Annual Report of Accomplishments and Results

Research and Extension Programs

College of Micronesia Land Grant Programs

Fiscal Year 2004 (October 1, 2003 – September 30, 2004)

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ANNUAL REPORT OF ACCOMPLISHMENTS AND RESULTS FOR COLLEGE OF MICRONESIA FOR FY 2004:

GENERAL OVERVIEW

Integrated research and extension programs continued to address a wide range of economic, social, and environmental issues affecting small island communities and helped in improving the quality of life of Micronesians. With mostly low-lying coral atolls and fragile ecosystems in Micronesia, farming of both crops and livestock are mostly on a subsistence nature. Aquaculture/mariculture demonstration projects have been initiated and it will require the appropriate technology to transfer the technical know-how to Micronesians to enable them to start engaging in projects that would begin the infusion of new cash from outside into the local economy.

Research and development activities on the application of biotechnology to conserve citrus germplasm to save the canker-infested citrus industry and the cultivation of tropical edible mushroom continued. The potential of simplified hydroponics to improve health and the economy, and utilization, processing and development of new products from banana, taro 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 and the supply of planting materials to growers and the in-vitro multiplication of other food crops such as breadfruit and pandanus.

Activities are on-going toward 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. The biological control of the leafhopper is progressing very well with the biological control agent, mirid bug, continued to be mass-produced and released at sites infested with the insect pest. 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 3 pilot farms in Pohnpei 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.

Outreach programs focused on a wide range of issues ranging from food safety and quality, health and nutrition, food security, strengthening families and developing youth, developing leadership and volunteerism, and managing limited natural resources and the island fragile ecosystems. The nutrition, diet and health programs continued to stress the importance of healthy lifestyles, which include behavioral changes (physical activity and consumption of safe, nutritious 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 4-H 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. 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 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 a consortium with other American-Pacific land-grant universities and colleges through the Agricultural Development in the American Pacific (ADAP) Project. There are ongoing partnerships with the College of Tropical and Subtropical Aquaculture (CTSA) and with the Secretariat of the Pacific Community (SPC) on a Distance Learning Paraveterinary Training project and 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 a continuing shortage of necessary human resources. Hence, 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:
Two major key themes were addressed this year – namely: plant germplasm and innovative farm techniques.

Maintenance of germplasm collection of staple root crops grown in Palau consisting of twenty four (24) accessions of sweet potato, fifty three (53) accessions of cassava and ninety (90) accessions of taro ensured the conservation of these valuable genetic resources for the future generation. It also becomes a reliable source of planting materials for distribution to farmers.

A tissue culture technique for the mass propagation of taro has been developed and standardized. Mass propagation of fifteen (15) popular varieties of taro is being done by continuous subculture in multiplication medium. Comparative yield and growth performance of tissue cultured and conventionally propagated taro are now being done in the field. Initial experiments are being conducted for long-term storage and in vitro conservation of taro.

Demonstration of traditional taro production systems in upland and wetland conditions (*sers, dechel* and *mesei*) was established. The use of appropriate production technologies such as land preparation, integrated pest management and nutrient management showcases and provides critical information on importance of these production technologies for increasing farmer's yield and income.

CMI-CRE:
Ongoing research and extension programs continued to address important agriculture and aquaculture issues affecting small island communities.

This year, the Aquaculture Researcher and CTSA Pearl Oyster Hatchery Specialist trained seven people on hatchery and farming techniques.

The study to find out suitable substrates for Volvariella volvacea fruiting body growth was done and substrates were identified. Single - spore cultures of Volvariella volvacea were successfully initiated. The spawn production technique for Volvariella volvacea was developed, conditions have been standardized and viable spawn was produced. An article entitled, "Blooming Volvariella: Another Success in Mushroom Research" was written and submitted for publication.

The collected taro germplasm was successfully multiplied through tissue-culture method. The nursery cum greenhouse is operational and well managed. Two plants of each multiplied taro germplasm have been transferred to the nursery cum greenhouse and all the plants have shown healthy growth.

Twenty-four varieties of multiplied taro were evaluated in the field. To train farmers, two farmers' fields were developed as demonstration plots.

Different varieties of taro were supplied to the Ministry of Resources & Development and local farmers for planting purposes.

Several activities were organized to help farmers on cultivation of taro. Survey for diseases and pests of taro, was performed regularly. Getting on spot solutions and recommendations has proven to be benefiting for farmers and growers.

A total of seven publications on taro including research papers/news articles/contributed paper/abstract/guide/posters have been presented/accepted/published/submitted to international conferences/journals/newspapers/newsletters etc.

COM-FSM/CRE:

Yap Site:
Agriculture and aquaculture programs are equally important to Yapese livelihood. Yapese people have been fishing and farming for ages, practicing agroforestry and sustainable agriculture and aquaculture as necessary to the development of their small island communities. The taro patch system found in Yap cannot be found anywhere else. Everything is done with knowledge and understanding of the natural environment and traditional systems of fishing and farming.

Chuuk Site:
The Agriculture and natural resources agent was able to establish 3 new demonstration gardens in two communities and taro and other staple food crops, as well as green leafy vegetables are being cultivated by people in these communities. About 70 “uht karat” banana suckers, a rare banana variety that was found to be rich in Vitamin A were distributed to farmers. Agriculture Extension agents have been working with these farmers on proper care of these banana plants and providing tips on how to maintain their gardens.
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Twenty-five (25) students from different schools in the state who completed the In-school Youth Summer Workshop from July to August 2004 were provided basic lessons in home gardening. In addition to the in-school students, the agriculture Extension agent was also able to educate fifty (50) high school drop outs/youth at risk on agriculture and home gardening. In this program, the students were given ‘uht karat’ for planting, and the Extension Agent provided lecture/demonstration on garden maintenance, use of local fertilizers and herbicides.

After completion of the ADAP/SPC sponsored Paravet training program, the ANR Extension Agent has begun providing assistance to livestock owners, especially swine farmers.

Pohnpei Site:
The main emphasis for extension programs for the goal area is to empower clientele to adopt appropriate agricultural techniques and management practices, and change behaviors. Proactive program delivery approaches including planning for program delivery, consultation among staff and other agencies, and daily responses to requests for technical assistance. Presentations and onsite demonstrations, workshops, community meetings, and some radio programs were conventional extension methods employed.

In the area of swine husbandry, extension staff conducted workshops and visits to conduct demonstrations and presentations on swine production improvement, feeding, selection of breeding stocks, and care and maintenance of piggeries. Extension staff also assisted farmers by identifying abnormalities in their stocks and providing information of type and dosage of medication.

Extension staff continued to take active role in the ongoing effort by a task force created for the eradication of alien invasive weed species that were accidentally introduced into the island. The main alien invasive species targeted by the task force is the *Piper auritum,* locally known as the 'false sakau or kava.'

Kosrae Site:
Sustainable agriculture and home gardening programs are ongoing and the agriculture extension agent has been conducting visits to farms and individual households to assist farmers. The agriculture Extension Agent basically helped beginning gardeners how to sow seeds and seedlings into the fields and demonstrated proper maintenance of the gardens. Individual sessions were conducted at homes and schools. The Extension staff also provided information on alternative ways to balance harmony between food production and at the same time protects the environment. An example of this is the distribution of the tissue cultured banana planting materials to farmers as one way of threats to the environment and being conscious about protecting it.

B. Key Themes:

Key Theme – Agricultural Competitiveness

a). Description of Activity – [Trials on Banana Resistant to Black Leaf Streak (BLS)]. Maintenance of 1200 bananas at two sites continued. As of September 2004, data collection for BLS evaluation was on the thirty-fourth month at Site 1 and thirty-third months at Site 2 per leaf per plant basis. Fruiting/yield data, other horticultural/agronomical parameters of the banana descriptors and acceptability test are being collected. So far, 75% of the entries attained reproductive stage and bunches were harvested. Data of twenty five percent (25%) of the entries are being collected from the first follower; and five percent (5%) on the second follower. Collection of data extends to the third followers/ratoons in some entries that bear the early bunches. Differences on field performance of the tissue cultured banana hybrids and reference clones were observed and differences within varieties as well. Apparently, observations indicated two hybrid varieties consistently showed BLS resistance under Pohnpei environment at the two locations. Other hybrids were showing apparent resistance/tolerance depending on the weather condition during growth and development of the plants and followers. Reproduction was badly affected by the typhoons in 2002 and 2003 that uprooted flowering and bearing plants. Eleven percent (11%) and 2.5% at Site 1 and Site 2, respectively were uprooted in 2002 and 6% and 25%, respectively in 2003. Continuing field research until all the varieties in the trials bear fruits to complete data (target is December 2004).

[Introduction of Elite Taro (Leaf Vegetable Varieties and Leaf Blight Resistant Varieties and Field Performance Evaluation in Pohnpei MIR-COMF30)]. Eighteen taro (Colocasia spp.) TLB resistant/tolerant varieties were introduced to Pohnpei from SPC RGC through the Plant Protection Micronesia Coordinator and Dr. Mary Taylor. One tiny (about 1 cm) plantlet each tube of five varieties did not survive. Out-planted TC plantlets are being reared in the shade house for explanting and subsequent in vitro multiplication will be done. The four or five varieties reported and rated excellent/good as leaf vegetable will also be sourced at SPC RGC in Fiji. Import permit was already sent and waiting for the multiplied plantlets to be available at SPC RGC for distribution. All varieties passed virus indexing. Thirteen varieties are in cultures and being multiplied in vitro. The varieties differed in their response to the recommended Murashige and Skoog (MS) media for

Colocasia spp. Tests are being conducted on media additives/supplements and components substitution for best response. Two organic additives are being tested: three concentrations and its combination with the two media components substitutes. Twelve treatment combinations were tested. Initially, there was apparent positive response of the varieties shown on one of the organic additives used but was variety specific. Further tests are needed for replications and reproducibility. Also another growth regulator would be tested as MS media component for plantlet regeneration and shoot multiplication.

b). Impact/Accomplishments – Trials on Banana Resistant to Black Leaf Streak (BLS) is continuing and there are increasing number of households requesting for planting materials of the banana hybrids and others. Two resistant hybrid varieties (FHIA-3, FHIA-1) could now be the interim recommendation based on observations. About five hundred suckers of the different varieties (FHIA-1, FHIA-2, FHIA-3, FHIA-17, FHIA-18, FHIA-23, Grand Naine, Yagambi Km 5) were distributed to more than fifty households.

2. Introduction of Elite Taro (Leaf Vegetable Varieties and Leaf Blight Resistant Varieties and Field Performance Evaluation in Pohnpei (MIR-COMF30). The varieties are being multiplied for the trials. The tests on the in vitro modified multiplication MS media and the varieties responses are being conducted. This would generate the protocol for the in vitro modified MS multiplication media using organic additive and substitutes for easier media components sourcing and media components cost reduction.

c). Source of Funds – Hatch Act & ADAP

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

Key Theme – Agricultural Competitiveness

a). Description of Activity - Eighteen taro (Colocasia spp.) TLB resistant varieties were introduced to Pohnpei from SPC RGC through the Plant Protection Micronesia Coordinator and Dr. Mary Taylor of SPC. One tiny (about 1 cm) plantlet each tube of five varieties did not survive. Out-planted TC plantlets are being reared in the shade house for explanting and subsequent in vitro multiplication will be done. The four or five varieties reported and rated excellent/good as leaf vegetable will also be sourced at SPC RGC in Fiji. Import permit was already sent and waiting for the multiplied plantlets to be available at SPC RGC for distribution. All varieties passed virus indexing. Thirteen varieties are in cultures and being multiplied in vitro. The varieties differed in their response to the recommended Murashige and Skoog (MS) media for Colocasia spp. Trials are being conducted on media additives/supplements and components substitution for easier sourcing and to reduce cost of media components. Two organic additives are being tested: three concentrations and its combination with the two media components substitutes. Twelve treatment combinations were tested. Initial apparent positive response of the varieties was shown on one of the organic additives used but was variety specific. Further trials are needed for replications and reproducibility. Also another growth regulator would be tested as MS media component.

b). Impact/Accomplishments - The varieties are being multiplied for the trials. The trials on the in vitro modified multiplication MS media are being conducted. This would generate the protocol for the in vitro modified MS multiplication media using organic additive and

substitutes for easier media components sourcing and media components cost reduction.

c). Source of Funds – Smith-Lever

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

Key Theme – Agricultural Competitiveness

a). Program Description – Objectives for the reporting period were 1) Mass clonal propagation of collected sweet potato varieties through tissue culture techniques and, 2) Field evaluation of pathogen-tested, virus-free micropropagated plants. Not only all the objectives for the reporting period were achieved, but some objectives for the next reporting period have also been achieved. Sweet potato germplasm that originally belongs to Papua New Guinea, Solomon Islands, Taiwan, Vanuatu and Marshall Islands have been multiplied through tissue culture using the protocol developed in the previous year. The developed protocol again proved its excellence for the multiplication of sweet potato.

Total thirteen sweet potato varieties have been multiplied through tissue culture and all varieties are being maintained in the nursery cum greenhouse to develop germplasm bank. A newly constructed nursery cum greenhouse has seven wooden trays that were filled with mixture of fine sieved sand and especially prepared wormy compost. Five varieties of multiplied sweet potato have been evaluated in the field. Three varieties of multiplied sweet potato are currently in the field for evaluation. Five more varieties of sweet potato are ready for field evaluation. Two plots have been developed for use as demonstration plots to train farmers. To increase the fertility of the soil it was amended with compost. These demonstration plots are being used for hands-on trainings, demonstrations and also for field trials of sweet potato. Several activities are being organized to help farmers for cultivation of sweet potato. Training workshops including PowerPoint presentations, hands-on trainings and field demonstrations have been organized for farmers. Eight varieties of sweet potato have been distributed to the farmers directly and also through the Ministry of Resources and Development. Weekly visits are being made to the farmers fields for disease and pest survey and also for on spot solutions and recommendations for disease and pest control, and nutrient deficiency remediation.

b). Impacts/Accomplishments - Micropropagation of collected germplasm has resulted in the availability of elite and disease-free planting material in large numbers for local farmers and growers. Training workshops have increased farmer's awareness, knowledge, skill and interest in cultivation of sweet potato and large number of farmers has started cultivation of sweet potato. Many others are interested to convert their lands into productive sweet potato farms. Collected, multiplied and maintained germplasm in the nursery cum greenhouse is the initiation to establish germplasm bank. The growing interest in sweet potato cultivation would ultimately result in mass production and would provide a means of income generation to the local farmers that would result in their improved economic and social status. Availability of fresh produce in local markets would stimulate alternation in food habits to consume more sweet potato, which could help in reducing vitamin A deficiency that is a major health concerns especially at outer atolls of the Republic of the Marshall Islands.

c). Source of Funding - Hatch Act Funds & SARE

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

Key Theme – Agricultural Profitability

a). Description of Activity – As a result of the Banana Planting Project at the Hospital, the Agriculture researcher met with the Hospital Administrator to discuss the progress of the project. Few recommendations were suggested to overcome the various problems that the project experienced.

b). Impact/Accomplishments – Three banana plants produced fruit bunches. These bananas were served to the hospital patients. According to the Administrator, the hospital was able to save some dollars because instead of purchasing bananas from the local stores where they cost $2.00/lb (imported bananas) and $20-$25/bunch. They look forward for the other banana plants to fruit.

c). Source of Federal Funds – Hatch Act

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

Key Theme – Animal Health

a). Description of Activity – Activities included in the general areas of swine husbandry have been the main thrust of the animal health program, providing disease treatments, iron injections, teeth clippings, and deworming. In addition, eight training workshops were conducted in the communities for swine farmers. Attendance to these workshops ranged from 21 to 43 participants and usually took a couple of days, one day for presentation and one day for hands-on. Presentations covered nutrition, diseases, housing, and management of breeding animals and piglets. Hands-on covered demonstrations on how to do castration, treatments and injection procedures, and teeth clippings.

b). Impact/Accomplishments – Some of the accomplishments are as follows: 1) Fewer requests for technical assistance and inquiries from the communities; 2) New knowledge and skills, farmers are now capable of doing their own assessment and could provide the necessary treatment for their pigs; 3) An increase in the number of pigs raised per household due to better skills and management practices that resulted in a higher weaning litter size, improved housing thus better sanitary and environment; 4) Five farmers have reported being able to reduce cost of feeding pigs up to 50% using excess local foodstuffs for swine feed, especially during breadfruit season; and 5) Several farmers have reported better experience in terms of marketing live pigs with better performance on growers and finishers when medication is used.

c). Source of Federal Funds – Smith-Lever

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

Key Theme – Animal Production Efficiency

a). Description of Activity – With the growing interest in swine farming in the Marshall Islands, the Agriculture Extension Agent had worked with interested farmers to show them the basic knowledge and understanding on how to start and manage a small backyard family pig pen, starting from constructing a pen to taking care of day old pigs until they reach the breeding, weaning and slaughtering stages.

b). Impact/Accomplishments – Some of these farmers sold their pork meat to earn income for their families and some slaughtered them to supplement the family diet and for ceremonial purposes. This is an ongoing project and the target is to have 60% of the Majuro community to become involve in raising pigs in their backyards. Also to start utilizing the pig's manure as compost and as fertilizer.

c). Source of Federal Funds – Smith-Lever

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

Key Theme – Aquaculture

a). Description of Activity – After the completion of phase one of the project on development of a pearl aquaculture industry and expertise in Micronesia, phase two is now underway. With additional funding support from USDA, pearl quality improvement research has been in progress. Trial pearl production by pearl seeding (implantation of pearl nuclei) began from September 2003 using 1500 oysters, which focused on actual pearl production and business development. The first harvest of the round pearls was conducted in July 2004 as well as the second trial seeding using approximately 2500 hatchery-produced oysters. These experiments were to assess pearl formation and quality as part of the Federal Hatch research project titled "Improving Quality of Pearls from the Black-lip Pearl Oyster *Pinctada margaritifera* (Linnaeus) in Pohnpei, the Federated States of Micronesia."

The project's skill training program is also progressing well in the phase two. The hatchery and grow-out farm skill training have been carried out by involving trainees and casual participants from local communities as well as work-study students from local high schools. The grow-out farm skill training was also expanded by collaboration with the FSM National Government and Pohnpei State Government under the Workforce Improvement Act (WIA) and the Job Training Partnership Act (JTPA).

b). Impact/Accomplishment – As the result of the project, "Development of Pearl Aquaculture and Expertise in Micronesia," there are now three black-lip pearl oyster demonstration grow-out farms in the FSM. Two farms are in the lagoon of Pohnpei, one on Parem Island with approximately 7000 oysters and the other at Nett Point with approximately 3000 seeded oysters and 20000 spat (juvenile oysters), and one is on Pakin Atoll with 5000 seedable oysters and 2000 young adult oysters. There are 25 trainees from local communities participating in the project's activities at each farm and hatchery. The core staff, made up of "first generation" trainees, are now training "second generation" trainees.

Some of the results during this report period are: (1) the establishment of a commercial scale demonstration farm at Pakin Atoll, which evolved from a small experimental

system; (2) completed training of the 1st generation Micronesian trainees on all aspects of hatchery production and ocean-based grow-out farms; (3) the 1st generation trainees (now trainers) commenced training of the 2nd generation trainees on hatchery production and grow-out farming; (4) a total of 21 trainees with their skill level categorized from Level 1 to Level 4 continued the training program, of which 19 trainees were supported under the WIA/JTPA program and 12 trainees represented from Pakin Atoll community; (5) 120 round pearls were test-harvested in July 2004 from the hatchery-produced oysters; (6) all the trainees including the hatchery staff learned preparation, seeding and post-seeding operations for the round pearl seeding operation; (7) a half-pearl seeding technique was demonstrated and taught by a highly skilled Japanese technician; and (8) the results from the-test harvest indicated a significantly short pearl production cycle, which took only 30 months from the fertilization of eggs (hatchery) to a commercial-grade round pearl production and is considered as the world fastest pearl production record from the spawning. A preliminary assessment of the first series experiments also indicated high percentage of higher quality pearls. The black pearls from commercial farming generally take 18 to 24 months to become a commercial grade after the seeding operation, suggesting that the pearl farming cycle in Pohnpei could potentially be shorter than traditional farming business.

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

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

Key Theme – Aquaculture

a). Description of Activity - Setting up of demonstration cum training pearl farm at the CMI Arrak campus has been accomplished. As part of this project's objectives, a demonstration pearl farm was set up at the CMI Arrak campus' lagoon area. This demonstration farm is being used as a broodstock holding facility as well as for refining grow-out technology. Experiments was conducted and repeated on the efficiency of various containers to grow-out spat by monitoring its growth rate and survival.

b). Impact/Accomplishment – In May 2004, another successful hatchery run was conducted and 260,000 spat were distributed to local farmers. The spats were made to settle on a modified substrate. The Pearl industry was given spat settled on the new settling substrate. Preliminary growth rate and survival data indicated better than average growth than the previous year run. Water quality is also being monitored to finds its effect on the growth and survival of pearl oyster spat. This year has a definite impact on the black pearl hatchery and farming industry of RMI. For this project the objectives looked 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's hatchery perspective, the Researcher along with the CTSA pearl oyster specialist are looking into ways which could increase the percentage of spat production in the hatchery by using more efficient rearing methods. This would lead to more spat being produced in the RMI for the existing and new pearl farmers.

c). Source of Funds – Hatch Act

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

Key Theme – Aquaculture

a). Description of Activity - Reproductive studies on the Black-Lip Pearl Oyster *Pinctada margaritifera* in selected Atolls of the Republic of the Marshall Islands. The research and monitoring work on studying the reproductive cycle of the black lip pearl oyster in selected atolls of the Marshall Islands is ongoing. Preliminary one-year data has yielded valuable results in the sense that it is now known that the oysters spawn bi-monthly every odd month to be precise. With the available data on hand there does not seem to be any correlation with the limited water quality parameter i.e. temperature and spawning season. Most of the water quality parameters were constant throughout the year. However it was noticed that oysters held on the farm had the tendency to mature and ripen faster than the one held on the coral reef 30 feet down.

b). Impact/Accomplishment – This year's research has a definite 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 would give the industry a better idea to plan things because knowing the spawning season would give the 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. The preliminary result suggests that the oysters in Majuro lagoon spawn on the odd months of the year. 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 Funds – Hatch Act

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

Key Theme – Aquaculture

a). Description of Activity – Four (4) aquarium displays at Land Grant/Marine Science Lab were set up containing 3 salt water and 1 freshwater. The aquariums will be used for educational purposes and open for visits and observations by anyone, especially students and kids from schools and communities. Freshwater has freshwater prawns and 2 fish in it. The other 3 aquariums hold seawater and contain various small fish in one and various fine filter animals (oyster, soft &hard corals, sponges) in the other. Yap-CES has officially informed the general public about the aquariums since the Marine Resources Agent is testing them to find out the best type of fish to put in them in regards to dietary needs and finding an efficient way of setting and maintaining the aquariums. Annual contacts on this aquaculture project are 65.

b). Impact/Accomplishments - Those people who have noticed the aquariums have shown great interest in them. The Upward Bound Program of Yap Campus and its students have shown interest in participating in this project.

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

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

Key Theme – Biodiversity

a). Description of Activity - Program staff implemented the activities on the documentation of the cultivars of the food crops of the Marshall Islands. Five food crops, coconut, breadfruit, pandanus, banana and taro were targeted for the program. Survey was conducted in collaboration with staff of Ministry of Resources and Development in Majuro atoll, Namdrik atoll and Arno atoll. Over eight, seven, twenty-five, twelve and six coconut, breadfruit, pandanus, banana, and taro cultivars were documented. Information on local, English and scientific names, botanical descriptions, habitat and uses of over 58 cultivars were documented after interviews were conducted in the farming communities. A publication is aimed at the end of the program, which will be distributed to the farmers' community and agriculture researchers.

b). Impact/Accomplishments - Information on the documentation of food crops would help in the traditional knowledge of the identification and uses of the native food crops of the Marshall Islands.

c). Source of Federal Funds – Hatch

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

Key Theme – Biotechnology

a). Description of Activity – Objectives for the reporting period were: 1) To characterize, determine and identify leaf blight resistant somaclones using in vitro plant-pathogen interaction and molecular biology techniques; 2) Mass clonal propagation of the selected leaf blight resistant somaclones through tissue culture techniques; 3) Field evaluation of regenerated plants. Collaboration with University of Hawaii has been made to identify, characterize and determine leaf blight resistant somaclones using molecular biology techniques. Taro germplasm that originally belongs to Thailand, Malaysia, Indonesia, Fiji, Papua New Guinea, Samoa, Hawaii, Philippines, Solomon Islands, Palau, Taiwan, Marshall Islands, Guam, New Caledonia and Tahiti, has been multiplied through tissue culture using the protocol developed in the previous year. The developed protocol again proved its excellence for the multiplication of taro. Total fifty-five taro varieties have been multiplied through tissue culture and all varieties are being maintained in the nursery cum greenhouse to develop germplasm bank. A newly constructed nursery cum greenhouse has seven wooden trays that were filled with mixture of fine sieved sand and especially prepared wormy compost. Twenty-four varieties of multiplied taro have been evaluated in the field. Fourteen varieties of multiplied taro are currently in the field for evaluation. Seventeen more varieties of taro are ready for field evaluation. Two plots have been developed for use as demonstration plots to train farmers. To increase the fertility of the soil it was amended with compost. These demonstration plots are being used for hands-on trainings, demonstrations and also for field trials of taro. Several activities were organized to help farmers with cultivation of taro. Training workshops including PowerPoint presentations, hands-on trainings and field demonstrations have been organized for farmers. Twenty-four varieties of taro have been distributed to the farmers directly and also through the Ministry of Resources and Development. Weekly visits are being made to the farmers fields for disease and pest survey and also for on spot solutions and recommendations for disease and pest control, and nutrient

deficiency remediation. All the field-evaluated varieties have not shown any symptoms of leaf blight.

b). Impact/Accomplishments – Micropropagation of collected germplasm has resulted in the availability of elite and disease-free planting material in large numbers for local farmers and growers. Training workshops have increased farmer's awareness, knowledge, skill and interest in cultivation of taro and large number of farmers have started cultivating taro. Many others are interested to convert their lands into productive taro farms. Collected, multiplied and maintained germplasm in the nursery cum greenhouse is the initiation to establish germplasm bank. The growing interest in taro cultivation would ultimately result in mass production and would provide a means of income generation to the local farmers that would result in their improved economic and social status. availability of fresh produce in local markets in affordable price would increase its consumption, which could help in improving eating habits and thereby health of local people especially at outer atolls of the Republic of the Marshall Islands. In the long term development of leaf blight resistant taro would help in growing taro at large scale and would serve as a means to secure food and nutritional security.

c). Source of Federal Funds – Hatch Act

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

Key Theme – Diversified/Alternative Agriculture

a). Program Description – Objectives for the reporting period were 1) Development and standardization of mushroom cultivation techniques, 2) Determine the most productive combination of substrates, easily available at the Marshall Islands and optimization of production environment for edible mushroom cultivation. Not only all the objectives for the reporting period were achieved but some objectives for the next reporting period have also been achieved. Straw mushroom (Volvariella volvacea) cultures were initiated from the single spores to maintain the uniqueness and purity of the cultures. These pure cultures, initiated from single spores, were used for spawn production. The viable spawn was prepared on sterilized rye grain. The conditions were standardized for viable spawn production of straw mushroom. Half-gallon glass bottles with screw-top lids were modified and used for spawn production. The viability of spawn has been proven excellent by the fruiting body formation. An extensive survey was performed to study different available substrates, which could be used for straw mushroom fruiting body growth in the Marshall Islands. Substrates identified by this survey were used for the experimental research. Each 200 gm dried substrate with 100 ml water in the half-gallon glass bottles, was individually sterilized by autoclaving at 121 oC and 1.05 kg/cm2 for 25 min. After cooling, the substrates were inoculated with the straw mushroom viable spawn under aseptic conditions. These cultures were incubated in dark with 33±2 oC temperature and 70±5% relative humidity. The mycelia growth was observed daily, up to six days. On the basis of mycelia growth, substrates were categorized and best suitable substrates were used for straw mushroom fruiting body growth in the field. On the basis of research results, best proved substrates were further studied for basic nutritive and mineral contents, i.e. total dry matter, protein, fat, fiber, nitrogen-free extract, total minerals, calcium, phosphorous, nitrogen and potassium. The most suitable substrates for straw mushroom fruiting body growth were mainly from the corn plant, which is available and/or could be easily cultivated in the Marshall Islands. Substrate material containing corn leaves, corn stalks,

corn stover, local grasses, banana leaves and humus from the grasslands near the trees was identified as best available substrate on the basis of experimental results.

b). Impacts/Accomplishments - This study indicates that the potential for straw mushroom production in the country is fair. Considering the very limited land and poor quality soil, alternative agriculture approaches like mushroom cultivation could prove very fruitful. Developed technology would prove helpful for designing and planning of experiments and to start cultivation of tropical edible mushrooms at large scale, which would certainly help in boosting agriculture and could also provide promising health benefits. mushrooms are standard health food, low in calories, high in vegetable proteins, iron, zinc, fiber, essential amino acids, vitamins and minerals. Therefore, we need to encourage consumption of mushrooms as daily dietary intake because mushrooms are ideal food for people suffering from hypertension, diabetes and obesity, which are major health concerns in the Republic of the Marshall Islands.

c). Source of Funding - Hatch Act Funds

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

Key Theme – Diversified/Alternative Agriculture

a). Description of Activity – The objectives of this project are to develop, test and standardize a suitable protocol for growing vegetables using simplified hydroponics technology and to train interested participants of the community in establishing simplified hydroponics gardens. Objectives are designed to carryout out activities in three phases namely, inception phase, pilot phase and replication or outreach phase. Activities under inception phase were to set up a polyhouse to harbor wooden growers and pots.

Pilot phase is currently underway. In an experimental set up three wooden growers are used to grow red vegetable amaranth using cocopith as media. In another experiment, old tires served as the container to grow vegetable amaranth but a mixture of compost and beach sand served as medium.

Concurrently two varieties of tomato (Master No. 2 from Takii seeds Co. and Kewalo 90020-991A from CTAHR, Hawaii) and one variety of bell pepper (California Wonder from Tomato Growers Co.) are also under experimental trials in pots using in cocopith media.

b). Impact/Accomplishments - Except for the nutrients and seeds, all locally available materials are used to grow vegetable. A simple method to grow red vegetable amaranth (rich in calcium, iron, vitamins A and C) is standardized. Each of the 4x2' size wooden grower produced around 14 pounds of vegetable amaranth in 27 days. Those plants grown in a medium of compost and beach sand showed vigorous growth and were ready for harvest in 24 days. One workshop on simplified hydroponics was conducted for extension agents, agriculture personnel, farmers and high school students in Kosrae.

c). Source of Federal Funds – Hatch Act

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

Key Theme - Innovative Farming Technique

a). Description of Activity – [Demonstration, Preservation and Improvement of Taro Production Systems in Palau] - The fertilization experiment on upland taro showed that application of manure and fertilizer gave better vegetative growth and corm yield compared to those applied with compost or manure only. A similar demonstration planting of different varieties taro in semi-wetland (*dechel)* conditions with and without fertilizer showcases the importance of fertilization and nutrient management on growth and yield of taro. In traditional wetland (*mesei*) conditions, demonstration plots were established on the use of different mulching materials (*ramk*) such as leaves of banana, *chermal (Hibiscus tiliaceus),* acacia *(Acacia mangium), kisaks (Pongamia pinnata), kelel a charm (Campnosperma brevipetiolata) and ngolm (Glochidium ramiflorum*). Initial results indicated that the use of *kisaks* as mulching material in *mesei* resulted in higher corm yield of *Ngesuas* variety of taro.

b). Impact/Accomplishments – This project on the comparison of traditional and modern methods of production technologies such as land preparation, nutrient management, integrated pest management in wetland and upland taro production systems highlighted the efficient and productive system, which could improve farmer's yield and income.

c). Source of Federal Funds – Smith-Lever

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

Key Theme – Invasive Species

a). Description of Activity – Extension staff continued to take active role in the ongoing effort by a multi-agency task force created about 4 years ago to eradicate alien invasive species. Program activities included monitoring and spraying of the identified alien invasive species. Besides *Piper auritum*, other invasive species identified were *Micania micrantha* and *Chromolaena odorata*. There were five potential sites identified infested with the *M. micrantha*. These sites were sprayed with herbicides in the first month and visited every month for monitoring. Every three months thereafter follow-up spraying and assessment was done. Fortunately, the present of *M. micrantha* was spotted on the early stage of its infestation, thus minimum effort was applied in order to control further spread of the *M. micrantha*.

Chromolaena odorata, a widely distributed invasive weed is being controlled by the use of two bio-control agents –*Cecidochares connexa (*Gall fly*) and Pareuchaetes.* Multiplication and distribution of these agents continues throughout Pohnpei and Yap with encouraging results.

b). Impact/Accomplishments – The effort is now about 50% successful. More than 70 sites continued to be treated and monitored over the year. As more people became aware of the consequences of not controlling such invasive species they voluntarily assisted by identifying and reporting new sites. Landowners abandoned infested sites. Three of the *M. micrantha* treated sites now have been converted back to farming. More utilization of scarce land is being made possible because of the success. More land to be cultivated translated to more farm produce and better income for these farmers.

c). Source of Federal Funds – Smith-Lever

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

Key Theme - Plant Germplasm

a). Description of Activity **-** [*Maintenance of Root Crop Germplasm Collection of Palau]* Germplasm collection of staple root crops collected from the different states of Palau are currently being grown and maintained at the PCC Research and Development Station in Ngermeskang, Ngaremlengui. It consists of 53 accessions of cassava, 24 accessions of sweet potato and 90 accessions of taro. As vegetatively propagated crops, continuous replanting in the field is important in maintenance of these germplasm collection. Fertilization at planting time and regular weeding were done to ensure good growth of the crops in the field.

b). Impacts/Accomplishments – The PCC Research and Development Station serves as the national repository of these valuable genetic resources of taro, cassava and sweet potato, which are the staple root crops in Palau. Maintenance and replanting of the taro, cassava, and sweet potato germplasm collection ensure the conservation of these valuable genetic resources for the future generation. It has created awareness of the genetic diversity of these root crops in Palau. Planting materials of cassava, sweet potato and taro have been distributed to farmers and various groups, thereby helping increase areas for root crops production in Palau

c). Source of Federal Funds – Smith-Lever

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

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 15 popular varieties of taro in Palau is being done by continuous subculture in multiplication medium. More than 3000 taro plantlets have been acclimatized in the greenhouse and transplanted in the field. Comparative yield and growth performances of tissue cultured and conventionally propagated taro are now being done in the field. Initial results show that tissue cultured taro show greater number of sucker production compared to field propagated plants. Continuous multiplication of these popular taro varieties is being done in the laboratory for distribution of planting materials to farmers. Initial experiments are being conducted for long-term storage and in vitro conservation of ten (10) varieties of taro on slow growth medium using mannitol and abscissic acid in the culture medium.

b). Impacts/Accomplishments - In progress.

c). Source of Funding - Hatch Act Funds

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

Key Theme – Plant Production Efficiency

a). Description of Activity - Phase II of the project on grafting breadfruit rootstock was implemented. Field evaluation of grafted breadfruit rootstocks continued in the Phase II

of the program. Several rootstocks transferred at the farmers' field and at the Agriculture Experiment Station in Arrak. Experiments with successful graft union `Approach' was repeated with newly raised rootstocks of Mejwan, Betaktak and Mejenwe. Recording of field data on the plant growth and development are in progress.

b). Impact/Accomplishments - Successful development of protocol of grafting in breadfruit cultivars would lead to an increase in the year round production of breadfruits.

c). Source of Federal Funds – Hatch Act

d). Scope of Impact – Marshall Islands (Micronesia)

Key Theme – Tropical Agriculture

a). Description of Activity - In collaboration with the University of Guam, a feeding project was completed using local feedstuffs (breadfruit, banana, copra and fish by-products). Commercial swine feed imported from the U.S. mainland, Australia and New Zealand is very expensive. With the use of the local foodstuffs as supplement for swine feed, it lowered the cost of raising pigs and in turn lowered the cost of live pigs sold in the local markets. A total of 33 participants attended the program in Pohnpei and another 32 in Kosrae where similar training was conducted, with a total attendance of 65 pig farmers. Farmers were taught during the training workshops on the feeding procedures, mixture and processes of the base ingredients such as grated coconut, ripe (bananas, breadfruit not suitable for human consumption), and taro.

b). Impact/Accomplishments - It has been a big saving for some farmers on using local feedstuff for their swine as the cost of imported commercial feed from the U.S., Australia, and New Zealand has gone up 20%. Pig farmers gained valuable knowledge on how to process and mix the different local ingredients for making local swine feedstuff.

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

d). Scope of Impact – Multi-state (Guam and Micronesia)

Key Theme – Tropical Agriculture

a). Description of Activity - CES staff continued to conduct banana demonstrations to individual farmers and groups including homemakers during nutrition education programs. Vitamin A rich bananas have become a hot topic for the Island Food Community of Pohnpei (IFCP). CES extension staff conducted program activities including presentations and demonstrations focused on how to select good and healthy planting materials and how to treat the planting materials before field planting. Field maintenance including de-trashing and removal of the flower, weeding and watching for abnormalities continued to be part of the banana extension work. Attempts to work with local market outlets to promote banana sales were not successful as they do not keep ready-to-use records of transactions and small businesses are wary when questioned about what they buy or sell.

b). Impact/Accomplishments - A total of 58 individuals were assisted through presentation, demonstrations, and farm visits. Follow-up visits showed all participants increased their knowledge and skills in the selection of planting materials, treatment, maintenance and methods of harvesting. Another 20 farmers who participated in two banana farmers meetings have increased the knowledge and awareness in the nutritional values of yellow flesh bananas. All of these farmers expressed their interest in other similar varieties and cultivars. Many have received planting materials of the newly introduced hybrid bananas being studied at two locations by the Research unit.

c). Source of Federal Funds – 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

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

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. 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

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

Of the FY2004 total FTE of 72.90, 24.65 FTE has been assigned to programs that support Goal 1, representing 34% of the total FTE for all programs. The FY2004 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:
Many elementary and high school aged children are now doing the task of food preparation, a task usually done by their parents or guardians. In doing food preparation such as cutting up meat, cleaning cooking utensils and kitchen counters, most children do not posses food safety knowledge. A program on Home Food Safety was initiated to address food borne illnesses that usually occur at home, which included basic personal hygiene as washing cooking utensils and proper food handling practices.

CMI-CRE:
The EFNEP Extension Agent attended a Food Safety workshop sponsored by the Ministry of Health & Environment where she joined staff from other agencies in visiting local restaurants and small food establishments to conduct sanitation inspections of their kitchens and to see if the food handlers had the proper health certificate forms for handling and preparing foods. The EFNEP staff also participated in this year's World Food Celebrations and conducted cooking demonstrations on certain recipes, including a coconut jam and coconut slush, a tropical drink that was well accepted by the audience.

The EFNEP staff joined other members of the RMI Mobile Team during their visits to several atolls and conducted outreach programs to inhabitants of these atolls. She spent one week at each atoll and worked with homemakers in these communities and presented them nutrition information and conducted cooking demonstrations on certain nutritious local recipes. Part of her presentations was the nutrition bingo game where she had prepared prizes for the game winners.

COM-FSM/CRE:

Yap Site:
Non-Communicable Diseases (NCD) accounts for most of the health problems in Yap. The HE Agent continued to collaborate with government agencies staff in providing educational programs on healthy living, healthy diets and healthy lifestyles. The Yap Interagency Nutrition Council (YINEC) that the HE Agent is a member, has been working actively in the communities and at schools to convey the message on eating the right kinds of food and cultivation of green leafy vegetables and other nutritious local food crops for family consumption. Health programs are not only targeting communities on the main island, but workshops and educational programs were also held in some of the outer islands.

Comment [PC1]: Can we have some statistics?

Chuuk Site:
A Food Handlers training was jointly sponsored by CES and Chuuk State Government Department of Health Services and 38 food handlers from several food establishments participated in the training. All food establishments are required to go through this type of training before the Division of Environmental Health can issue them their licenses for cooking and selling food.

A total of forty-four homemakers had completed the 5 lessons on food safety and participated in cooking demonstrations.

Pohnpei Site:
Nutrition education programs continued in the communities and with individuals where other health related programs, such as EFNEP and food safety were conducted to homemakers and the youth population. In delivering the programs, Extension staff collaborated with other agencies and NGOs where staff made presentations and shared nutrition information and performed cooking demonstrations on a selection of nutritious local recipes. Other important components of educational programs that emphasized food storage, food sanitation and understanding of food labels.

Kosrae Site:
The State of Kosrae, like other States in the FSM has developed an economically harmful reliance on imported processed food stuffs that have high cholesterol content and depending less on nutritious local foods. The increased in consumption of imported food has lead to an overall decline in local food production and consumption. Agriculture Extension staff have launched a backyard home gardening program to help with local food production and to decrease the harmful habit of relying on imported fruits and vegetables. This program was done in collaboration with the municipal Mayors offices, Department of Education, and Office of Community Affairs. It started with the recruitment of interested gardeners and agriculture staff assisted the recruits in providing seedlings and assisted them with basic gardening techniques.

B. Key Themes:

Key Theme - Food Handling

a). Description of Activity - The EFNEP Extension Agent conducted a one week workshop, in collaboration with staff from other agencies, with 15 young ladies between the ages of 18-25 living in the rural villages of Majuro atoll. The ladies learned about good nutrition, proper food storage and food preparation, proper sanitary practices and the three basic food groups. They also participated in cooking demonstrations where they learned how to prepare 4 simple, nutritious and delicious local recipes.

b). Impact/Accomplishments – All fifteen ladies received Certificates of Completion at the end of the workshop and all fifteen participants said they found the workshop to be informative and very helpful. Some said they have started preparing healthy and delicious meals for their families.

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

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

Key Theme - Food Accessibility and Affordability

a). Description of Activity - The HE Agent continued to collaborate with other government agencies through YINEC, which is an interagency collaboration on promoting healthy and nutritious local food for farmers, homemakers and school children. In their programs, they emphasized the importance and advantages of local food production through home gardening to provide families with fresh foods and vegetables and save a few dollars on buying imported fruits and vegetables. They shared the importance of consuming local food that are easy to cultivate and are accessible to use instead of relying on costly imported canned goods and fruits and vegetables.

b). Impact/Accomplishments – Through follow up visits to homes of some of the participants, it was observed that there is an increase interest in home gardening as a way of providing for the family food and to supplement the family diet.

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

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

Key Theme - Food Safety

a). Description of Activity - A food safety program was conducted in partnership with agencies and NGOs, including The Conservation Society of Pohnpei (CSP), Aramas Kapw (Outward Bound), Mental Health, and Head Start Program, targeting both youths and adults. The program was conducted as a component of EFNEP in different communities. Follow up visits were conducted except for Mental Health since it was only a Summer Camp program and participants disbanded after one week. Nutrition staff conducted food safety and quality presentations, cooking demonstrations, and follow up visits to assess behavioral change and adoption of appropriate food safety measures by program participants. The emphasis on food safety included (1) sanitation-washing hands and surfaces during food preparation, (2) cross-contamination of food through use of proper kitchen tools and utensils, (3) thorough cooking of meat to kill germs, and (4) chilling and safe thawing of meat. Program activities were conducted to 4 groups of homemakers, Head Start Program parents, and elementary school students. Follow-up visits were made to all adults groups and youth, except for the Mental Health program. Two different sets of evaluations were used each for adults and youth. Youth participants were given a set of questionnaire to complete which basically a recollection of information and knowledge given during presentations. Adults used a nutrition assessment regarding behavior change and adoption of practices.

b). Impact/Accomplishments – More than 50% of youths were able to recollect information and knowledge while about 75% of adult participants showed positive behavioral change including sanitation practices during meal preparation, proper thawing, and storage. An impact which may be related to similar program in previous years was a report by Public Health indicating a reduction of food poisoning.

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

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

Key Theme - Food Safety

a). Description of Activity - Students from one of the elementary schools in Palau received 10 hours of Home Food Safety lessons. The lessons addressed issues that arise during normal preparation of meals in the home and tips on safe storage and handling of foods. Students were required to follow the recommended practice in washing of their hands and all cooking utensils used in food preparation exercises. Washing of hands before lunch was not always practiced in school due to lack of proper facility and was not encouraged at home as many were left without parents' supervisory.

b). Impact/Accomplishments – Thirteen students completed the required hours of food safety program and were following all recommended safe practices during food

preparation. Ninety-two percent of 13 students improved their practices in food preparation and safety at the end of program.

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

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

Key Theme - Food Safety

a). Description of Activity – Food Safety lessons were integrated with EFNEP program and taught in the communities and at schools. Program component included lessons on food safety, proper food handling practices, and also included cooking demonstrations on local foods rich in Vitamin A. Promotion of Vitamin A-rich local foods for health and food security in Kosrae taught in schools as part of school enrichment program, which was a collaborative efforts among the following departments and agencies to address the growing problem and the killer disease, diabetes: Department of Health Services, Department of Agriculture Land & Fisheries, Office of Community Affairs, and Land Grant Program as the coordinating agency.

The Extension Assistant continued to work at schools and in the communities by introducing nutritional information and health materials received through collaborative efforts with SPC.

b). Impact/Accomplishments – The SPC information on health made people more aware of healthy eating habits and proper diet and they became more aware of the importance of eating local food rather than relying so much of imported processed food.

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

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

Key Theme – Food Handling

a). Description of Activity – Land Grant Program staff and staff from the Environmental Health and Sanitation Division of the Department of Health Services (EHS-DOHS) jointly sponsored a food handlers training. Designed by CES staff, the training syllabus included food safety information, proper food storage and handling, and also included cooking demonstrations on selected nutritious local recipes. Invitation letters were sent to operators of food establishments, namely hotels, restaurants, take out food shops, department store (food section), bakeries, fish and local food market, regarding the training. The methodologies used in the training program included lectures, discussion both by the facilitators and participants, cooking demonstrations, practicum by the participants, and pre and post tests. The subject matter included food safety practices, rules and regulations of food establishments, microorganisms, food borne diseases, personal hygiene, food selection, food handling and preparation.

b). Accomplishments/Impacts – Thirty-eight (38) food handlers from 22 food establishments completed the lessons mentioned in the program description. The participants were very active during group and individual discussions. The pre and posttest showed ninety (90) per cent improvement. Daily attendance was very good. The distribution of participants among the food establishments are as follows:

c). Source of Funds – Smith-Lever

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

Key Theme – Food Borne Illnesses

a). Description of Activity - Homemakers, farmers and youths were organized for the training on food safety and food borne illnesses. The hands on component of the training included cooking demonstrations and topics discussed included personal and household hygiene, cleanliness of cooking utensils and equipment, safe cooking wares and utensils, proper food selection, handling, and storage, temperature control and sanitation during food service.

b). Impact/Accomplishments - Forty four adult homemakers from the municipality of Patta and other islands and fifty youths, twenty five (25) from In-school Summer Workshop and twenty five (25) from Youth at Risk project have completed the lessons on food safety and food borne diseases. Pre and post test were given to the students and 85% of the students were found to have improved knowledge. Participation during the discussions was very satisfactory and attendance was very good.

c). Source of Federal Funds – Smith –Lever

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

Key Theme – Food Security

a). Description of Activity – The objectives of this project are to develop, test and standardize a suitable protocol for growing vegetables using simplified hydroponics technology and to train interested participants of the community in establishing simplified hydroponics gardens. Objectives are designed to carryout out activities in three phases namely, inception phase, pilot phase and replication or outreach phase. Activities under inception phase were to set up a polyhouse to harbor wooden growers and pots.

Pilot phase is currently underway. In an experimental set up, three wooden growers are used to grow red vegetable amaranth using cocopith as media. In another experiment, old tires served as the container to grow vegetable amaranth but a mixture of compost and beach sand served as medium.

b). Impact/Accomplishments – Except for the nutrients and seeds, all locally available materials were used to grow vegetables. A simple method to grow red vegetable amaranth (rich in calcium, iron, vitamins A and C) is standardized. Each of the 4x2' size wooden grower produced around 14 pounds of vegetable amaranth in 27 days. Those plants grown in a medium of compost and beach sand showed vigorous growth and were ready for harvest in 24 days. One workshop on simplified hydroponics was conducted for extension agents, agriculture personnel, farmers and high school students in Kosrae.

c). Source of Funds – Hatch Act

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

Key Theme – Food Security

a). Description of Activity - The fruit fly traps surveillance have been one of the first line of defense against accidental introduction of new fruit fly species that may threaten food security of the island. Activities include monitoring, collection, and maintenance of 26 traps placed around Pohnpei proper. Traps content were collected bi-weekly, examined, dried, weighted and recorded for future reference. In addition, fresh traps replacing old traps were done every three months.

b). Impact/Accomplishments – As of this reporting, due to activities carried out under this project, it is certain that Pohnpei had but one species of fruit fly, which is the mango fruit fly (*Bactrocera frauenfeldi*). Activities undertaken under this project allowed agricultural products to be exported to other counties with the assurance that no pest, particularly fruit fly will be introduced to the importing countries. With free export, especially the neighboring countries, farmers have added source of funds to support and provide for their families. In addition, regular collection and maintenance of these traps have kept fruit flies population low thus; less agricultural products have been wasted. These products have thus been utilized by the farmers and families.

c). Source of Funds – Smith-Lever Act

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

Key Theme – Food Security

a). Description of Activity - Agriculture extension program staff assisted in the nutrition program by conducting presentations and demonstrations on how to start home gardens. They prepared vegetable seedlings including other greens, e.g. Chaya, which is rich in vitamins and minerals that were used during the demonstrations. Emphasis on home gardening is food security and the promotion of banana and other staple food crops cultivation for food security was part of the presentations and demonstrations. Two radio programs were aired on how to cultivate banana, including preparation of planting materials, site selection, planting, field maintenance, and harvesting.

b). Impact/Accomplishments – A total of 10 demonstrations and 10 presentations were done on home gardening and preparation of plots and cultivation of banana to 57 homemakers in five communities and to other 13 individuals in other communities. All of the 18 home garden plots established during this period were successful as evidenced by harvesting and utilization of vegetables and fruits for home consumption and giveaway to relatives and friends. It was also noted that certain food preparation behaviors were changed for the nutrition program participants, such improvements can be attributed to the home gardening efforts. Other impact is seen in the number of other individuals who are requesting to have home garden demonstration conducted in their homes or communities.

c). Source of Funds – Smith-Lever Act

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

Key Theme – Food Security

a). Description of Activity - A six-lesson course outline was developed as a guide for the backyard gardening program. The course outline covered site selection, seedling preparation, planting, field maintenance, preparation of mulching, pest management and harvesting and handling. The backyard gardening program was conducted at homes and in schools in conjunction with the EFNEP program. The program was designed to help families in utilizing their backyards for gardening and to produce their own fruits and vegetables. The program provided seedlings, planting materials and Extension staff provided technical assistance on basic agricultural practices to the clients. Gardeners were encouraged to establish their own nurseries to supply and expand their gardens. Site visits were conducted on a weekly basis to monitor progress of backyard gardening activities.

b). Impact/Accomplishments - There were six workshops conducted through the year. The information on backyard garden was disseminated to more than 200 young mothers and more than 20 men attended the community workshops. Total of forty-four (44) ardent gardeners recruited and completed backyard gardening activity. Four schools were assisted and their garden products were displayed during school base program. And two schools out to four schools have established their mini nurseries and supplying their school garden activities.

More than fifty percent (50%) of the gardens established during FY 2004 are producing fruits. Thirty-seven families have established their nurseries and three out of forty-four families have expanded in size and supplying local market with fresh local products.

c). Source of Federal Funds – Smith Lever

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

Key Theme – Food Security

a). Description of Activity – CES staff organized farmers, homemakers, youths and students for lessons and demonstrations on home gardening. The use of local materials in garden construction, compost/fertilizers and herbicides are emphasized during the training. Other program, areas covered included proper handling of seeds, preparation of seedlings, transplanting, and garden maintenance. Some of the home gardens that do well were used as community demonstration gardens where other interested farmers observed and replicated at home.

b). Impact/Accomplishments - A total of seventy-five (75) high school dropouts and twenty-five (25) in-school students have benefited from the education and practicum on home garden. Three new demonstration gardens were established in the mountainside of Iras community. Demonstration gardens in the five (5) municipalities in the Northwest Region namely Houk, Tamatam, Fananu, Onoun and Unano are still being maintained. These islands were the recipients of seeds distribution from churches and charitable organizations. The islanders were taught proper handling of seeds, seedlings, transplanting, and general garden maintenance.

c). Source of Federal Funds – Smith Liver and Local Match

d). Scope of Impact – Chuuk, Micronesia

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

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

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

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

From the FY2003 total FTE of 72.90, 9.25 had been assigned under Goal 2, representing 13% of FTE input. The FY2004 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 nutritional situation among the children in Palau has changed dramatically over the years. The traditional diets of Palauans consisted mostly of staple food, which are mostly root crops and marine products, however these days, there is an increase in the consumption of imported processed foods. Their food intake of fruits and vegetables is lower than recommended, whereas that of saturated fat has become very high. Salt intake is at more than twice the recommended level. Their typical diet now includes white rice, ramen (noodles), white bread, canned foods such as corned beef and Spam, fast foods and less milk than before. Healthy choices are less frequent among adolescents compared with other age groups.

The publication on Medicinal Plants in Palau – Volume 1 was printed and 308 copies have been distributed to political leaders, heads of public and private agencies, and private individuals in Palau and outside Palau. It was well received by the public and the information contained therein is being used and adopted to alleviate some ailments common to the local population.

COM-FSM/CRE:

Yap Site:
A healthy and well nourished population depends on a sustainable food production system. Traditionally, Yapese depends on locally produced food and the abundant and easily accessible marine life to supplement their diets. However with the introduction of processed food that is easy to obtain and prepare, a big portion of the population now preferred fast food over the local food.

Collaborative efforts continued through the Yap Interagency Nutrition Council (YINEC) in which the CES staff is a member, on programs to encourage people to continue and increase local food production as opposed to relying too heavily on imported processed food that is high in saturated fat and low in nutritional value.

Chuuk Site:
CES staff joined staff of the FSM National Government on their programs in some of the outer islands of Chuuk State in their efforts to provide educational programs on NCDs, diabetes and obesity. In addressing these growing health issues, programs were provided on food selection and a change in the lifestyle of people on these remote islands. In these communities, EFNEP lessons and cooking demonstrations were conducted to 90 homemakers and members of the Chuuk Women Association.

During the International Women's Day in March, CES staff participated through cooking demonstrations on a selection of local recipes. In connection with the Healthy Living in the Pacific Islands (HLPI) project, a focus group meeting was held and the results of the Needs Assessment Survey conducted at certain island groups were shared with the participants. The meeting also allowed for comments and suggestions on what to do with the results.

Pohnpei Site:
To assist the local people as they continued to make efforts in decreasing their reliance on imported processed food and start local food production, home gardening programs were delivered as a component of nutrition education program in the communities and at schools.

Agricultural Extension staff visited the communities and schools in the company of nutrition staff and provided planting materials and provided information on basic gardening practices, showing clienteles how to prepare planting materials, when and how to sow seeds, preparing the farm sites, transplanting seedlings to the fields, preparing compost, and other helpful ways of looking after their gardens.

Kosrae Site:

Accomplishments during the fiscal year of 2004 included a number of training, community workshops, school enrichment programs and participation in health activities on the island and abroad. CES staff were involved in community workshops in collaboration with staff from other agencies and participated in other events such as the World Food Day, International Women's Day, and Breastfeeding Week to promote healthy lifestyles and promotion of healthy diets and the consumption of Vitamin A rich foods available locally.

B. Key Themes:

Key Theme - Human Nutrition

a). Program Description – Students from one elementary school in Palau went through a 10-hour program called "Healthy Body, Healthy Mind Campaign". The program emphasized washing of hands and all utensils used in food preparation, safe food handling and storing, healthy eating habits-balance and variety, healthy snacks vs. fast foods, food labels and preparation of 10 healthy recipes. Students had a lot of fun preparing, cooking and enjoying these recipes.

b). Impact/Accomplishments – Thirteen students completed the required hours of "Healthy Body, Healthy Mind Campaign" and were following all recommended safe practices during food preparation. Ninety-two percent of 13 students have changed their eating habits and started eating a variety of foods, all 13 increased their knowledge in essential elements of human nutrition, ninety-two percent of all students increased their ability to select low-cost, nutritious foods, and improved their practices in food preparation and safety.

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

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

Key Theme – Human Nutrition

a). Description of Activity – Human nutrition presentations and cooking demonstrations were made to four homemaker groups and similar presentations were made to youths and elementary school children as a component of community enrichment programs conducted in collaboration with the Mental Health Program and Conservation Society of Pohnpei. Topics presented were (1) Three food groups; (2) Sources and functions of different nutrients, vitamins, and minerals; and (3) serving size of meals. Food ingredients representing the 3-food groups were used in the presentations and in cooking demonstrations. Participants in these training programs learned to prepare different local recipes, including a nutritious local juice that used the hibiscus flower as an ingredient.

b). Impact/Accomplishments – About 75% of adult participants reported positive behavior change in the selection and preparation of meals. About 60% of youth who participated were in command of information and knowledge learned during such presentations.

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

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

Key Theme – Human Nutrition

a). Description of Activity – A Mother Child Health community workshop was held in all four municipalities in Kosrae and was coordinated with collaborative effort with the Division of Public Health, Department of Health Services. There were 149 young mothers who attended the workshop. The Extension Assistant made presentations on complementary feeding and the nutritious value of yellow varieties of tropical fruits and encouraged participants to make use of the readily available tropical fruits and root crops that have high content of Vitamin A.

The Extension Assistant also participated in a two-day Breastfeeding workshop where she made presentations on Nutrition in Pregnancy and Infant Feeding. Similar workshop was conducted for government employees and planting materials to support utitilization of these local food crops that are rich in Vitamin A were distributed to participants. Handouts on information presented and planting materials were provided to all participants for planting.

b). Impact/Accomplishments – Seven-teen (17) homemakers had successfully completed the EFNEP course of twenty lessons and five cooking demonstrations on local recipes.

c). Source of Funds – Smith-Lever Act

d). Scope of Impact – (Kosrae, Micronesia)

Key Theme – Human Health

a). Description of Activity – An offshoot initiative from the regional project, Healthy Living in the Pacific Islands (HLPI) was organized and implemented in Chuuk State**.** A policy focus group was organized to identify the problems and the activities/projects to address the problems. The group was in agreement that the number one problem was lack of new data or baseline data to determine the existing problems related to health and nutrition. The group further identified the need for a "Needs Assessment Survey". During the year a Health and Nutrition Needs Assessment survey was conducted in nine municipalities namely Houk, Onoun and Fananu for the Northwest Region, Moch and Nama for the Mortlocks, Fefen for the Southern Namoneas Udot and Pata for the Faichuuk.

b). Impact/Accomplishments – Tremendous amounts of data have been gathered during the survey conducted in the nine municipalities. The results have already been presented to the policy group for their information and comments and also for their suggestions on how the write up will be presented. The data included socio-economic characteristics on the households, and food and nutrition practices from infancy, preschool, and adult

period. Also included are data on lifestyle. The final result will be written up and presented separately in a booklet form.

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

d). Scope of Impact – (Chuuk, Micronesia)

Key Theme - Medicinal Plants

a). Description of Activity –[Search, Preservation and Propagation of Medicinal Plants in Palau] - The first of a series of publication on "Medicinal Plants in Palau – Volume 1" was printed and is being distributed to the public. It contains photographs and information on local, English and scientific names, botanical descriptions, habitat, uses and preparation of 53 medicinal plants for curing various ailments.

b). Impact/Accomplishments – The printed booklet on Medicinal Plants in Palau –Volume 1 have been distributed to political leaders, heads of public and private agencies, and private individuals in Palau and outside Palau. There was a strong positive response and acceptance of the information in the publication produced in this project. Dissemination of knowledge on medicinal plants as alternative medicine to cure various illnesses has created awareness and adoption of these plants for primary health care. Ten residents of Ngaremlengui have attested to the efficacy of the use of a plant (*rtertiil*) to cure some of their ailments. It has also led to the establishment of village-level herbal gardens as source of alternative medicine.

c). Source of Funding – Hatch Act Funds

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

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

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

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

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

Allocate Resources:

From the FY2004 total FTE of 72.90, 6.40 have been assigned under Goal 3, representing 9% of FTE input. The FY2004 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 AGRICULTURE AND THE ENVIRONMENT.

A. GOAL ACCOMPLISHMENT NARRATIVE

PCC-CRE:
In this reporting period, two important themes were addressed: Biological Control and Integrated Pest Management.

On Biological Control, the taro leafhopper populations were reduced to low level on those taro farms where the mirid bugs were established. USDA CSREES approved two research projects for implementation in the next few years. These are "Biological Control of the Mile-A-Minute Weed in the Republic of Palau" and "Biological Control of the Melon Aphid in the Republic of Palau". These projects aim to reduce the threat of the mile-a-minute weed to the native vegetation while the other deals on controlling the aphid, considered a major pest of taro on Palau. Continuous rearing of three biological control agents is being done at the PCC Research and Development station. These are the predatory mites for control of spider mites on cassava, predatory mirid bugs for control of taro leafhopper and psyllid insects for control of *Mimosa*. This is done to fulfill the needs of farmers when they request for biological control agents.

On Integrated Pest Management, a Smith-Lever funded extension project on "Transferring and Monitoring of Gallflies and Mirid Bugs (Biological Control Agents) in Angaur and Peleliu States in Palau" was implemented. Initial results showed that the gallflies are getting established on the Siam weed. Furthermore, the mirid bugs could be recovered easily on a taro patch where they were released in which the taro leafhoppers were also present. A meeting with local residents in both islands discussed the results of the experiments and other problems encountered in growing their crops.

A brochure on results of Water Quality Survey was published in PCC Newsletter. Also a web page featuring the Palau Water Quality Program was developed.

CMI-CRE:
The Water Quality Program has been active in conducting its public awareness and monitoring program via media such as radio, college's monthly newsletter, local newspaper, brochures and through presentations by Extension Agents at schools and in the communities.

Through support from a grant from the Region IX Water Quality Project coordinated by University of Arizona, the water quality Extension Agent visited several outer islands and conducted awareness programs in the communities and has been actively collaborating with the Republic of the Marshall Islands Environmental Protection Authority (RMIEPA) Water Quality Awareness Program both in the urban and rural areas.

The Water Quality Extension Agent attended a training provided by two consultants funded by the United Nation Department of Economic & Social Affairs (UNDESA) project to monitor the Reverse Osmosis Unit that was set up at the CMI Arrak campus and to collect data from the two ground water wells, which were drilled at the CMI main campus. The Extension Agent collected data on a weekly basis from both units and send them to the project consultants for analyses.

COM-FSM/CRE:

Pohnpei Site:
Besides animal waste management to reduce environmental hazards and improve sanitation, use of manure for plant food (fertilizer) is catching-the-eye in Pohnpei. At one time the only discussion relating to pig manure is sanitation, human health hazards and environmental concerns. EPA Office has, but one, recommendation and that is to have cesspool where manures and effluent are discharged underground, out of site and no smell. Nowadays more and more people have direct experience using manure (animal and poultry alike) as plant food or fertilizers. The need is not just to contain the manure, but to store it in such a manner that it could be used anytime.

The fruit fly traps surveillance continued to be an important extension activity to address the need for export market and for local food security and sustainable agriculture needs. Hundreds of flies collected weekly is a good indication that the fruit fly population is being maintained.

Kosrae Site:
The expansion of agriculture in Kosrae State must be done with careful consideration for the fragile environment. Agriculture practices must be selected carefully to ensure harmony between farming and the environment; for example deforestation, pesticides use, chemical fertilizer uses, and the topsoil removal due to commercial farming. The implementation practices should be done conservatively due to the limited resources of the island. Modern sustainable agriculture practices and traditional practices have been shared with farmers to help in maintaining the harmony with the environment.

Chuuk Site:
The Northwest Region of Chuuk State was the badly hit area during typhoon Pongsona. So much of crop damages and it was estimated that it will take 10 or more years for the region to recover after about 70-80% of the crop damages in these areas. Extension staff helped in the recovery efforts by distributing a variety of seeds and other planting materials to municipalities in the region and continued to work with farmers on backyard gardening activities. In the meantime, a lot of families are still relying very much on donations given by churches, charity organizations, and through FEMA and FSM National Government.

B. Key Themes:

Key Theme – Agricultural Waste Management

a). Description of Activity – During visits and workshops conducted during the reporting period, Extension staff assisted swine owners on how to improve their operations, most of which are on backyard basis. Besides arrangements for workshops and one-on-one demonstrations, visits were made in response to requests for technical assistance. Many of the waste management recommendations were given during visits for animal health and at training workshops. Waste management practices were not considered as important to small swine project operators. The following were emphasized during program delivery: 1) swine waste as a good source of fertilizer, 2) improve sanitation in the households, and 3) decrease pollution to the environment. Demonstration were made to program participants on how to set up gutter, septic tanks and pig manure for composting and fertilizer to crops in the field. Waste management presentation and demonstration were made during workshops and during visits

b). Impact/Accomplishments – A total of 8 training workshops were conducted in the communities and waste management information was shared with 685 clienteles. Program participants increased their knowledge and awareness in the area of agricultural waste management, more specifically, the benefit of swine manure for composting and fertilizer.

c). Source of Funding – Smith-Lever

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

Key Theme - Biological Control

a). Program Description – [Taro Leafhopper] - The effective predatory mirid bug, *Cyrtorhinus fulvus,* had continuously reduced the taro leafhopper population on taro farms at the Research & Development station. Releases of the mirid bug were done on taro farms infested with the leafhoppers in eleven (11) States in Palau. As a result of the releases, some farmers in Airai, Aimeliik, Ngaraard and Ngardmau are no longer complaining about the populations of the leafhoppers on their taro plantings. It is a case of successful classical biological control program in Palau.

b). Impact/Accomplishments – A draft copy of an extension bulletin entitled "An Insect Enemy of the Taro Leafhopper" has been prepared and will be submitted for comment to the Publication Committee and to the President before final printing will be done. Once printed, this bulletin will be disseminated to farmers and other agencies in Palau and in other places. Likewise, taro farmers did not resort to applying pesticides to control the leafhoppers since the mirid bugs are already established in their farms.

c). Source of Funding – Hatch Act Funds

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

Key Theme - Biological Control

a). Program Description – [Mile-A-Minute Weed] - This project deals with importing a nymphalid butterfly, *Actinote anteas,* from Indonesia, rear them to pure culture, study its life cycle, behavior and conduct host specificity studies. All the necessary documents that are needed to support our request for an Import Permit from the Bureau of Agriculture are being prepared. Once the Import Permit is obtained, it will allow the insect to enter Palau for experimental purposes and for future field releases as well.

b). Impact/Accomplishments – In Progress

c). Source of Funding – Hatch Act Funds (New)

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

Key Theme – Biodiversity

a). Description of Activity - To document yam agrobiodiversity, including traditional landraces (farmer's varieties). Conduct a range of participatory research surveys across

Yap Island to record yam landraces. Collect and conduct field trials to test and assess characteristics of each landraces based on morphological features. Record morphology of each cultivar tubers based on IPGRI Descriptors and farmer's descriptions. Document traditional knowledge, beliefs and biocultural heritage associated with all aspects of yam cultivation and identify the custodians.

b). Impact/Accomplishments - During this period, fourteen participatory surveys were conducted. Two new varieties of *Dioscorea alata* and one new variety of *Dioscorea esculenta* recorded. So far, a total of 25 *Dioscorea alata* and 8 *Dioscorea esculenta* cultivars recorded for the period of the project. Besides, morphology of 10 cultivars recorded from a semi experimental plot using IPGRI Yam Descriptors and farmer's descriptions. In addition, participatory surveys with women farmers revealed several traditional cultivation techniques practiced in the yam cultivation.

Coastal flooding during typhoon Sudal destroyed hundreds of stored yam tubers. Only one women's group successfully established traditional yam cultivation after the typhoon havoc.

c). Source of Federal Funds – Hatch

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

Key Theme – Composting and Soil Amendment

a). Description of Activity - The ANR Extension Agents worked in seven atolls to introduce to the farmers the usage of these vegetation (*merina vigna and sopora tomendosa*) leaves as major soil amendment and as well as major source of NPK on composting preparation. Small demonstration sites were set up to demonstrate the effect of using these local vegetations as compost to help with the soil amendment efforts. Seven mature lime trees, which have not been able to bear fruit, were transplanted into this new demonstration site. Ongoing monitoring and evaluation were observed.

b). Impact/Accomplishments - After 12 months of nursing and supplying the soil compost pit with merina vigna and sopora tomendosa leaves, the seven lime trees started producing fruits and they were 4–5 years old. This method is being conveyed and demonstrated to farmers who have limited knowledge on the improvement on atoll soil to help them in their gardening activities.

c). Source of Federal Funds – Hatch Act

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

Key Theme – Integrated Pest Management

a). Program Description – [Sustainable Control Strategy Against Taro Corm Rot] – The *obei* (corm rot) resistant varieties such as Renged, Ngetmadei, Dungersuul, Homusted and Erderid were mass-produced using tissue culture technique. About 700 planting materials of these resistant varieties were distributed to farmers. Also, tissue culture propagated obei-resistant varieties are now being planted in the field and are being

compared with field propagated planting materials of the same varieties for growth and yield performances.

b). Impact/Accomplishments – Overnight soaking of taro planting materials in either Captan or Ridomil reduced incidence of corm rot in field plantings at the PCC R & D Station. Planting materials of obei-resistant varieties were disseminated to Julie Tellei, Regina Mesebeluu, Ann Kitalong, Haruko Skano and Medangeliang Reklai.

c). Source of Funding – Hatch Act Funds

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

Key Theme – Integrated Pest Management

a). Program Description – [Transferring and Monitoring Gallflies and Mirid Bugs in Angaur and Peleliu] – About 600 adults of the biological control agent, *Cecidochares connexa* were released in three sites in Peleliu State and 200 adults on one site in Angaur State to control established infestations of the Siam weed. In the last boat trip conducted, the gallflies were getting established on Siam weed in Peleliu and slowly getting established on Siam weed in Angaur. Likewise, about 400 mirid bugs, which are considered effective biological control agents, were released on taro plantings infested with the leafhoppers in Peleliu and about 120 mirid bugs in Angaur. Again, in the last boat trip conducted, the bugs could easily be recovered on taro plantings and leafhopper populations were low.

b). Impact/Accomplishments – Once the biological control agents get fully established, the gallflies will reduce the threat of the Siam weed to the native vegetation on these two islands. Furthermore, the mirid bugs once fully established can maintain the leafhopper population on taro at a low level.

c). Source of Funding – Smith-Lever Funds

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

Key Theme – Integrated Pest Management

a). Description of Activity - Cucumber Cultivation is a continuing IPM related project. Assistance was provided to four farmer cooperators on on-farm demonstration field trials and maintenance of the established plots (3-80 ft long, 2-3 ft wide) for household consumption and surplus production. Technical assistance on cucumber crop practices and management with regular pest monitoring are being provided. The program emphasized the importance of each step from cultivation of compact soil, improving fertility of the soil by combined application of inorganic nutrients and organic nutrients, compost (or commercial compost in the absence of ample amount of composted farm waste and/or residues), and application of organic-based micronutrient that extends harvesting from two to three weeks. Fallowing for one year after two crop cycles and crop rotation were also emphasized. Establishing on-farm demonstration trials however was delayed due to field inputs problem in the island.

b). Impact/Accomplishments - [Cucumber Cultivation]. Adoption of the How To's was 100% in regard to the practices with 50% of the cooperators. No serious pest attacked the

plants. Yield was at least doubled as an improvement to adopting the practices. Confirmatory field demonstration trials were requested. Crop Profile on Cucumber Cultivation in Pohnpei (in progress).

The echo seminar was conducted for the Extension Agents, AES staff and students in Agriculture attended the training workshop held in Kosrae. More people became aware and knowledgeable on nematodes, what it does to the crops, visible symptoms of nematode crop infestation, collection of samples in the field, laboratory isolation of nematodes, microscopic ID and how to control infestation. The seminar on the Kosrae training workshop was presented using power point. Handouts on the nematode body and its parts, life cycles of three kinds of nematodes were prepared and distributed. Twenty-three people attended the seminar.

c). Source of Federal Funds – Hatch Act & IPM

d). Scope of Impact – FSM

Key Theme – Integrated Pest Management

a). Description of Activity - IPM team continued the survey of insect pests and visited the Maloelap atoll, Arno atoll and Wotho atoll. Survey finding revealed that three major insect pests were common in the Marshall Islands viz. spiraling whitefly, mealy bugs and coconut scale. A training program was organized on Pacific Islands Distance Diagnostics System (PIDDS) for the Plant Protection and Quarantine officers of the Ministry of Resources and Development and Research Aids. Training program demonstrated the technique of digital photography and sample submission for the insect pests and plant diseases on the network for the diagnosis.

b). Impact/Accomplishments - Insect pest survey generated the updated information on new insect pests in the Marshall Islands. Farmers and Plant Protection and Quarantine officers from the Ministry of Ministry of Resources and Development are able to identify common pests found in their plants.

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

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

Key Theme – Sustainable Agriculture

a). Description of Activity - Community workshops were held for farmers and elite planting materials of banana, taro and cassava were provided to participants. Farmers were assisted in the basic skills in agriculture and also the basic agricultural methods such as, mulching, composting, and the traditional methods of controlling the insect pests. This agriculture program is promoting practices that will maintain harmony with the environment without the application of commercial fertilizers and chemicals.

b). Impact/Accomplishments - Other workshops sponsored by the Department of Health, the Department of Agriculture Land and Fisheries with involvement of the College were conducted in the municipalities and about four hundred forty five (445) seedlings of tissue cultured banana seedlings were distributed. Five farmers were provided with cuttings of the new varieties of cassava. Farmers learned the basic methods in

agriculture and in promoting the agriculture practices that will maintain the harmony of the environment. Six of these banana farms are now in their fruiting stage and expanding in size.

c). Source of Federal Funds – Hatch Act/Smith-Lever/Local

d). Scope of Impact – (Kosrae, Micronesia)

Key Theme – Water Quality

a). Description of Activity - The Water Quality Extension Agent visited 6 rural islands to conduct his awareness and monitoring program. The length of all his visits was one week at each of the islands, due to the flight schedules. His program would include working with the students at the schools, having awareness meetings with the community and collecting and testing of water samples collected from the communities' public water catchments and ground water well for total and fecal coliform. In the outer islands, the community rely on drinking from the well water therefore it is important to test these wells for coliforms. A minimal fee is charged to private owners, who want their drinking water tested.

b). Impact/Accomplishments - The Extension Agent made follow-up visits to the communities and assisted water catchments owners who had negative results on ways to clean them up and to improve their systems.

c). Source of Federal Funds – Smith-Lever

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

Key Theme – Water Quality

a). Description of Activity – Coordination of water quality efforts specific to Palau and in relevance to the other member states/territories. This was done through educational programs to help people, industry and governments prevent and solve current and emerging water problems. A Water Quality Survey conducted in Palau documented public awareness, aptitudes, attitudes, and actions towards water quality. According to 84% of respondents in Palau, clean drinking water appears to be the most important issue. Result of the survey has shown to be effective tool in support of local agencies and has enabled the partners to initiate a collaborative plan to conduct a nationwide training.

b). Impact/Accomplishments - A brochure on the Palau Water Quality Survey was published in the PCC Mesekiu Newsletter. The brochure and summary report were distributed to partner agencies such as Palau Environmental Quality Protection Board and Ministry of Resource & Development. A web page featuring the Palau Water Quality Program, as part of the USDA CSREES Regional Water Quality Website (http//www/ctahr.Hawaii.edu/rwq/westernpacific/westernpacific.htm or ag.Arizona.edu/region9wq) was developed. People in Palau will be more informed and can readily access information about local water quality issues.

c). Source of Federal Funds – CSREES 406 Regional Water Quality Grant

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

Key Theme – Water Quality

a). The Water Quality Extension Agent visited 6 rural islands to conduct his awareness and monitoring program. The length of all his visits was one week at each island, due to the flight schedules on small 6-seater passenger plane servicing those islands. His program included working with students at the schools, having awareness meetings with the community members and collecting and testing of water samples collected from the communities' public water catchments and ground water wells for total and fecal coliform. In the outer island communities, most everybody rely on drinking from the well water, therefore it is important to test these wells for coliforms and to ensure that they're safe for consumption. A minimal fee is charged to private owners, who want their drinking water tested.

b). Impact/Accomplishments - After the Extension Agent received the test results, he visited the owners to provide them with recommendations on how to clean their catchments and ground water sources. He has noticed that a couple of community members have gone through the processing of cleaning out their catchments, roof gutters and area surrounding the ground water.

c). Source of Federal Funds – Smith Lever

d). Scope of Impact – 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

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

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

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

From the FY2004 FTE of 72.90, 20.80 has been assigned under Goal 4, representing 28% of FTE input. The FY2004 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:
The extension programs continued to focus on providing tools and learning opportunities for the students and the public to become knowledgeable on issues that affect their lives and participated in trying to correct the problems. More students gained valuable lessons and interest by participating in the lectures, hands-on activities and field trips in numerous science classes designed for third to eight graders. The intern students learned about agriculture as a chosen career and gained experience working in a professional work environment. Likewise, participants in the Personal Sewing Class saved about 30 to 50 percent of their expenses for clothing.

CMI-CRE:
Programs to enhance economic opportunities and the quality of life for Marshallese were conducted at schools and in the communities for young mothers and school children. The 4-H and EFNEP Extension Agents jointly organized programs where they invited guest speakers from different governmental agencies, NGOs and community leaders to speak to school children on various topics such as taking leadership on community projects, teen pregnancy, suicide, alcohol and substance abuse, smoking and personal hygiene.

COM-FSM/CRE:

Yap Site:
The overall goal of programs is to establish aquaculture demonstration projects in at least three locations in the Southern, Northern and Central Yap. With technical assistance provided by the CES Marine Extension Agent, a private fishpond project was established using a 100' x 100' pond for growing milkfish and other fish species. With additional funding, similar projects are envisioned for other parts of the island.

At the youth level, the 4-H Extension Agent continued to collaborate with staff from the state community development office on organizing activities that would help in enhancing the quality of life for the local population. On going program are sports activities, community beautification projects, handicraft making, traditional dance programs, and aluminum can recycling.

Pohnpei Site:
Black Pepper production is now on the rise as some of the original pepper farms are being revived and new farms were established. Black Pepper is one of the major cash crops that have high potential for export. Production gradually increased over the past few years from about zero production in 2002 to more than 40,000 lbs annually in 2004. Almost 10,000 new vines are being maintained in several pepper farms, as more and more farmers are getting involved. Total number of farms which include those that have yet to produce berries is about 57. Agriculture Extension staffs assisted interested farmers to locate financial assistance to assist in establishing and maintaining new farms. The State Division of Agriculture provided incentive of free fertilizer for all pepper farmers for one whole year while CES staff continued to provide technical assistance to pepper farmers by way of demonstrations during monthly visits and through radio programs and community meetings.

Chuuk Site:
The Youth Development Program continued with both school children and school drop outs as collaborative efforts with other governmental agencies and community organizations on youth programs continued. Linkages with other governmental and private agencies remain very strong, with youth activities and programs to help youth-at-risk and school drop outs. Some of the youth programs were conducted through the Youth Wellness Center, which is a tie-up with the Division of Public Health that offered medical and counseling assistance to youth on sexually transmitted diseases and other youth maladies.

The three months Youth Development Program, Youth at Risk Project has served a total of seventy- nine (79) high school dropouts. These students have received certificates of completion, with some students receiving special awards on academic subjects, good behavior and good attendance. One female student got a special award for winning first prize for marathon during the Founding and Cultural Day Celebration. This student moved on to study at Moen High School where she was picked up to represent Chuuk State in FSM games. In the end, this female student represented the Pacific team in the Olympics in Athens.

Twenty-five (25) students from the different schools in the state completed the In-school Youth Summer Workshop with sessions on cultural, spiritual and social values in Chuuk. Other sessions included agriculture and home gardening where the students were given 'uht karat' for planting. Other sessions included food and nutrition, small business development, handicraft making, and local methods of cooking.

CES staffs were involved in the organization of a visit by 52 Japanese students who visited Chuuk as part of the Japan-FSM Exchange Program.

CES staff assisted in facilitating the Girl Scout Movement in Chuuk, collaborating with the government agencies in organizing camping trips and other activities provided to new recruits.

B. Key Themes:

Key Theme – Family Resource Management

a). Program Description – Training on Personal Sewing was conducted at an only girl high school in Palau to the sophomore class and their home economic teacher. The training provided basic lessons on sewing, such as learning different parts of a sewing machine, how to operate a sewing machine and learning the fundamentals required for making simple style of garment such as skirt for school uniform as requested by parents and students. Their major concern was to save at least 20% of the cost of their school skirt uniform, as the ready made skirts and dresses sold in the shops are too expensive.

b). Impact**/**Accomplishments – Certificates of completion were awarded to eighteen participants for completing 30 hours of Personal Sewing. Each student finished two skirts and a basic pattern. The pattern can be easily altered into a different style for their later use. The students were elated with results when completed garments were calculated and compared with ready-mades. The comparison showed a 30%-50% savings for students.

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

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

Key Theme - 4-H/Youth Development

a). Program Description – [Young Environmentalist] - A two-week program gave students in grades sixth through eighth a chance to learn how to protect the environment. Topics covered included recycling, reducing wastes, conserving energy, and endangered animals.

b). Impact – The students increased their environmental knowledge and completed the class with a better understanding of how their actions affect their environment and ways that they can help improve the environment.

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

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

Key Theme – 4-H/Youth Development

a). Description of Activity – [Young Ecologist] - Thirty five students / youth from Ngaremlengui State in grades 6 to 8 participated in the Young Ecologist Program. The students performed soil stabilization on exposed hillsides, conducted soil and water quality testing, planted numerous species of plants, identified different plant and animal species, started vegetable gardens, and picked up trash around the state during the Coastal Cleanup Campaign. The students planted trees and learned the importance of preventing soil erosion. They also conducted soil and water quality tests and learned about the different nutrients in their local ecosystem. They identified different pollutants entering the watershed that can affect the water supply and how it can be prevented. They also identified many of the plant and animal species that are in and around their communities. During the Coastal Cleanup they recognized the negative impact of garbage in the local ecosystem.

b). Impact – The students started their own vegetable gardens and took home the seeds and seedlings to start their own gardens with their families. This programs built on the student's previous knowledge of science and applied those concepts and lessons with new field based work. All of these programs helped teach the students about human impacts on the environment of Palau and ways to minimize or prevent its negative aspects. They can now spread this gained knowledge to the community.

c). Source of Federal Funds – Smith-Lever

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

Key Theme – 4-H/Youth Development

a). Description of Activity – - [Marine Science Classes] - Two classes on Marine Science, one for students in grade sixth through eight (Tidepool Grouper) and another for students in grade three to five (Little Minnow) were conducted. The classes included lectures, hands-on activities and field trips. Topics covered were on the importance of coral reefs, unique features of marine invertebrates, fish body shapes, and turtle migrations.

b). Impact – Fifteen students in the Tide Grouper Marine Science Class and twenty two students in the Little Minnow Marine Science Class showed increased knowledge as indicated by the scores of test given at the end of the class. All of them received Certificates of Achievement.

c). Source of Federal Funds – Smith-Lever

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

Key Theme – 4-H/Youth Development

a). Description of Activity – - [Gecko Outdoor Wildlife Class] - The class designed for students in third through fifth grades included lectures, hands-on activities and field trips with emphasis on terrestrial science such as identifying insects, studying plant adaptations and island formation.

b). Impact – All eighteen students were given a Certificate of Achievement and exhibited a better understanding of terrestrial science as shown by the result of Post-Quiz given at the end of the class.

c). Source of Federal Funds – Smith-Lever

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

Key Theme – 4-H/Youth Development

a). Description of Activity – A 4-H fishing project was conducted during the summer for a duration of two weeks. This project had 13 participants (12 boys and 1 girl). The purpose of this project was to impart on the participants the basic skills of fishing so that they can learn the skill and help in providing food for their families and to become skilled fishermen. The resource person taught the students how to make their own fishing rod from local materials and how to tie fishing hooks to the fishing lines.

b). Impact/accomplishments – The student now have their own fishing gears and they started fishing and going out to the lagoon by themselves to fish. Their catches provided the badly needed protein for good health.

c). Source of Federal Funds – Smith-Lever

d). Scope of Impact – (Marshall Islands, Micronesia)

Key Theme – Youth Development

a). Description of Activity - The youth summer program is designed for the in-school youths. For a breather from the academically oriented school curriculum, the syllabus is designed to include non-academic subjects such as practical skills training in making lei (maramar), weaving baskets, weaving coconut palm plates, building a fire and broiling food on the fire, cooking simple recipes, and doing home gardening. Twenty- five (25) in school youths aged ten to fourteen completed the one month summer program. Most of the kids were raised in the capital city and have not engaged in outdoor

activities.appreciated the skills that they have learned like building fire from firewood and broiling breadfruit and other starches. It's a first time experience for many and they enjoyed it.

b). Impact/Accomplishments – Over 80% of the students learned new skills in weaving coconut palm baskets, plates and other handicrafts they were never exposed to before the training. Friendship also started among many of the children.

c). Source of Federal Funds – Smith Lever

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

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 steadily making progress in its endeavors to establish pearl oyster hatcheries and farms, provide training programs, and promote industry development in Pohnpei. Two Micronesian core technicians were trained as trainers from whom several community people are learning to gain practical knowledge and skills necessary in establishing, managing and maintaining their own farms. The project has been proving that a hatchery-based farm is an alternate method of developing pearl farming by providing a constant and high quality supply of spat and to immediately begin the transfer of technical know-how from the pearl expert to the local people. The project's phase two is underway, which focuses on actual pearl production and business development.

The implantation of round nuclei (pearl seeding) and test-harvest have been performed by one of the best pearl technicians from the cultured black pearl industry, who is also teaching a half-pearl seeding technique to the Micronesian trainees.

b). Impacts/Accomplishments – 1) The first generation trainees (now trainers) started training of the second generation trainees on hatchery production and grow-out farming; a total of 21 trainees continued the training program, of which 19 trainees were supported under the WIA/JTPA program and 12 trainees represented from Pakin Atoll community; 2) the round pearls were test-harvested in July 2004 from the hatchery-produced oysters for the first time in Micronesia; 3) all the trainees including the hatchery staff learned preparation, seeding and post-seeding operations for the round pearl seeding operation; 4) a half-pearl seeding technique was demonstrated and taught by a highly skilled Japanese technician.

In addition to the skill training program and demonstration of hatchery, grow-out and pearl production, workshop/consultation meetings were held under the coordination and guidance of this project: 1) on July 29, 2004, the first Pohnpei Pearl Industry Development meeting convened and brought together national, state, and local government leaders to discuss the potential of this new industry, which indicated that there was a strong consensus that a pearl industry is viable in Pohnpei and the FSM; 2) on October 28, 2004, the second consultation meeting was coordinated by the project at the Pohnpei Marine Development Office with a participation of local business and state government leaders on how to develop the Pohnpei pearl industry to become successful, discussing issues and making recommendations on how such undertaking

would best served Pohnpei and other islands in the FSM. The workshop/meeting participants had opportunities to view harvested 10-month old pearls and discussed other pertinent issues relating to the ongoing project.

c). Source of Funds – Hatch Act & DOI

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

Key Theme – Leadership Training and Development

a). Program Description – The Dean of the Department of Cooperative Research and Extension at the College of the Marshall Islands attended Phase I of the 2004-2005 ESCOP/ACOP Class 14 Leadership Development Program . As part of her project for Phase II, she had organized a strategic planning meeting for her department and invited her mentor, Mr. Jim Hollyer, Project Manager for the Agricultural Development in the American Pacific (ADAP) project who traveled to Majuro, Republic of the Marshall Islands and facilitated the strategic planning meeting. ADAP is a consortium of the 5 land-grant colleges and universities in the American Pacific region. The strategic planning meeting was a success, which has become an operational guide for her organization and is somewhat of a contract between colleagues about how they will conduct their professional interactions and also serves as an instrument that establishes trust, partnership and open communication and provides for accountability in all that the Dean and her staff do.

b). Impact/Accomplishments – First time that the Research and Extension Department has a working document that guide them in the planning and implementation of their programs and the management and leadership skills that the Dean of CRE has gained, which definitely helped in the developmental growth of the organization.

c). Source of Funding – Smith-Lever & ADAP

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

Key Theme – Leadership Training

a). Program Description – Girl Scout leaders and members have been organized all over Chuuk State. The leaders and members have attended a series of workshops, and meeting sessions to familiarize themselves with the Girl Scouts principles and activities that are hoped to make them ideal leaders and volunteers. The girl scouts have been involved in many state functions and youth activities.

b). Impact/Accomplishments – A total of 21 Girl Scout leaders and 200 members have participated in very successful “thinking day” and “camping” activities. The group has likewise ventured on a successful fund raising activity to purchase uniforms and have also participated in a parade during the Public Safety Week. The Girl Scouts have been tapped many times to provide food donations to government and civic activities.

c). Source of Funding – Smith-Lever

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

Key Theme – Parenting

a). Description of Activity – Lessons on parenting were provided to young mothers, members of Chuuk Women Association, and school children. The lessons included leveling of expectations of both parents and children, understanding diversity, respect for the elders, good family values, charting relationships in the family, drawing the line, and developing boundaries. As juvenile delinquency and other social problems increased at an alarming rate while the family structure in the islands is no longer tightly knitted like in the old days, Chuukese communities are going through difficult times in providing appropriate programs to a fast growing youth population. Youth programs are being coordinated with the involvement of almost all sectors of the Chuukese society as youth related problems in the communities continue to rise.

b). Impact/Accomplishments – Thirty-five women attended the training workshops and about 75% gained knowledge about parenting skills.

c). Source of Funding – Smith-Lever

d). Scope of Impact – (Chuuk, Micronesia)

Key Theme – Supplemental Income Strategies

a). Description of Activity - CES continued to provide technical assistance to pepper farmers by means of demonstrations during monthly visits and through radio programs and community meetings. CES staff also shared information to potential and new pepper farmers regarding current market demand for the highly valued Pohnpei black pepper. At present, the demand for the Pohnpei black pepper cannot be met due to low production because many vines are yet to bear berries. Despite gradual increase in production over the past several years, demand for the export market is still greater than production volume. Information sharing served as a motivation for farmers to engage in pepper production or revitalize existing pepper farms. CES staff provided information on types of posts and maturity of fern posts, soil fertility and sources of planting materials. Types of demonstration conducted varied depending on the need of each farmer. Most common demonstrations included how to properly prune pepper vines, when to apply fertilizer and the amount to be applied based on the age of pepper vines, preparation of planting materials and harvesting. CES staff encouraged the use of compost and other organic materials for optimum growth and yield. For new pepper farms, CES staff also assisted in the selection of site, field layout and transplanting of cuttings to the field from the nursery including care for new vines in the field and pruning. Intercropping with kava and cucumber was demonstrated on two new pepper farms to generate income while waiting for the vines to bear.

b). Impacts/Accomplishments – Five new farms totaling 370 vines were established during the reporting period. Twenty-seven farmers who previously neglected their farms are now harvesting resulting in part by encouragements and technical assistance by CES staff. More than 50 of the 57 farmers assisted adopted recommendations given during visits and demonstrations. One farmer was again able to harvest and sell pepper beginning early last year after more than 10 years of abandonment. Then he was earning about $60 per week, now with increased production he is making up to $200 for the same period. That is an increase of 240% in sales and such an impact would not have taken place without staff technical assistance and information sharing. A relatively

new farmer who has planted pepper to 4.5 acres and now harvesting from less than 50% of the vines is now making $900 to $1,200 every month. Other impacts and accomplishments that should be noted include the fact that production of pepper dropped significantly up to 2000 and now is on the rise and the total number of pepper farm is now counted 57 as compared to about 38 four years ago.

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

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

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

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

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

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

From the FY2004 FTE of 72.90, 11.80 FTE has been assigned to programs addressing Goal 5, representing 16% of FTE input. The FY2004 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 conducted. During these meeting, the public was asked or invited to define and rank issues of concern to them. Issues ranging from food security to women 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 state visits to the different states throughout the Micronesia to meet with state leaders and community members 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 met more frequently during the year as renegotiation of the Compact of Free Association for FSM and Marshall Islands continues and the status of land-grant program is still in limbo. Accomplishment reports for land-grant program are always an item in their meeting agenda.

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 ongoing 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 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 continued to interact with local collaborators or external groups. 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 last POW cycle and the POW Update 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.

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. 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 has 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 is 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. 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