

**Annual Report of Accomplishments and Results**

**Research and Extension Programs**

**College of Micronesia Land Grant Programs**

**Fiscal Year 2003 (October 1, 2002 – September 30, 2003)**

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## ANNUAL REPORT OF ACCOMPLISHMENTS AND RESULTS FOR COLLEGE OF MICRONESIA FOR FY 2003:

### GENERAL OVERVIEW

Programs in research and extension continued to address a wide range of economic, social, and environmental issues affecting small island communities. 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 are now underway, which 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 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 pest 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. 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. Another summer internship program offered high school students an opportunity to work with and learn from research and extension staffs to increase their appreciation for agriculture and family and home economics as career choices. More and more students are now exposed to computers and were given the opportunity 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, 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:**

Key themes addressed for this year were plant germplasm and innovative farm techniques.

An established germplasm collection of staple root crops consisting of twenty-two varieties of sweet potato, fifty-three varieties of cassava, and ninety accessions of taro ensured the genetic conservation of these crops for the future generations. Production, printing, and distribution of publications on the morphological characteristics, culture management, and yield of sweet potato, cassava and taro created an awareness of the diversification of these root crops in Palau.

A new project on developing the micropropagation techniques for the mass propagation of disease-free taro planting materials was started. The appropriate levels of plant growth regulators for optimum regeneration of adventitious shoots were identified. Continuous subculture of taro shoot tips was performed to determine the response of different varieties of taro to this culture medium and to obtain numerous planting materials. Experiments were started to compare the field performance of tissue culture-derived and conventionally propagated planting materials of taro. Likewise, the procedures for the in-vitro conservation of the taro germplasm collection were initiated.

The demonstration of traditional taro production systems under wetland and upland conditions (*mesei*, *dechel* and *sers*) was established. Improvement of these production systems in terms of modern methods of land preparation, integrated pest management, and nutrient management will enable comparative production evaluation of taro's yield in each system thus providing critical information for a potential increase in the grower's income.

#### **CMI-CRE:**

Ongoing research and extension programs continued to address important agricultural issues affecting small island communities. With limited land resources, agriculture projects were aimed at improving backyard and home gardening techniques at the subsistence level. Research activities are ongoing on the production and development of new products from breadfruit, pandanus, banana, taro, sweet potatoes and vegetables. Introduction and field evaluation of banana varieties continued for their suitability to grow under atoll conditions. The trials on banana varieties resistant to the black leaf streak (BLS) or sigatoka and the micro propagation of 'Jilibugi' and FHIA banana varieties are continuing to improve the quality and quantity of banana for local consumption and the export market. A training workshop for banana farmers was conducted in collaboration with the RMI Ministry of Resources and Development and attended by 28 participants from Majuro and outer islands.

Research is ongoing on taro, utilizing the modern biotechnological and molecular biology techniques to develop leaf blight disease resistance in collaboration with University of Hawaii, and developing micropropagation protocol for the vitamin A rich sweet potato and evaluating field performance of micropropagated sweet potato. A research and extension program is continuing to introduce new products using emerging innovative technology like cultivation of tropical edible mushrooms and to popularize mushroom cultivation among local people.

Through funding support from the United Nations Food and Agriculture Organization, the

Marshall Islands Ministry of Resources and Development contracted one of the college agriculture researchers to produce 3000 banana seedlings through the method of tissue culture for distribution to farmers. Tissue culture plants of several varieties of FHIA hybrid banana (cooking and dessert) have been introduced and more than 250 plants have been distributed in the communities and at the Agriculture Experiment Station using narrow-pit system technique.

Breadfruit rootstocks and grafted plants were distributed in the community and planted in the soil at farmer's fields. Field evaluation of grafted plants is in progress. More than 200 colocasia esculenta (taro) seedlings were distributed to the outer atolls for planting and about 500 taro seedlings were reserved for the Ministry of Resources & Development Agriculture Division for distribution to the outer atolls.

The following articles were submitted and published in international scientific journals:

1. Nandwani D., M.C. Cheng, Jimmy Joseph, Jabukja Aikne, Arwan Soson and Gwo-jong Moh. 2003. *Taro Cultivation in the Marshall Islands: Problem, Perseverance and Prospectus*. Third Taro Symposium, Nandi, Fiji
2. Nandwani Dilip., *Biodiversity and Biocultural Heritage in the Island Countries: the Marshall Islands*. Int. J. Island Affairs, UNESCO, Paris. P. 35-40.
3. Nandwani D and Edgar J DaSilva 2003. *Traditional Knowledge and Medicine in the Marshall Islands*. Teknosience p. 42-46

### **COM-FSM/CRE:**

#### **Yap Site:**

A research project on simplified hydroponics to improve health and economic prospects of Yapese communities aims at introducing, developing and promoting low-cost vegetable production techniques. Successful development of simplified hydroponics of growing crops will enable them to produce surplus food and meet their own nutritional requirements and supplement their daily income.

Extension activities were focusing on home gardening or small scale food production. Extension staffs continued to visit clientele on their farms and provided information to assist them on their gardening projects. A gardening plot located at the college campus also made available seedlings and planting materials to farmers.

In progress are fishpond culture and pearl oyster trials, aiming at increasing awareness of their potential for benefiting families through supplementing their diet and providing employment opportunities.

#### **Chuuk Site:**

Extension program on home gardening included extension education to encourage and establish household gardens by providing technical assistance to men and women, youth groups, and communities within the lagoon area. ANR program staff assisted 36 homemakers and 39 high school students with their home gardening projects. The nursery at the CES office has been maintained and utilized for home gardening demonstrations for the IPM program. Program delivery has been through demonstrations on practices of growing crops in the garden and providing quality seeds and seedlings to families. Technical assistance aimed at encouraging cultivation of local food crops for household consumption has been provided to

people on these islands. ANR staffs have also been involved in the agricultural crop assessment and food distribution for FEMA assistance in the wake of the devastation caused by two typhoons that hit the islands in the Mortlocks and the North Western Region.

### **Pohnpei Site:**

Banana diseases trials on black leaf streak (BLS) and other diseases in Micronesia in collaboration with the University of Hawaii (Manoa), College of Tropical Agriculture and Human Resources (CTAHR) is a continuing project. New improved and designated hybrid bananas were introduced from the International Center for the Improvement of Banana and Plantain (INIBAP) for resistance/tolerance evaluation to BLS and other diseases in Micronesia. BLS is prevalent in FSM particularly Pohnpei. Chemical sprays costly to farmers control the disease. Control with the use of chemical however, is an environment hazard especially to small islands States in the Pacific especially when it is not properly applied. Results of the trials on resistance/tolerance of the bananas to BLS and other diseases will be the basis of recommendations for production towards agriculture competitiveness of quality fruits and yield. Another project is the trials on taro varieties (*Cyrtosperma* spp. and *Colocasia* spp.) being tested for its suitability to grow under atolls conditions and documentation of field performance in the island of Pohnpei, a modification. Also the results of the trials will increase knowledge base on taro cultivation.

Extension program on Banana Production and Marketing addressed poor quality banana, lack of bananas in the local market outlets, improve supply and fulfill export demand. Farmers often neglect banana cultivation practices and management. Non-formal education on banana cultivation through demonstration and workshops is aimed at encouraging farmers to improve knowledge and skills on best practices in the production and management of banana for subsistence and for the market outlet. Adoption of appropriate cultivation techniques and technologies would improve yield and thus, volume and quality available for home consumption and export. Market information for banana is also a component of the program to collect data and assess prevailing trends.

The program on Swine Production and Management/Swine Upgrading is aimed at addressing the current situation of in-breeding of swine due to the practice of raising swine in semi-close system resulting from lack of resources, lack of basic management skills, feeding scheme, selection of breeding stock, high mortality rate and small weaning litter size resulting from poor or improper piglet management. Efforts continued to focus on improving knowledge and skills on swine management and upgrading in order to optimize backyard and semi-commercial operations and increase number of improved stocks, thus more pigs for personal, family and business undertakings.

Agriculture extension staff took active role in the effort with other agencies to prevent spread of the invasive species, *Piper auritum*. The invasive weed was introduced about 3 years ago and was established in more than 60 locations around the island. An expanded effort on the subject of invasive species, Agriculture extension staffs participated in the production of a poster on the 10 most invasive species on the island of Pohnpei, a 3x6 color poster now posted in public areas and at businesses.

Destruction of natural forest due to upland planting of kava, locally known as *sakau*, is a big problem in Pohnpei. The preference for upland cultivation resulted to deforestation, erosion, sedimentation and alteration of the forest ecosystem. There is lack of knowledge in tropical lowland cultivation of kava. The program is aimed at improving knowledge and skills in tropical

sakau cultivation among sakau farmers and others to adopt site-specific cultivation practices in the lowlands. Program delivery is through training, demonstrations and radio programs.

### **Kosrae Site:**

The Micronesia Plant Propagation Research Center (MPPRC) was working on two Key Themes: (1) agricultural competitiveness; and (2) sustainable agriculture. In 2003, MPPRC concentrated on staple crops of Kosrae like banana, taro and *Citrus*. Research focused on improving micropropagation protocol for the popular banana variety *kufwafwa* and evaluating field performance of micropropagated bananas. Research results were published at the 2003 Congress on *In vitro* Biology held in Portland, Oregon in June 2003. A new variety "macao" banana with great commercial potential was acquired from Guam, as tissue cultures.

Focus of *Citrus* research included developing micropropagation procedure for 6 varieties and standardizing somatic embryogenesis protocol for sweet orange and lime. A cell culture system for *Citrus* was also developed.

Research on taro was aiming at determining comparative resistance of different varieties to the taro leaf blight disease. Over 10,000 elite (disease free, fast growing) taro seedlings and banana seedlings were produced and distributed to 211 families in Kosrae. Three publications were made from the research on taro; two at the 3<sup>rd</sup> international taro symposium held in Fiji and one in the American Society of Plant Biologists congress in Honolulu, Hawaii.

A microbiology laboratory was added to the tissue culture facility in 2003. A project on micropropagation of sakau received approval of USDA this year. A multi-state project in collaboration with College of Natural and Applied Science funded by T-STAR program became operational in 2003. Micropropagation and distribution of endangered vitamin A rich bananas supported by the US Department of Interior produced and distributed over 3000 plantlets to families in Kosrae and to Pohnpei and Yap States. Trainees from Yap (3) and Pohnpei (9) attended advanced training in agriculture (tissue culture and nursery practices) at MPPRC in 2003.

Extension programs on backyard gardening addressed the growing dependence on imported fruits, vegetables and other crops. This ongoing program is encouraging families to establish and maintain backyard gardens to supplement expenses on imported fruits and vegetable and their diets.

The following articles were submitted and published in international scientific journals:

1. Puthiyaparambil Josekutty, Salik Cornelius, Tholman Kilafwasru, Roland George, Neis Nena, Vicente Thoulang and Ludick Thalley. 2003. *A Simple Nursery Technique for Rapid Propagation of Clean Soft Taro Seedlings*. Accepted for presentation in the third international symposium on taro, Fiji Islands (21-23<sup>rd</sup> May 2003).
2. Puthiyaparambil Josekutty, Moses Asher, Glastine Cornelius and Nena Nena. 2003. *Documentation and On Farm Conservation of Taro Varieties on Kosrae*. Accepted for presentation at the third international symposium on taro, Fiji Islands, 21-23<sup>rd</sup> May 2003. (Both posters presented with kind assistance from Kosrae State Govt., and Secretariat of Pacific Community (SPC), Fiji).
3. P C Josekutty, Elsa Langu, Joesen Mongkeya, Salik Cornelius, Tholman Kilafwasru, Roland George and Neis Nena. *Nutritional and Growth Regulator Requirements for in*



*in vitro* Development of Ten Taro (*Colocasia esculenta*) varieties. 2003 Congress of the American Association of Plant Biologists, Honolulu, Hawaii, USA, 25-30<sup>th</sup> July 03 (Abstract # 456).

## **B. Key Themes:**

### Key Theme – Agricultural Competitiveness

- a). Description of Activity - The project on BLS disease evaluation is still continuing field research until fruiting of all banana varieties to complete data collection that extends to first ratoon. Maintenance of 1200 bananas at two sites continued. As of September 30, 2003 data collection for disease evaluation was twenty-third month at Site #1 and twenty-second month at Site # 2 per leaf per plant basis. Fruiting/yield data, horticultural parameters and taste and acceptability test are being collected.

Maintenance of the taro patch and plots was accomplished. New area for the 'Swamp' taro was re-established in February 2002 for field performance evaluation and documentation of eight cultivars. Plants are growing very slow however, there are varieties that grow relatively faster than others. Planted fifteen varieties (thirteen and previously eight) 'Dry' or 'Soft' taro cultivars in March 2003 for the third and final trials for field performance evaluation.

Harvested the thirteen 'Dry'/'Soft' or 'Sweet' taro cultivars in March 2003 (nine months after planting) for the second trial. Three hundred (300) lbs. tubers were harvested in a 33 ft x 36 ft area. Plant description, tuber characteristics, suckering ability and yield data were collected.

Maintenance of the field was accomplished. Bi-monthly cultivation (hilling-up), application of chicken manure and complete fertilizers were conducted. Removal of diseased leaves was adopted as a management practice to prevent spread of the disease. The third and final trial is scheduled for harvesting October 2003. Final data would be collected.

- b). Impact/Accomplishments – [Project in progress] So far, 139 banana bunches were harvested. Differences on field performance of the tissue cultured banana varieties were observed and differences within varieties as well. Apparent BLS resistance of the hybrid banana entries was observed. There is an increasing number of households requesting for planting materials. Multiplication of the varieties for distribution depends on the results and recommendations generated from the experiment being conducted. A number of suckers after desuckering, however, were distributed to farmers through CES. Households observed vigor of FHIA bananas. The hybrid bananas are developed by the Fundacion Hondurena de Investigacion Agricola (FHIA) in Honduras through the years of breeding and selection. These were identified promising hybrids with superior agronomic and disease resistance characteristics.

Project is terminating in December 2003. The experimental site of field performance trials of the different taro (*Colocasia* spp.) with modification serves as a 'show window' for cultivation with promising surplus production potential for trade. Plants showed vigor as early as 30 days after planting (DAP). Plants are vigorously growing at 180 DAP, but showed symptoms of taro leaf blight (TLB) disease reported on *Colocasia* spp. in Pohnpei. There are few local varieties identified as resistant to TLB. Harvesting

schedule for the third and final trials is on the seventh month (October 2003) at 210 DAP. Distribution of suckers to interested households after harvest was accomplished. Planting materials were also extended to CES. The scientific paper on 'Field Performance of Taro (*Colocasia spp.*) Varieties in Pohnpei' is in progress and waiting final trials harvest data.

- c). Source of Funds – Hatch Act & ADAP
- d). Scope of Impact – County Specific (FSM)

#### Key Theme – Agricultural Competitiveness

- a). Description of Activity - Planned activities, including training programs on swine production, visits, and demonstrations were conducted to farmer groups and individual farmers throughout the main island of Pohnpei. Most program delivery was conducted based on immediate needs or problems at piggens. Response to requests from farmers was conducted through demonstrations to teach farmers proper pig handling practices, which included castration, tooth clipping, application of Iron, and the administration of antibiotics. Farmers usually acquired medications for antibiotic from the local government and extension staffs assisted in the administration of it. Extension staff also provided advice on improving feeding and watering, timely weaning, and designing of a piggery project.
- b). Impact/Accomplishments - About 70% of the more than 300 swine raisers adopted best management practices. A positive impact of this program is more and more people are able to administer antibiotic, Iron, and tooth clipping. A community piggery project funded by Pohnpei State Legislature was successfully implemented for 15 households or families. Each unit, all of which started with one sow or gilt, has at least one litter. A few now raise piglets from the second litter. Aside from competitiveness and sustainable development opportunities, this program is seen as an integral component of the socio-economic development and cultural practices of the island where swine of large size are displayed and used on special occasions.
- c). Source of Funds – Smith-Lever
- d). Scope of Impact – County Specific (Pohnpei, Micronesia)

#### Key Theme – Agricultural Competitiveness

- a). Program Description – The main goal of the project entitled, "Vitamin A-Rich and Pathogen Tested Micropropagated Sweet Potato", is to provide a safe, cheap and simple delivery system to increase the dietary intake of Vitamin A and thereby controlling Vitamin A deficiency and simultaneously helping the country in attaining food self-sufficiency and to develop a germplasm bank. The project is in the beginning stage as it started on January 1, 2003. In the initial stage, many research articles and concerned literatures were collected and reviewed. Research staff alternated the laboratory according to experimental needs and constructed the nursery cum greenhouse. Successfully standardized the sterilization technique and developed protocol for tissue culture of sweet potato. Nine different varieties of sweet potato from SPC were collected and multiplied through tissue. Tissue culture sweet potato plants are successfully

transferred into the field after hardening. Data collection and feeding in computer are in progress for the analysis. Analysis report will be used for planning future experiments.

- b). Impacts/Accomplishments - Collection and review of related literature would prove helpful in successful planning and proper design of experiments. Generation of necessary laboratory and nursery facilities would result in successful and timely implementation of the planned experiments. The facilities generated would also serve the research interests of the country. Standardized sterilization technique and developed tissue culture protocol would be used to raise tissue culture plants of more superior and vitamin A rich germplasm. Collected germplasm and developed protocol would be used to establish the germplasm bank. Distributed germplasm would result in increased sweet potato production.
- c). Source of Funding - Hatch Act Funds & SARE
- d). Scope of Impact - County Specific (Marshall Islands)

Key Theme - Agricultural Competitiveness.

- a). Description of Activity - Sixty-nine media combinations were tested to improve the multiplication rate of the variety of banana, *kufwafwa*. Results from the field experiment were analyzed and published at the 2003 congress on *in vitro* biology in Portland, Oregon. A full paper on this research is in draft form for publication in a Peer reviewed journal.

Attempts were made to improve micropropagation protocol for *Citrus* by testing over 100 new media formulations. Callus cultures of all the six varieties of *Citrus* on Kosrae were established. Cell cultures of sweet orange and lime were established and the procedure for somatic embryogenesis of lime, lemon and sweet orange was further refined. In the case of seedless tangerines, axillary bud cultures were established. Over 100 plants were acclimatized and are field planted to monitor their growth and development. Most of them are growing well.

On taro, all the 23 varieties (14 varieties gathered from Kosrae and 9 varieties acquired from Yap and Pohnpei States) were multiplied using tissue culture. Results from this study, physiological requirements for Micropropagation of taro were accepted for presentation at the 2003 Plant Biology Congress held in Honolulu, Hawaii in July 2003. Due to lack of funds for travel, the work was not presented at the congress. Field performance evaluation was carried out using the micropropagated, disease free seedlings. A trial plot was designed in a completely randomized fashion. A poster was presented at the 3<sup>rd</sup> International Taro Symposium held in Nandi, Fiji islands in May 2003. Rapid, clean taro seedling production using taro corm cuttings established earlier was further tested and results confirmed. Results of this research were published in the 3<sup>rd</sup> International taro symposium in Fiji.

- b). Impact/Accomplishments – A reliable, micropropagation procedure for banana var. *kufwafwa* established and tested micropropagated *kufwafwa* bananas over past two years. About 5000 micropropagated *kufwafwa* bananas were field trailed in 2003. As an offshoot of the research on *kufwafwa* banana, standardized procedure for micropropagating of 7 other local varieties of bananas was conducted and were tested in

the farm. Research results were analyzed and published at the 2003 congress on in vitro biology in Portland, Oregon.

Refined micropropagation protocol for all the 6 varieties of *Citrus* in Kosrae were developed in the previous year and made a working protocol. Refined previously established protocol for somatic embryogenesis and made it a working protocol. Standardized cell culture technique for sweet orange and lime and a few seedlings of lime and orange were established in the field for studying their establishment and growth.

A method was developed and standardized for rapid *in vitro* and *ex vitro* propagation of taro varieties. Gathered and documented all varieties of taro currently present on the island of Kosrae. Conducted field-testing of taro varieties in Kosrae for their resistance to taro leaf blight disease. Two publications made at the 3<sup>rd</sup> International taro symposium in Fiji islands in May 2003. A poster dealing with nutritional and growth regulator requirements of taro was accepted for presentation at the ASPB congress, Honolulu, Hawaii in July 2003.

- c). Source of Funds – Hatch Act & Smith-Lever 3b&c
- d). Scope of Impact – County Specific (Kosrae, Micronesia)

#### Key Theme – Agricultural Profitability

- a). Description of Activity – Presentations and demonstrations on banana production were conducted to individuals and farmers groups in communities around the island. Most banana farmers are cultivating the crop for cash in the local market and for the export market to Guam and Saipan. Extension agents conducted site visits and did demonstrations on all aspects of growing banana, from selecting and treating planting materials to field planting and post harvest handling. Other management aspects, which included detashing, dehanding, desuckering, flower removal, and removing deformed fingers and leaving the last fingers as a measure to prevent diseases were also shared with farmers.

Agriculture extension staff also conducted demonstrations on selecting and preparing planting materials on other crops, which also included the identification of Vitamin A rich banana varieties and Vitamin A rich *Cyrtosperma* taro varieties.

Extension staff will continue to work with local market outlets for the maintenance of reliable records of farm sales and to revive the marketing information system that was used in the past. These records of farms or small businesses are sometimes inaccurate as small businesses are sometimes wary and suspicious when inquiries are being made about what they buy or sell.

- b). Impact/Accomplishments – A total of 58 individuals were assisted through presentations, demonstrations, and farm visits. All participants increased knowledge and skills in selection of better plantings, 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 fresh banana varieties. All of these farmers expressed interest in other varieties and cultivars and made request to CES for new cultivars under field observation at three different research sites.

- c). Source of Federal Funds – Smith-Lever
- d). Scope of Impact – County Specific (Pohnpei, Micronesia)

Key Theme – Animal Health

- a). Description of Activity – A total of 1,872 pigs were treated for such needs as castration, deworming, no milk syndrome, diarrhea, lameness, iron injection, piglet tooth clipping, prolapse, dystocia and hernia. On a daily basis, requests for technical assistance including medication and castration, were received and processed. A total clientele contact for the reporting period was 529. A form detailing the nature of the problems with swine has been made available and CES staffs are maintaining a database of all such requests for future references. Responses to requests for assistance included making arrangements through telephone or other means and for a bigger group participation in the learning process through community visits and demonstrations. CES staffs used such visits as an opportunity to make observation of piggery projects and to share with farmers healthy tips to assist them in the management aspects of their projects.

Nine workshops on swine improvement and waste management were conducted by CES staff in villages and communities around the island. Hands-on has always been the main thrust of these workshops.

- b). Impact/Accomplishments – Overall observation showed an increase in knowledge and skills in proper swine husbandry management and practices. Presentations and hands-on experience from workshops/training programs contributed positively to farmers' knowledge in making diagnosis on the health of their swine and in the administration of medications. More farmers are now able to use local feedstuffs to supplement commercial feeds, thus reducing the high cost of maintaining their projects. The bottom line is that there are now more pigs available for the high demand for live pigs for ceremonial activities and for restocking purposes.
- c). Source of Federal Funds – Smith-Lever
- d). Scope of Impact – County Specific (Pohnpei, Micronesia)

Key Theme – Animal Production Efficiency

- a). Description of Activity – Planned activities, including training programs on swine production, visits, and demonstrations were conducted to farmer groups and individual farmer throughout the main island of Pohnpei. Most program delivery was conducted based on immediate needs or problems at pignpens. Response to requests from farmers was conducted through demonstrations to provide farmers proper pig handling practices, which included castration, tooth clipping, application of Iron, and the administration of antibiotics. Farmers usually acquired medications for antibiotic from the local government agriculture division and extension staffs assisted in the administration of it. Extension staff also provided advice on improving feeding and watering, timely weaning, and designing of a piggery project.
- b). Impact/Accomplishments – About 70% of the more than 300 swine raisers adopted best management practices. Another positive impact of this program is more and more

people are now capable of administering antibiotics, Iron, and tooth clipping. A community piggery project funded by the Pohnpei State Legislature was successfully implemented for 15 households or families. Each unit, all of which started with one sow or gilt, has at least one litter. A few now raise piglets from the second litter. Aside from competitiveness and sustainable development opportunities, this program is seen as an integrated approach to the socio-economic development and cultural practices of the island where swine of large size are displayed and used on ceremonial or special occasions.

- c). Source of Federal Funds – Smith-Lever
- d). Scope of Impact – County Specific (Pohnpei, Micronesia)

#### Key Theme – Aquaculture

- a). Description of Activity – The project on development of a pearl aquaculture industry and expertise in Micronesia is progressing further with additional funding support from USDA. The project entered phase two for trial pearl production by pearl seeding (implantation of pearl nuclei) after accomplishing all phase 1 objectives in establishing a low-tech pearl hatchery and the establishment of three pilot grow-out farms.
- b). Impact/Accomplishment – Confidence in establishing pearl oyster farms in Micronesia has been boosted after a series of successful spawning runs at the hatchery that produced tens of thousands of baby oysters (spat) and successful grow-out culture to the seedable adult oysters at the demonstration farms. The success of the process demonstrated the feasibility of establishing a hatchery-based pearl industry in Micronesia.
- c). Source of Funds – Hatch Act & DOI Funds
- d). Scope of Impact – Micronesia

#### Key Theme – Aquaculture

- a). Description of Activity – [Setting Up and Operating a Demonstration Cum Training Pearl Farm in Majuro] - A demonstration farm has been set up in the Majuro lagoon. It is a 100 m subsurface longline. Spat from the 2002 hatchery run and a recent run are being held in this farm and monitored for the growth by measuring the morphometric (length, breadth, width, thickness and weight) dimensions. Fouling (2 x 2 feet panel nets containing adult pearl oysters) on farm structures and growth of the spat on at different depths (2,4,6,8m) have also been initiated and monitored both on the ocean and on the lagoon side. Experiments on different stocking densities of the spat and the effect of different holding containers on the spat growth and importantly survival are being continued. Simultaneously, 4 native workers are being trained in the techniques of maintaining and installing pearl farm structures, cleaning and other husbandry techniques of pearl farming. Slight but very important and pertinent technical knowledge on biology and growth, water quality measurements and identification of pests and predators of pearl oyster spat and early juveniles are also being imparted.
- b). Impact/Accomplishment – The results of this project would have a definite impact on the black pearl hatchery industry especially during the transition from the hatchery to the

crucial ocean early nursery stages (where there is maximum mortality) where we could enhance the percentage of spat production in the farms by using more efficient rearing methods, prevention of fouling, predation etc. The demonstration farm would also serve as a training center for students of the College of the Marshall Islands and also for others interested in this profession where hands on training on pearl farming methods will be imparted. Training of these people would be helpful for them to get jobs in future pearl farms and more importantly they could in turn inform and popularize the concept of pearl hatchery and farming to the Marshallese community. From a technical point of view the project data and analysis of 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.

- c). Source of Funds – Hatch Act
- d). Scope of Impact – County Specific (Marshall Islands)

#### Key Theme – Aquaculture

- a). Description of Activity - [Studies on the Reproductive Cycle of the Black Lip Pearl Oyster *Pinctada Margaritifera* in Selected Atolls of the Marshall Islands] - The project was the first of its kind in the Marshall Islands and the aim of the study was to understand the reproductive behavior of the pearl oyster population in some selected atolls of the Marshall Islands. Monthly sampling was done from 3 selected sampling sites of the Marshall Islands mainly Majuro and nearby islands where sufficient pearl oysters have been reported earlier and permitted to collect. Pearl oysters were sampled for their gonadal conditions with the help of a non-sacrificing biopsy of the gonad and studied the smears under the compound microscope or took visual observation of the gonad. The gonadal progression was noted. Simultaneously some important water quality parameters were noted from the area of collection to find out the correlation if any between gonadal maturity and water quality.

120 pearl oysters were collected and staged (by taking non-sacrificial biopsies of the oysters) to see the reproductive stages and then individually tagged. The project started in August 2003 in a make shift manner after getting a few pocket panels to put the oysters from a local company as the ordered supplies nearly a year ago have still not arrived. After taking non-sacrificial biopsies of the oysters to see the reproductive stages, they were staged and tagged and the experimental set up was initiated. In situ temperature data loggers have been installed both on the farm and down on the coral heads. The oysters are being monitored both on the arm and on the coral heads to find out if there was any difference in the reproductive capability in holding them in the natural condition and on the farm. As the ordered multi parameter water quality instrument has not yet come some seawater quality parameters like salinity, temperature, pH have been monitored. The monthly progression of the oyster gonad is being continued at the time of writing this report.

- b). Impact/Accomplishment – 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.

- c). Source of Funds – Hatch Act
- d). Scope of Impact – County Specific (Marshall Islands)

#### Key Theme – Biotechnology

- a). Description of Activity – The project on “Biotechnological Development and Introduction of Leaf Blight Resistant Taro (*Colocasia Esculenta* (L) Schott) in the Marshall Islands” is a novel advancement in research paradigm of the country because it is the first project, which would imply the modern biotechnological and molecular biology techniques to develop disease resistance. The project is in the beginning stage as it started on October 1, 2002. In the initial one year, many research articles and concerned literature were collected and reviewed. The laboratory according to experimental needs was alternated and the nursery cum greenhouse was constructed. Successfully standardized the sterilization technique and developed protocol for tissue culture of locally available taro germplasm. Different varieties of taro were collected and multiplied through tissue culture. Tissue culture taro plants are successfully transferred into the field after hardening and they are growing well. Data collection and feeding in computer are in progress for the analysis. Analysis report will be used for planning future experiments.
- b). Impact/Accomplishments – Collection and review of related literature would prove helpful in successful planning and proper design of experiments. Generation of necessary laboratory and nursery facilities would result in successful and timely implementation of the planned experiments. The facilities generated would also serve the research interests of the country. Standardized sterilization technique and developed tissue culture protocol would be used to raise tissue culture plants of superior germplasm, which would be screened for leaf blight resistance. Collected germplasm and developed protocol would be used to establish the germplasm bank. Distributed germplasm would result in increase taro production.
- c). Source of Federal Funds – Hatch Act
- d). Scope of Impact – County Specific (Marshall Islands)

#### Key Theme – Biotechnology

- a). Description of Activity – [Generation of Know-how for In-vitro Multiplication of Food Crops of the Marshall Islands: Breadfruit and Pandanus]. Laboratory experiments for the establishments of aseptic cultures and shoot bud induction were carried out on breadfruit. Various sterilization methods using the different disinfectants viz. mercuric chloride, Sodium hypochloride, etc. was tried on the explants. Further activities and progress of the project were affected by the various constraints e.g. lack of matching funds, transportation to field for the explants collections, and installation of back up generator in the growth room.
- b). Impact/Accomplishments – Establishment of aseptic cultures in breadfruit would lead to the regeneration and plantlets formation in-vitro and subsequently shall provide the quality planting material to the farmer community.



- c). Source of Federal Funds – Hatch Act
- d). Scope of Impact – County Specific (Marshall Islands)

Key Theme – Diversified/Alternative Agriculture

- a). Program Description – The project entitled, “Tropical Edible Mushroom Cultivation: Right Technology for Food and Nutritional Security in the Marshall Islands”, is aim to develop an easy and efficient method to grow tropical edible mushrooms by using locally available substrates and popularize mushroom cultivation among local people, thereby helping them in attaining good health and providing opportunity for income generation. Research articles and concerned literature were collected and reviewed. The laboratory was alternated according to experimental needs. A research staff initiated fungal pure cultures from the single spore cultures and prepared spawn. Various experiments were conducted to standardize the ideal substrate for mushroom fruiting -body growth using different combinations of locally available substrate materials. Effects of temperature, light and humidity on mushroom growth were also studied to find out most conducive growth conditions for fruiting - body growth. Data collection and feeding in computer are in progress for the analysis and analysis report will be used for planning future experiments.
- b). Impacts/Accomplishments - Collection and review of related literature would prove helpful in successful planning and proper designing of experiments. Generations of necessary laboratory facilities would result in successful and timely implementation of the planned experiments.
- c). Source of Funding - Hatch Act Funds
- d). Scope of Impact - County Specific (Marshall Islands)

Key Theme – Diversified/Alternative Agriculture

- a). Description of Activity – A project on the potential of simplified hydroponics to improve health and economic prospects of Yapese communities in now being implemented as a feasibility study aiming at introducing, developing and promoting low-cost vegetable production technique using simplified hydroponics. Successful development of simplified hydroponics of growing crops will enable Yapese people to produce surplus food and meet their own nutritional requirements and supplement their daily income.
- b). Impact/Accomplishments–[In progress] - Two water samples were tested for it chemical constituents in order to formulate a right nutrient solution for the hydroponics experiments. AECOS Laboratory in Hawaii and Columbia Analytical Laboratory in Canoga Park, California assisted in analyzing the water samples.
- c). Source of Federal Funds – Hatch Act & Local Match
- d). Scope of Impact – County Specific (Yap, FSM)

### Key Theme – Home Lawn & Gardening

- a). Description of Activity – The home gardening program consists of 10 lessons and lessons were conducted in the communities to families and school children. Lessons included hands-on activities on planning and identifying farm sites, clearing of the sites, and planting of seedlings. Extension agents distributed planting materials to farmers and assisted them in planting them in the field. Cooking demonstrations on garden produce were taught as a way of decreasing reliance on imported foodstuff.
- b). Impact/Accomplishments – 75 homemakers and students had completed the program and are starting to show interest in home gardening. About 80% of the participants have started their own backyard gardens and are now relying on their garden produce as supplement to the family diet. Working in the garden is also promoting physical fitness and contributed to weight management.
- c). Source of Funds – Smith-Lever 3b&c & Local Match
- d). Scope of Impact – County Specific (Chuuk, Micronesia)

### Key Theme – Home Lawn & Gardening

- a). Description of Activity – Interested gardeners from four communities were recruited for the home gardening program. An informal course outline on basic agriculture was developed that covered site selection, seedling preparation, planting, watering, mulching, pests management and harvesting. Individual and group sessions were conducted to clientele on weekly basis. Seedlings of Chinese cabbage, eggplant, bell pepper, papaya, watermelon and cucumber were provided for planting in their home gardens. Participants had also established their own nurseries and are maintaining them.
- b). Impact/Accomplishments – A total of 42 gardeners were actively involved in the program learned the basic techniques and skills of home gardening in the backyard. Based on program monitoring, all participating families have gained skills in growing their own seedlings and in the maintenance and nursery operations. Produce from the garden is now being used in the households.  
  
Out of 42 gardeners, twenty-six (26) or 62% are operating their gardens and providing fresh vegetables to the households.
- c). Source of Funds – Smith-Lever 3b&c
- d). Scope of Impact – County Specific (Kosrae, Micronesia)

### Key Theme – Home Gardening

- a). Description of Activity – The Agriculture Extension Agent worked with a total of 103 local farmers from Laura village, where 62 are very active and 41 are always depended on the Extension Agent to help them out. The number of farmers has increased from last year by about 50%. The agriculture extension agent conducted weekly monitoring and visits with farmers and provided tips on maintaining their gardens. He also helped them in making compost for additional nutrients to the poor soil condition.

- b). Impact/Accomplishments – By working hard with the local farmers, the Agriculture Extension Agent was able to organize an association for the farmers called “Laura Farm Association”. He also helped them in drafting and developing by-law for the organization. The final draft was reviewed and submitted to the Attorney General’s Office for review and processing. The Association is now eligible to apply for grants since they have their by-laws.
- c). Source of Funds – Smith-Lever 3b&c
- d). Scope of Impact – County Specific (Marshall Islands)

Key Theme - Innovative Farming Technique

- a). Description of Activity – [Demonstration, Preservation and Improvement of Taro Production Systems in Palau] - Demonstration plots of taro were established in the traditional *mesei* (wetland condition) using leaves of different plants such as banana, *chermal* (*Hibiscus tiliaceus*), *acacia* (*Acacia mangium*), *kisaks* (*Pongamia pinnata*), *kelel a charm* (*Camptosperma brevipetiolata*) and *ngolm* (*Glochidium ramiflorum*) as mulching materials and with or without fertilizer. Another demonstration plot of taro was also planted under *dechel* conditions with or without fertilizer. A fertilizer trial for taro grown in *sers* (upland) condition was established.
- b). Impact/Accomplishments – This project on the comparison of traditional and modern methods of land preparation, integrated pest management, and nutrient management in wetland and upland taro production systems highlighted and demonstrated the efficient and most productive system hence improving a farmer's crop yield and income. The manuscript, “Crop Profile for Colocasia Taro in the Republic of Palau”, was distributed to all relevant stakeholders (farmers, government, political, community and traditional leaders, schools and individuals in and out of Palau) enhanced the level of agricultural information available and the development on our island.
- c). Source of Federal Funds – Smith-Lever
- d). Scope of Impact – County Specific (Palau, Micronesia)

Key Theme - Innovative Farming Technique

- a). Description of Activity – The Agriculture Extension Program has been working closely with five rural atoll communities to demonstrate the importance of using the following vegetation leaves, *Merina vigna*, and *Sopora Tomendosa*, as a major soil amendment and a major source of NPK on compost preparation. Last year, 7 full-grown lime trees that have not been able to bear fruits were transplanted to a selected site to be used for demonstration. At this site, these two vegetations were added to the soil to give the proper nutrients that these 7 lime trees lacked.
- b). Impact/Accomplishments – After 12 months of nursing these lime trees, all 7 lime trees were producing fruits by using *Merina Vigna* and *Sopora tomendosa* leaves. The Agriculture Extension has produced brochures explaining and recommending the importance of using these local vegetations. The seven communities of atolls are

currently multiplying compost pit method using merina vigna as major source of NPK, which is improving atoll soils at no cost.

- c). Source of Federal Funds – Smith-Lever
- d). Scope of Impact – County Specific (Marshall Islands)

#### Key Theme – Invasive Species

- a). Description of Activity – [False Sakau] - The eradication of false kava (*Piper auritum*) continued for the third year now since the declaration by the Governor of Pohnpei State for the total eradication of this false kava. Extension staff, joined by staff from Pohnpei State Agriculture Station, USDA-NRCS and SPC Quarantine, conducted follow-up visits and treated plants mostly in the rural agroforestry areas of the island. Herbicides were used to control re-growth of the false kava. Other efforts included cautioning farmers not to plant the very invasive and aggressive *P. auritum* that shades and kills other crops, especially the real kava. During the past three years of this control program, 367 visits were made to 64 sites or locations, including some of the mountainous areas of the island. Four sites way up in the mountains required a full day of walking to reach it. There are reports of new areas that are also infested.
- b). Impact/Accomplishments – The eradication program is progressing well, fewer re-growths occurred in the infested areas. Most farmers are now aware of the terrible consequences of cultivating the false kava. Approximately 60% of the eradication had been successful as of this reporting.
- c). Source of Federal Funds – Smith-Lever
- d). Scope of Impact – County Specific (Pohnpei, Micronesia)

#### Key Theme - Plant Germplasm

- a). Description of Activity - [Evaluation of Root Crop Varieties Adaptable Under Palauan Environment] - Three planting cycles of the twenty-two varieties of sweet potato, two planting cycles of the fifty-three varieties of cassava, and one planting cycle of the ninety-eight taro accessions in the field and in the greenhouse were performed to ensure continuation of the germplasm collections.
- b). Impacts/Accomplishments – Maintenance of the germplasm collection of the staple root crops in Palau, namely, sweet potato, cassava and taro, ensured the genetic conservation of these valuable resources for future generations. The publication, “Cassava Varieties in the Republic of Palau”, was prepared and distributed to farmers, traditional leaders, schools, government officials, and interested individuals in and out of Palau. Both the collection and manuscript created an awareness of the genetic diversity of these root crops being grown in Palau. Planting materials of these crops distributed to various community groups helped boost income for the growers.
- c). Source of Federal Funds – Hatch Act
- 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] - Experiments were conducted to determine the response of taro shoot tip explants (taro plants inserted into test tubes) to different levels and combinations of plant growth regulators. Combinations of indoleacetic acid and kinetin were not favorable for adventitious shoot formation. The appropriate level of naphthaleneacetic acid and benzylaminopurine for optimum production of adventitious taro shoots in vitro was identified. Continuous subculture of different varieties of taro shoot tips was initiated to determine the responses to this culture medium. In addition, the subculture of taro tissue cultures in multiplication medium to obtain cultured planting materials for field evaluation after acclimatization in the nursery was continued. Likewise, ten varieties of taro were maintained in vitro for germplasm conservation.

An experiment was implemented to compare the field performance of tissue culture - derived and conventionally propagated planting materials of four varieties of taro.

- 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). Program Description – Development of protocol for grafting of breadfruit cultivars were conducted at the new research station and results obtained during the investigation showed the potential of grafting in at least two cultivars of breadfruit. Seeded variety Mejwaan (*Artocarpus mariannensis*) was successfully grafted on the rootstocks of Betaaktak, which is a seedless variety (*A. altilis*). Germplasm of various breadfruits varieties viz. *Betaaktak*, *Mejwan*, *Mejenwe* etc. were maintained in the nursery. Vegetative propagation through root suckers and root cuttings in various varieties was accomplished and over one thousand rootstocks were raised for the grafting. T-budding, Cleft, Splice and Approach grafts unions were applied and splice graft was observed to be most successful. Over three hundred breadfruit rootstocks including few grafted plants were distributed into the communities for planting in their farms or back yard home gardens. Preparations are underway to implement the Phase II of the project.
- b). Impacts/Accomplishments - Successful development of grafting technique of various varieties of breadfruit would lead to an increase in the fruiting season and higher yields of breadfruits. The Phase I of the project has produced the positive results and indicated that grafting is feasible in breadfruit.
- c). Source of Funding - Hatch Act Funds & Local Match
- d). Scope of Impact - County Specific (Marshall Islands)

## Key Theme – Small Farm Viability

- a). Description of Activity – Household gardens were monitored and two yam trellises on sites demonstrations were conducted. Technical assistance on knowledge and skills of vegetable production was provided to household farmers. Technical assistance included intervening practice of adding sand and corals to compost to help with the poor soil condition at these locations and the demonstration on the traditional tea manure composting with the use of sea cucumber and the use of a local insecticide to control severe insect infestation.

Many young men and women (in Yapese culture, farming is done by women) participated in the two yam trellis demonstrations on traditional practices and techniques for the cultivation of the crop. Traditional practices were used in these demonstrations, which hopefully will increase production yield of yam.

- b). Impact/Accomplishments – Of the 26 women participated in the program, 58% adopted the traditional practices of yam cultivation. One out of five or 20% of the household farmers adopted management practices for home gardening.
- c). Source of Funds – Smith-Lever 3b&c
- d). Scope of Impact – County Specific (Yap, Micronesia)

## Key Theme – Tropical Agriculture

- a). Description of Activity – CES staff continued to conduct activities for sustainable kava cultivation in different lowland agroforestry systems. Additionally, CES staff provided training to Conservation Society of Pohnpei (CSP) recruiters, enabling them to assist farmers directly to develop planting materials for lowland kava cultivation. Much of the activities were focusing on educating farmers to stop the cultivation of kava in the forest and watershed areas and by starting and maintaining their own kava nurseries for lowland cultivation.

Through a collaborative effort, CSP had taken up the role of assisting farmers in the watershed areas to engage in alternative ways of making a fast income by providing vegetable seedlings and provided assistance in maintaining vegetable gardens. CES staff also assisted in demonstrating to CSP staff on how to prepare potting soil using heat-fumigation, germinating seeds, and providing transplanting pointers through field demonstrations. CES staffs are also working directly with five model farms and will continue to provide assistance throughout at least one entire planting cycle. Some of these farmers have shown interest in adopting a kava/pepper intercropping technique and CES staff will continue to provide assistance and will continue to monitor these farms.

- b). Impact/Accomplishment – Progresses have been made in the prevention of further destruction to the forest through public awareness, outreach programs, and one-on-one contact with farmers. It is becoming obvious to more farmers that the advantages of lowland kava cultivation out-weighed upland kava farming. Most kava growers are now aware of the consequences of cultivation in the upland areas, which had contributed to more landslides as a result of heavy rain and flooding. A total of 183 individuals were assisted by CES.

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

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

**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				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				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	0.0	0.0	0.0	0.00	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	0.00	0.0	0.0	0.00	0.0	0.0

Of the FY2003 total FTE of 74.42, 25.32 FTE has been assigned to programs that support Goal 1, representing 34% of the total FTE for all programs. The FY2003 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:**

To address food borne illness in Palau, a program on Home Food Safety was implemented in two communities for food handlers. Although food handlers were educated about the important issues on food safety and were provided tips for handling foods easily and safely, they continued to thaw out foods at room temperature or immersed them in water. Lack of refrigerators and freezers contributed to this problem. With less space to store perishable foods and the continuing practice of thawing food at room temperature, there is a greater risk of food contamination. People continued to immerse frozen foods in water because it seems to work faster than thawing them under room temperature. In addition, food are still prepared and packed in big portions during social occasions where there is a long delay between the arrivals of the food and when it is served. This allowed bacteria to grow and multiply and contributed to many cases of food borne illnesses in Palau. With still inadequate knowledge about safe food handling and storing, food safety education will continue in the communities.

#### **CMI-CRE:**

Outreach programs continued in the outer island communities and at schools to provide information on food safety and food security. Several outer islands were visited and workshops were conducted and presentations were made on proper nutrition, food safety, proper sanitation, lessons on the 3 food groups, diabetes as a killer disease, along with cooking demonstrations on local recipes.

During the World Food Day celebrations, Extension staff conducted cooking demonstrations on food safety on safe local recipes of coconut jam, coconut pudding, coconut drink and fish balls. Samples of the end products were shared with audience at the World Food Day celebration, who had high praises for the recipes and wanted to receive information on the recipes.

An Extension staff also participated in a Trade Fair on Kwajalein atoll, where local produce and local food were promoted and she also conducted a workshop in Ebeye, where she made presentations to church groups and public school students to promote good nutrition and safe drinking water, issues of great concern for people on those atolls.

#### **COM-FSM/CRE:**

##### **Yap Site:**

The program on food safety and quality is addressing the current eating habits of the population and the negative effects it has on people's health. In the past, Yapese families relied mostly on local produce and home grown fruits and vegetables and sea food from the vast ocean around them. With an increasing population and the introduction of the cash economy, people are now relying mostly on imported food and less on domestic animals and homegrown food products. This has contributed to a dramatic change in the diets of the local population and fast food from convenient stores is now what most people preferred. With the increase consumption of processed and canned food come new illnesses and an increase in NCDs and food poisoning. Extension staff continued with their awareness education programs with individuals and community groups in providing healthy tips and encouraging clientele to cultivate their own food and rely less on imported fatty and high cholesterol processed and canned food.

**Chuuk Site:**

The changing lifestyle throughout the islands had caused many people to give up their traditional way of living and had moved into the urban areas (State Centers) in search of employment and new life. This had caused people to leave their subsistence way of life and had become confused in the turmoil of the cash economy. Many people found it difficult to live on their local diet, as they could only depend on processed and imported foodstuff that they found in the stores and in fast food establishments. There is also a problem of limited land for people to cultivate in the urban areas and people relied heavily on purchasing unhealthy food from the stores.

Extension staffs had been working with the Department of Health and Sanitation in providing food safety lessons and healthy tips.

**Pohnpei Site:**

Over the years, imported frozen and processed food items invaded store shelves and white rice and flour products have become the normal diet of most families. Importation of processed and canned food is posing food safety concerns and contributed to a lot of the health issues in the islands, as imported food stuff are not properly stored and sometimes are outdated by the time they are put on store shelves. Improper food preparation, food storage, and food handling contributed to many health issues in the households, and of course the changing lifestyle of islanders has contributed to all these health issues. Food safety practices are often neglected during social activities as large amount of food is prepared to feed a big crowd. Food safety and food security programs continued with homemakers and young mothers as part of EFNEP programs in the communities. Home gardening programs with the aim of increasing knowledge on safe and secured food and fiber system were provided to homemakers with an emphasis on availability of fresh fruits and vegetables as sources of nutritious and less expensive food.

**Kosrae Site:**

Extension programs on safe and secured food resources were conducted through the home gardening program, which addressed the acquired dependence on fast food as well as imported preserved foodstuffs. The program aimed at helping to develop self-reliance among families in producing their own food and not relying on imported processed and canned food. A component of the program is the recruitment of ardent gardeners in collaboration with local municipalities. Technical assistance to provide information and knowledge on basic gardening to help families and participants to produce their own food as a way of providing household with fresh, safe and accessible food resources. To support the program, a mini nursery was established and being maintained in the campus area. Program delivery included visits to farms and demonstrations to families and at schools on how to sow seeds and transplanting from sowing containers into foam cups. Planting materials were distributed to families and schools.

Food safety programs addressed the growing number of illnesses that are mostly food-borne related (Kosrae Health Services Report, 1998). The program provided awareness and understanding of foodborne illnesses and provided tips on minimizing their occurrences and preventing people from contracting them. Lessons were emphasizing food safety, harmful bacteria that are causing food poisoning and growth prevention of food poisoning causing bacteria. Information on diabetes and its growing effect on the local population and how to control it was an integral part of these educational programs. Information was shared with clientele on proper diet and the importance of physical exercises.

## **B. Key Themes:**

### Key Theme - Food Handling

- a). Description of Activity - The EFNEP staff visited three outer islands and conducted workshops for women and students on proper nutrition, food preparation and food handling. As part of her outreach programs in the outer island communities, she also did cooking demonstrations on local nutritious recipes on ingredients such as coconut, breadfruit, and pandanus. Her lessons also emphasized the mixing of green leafy vegetables to their meals.
- b). Impact/Accomplishments – From observations and based on the 24 hour food recall, 80% of participants have started to change their eating habits and green leafy vegetables are now being used in meal preparation. Participants also gained knowledge in proper food preparation and food handling.
- c). Source of Federal Funds – Smith-Lever 3b&c
- d). Scope of Impact – County Specific (Marshall Islands, Micronesia)

### Key Theme - Food Safety

- a). Description of Activity - Food safety lessons were integrated with the Adult EFNEP programs in the communities and at schools. Workshops were conducted targeting diabetes groups, school children, cooks and teachers to ensure that food are properly stored, prepared and served in the right amount. Extension staff demonstrated preparation of safe meals of local recipes and proper food handling practices. Information provided to homemakers and school children discouraged growing dependence on imported processed and canned food and encouraged families to grow their own local food, which are fresh, safe and nutritious.

A total of 214 homemakers and students attended and successfully completed food safety lessons.

- b). Impact/Accomplishments – From observations, green leafy vegetables are now being used in meal preparation and food is cooked with less salt and sugar. Participants also gained knowledge in proper food storage and preparation.
- c). Source of Federal Funds – Smith-Lever 3b&c
- d). Scope of Impact – County Specific (Kosrae, Micronesia)

### Key Theme - Food Safety

- a). Description of Activity - Food safety lessons were taught and demonstrated in all nutrition education programs, including EFNEP programs and on other occasions that catered to a big crowd, such as World Food Day and Cultural Day Celebrations. Nutrition education programs were also conducted to homemakers in the communities, to school children, and to government employees. In the communities and at the schools, Extension staff conducted food safety lessons on proper food preparation and food handling, proper food storage and provided cooking demonstrations on nutritious local

recipes. Ten radio programs on food safety issues, proper nutrition, and healthy diets were developed by Extension staff and presented over the local radio station. Some of these radio programs were developed to address the growing food safety problems.

- b). Impact/Accomplishments – The program resulted in increased knowledge and skills in food safety issues and applications. Exit reports showed more than 50% of participants who had improved practices in selecting healthy food, and increased awareness in proper food preparation and storage, and increased awareness in proper food handling.
- c). Source of Federal Funds – Smith-Lever 3b&c
- d). Scope of Impact – County Specific (Pohnpei)

#### Key Theme - Food Safety

- a). Description of Activity - Lessons on Home Food Safety were integrated with the Adult EFNEP program to address issues arising during normal preparation of meals in the home. Three Home Food Safety classes were conducted in two states of Palau. Classes focused on important issues of food safety and provided solutions to easily and safely handle foods in the home and for a large crowd during ceremonies.
- b). Impact/Accomplishments – Twenty-four female food handlers completed all three classes and were observed to follow proper food safety practices during food preparation. Based on additional questions, 92% (22 participants) washed their hands more thoroughly; 96% (23 participants) cooled food by filling them into smaller containers or cutting big fish and meat into smaller portions before refrigerating; 92% (22 participants) inspected foods more closely before buying; 92% (22 participants) washed vegetables before using; 42% (10 participants) more often followed the recommended practices of not allowing meat and dairy foods to sit out for more than two hours; 42% (10 participants) always followed the recommended practices; 54% (13 participants) demonstrated acceptable food safety practices at entry but only 4% (1 participant) showed to have demonstrated acceptable practices on exit surveys. The results of the exit surveys confirm the problem stated in the overview.
- c). Source of Federal Funds – Smith-Lever 3b&c
- d). Scope of Impact – County Specific (Palau)

#### Key Theme - Food Safety

- a). Description of Activity – Lessons on food safety were provided to homemakers, Head Start teachers, cooks and students, which were also accompanied by cooking demonstrations on local recipes that are nutritious, delicious, and palatable. Food safety information was shared with the participants through the use of the Food Guide Pyramid and the table on the three basic food groups. Other lessons covered helpful information on food sanitation, personal hygiene, and benefits of eating sufficient amount of fruits and green leafy vegetables. Cooking demonstrations has helped a great deal in transferring knowledge in that it provided opportunities for trainees to actually prepared healthy local dishes that contain less salt and less fatty materials, which included banana milk shake, chicken adobo, udong dinner and papaya ice cream.

- b). Impact/Accomplishments – Of a total of 27 participants, 75% had gained knowledge on food safety issues and had started practicing the new recipes and local drinks they had learned and demonstrated.
- c). Source of Federal Funds – Smith-Lever 3b&c
- d). Scope of Impact – County Specific (Yap)

Key Theme – Food Safety and Foodborne Illness

- a). Description of Activity – Training syllabus and lessons were developed to address issues on food safety and quality, food selection, food storage and handling, and food preparation. Demonstration of healthy recipes accompanied these lessons during workshops and trainings conducted in the communities for homemakers and school children.

Food handler's training on rules and regulations of food establishments, personal hygiene, safe food supply and storage were also provided to homemakers and school children to support food handling and food preparation lessons. The food handlers training was jointly conducted by the Department of Environmental Health and Sanitation and the land-grant program.

- b). Accomplishments/Impacts – A total of 75 adult homemakers and youths attended programs on food safety and food borne illnesses. Post-tests showed marked improvement on the participants' knowledge on the subjects. Food handling during cooking demonstrations had shown marked improvement in food handling practices.

Thirty-nine food handlers from hotels and other food establishments had completed food handlers training. Interviews and visits at food establishments had found positive results in terms of improvement in food handling practices.

- c). Source of Funds – Smith-Lever
- d). Scope of Impact – County Specific (Chuuk, Micronesia)

Key Theme – Food Security

- a). Description of Activity – A technical collaboration has been established with International Institute of Simplified Hydroponics, located at Tehuacan, Mexico. Its Managing Director, Ms. Peggy Bradley who has international expertise in simplified hydroponics technology, has successfully trained many entrepreneurs in several Latin American countries, funded by UNDP/FAO. Tomato and bell pepper are selected as model system for media based experiment and lettuce for floating beds. The researcher is in the process of establishing the pilot phase, which forms the first part of this three years project.
- b). Impact/Accomplishments – At the inception phase (prior to pilot phase) several substrates were considered for media based experiment. Coconut fiber, which is available locally, found more suitable. However, detailed study will follow in pilot phase where coco pith alone or in conjunction with coconut fiber will be tested for its efficacy.
- c). Source of Funds – Hatch Act

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

Key Theme – Food Security

- a). Description of Activity - A joint effort by agriculture extension staff and nutrition staff on home gardening has enabled homemakers to established small backyard gardens to supplement the family diet. Agriculture extension agents assisted homemakers to clear small areas behind their homes and provided them with seedlings and showed them the proper ways of maintaining their gardens. Planting materials that included vegetables and other greens that are rich in vitamins and minerals were provided to participants to assist in providing for the family diet and help in the fight against the diabetes onslaught.
- b). Impact/Accomplishments – A total of 6 demonstrations and 6 presentations were conducted on home gardening and preparation of plots and seedlings. A total of 739 participants attended these six demonstrations and six presentations from schools and families of children attending the Family Head Start Program and as a result, have increased knowledge and skills in home garden preparation, seedlings germination, curing and planting. A total of 1000 fruit tree seedlings have been seeded and 500 already been distributed as of this reporting.
- c). Source of Funds – Smith-Lever Act
- d). Scope of Impact – County Specific (Pohnpei, 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				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	0	0	0	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
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	0.0	0.0	0.0	0.0	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
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	0.0	0.0	0.0	0.0	0.0	0.0

From the FY2003 total FTE of 74.42, 9.75 had been assigned under Goal 2, representing 13% of FTE input. The FY2003 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:**

With more people in Palau every month contracting non-communicable diseases such as diabetes, hypertension, obesity, heart disease, and gout, educational programs in nutrition and health continued to combat these diseases, helping stakeholders to change eating habits and lifestyles.

The first volume of the Medicinal Plants of Palau was finalized and will be distributed to the public after printing.

###### **CMI-CRE:**

The EFNEP Extension Agent continued to work with homemakers in the urban center of Majuro and in the outer island communities in providing information on proper diet and good health. Through a collaborative effort with the Ministry of Health, CMI and the Healthy Living in the Pacific Islands (HLPI) project, health and nutrition programs were expanded to school children and teachers. A two-day SPARK (Sport, Play & Active Recreation for Kids) training conducted by the San Diego State University through a contract with the HLPI project provided an opportunity for elementary school children and their teachers to learn different ways of making children to play and exercise at the same time.

###### **COM-FSM/CRE:**

###### **Yap Site:**

The program on proper nutrition and healthy living addressed the increasing number of health related problems and high incidence of food related illnesses. The program is advocating healthy diet and healthy lifestyle and promoted the consumption of healthy local food. Overweight and obesity is becoming a big health problem as a result of changing lifestyle and the increasing reliance on imported high cholesterol and fatty canned and processed food. Many people, including young children are spending much of their time staying indoor and watching TV and doing other less strenuous activities, such as riding in a car instead of walking from place to place. Physical fitness programs have been introduced and sports activities have been incorporated into youth programs. Extension agents are doing all their best in providing awareness programs and increasing knowledge on proper nutrition to improve the health of the local population.

###### **Chuuk Site:**

The programs on health and nutrition addressed high incidence of non-communicable diseases (NCD), hypertension, and diabetes, which are the three top causes of morbidity and mortality in Chuuk State. One of the causes of NCD is high consumption of foods high in fats, sugar and salt. While obesity and NCD are the problems among adults, under-nutrition and nutrient deficiency remain a problem among children. Pregnant and nursing mothers were also found to be anemic, one of the causes of low birth weight babies. The program is aimed at improving knowledge and practices in food choices, food selection and food preparation to prevent children's malnutrition and adults' NCD, and increase awareness of the general public on health and nutrition problems and issues through campaigns and State celebrations. Program delivery is through education programs for women leaders, extension classes for elementary school students, and dietary counseling and cooking classes.

### **Pohnpei Site:**

The program on human nutrition is aimed at increasing the number of people who consume local food, providing the need for local recipes, and provided information on a healthy and well nourished population. It also provided information on healthy dietary habits and safe handling of food to improve health and reduce nutrition related diseases.

Home gardening projects have been encouraged as a way of promoting food security, with a broader scope and emphasis on healthy and well-nourished families and communities. Home gardening projects are a source of fresh fruits and vegetables and provide for food security for many families. It provided for additional food choices for a healthy living and a stable diet. Healthy food choices are promoted at schools and during EFNEP programs in the communities. Individuals and families are becoming more aware of healthy food and a healthy lifestyle as oppose to consuming too much fatty food and food with high concentration of sugar and carbohydrates.

Health programs also included demonstrations of local recipes, which used mostly local ingredients and utilization of local food sources that have high content of carbohydrates and protein. Programs are also discouraging the consumption of imported frozen foods for being less nutritious and unhealthy due to extended storage life and the addition of preservatives.

### **Kosrae Site:**

Kosrae is known for its abundance of local and nutritious food like taro, breadfruit, yam, banana, sweet potato, fresh fruits and vegetables. The ocean also provides marine resources that are excellent sources of minerals and vitamins to support the family diet. Despite these available land and ocean resources, food related diseases continued to increase as people relied heavily on imported and cheap processed and canned food (Kosrae State Statistic Bulletin 1998). Families have developed a high preference to this imported frozen and canned food, such as turkey tail, chicken, corned beef, polished rice, ramen and bread. On the other hand, dietary vitamin A (VA) intake is low as 57.7% among preschool children ages 24-59 months were found to have VA disorders and 58% of mothers.

EFNEP staff continued to work in the communities to provide information on these growing health problems. Lessons on the 3 food groups and healthy diets were provided to homemakers, the elderly population, and school children to help with the improvement of their health. Other health nutrition information was provided through workshops conducted by SPC, Kosrae State Festival of Arts where a presentation on Vitamin A rich varieties of banana was made, and the World Breast Feeding Week.

## **B. Key Themes:**

### Key Theme - Human Nutrition

- a). Program Description – The Food Preparation & Nutrition program was conducted in two states in Palau. The program provided homemakers with the basics of nutrition and food preparation skills needed for making wise food choices. To encourage participants to continue what they have learned, numerous healthy recipes were prepared and tasted in class by these participants. Twenty-four homemakers completed the program and exited with Certificates of Completion.
- b). Impact/Accomplishments – All twenty-four participants showed improvement in one or more nutrition practices. On entry surveys, two participants demonstrated acceptable nutrition practices compared to twenty participants on the exit surveys. Dietary intakes improved slightly in the number of servings for fruits, vegetables, calcium, and meat. The following shows improvement in one or more nutritional practices:
- 92% more often planned meals.
  - 88% more often thought about healthy food choices when deciding what to feed their family.
  - 54% more often prepared meals without adding salt.
  - 92% more often used the “Nutrition Facts” on food labels to make food choices.
  - 38% reported that their children ate breakfast more often

All showed improvement in one or more food resource management practices. While on the entry survey, only one participant demonstrated acceptable practices of food resource management. On the exit survey, all 24 participants used acceptable food management practices as shown below:

- 92% more often planned meals in advance
  - 79% more often compared prices when shopping
  - 96% less often ran out of food before the end of the month
  - 88% more often used a list for grocery shopping
- c). Source of Funding – Smith-Lever 3b&c
- d). Scope of Impact – County Specific (Palau)

### Key Theme – Human Nutrition

- a). Description of Activity – Program activities included diet and weight management. Information on lessons were taught through presentations and discussions, and demonstrations. Participants were also taught to calculate body mass index and body fat for health purposes. CES staff also provided individual and group counseling for diet and health, weight management, and for diabetes customers both at training sites and at the office. Program outreach included radio program broadcast on range of topics on nutrition and weight management, both in English and in the local language.

- b). Impact/Accomplishments – A variety of audiences were reached through the Human Nutrition Program ranging from youth in schools to homemakers in the communities. A total of 470 individuals were serviced over the reporting year and as a result have increased knowledge and skills in proper dieting and weight management, nutrition and how to care for their health. All program participants are now aware of the fact that to maintain ideal weight, one should burn all the calories in food consumed before going to bed. Previous to this program, most program participants knew very little about calories.
- 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 two months training on health and nutrition was conducted for homemakers, teachers and Head Start staffs and parents. The program included lessons on meal planning, infant nutrition and complementary feeding, preschool nutrition, adult nutrition, and dietary counseling. A total of 239 participants attended the training, which also included cooking demonstrations on local recipes.
- b). Impact/Accomplishments – A total of thirty-six (36) homemakers and farmers attended the training. The EFNEP entry and exit data that were used showed very encouraging results in terms of changes in food choices. Pre- and post-tests also showed improvement in knowledge. Most importantly, they learned the relationship of diet with prevalence of NCD. Through the cooking demonstrations, the participants were able to learn how to substitute imported food with the local ones.
- c). Source of Funds – Smith-Lever
- d). Scope of Impact – (Chuuk, Micronesia)

Key Theme – Human Nutrition

- a). Description of Activity – Nutrition education programs were conducted to young mothers, youth groups, students, parents of disabled children, senior citizens and teenage mothers. EFNEP staff conducted cooking demonstrations on healthy recipes on green leafy vegetables, with local meat ingredients and less salt and fats. Lessons also included tips on healthy eating, eating less of certain food categories, and healthy lifestyles. With the identification of certain varieties of banana with high Vitamin A content, people were encouraged to plant and eat more of these varieties to help with the deadly diabetes disease.
- b). Impact/Accomplishments – An EFNEP food recall showed great improvements with the inclusion of more fruits and vegetables in participants' meals. Based on the meal planning exercises, women are now capable of planning meals using local foods, use less fat – fat trimmed before cooking with less salt and less sweets.
- c). Source of Funds – Smith-Lever Act
- d). Scope of Impact – (Kosrae, Micronesia)

## Key Theme – Human Nutrition

- a). Description of Activity – Nutrition educational materials were shared with homemakers, Head Start program teachers, cooks, and students in collaboration with the Yap Interagency and Nutrition Education Council (YINEC). Twelve lessons on food nutrients, food preparation, food purchase, food safety and sanitation and meal planning were provided to small groups of homemakers. Similar lessons were also provided to school children at five elementary schools. Children were taught to eat healthy and locally prepared snacks instead of eating too much of processed and canned food and snacks. Cooking demonstrations were provided on a variety of recipes that used local ingredients and homemakers and school children had hands-on experience in preparing these recipes, which included banana milk shake, chicken adobo, udong dinner, and papaya ice cream.
- b). Impact/Accomplishments – More than 90% of participants had increased knowledge on healthy food to eat and same percentage had increased knowledge on preparing healthy snacks.
- c). Source of Funds – Smith-Lever Act
- d). Scope of Impact – (Yap, Micronesia)

## Key Theme – Human Health

- a). Description of Activity – Some components of the Healthy Living in the Pacific project have been conducted through focus group meetings of women groups and government and other non-governmental agencies. Health and nutrition problems were identified through needs assessments and surveys conducted in four municipalities. The Healthy People, Healthy Communities initiative promotes the capacity of individuals, families, and communities to adopt healthy behaviors and lifestyle and make informed consumer decisions. The initiative brought together people from different sectors of the society to identify health issues and to find ways of addressing these issues. An action plan has been drawn up and is currently being implemented in the selected communities.
- b). Impact/Accomplishments – The project has drawn the attention of key government and traditional leaders to the seriousness of health issues affecting the lives of their people. Another accomplishment of this project is the organization of the focus groups, which comprised of a fair representation of all sectors of the State.
- c). Source of Federal Funds – Smith –Lever & ADAP
- d). Scope of Impact – (Chuuk, Micronesia)

## Key Theme – Human Health

- a). Description of Activity – A two-day SPARK (Sports, Play & Active Recreation for Kids!) training for elementary school teachers working with 5-14 years olds was conducted through a contract with San Diego State University. The training was funded by the

ADAP project through the Healthy Living in the Pacific Project (HLPI) with coordination by the Marshall Islands Ministry of Health. The aim of the training program was to increase physical activity as part of ongoing efforts in reducing chronic diseases and promote healthy living in the islands. Sixty seven teachers from the Ministry of Education participated in the training, which offered many fun and easy activities to keep children playing without realizing that they are working their bodies and are exercising. Home made toys were made from local resources, such as pandanus leaves, vines, coconuts, and bean bags filled with sand were used in these exercises. The participants of the training mentioned that they had a great time learning the various games and activities that they can easily transfer to their students in keeping them fit and healthy.

- b). Impact/Accomplishments – Students and teachers alike were highly impressed with the program and are continuing to play the different games and activities to keep them healthy and fit. Monitoring will continue to follow up on the progress of the program.
- c). Source of Federal Funds – Smith –Lever & ADAP
- d). Scope of Impact – (Marshall Islands, Micronesia)

#### Key Theme - Medicinal Plants

- a). Description of Activity –[Search, Preservation and Propagation of Medicinal Plants in Palau] - The final manuscript of the publication, "Medicinal Plants in Palau", was prepared and reviewed by the Publications Committee of PCC-CRE and the PCC President. It contained photographs and information on local, English and scientific names, botanical descriptions, habitat, uses and preparation of 53 medicinal plants for curing various ailments. This publication, which will be distributed to the public after completion, will be the first in a series printed materials on Medicinal Plants in Palau.
- b). Impact/Accomplishments – Knowledge of the identification and uses of plants with medicinal value led to the establishment of village-level herbal gardens as a 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				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	0	0	0	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	0.00	0.0	0.0	0.00	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	0.0	0.0	0.0	0.0	0.0	0.0

**Allocate Resources:**

From the FY2003 total FTE of 74.42, 6.65 have been assigned under Goal 3, representing 9% of FTE input. The FY2003 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:**

Two themes addressed during this reporting period are: Biological Control and Integrated Pest Management. Thousands of mirid bugs were released in six states while ten thousands of predatory mites were released in three states to combat spider mite infestation. A base population of both predatory insects was established on the R&D Station crop fields.

#### **CMI-CRE:**

Pest and diseases, old and new introductions, caused severe damages to many crops and seriously affected crop productivity and overall food security. In the Marshall Islands in recent years, many of these pests have become prevalent as they spread from initial points of entry to atolls and islands in both the Ralik and Ratak island chains, where they cause outbreaks that seriously damaged crops, and regularly destroyed important food crops.

The Marshall Islands government has adopted guidelines to promote environment-friendly pest control methods. These methods are part of the Integrated Pest Management approach, in which a major focus is on biological control.

The IPM team visited two outer islands, Ebeye and Wotho, to conduct the survey of insect pests in the Marshall Islands. A wide range of insect pest and weeds were found and listed. No new introduction or insect pest was identified on the two atolls surveyed. Commonly found insect pests, such as mealybugs, spiraling whitefly and red coconut scales were observed along with some other pests as reported before. However, no insect pest was observed to cause serious damage at threatening level.

A staff from the USDA NRCS office in Pohnpei visited the Marshalls to coordinate with the Water Quality Extension Agent in setting up a solar distillation unit at the campus for display. This unit is affordable, simple to build and can produce 2-4 gallons of fresh water per day. This unit is recommended for remote and isolated islands because it does not require electricity and it converts salt water into fresh potable drinking water for daily use and consumption. An article on the solar unit was written and published in the local newspaper. The Extension Agent has received numerous inquiries and interest from the communities about the solar unit and the possibility of installing one in their homes.

The Water Quality visited 30 households on Majuro atoll to discuss with homeowners issues such as waterborne diseases, sanitation and water treatment. He is currently collaborating on a Region IX water quality project through the University of Arizona.

Other activities included an insect and disease survey conducted in Majuro and Arno atolls with coordination of SPC and the Ministry of Resources and Development, and a workshop on insect collection and insects of Marshalls.

It was recommended that Inter-island quarantine measures should be implemented to prevent introduction of pests within the Republic. An extension publication on 'Survey of Arthropod Pests and Invasive Weeds in the Republic of the Marshall Islands' produced was distributed to various individuals and institutions in and outside of RMI.

Publications:

Nandwani Dilip, Jimmy Joseph. 2003. *Biological control of insect and plant pests of the Marshall Islands*. Micronesia Suppl. 7:125-132.

### **COM-FSM/CRE:**

#### **Yap Site:**

The yam research project entitled "Documentation of Yam (*Dioscorea* spp.) Diversity and Associated Traditional Knowledge Systems in Yap State, Federated States of Micronesia" aims to give greater recognition to the prudent methods of indigenous communities in managing agrobiodiversity in Yap. Throughout Yap State, yams play an important role in the life of local communities. Through an array of participatory research methods, this project aims to unfold the traditional wisdom practiced by farmers over generations with respect to the cultivation of yams. A better knowledge of traditional cultivars is a prerequisite to overcoming the various constraints of yam production.

Pest management is another program aimed at controlling weeds, specifically *mimosa* along the roadsides throughout the island. *Mimosa diplotricha* belongs to the leguminous family and a nitrogen fixing plant, but it poses undesirable characteristics and therefore regarded as an obnoxious pest or invasive weed. The obnoxious plant is thorny and covering land areas for agriculture. One sustainable way to control growth is the use of the psyllid insects. The psyllid insect is one of the several biocontrol agents that feed/kill only the mimosa plants and no other plants. The program utilized the participation of youth in the mimosa plant weeds control.

#### **Pohnpei Site:**

Crop production in small island communities is basically subsistence in the traditional backyard or home garden of multi-storey cropping system. Until recently, 'semi-commercial' and 'commercial' farms are established on introduced vegetable crops promoted for nutritional value for one's diet and man's choice for food. The momentum to increase crops produced for surplus requires concomitant and appropriate soil and other resource management towards sustainable growing of crops while controlling further erosion and depletion of soil poor condition. With the introduction of new crops, exotic pests and diseases, and others are believed accidentally introduced also by air, sea and by humans and heavy equipment. Chemical pesticides are relatively the most convenient and commonly referred to in controlling pests (diseases and weeds) on crops. The use of chemicals however is limited to what is available (very few selected chemical pesticides and minimal volume) in the island attributed to strict implementation of policies on importation. The toxic nature and disadvantages to man and environment and prohibitive cost to small farmers are deterrent to using chemicals. The program on integrated pest management involves alternative control and other approaches that are most needed to further reduce use of chemicals. It involves monitoring of pests and cultural practices and management integration that ensures crop economic yield.

Another project is on endangered species with nutritional value for growing children suffering from vitamin A deficiency and adults as well. The project is trying to address conservation of endangered bananas recently analyzed with high vitamin A content. The rare banana could be multiplied faster and in mass for a shorter period of time using tissue culture technique. Collection area establishment in the lowland is to conserve the bananas, for student awareness and instruction purposes and assured source of mother plants and conventional planting materials. The knowledge and materials generated from the project is in support to provide

'clean' planting materials for increasing households' plantings and small farm cultivation in the lowland.

Raising pigs is an important component of socio-economic of the people on the island proper. Besides from its part in traditional tributes and other special events, it could be and had proven, to be a good source of income. Solid waste management was less of a concern in the recent past mainly because of small pig's population then. Pigs were allowed to roam and there were minimal sanitary problems associated with accumulation of manure. Construction of pigpens was on a voluntary basis by owners and pigpens mostly were backyard or small 1-2 sow operations. In recent years with state legislation and municipal ordinances prohibiting roaming of pigs, solid waste became a concern as confined accumulation of manure became a sanitary hazard and issue. To address the issue, the local EPA designed and recommended open-drain cesspool. With the increased operation size the cesspool system did not always work, resulting in more sanitary problems and of course manures, a good source of fertilizer wasted. Solid waste management workshops are being conducted in communities that have piggery operations.

**Kosrae Site:**

The extension projects at MPPRC were focusing at improving sustainability of the agriculture system on Kosrae. The distribution of elite seedlings to farmers is part of the program in support of sustainable agriculture. Non-formal education of farmers on important steps in sustainable agriculture and field visits are program delivery means while considering ways to improve agriculture production. Laboratory and nursery practices of elite seedling production are viewed as knowledge and skills enhancement affecting sustainability. The approaches and practices for agriculture must be selected carefully to ensure harmony between farming and the environment for sustainability.

**Publication:**

PC Josekutty, H Andrew, NH Nena, RA George, TN Kilafwasru & SS Cornelius 2003. *Micropropagation Saves the Endangered Musa Germplasm in the FSM*. 2003 Congress of *In Vitro* Biology, 31 May – 4<sup>th</sup> June 2003, Portland, Oregon, USA.

## B. Key Themes:

### Key Theme – Agricultural Waste Management

- a). Program Description – CES staff visited pig farmers in response to requests from the communities, made observations on their projects and provided advises, including managing swine waste. Waste management presentations and demonstrations were also made during swine management workshops. The emphasis of the program is to minimize and reduce environmental pollution from pig manures and effluents and encourages the use of the manure as compost and fertilizer. CES staff also demonstrated to farmers how to use pig manure for compost and fertilizer and showed them other environmentally friendly waste management systems suitable for their farm sites. CES staff continued to monitor a piggery project that was funded by SARE under the Farmers/Ranchers grant. The project came to a successful completion and was open for public viewing at the end of the year.
- b). Impact/Accomplishments – More than 500 customers increased their knowledge and skills with respect to solid waste management. A total of 9 workshops/trainings were conducted in the communities. In addition, 4 demonstrations were carried out coinciding with the EFNEP program. Overall, the animal solid waste management information reached a total of 539 clients. Participants increased their knowledge and awareness in 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 - Biodiversity

- a). Program Description – To document yam agrobiodiversity, including traditional landraces (farmer's varieties), a participatory survey continued across Yap island. Review of existing data from various sources such as descriptor lists, grey literature and personal knowledge experts, etc is continuing. Field trials to test and assess identities of each landraces based on morphological characteristics are also continuing.
- b). Impact/Accomplishments – Review of secondary data revealed information about 36 landraces of yam that belongs to three different species. Participatory research techniques - key informant interview and focus group discussion - helped to create a more equitable interaction between researcher and farmers and understand value of yam diversity. So far, a total of 23 landraces of *Dioscorea alata* and 7 landraces of *Dioscorea esculenta* recorded. Morphological characterization of seven available varieties for genetic distinction is ongoing and will culminate by early next year when tuber characteristics verify during harvest. Participatory surveys and field trials are ongoing process and will continue next year.
- c). Source of Funding – Hatch Act
- d). Scope of Impact – County Specific (Yap, Micronesia)

## Key Theme - Biological Control

- a). Program Description – [Taro Leafhopper] - This project on the biological control of the leafhopper progressed very well. The biological control agent, a mirid bug, continued to be mass-produced in the screen house at the R&D Station. About two thousand mirid bug nymphs and adults were released and continued to be monitored on taro plantings infested with leafhoppers in six states of Palau.
- b). Impact/Accomplishments – An established mirid bug population in at least two states (Aimeliik and Airai) have reduced the taro leafhopper population thus minimizing the loss of income due this pest.
- c). Source of Funding – Hatch Act Funds
- d). Scope of Impact – County Specific (Palau, Micronesia)

## Key Theme – Endangered Species

- a). Description of Activity - Verification trials on initiating cultures in vitro of ‘Karat’ bananas for the alternative micropropagation were conducted. It was done at the existing research laboratory after it was renovated with minimum requirement of a tissue culture laboratory (micropropagation). Procedures reported previously need further verification for micropropagation protocol with media supplements and components substitution to economize on the cost of propagating plants using tissue culture technique. Available suckers were collected for induction/initiation of cultures. Two lowland collection areas (with planting plan and replication) of high vitamin A containing bananas were established and two sites for the collection banana varieties high in vitamin A (‘Karat Kole’, ‘Karat Pako’, Utin lap, Uht en Mangat were also established.
- b). Impact/Accomplishments - Project terminated as of September 30, 2003. The alternative protocol was verified if adopted, in vitro multiplication of the bananas could easily be justified for lesser cost and sourcing of media items could be facilitated. The abstract on Alternative In Vitro Multiplication of Fe'i Banana was published.

The established collection sites are now “show-window”/demonstration” sites disproving local belief that the bananas can only grow in the upland. The bananas are responsive to nutrient management.

- c). Source of Federal Funds – Hatch
- d). Scope of Impact – Micronesia (FSM)

## Key Theme – Integrated Pest Management

- a). Program Description – [Integrated Control of Cassava Spider Mite] - The predatory mites, *Phytoseiulus persimilis*, acquired from Beneficial Bug Company in Australia and Natural Pest Control Company in California were reared on potted cassava seedlings infested with spider mites in the screen house. About 10,000 predatory mites were released on infested cassava plantings in three states. At the R&D Station, the predatory mites were slowly establishing a population on field plantings of cassava.

- b). Impact – In progress.
- c). Source of Funding – Hatch Act Funds
- d). Scope of Impact – County Specific (Palau)

Key Theme – Integrated Pest Management

- a). Program Description – [Sustainable Control Strategy Against Taro Corm Rot] – It was revealed through a previous study that dipping taro plant materials in Ridomil and Captan solutions before planting reduced the incidence of corm rot infection. Disease resistant varieties of taro such as Dungersuul and Homestead were tissue culture propagated and planted together with field plantings of same varieties to compare their growth, yield performances and susceptibility to taro corm rot.
- b). Impact/Accomplishments – Study results showed that dipping taro plant materials in Ridomil and Captan solutions before planting reduced the incidence of corm rot infection. The field study on resistance of various taro varieties is still in progress.
- c). Source of Funding – Hatch Act Funds
- d). Scope of Impact – County Specific (Palau, Micronesia)

Key Theme – Integrated Pest Management

- a). Program Description – Youth clubs and youth groups had volunteered to work with Extension staff in implementing the project on controlling pests without the use of chemical pesticides. Under the supervision and guidance of 4-H and ANR Extension agents, village youths collected and released the *psyllid* insects along roadsides where the *mimosa* plants had literally invaded. Fifteen of these insects were released on their first trip and four subsequent trips were conducted to collect and release the biocontrol agent. Monitoring is continuing for the establishment of the psyllid insects at released sites. Some insects were released near the research lab for general observation and monitoring and some psyllid insects collected will be sent to Pohnpei for ID of species.
- b). Impact/Accomplishments – Number of psyllid insects increased and became well established. Continue release of these insects will hopefully lead to the reduction of this invasive weed around the island and monitoring is ongoing. Local farmers and the general public had employed other cultural methods to help in the control of this invasive weed specie.
- c). Source of Funding – Hatch Act Funds
- d). Scope of Impact – County Specific (Yap, Micronesia)

Key Theme - Integrated Pest Management

- a). Description of Activity – Project on “Survey of Diseases in the FSM” was finally implemented in August- September 2003. Disease diagnoses and identification would be based on the collected diseased samples of more than ten different crops each State using visual examination, photographs and field observations on symptoms. Microscopic

examinations are being done on mounted slides from incubated plant diseased samples collected. Results would be subject for further verification and cross-reference. Publication of the survey results in relation to IPM would be done within one-year time.

The project on developing training materials on pest management in the vernaculars of FSM could now proceed with approved funding from Rural Development, however still waiting for release and transfer of grant funds. Technical assistance is being solicited from ADAP in addition to printing arrangements, which include interpretation and poster layout of the pesticide safety, concept and poster design of the Alternative Approach to Pest Management, and pests ID pictures and assistance to writing the text to include the insect life cycle of selected pests. The 'blueprints' on the materials to be developed, such as pesticide safety and handy pest ID booklet, were submitted.

A research staff participated in the University of Hawaii Department of Natural Resources and Environmental Management (DNREM) project on field demonstration for sustainable pest management project on important crops in the islands. The second field demonstration was conducted in March 2003 in the cooperator's farm. The project commenced in June 2002 with 2-field day demonstration activities. Concomitant with this project is the continuation of the IPM project on cucumber cultivation. Data in the farmers' field and other pertinent information are being collected for the cucumber profile in Pohnpei.

- b). Impacts - Microscopic examination, verification and cross-reference in the identification of the diseases are being done (Plant Pathologist, UH at Manoa). Other aspects of the report publication are also being searched and prepared. Findings on identified diseases and new ones are vital information; knowledge confirmatory to previous surveys or if there are new ones, alertness and awareness of a disease or diseases would impact production how to's and should be prepared and implement IPM strategies to control epidemics.

The project on "Developing Materials for Pest Management in the Vernaculars of FSM" when completed would be an added form of information in translated languages towards better understanding of integrated pest management.

Unsuccessful and interested cucumber farmers attended the field demonstration conducted. CES Extension Agents, LGP and NRCS staff participated. Forty participants were provided first-hand information on producer's experiences and 'farm secrets' on cucumber cultivation. Revision was done on the Handout on Cucumber Cultivation to include effect of the temporary drought in Jan-Feb'03 affecting the cucumber season planting where the farmer opted not to provide irrigation input. The English and Pohnpeian versions were distributed. If participants would adopt the knowledge, experiences and 'secrets' shared would definitely improve yield, farmers' income from cucumber cultivation in the island. The case study publication was written with UH Manoa DNREM for Sustainable Pest Management and IPM. The Crop Profile on Cucumber in Pohnpei for publication is in progress.

- c). Source of Federal Funds – Smith-Lever/IPM
- d). Scope of Impact – (FSM-Micronesia)

## Key Theme - Integrated Pest Management

- a). Description of Activity – [Eco-Friendly Farming Through Integrated Pest Management in the Republic of the Marshall Islands Project] - The project proposes to enhance pest and disease control through environment-friendly methods by: (1) determining the agricultural pests and diseases, and their distribution in the Marshall Islands; (2) training local farmers, extension and research staff in the identification of agricultural pests and diseases; (3) developing and implementing Integrated Pest Management approaches, with a particular emphasis on biological control and other non-chemical methods; and (4) promoting and encouraging the adoption of these approaches by end-users.

The Government of the Marshall Islands encourages the use of non-chemical control methods, and seeks to keep pesticide usage to a minimum and for emergencies. Integrated Pest Management approaches aim to maintain pest damage at acceptable levels by manipulation of the crop ecosystem without causing damage to it, through both the application of a range of practices, and a minimum use of pesticides. The IPM approach is therefore the most appropriate means for agriculture in the Marshall Islands.

- b). Impacts - Insect pest survey generated the updated information on new insect pests in the Marshall Islands. Farmers are able to identify common pests found in their plants. Also, they are instructed on how to treat their infested plants. The Plant Protection and Quarantine officers from the Ministry of Ministry of Resources and Development and the CRECMI staff have benefited by attending and participating in the various workshops and training programs organized by Secretariat of Pacific Community and the IPM project Investigator.
- c). Source of Federal Funds – Smith-Lever/IPM
- d). Scope of Impact – County Specific (Marshall Islands)

## Key Theme – Sustainable Agriculture

- a). Description of Activity - Micropropagation and distribution of elite planting materials of banana and micropropagation and distribution of elite taro seedlings are ongoing projects at MPPRC.
- b). Impact/Accomplishments - Distribution of 9,667 elite banana seedlings belonging to 8 cultivars were made to 142 families in Kosrae during 2003. Export of banana from Kosrae is regularized since July 2003 and it is generating renewed interest in banana farming. Export and trade within Kosrae are positively impacting the household income and life of many families in the county. Trainees from the State of Yap received 300 seedlings while the Pohnpeiian trainees carried 250 seedlings of high vitamin bananas back to Pohnpei with them. The tissue culture bananas are reported to be doing well in both Yap and Pohnpei.

MPPRC is operating the project on saving the endangered vitamin A rich Fei' bananas (Usr Kulasr and Usr Kulundol) from a technical assistance grant to conserve the germplasm as well as reduce Vitamin A deficiency problem in Kosrae through education on the role of Vitamin A in nutrition and by providing micropropagated planting materials of vitamin A rich bananas (a staple food) to farmers. In 2003, a few thousand micropropagated seedlings of these special bananas were provided to over 200



families. Several workshops were conducted to the benefit of over 500 people, including senior citizens and school children.

Taro distribution in 2003 stood at 11,291. Sixty-nine (69) families benefited from the seedling distribution. Although not exported out of Kosrae in large volumes, taro is sold well in the local market, thus improving household income and quality of life of many families in Kosrae.

- c). Source of Federal Funds – Hatch Act/Smith-Lever/Local
- d). Scope of Impact – (Kosrae, Micronesia)

#### Key Theme – Sustainable Agriculture

- a). Description of Activity - Sustainable food production activities were conducted in 5 municipalities in the Northwest Region of Chuuk, as part of an atoll agroforestry and crop production project. Certain crops that are resistant to salt water and are adaptable under harsh atoll environment and typhoon-prone areas were identified and were being cultivated. People in these atoll areas were assisted with information on preparing farm plots and were provided planting materials for the project. Extension agents were dispatched to these areas to provide assistance in establishing farm plots and maintaining them.
- b). Impact/Accomplishments – In progress and early indications showed that banana, taro, and other crops are doing well.
- c). Source of Federal Funds – Smith-Lever
- d). Scope of Impact – (Chuuk, Micronesia)

#### Key Theme – Water Quality

- a). Description of Activity - A joint effort project with the Republic of the Marshall Environmental Protection Authority (RMIEPA) was established to conduct water monitoring and surveillance testing in selected rural islands. The Water Quality Extension Agent was responsible for educating the community on water quality issues while a staff from RMIEPA was responsible for collecting and analyzing the water samples from the communities' groundwater resources and water catchments. The team visited 7 rural areas (outer islands) and made presentations to about 3000 people. They surveyed 394 water catchments and 162 groundwater pits and tested them for quality assurance.
- b). Impact/Accomplishments - The test results from their surveys indicated that 64 catchments and 43 groundwater were positive for total and fecal coliforms and the Water Quality Extension Agent met with the owners to inform them of the results and provided information and assisted them on ways of treating their water, such as bleaching draining out and then cleaning the inside and gutters. The communities were very grateful for the team's visit and have indicated that they have learned a lot from the team. A follow up visit to one of the 7 visited rural islands was conducted by the Extension Agent where he reported back that about 85% of that community has followed his recommendations on bleaching and cleaning their water tank and home gutters.

- c). Source of Federal Funds – Smith-Lever with Local Match
- d). Scope of Impact – County Specific (Marshall Islands)

Key Theme – Water Quality

- a). Description of Activity – College of the Marshall Islands UV Water Unit was installed in the late 90s with the intention of providing clean and fresh drinking water to the students, faculty and staff of the college. The unit is tested twice a month for total and fecal coliforms. A total of 24 tests were taken. The Water Quality Extension Agent is proud to announce that so far that the tests have been negative for coliforms presence.
- b). Impact/Accomplishments - The college has saved thousands of dollars from not buying drinking water from the local water bottling company. Most importantly is that no report has been received regarding student, faculty or staff getting sick after drinking water from this unit. The Extension Agent along cleans the unit on a monthly basis. It has been reported that staff from the local public elementary schools have been using this unit to provide drinking water to their students. This is one investment that the college did not regret doing.
- c). Source of Federal Funds – Smith-Lever
- d). Scope of Impact – County Specific (Marshall Islands)

## C. Allocated Resources

### Fiscal Resources

#### Extension

Year	Federal	State	Local	Other
2000	197,037	70,370	14,074	0
2001	201,346	40,129	50,331	0
2002	237,233	47,234	71,382	0
2003	199,971	42,767	33,942	0
2004				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				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	0.00	0.0	0.0	0.00	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	0.00	0.0	0.0	0.00	0.0	0.0

From the FY2003 FTE of 74.42, 20.75 have been assigned under Goal 4, representing 28% of FTE input. The FY2003 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:**

PCC-CRE continued to be committed to improving the lives of all Palau's citizens this past year. To that end, the Personal Sewing program resumed in order to fulfill a need in the community. This program helped families offset the high cost of ready-made clothes sold in stores and provided an alternative income source by providing the knowledge and skills on sewing children and adult dresses and other styles and patterns of clothing.

Several youth programs were conducted to generate and cultivate interest in many different areas of science. The Marine Science and Outdoor Wildlife Programs offered high school students an in-depth look into Palau's diverse marine and terrestrial environments. The goal for the After-School Science classes was to create an interest in science by having the students participate in many fun and engaging experiments and activities.

#### **COM-FSM/CRE:**

##### **Yap Site:**

The program on sewing addressed the high unemployment rate, the growing cash economy, and the lack of knowledge and skills in supplementing family income. Lessons on operating a sewing machine and the actual sewing of different styles and patterns were provided to both men and women homemakers to help with the low wages by generating new jobs and supplementing meager income for families.

Youth programs were addressing youth productivity and promoting interest in agriculture and other areas. The program is an attempt at making use of youth's leisure time into time well-managed by involving youths on community projects, such as planting ornamental crops and landscaping and cleaning along public roadsides .

##### **Pohnpei Site:**

The program on black pepper addressed the decrease in the number of farms and a lower production level as World demand for the Pohnpei black pepper product is soaring. Program emphasis is on increasing planting materials and increasing black pepper farmers' knowledge and skills and provide for more financial assistance to farmers. The intent of the program is to provide knowledge and skills on black pepper production through workshops, field days, visit to the farms and radio programs to increase production of black pepper by rehabilitation of existing farms and promote expansion and establishment of new ones as new undertakings to reach 50 acres around the island. The ultimate aim is to increase production annually by 10%.

Agriculture extension staff continued to conduct extension and educational outreach programs in the communities to enhance social and economic status of families and individuals. Presentations and demonstrations were conducted to individuals and groups in the communities and to students, teachers, and parents at schools and Head Start Centers.

### **Chuuk Site:**

Youth-at-risk remains the priority area for youth development programs, with 135 high school dropouts participating in the program. Youth suicide still remains a serious problem in Chuuk. Substance abuse, such as alcoholism, use of drugs and other harmful substances are also increasing at an alarming rate, which led to juvenile delinquency and gang fights. Parenting skills training programs aimed at developing constructive disciplinary actions by parents, improving communication and dialogue with children and promoting transparency and openness between parents and their children.

The Girl Scout's Movement with its built-in leadership training component has empowered women to become active participants in governmental, civic, religious and social matters. A total of 18 troops have been organized with a membership of 265. The Girl Scout's activities included Investiture, Thinking Day Celebration, Student Exchange Program to Japan, hosting of various state functions.

### **Kosrae Site:**

Personal sewing programs continued in the communities, targeting young mothers and vocational teachers at elementary and high schools. Short-term training programs were designed for women who could devote more time up to four hours per day for a period of two weeks. Collaborative effort has been established with the Kosrae Community Affairs Office in the coordination of community training programs on the operation of electric sewing machine and soap making with the use of the coconut oil. Fifty homemakers and vocational teachers attended these training and were able to acquire the necessary skills on sewing different patterns and styles of children dresses and women skirts and muumuus.

## **B. Key Themes:**

Key Theme – Family Resource Management

- a). Program Description – [Personal Sewing] - A 40-hour program on Personal Sewing was conducted in one of the villages in Palau to ten women participants. The program provided the homemakers with basic sewing skills and lessons that helped them save money on ready-made as well as custom-made clothes. Each participant made two dresses, two muumuus, one skirt, one blouse, one men's shirt, and a pair of elasticized shorts or long pants. Projects completed by each participant were calculated and compared with costs of ready-made and custom-made clothes and a 35% – 50% saving for each participant was shown. Four participants were very enthusiastic and eager to continue sewing for their families after discovering the tremendous amount of savings there is in home sewn clothing. The participants also improved their income capacity in that money saved from buying ready or custom made clothes could be utilized for other family essentials, such as food, school supplies, or monthly utility payments.
- b). Impact/Accomplishments – Ten homemakers completed the Personal Sewing program earning Certificates of Completion. The skills and knowledge gained from the program enabled each participant to improve the quality of their household with tailored clothing for the family.
- c). Source of Funding – Smith-Lever Act Funds
- d). Scope of Impact – State Specific (Palau, Micronesia)

## Key Theme – Family Resource Management

- a). Description of Activity – Sewing lessons continued to provide homemakers an opportunity to learn new skills and to save some money on buying costly ready-made clothes. Personal sewing classes consist of three levels: basic, intermediate and advance. Sewing programs were conducted at two sites for homemakers and young mothers on pattern-making and methods of sewing fashionable dresses.

Ten Chuukese and 40 Kosraen homemakers were trained on sewing simple patterns for adult and children dresses and other patterns such as nikotang, rags, oven mitts, pan holder, and muumuus. Homemakers were also trained on different parts of the sewing machine and how to operate it.

- b). Impact/Accomplishments – A good percentage of the trainees have started sewing for their family with the knowledge and skills gained from cutting patterns and actually sewing dresses for their families. The experience they gained also helped in supplementing the family income from proceeds from their sales. Some trainees have opened small tailershops.
- c). Source of Funds – Smith-Lever 3b&c
- d). Scope of Impact – (Chuuk & Kosrae, Micronesia)

## Key Theme - 4-H/Youth Development

- a). Program Description – [Summer Marine Science] - The Summer Marine Science Program was designed for high school students and encompassed informative lectures given by local scientists and CRE staff members. The class covered a wide variety of subjects, such as the formation of the rock islands, Palau's unique marine lakes, marine invertebrates and vertebrates, and the importance of mangroves and coral reefs. After the lectures, the class went out into the field to gain hands on knowledge corresponding to the earlier classroom lecture. The students spent approximately 30 hours in the classroom and over 50 hours in the field.
- b). Impact – Ten students successfully passed the class and earned Certificates of Achievement. To pass the class, each student had to take six quizzes, complete six homework assignments and pass the final exam in order to demonstrate their knowledge and understanding of the marine world. According to the evaluations filled out by the students, all enjoyed the program and learned many new things about the marine ecosystem.
- 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 – - [Outdoor Wildlife] - Outdoor Wildlife was a three-week class for high-school students and encompassed informative lectures about terrestrial science given by local scientists and CRE staff members. The class covered a wide variety of subjects such as the formation of the rock islands, traits and features of Palau's endemic

birds, medicinal plants, and the benefits of biological control. After the lectures, the class went on hikes around Palau to gain hands on knowledge corresponding to the earlier classroom lectures.

- b). Impact – Seven students successfully passed the class and earned Certificates of Achievement. To pass the class each student had to take six quizzes, complete six homework assignments and pass the final exam in order to demonstrate their knowledge and understanding of the topics covered. The evaluations filled out by the students, showed great enthusiasm regarding the program and were interested in next year's class.
- c). Source of Federal Funds – Smith-Lever
- d). Scope of Impact – (Palau, Micronesia)

#### Key Theme – 4-H/Youth Development

- a). Description of Activity – - [After-School Science] -This program was developed in order to generate and maintain students' interest in science by having them complete many hands on activities. During each class, the students took part in at least three experiments or activities. The program was broken down into three grade levels (9-12, 6-8, & 3-5) meeting twice a week for five weeks. A variety of subject areas was covered such as geology, the water cycle, chemistry, plant biology, and meteorology.
- b). Impact – Over 30 students completed the five-week program. The students took a pre- and post-test to compare their scores and determine how much they learned during the 5-week class period. Over 75% of the students scored better on the post-test than the pre-test. From daily evaluations, completed anonymously by the students, most enjoyed the programs, had fun doing the experiments, and gained a better interest in science than before the class started.
- c). Source of Federal Funds – Smith-Lever
- d). Scope of Impact – (Palau, Micronesia)

#### Key Theme – 4-H/Youth Development

- a). Description of Activity – The 4-H gardening program for children in the age range of 9-19, provided the knowledge and skills on appropriate gardening techniques and practices. Lessons on home gardening included the growing of different varieties of vegetables and ornamental crops for the growing landscaping industry, and also included presentations and hands-on on actual gardening work in the maintenance of demonstration gardens and nurseries. Technical assistance by agriculture Extension staff is continuing to provide information on the growth cycle of different species of plants and varieties of vegetables and different methods of harvesting, handling and marketing farm produce. Agriculture Extension staff continued their visits to farm communities and provided planting materials and helping farmers.

Youth programs also included sports activities that were organized in the villages, such as junior boy's league and women volleyball. 4-H and youth program staff also worked very closely with staff from the Yap State Youth Services Office on a village



beautification project where youths helped in the clearing of bushes along public roadsides and planting of ornamental plants.

- b). Impact/accomplishments – People’s lawn and yards are more organized now as a result of the beautification/landscaping project. More youths are now involved in recreational activities, which also helped in taking away their time on doing drugs and consuming alcohol which lead to improvement on their health.
- c). Source of Federal Funds – Smith-Lever
- d). Scope of Impact – (Yap, 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 on developing a pearl aquaculture industry and developing local expertise in Micronesia has been progressing further. Two Micronesian core staff were trained and several community people are undergoing training to gain the knowledge and skills necessary in establishing, managing and maintaining their own farms. The project has proven that a hatchery based farm is an alternate method of 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 implantation of round nuclei (pearl seeding) has been performed by one of the best pearl technicians from the cultured black pearl industry.

- b). Impacts/Accomplishments – In addition to the two trained Micronesian core staff, 30 other Micronesian trainees/volunteers have been involved in the hatchery and farming activities. The hatchery has conducted 31 series of spawning and 7 larval rearing trials, resulting in tens of thousands of oysters for pearl seeding in phase 2. Three pilot grow-out farms were established at the two lagoon islands and one at an outer island of Pakin, where local people received farming and skill training.
- c). Source of Funds – Hatch Act & DOI
- d). Scope of Impact – State Specific (Micronesia)

#### Key Theme – Leadership Development

- a). Program Description – CES Land Grant program staff assisted in the coordination of the Girl Scouts Movement for Chuuk State. Troops were organized and troop leaders provided training on leadership development, which included topics such as value clarification, visioning, setting goals, planning, roles and relationships, leadership styles, exercises on leadership and trust, communication skills, action planning and integration. On the other hand, the Girls Scouts’ members participated in activities that would enhance their leadership skills and volunteerism through the “The Thinking Day and Camping”.
- b). Impact/Accomplishments – Eighteen (18) Girl Scouts leaders have attended the Leadership training. The Girl Scout leaders showed “leadership” and initiative in various

functions where the Girl Scouts are involved. A total of two hundred and sixty-five (265) Girl Scouts from 18 troops joined the “Thinking Day” and the three-day “Camping”.

- c). Source of Funding – Smith-Lever & Local Match
- d). Scope of Impact – State Specific (Chuuk, Micronesia)

#### Key Theme - Parenting

- a). Program Description – The training on parenting skills was integrated in the training of other programs most especially small business, sewing class and youth development. The lessons on parenting include: leveling of expectations of parents and children, understanding diversity, cultural perspective, Christian values, family values, charting relationships in the family, drawing the line, developing boundaries, changing unhealthy behavior, listening to and honoring feelings of grief, fear, guilt, anger, compliance etc.
- b). Impact/Accomplishments – For the current year, twenty (20) parents from Outer Islands have been trained and counseled on “Parenting Skills”. This is most important as cash economy has replaced subsistence economy and materialism has corrupted the society and eroded parental roles and authority. Many of the participants have verbalized that their methods of discipline or action to children’s behavior were not the proper or the correct way for their children’s development.
- c). Source of Funding – Smith-Lever
- d). Scope of Impact – State Specific (Chuuk, Micronesia)

#### Key Theme – Promoting Business Education

- a). Description of Activity – Traditionally, the husband is the breadwinner and the wife is totally dependent on the husband. Oftentimes, the husband’s income is inadequate to meet the basic needs of the whole extended family. The small business and skills development training program provided an opportunity for some women to learn new skills on dressmaking, making lei, and cooking special snacks. This program also shared information on drawing up a business plan and starting a small business.  
  
Through collaborative efforts with the Chuuk Department of Commerce and Industry, trainings were conducted for business entrepreneurs and others who are already engaged in small business. Information on different aspects of operating a business and procedures for securing business loans were shared with participants.
- b). Impact/Accomplishments – Thirty-six participants successfully completed the training and have started utilizing their newly obtained skills at their workplace and in their businesses.
- c). Source of Funding – Smith-Lever
- d). Scope of Impact – (Chuuk, Micronesia)

### Key Theme – Supplemental Income Strategies

- a). Description of Activity – Regular visits to existing and new farms are the main activity being conducted for black pepper production. For the older farms, CES staff are continually making survey of vines of different ages in the field. The main purpose of the survey component of the visits is to enable the distribution of free fertilizers to pepper growers, an initiative of the Black Pepper Board of Directors, as a way of increasing production. Agriculture extensions staff also assisted farmers to establish new black pepper farms. Technical assistance provided to black pepper farmers included use of mature fern post, planting materials, field planting demonstration including rates of application of fertilizer to different ages of plants.
- b). Impacts/Accomplishments – A total of 5 demonstrations were done in the communities on Black Pepper Production and 12 presentations to selected farmers, businesses and Board members of Black Pepper Association. A total of 183 individuals have been made aware and they have increased knowledge and skills in properly managing Black Pepper. Three (3) new farms were established and being assisted.
- c). Source of Funds – Smith-Lever & Local Match
- d). Scope of Impact – State Specific (Pohnpei, Micronesia)

### Key Theme – Supplemental Income Strategies

- a). Description of Activity – Training on sewing simple clothes, pillowcases and children's pants was completed with presentation of certificates and display of their sewing work and skills. Another sewing class for the second phase was conducted. The same batch that finished the first phase of sewing requested the continuation of sewing class that is the second phase training.
- b). Impacts/Accomplishments – The eleven (11) participants of sewing class sold and made profits from their products sales.  
  
Eleven (11) participants gained more knowledge and skills on sewing.
- c). Source of Funds – Smith-Lever & Local Match
- d). Scope of Impact – State Specific (Yap, Micronesia)

### Key Theme - Workforce Preparation – Youth

- a). Program Description – Fifteen apprenticeship positions gave high school juniors and seniors an opportunity to gain valuable knowledge about the vast fields of agriculture. Under the supervision of Research and Extension staffs, students developed their own research and extension projects. The students worked with and assisted the agriculture, marine science, and home economic staffs in order to gain actual work experience in these areas.  
  
The Internship Program took ten weeks. The interns, who must be from grades 11-12, developed their own projects and they were mentored by research and extension staff.

- b). Impact/Accomplishments – The students successfully completed the internship program. Each student obtained many new skills and ideas. They learned to plant and maintain vegetable gardens, used different techniques for planting taro, banana, cassava and other tropical crops, and learned the uses of biological control. All fifteen students expressed a commitment to continue their study of agriculture.
- c). Source of Funding – ADAP
- d). Scope of Impact – County Specific (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				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	0	0	0	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	0.0	0.0	0.0	0.00	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	0.0	0.0	0.0	0.0	0.0	0.0

From the FY2003 FTE of 74.42, 11.95 FTE has been assigned to programs addressing Goal 5, representing 16% of FTE input. The FY2003 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 used 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.

Input will continue to be received from our various stakeholders from the local, state, and national level.

### **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 micropropagation 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 10,000 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