2008 Annual Report
College of Micronesia

I. Report Overview

1. Enter an Executive Summary for your Fiscal Year 2008 Report (6400 characters).

At the College of Micronesia, programs were implemented through the Department of Cooperative Research and Extension (CRE) at the three partner colleges: College of the Marshall Islands (CMI), College of Micronesia – FSM (COM-FSM), and Palau Community College (PCC). Integrated research and extension programs in FY 2008 continued to address economic, social, and ecological issues that are critically important to the people in small island communities. Programs provided were the continuation of last year's efforts in disseminating new knowledge and technologies to sustain and improve the quality of life of all Micronesian citizens in the Republic of the Marshall Islands (RMI), Federated States of Micronesia (FSM), and Republic of Palau (ROP).

With rising sea level due to global warming and inflation as a result of increasing cost of food and fuel, the Micronesian population, which is mostly rural and scattered throughout mostly low-lying coral atolls, have scrambled to make the adjustments necessary for the new economic and social conditions and find new methods of farming of both crops and livestock. Research and development activities continued to promote agricultural productivity, self-sufficiency, provide for food security, and enhance quality of life for Micronesians. The utilization, processing and development of new products from banana, taro, breadfruit and cassava that are acceptable to the native population and in local markets continued. Trials on taro varieties (Cyrtosperma spp. & Colocasia spp.) for their suitability to grow under atoll conditions and 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 varieties that will improve the quality and quantity of certain varieties for the export market were ongoing. A research project looked at determining comparative resistance of different taro varieties to the taro leaf blight disease. Germplasm of staple root crops, namely sweet potato, cassava and taro, has ensured the genetic conservation of these valuable resources for future generations. This has also facilitated the continue supply of planting materials to growers and allow in-vitro multiplication of other food crops such as breadfruit and pandanus.

Aquaculture/mariculture demonstration projects were continuing with new advances in technology to transfer the technical know-how to Micronesians to enable them to actively engage in projects that could provide alternate/supplementary income generation with the overall aim of improving the socio-economic conditions of the island communities**.** Efforts were made to initiate and improve site-specific multi-species aquaculture and transfer simple and appropriate feeding technology for targeted aquaculture species to farmers to formulate and prepare their own feeds. Other projects were to provide stock enhancement to replenish depleted stocks. A joint project that got underway was to develop the technology for the farming of sea cucumbers in the FSM and RMI to enable the replenishment of lagoons and reefs depleted as a result of over harvesting.

Outreach programs continued on critical issues ranging from food safety and quality, food security, health and nutrition, strengthening families and developing youth, water quality, developing leadership and volunteerism, and managing limited natural resources and the environment. Health and nutrition programs continued to stress the importance of healthy lifestyles, which include behavioral changes (physical activity and consumption of safe, nutritious local food) to combat the ever-rising tide of obesity, diabetes, heart diseases and NCDs. The outbreak of melamine infected food from China provided a wake-up call on how vulnerable our population is to food borne diseases and reminded us that we must be vigilant in combating such diseases. A project on endangered species of banana is multiplying rare banana varieties to support nutritional needs for Vitamin A among both children and adult. The youth development programs at schools and with out-of-school children provided information to increase knowledge and appreciation of marine and terrestrial flora and fauna. Summer programs also provided information on basic survival skills on small island communities and appropriate island lifestyles. More students are now exposed to computers through computer training programs at schools that provided the opportunity for children to use the Internet as an introduction to electronic connectivity and information gathering. Water quality education programs continued in some of the islands as collaborative efforts with international and regional organizations, government agencies, and community groups on monitoring and surveillance testing of water sources in selected areas. 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. Activities are ongoing on resistant crop varieties and practical biological pest control measures to provide useful tools for stakeholders to combat crop pests and diseases and increase productivity of tropical food crops. The use of beneficial organisms was the emphasis in reducing pest threats on crops. Biological control agents such as mirid bugs (*Cyrtorhinus fulvus)* to control the taro leafhopper, predatory mites (*Neoseilus longispinosus)* on cassava spider mites and the parasitic wasp *(Aphidius colemani)* to control the melon aphids on taro were reared and released on field plantings of taro and cassava. The biological control of the melon aphid and mile-a-minute is progressing with the successful control of gallflies and mired bugs with *Chromolaena* and taro leafhopper. Biological control of the *Mimosa diplotricha,* which is still growing along roadsides through the use of the psyllid insects continued.

Multi-state, multi-institutional and multi-disciplinary efforts continued through the alliance of the American-Pacific land-grant universities and colleges through the Agricultural Development in the American Pacific (ADAP) project and with the College of Tropical and Subtropical Aquaculture (CTSA) on aquaculture projects. A cost-sharing agreement with Pohnpei State Government continued, whereby extension agents from the Agriculture Station have been collaborating with Pohnpei CES staffs. There is continued shortage of necessary human resources and professional staff, 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. Other capacity building activities included sustainable agriculture workshops, pesticide application, tissue culture and nursery practice, integrated pest management, health and nutrition, and basic sewing attended by farmers,

producers, homemakers, the youth and adult sectors of the society and the underprivileged and underrepresented.

2. Enter the Total Actual amount of professional FTEs/SYs for the State.

	Extension		Research		
Year: 2008	**1862**	**1890**	**1862**	**1890**	**Others***
Plan	**49.1**		**11.9**		
Actual	**53.84**		**23.96**		

II. Merit Review Process

1. Select the Merit Review Process that was employed for this year. (Check all that apply).

__X_ Internal University (college) Panel
__X_ External University Panel
_x__ External Non-University Panel
___ Combined Internal and External University Panel
_X_ Combined Internal and External University and External Non-University Panel
__x_ Expert Peer Review
___ Other _____

2. Tell us about your Merit Review and/or Peer Review Process completed this year. (3200 characters).

Project proposals were developed as a result of meetings and consultation with stakeholders and also based on existing plans of work for research and extension. The proposals were submitted to a publication, merit or scientifically acceptable peer review committees for comments and suggestions. Other special project proposals were subject to peer review within and outside of the colleges by other stakeholders and also subjected to review by advisory committees. Proposals were also posted on websites. Once comments were incorporated into the proposals, the Vice-President of Cooperative Research and Extension then submitted them for review and approval at each college. Final proposals were submitted to the AES/CES Interim Director through the college Presidents for approval.

III. Stakeholders Input

1. Actions taken to seek stakeholder's input that encourages their participation. (Check all that apply.)

_X_ Use of media to announce public meetings and listening sessions
_X_ Targeted invitation to traditional stakeholder groups
_X_ Targeted invitation to non-traditional stakeholder groups
_x_ Targeted invitation to traditional stakeholder individuals
___ Targeted invitation to non-traditional stakeholder individuals
__x_ Targeted invitation to selected Individual from general public
___ Survey of traditional stakeholder groups
___ Survey of traditional stakeholder individuals
___ Survey of general public
___ Survey specifically with non-traditional groups
___ Survey specifically with non-traditional individuals

___ Survey of selected individuals from the general public
___ Other _____

Briefly explain how you encouraged stakeholder participation (3200 characters).

When meetings were called to discuss research and extension planned activities, stakeholders such as community leaders, farmers, homemakers, traditional leaders and political leaders, were directly involved in the discussions. Many of their suggestions and comments were included in the planned research and extension activities. In some cases, research activities were done in farmers' field and in so doing farmers participated directly in the implementation of projects. Scheduled meetings were also held in the communities to inform community leaders, farmers, homemakers, political and traditional leaders about progress being made with research and extension activities. During these meetings, stakeholders were given the opportunity to ask questions, make comments, share traditional knowledge and even suggested changes or other activities that are more important and relevant to the needs of their communities. Other methods of encouraging stakeholder participation were done through direct meetings and workshops with different sectors of the population to solicit their inputs in identifying priority issues.

2(A). A brief statement of the process that was used by the recipient institution to identify individuals and groups who are stakeholders and to collect input from them. (Part – 1)

1. Method to identify individuals and groups. (Check all that apply)

__x_ Use Advisory Committee
__x_ Use Internal focus Group
___ Use External Focus Groups
__x_ Open Listening Sessions
_x_ Needs Assessments
___ Use Surveys
___ Other __Referred by others_____

Briefly explain your methods for identifying individuals and groups. (3200 characters)

Farmers, homemakers, political, traditional and community leaders were requested to identify names of individuals or groups in their respective communities who should be attending meetings and workshops. Other individuals were those working on similar programs with other agencies and those recommended by peers. Those identified were informed via letter, radio or through personal visits when meetings or trainings were held. Other methods were through strategic planning meetings, interagency collaboration, community associations and direct client contact and needs assessment surveys directly in the field. Meetings/discussions were also held with school authorities, church leaders, parents and the general public on the implementation of community projects.

2 (B). A brief statement of the process that was used by the recipient institution to identify individuals and groups who are stakeholders and to collect input from them:

1. **Methods for collecting stakeholders input. (Check all that apply).**

_**x**_ Meeting with traditional Stakeholders groups;
__x_ Survey of traditional Stakeholder groups
_x_ Meeting with traditional Stakeholder Individuals
___ Survey of traditional Stakeholder Individuals
_x_ Meeting with the general public (open meeting advertised to all)
_x__ Survey of the general public
_**x**__ Meeting specifically with non-traditional groups
___ Survey specifically with non-traditional groups
___ Meeting specifically with non-traditional individuals
___ Survey specifically with non-traditional individuals
_x_ Meeting with invited selected individuals from the general public
___ Survey of selected Individuals from the general public
___ Other _____

Briefly explain your methods for collecting stakeholder input. (3200 characters)

Some of the methods used for collecting stakeholder input were one-on-one visits conducted in the stakeholders' homes and through discussions and interviews with community leaders. Surveys and field observations in addition to farmers association and other community meetings were also used. Youth programs were developed through discussions with schools, church and community groups and through direct assistance to government agencies such as the Early Childhood Education (ECE) recruitment programs. Stakeholders were directly involved in identifying positions and hiring new upper level staff. Other methods used were questionnaires, need assessments, Board of Regents reviews, annual retreat, cabinet level meetings and student recruitment campaigns. Sometimes people called in after listening to radio and TV programs.

3. How the input was considered. (Check all that apply).

__x_ In the Budget Process
_x_ To identify emerging issues
_x_Redirect Extension Programs
_x_ Redirect Research Program
___ In the Staff Hiring Process
__x_ In the action plans
__x_ To Set Priorities
___ Others _____

Briefly explain how you used the input given by stakeholders (3200 characters).

During meetings with stakeholders, suggestions, comments and modifications from them were sorted out and those with positive impacts to research and extension project proposals were incorporated. It also helped with planning and prioritization of the next year's planned program activities. The review of strategic action plans, hiring of senior research and administrative positions, and focusing on special projects were also used to collect stakeholder inputs. State agencies assisted in developing programs and focus budgets for activities supported by matching funds through MOAs.

Key Stakeholder input items for CSREES Attention: What did you learn from your Stakeholders? (3200 characters)

Older women farmers have rich experience in traditional knowledge applicable to a large extent to improving crop production and crop protection. As such those wisdom, knowledge and experiences of farmers and stakeholders are used to improve strategies in research and extension activities. A lot of great ideas were collected. The older people kept referring to the traditional methods of gardening, fishing, cooking, etc., whereas, the younger ones depended on modern technologies. Collaborative surveys with NGO's and government agencies indicated the general population is seriously affected by increase in prices of staple food items and due to from this, there is an increase in use of traditional foods either through increase food production activities. Near seashores, resources are at risk from environmental changes and increased harvesting pressures. Student recruitment activities indicate an untapped interest in formal agricultural training at the certificate level.

IV (A): Planned Program (Knowledge Area)?
Name of Planned Program: Aquaculture

1. Enter the program Knowledge Areas (up to 20) and a percentage for each (total of each column must equal either 100% or 0%).

KA Code	Knowledge Area	%1862 Extension	%1862 Research
135	Aquatic and Terrestrial Wildlife	10	5
136	Conservation of Biological Diversity	10	10
301	Reproductive Performance of Animals	20	20
302	Nutrient Utilization in Animals	10	10
307	Animal Management Systems	20	20
308	Improved Animal Products (Before Harvest)	10	15
315	Animal Welfare/Well-being and Protection	10	10
511	New and Improved Non-Food Products and Processes	10	10
Total		**100**	**100**

IV (B). Planned Program Inputs
1. Enter the actual amount of professional FTEs/SYs expended for this Planned Program.

	Extension		Research	
	1862	1890	1862	1890
Plan	**6.9**		**5.0**	
2008	8.25		4.75	

2. Enter Actual dollars Expended in this Planned Program during FY 2008 (includes Carryover Funds from previous years). The values must be whole number i.e. no commas or decimals are allowed.

Extension	Research

	Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
2008	$ 39448	0	$ 51450	0

	1862 Matching	1890 Matching	1862 Matching	1890 Matching
2008	0	0	0	0

	1862 All Other	1890 All Other	1862 All Other	1890 All Other
2008	0	0	0	0

IV. (C): Planned Program (Activity and Participation)

1. Brief description of Activity (What was done?): (3200 characters)

PCC: About 20,000 fingerlings rabbit fish were released to five farms and recreation pools, from which the wild caught broodstock had been maintained at the Bureau of Marine Resource (BMR) hatchery and spawned each month since January 2008. Some of the fingerlings were brought for an aquarium exhibit during the Earth Day celebration. Fingerlings of another rabbit fish species (*Siganus lineatus*) locally known as Klesebuul were also produced as well as Tiau (coral trout) larvae. The wild caught milkfish fry were maintained at BMR and grow into maturity for hatchery operation. A preliminary larval rearing of mangrove crabs was attempted with the berried females obtained from a crab culture farm in Ngatpang. A request was made by NECO Company for assistance in their grouper cage farming and about 10,000 of 55-day-old fingerlings were produced and stocked in floating cages. The aquaculture team assisted in solving the parasite infestation problem of imported orange spotted grouper (*Epinephels coioides*) being stocked in floating cages. The lease agreement between the college and the Ngeremlengui State to use portion of its dock for establishment of a multi-species hatchery was finally signed and construction had begun.

CMI: Direct one-to-one contacts were made with students, youth, administrators, community and fishermen on aquaculture activities on pearl farming and sea cucumber farming. A collaborative work by CMI Land Grant / MIMRA on the spat (pearl oyster juveniles) produced around 40,000 of 1-inch size spat. Students, community members and dignitaries were also taught aquaculture topics on pearl and sea cucumber between October 2007- September 2008. Water, algal and spat and larval samples were analyzed for bacteriological comparisons between the two CMI-MIMRA hatchery facility's water quality profiles in November 2008. The researcher focused on the effect of partial/full replacement of live microalgae in the hatchery spat production of the black-lip pearl oyster (*Pinctada margaritifera),* as well as providing onsite training for aquaculture extension agent on hatchery and farming operations of pearl oysters and species.

COM-FSM: Demonstrations to reduce tilapia population, which has been listed as one of the ten worst invasive species in Pohnpei and to enhance rabbit fish and other native fish species population were made for a local community by a constant capture-removing tilapia from the water. Technical assistance was provided to a community on a funding proposal to the Global Environmental Facility (GEF) Small Grant Program-Micronesia and a community-based project began to increase/improve pig production using the tilapia as a pig feed. Information

disseminations and technical advices on aquaculture continued on mangrove crabs, sea cucumber, giant clams, freshwater prawns and rabbit fish. In Pohnpei, black pearl extension work focused on a commercialization process as local farmhands were trained to maintain the farms and COM/COM-FSM pearl hatchery program shifted its activity to simulate mass juvenile production for implementing commercial farming at three outer islands. Pearl quality research continued by the grants from Hatch and the Center of Tropical and Subtropical Aquaculture (CTSA) to improve pearl quality by grafting and husbandry methods. A new project on the sea cucumber began on the hatchery technology transfer (CTSA) and resource enhancement (Hatch) in Pohnpei targeting a high-value commercial species, the sandfish (*Holothuria scabra*).

1. **Brief description of the target audience. (3200 characters)**

PCC: Target audience included individuals engaged in aquaculture activities at six private and State-owned aquaculture farms, who have benefited from the technical assistance provided. College, secondary and elementary students have also learned the basic principles in aquaculture through lectures and field visits. People from different sectors have also realized the aquaculture development in Palau through aquarium exhibits and posters shown during special events.

CMI: Targeted audiences were the students, youth, administrators, community and farmers on Majuro atoll and indirect contact with clients through radio programs through the government owned radio station.

COM-FSM: Aquaculture and marine resources development and conservation is rapidly gaining interest and support from governments and the private sector, stakeholders, communities, NGO's and individuals. The major constraint to aquaculture development is the lack of information, knowledge and understanding of this new emerging technology. Thus, the aquaculture program targeted a wide range of audience including stakeholders, government leadership (State legislature), heads of relevant government agencies (Marine Resources, Fisheries, Agriculture, EPA etc.), NGO's and community-based groups, businesses and private sector, fishermen, farmers and individuals and in general those who have interest in raising or culturing black pearl. In Pohnpei, the pearl project targeted three atoll communities, local and state governments and agencies for implementing commercial farming by securing public funding and equipment supports as well as private business owners by the project's five-year commercial farm operation plan. Local small and family business people were also targeted audience to develop value-added local handicrafts utilizing pearls and pearl related products.

IV (D): Planned Program (Outputs).

1. Enter the actual number of persons (contacts) to be reached through direct and indirect methods. (Standard Extension Output).

Direct Contacts Adults Indirect Contacts Adults Direct Contacts Youth Indirect Contact Youth

Year	Target	Target	Target	Target
Plan	350	1000	150	1000
2008	471	800	254	300

2. Number of patents (Standard Research Output).
Patents Received

Year	Target
Plan	0
2008	0

If patents received, please list them here.

3. Publications (Standard General Output Measure).
Number of Peer Reviewed Publications.

	Extension	Research	Total
2008	0	0	0

IV (E): State Defined Output Measure
1. Output Target
Number of demonstration farms established.

Year	Target	Actual
2008	6	14

1. Output Target
Number of publications for lay use.

Year	Target	Actual
2008	4	3

1. Output Target
Number of conference paper and publication/presentation.

Year	Target	Actual
2008	5	5

1. Output Target
Expected Professional Journal publications.

Year	Target	Actual
2008	3	0

1. Output Target
Expected Gray Literatures.

Year	Target	Actual
2008	6	2

1. Output Target
Expected publications for lay use.

Year	Target	Actual
2008	5	3

IV (E): State Defined Outcome Measures

1. **Outcome Target: Increase awareness in the communities and prospective and existing industry about sustainable, site-specific, and low energy aquaculture technologies.**
2. **Outcome Type**
   _**x**_ Change in Knowledge Outcome Measure

___ Change in Action Outcome Measure
___ Change in Condition Outcome Measure

Enter by Quantitative and/or Qualitative Method Below as appropriate.
Quantitative Outcome

Year	Quantitative Target (If appropriate)	Actual
2008	30	395

Qualitative Outcome or Impact Statement

Issue (Who cares and Why?): (500 Char Max)

As interest in aquaculture increases in Palau, Marshall Islands and FSM, people including the students need to be aware of recent aquaculture development and its importance to the livelihood of islanders. There is a general feeling in the public that many resources have been depleted and need to be replenished. Aquaculture such as pearl culture, sea cucumber and fish farming has been considered as the best for the existing infrastructure and resources and some individuals and communities have already started investing in it.

What has been done: (500 Char Max)
Displaying posters at public functions and at the hatchery, providing series of lectures and hands-on training at schools and colleges, participation in conservation and aquaculture workshops and conferences, provided students and individuals visiting the hatchery facilities, providing technical assistance on hatchery and farming operations, releasing information through public meetings and mass media, conducted sea cucumber resource surveys, collaborating and coordinating with public and private sectors on aquaculture commodities were some of the activities that were made.

Results: (1000 Char Max)
PCC: Students and fishermen gained basic knowledge on aquaculture including the early life histories and hatchery techniques of finfish and mangrove crabs. Fish farmers in two states benefited from the technical assistances on grow-out. Existing clam farmers became aware of growing rabbit fish in their clam pens to control unwanted growth of filamentous algae.

CMI: As the most preferred species (*Holothuria scabra*) is not available, a medium valued species (*Actinopyga mauritiana*) was collected and stocked in the hatchery. A local community has been collecting juvenile sea cucumbers for restocking in the depleted areas for conservation and future harvest. They are interested to collaborate with CMI for hatchery project.

COM-FSM: As the black pearls, round and half-pearls from the project received immediate attention from stakeholders and international journals and as the project has reached the capacity to supply pearl oysters regularly, three atoll communities began implementing commercial pearl farming. The sea cucumber project developed closer collaboration with local people, domestic and international agencies.

3. Associate KAs from the Planned Program. (Check all that apply).

	KA Code	Knowledge Area
x	135	Aquatic and Terrestrial Wildlife
x	136	Conservation of Biological Diversity
X	301	Reproductive Performance of Animals
	302	Nutrient Utilization in Animals
X	307	Animal Management Systems
X	308	Improved Animal Products (Before Harvest)
	315	Animal Welfare/Well-being and Protection
	511	New and Improved Non-Food Products and Processes

IV (F): State Defined Outcome Measures

1. **Outcome Target - Adoption of sustainable aquaculture technologies by commercial and community groups.**
2. **Outcome Type**

___ Change in Knowledge Outcome Measure
__x_ Change in Action Outcome Measure
___ Change in Condition Outcome Measure

Enter by Quantitative and/or Qualitative Method Below as appropriate.
Quantitative Outcome

Year	Quantitative Target (If appropriate)	Actual
2008	**10**	**37**

Qualitative Outcome or Impact Statement

Issue (Who cares and Why?): (500 Char Max)

At PCC, the stakeholders were asking hands-on technical advices to improve their finfish production by better hatchery techniques, disease control and prevention measures. Based on the public feeling that the resources have been depleted, a private company in the Marshall Islands has been doing finfish cage farming with grouper and cobia species in Majuro lagoon. Technical assistances have increased confident of locals to pursue aquaculture activities on improving living standard and six communities in Pohnpei and outer islands participated in various levels of pearl farming activities at COM-FSM.

What has been done: (500 Char Max)

PCC: Technical advises were provided at different sites and on-site work on seed production of grouper and rabbit fish at the BMR hatchery facility including the quarantine, detection and control of parasite infection at a private farm.

CMI: Cage culture trials of grouper and cobia in Majuro lagoon by a private company have found to grow to commercial sizes.

COM-FSM: Yap pearl project proposal was submitted to several funding sources. Training and hands-on work on black pearl farming continued and the sea cucumber hatchery technology transfer has begun in Pohnpei.

Results: (1000 Char Max)

PCC: Technicians of the BMR hatchery facility were able to achieve natural food and seed production of grouper and rabbit fish. Parasite infection at the NECO Aquaculture Farm was controlled.

CMI: As part of a pilot project, the commercial fish company brought in two new exotic fish species. The humpback grouper and the cobia were grown out in cages in the Majuro lagoon. The monthly growth rate of the fish fingerlings produced and shipped from the Australian hatchery of this company showed that these fish could grow to commercial sizes without much difficulty in economically viable times and in growth rates faster or comparable to growth rates reports from other countries culturing the same species.

COM-FSM: Yap pearl project proposal has been waiting for the Yap Government's funding decision. Pearl project staff became all-around players in hatchery production, ocean grow-out and pearl culture including half-pearl grafting, who became capable of producing 100,000 spat on a regular basis and currently holding 70,000 pearl oysters at the Nett Point demonstration farm. This enhanced local awareness in immediate pearl farming business investment. A preliminary broodstock survey in Pohnpei lagoon resulted in the higher resources of a high-value sandfish (*H. scabra*) than those surveys made in the past that had reported nil or near extinct, encouraging to continue hatchery technology transfer and to revise the existing management policy.

3. Associate KAs from the Planned Program. (Check all that apply).

	KA Code	Knowledge Area
x	135	Aquatic and Terrestrial Wildlife
x	136	Conservation of Biological Diversity
x	301	Reproductive Performance of Animals
	302	Nutrient Utilization in Animals
X	307	Animal Management Systems
X	308	Improved Animal Products (Before Harvest)
x	315	Animal Welfare/Well-being & Protection
	511	New and Improved Non-Food Products and Processes

IV (G): State Defined Outcome Measures

1. **Outcome Target: Number of established aquaculture operations.**
2. **Outcome Type**

___ Change in Knowledge Outcome Measure
___ Change in Action Outcome Measure
_x__ Change in Condition Outcome Measure

Enter by Quantitative and/or Qualitative Method Below as appropriate.
Quantitative Outcome

Year	Quantitative Target (If appropriate)	Actual
2008	**3**	**5**

Qualitative Outcome or Impact Statement

Issue (Who cares and Why?): (500 Char Max)

PCC: A private company was interested in conducting cage culture of grouper and rabbit fish, but fingerlings were not available locally. A school and private company also sought assistance for the crablets.

CMI: Considering the existing infrastructure and resources, pearl and sea cucumber could be the best commodities.

COM-FSM: The communities required training of local youths and practical commercial operation planning. Strengthening extension and research between the states and regional land grant institutions were concerns and the sea cucumber project becomes a bonding tool.

What has been done: (500 Char Max)

PCC: About 10,000 fingerlings of grouper and 21,000 fingerlings of rabbit fish were given to local farmers. Hatchery runs were conducted in the second quarter by collaborations of farmers.

CMI: Training of locals and other awareness programs have been done. A new hatchery was built to expand the hatchery production of pearl oyster spat.

COM-FSM: Pearl farm training was offered to local youths in three communities as part of the preparation for commercial grafting operations in 2010-2011. The sea cucumber workshop was held with the participants from Marshall Islands and FSM.

Results: (1000 Char Max)

PCC: Fish farmers were able to obtain their rabbit fish fingerling requirements. Ngatpang State and NECO farms were able to benefit with the grouper fingerlings that were produced locally at the BMR hatchery. Efforts to succeed in producing crab larvae are being done and both cooperating farmers were committed to support the PCC-CRE's broodstock/spawner requirement.

CMI: Pearl hatchery spat production efficiency projects on alternative or substitute feeds for microalgae is ongoing. Sea ranching programs of spat to replenish the natural stock is underway too. Experiments to find out the best sizes to sea ranch are continuing.

COM-FSM: Three youths from Mwoakilloa joined pearl farm training with 10 other trainees from two communities. As the hatchery work enabled constant spat production from which approximately 70,000 1-year-old oysters have been kept at the pilot farm in Pohnpei, three atoll communities began setting up line culture systems for commercial operations. The sea cucumber project was implemented by holding pre-operation workshop with collaboration of other land-grant institutions from RMI and Yap, Pohnpei State Government, CTSA and SPC.

3. Associate KAs from the Planned Program. (Check all that apply).

	KA Code	Knowledge Area
x	135	Aquatic and Terrestrial Wildlife

x	136	Conservation of Biological Diversity
x	301	Reproductive Performance of Animals
x	302	Nutrient Utilization in Animals
x	307	Animal Management Systems
X	308	Improved Animal Products (Before Harvest)
x	315	Animal Welfare/Well-being & Protection
x	511	New and Improved Non-Food Products and Processes

IV (H): Planned Program (Evaluation)

1. Evaluation studies Completed. (Check all that apply)

___ After Only (post program)
___ Retrospective (post program)
_x_ Before-After (before and after program)
_x_ During (during program)
___ Time series (multiple points before and after program)
___ Case study
__x_ Comparisons between program participants (individual, group, organization) & non-participants
___ Comparison between different groups of individuals or program participants experiencing
different levels of program intensity;
___ Comparison between locales where the program operates and sites without program intervention;
___ Other(s) _____

What are your Evaluation Results? (3200 characters)

PCC: Farmers were able to find sources of their rabbit fish and grouper seed stock locally. Fish farmers were able to learn how to improve their production through the technical advises that were provided to them on-site. There are an increasing number of individuals who developed an interest in aquaculture and wish to invest in aquaculture activities. Cooperation with mangrove crab farmers was established and technicians have learned how to collect and handle healthy spawners. Students learned the basics of aquaculture and its importance to Palau's economy. People from different walks of life learned about the recent development of aquaculture in the country.

CMI: Evaluation clearly shows that if there is intervention the outputs are delivered more efficiently. Evaluation and the outputs demonstrated that it is effective to do a before and after evaluation to see the results of the intervention.

COM-FSM: Targeted audience has gained and increased knowledge of their interests. Feedback from the communities has been positive and encouraging. A number of participants increased skills and knowledge and has increased confidence to pursue commercial pearl

farming. As the sea cucumber has been considered another commodity that coastal communities can access to sources of income, the project's technology transfer and resource enhancement work enabled them to increase awareness of appropriate management planning among the stakeholders.

Key Items of the Evaluation(s) for CSREES Attention. (3200 characters)

PCC: A practical method in larval rearing of rabbit fish was established with the success in natural spawning of the captive breeders. The embryonic and larval development of rabbit fish had been well documented and a better feeding protocol was developed. After conducting a series of larval rearing trials, the larval production and survival rate were improved. The collaboration with the BMR hatchery was successful in the production of high-valued aquaculture species such as grouper and has benefited the two major grouper farmers in Palau. The establishment of cooperation and support from mangrove crab farmers in Palau greatly helped in the implementation of the newly approved Hatch project: "Seed Production of Mangrove Crabs in Palau".

CMI: Subject knowledge of the people shown by interested individuals and groups to do aquaculture in the Republic of the Marshall Islands even with challenges and constraints of logistics to deliver the interventions effectively.

COM-FSM: Invasive species are affecting the health of aquatic systems of FSM. The economic changes are creating pressure to diversify income sources to include aquaculture activities. Pearls and pearl-related value-added products (e.g. half-pearl or Mabe) are getting more attentions among local and international stakeholders, which need to establish a uniform product branding i.e. the Micronesian Brand Pearls. Quality standard and control for export development are one of the issues to be discussed before local farming and manufacturing enterprises take off. COM/COM-FSM pearl project's researchers and extension staff shifted their focus on business-related product's quality improvement, developing marketing and sales methodologies for a Micronesian brand and cost-effective farming methodologies for a sustainable industry development in the Micronesian region. As the technologies gained by the project staffs and local youths in Pohnpei, a wider collaboration on pearl aquaculture research, extension and training became possible. In the case of the sea cucumber, the worldwide resource of the sandfish (*H. scabra*), one of the most highly valued species, has been depleted to the point of fishing bans or strict fishery regulations. The project's preliminary broodstock survey indicated surprisingly higher density (5 - 20 animals per diver per hour) in the vicinity of Nett Point hatchery in the northeast Pohnpei lagoon and Madolenhwm in the southeast, contradicting past surveys in 1996-98 and 2005, which reported zero or near extinct. This suggested a need to revise survey methodologies of the past published by others in FSM and overseas. The sandfish hatchery techniques are relatively easy to learn compared to pearl oyster and continuous hands-on training could build a world-leading technical foundation by the project's core technicians. The sea cucumber aquaculture project has a potential to re-vitalize local and regional small income businesses and poverty alleviations among island communities.

IV (I): Planned Program (Outcome)

1. External factors which affected outcomes. (Check all that apply)

_x__ Natural Disasters (drought, weather extremes, etc.)
__x_ Economy
_x__ Appropriation changes
___ Public Policy changes
___ Government regulations
_x_ Competing Public priorities
_x_ Competing Programmatic Challenges
___ Population changes (immigration, new cultural groupings, etc.)
___ Other

Brief explanation of external factors which affected the outcomes. (Opportunity to discuss Unmet Goals). (3200 characters).

PCC: There is a need for the establishment of a multi-species hatchery in order to cater to the future fingerling requirements of the fish farmers. Conflicts on the use of facilities have slowed the progress of the work.

CMI: The main challenge to the program was the logistical problem in getting to the outer islands to set up new pearl farms for the community and extend outreach to the community on opportunities in Aquaculture. The high fuel prices and the state of the economy were also a problem.

COM-FSM: Over-expectations about end-products at retail outlet overseas always lure local people and small business without going through appropriate aquaculture skill training, business planning and marketing/sale development, which should be based on practical and successful methodologies. However, such skill training programs has been usually tended to focus on the management training of fisheries/economic officers (a top-down method). National, states and local governments needed to place much more effort on involving financially and educationally disadvantaged local folks and island communities to create high skilled human resources (a bottom-up method) that could be a vehicle of a sustainable economic development in Micronesia.

IV (A): Planned Program (Knowledge Area)?
Name of Planned Program: Small Island Agricultural Systems

1. Enter the program Knowledge Areas (up to 20) and a percentage for each (total of each column must equal either 100% or 0%).

KA Code	Knowledge Area	%1862 Extension	%1862 Research
102	Soil, Plant, Water, Nutrient Relationships	5	5
111	Conservation and Efficient Use of Water	5	5
112	Watershed Protection and Management	5	5
123	Management and Sustainability of Forest Resources	10	5
125	Agroforestry	5	5
133	Pollution Prevention and Mitigation	5	5
136	Conservation of Biological Diversity	5	10

202	Plant Genetic Resources	5	10
204	Plant Product Quality and Utility (Preharvest)	5	5
205	Plant Management Systems	10	10
212	Pathogens and Nematodes Affecting Plants	5	10
216	Integrated Pest Management Systems	20	10
315	Animal Welfare/Well-Being and Protection	5	5
601	Economics of Agricultural Production and Farm Management	10	10
	Total	100	100

IV (B). Planned Program Inputs

1. Enter the actual amount of professional FTEs/SYs expended for this Planned Program.

	Extension		Research	
	1862	1890	1862	1890
Plan	19.8		7.0	
2008	19.09		11.91	

2. Enter Actual dollars Expended in this Planned Program during FY 2008 (includes Carryover Funds from previous years). The values must be whole number i.e. no commas or decimals are allowed.

	Extension		Research	
	Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
2008	$ 39448	0	$ 77177	0

	1862 Matching	1890 Matching	1862 Matching	1890 Matching
2008	0	0	0	0

	1862 All Other	1890 All Other	1862 All Other	1890 All Other
2008	0	0	0	$ 26664 - WSARE

IV. (C): Planned Program (Activity and Participation)

1. **Brief description of Activity (What was done?): (3200 characters)**

PCC: The root crops germplasm collection was maintained and propagated through tissue culture technique and field plantings to ensure a steady supply of planting materials. There were 6,475 tissue-cultured taro plantlets given to 223 farmers. Eleven taro hybrids received from SPC were evaluated for morphological characters, yield, incidence of pests and diseases and sensory evaluation. Three banana research and demonstration farms were maintained by fertilization, weeding, removal of diseased leaves and flower bunches. The treatment applied with fertilizer every two months consistently showed the best growth and yield compared to other treatments. *Marasmielus* disease of banana in the demonstration farms was alleviated through removal of diseased bracts and fertilizer application. The biological control agents for melon aphid, taro leafhopper and spider mites were cultured in the screen house

and released on taro and cassava farms. Micropropagation of scab-resistant sweet potato varieties was started. A new research project on the biological control of the Siam Weed in Palau using *Pareuchaetes pseudoinsulata*,was approved. The larvae of this insect feed on the leaves of the weed. Fruit trees were planted in the sloping areas to make available fresh fruits and prevent soil erosion. Rainwater Catchments Maintenance workshops and water quality education campaign were conducted. Several students, parents and government officials visited the Dry Litter Waste Management System demonstration site. Youth and adults visited the farm at the Research and Development Station and exhibit booths set up during special events.

CMI: Three Hatch projects were approved and implemented. The agriculture extension program continued working on promoting container gardening with around 100 clients in the urban villages where space was a limiting factor with the technical support of ROC Taiwan Technical Mission. The container gardening concept was presented during several community events and announced on the prepared weekly radio programs. Bi-weekly visits to clients were made to assess crop growth. Out of the one hundred rainwater catchments that were tested for bacterial coliforms, 75% tested positive. The extension agent met with the owners and provided them with solutions on how to treat their water and to clean the area surrounding the catchments. Follow up results indicated that 90% of the water catchments tested negative for coliforms. A water quality fact sheet was produced, published and distributed to clients.

COM-FSM: Production and consumption of local produce were emphasized during workshops and awareness programs. Training modules were prepared for crop and livestock production. Basic techniques and knowledge on conventional farming including rows and raised-bed, backyard and container gardening, were key training components. Low input hydroponics system continued to be promoted in one of the four states in the FSM. Clients were provided with selective planting materials to start individual and community garden demonstrations. Some training activities were conducted in collaboration with the Secretariat of the Pacific Community. Extension agents visited and provided technical assistance and assisted to set up mini nurseries in the communities.

Multiplication of staple food crops through micropropagation and in vitro germplasm conservation continued to produce healthy and disease-free plant materials; assessment of in vivo and in vitro grafting for rapid production of elite grafted lime seedlings; and multiplication and distribution of banana, taro, sweet potato and noni are ongoing research focused on improving micropropagation protocols and nursery techniques for mass-multiplication of different varieties of banana, taro, citrus, kava and sweet potato. High efficiency protocols have been developed for rapid multiplication of different varieties of banana, sweet potato and taro. Initial grafting experiments on citrus are encouraging and showing positive results. Research work has also been initiated on kava multiplication and seedlings have been produced. During visits, technical assistance and support were provided to farmers on new and innovative farming techniques and practices.

Black pepper, citrus, and banana are cash crops being promoted with farmers and market outlets. Noni (*Morinda citrifolia*) is now being promoted as an alternative crop. Vitamin A sweet

potato and Colocasia taro planting materials were made available as rapid recovery food for atoll gardens besides the swamp taro (*cyrtosperma*).

2. Brief description of the target audience. (3200 characters)

PCC: Target audience included farmers growing root crops in Palau who were provided with planting materials and biological control agents to control pests of taro and cassava. Several elementary, high schools, college students, parents, teachers, government officials and the general public often come to the PCC R & D Station and viewed our exhibits during various civic and special events. They learned the current research activities and technologies such as tissue culture for mass propagation and in vitro conservation, biological control of pests, dry litter waste management, and water quality.

CMI: Community members such as traditional leaders, Mayors and local councils, church leaders, farmers, housewives, home owners, women's groups, retirees, youths, elementary, high school and college students, government and private employees.

COM-FSM: The majority of FSM citizens depend on local production for consumption and for traditional or cultural activities. Direct contact was maintained with the commercial farmers (bananas, vegetables, noni, root crops and citrus) as well as the subsistence sector. Individual farmer visits were the main link, however, adult group training, youth group activities and faith based and gender based training meetings were also used.

IV (D): Planned Program (Outputs).

1. Enter the actual number of persons (contacts) to be reached through direct and indirect methods. (Standard Extension Output).

Direct Contacts Adults Indirect Contacts Adults Direct Contacts Youth Indirect Contact Youth

Year	Target	Target	Target	Target
Plan	600	3000	300	600
2008	1205	1744	680	1406

2. Number of patents (Standard Research Output).
Patents Received

Year	Target
Plan	0
2008	0

If patents received, please list them here.

3. Publications (Standard General Output Measure).
Number of Peer Reviewed Publications.

	Extension	Research	Total
2008	1	1	0
Actual		1	1

IV (E): State Defined Output Measure

1. Output Target
Expected Professional Journal Publications.

Year	Target	Actual
2008	0	0

1. Output Target
Expected Gray Literatures.

Year	Target	Actual
2008	0	1

1. Output Target
Expected publications for lay use.

Year	Target	Actual
2008	0	0

1. Output Target
Conference presentations.

Year	Target	Actual
2008	0	6

1. Output Target
Conference publication.

Year	Target	Actual
2008	0	6

1. Output Target
Number of publications for lay use.

Year	Target	Actual
2008	0	2

1. Output Target
Number of conference paper publication/presentations.

Year	Target	Actual
2008	0	4

1. Output Target
Number of demonstration farms established.

Year	Target	Actual
2008	0	74

IV (F): State Defined Outcome Measures

3. **Outcome Target - Number of persons with increased knowledge on appropriate production technologies.**
4. **Outcome Type**
   _x_ Change in Knowledge Outcome Measure
   ___ Change in Action Outcome Measure
   ___ Change in Condition Outcome Measure

Enter by Quantitative and/or Qualitative Method Below as appropriate.

Quantitative Outcome

Year	Quantitative Target (If appropriate)	Actual
2008	2400	2197

Qualitative Outcome or Impact Statement

Issue (Who cares and Why?): (500 Char Max)

PCC: People in Palau need to be aware of the current technologies in improving crop production and managing pests using biological control techniques and other best management practices to make their agricultural products available to consumers year round and added income for farmers. Individuals interested to go into piggery farming need to be aware of the dry litter waste management system for water conservation and preventing waste contamination of the environment.

CMI: Within a short period of time, the cost of fuel, utilities, and imported food such as rice, flour, sugar had escalated tremendously [cost of rice has gone up by three times; cost of fuel has doubled. The RMI government declared a State of Emergency in the nation.

COM-FSM: Plant-parasitic nematodes are a problem to sustainable crop production. Knowledge about these plant pathogens will help farmers to take appropriate control measures to increase crop productivity. Potential of cash crops such as noni and its chemical properties has not received much attention. Exploration of potent varieties for commercial production will provide alternative sources of economic growth while opening doors for private sector development.

What has been done: (500 Char Max)

PCC: Posters, exhibits, brochures, publications, and presentations for successful agricultural production were displayed during special events. Clients visiting the R&D Station were informed of root crops germplasm conservation activities, use of tissue culture technique for the mass propagation of taro and banana, biological control of pests of crops, and dry litter waste management. Water quality education campaigns were conducted on cleaning and decontaminating water catchment systems. Also, a model dry litter waste management system was done at the R&D station.

CMI: Staff conducted outreach activities such as gardening, cooking demonstrations, installing solar water distillation units, bleaching drinking water, and provided trainings and information on making local handicrafts and income generating projects in aquaculture to the local communities.

COM-FSM: Field survey gave additional information about plant-parasitic nematodes. Soil solarization experiment showed up to 35 percent reduction in the number of eggs and juveniles in the soil. Vegetative noni cuttings were established in nursery settings and their morphological characters were compared with that of plants from natural population. Women farmers help the project director to identify swamp taro cultivars. Collection of local and imported germplasm of banana, sweet potato, taro and citrus has been done.

Results: (1000 Char Max)

PCC: In Palau, farmers are now aware of and understand the current crop protection and agronomic practices to ensure good yields of crops. Students in the Water Quality education campaign know water quality maintenance and decontamination procedures. Thus, people are now drinking safe water in their homes. Piggery farmers showed interest in adopting the Dry Litter Waste Management System.

CMI: Local participants were introduced and demonstrated hands on simple and workable skills that they can adopt to improve their quality of lives. They learned how to conserve and preserve traditionally grown and prepared food to minimize the shock of high cost of imported food.

COM-FSM: Field survey revealed additional information about plant-parasitic nematodes affecting vegetable crops and helped to evaluate the intensity of infestation in swamp taro cultivars. Soil solarization experiment showed up to 35 percent reduction in the number of eggs and juveniles of root-knot nematodes in the soil. Analyzed data provided significant differences in the morphological characteristics of noni varieties. Island-wide surveys provided key information about existing noni resources in Yap and helped to formulate required business plan for noni products. Monthly information bulletins created more interest in noni among island community.

High efficiency protocols and nursery techniques have been developed for mass-multiplication of different varieties of banana, taro and sweet potato.

3. Associate KAs from the Planned Program. (Check all that apply).

	KA Code	Knowledge Area
x	102	Soil, Plant, Water, Nutrient Relationship
x	111	Conservation and Efficient Use of Water
	112	Watershed Protection and Management
x	133	Pollution Prevention and Mitigation
x	136	Conservation of Biological Diversity
x	202	Plant Genetic Resources
x	204	Plant Product Quality and Utility (Preharvest)
x	205	Plant Management Systems
x	212	Pathogens and Nematodes Affecting Plants
x	216	Integrated Pest Management Systems
x	315	Animal Welfare/Well-Being and Protection
x	601	Economics of Agricultural Production and Farm Management

IV (G): State Defined Outcome Measures

3. **Outcome Target - Number of program participants adopting recommended practices.**
4. **Outcome Type**
   - **___ Change in Knowledge Outcome Measure**
   - **_x_ Change in Action Outcome Measure**
   - **___ Change in Condition Outcome Measure**

Enter by Quantitative and/or Qualitative Method Below as appropriate.
Quantitative Outcome

Year	Quantitative Target (If appropriate)	Actual
2008	10	414

Qualitative Outcome or Impact Statement

Issue (Who cares and Why?): (500 Char Max)

PCC: Adequate food production is hampered by lack of planting materials and by depredation from pests. Prevention of contamination of water sources is important to conserve the environment of Palau and promote the family and community health.

CMI: The RMI Government has declared a state of emergency due to the high fuel cost. The community's health and food security were affected due to high prices.

FSM: Farmers who require availability of disease-free and elite seedlings, through mass multiplication and distribution of banana, taro, sweet potato, noni and kava seedlings.

What has been done: (500 Char Max)
PCC: More than 8,000 planting materials were given to farmers and biological control agents were released in infested farms have greatly enhanced food supply and production capacity in Palau. Ways to test and decontaminate rainwater catchments are now available. The Dry Litter Waste Management has also served as a model for piggery farmers to promote water conservation and prevent pollution

CMI: Staff conducted numerous workshops, demonstrations, and teachings to clients on gardening, composting, planting and farming and safe drinking water practices.

COM-FSM: More than 6,400 elite seedlings of different varieties of banana, taro, kava and sweet potato were produced through micropropagation and nursery management system. A total of 2,338 seedlings of different varieties of banana, taro and sweet potato were distributed to 86 interested farmers. Distribution of new and imported banana and sweet potato varieties multiplied through tissue culture has also been started.

Results: (1000 Char Max)

PCC: More farmers are growing root crops and with appropriate pest control measures, food security in Palau is assured. The public can prevent environmental pollution and contamination of water sources thus assuring them of safe drinking water.

CMI: Forty clients out of the100 who got started in the container gardening concept, continued harvesting and reseeding. Six new farmers have started farming. Sixty out of the 100 homeowners adopted the water sanitary and safe drinking measures.

FSM: Adults and youths were directly impacted on agriculture production and new technologies. Seventy-one of those participated were demonstrating follow-up activities in agricultural production. They were doing vegetable crop, traditional crops, or a combination of

both. A total of 2,338 seedlings of different varieties of banana, taro and sweet potato were distributed to 86 interested farmers. Distribution of new and imported banana and sweet potato varieties, multiplied through tissue culture has also been started.

3. Associate KAs from the Planned Program. (Check all that apply).

	KA Code	Knowledge Area
x	102	Soil, Plant, Water, Nutrient Relationship
x	111	Conservation and Efficient Use of Water
x	112	Watershed Protection and Management
x	133	Pollution Prevention and Mitigation
	136	Conservation of Biological Diversity
x	202	Plant Genetic Resources
x	204	Plant Product Quality and Utility (Preharvest)
x	205	Plant Management Systems
x	212	Pathogens and Nematodes Affecting Plants
x	216	Integrated Pest Management Systems
	315	Animal Welfare/Well-Being and Protection
	601	Economics of Agricultural Production and Farm Management

IV (H): State Defined Outcome Measures

4. **Outcome Target - Number of established farms and farm related businesses by individuals and cooperatives.**
5. **Outcome Type**
   - **___ Change in Knowledge Outcome Measure**
   - **___ Change in Action Outcome Measure**
   - **_x_ Change in Condition Outcome Measure**

Enter by Quantitative and/or Qualitative Method Below as appropriate.

Quantitative Outcome

Year	Quantitative Target (If appropriate)	Actual
2008	0	390

Qualitative Outcome or Impact Statement

Issue (Who cares and Why?): (500 Char Max)

PCC: Farmers are reluctant to adopt crop production technologies and practices to prevent environmental pollution and conserving water resources unless they see how it is done and the outcome. The need to see to believe the effectiveness of the technologies is accomplished by involving farmers in the implementation of the projects.

CMI: Locals were encouraged to grow their own food as a result of high cost of imported foods that was threatening the food security and health in the community.

COM-FSM: Household food intake is considerably subsistence - living off the land and the surrounding waters. Westernization has brought in the other 50% that is growing large day by day. Western expertise has established that not all imported foods are superior, though they

are convenient to prepare and consume. The consumers need to be educated about imported foods as well as the first 50% coming off the land. The FSM President officially recognized the need to GO LOCAL. To reduce the dependency on imported food, targeted number of youths and adults from farmers and home-gardener communities will start their own home-gardens and/or develop their land into agriculture farms and will start crop production.

What has been done: (500 Char Max)

PCC: Taro and banana demonstration farms were established showcasing the use of tissue cultured planting materials, proper fertilization, and cultural management practices for successful crop production. The Dry Litter Pilot Project at the R&D Station and in a private farm has received good comments and positive impact to other farmers who intend to adopt the technology.

CMI: Promotion of agriculture is done through traditional gardening practices and container gardening concept to clients in the community.

COM-FSM: 2,338 seedlings of different varieties of banana, taro and sweet potato were distributed to 86 interested farmers.

Results: (1000 Char Max)

PCC: In those farms, farmers now use tissue cultured planting materials, proper fertilization and cultural management practices resulting in increased production of taro and banana, thereby ensuring increased income. More visitors are interested to observe and adopt the practices showcased in the demonstration farms.

CMI: As a result of follow up visits with clients/farmers/homeowners, 40 clients are continuing the container gardening concept, 126 farmers are continuing traditional gardening and selling their produce to the local stores and market and 200 homeowners have adopted the water sanitary and safe drinking measures.

COM-FSM: Ten youths and adults have started establishing their farms and are cultivating different varieties of banana, soft taro and sweet potato. All the banana plants are showing healthy growth at the banana evaluation and demonstration plots and are being maintained regularly.

3. Associate KAs from the Planned Program. (Check all that apply).

	KA Code	Knowledge Area
x	102	Soil, Plant, Water, Nutrient Relationship
x	111	Conservation and Efficient Use of Water
	112	Watershed Protection and Management
x	133	Pollution Prevention and Mitigation
	136	Conservation of Biological Diversity
x	202	Plant Genetic Resources
	204	Plant Product Quality and Utility (Preharvest)
x	205	Plant Management Systems
x	212	Pathogens and Nematodes Affecting Plants
x	216	Integrated Pest Management Systems

	315	**Animal Welfare/Well-Being and Protection**
x	**601**	**Economics of Agricultural Production and Farm Management**

IV (I): Planned Program (Evaluation)

1. **Evaluation studies Completed. (Check all that apply)**

___ After Only (post program)
___ Retrospective (post program)
_x_ Before-After (before and after program)
_x_ During (during program)
___ Time series (multiple points before and after program)
__x_ Case study
__x_ Comparisons between program participants (individual, group, organization) & non-participants
___ Comparison between different groups of individuals or program participants experiencing different levels of program intensity;
___ Comparison between locales where the program operates and sites without program intervention;
_ __ Other(s) _____

What are your Evaluation Results? (3200 characters)

PCC: Farmers have been consistently requesting for tissue-cultured taro planting materials that they have found to be an essential component to increase taro production in their farms. In addition, biological control agents have effectively controlled pests of taro and cassava. An adequate fertilization scheme is also an essential component to ensure successful banana production. Dry litter is an effective system for the water conservation and prevention of piggery waste contamination of water sources and environment.

CMI: Clients were evaluated by before after and during for agriculture practices by observing how many clients actively took care and harvested vegetable and continued with replanting. Pre and Posttests were used to evaluate the water catchment homeowners to find out whether they adopted the safe drinking and water sanitary measures.

COM-FSM: Results of the survey periodically compared with similar survey results available from other Pacific Islands. Comparative evaluation helped to identify information about common plant parasitic nematodes. The extension activities have improved knowledge, created awareness and developed skills of participants in sustainable agriculture systems. The project activities have made extension agents capable of organizing trainings, teaching farmers and providing technical assistance, and apply gained knowledge and skills in the field. Ultimately the project has developed positive attitudes, zeal for learning techniques and farming aspects, and has changed the behavior of the participants.

Key Items of the Evaluation(s) for CSREES Attention. (3200 characters)

PCC: The tissue culture technique has been successful in providing continuous availability of taro planting materials to farmer clients all year round. In vitro conservation of taro germplasm has ensured its availability to the future generation. Biological control agents have been

successful in controlling pests of root crops and invasive weeds in Palau. The Dry Litter Waste Management System is effective in water conservation and preventing animal waste and contaminants from polluting water resources and environment and providing a good source of compost for food production.

CMI: Homeowners on Majuro have adopted farming and container gardening practices. The observance of lots of locally grown produce available in stores and markets are testimonial to this fact. From clients' feedbacks, we negotiated to get more seedlings from our collaborators [ROC Taiwan Technical Mission and local Department of Agriculture] in a reliable and timely manner to provide to current and new clients. Due to the efforts of the water quality extension program, more homeowners were interested in getting their water catchments tested for bacterial coliforms.

COM-FSM: Nematodes can be controlled through management practices. There are differences in noni variety efficacy. High efficiency protocols have been developed for rapid multiplication of different varieties of banana, sweet potato and taro. Initial grafting experiments on citrus are encouraging and showing positive results. The extension activities have improved knowledge, created awareness and developed skills of the participants in sustainable agriculture systems.

IV (J): Planned Program (Outcome)

1. External factors which affected outcomes. (Check all that apply)

__x_ Natural Disasters (drought, weather extremes, etc.)
__x_ Economy
___ Appropriation changes
__x_ Public Policy changes
__x_ Government regulations
_x_ Competing Public priorities
_x_ Competing Programmatic Challenges
___ Population changes (immigration, new cultural groupings, etc.)
__x_ Other

Brief explanation of external factors which affected the outcomes. (Opportunity to discuss Unmet Goals). (3200 characters).

PCC: Secretariat of Pacific Community (SPC) was still unable to provide the biological control agent for Mikania because of difficulty of mass producing them, hence causing a delay in the implementation of the project.

CMI: Due to constraint in logistics [unreliable airlines and shipping services to outer islands] we could not sustain our program evaluation/follow up with our clients in the outer islands. Unpredictable global economy, price increases and natural disasters hindered with the effective implementation, delivery and evaluation of some of the program activities.

COM-FSM: Frequent rain, at times, hindered field survey. Progress of the work is slow owing to lack of additional funding. Two research assistants are needed to carry out field surveys effectively. Land tenure and ownership disputes affect secure access to available properties and islands are dispersed over 1.5 million sq. miles of ocean.

IV (A): Planned Program (Knowledge Area)?
Name of Planned Program: Families, Youths & Communities

1. Enter the program Knowledge Areas (up to 20) and a percentage for each (total of each column must equal either 100% or 0%).

	KA Code	Knowledge Area	%1862 Extension	%1862 Research
	608	Community Resource Planning & Development	10	0
	801	Individual and Family Resource Management	10	0
	802	Human Development and Family Well-being	10	0
	804	Human Environmental Issues Concerning Apparel, Textiles, and Residential and Commercial Structures	10	0
	806	Youth Development	60	0
		Total	100	0

IV (B). Planned Program Inputs

1. Enter the actual amount of professional FTEs/SYs expended for this Planned Program.

	Extension		Research	
	1862	1890	1862	1890
Plan	12.4		0.0	
2008	18.0		0	

2. Enter Actual dollars Expended in this Planned Program during FY 2007 (includes Carryover Funds from previous years). The values must be whole number i.e. no commas or decimals are allowed.

	Extension		Research	
	Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
2008	$ 26298	0	0	0

	1862 Matching	1890 Matching	1862 Matching	1890 Matching
2008	0	0	0	0

	1862 All Other	1890 All Other	1862 All Other	1890 All Other
2008	0	0	0	0

IV. (C): Planned Program (Activity and Participation)

1. **Brief description of Activity (What was done?): (3200 characters)**

PCC: About 175 students from public and private schools participated in the Environmental and Marine science programs this year. They acquired awareness and knowledge from field trips, hands on activities, class presentations and after school programs. Brochures, posters and demonstration models were provided to students to read, examine, and view to get the feel for science and acquire information that they did not know. About 40 students participated

in a marine debris clean up in four underserved states. This was another way of involving young people in environmental and marine protection and conservation activities.

CMI: The 4-H Extension Agent conducted training workshops on traditional and basic life skills on two atoll communities and a total of 60 youths participated. Basic computer skills were offered as part of these training programs. Evaluations were done for each of the workshops, which showed that 80% of the participants projected a more positive attitude and actually enjoyed learning the skills they were taught. The Extension Agent also held after school activities with three local elementary schools and 60 Upward Bound students and taught them nutrition education. In addition, nineteen members of the Majuro Middle School 4-H club participated in the "Youth to Youth in Health Leadership and Life Skills Training Seminar".

COM-FSM: 4-H and youth development programs has expanded to include gardening at the elementary schools and youth clubs, community beautification, sports and physical exercise, and arts and craft. Handicraft and sewing projects were undertaken. Counseling and skill training was provided to children and parents in the program. Student recruitment and career day resulted in one new Certificate Level program being offered at one state campus.

1. **Brief description of the target audience. (3200 characters)**

PCC: Target audience included all students in all grade levels from public and private schools.

CMI: Target audience included elementary and high school students, teachers, principals, at-risk youth, parents, church youth groups, 4-H clubs, NGOs, National Youth Council, traditional and church leaders.

COM-FSM: The participants include youth and adults between age of 9 and 35. Young mothers, single mothers, farmers producing food for the family, and students to learn skills and apply knowledge. The youth program involved students and their parents. The participants to the sewing and handicraft classes were all women/homemakers and youths from the different regions and municipalities. The youth participants to 4-H projects and water quality were also from the different regions in Chuuk State.

IV (D): Planned Program (Outputs).

1. Enter the actual number of persons (contacts) to be reached through direct and indirect methods. (Standard Extension Output).

Direct Contacts Adults Indirect Contacts Adults Direct Contacts Youth Indirect Contact Youth

Year	Target	Target	Target	Target
Plan	900	2700	1200	3600
2008	1371	2745	3574	3200

2. Number of patents (Standard Research Output).

Patents Received

Year	Target
Plan	0

2008	

If patents received, please list them here.

3. Publications (Standard General Output Measure).
Number of Peer Reviewed Publications.

	Extension	Research	Total
2008			

IV (E): State Defined Output Measure

1. Output Target
Number of training conducted targeting youths.

Year	Target	Actual
2008	**12**	**48**

1. Output Target
Number of training conducted targeting families and youths in the communities.

Year	Target	Actual
2008	**6**	**38**

1. Output Target
Total number of youth clubs organized.

Year	Target	Actual
2008	**3**	**8**

IV (F): State Defined Outcome Measures

5. **Outcome Target - Number of youth with increased awareness and understanding of roles and relationship with parents.**
6. **Outcome Type**
   _x_ Change in Knowledge Outcome Measure
   ___ Change in Action Outcome Measure
   ___ Change in Condition Outcome Measure

Enter by Quantitative and/or Qualitative Method Below as appropriate.

Quantitative Outcome

Year	Quantitative Target (If appropriate)	Actual
2008	**900**	**1371+3574**

Qualitative Outcome or Impact Statement

Issue (Who cares and Why?): (500 Char Max)
PCC: Students are not aware of the exciting and important aspects of science thus having a negative impression of the subject. These issues have an impact on students' interest toward science.

CMI: Statistics have shown that the teen pregnancy, suicide rate and high unemployment among youth are still problems for the nation and communities. High cost living in has forced

the government to prioritize programs to address these youth issues. These programs will increase the participant's awareness and knowledge.

COM-FSM: Food processing helps food security while selling quality products generates income for families. Parents, teachers, and local leaderships in the communities are concerned with cultural disintegration and youth problems. All natural resources agencies need qualified replacement staff. Employment is very limited in FSM so any income generated by entrepreneurs in the communities is important. The number of youth with awareness and understanding of roles and relationship with parents will be increased. An increased number of youth will select Agriculture and Natural Sciences as their major at the local college. Food production and food security is declining and families are relying more on imported food products.

What has been done: (500 Char Max)

PCC: Environmental and marine science programs were conducted in the schools to promote and motivate the students to like science and view it as fun and interesting subjects. Field trips, activities, and community clean up were held for students to acquire skills.

CMI: Youth and students were trained to be responsible in helping out their parents and other family members. They were prepared on life skills and income generating activities.

COM-FSM: Twenty food processing sessions were conducted and four community-fair were held during the year. Program participants took part in displaying locally produced jams and demonstrated fruit punch drink to more than 300 community people. Counseling and skill trainings were provided to both kids and parents that were actively participating in the program during the year. The 4-H program guided more sport and physical fitness programs. The program has impacted a total of 13 elementary schools and 397 students. There are 50 active gardening 4H'ers. Youth clubs provide ample opportunity for leadership development, volunteer development and the actual hands-on process of a project cycle: project planning, implementation, and project evaluation.

Results: (1000 Char Max)

PCC: Students are now more involved in science activities and clubs in their schools and community. They are now joining science essay and drawing contests. The program shows evidence that students who are continuing to college level are considering science as a field of study. Schools are also starting their after-school science programs at their site to motivate the students to like science.

CMI: Nineteen students completed a handicraft making session. Their products were showcased during the site visit of the 4-H National Program Leader from University of Guam. He was impressed with the final products.

COM-FSM: Eighty percent (80%) of the trained women were making jams for their families. Shelf life of the banana jam produced is more than one year. More than 50% of the program clienteles could make jam using different banana varieties, papaya and apples. Ninety percent of the total participants have gained knowledge from both the entrepreneur and skill trainings.

Fifty percent of participants learned new and improved food processing and preservation techniques, handicraft and sewing of clothing.

3. Associate KAs from the Planned Program. (Check all that apply).

	KA Code	Knowledge Area
x	608	Community Resource Planning & Development
x	801	Individual and Family Resource Management
x	802	Human Development and Family Well-being
x	804	Human Environmental Issues Concerning Apparel, Textiles, and Residential and Commercial Structures
x	806	Youth Development

IV (G): State Defined Outcome Measures

5. **Outcome Target - Number of families adopting interpersonal skills to improve quality of life and harmony in the family.**
6. **Outcome Type**
   ___ Change in Knowledge Outcome Measure
   __x_ Change in Action Outcome Measure
   ___ Change in Condition Outcome Measure

Enter by Quantitative and/or Qualitative Method Below as appropriate.
Quantitative Outcome

Year	Quantitative Target (If appropriate)	Actual
2008	**300**	**(PCC has no numbers)-506**

Qualitative Outcome or Impact Statement

Issue (Who cares and Why?): (500 Char Max)
PCC : Science is considered as a boring, complicated subject by many students.

CMI: Statistics showed that most of the unemployment burden is falling on youths. Programs were conducted to prepare the participants for job interviews to seek employment and/or to be self-employed. (This is part of what has been done)

COM-FSM: Eighty percent (80%) of the trained women were making jams for their families. Shelf life of the banana jam produced is more than one year. More than 50% of the program clienteles could make jam using different banana varieties, papaya and apples. Ninety percent of the total participants have gained knowledge from both the entrepreneur and skill trainings. Fifty percent of participants learned new and improved food processing and preservation techniques, handicraft and sewing of clothing. Number of students enrolled at COM-FSM agriculture certificate has increased as a result of extension role in the recruitment process. One student each was accepted at University of Guam and the University of Hawaii Hilo and four at the University of the South Pacific School of Agriculture. Homemakers have learned the skills as shown by the different projects that they were able to accomplish.

What has been done: (500 Char Max)

PCC: After-school and summer science programs were conducted to elementary and high school students to create interest and encourage them to go into science.

CMI: Nineteen students completed a handicraft making session. Trainings were conducted to teach participants on how to prepare for job interviews. A three-part curriculum on entrepreneurial was used during the trainings.

COM-FSM: The CES coordinated trainings to the CYFAR participants (ages 15-19) on backyard gardening. Trainings on entrepreneurship, business planning, marketing and advertising were conducted to the 14 participants. Water Quality youth projects were used to interest youth in the study of natural sciences. The 350 participating families were able to achieve cohesiveness and harmony through adoption of interpersonal reinforcements resulting in improved quality of life in the family, the peer groups and the community. One hundred and sixty-six homemakers have learned the skills in sewing and handicraft as shown by the different projects that they were able to accomplish i.e. boy's and girl's wear, men and women's wear necklaces, trays and wall décor. Food safety practices were promoted during food preservation to reduce contamination. Fourteen vegetable gardens developed by the participants & their families. In all mini-project activities, parents showed support, praise and enthusiasm for their participating children through attendance in sport competitions. Food safety gloves during food demonstration and any food handling activities.

Results: (1000 Char Max)

PCC: Students are now involved in community and marine clean up, tree planting, recycling practices and environmental essay and drawing contest. They are sharing the information to their siblings and parents.

CMI: The 19 students, both male and female, were proud to display the final products to their trainers and parents, after completing the handicraft making sessions. The sessions on entrepreneurial is still ongoing.

COM-FSM: Most program participants observed have adopted certain food safety practices during food processing, e.g. wearing gloves and using appropriate tools during community functions. Seventy-five per cent of the participating youth have shown an interest in the type of entrepreneurial activities they would like to pursue. A certificate course in agriculture was had started at the second of 4 campuses.

3. Associate KAs from the Planned Program. (Check all that apply).

	KA Code	Knowledge Area
x	608	Community Resource Planning & Development
x	801	Individual and Family Resource Management
x	802	Human Development and Family Well-being
x	804	Human Environmental Issues Concerning Apparel, Textiles, and Residential and Commercial Structures
x	806	Youth Development

IV (H): State Defined Outcome Measures

2. **Outcome Target - Total number of families and youths benefiting from the use of learned skills.**
3. **Outcome Type**
   - **___ Change in Knowledge Outcome Measure**
   - **___ Change in Action Outcome Measure**
   - **_x_ Change in Condition Outcome Measure**

Enter by Quantitative and/or Qualitative Method Below as appropriate.

Quantitative Outcome

Year	Quantitative Target (If appropriate)	Actual
2008	300	(PCC has not numbers) 370

Qualitative Outcome or Impact Statement

Issue (Who cares and Why?): (500 Char Max)

PCC: Palau needs more local science-oriented professionals to better manage the environment and inspire and encourage the younger generation to go into science.

CMI: Statistics showed that most of the unemployment burden is falling on youth. Programs were conducted to prepare the participants for job interviews to seek employment and/or to be self-employed. Inadequate parental support and supervision is having a profound negative impact on young people.

COM-FSM: There is a lack of interest in natural sciences. Most homemakers lack skills in sewing and handicraft making. The whole community cares because the new skills have potential for income generation to decrease dependency on relatives and friends. Individual family members improve life by increased self-sufficiency and food security or by added income for sale of produce or processed items. New students mean better-qualified applicants for open positions, and employed family members improve the total family lifestyle.

What has been done: (500 Char Max)

PCC: Many elementary and high school students participated in after-school and summer science programs. They had field trips and experiments in their classes to supplement their science lessons.

CMI: Trainings on basic life skills were conducted in the communities, elementary and high schools to teach participants on how to strengthen their relationships with parents and families and ways to improve their livelihoods.

COM-FSM: Participants in the food processing training were given Vitamin A rich banana varieties for planting on their farms and were guided toward sources of funding support and entrepreneurial training. Extension efforts supported youth groups studying natural sciences and recruitment into formal education program at all levels of the education system.

Results: (1000 Char Max)

PCC: Most students who have participated in the program have showed interest in working with environment and conservation agencies during the summer. Teachers and school administrators have incorporated *Water Education* in their curriculum. Students are assisting

in cleaning water catchments for safe drinking water. Some students are now pursuing higher education in the field of science.

CMI: Two hundred youth and students were taught on basic life skills. Evaluation has indicated that 80% of the participants have open communication with their parents and family members. The nineteen students who completed the handicraft making training have displayed their products to their parents and family members and were eager to learn more income generating skills.

COM-FSM: Number of students enrolled at COM-FSM agriculture certificate has increased as a result of extension role in the recruitment process. One student each was accepted at University of Guam and the University of Hawaii Hilo and four at the University of the South Pacific School of Agriculture. Homemakers have learned the skills as shown by the different projects that they were able to accomplish. All program participants have banana farms and received Vitamin A rich banana varieties during the training. Two ladies were participated in the crop competition during community fair and won the best award on Vitamin A rich banana. Other banana varieties were harvested more and were used for jam and other recipes.

3. Associate KAs from the Planned Program. (Check all that apply).

	KA Code	Knowledge Area
X	608	Community Resource Planning & Development
x	801	Individual and Family Resource Management
x	802	Human Development and Family Well-being
x	804	Human Environmental Issues Concerning Apparel, Textiles, and Residential and Commercial Structures
x	806	Youth Development

IV (I): Planned Program (Outcome)

1. External factors which affected outcomes. (Check all that apply)

_x_ Natural Disasters (drought, weather extremes, etc.)
__x_ Economy
_x_ Appropriation changes
___ Public Policy changes
___ Government regulations
__x_ Competing Public priorities
_x__ Competing Programmatic Challenges
__x_ Population changes (immigration, new cultural groupings, etc.)
___ Other

Brief explanation of external factors which affected the outcomes. (Opportunity to discuss Unmet Goals)

CMI: Due to constraint in logistics [unreliable airlines and shipping services to outer islands] we could not sustain our program evaluation/follow up with our clients in the outer islands. Unpredictable global economy, price increases and natural disasters hindered with the effective implementation, delivery and evaluation of some of the program activities. Due to

high tides and high cost of fuel and logistic, it was possible to conduct follow up visits with the youth from the neighboring islands.

COM-FSM: Weather, natural disasters and lack of funding are the primary external causes affecting outcomes. Prices of commodities and fuel have gone up tremendously. Family members have to meet student's obligation, social commitments, i.e. funerals, weddings etc. all affected attendance and the outcome of the projects.

IV (J): Planned Program (Evaluation)

2. Evaluation studies Completed. (Check all that apply)
__x_ After Only (post program)
_x__ Retrospective (post program)
_x_ Before-After (before and after program)
__x_ During (during program)
___ Time series (multiple points before and after program)
___ Case study
_x Comparisons between program participants (individual, group, organization) & non-participants
_x Comparison between different groups of individuals or program participants experiencing different levels of program intensity;
_x Comparison between locales where the program operates and sites without program intervention;
___ Other(s) _____

What are your Evaluation Results? (3200 characters)

PCC: More students are now aware of the various fields of science and some of them are continuing their college level education in science. Schools are starting their own after-school science programs to motivate the students into appreciating science. More youths are now involved in community clean up, tree planting, marine clean up and summer programs. More students are now involved with community clean up and more students got into science as their field of specialization.

CMI: Evaluations had indicated that the participants had expanded their knowledge and livelihood opportunities after completing the trainings provided by CRE. There is a need to expand the program to other participants both in the capital city and in the outer islands.

COM-FSM: A good percentage of participants successfully completed two sets of entrepreneur training conducted. Thirty percent of the participants have changed in behavior, attitude and participated in the community and Church activities. All the girls were able to complete the sewing course while the boys repair all the eight (8) broken weed eaters and 5 electrical sewing machines. All certificate level students either have continued on in agriculture in the second semester or have received scholarships to transfer to higher level programs.

Participants and families have gained knowledge and are slowly beginning to consider establishing individual businesses. A good number of the participants have developed knowledge and skills on handicraft making and sewing. 8 program participants have prepared and sold local jams.

Key Items of the Evaluation(s) for CSREES Attention. (3200 characters)

PCC : Some students appreciated science by going into college education with science as their field of study.

CMI: The population of RMI is very young with over 64% under the age of 24. The youth unemployment rate is estimated at 80%. There is a need to expand livelihood opportunities through targeted program and life-skills trainings.

COM-FSM: Program participants and families are eager for entrepreneurial opportunities for training or beginning businesses. Funding is often a restriction. Youth respond positively to encouragement and opportunity.

IV (A): Planned Program (Knowledge Area)?
Name of Planned Program: Food, Nutrition & Health

1. Enter the program Knowledge Areas (up to 20) and a percentage for each (total of each column must equal either 100% or 0%).

KA Code	Knowledge Area	%1862 Extension	%1862 Research
501	New and Improved Food Processing Technologies	15	25
502	New and Improved Food Products	15	25
701	Nutrient Composition of Food	10	10
702	Requirements and Function of Nutrient and Other Components	15	0
703	Nutrition Education and Behavior	10	10
711	Ensure Food Products Free of Harmful Chemicals, including, Residues from Agricultural and Other Source	10	10
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxin	10	10
724	Healthy Lifestyle	15	10
	Total	100	100

IV (B). Planned Program Inputs

1. Enter the actual amount of professional FTEs/SYs expended for this Planned Program.

Extension **Research**

	1862	1890	1862	1890
Plan	10.0		0.0	
2008	9.25		0.75	

2. Enter Actual dollars Expended in this Planned Program during FY 2007 (includes Carryover Funds from previous years). The values must be whole number i.e. no commas or decimals are allowed.

	Extension		Research	
	Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
2008	$ 26298	0	$ 51450	0

	1862 Matching	1890 Matching	1862 Matching	1890 Matching
2008	0	0	0	0

	1862 All Other	1890 All Other	1862 All Other	1890 All Other
2008	0	0	0	$ 12939 - EFNEP

IV. (C): Planned Program (Activity and Participation)

Brief description of Activity (What was done?): (3200 characters)

PCC:

Two research projects were implemented in this program, namely, (1) Processing of Rootcrops in the Republic of Palau, and (2) Product Development for Food Security in Palau. Product development utilizing root crops such as taro, cassava, and sweet potato as raw materials resulted in the development of 25 processed foods. Pilot scale processing of 9 products was conducted to serve as basis for product costing and feasibility studies. Fifteen new acquisitions of taro were subjected to sensory evaluation and results showed that 3 varieties were identified for propagation and distribution to the farmers. Product development utilizing banana, fish and coconut as raw materials resulted in the development of 21 food products. Two food technology classes were conducted with 46 participants. A total of 1,767 respondents composed of 1,245 adults and 522 youth have evaluated PCC-CRE food products during visits to the R & D Station and civic events. Three human nutrition and four food safety programs were conducted to increase knowledge in nutrition and health related issues and safe food handling.

CMI: A total of 365 adults and youths participants received Certificate of Completion after participating in a nutrition workshop. Both nutrition and 4-H extension agents participated in the World Food Day 2008 celebration by demonstrating to the audiences on how to prepare and to cook mackerel patties and banana (unripe) salad. The audiences enjoyed sampling the finished products. Thirty local recipes were collected from several homemakers to measure nutritional values in order to find out how nutritious they are for the body. During the college's spring break, the nutrition extension agent accompanied the female dorm students to their retreat at a neighboring isle, where she presented on nutrition and health related issues and conducted cooking demonstrations with them.

COM-FSM: Nutrition education activities were coordinated for adults and youth in partnership with other agencies and NGOs. Food production and physical fitness were stressed in nutrition education. Physical exercises are a necessary component of nutrition education and the food pyramid and food production through gardening is a needed part of her educational EFNEP activities to assist farmers put the recipe-required vegetables on the table. Non-communicable diseases have been escalating at an alarming rate. EFNEP lessons and cooking demonstrations focused on healthy food choices and the use of local foods. Food Safety trainings were undertaken at two levels. At the public and commercial institution level there was collaboration with Environmental Health and Sanitation, Deptartment. of Health Services. At the community level, food safety was incorporated into the EFNEP program and the food processing demonstrations. School Nutrition Enrichment Program and Child Find Survey: The rationale behind this project is to reach the household members thru the students in high school. The focus of the education is on prevention of NCD thru proper diet This is in collaboration of the Public Health, Early Childhood Education Program, Dept of Education and the Cooperative Research and Extension. Follow-up of clients thru anthropometric measurements and dietary counseling were conducted as requested by individuals or in collaboration with health clinics such as the Diabetes & Hypertension Awareness & Prevention Week, International Women's Day Celebration, World Food Day and similar state and national efforts.

1. **Brief description of the target audience. (3200 characters)**

PCC: The target audience for Food Technology classes were those working in food establishments such as food processors, hotel and restaurant managers, store owners, headstart chefs, cafeteria staff, teachers, and women entrepreneurs. The profile of the food evaluators are students, teachers, employees, parents, tourists, homemakers, farmers, civic groups, women groups, and the general public. Targeted audiences for nutrition classes included families with limited income, families with young children, and individuals with low formal education level, youth ages from 9-19 and home and school food handlers.

CMI: Target audience include housewives, young mothers, dropouts, youth, school aged students, Ministry of Health staff, NGOs, nutritionists, farmers, church leaders, traditional leaders, local businesses, bakeries and restaurant owners, local and national government leaders.

COM-FSM: The target audience included young breastfeeding, pregnant mothers, home-makers, males and females of all walks of life, and interest groups (NGOs, Women Group, Community Group, etc.) women/homemakers, women leaders, church leaders, high school students, school staffs, youths and the whole community, school teacher and parent groups, youth clubs and island/atoll populations, generally low income families relying on the ocean and the land to subsist and supplement their required food intake

IV (D): Planned Program (Outputs).

1. Enter the actual number of persons (contacts) to be reached through direct and indirect methods. (Standard Extension Output).

Direct Contacts Adults Indirect Contacts Adults Direct Contacts Youth Indirect Contact Youth

Year	Target	Target	Target	Target
Plan	600	3000	300	1500
2008	3028	4000	1603	1803

2. Number of patents (Standard Research Output).
Patents Received

Year	Target
Plan	0
2008	

If patents received, please list them here.

3. Publications (Standard General Output Measure).
Number of Peer Reviewed Publications.

	Extension	Research	Total
2008			

IV (E): State Defined Output Measure
1. Output Target
Number of community workshops conducted.

Year	Target	Actual
2008	12	29

1. Output Target
Number of coalitions strengthens.

Year	Target	Actual
2008	6	11

1. Output Target
Number of intervention conducted to individuals or small groups.

Year	Target	Actual
2008	134	423

IV (F): State Defined Outcome Measures

7. **Outcome Target - Number of program participants who increase awareness of nutrition related health issues.**
8. **Outcome Type**
   _x_ Change in Knowledge Outcome Measure
   ___ Change in Action Outcome Measure
   ___ Change in Condition Outcome Measure

Enter by Quantitative and/or Qualitative Method Below as appropriate.
Quantitative Outcome

Year	Quantitative Target (If appropriate)	Actual
2008	900	3511

Qualitative Outcome or Impact Statement

Issue (Who cares and Why?): (500 Char Max)
PCC: There is lack of food processing skills among farmers and women who have surplus raw materials like taro, cassava and sweet potato. Cardiovascular and non-communicable

diseases are increasing in Palau due to poor eating habits and lack of knowledge to make safe and healthy food choices.

CMI: Diabetes is a condition that has plagued generations of Marshallese. Furthermore, the trend of diabetes is affecting the younger population with a gradual increase of cases in the 20 – 35 years of age. The increase in the number of diabetic patients and people at risk for diabetes is mainly due to the changes in the lifestyles of the Marshallese population.

COM-FSM: Training topics included information on increasing non- communicable diseases as a direct result of poor diet and lack of exercise. Program participants become proactive in the education of others in the area of food, nutrition and health. They are taught preference of local foods over imported foods and the importance of physical work and exercises, participants shared the recipes learned during the training/workshops. In the breastfeeding, about 20% of clients started breastfeeding their babies. The College of Micronesia - FSM mandates to provide technical assistances to the communities as requested in order to improve health, status and the environment. Trainings provided improved skills, health, knowledge and better use of meager resources available to families. Women associations, health authorities, educators, political and church leaders are alarmed at the rapid increase in non-communicable diseases impacting immediate family, neighbors and island atolls. Many citizens are referred to Philippines and Hawaii for medical care. Morbidity and mortality from NCD leave many disabled and quality of life is severely affected. Micronutrient deficiency among the preschoolers was found to be high, affecting their growth and performance.

What has been done: (500 Char Max)

PCC: Food Technology classes were conducted to train participants to process food products from root crops thereby increasing awareness in food processing. Human nutrition programs were conducted to increase people's awareness and knowledge in health related issues.

CMI: Three hundred sixty-five clients participated and received certificate of completion after participating in nutrition workshops. The nutrition extension agent was an active member of several task forces organized by the Ministry of Health to address diabetes and to promote healthy living and wellness in the Marshall Islands.

COM-FSM: Extension staffs conducted training/workshops in the communities. Former students and program participants volunteered as trainers to educate the populace on the severity of the NCD problem and the role of diet and healthy lifestyle i.e. physical activities to prevent and contain the disease. Healthy food choices and lifestyles, local foods as well as foods and habits such as smoking, alcohol, coffee and substance abuse to avoid are emphasized.

Results: (1000 Char Max)

PCC: More people became interested to enroll in human nutrition programs because they became aware of their family's health. Forty-six participants of food technology classes learned how to prepare 50 food products from locally available materials. Taste testers of CRE food products became aware that processed foods from local materials could alleviate food security problems and add value to crops.

CMI: All 365 clients received their certificate of completion after completing the nutrition classes. Because of CMI-CRE involvement in the various nutrition task forces, it allows the nutrition extension agent to present her teachings to the participants of the various workshops sponsored by collaborators. New clients are recruited for soon to be held nutrition classes.

COM-FSM: About 20% of the clients started breastfeeding their babies after the attending traioning/workshops. Former nutrition education students are teachers and decision makers in the area of food, nutrition and health: the trained are the trainers. Pre and post test during the food safety training also showed significant improvement. Evaluation during the workshops showed the improved knowledge the participants have on different knowledge and skill areas. During the community follow-up, the interview showed that there was retention of knowledge learned during the trainings; however, there was no improvement on the body mass index of the participants weighed during the follow-up. People are more selective in the type of bananas, taro, they use for baking or use in the homes, yellow varieties is preferred over other varieties.

3. Associate KAs from the Planned Program. (Check all that apply).

	KA Code	Knowledge Area
X	**501**	New and Improved Food Processing Technologies
X	**502**	New and Improved Food Products
X	**701**	Nutrient Composition of Food
X	**702**	Requirements and Function of Nutrients and Other Food Components
X	**703**	Nutrition Education and Behavior
X	**711**	Ensure Food Products Free of Harmful Chemicals, including Residues from Agricultural and Other Sources
X	**712**	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxin
X	**724**	Healthy Lifestyle

IV (G): State Defined Outcome Measures

7. **Outcome Target - Number of program participants adopting recommended practices after completing educational programs.**
8. **Outcome Type**
   ___ Change in Knowledge Outcome Measure
   _x_ Change in Action Outcome Measure
   ___ Change in Condition Outcome Measure

Enter by Quantitative and/or Qualitative Method Below as appropriate.

Quantitative Outcome

Year	**Quantitative Target (If appropriate)**	**Actual**
2007	**600**	**990**

Qualitative Outcome or Impact Statement

Issue (Who cares and Why?): (500 Char Max)

PCC: There is a need for people to be trained on the basics of nutritional skills to prepare safe and healthy food choices. People are not aware that taro, cassava and sweet potato can be prepared into processed products aside from boiling and using traditional recipes.

CMI: Diabetes is a condition that has plagued generations of Marshallese. Furthermore, the trend of diabetes is affecting the younger population with a gradual increase of cases in the 20 – 35 years of age. The increase in the number of diabetic patients and people at risk for diabetes is mainly due to the changes in the lifestyles of the Marshallese population.

COM-FSM: Non-communicable diseases (NCD) are becoming a nationwide issue for individuals and families. This is directly related to of poor diet and lack of exercise. Many people are either overweight or are obese. Nutrition and health awareness continued in the communities and also at the household level, however, learned knowledge and skill do not necessary means adoption of practices. The mindset for most islands is to fix when broken and not preventive. Outcomes are fully realized when program participants actually adopt the learned skills and live them. Pre and post interviews and tests –EFNEP Entry and Exit data showed significant improvement in dietary habits and practices. Pre and post test during the food safety training also showed significant improvement. During the community follow-up, the interview showed that there was retention of knowledge learned during the trainings.

What has been done: (500 Char Max)
PCC: About 183 participants of Food Technology classes were provided with skills to process root crops. Participants planned meals, made healthy food choices, read food labels, and followed food safety practices.

CMI: Staff organized several EFNEP classes this year to 365 participants. Active member of several task forces organized by the Ministry of Health to address diabetes and to promote healthy living and wellness in the Marshall Islands.

COM-FSM: Program participants become decision makers to improve community training programs. The Child Find Survey - The staff with Health Services dietitian interviewed mothers on the 24 hrs food recall of each child and provided nutrition counseling during the two weeks of survey. Anthropometric measurements were done to determine body mass index for each participant. Nutrition lessons include the relationships between obesity, NCD and other debilitating illnesses were discussed.

Results: (1000 Char Max)
PCC: Participants who attended the training showed substantial improvement in preparing meals and following recommended food safety practices. Food technology participants were able to prepare processed local foods for the market and their families.

CMI: As a result of the nutrition workshops, some of the clients were observed at homes preparing healthy meals for themselves and their families. They also indicated that they have started exercising to keep themselves fit and healthy. More people are seen walking during the mornings and evenings. Local stores sell a variety of healthy food, imported and local produce. People are realizing that they need to start living healthy. Almost all community events usually sponsor a walkathon and receive a good number of participants.

COM-FSM: One observation showed only 25% of clients continued to practice recommended practices 6 months after participating in training program. Another observation indicated 50% of program participants learned food storage techniques and understand Vitamin A and important roles it plays in the body. They are selecting Vitamin A type bananas for baking or in the homes. Program families establish more vegetable gardens. The homemakers now understand the relationships between obesity and NCD and other debilitating illnesses i.e. gout. Participants have also become aware that abuse of alcohol, coffee, betel nut is bad for the health. Most have learned to appreciate the merits of local foods.

3. Associate KAs from the Planned Program. (Check all that apply).

	KA Code	Knowledge Area
X	501	New and Improved Food Processing Technologies
X	502	New and Improved Food Products
X	701	Nutrient Composition of Food
X	702	Requirements and Function of Nutrients and Other Food Components
X	703	Nutrition Education and Behavior
X	711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources
X	712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxin
X	724	Healthy Lifestyle

IV (H): State Defined Outcome Measures

4. **Outcome Target – Annually increase the number of healthy food snacks or lunch programs in schools and communities.**
5. **Outcome Type**
   ___ Change in Knowledge Outcome Measure
   ___ Change in Action Outcome Measure
   _x_ Change in Condition Outcome Measure

Enter by Quantitative and/or Qualitative Method Below as appropriate.

Quantitative Outcome

Year	Quantitative Target (If appropriate)	Actual
2007	6	33

Qualitative Outcome or Impact Statement

Issue (Who cares and Why?): (500 Char Max)

PCC: Utilization of marketable local processed food has not been practiced in Palau. Because of limited income, clients could not afford to include fruits, vegetables and other sources of essential nutrients to make healthy food choices.

CMI: Diabetes is a condition that has plagued generations of Marshallese. Furthermore, the trend of diabetes is affecting the younger population with a gradual increase of cases in the 20

– 35 years of age. The increase in the number of diabetic patients and people at risk for diabetes is mainly due to the changes in the lifestyles of the Marshallese population.

COM-FSM: With the availability of imported food, healthy snacks are not always available to many people for all family members. By policy, school lunches are not provided in schools except the early childhood program. Still, balanced meals should be prepared and served for all family members and the parents are always supplementing the ECE menus with local vegetables and local foods. There is no lunch program in schools. The Government together with educators called for the policy in our schools. Most people are relying on imported food with limited food dollar to provide healthy snacks for the family.

What has been done: (500 Char Max)
PCC: Participants of food technology classes enhanced their business with new products learned. Clients used locally-grown produce, substitutions, combination of food sources, and use of supplements to get needed nutrients.

CMI: CMICRE collaborated with the Ministry of Health Wellness Health Clinic staff to learn how to prepare some of their recipes that they teach to their diabetic patients and clients. All the recipes are vegetarian dishes and uses healthy ingredients.

COM-FSM: The extension program conducted lessons on food safety, food storage and food preparation. Clients also learn home gardening where they can eventually use the products when preparing family food with fresh vegetables. The staff provided nutrition counseling to mothers and caretakers on the importance of balanced diet and healthy snacks and to use local food for nutritive value and the cost. The parents are fully aware of their children health status.

Results: (1000 Char Max)
PCC: Clients are eating more locally-grown, nutritious and affordable foods and are less imported foods. The participants made taro and cassava flours for sale and formed a cooperative to sell taro and cassava doughnuts, and other processed products.

CMI: The EFNEP Extension Agent demonstrated some of these recipes during her classes. The CMICRE staff worked closely with the Wellness Clinic's clients to demonstrate to them the "Gardening in a Container" concept. Also they visited the clients to monitor the growth of their plants.

COM-FSM: 100% have learned food storage skills and 50% have actually applied new skills. Gardens are in place and program family members are working together in their gardens. Snacks are made available for children and other family members. Fresh products harvested from the family gardens were used when preparing snack for the family. More mothers are seen preparing locally produced crops as snacks for their children. More families are maintaining vegetable gardens and planting more Vitamin A banana plants around their houses and in the farms.

3. Associate KAs from the Planned Program. (Check all that apply).

	KA	Knowledge Area

	Code	
X	501	New and Improved Food Processing Technologies
X	502	New and Improved Food Products
X	701	Nutrient Composition of Food
X	702	Requirements and Function of Nutrients and Other Food Components
X	711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources
X	712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxin
X	724	Healthy Lifestyle

IV (I): Planned Program (Outcome)

1. External factors which affected outcomes. (Check all that apply)

__x_ Natural Disasters (drought, weather extremes, etc.)
__x_ Economy
__x_ Appropriation changes
__x_ Public Policy changes
_x_ Government regulations
_x_ Competing Public priorities
_x_ Competing Programmatic Challenges
__x_ Population changes (immigration, new cultural groupings, etc.)
_x_ Other, brain-drain

Brief explanation of external factors which affected the outcomes. (Opportunity to discuss Unmet Goals)

PCC: Entrepreneurs who would like to go into the food business right away are hampered by strict government regulations and expensive permits to obtain license to operate.

FSM: Natural disasters adversely affected programs. Public policies have been positive and supportive. Intra-State immigration of neighboring islanders affected nutrition education to the extent of competing with local funds for programs. Increased population shift public priorities. There is a lack of funding for equipments and supplies, for travel to the neighboring islands and program improvement/expansion.

IV (J). Planned Program (Evaluation)

1. Evaluation studies Completed. (Check all that apply)

_x_ After Only (post program)
___ Retrospective (post program)
_x_ Before-After (before and after program)
_x__ During (during program)
___ Time series (multiple points before and after program)
___ Case study
___ Comparisons between program participants (individual, group, organization) & non-participants
___ Comparison between different groups of individuals or program participants experiencing different levels of program intensity;

___ Comparison between locales where the program operates and sites without program intervention;
___ Other(s) _____

What are your Evaluation Results? (3200 characters)
PCC: Participants are now preparing meals using nutritious, affordable locally- grown food, and following recommended safe food handling practices. Some clients have gone into small-scale businesses in food processing.

CMI: Some of the ingredients needed to prepare these healthy dishes are expensive since they are mostly imported. This is one reason why when follow ups are conducted some of the clients' health did not improved because they couldn't afford to purchase these ingredients. During the classes, the participants lifestyle and behavior changed. Some participants mentioned that they don't like the vegetarian dishes although it is healthy. They wanted to learn how to prepare healthy recipes using meat products.

COM-FSM**:** More people are using the yellow bananas in their cooking and also as baby foods. More markets are selling these yellow bananas and more people are buying. The women are changing a lot in what they are doing. Food handlers are using technique like using 2 different cutting boards and separating meats from the rest of the food. These are food safety techniques learned from the program. The women and the youths also read carefully what they are buying in the stores to keep their families healthier than ever. They are reading the food thermometers to find out if the foods, especially the meat are cooked well. These women and youths are really paying better attention of what their families are eating.
Exit data during the year showed a significant improvement on food habits and practices i.e. an increase in the usage of vegetables and fruits. The participants have understood the concept of a balance diet which means that everyday, the meals should contain foods from the three groups. They have understood how saturated fats affect the circulatory system, how too much refined carbohydrates and sugars can damage the pancreas and the production of insulin, and how salt can raise the blood pressure. The participants have understood how inactivity together with bad food can cause obesity. Above all they have realized the superiority of local foods i.e. local starches. Community follow-up where anthropometric measurements were undertaken also showed retention of knowledge, although obesity remains a problem. Pre and post test during the food Safety Training also showed significant improvement in knowledge and skills. This was further proved during the practicum part of the training. All participants know what a food pyramid is, the role of vitamins, irons, fruits, dairy products, starch and the importance of food safety and food security. But like smoking, the daily choice is individualistic and hard to overcome. Homemakers fare better when they save time cooking rice rather than harvest, prep and cook local crops. Island wide is the preference for imported snacks to local fruit snacks.

Key Items of the Evaluation(s) for CSREES Attention. (3200 characters)
PCC: Some participants were able to prepare food for sale during fund raising and cater to customary traditions. Other clients went into business selling processed food products from root crops.

COM-FSM: Based on the food recall and food behavioral checklist, it shows increased in knowledge and better eating pattern on the collected data. Learned skills and acquired

knowledge are natural and automatic in nature. It's the behavioral outcome that slowly evolves to follow suit. What is needed is the constant education and positive message to continue to impact and increased awareness, skills and knowledge for participants and communities with regards to nutrition, health and management of meager resources available to them.

V. Expenditure Summary

1. Total Actual Formula dollars Allocated (prepopulated from C-REEMS) and Actual Total Formula, Matching and Other dollars Expended for FY 2007 (automatic addition from Planned Programs)

	Extension		Research	
Year:				
	Smith-Lever 3b & 3c	**1890 Extension**	**Hatch**	**Evans-Allen**
Allocated	**$959,051**	**0**	**$1,299,774**	**0**

2. Total Actual dollars from Planned Programs input Screens

Actual Formula	**0**	**0**	**0**	**0**
Actual Matching	**0**	**0**	**0**	**0**
Actual Other	**0**	**0**	**0**	**0**
Total Actual Expended	**0**	**0**	**0**	**0**

3. Amount of Above Actual Formula Dollars Expended for FY 2007 which comes from Carryover funds from previous years.

Carryover	**0**	**0**	**0**	**0**