NCD) brochure as a guide to the general public of the ever-escalating prevalence of NCD. Information in the brochure includes food choices and appropriate practices including exercises. The brochure provides warning messages on NCD, advices, and how diet plays a critical role in preventing and controlling of NCDs. The program reached more than 100 adult participants.

b). Impact/Accomplishments - As a direct result of the human health program, twelve of the participants and the nutrition extension agent have started a physical fitness program that is held at Extension Service facility. Program participants increased their awareness in human health and related activities including proper food choices, breast-feeding and complimentary foods for infants and children. Some participants reported they are beginning to walk in the mornings as a daily exercise. Clients also reported using recipes that were translated into the local

vernacular. Many clients are seeking for addition information and advice on proper diet for hypertension, diabetes, and advices on NCDs.

c). Source of Funds – Smith Lever

d). Scope of Impact – County Specific (Chuuk)

Key Theme – Human Health

a). Description of Activity – A total of 52 women participated in this year's program. The twelve EFNEP lessons were taught in addition to cooking demonstrations on nutritious local recipes to promote healthy living and proper nutrition. The participants went through all twelve lessons, which covered various issues pertaining to nutrition, sanitation, and food safety. They also learned how to prepare healthy and delicious meals using green leafy vegetables and local produce that are readily available on island.

b). Impact/Accomplishments – Fifty-two ladies received Certificate of Participation. During the ceremonies, comments were shared by the participants' family members claiming that they have changed their eating habits and had begun practicing washing hands before meals, seeing that the kitchen is always clean and enjoyed eating vegetables that were added into their foods. Calls have been received to collect more new recipes.

c). Source of Federal Funds – Smith –Lever/FAO

d). Scope of Impact – County Specific (Marshall Islands)

Key Theme – Human Health

a). Description of Activity – A Youth EFNEP called " Healthy Body Healthy Mind Campaign" was conducted to twenty-five sophomores at one of the high schools in Palau. The campaign provided the students with the basics of nutrition and healthy eating skills that will help them plan, choose and prepare simple healthy meals for them and their families. Twenty-two healthy recipes were also prepared, cooked and tasted by students, the principal and teachers of the school.

b). Impacts/Accomplishments - All twenty-five students completed the program and exited with certificates of completion. Based on ERS impact indicators: 92% of 25 youth now eat a variety of foods, 96% of 25 youth increased their knowledge of the essentials of human nutrition, and 92% of 25 youth increased their ability to select low-cost and nutritious foods.

c). Source of Federal Funds – Smith-Lever 3b&c

d). Scope of Impact – County Specific (Palau)

Key Theme - Human Nutrition

a). Program Description – A program of Adult EFNEP called “Food Preparation and Nutrition” was conducted in one of the underserved state to seventeen adult participants. This program was designed to provide basic nutritional knowledge and healthy eating skills needed to make healthy choices for participants and their families. It emphasized variety, balance, and moderation as the key to healthy lifestyle. In addition, twenty-two selected healthy recipes were prepared, cooked and tasted by the participants.

b). Impact/Accomplishments – Participants orally reported to have reduced their use of cooking oil and some have started to eat breakfast as compared to none before the program. Others reported to have begun to shop for healthy foods whereas before they went for cheaper purchases and some have started to trim fats from poultries and meats unlike before the program. Based on Behavior Checklist Summary Report for Food resource management practices: 100% more often planned meals in advance, 100% more often compared prices when shopping, 100% less often ran out of food before the end of the month, 100%more often used a list for grocery shopping.

For Nutrition practices: 100% more often planned meals in advance, 100% more often thought about healthy food choices when deciding what to feed their family, 73% more often prepared meals without adding salt, 100% more often used the “Nutrition Facts” on food labels to make food choices and 100% reported that their children ate breakfast more often.

c). Source of Funding – Smith-Lever 3b&c

d). Scope of Impact – County Specific (Palau)

Key Theme – Human Nutrition

a). Description of Activity – Homemakers, farmers, leaders and youths were organized and educated on 12 lessons which include meal planning, healthy eating in the Pacific, food guide, nutrition during infancy, complementary feeding, adult nutrition, prevention of NCD and under nutrition among the children through proper diet, and dietary counseling. Anthropometrics are a part of the program where the BMI of the adult participants were taken. The 24-hour food recall of participants is also recorded). Cooking demonstrations mostly using local foods, high in fiber, low in salt, sugar and fats were a part of the sessions.

b). Impact/Accomplishments – One outcome of a weeklong session a menu was developed that would guide head start staffs on foods to serve the preschoolers. Many individual clients have sought advice on diet for hypertension, and diabetes, breastfeeding and complimentary foods for infants.

c). Source of Federal Funds – Smith-Lever

d). Scope of Impact – County Specific (Chuuk)

Key Theme – Human Nutrition

a). Description of Activity – Extension staffs conducted human nutrition education

training to homemakers and other participants in six villages or communities. Staff organized training in urban and rural communities with obvious human nutrition problems or in response to request. Documentation of program participants and administration of 24-hour food recall to participants are done prior to program exit. Delivery includes presentation of 12 lessons that are reinforced by cooking demonstrations. Discussions between staffs and clients and hands-on are components of training program activities. The program aimed to provide clients with tips and knowledge in preparation of healthy meals for families. The nutrition agents also conducted similar program to schoolchildren, out of school youths, women groups and pre-school cooks. Trainings for children and youths, and for women groups were structured based on the needs of the groups.

b). Impact/Accomplishments – Pre- and post- tests indicated increase awareness in nutrition concepts and practices. Observations showed positive changes in how program participants select foods and cooking ingredients and methods. Homemakers that completed the nutrition education training are catering and are making additional income with nutritious recipes. One of three homemakers groups that prepare lunch during the 2006 World Food Day was able to make $1,050 from selling more than 350 lunch packs.

c). Source of Funds – Smith-Lever Act

d). Scope of Impact – County Specific (Pohnpei)

Key Theme - Human Nutrition

a). Description of Activity - Nutrition education program training sessions were conducted to homemakers in all of the four municipalities. Presentations were made based on the EFNEP 12 lessons and reinforced by new SPC posters and Vitamin A-rich local food posters. Actual cooking demonstration is an additional delivery method used during all training sessions.

b). Impacts/Accomplishments – Based on exit report 100% of program participants increased their knowledge and awareness in food purchasing, food preparation, meal planning and food budgeting after exited from the program. More than 50% of food preservation workshop participants have repeatedly cook some of the new recipes at home and made special dishes to community functions as complimentary of their training.

c). Source of Federal Funds – Smith-Lever

d). Scope of Impact – County Specific (Kosrae)

C. Allocated Resources

Fiscal Resources

Extension

Year	Federal	State	Local	Other
2000	114,443	40,873	8,175	0
2001	116,616	23,242	29,151	0
2002	101,383	20,186	30,506	0
2003	77,105	16,490	13,088	0
2004	92,453	4,208	8,280	0
2005	96,378	5,613	11,395	0
2006	96,378	5,613	11,395	0

Research

Year	Federal	State	Local	Other
2000	71,807	15,071	1,773	0
2001	58,161	14,330	11,801	0
2002	25,176	6,388	6,012	0
2003	21,496	428	1,302	0
2004	25,285	1,036	976	0
2005	23,537	657	1,333	0
2006	23,537	657	1,333	0

Summary of FTE Allocation:

Budgets coming from the formula funds, competitive grants and other sources like local matching funds were expended as planned in each specific research, extension and integrated research and extension projects. In general, these monies were utilized for the salaries and wages and fringe benefits of administrative and support staffs, and research and extension staffs. International travels for key program personnel to participate in international workshops, meetings and conferences designed for exchange of information, ideas and forming regional collaboration in projects. Domestic travels were for monitoring research and extension projects. Publication/printing costs were incurred as a result of publishing articles in local newspapers, scientific journals and manuals, proceedings, pamphlets and brochures. Communication cost

between the six delivery sites and the Central Office located in Pohnpei and with offices collaborating with COM through phone calls, faxes, e-mails and regular mails incurred as well.

Human Resources (FTEs)

Extension FTEs

Year	Professional			Paraprofessional		
	1862	1890	Other	1862	1890	Other
2000	0.68	0.0	0.0	7.80	0.0	0.0
2001	1.18	0.0	0.0	8.00	0.0	0.0
2002	0.98	0.0	0.0	6.05	0.0	0.0
2003	0.90	0.0	0.0	5.25	0.0	0.0
2004	0.90	0.0	0.0	5.00	0.0	0.0
2005	0.90	0.0	0.0	5.00	0.0	0.0
2006	0.90	0.0	0.0	5.00	0.0	0.0

Research SYs Only

Year	Scientist Years			Research Assistants		
	1862	1890	Other	1862	1890	Other
2000	1.13	0.0	0.0	0.3	0.0	0.0
2001	1.20	0.0	0.0	0.5	0.0	0.0
2002	0.10	0.0	0.0	0.4	0.0	0.0
2003	0.20	0.0	0.0	0.3	0.0	0.0
2004	0.20	0.0	0.0	0.3	0.0	0.0
2005	0.20	0.0	0.0	0.3	0.0	0.0
2006	0.20	0.0	0.0	0.3	0.0	0.0

Allocate Resources:

From the FY2006 total FTE of 73.50, 6.40 have been assigned under Goal 3, representing 9% of FTE input. The FY2006 budget allocated to Goal 3 programs and activities takes into account this FTE distribution plus how Goal 3 integrates with other programs conducted by COM as a whole

V. GOAL 4 - TO ACHIEVE GREATER HARMONY (BALANCE) BETWEEN AGRICULTUREAND THE ENVIRONMENT.

A. GOAL ACCOMPLISHMENT NARRATIVE

PCC-CRE:

Two important themes were addressed in 2006: Biological Control and Integrated Pest Management.

On Biological Control, two primary parasitoids of the melon aphid were obtained from the University of Hawaii, Kauai Branch Station on April 4, 2006. These parasitoids, Aphidius colemani, and Aphelinus sp. are being reared on potted taro plants in the screen house. Collection and field releases of these parasitoids were started on taro plantings at the PCC R & D Station. Continuous releases are planned until field establishment occurs.

The contact scientist, Mr. Warea Orapa, from the Secretariat of the Pacific Community (SPC) and who has a project on Biological Control of Mikania micrantha in Papua New Guinea was contacted. He promised to hand carry eggs of the nymphalid butterfly, Actinote, early next year once the host specificity tests have been done.

On Integrated Pest Management, sweet potato varieties such as Telentund, Telekeok, Dirradid and Sment consistently showed no infection due to the scab fungus in several field screenings conducted.

Also, a book on "Economic Entomology in Micronesia" has been edited, finalized and is now ready for printing, once the funds for printing is released.

A training was conducted to Palauans on dry litter piggery management. At the college piggery, chopped wood and coconut husk were used as beddings for piglets. These beddings were later used to fertilize bananas growing nearby. Also, youngsters were trained on decontaminating rainwater catchments for drinking water.

CMI-CRE:

Research and extension staff attended regional and international conferences to upgrade their knowledge on new information and new technologies on how to deal with emerging issues ranging from pest and diseases such as the Avian Influenza to water quality.

COM-FSM/CRE:

Yap Site:

A comprehensive survey and assessment of potential damage of plant parasitic nematodes affecting various food crops across Yap helped to formulate appropriate cultivation strategies to minimize the yield loss. The study has particular relevance in the wake of recent report from this laboratory on the nematode species causing corm rot disease of swamp taro, the island's staple food crop. Plant parasitic nematodes are a limiting factor in crop production and it is important to gather information through survey and assessment of plant and soil samples. Few records on the existence of nematodes are available on Yap.

The survey and documentation of the plant parasitic nematodes associated with various crops of economic importance; assessment of damage potential based on their frequency, population density and symptomatology; amendment to the cultivation practices to reduce the impact of

nematode infestation; screening of pot grown and field grown plant crops for the presence of parasitic nematodes and provide advise for necessary cultivation amendments were undertaken. Regular screening tests revealed the presence of three nematode species, which helped to make precautions while planting the crops. Identification of root knot nematodes from okra plants facilitated the amendment of planting bed for subsequent crop cycle. In one of the field trials, addition of compost in sufficient quantity reduced the frequency of nematodes up to 30 percent. Three homeowners advised to utilize the amendment practices to enhance the yield.

Pohnpei Site:

To a certain extend public awareness of water quality was increased through distribution of fact sheets, water testing demonstration, poster presentations, and individual and group discussions.

CRE water quality officials at the College of Micronesia – FSM were involved in the coordination of a water quality contest on water issues in their communities describing the problems and offering solutions. Based on results of the contest on the issue "Water Issues on My Island", a freshman attending the national campus was awarded a trip to Okinawa. The award was provided through the Okinawa Pacific Education Network Initiative sponsored by Ryukyus University in Okinawa, Japan. There were three participants from the Pacific Land Grant institutions, including University of Guam, Palau Community College, and College of Micronesia-FSM. The trip to Okinawa began on October 15 and lasted until October 22, 2006. The three students and chaperones visited many interesting sites and attended a 3 day conference on Amami Island. Sites visited were Fukuchi-Dam, the Okinawa Churaumi Aquarium, the Seawater Desalination Plant, Chatan Saltery Factory, Kurashiki-Dam, an underground Dam in Itoman, and Okinawa World Cave Park. Then everyone traveled to Amami Island where lectures on the nature and castles of Amami were attended. The group also visited the Amami City Museum of History and Folklore, Amami Park and the art museum established for a local artist named Tanaka Isson. On the last morning students from Ryukyus University, a local high school, Palau Community College, University of Guam, and the College of Micronesia-FSM gave presentations about local water issues. The trip was educational, informative, and exciting.

B. Key Themes:

Key Theme – Biological Control

a). Description of Activity – Extension program activities continued to emphasize cultural and traditional applications in controlling pests. Applications in IPM are being carried out to reduce certain pest population. Biological control of the invasive "devil's weed" *Chromolaena adorata* (also known as the devil weed), is a major and ongoing program activity. It is part of the ongoing efforts in controlling the weed from spreading to new areas and destroy native weeds and plants. The moth, *Pareuchaetes pseudoinsulata,* and the gall fly *(Cecdochares connexa)* are biological control agents being used. Rearing of the bioagents continued in the laboratory.

b). Impact/Accomplishments – There is evidence of success as seen in slowing the growth and spread of the *Chromolaena.* The gallfly has spread extensively outward from areas of initial release and has successfully established itself well.

Staffs were able to find and transfer 58 mature galls plant parts to other locations where the *Chromolaena* plants were predominant. The program was able to release about 8,000 larvae of Pareuchates were released in one location.

c). Source of Funding – Smith-Lever/SPC

d). Scope of Impact – County Specific (Yap)

Key Theme - Biological Control

a). Program Description – The first shipment of *Actinote sp.*, which came from Marihat Experiment Station in Indonesia was received on March 15, 2005. It took almost two weeks to reach Palau despite sending it by airfreight. The package containing the *Actinote* eggs were sent through Singapore, Manila, Japan, Guam and finally to Palau. When the package was opened, majority of the eggs hatched, many larvae were already dead, and host leaves were rotten. The larvae that survived the trip could not reach the third instar and also died.

The second shipment of *Actinote* eggs was received on April 11, 2005. It took more than a week for the package to reach Palau. Many eggs hatched on rotten leaves and young larvae were dead. The few larvae of *Actinote* that survived were reared on detached fresh leaves of *Mikania* and *Chromolaena* in the laboratory. When the larvae reached the third instar, they were transferred to potted *Mikania* and *Chromolaena* in the greenhouse. More than 30 larvae developed into pupae, but ants and lizards ate more than half. Those that survived and emerged into adult butterflies mated, but would not lay eggs on either *Mikania* or *Chromolaena*. To save the remaining butterflies that emerged, they were collected and transferred to a rearing cage provided with a sponge soaked in sugar solution. However, the female butterflies did not lay eggs and they died after 6 days. Eventually the *Actinote* cultures were lost.

Dr. Desmier de Chenon who supplied the *Actinote* eggs could not be reached despite several e-mail messages sent. A letter requesting for *Actinote* was also sent to Dr. Warea Orapa of the Secretariat of the Pacific Community (SPC) who has an ACIAR funded project on Biological Control of *Mikania* in Fiji and Papua New Guinea using also the nymphalid butterfly.

b). Impact/Accomplishments – In progress.

c). Source of Funding – Hatch Act Funds

d). Scope of Impact – County Specific (Palau)

Key Theme - Biological Control

a). Program Description – [*Melon Aphid*] - Pure cultures of the braconid parasite, Aphidius colemani, of the melon aphid were received from Drs. Russel Messing and E. Mondor of the Kauai Branch Experiment Station, University of Hawaii. Live specimens of the parasite in gel caps were sent by Express Mail from Kauai and were received on April 4, 2006. Twenty adults of A. colemani were released inside the screen house with potted taro plants infested with the melon aphids.

Similarly, twenty adults of the A. colemani were released in the other screen house with potted taro infested with the banana aphid, Pentalonia nigronervosa.

Since April 4, 2006, the parasite, A. colemani, has been successfully reared on potted taro infested with the melon aphid. From May 18, 2006 to August 4, 2006, a total of 171 adults of A. colemani were collected from the existing cultures in the screenhouse and released in field plantings of taro. Continuous releases of A. colemani will be done until establishment of the parasite occurs in the field on taro.

Another primary parasitoid that came from Hawaii was Aphelinus sp. This parasitoid is also being reared continuously on melon aphid infested taro plantings in the screen house. Once established in the screen house, some adults will be collected and released on taro plantings infested with the melon aphid at the PCC R & D Station.

b). Impact/Accomplishments – Once the parasitoids have established on field plantings of taro at the R & D Station, collection of the parasites will be done for release on taro plantings in other States of Palau infested with the melon aphids. It is expected that once field releases are done in some states, the melon aphid population will be reduced and will no longer be a problem pest of taro.

c). Source of Funding – Hatch Act Funds

d). Scope of Impact – County Specific (Palau)

Key Theme – Biological Control

a). Description of Activity - This year, about 100 nymphs of the mirid bugs were collected from the taro plantings infested with the taro leafhoppers. The collected mirid bugs were placed in a gallon size ice cream container with cut petioles of taro and properly covered. The next day they were brought and released on a taro farm infested with the leafhoppers in Ngiwal State. Another release of 50 mirid bugs was done three months later to allow the mirid bugs to increase in number and reduce the leafhopper infestation in the farm.

b). Impacts/Accomplishments - It is expected that once the mirid bugs have increased in number, the taro leafhopper population will start to go down enabling the farmer to harvest a good crop of taro every year.

c). Source of Funding – Smith Lever Act 3b&c

d). Scope of Impact – County Specific (Palau)

Key Theme – Integrated Pest Management

a). Program Description – [Economic Entomology in Micronesia] – A book that deals on major pests of crops, their life cycle, habits and description with colored photographs of the different life stages has been finalized and is now ready for printing. Once the budget is released, it will be printed by PRA Printing in Palau.

b). Impact/Accomplishments – The book once printed and disseminated to the public can be a useful tool in identifying pests of crops in the field and ways to control them successfully.

c). Source of Funding – Smith-Lever Funds

d). Scope of Impact – County Specific (Palau)

Key Theme – Sustainable Agriculture

a). Description of Activity - Presentations and demonstrations on sustainable agriculture knowledge and skills were provided to farmers during farm visits. The program was emphasizing sustainability and productivity in agricultural programs in relation to the environment and harmony between agriculture and the environment. Participants learned through hands-on on various activities including land preparation, planting material preparation and storage, fertilizer application, methods of planting, time and distance of planting, replanting, cultivation, and weeding. Germplasm of different varieties of banana, taro, and noni were mass produced and distributed to farmers.

b). Impact/Accomplishments - Up to about 300 clients have increased their awareness in sustainable agriculture practices and the need to connect agriculture and the environment. On-site help and recommendations regarding critical environmental issues provided opportunities for farmers to increase their knowledge and skills on sustainable agriculture. Clients were able to benefit from the mass-scale production of more than 30,000 planting materials.

c). Source of Federal Funds – Smith-Lever, Hatch & Local Match

d). Scope of Impact – County Specific (Kosrae)

Key Theme – Water Quality

a). Description of Activity – CRE hosted a Rainwater Catchments System Training Workshop. Trisha Macomber, MPH-Educational Specialist from the University of Hawaii at Manoa College of Tropical Agriculture and Human Resources (CTAHR)/ Department of Natural Resources and Environmental Management, conducted the training. Topics covered were rainwater catchments systems, rainwater testing (H_2S), rainwater contaminants and other issues related to rainwater.

Ten representatives of different local agencies dealing with environment and human health programs participated in this training. In the workshop, the

participants shared that they were already doing what Macomber was teaching them to do.

In addition, on February 25, 2006 a short survey of 27 homes in Airai and Koror on decontamination and maintenance process of the Rainwater Catchments were done. Thirteen rainwater catchments were tested. Five were negative and not contaminated with harmful organisms, while eight were positive and contaminated. CRE Office assisted the owners in decontaminating their rainwater catchments.

Lastly, 18 elementary school and 12 high school students experienced the rainwater testing and rainwater catchments maintenance in their school campus and classroom sites. The students also learned about the importance of water quality and human health.

b). Impacts/Accomplishments – Rainwater catchments were surveyed, tested, cleaned and treated according to the instructions given to them. Students who participated in the summer program reacted to the effect of contaminated water and they even requested their respective school cooks to clean the rainwater catchments. Students were reluctant to drink water from the contaminated rainwater catchments that they used to drink before.

b). Source of Federal Funds – Hatch Act & CSREES 406 Regional Water Quality Grant

d). Scope of Impact – County Specific (Palau)

Key Theme – Water Quality

a). Program Description - Two workshops were conducted where participants from the seven main villages on Majuro island attended. A lot of efforts were put into the planning of the workshops by staffs from several collaborators from the Republic of the Marshall Islands Environmental Protection Authority, University of Hawaii – College of Tropical Agriculture and Human Resources-Department of Natural Resources and Environmental Management, RMI Ministry of Health, and Majuro Water Sewer Company. All these collaborators were actively involved in the workshops by either presenting or providing tours of their facilities.

The water quality extension agent visited homes and shared information on water quality and answered questions and concerns people have with their water systems.

b). Impact/Accomplishments – Fifty-three participants received Certificate of Completion. The facilitator from University of Hawaii was impressed by the coordination of the workshop and how informative the presentations were. She had invited the water quality extension agent and one of the staff of local EPA to be resource persons in the upcoming rainwater catchment workshop scheduled for the summer of 2007.

c). Source of Federal Funds – Smith Lever & Region IX

d). Scope of Impact – Marshall Islands

Key Theme – Water Quality

a). Description of Activity – Water Quality, as an issue was introduced during an environment and economic development meeting in one of the five municipalities. Because of the interest of the topic, a demonstration was conducted the following day. Water quality test were demonstrated to the group following the introduction. Forty-eight test kits were distributed through the chief magistrate of that municipality for individuals to conduct the test at their households with the assistance of a municipal health committee. Another demonstration was conducted during the World Food Day celebration and about 20 test kits given out. Regional water quality fact sheets were displayed. Additionally six water quality fact sheets, including regional fact sheets were distributed to more than 10 offices in the FSM.

b). Impact/Accomplishments - According to the report received, 90% of the tests were positive, i.e. there is presence of some kind of bacteria in the water. Water sources included groundwater, rivers and streams, and rain catchments. The advice given with the test kits is to confirm finding, if positive, by contacting the local EPA Office and to boil water before drinking.

c). Source of Funds – Smith Lever & CSREES Water Quality Program

d). Scope of Impact – County Specific (Pohnpei)

Key Theme – Wildlife Management

a). Description of Activity - The agriculture staff had participated in several local and overseas workshops addressing the Avian Influenza. The department of CRE is an active member of the RMI Emergency Response Planning Committee for Avian Influenza. A demonstration was conducted where ten blood samples were randomly collected from local birds and sent to labs in Hawaii and Fiji for tests. Results indicated that RMI is AI free. However with the increased in the number of Asian fishing vessels entering the Marshall Islands' waters, emergency regulations were prepared for presentation to the appropriate authority for approval.

b). Impact/Accomplishments - Even though tests results turned out negative, preventive measures are necessary for unexpected occurrence or outbreak of the disease.

c). Source of Federal Funds – Smith Lever & ADAP

d). Scope of Impact – County Specific (Marshall Islands)

C. Allocated Resources

Fiscal Resources

Extension

Year	Federal	State	Local	Other
2000	197,037	70,370	14,074	0
2001	201,346	40,129	50,331	0
2002	237,233	47,234	71,382	0
2003	199,971	42,767	33,942	0
2004	250,720	11,412	22,455	0
2005	250,646	14,936	30,323	0
2006	250,646	14,936	30,323	0

Research

Year	Federal	State	Local	Other
2000	254,588	53,432	6,286	0
2001	191,591	47,204	38,873	0
2002	203,926	51,742	48,699	0
2003	206,364	4,109	12,504	0
2004	242,734	9,949	9,369	0
2005	225,954	6,305	12,801	0
2006	225,954	6,305	12,801	0

Summary of FTE Allocation:

Budgets coming from the formula funds, competitive grants and other sources like local matching funds were expended as planned in each specific research, extension and integrated research and extension projects. In general, these monies were utilized for the salaries and wages and fringe benefits of administrative and support staffs, and research and extension staffs. International travels for key program personnel to participate in international workshops, meetings and conferences designed for exchange of information, ideas and forming regional collaboration in projects. Domestic travels were for monitoring research and extension projects. Publication/printing costs were incurred as a result of publishing articles in local newspapers, scientific journals and manuals, proceedings, pamphlets and brochures. Communication cost

between the six delivery sites and the Central Office located in Pohnpei and with offices collaborating with COM through phone calls, faxes, e-mails and regular mails incurred as well.

Human Resources (FTEs)

Extension FTEs

Year	Professional			Paraprofessional		
	1862	1890	Other	1862	1890	Other
2000	1.80	0.0	0.0	12.80	0.0	0.0
2001	2.00	0.0	0.0	13.85	0.0	0.0
2002	3.30	0.0	0.0	13.15	0.0	0.0
2003	3.50	0.0	0.0	12.45	0.0	0.0
2004	3.60	0.0	0.0	12.40	0.0	0.0
2005	3.30	0.0	0.0	12.40	0.0	0.0
2006	3.30	0.0	0.0	12.40	0.0	0.0

Research SYs Only

Year	Scientist Years			Research Assistants		
	1862	1890	Other	1862	1890	Other
2000	2.40	0.0	0.0	2.67	0.0	0.0
2001	2.50	0.0	0.0	3.10	0.0	0.0
2002	2.50	0.0	0.0	1.55	0.0	0.0
2003	2.30	0.0	0.0	2.50	0.0	0.0
2004	2.30	0.0	0.0	2.50	0.0	0.0
2005	2.30	0.0	0.0	2.50	0.0	0.0
2006	2.30	0.0	0.0	2.50	0.0	0.0

From the FY2006 FTE of 73.50, 20.50 had been assigned under Goal 4, representing 28% of FTE input. The FY2006 budget allocated to Goal 4 programs and activities takes into account this FTE distribution plus how Goal 4 integrates with other programs conducted by COM as a whole.

VI. GOAL 5 - TO ENHANCE ECONOMIC OPPORTUNITIES AND THE QUALITY OF LIFE AMONG FAMILIES AND COMMUNITIES

A. GOAL ACCOMPLISHMENT NARRATIVE

PCC-CRE:

Palau is a country with a very small population and food production level is sufficient to provide for the food security and nutritional needs of the people. PCC-CRE continued to offer services for the consumers, families, and the whole populace by way of outreach programs from results of researches conducted at the Research and Development Station. Economic opportunities and quality of life among families and consumers are enhanced by way of trainings in EFNEP and Food Technology, which somehow made an impact on the public's awareness on health improvement through proper nutrition. Local food processing helps to increase income of training participants by adopting CRE food technologies and selling the processed products for income generation. Farmers were beneficiaries of tissue cultures taro planting materials. The youth were given training on the environment and marine science. Thousands of students from all the schools in Palau were given orientation to vocational programs during Vocational Technology Awareness Week.

CMI-CRE:

The establishment of community pearl farms in the outer islands is part of the ongoing efforts on enhancing economic opportunities and quality of life for people on these remote islands. This effort is also done collaboratively through farm activities jointly sponsored by the local bank, the Taiwan Agricultural Technical Mission and research and extension staffs. The Bank of the Marshall Islands in collaboration with the Marshall Islands Development Bank has set up micro loans for farm producers to apply for financial assistance to support and sustain their agricultural undertakings. This is just part of the effort in promoting agriculture as a way of making a living and contributing to the local economy of small island communities.

COM-FSM/CRE:

Yap Site:

All CES staffs are tasked to identify economic opportunities for clienteles through which they can improve their quality of life. Effort is continuing to increase community awareness of such opportunities as aquaculture as potential ventures.

4-H and youth development programs continued to enhance the quality of community life through beautification and other meaningful activities such as sports and handicraft making. Youth also attended the activities of the World Food Day and the World Diabetic Day, where they demonstrated how to make the banana chips and pepper paste.

Pohnpei Site:

One program that was conducted to enhance economic opportunities and quality of life for Pohnpeian families is the black pepper farm. More than 120 farm visits were made to 62 existing and new pepper farms. Most of the pepper farms are located in the eastern part of the island. There are pepper farms in all five municipalities. More and more farmers are getting involved in black pepper production as a source of supplementing income for families.

Chuuk Site:
More than 140 adults and youths participated in sewing and handicraft training programs. Participants learned to prepare wall decorations, leis, bags and mats among others. The methods of teaching were demonstrations and hands-on experience. Projects will be required for submission before certificates will be given.

An HE extension staff was in Honolulu to display locally sewed materials and handicraft products, an activity sponsored by the Honolulu-based project called Bactrim. The Bactrim coordinator indicated approval of the quality of the handicraft and other materials. Extension staffs also assisted in coordinating civic and social activities of the girl scout program . .

Kosrae Site:
Extension staff continued to improve knowledge and skills of clients for the main purpose of enhancing economic development opportunities and quality of life for families in the both communities in the urban and rural areas. An ongoing program toward enhancing economic opportunities is sewing. The program was conducted to female students at the college and homemakers in the villages. The government office of Community Affairs provided 15 sewing machines for the program.

Other training programs were conducted by agriculture extension agents on the cultivation of certain important economic crops, such as banana, taro, oranges and noni for the domestic and export markets.

B. Key Themes:

Key Theme – Community Development

a). Program Description – Results of researches conducted at the PCC-CRE Research and Development Station in Ngaremlengui State are ready for dissemination to the people and communities in Palau through outreach programs on agricultural, aquaculture, crop protection, food safety, and water quality, family and consumer education programs and environmental education. This year, three seminars were conducted in 3 States of Palau, namely, Ngaremlengui State with 38 participants, Ngarchelong State with 36 participants and Ngaraard State with 53 participants.

b). Impact**/**Accomplishments – About 200 farmers, fishermen, and rural area folks were benefited by these outreach programs by way of improving their agricultural techniques through research results from agronomy, crop protection, aquaculture and food processing of agricultural produce into stable products.

c). Source of Funding – Smith-Lever Act Funds

d). Scope of Impact – State Specific (Palau, Micronesia)

Key Theme – 4-H/Youth Development

a). Description of Activity – Palau Community College hosted a Vocational Technology Awareness Week wherein CRE and all the staff of the college exhibited and explained their respective vocational programs. About one thousand students from all the elementary and high schools in Palau were oriented to different programs that the College provides.

b). Impact/Accomplishments – Many students understood and became aware of the different vocational courses and career opportunities available at the college.

c). Source of Federal Funds – Smith-Lever

d). Scope of Impact – (Palau)

Key Theme – Youth Development

a). Description of Activity – Eighteen elementary school students were exposed to hands on or field activities on the following topics: agriculture/organic compost, water quality testing, forestry, invasive weeds, mangroves, tissue culture, organic farming, aquaculture environmental science, ethics and soil testing. They had field trips to Ngeremlengui waterfalls, aquaculture sites, organic farms, technical farm station, coral reef center, the newly constructed Babeldaob Compact road and other archeological or historical sites.

Twelve students enrolled in an after-school science program. The class covered several environmental and marine science topics, which enhance the knowledge on issues of environmental/marine sciences and agriculture; including conserving, maintaining and protecting ecosystem integrity and biodiversity.

b). Impact/Accomplishments – Students are now more knowledgeable on environmental and marine science, conservation and ecosystem protection. Students acquired more knowledge when doing the actual exercise or experiments than just listening to long lectures and reading the text.

c). Source of Federal Funds – Smith Lever

d). Scope of Impact – County Specific (Palau)

Key Theme – Children, Youth and Families at Risk

a). Description of Activity – The youth at risk training programs were conducted to youths in the communities through collaborative efforts with different agencies that specialized in youth issues, such as juvenile delinquency, substance abuse, HIV AIDS and other sexually transmitted diseases, focusing mostly on school drop outs. Programs were academic in nature, in addition to personal, spiritual and cultural enhancement sessions

b). Impact/accomplishments – The program resulted in 143 dropouts ready and prepared to go back to school. Fifty percent of program participants are now enrolled in schools. Program participants are more confidence and motivated.

c). Source of Federal Funds – Smith-Lever

d). Scope of Impact – County Specific (Chuuk)

Key Theme – Jobs/Employment

a). Description of Activity – Development of economically viable industries in Micronesia to support the fledging economy is at the top of the development priorities. A research and extension project is making further progress in its endeavors to establish pearl industry in Pohnpei, provide training programs for local people, and promote local pearl business development. The COM Pearl Project has been working actively on the Phase 3's Objectives for a commercialization process (developing pearl farming business models, demonstrating a small-scale commercial pearl production, making a framework on marketing strategies for the "Micronesian-brand" black pearls and pearl-related products, and collaborating to various agencies, organizations and institutions in sustainable pearl industry development in Micronesia). Between February and April 2006, several locations in Pohnpei lagoon and outer islands were surveyed to assess pearl farming environment, which followed reports of recommendations on how to develop into commercial pearl farms for each location. Before the end of September 2006, the Project helped to deploy line-culture system for one private site in Pohnpei lagoon (Nahlap Island) and two of the outer islands (Ahnt Atoll and Mwoakilloa Atoll). In July and August 2006, pearl harvest and seeding operation was conducted at the Project's Nett Point demonstration farm as a part of pearl quality improvement research and pearl seeding skill training for Micronesian locals. The Project's demonstration and training hatchery continued to work on a small-scale pearl oyster production, solely conducted by the Project's Micronesian trainers (two) and trainees (three). Several thousands of hatchery-produced one-year-old oysters were also transferred to the lagoons of two outer islands (Pakin Atoll and Mwoakilloa Atoll) for oyster restocking trials as a part of an integrated aquaculture and marine conservation activities for those atoll communities. Closer collaborations were established between the COM Pearl Project and the Pohnpei State Government's department and agencies (e.g. Office of Economic Affairs, Division of Marine Development and Economic Development Authority) as well as foreign country aide agencies such as Japan Overseas Cooperation Volunteers/Japan International Cooperation Agency (JOCV/JICA) for technical cooperation programs. The Project also encouraged private business owners to step into a pearl farming and pearl-related handicraft businesses.

b). Impacts/Accomplishments – 1). During this reporting period, population flow-out from Pakin Atoll to Pohnpei main island has been reversed, where the COM Pearl Project continues pearl farming training and pearl oyster grow-out experiments: the land owners and relatives began building houses and making their living again on some of uninhabited and habited islands of Pakin Atoll; young couples married to stay on the islands; and relatives of some of the farm trainees and caretaker of the Project moved permanently from Pohnpei to Pakin Atoll. The Project's trainee stipends not only provided continuous learning opportunities of grow-out farming skills and farm maintenance but also supported the people's livelihoods and provided more time of contemplating community improvements through pearl farming. The Project's concept of "blocks of time"

stipend system has been accepted by the community people, which could lead to practicing this new wage system when a commercial pearl farm is formed at Pakin Atoll.

2). After several discussions/consultation meetings held either at Pakin Atoll and Sokehs municipality where many Pakin community people live, Pakin people began forming a community association (NGO) to implement a community-based commercial pearl farm project. The COM Pearl Project supported this awareness by participating discussions and by continuing farm skill training at the Project's demonstration farm at Pakin. The project's pearl oysters those seeded in September 2005 and August 2005 were transferred to Pakin farm by shifting the Project's pearl quality improvement experiments to Pakin Atoll. This could be a case-study of smooth transforming of the Project's demonstration farm to a community-based commercial farm while we continue research and extension programs.

3). Based on the Project's site surveys and recommendations on potential commercial pearl farming, closer collaborations were established with the Pohnpei State Government's Division of Marine Development of the Office Economic Affairs (PNIMD) and Pohnpei Economic Development Authority (EDA). EDA provided basic pearl farming equipment such as ropes, floats and pearl nets, which made the Projects possible to help establishing two private pilot commercial farms at Nahlap Island and Ahnt Atoll. PNIMD participated to community meetings for commercialization processes of the two atolls (Pakin and Mwoakilloa) and its personnel began working on establishing a line-culture system at Mwoakilloa Atoll. The COM Pearl Project has been providing hatchery-produced pearl oysters as well as technical advises on oyster grow-out for those private and community-based pilot farms. JOCV/JICA provided a volunteer to the Project, whose support services to the Project's Micronesian staff has improved the underwater activities, computer knowledge and data maintenance of the hatchery and farm operations.

4). The Project has advised the economic development potential for the communities and local business owners to develop some business models/options. The round black pearls produced by the Project's pearl quality improvement experiments, pearl oyster shells and pearl-related products, including half-pearls or "mabe" produced by the Project's Micronesian staff, have been displayed at various occasions during tourist's events in Pohnpei and some of them were also donated to local handicraft makers and tourism operators for their promotional sales and marketing development. One of the local handicraft makers has been developing a domestic and export business with on-going commercialization process of Pakin pearl farm.

c). Source of Funds – Hatch Act & DOI

d). Scope of Impact – County Specific (Pohnpei)

Key Theme – Supplemental Income Strategies

a). Description of Activity - During visits to 62 pepper farms, extension agents conducted thirty demonstrations ranging from how to apply fertilizer and amount

required per hill based on age of plants up to harvesting. For those farmers who are beginning to harvest, extension agent provided tips and demonstrated proper harvesting methods. Extension agent also conducted demonstrations on composting, how to use compost, preparing and field planting cuttings, and pruning.

b). Impacts/Accomplishments – More than 100 field visits were made to 62 different black pepper farms. Besides those who are making additional income already, the new farmers are beginning to benefit from sales of fresh pepper corms. Four of 10 new farms are harvesting. One farmer reported his first three harvests earned him $50, $58, then $60, and he is expecting more than $100 for the subsequent harvests in the next couple of months

c). Source of Funds – Smith-Lever & Local Match

d). Scope of Impact – County Specific (Pohnpei)

Key Theme – Supplemental Income Strategies

a). Description of Activity – CES staff continued to monitor activities and collected data on the Western SARE-funded fishpond demonstration project. The fishpond was fully stocked at one point with mullet fish and two species of rabbit fish. However, infestation of tilapia reduced the fish population and current activities include exploring ways of solving the problem of tilapia infestation. Because of the tilapia problem, the marine agent is assisting project owners to look at other activities including farming of mangrove grabs, fish in floating cages, and other marine life for the local market.

b). Impacts/Accomplishments - Results from this project including costs, measure of feasibility, species suitable, and obstacles that may come about are baseline for future fishpond and related development. A schedule was set for the owner to sell fresh tilapia to specific establishments and the Filipino community. The initial sales of tilapia was to two vendors at $1.75 and $2.00 in comparison to the $1.00 per pound for other fish.

c). Source of Federal Funds – Smith-Lever & WSARE

d). Scope of Impact – County Specific (Yap)

Key Theme – Supplemental Income Strategies

a). Description of Activity - Extension agents conducted a series of training to teach participating homemakers and female students how to operate electric sewing machines and to be familiar with the different parts and components of the machine. The were also taught how to cut and sew dresses, skirts, and school uniforms. One advice being given to program participants is to keep a record of how much they spent of materials and how much they make from finished products.

b). Impact/Accomplishments - About 20% of the 80 program participants are making

their own dresses and are not being burdened cost for garments in the stores. Another 30% are actually earning a little income selling of dresses they made.

c). Source of Funds – Smith Lever & Local Match

d). Scope of Impact – County Specific (Kosrae)

Key Theme – Workforce Safety

a). Description of Activity - Two CRE employees attended a one week First Aid & CPR training conducted by the college's Nursing Department staff. It was an intensive 8 hours training where they had to do watch videos of the topics, did practical demonstrations of CPR and First Aid and taking a written exam.

b). Impact/Accomplishments - The two employees passed the written exam and the practical and received certificates of completion. It is important that they have knowledge in both CPR and First Aid to help when there are emergencies in the work place or in the communities.

c). Source of Funds – Smith Lever & Local

d). Scope of Impact – County Specific (Marshall Islands)

C. Allocated Resources

Fiscal Resources

Extension

Year	Federal	State	Local	Other
2000	139,005	49,645	9,929	0
2001	130,589	26,027	32,644	0
2002	156,473	31,155	47,082	0
2003	127,254	27,215	21,600	0
2004	158,267	7,204	14,175	0
2005	181,321	10,560	21,438	0
2006	181,321	10,560	21,438	0

Research

Year	Federal	State	Local	Other
2000	65,781	13,806	1,624	0
2001	78,689	19,387	15,966	0
2002	44,310	11,243	10,581	0
2003	77,386	1,541	4,689	0
2004	85,968	3,524	3,318	0
2005	98,855	2,758	5,601	0
2006	98,855	2,758	5,601	0

Summary of FTE Allocation:
Formula funds and local matching funds were expended as planned in research, extension and integrated research and extension projects. In general, these monies were expended on salaries and wages and fringe benefits of the administrative staff and research and extension staff that were responsible for programs under this Goal. International travels were for key program personnel to participate in international workshops, meetings and conferences designed for exchange of information, ideas and forming regional collaboration in projects. Domestic travels were for monitoring of research and extension projects scattered throughout the islands and for discussion with stakeholders at those sites. In some instances when local experts are not available locally like social scientist, funds were made available for the hiring of

consultants from other land-grant institutions or nearby institutions for a period of one to two weeks to assist in the necessary capacity building activities. Publication/printing costs for publishing articles in local newspapers, scientific journals and manuals, proceedings, pamphlets and brochures were acquired. Communication between the six delivery sites and to the COM Central Office in Pohnpei, and to offices collaborating with COM through phone calls, faxes, e-mails and regular mails were part of the total expenditures.

Human Resources (FTEs)

Extension FTEs

Year	Professional			Paraprofessional		
	1862	1890	Other	1862	1890	Other
2000	3.00	0.0	0.0	7.30	0.0	0.0
2001	2.28	0.0	0.0	8.00	0.0	0.0
2002	3.05	0.0	0.0	7.80	0.0	0.0
2003	3.10	0.0	0.0	7.05	0.0	0.0
2004	3.10	0.0	0.0	7.00	0.0	0.0
2005	3.10	0.0	0.0	8.0	0.0	0.0
2006	3.10	0.0	0.0	8.0	0.0	0.0

Research SYs Only

Year	Professional			Paraprofessional		
	1862	1890	Other	1862	1890	Other
2000	1.01	0.0	0.0	0.3	0.0	0.0
2001	1.20	0.0	0.0	1.1	0.0	0.0
2002	0.68	0.0	0.0	0.2	0.0	0.0
2003	1.10	0.0	0.0	0.7	0.0	0.0
2004	1.00	0.0	0.0	0.7	0.0	0.0
2005	1.00	0.0	0.0	1.1	0.0	0.0
2006	1.00	0.0	0.0	1.1	0.0	0.0

From the FY2006 FTE of 73.50, 13.20 FTE has been assigned to programs addressing Goal 5, representing 18% of FTE input. The FY2006 budget allocated to Goal 5 takes into account this FTE distribution plus how Goal 5 integrates with other programs conducted by COM as a whole

Management Key Themes:

Key Theme - Information Technology

a). Description of Program - A continuing effort has been to provide access to the global information superhighway to the schools and the communities. The relative isolation of some islands has made access to current information very costly as well as difficult.

b). Impact/Accomplishments – Purchase of high-speed computer systems with built-in communication hardware and software are now providing research and extension staffs the capability in surfing the WWW. Most land-grant offices have computer systems and are now capable of accessing the WWW for information gathering. The Video Teleconference (VTC) capability is now available at the colleges, so college faculty and staff have been using this new technology for meetings and conferences.

c). Source of Funding – Smith-Lever/Hatch

d). Scope of Impact – Micronesia

Stakeholder Input Process:
On-going consultations through public meetings were held to discuss the U.S. Federal requirements, stakeholder input and the implementation role by COM Land Grant Program faculty and staffs. Needs assessment surveys with government offices and agencies, farmers, private organizations, church groups, 4-H clubs, and NGOs were have always been part of the stakeholder input process. During these meeting, the public was asked or invited to define and rank issues of concern to them. Issues ranging from food security to children, youth and families at risk issues were noted.

Stakeholders input process continued through open forum and interviews with government and traditional leaders, collaborating agencies, and community-based organizations. Solicitation for input also occurred through direct written invitations to Ministries, Senators and Mayors, and through announcements that were placed in local newspapers and were aired over radio stations

The three college presidents and the vice-residents for Cooperative Research and Extension have made site visits to the different states throughout Micronesia to meet with state leaders and other stakeholders to solicit input on state needs and issues.

The College of Micronesia Board of Regents acts as an advisory body to the COM land-grant program. The board frequently met during the year as part of the ongoing process of providing guidelines and review status of programs.

The College evaluates the relevance of priorities and concerns of the island governments with those set by the funding sources. These sources are the USDA, South Pacific Commission,

Australian Center for International Research, Agricultural Development in the American Pacific and local donors, like the National Congresses, local legislatures, Board of Trustees/Regents for the three Colleges, COM Board of Regents and local governments.

The review of programs was an integral part of the completed renegotiation of the Compact of Free Association between the Governments of the Republic of the Marshall Islands and the Federated States of Micronesia and the U.S. Government. The College of Micronesia Land Grant Programs is still viewed as an entity that had contributed well to the social and economic development of the islands and will continue to serve the needs of the people and the communities throughout Micronesia in the next 20 years of the new relationship.

Research and Extension administrative and program staffs located at the six program delivery sites (islands) have gone through four strategic planning meetings in the four FSM States that catered to continued interactions with stakeholders in those localities. Most of the program administrators and program staff are members of government and private organizations and they received feedback periodically through interactions with these different organizations. At meetings conducted at the county level, feedbacks were received from stakeholders on issues and concerns unique to the different islands.

As a response to stakeholders input, research and extension staff undertook the task of drawing up local plans of work to address concerns and problems that are unique to the different islands or groups of islands. Stakeholders input is also use to determine what research and extension programs that will be funded by local matching funds as government and private organizations demand the most out of their contributions to these projects.

Inputs for program design and implementation for the new 5-Year POW cycle and the were obtained and used through consultation with our various stakeholders from the local, state, national and regional levels and we will continue to take into account these inputs for future programs and future updates.

Program Review Process:

Merit Review
The standard procedure for program proposals is to subject each proposal to an in-house review by an internal review team composed of researchers, specialists and extension agents. The review team edits and makes comments and suggestions on the program / project proposal before it is finalized. Once finalized, the program / proposal goes through a review process, this time with College administrators, the local College Board of Trustees, through the College of Micronesia (COM) administrator, and finally through the COM Board of Regents before it is sent to the USDA or non-USDA funding agencies.

Advisory committees established at the three colleges continued to review plans of work as they relate to agriculture, family and consumer sciences, and community economic development needs of the three nations under the College of Micronesia system. Advisory committees situated at the three colleges provided the review of programs based on the priorities of the governments and non-governmental organizations. The COM Board of Regents and the local Board of Regents at the three colleges were involved in these reviews, as they are also members of these advisory committees. The COM administration and faculty served in these committees as resource persons. All attempts were made to include a broad based advisory group, which represents a multi-institutional and multi-disciplinary effort.

Scientific Peer Review
A peer review process has been in use for research proposals. The peer review team includes administrators and researchers. They reviewed proposals for their potential impact and their relevancy to the communities and their fragile ecosystems.

A project proposal goes to the internal review team and outside experts who also specialized in the field of the proposed project. Once the comments and suggestions of the reviewers are included in the final project proposal, it goes to the AES Director at COM Central Office for his comments and final endorsement before it is send to CSREES-USDA for approval.

At the colleges, peer review teams have been organized. Other professionals at land-grant institutions through the Agricultural Development in the American Pacific (ADAP) coalition and other collaborating agencies in the South Pacific region were always invited to review and comment on proposals, in order to satisfy the need for a multi-institutional and multi-disciplinary requirement.

Assessment of Accomplishments Relative to 5-Year POW
Overall, there have been major accomplishments in research and extension projects proposed in the 5-Year POW and this was due mostly to the improvement on research infrastructure and the acquisition of appropriate technologies. Research activities have provided for an increase in production of indigenous and staple food crops and the development of new products, part of ongoing efforts to enhance food security and accessibility. New varieties of tropical crops have been acquired through the tissue culturing process and micro propagation procedures and protocol for somatic embryogenesis of these crops has been standardized.

Extension activities on the biological control of several invasive weeds have contributed to the reduction in pesticide usage and increase in the adoption of new practices to reduce the contamination of the air, water, and soil of small island communities. Food safety, nutrition and health programs have decreased illnesses and have decreased low birth weight and infant mortality rate. Improving eating habit and curbing the Western influences on the lifestyle of the local population is a continuing struggle and it has been a tug of war.

Extension efforts in transferring research results have been positive and resulted in programs becoming more readily available to underserved and underrepresented communities. As programs expanded and there is an increase in collaboration, there is a bigger segment of the population that is being served.

Program efforts in aquaculture/mariculture development are steadily growing as more and more communities and organizations are showing interest and are becoming involved in pearl farming. The hatchery production and training had resulted in over 20,000 oysters, which have been deployed in two pilot farms. The Micronesian trainees had successfully performed their first solo pearl oyster hatchery spawning and have subsequently handled all the hatchery procedures as required in raising and growing the oysters spat, including making feed, changing tanks, placement of collectors, keeping records, calibration of feeding schedule and other activities.

List of Acronyms:

1. ADAP – Agricultural Development in the American Pacific
2. CMI – College of the Marshall Islands
3. CMI-CRE – College of the Marshall Islands Cooperative Research and Extension Department
4. COM – College of Micronesia
5. COM-FSM – College of Micronesia – Federated States of Micronesia
6. COM-FSM/CRE – College of Micronesia – Federated States of Micronesia/Cooperative Research and Extension Department
7. FSM – Federated States of Micronesia
8. IAS – Invasive Alien Species
9. IBPGR – International Board for Plant Genetic Resources
10. MISS – Marshall Islands Science Station
11. MPPRC - Micronesia Plant Propagation Research Center
12. PCC – Palau Community College
13. PCC-CRE – Palau Community College Cooperative Research and Extension Department
14. RMI – Republic of the Marshall Islands
15. ROP – Republic of Palau
16. SPC – Secretariat of the Pacific Community
17. UNDP – United Nations Development Program
18. UOG – University of Guam
19. USP – University of the South Pacific
20. YINEC - Yap Interagency Nutrition Education Council