V(A). Planned Program (Summary)

Program # 6

1. Name of the Planned Program

Global Food Security and Hunger

☑ Reporting on this Program

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
102	Soil, Plant, Water, Nutrient Relationships	10%		10%	
112	Watershed Protection and Management	10%		10%	
136	Conservation of Biological Diversity	10%		10%	
202	Plant Genetic Resources	10%		10%	
204	Plant Product Quality and Utility (Preharvest)	10%		10%	
205	Plant Management Systems	10%		10%	
212	Pathogens and Nematodes Affecting Plants	5%		5%	
216	Integrated Pest Management Systems	20%		20%	
315	Animal Welfare/Well-Being and Protection	5%		5%	
601	Economics of Agricultural Production and Farm Management	10%		10%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2013	Extension		Research	
	1862	1890	1862	1890
Plan	16.0	0.0	6.0	0.0
Actual Paid Professional	12.6	0.0	8.5	0.0
Actual Volunteer	0.0	0.0	0.0	0.0

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	**1890 Extension**	**Hatch**	**Evans-Allen**
355429	0	506748	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
47674	0	17196	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
0	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

PCC: The germplasm of taro, cassava and sweet potato maintained and multiplied at the research station is a reliable source of planting materials for food security. Planting materials of taro, cassava, sweet potato and fruit trees were distributed to farmers. Farmers were also assisted in land preparation and planting of root crops, and in establishment of backyard vegetable gardens. Community members and students learned about the agricultural activities that were conducted at the research station and during national events.

CMI: Agriculture activities were primarily carried at atolls and schools, related with food security and hunger and school curriculum. In the communities, small scale gardening was provided. Small islands' communities in Majuro lagoon were visited to trained homeowners on farming. Knowledge was also shared of how crucial it is to farm as many local food crops in and around their properties.

COM-FSM: Organized workshops on farming and food processing techniques, increased number of value added products focused more on homemade flour. Educational material on farming and food processing were translated and distributed. Farmers processed rejected cucumber and long chili pepper into vinegar, increasing income. A school based program assisted vocational teachers on basic skills in agriculture. Small-scale piggeries were evaluated for use as dry-litter demonstration sites. A project of artificial Insemination of sows was carried out with approximately 50% success. Research of root crops with improved productivity took place. Germplasm of different varieties of swamp taro, soft taro and sweet potato have been collected from the Micronesia Region. In vitro and in vivo screening to study salt tolerance level of swamp taro and soft taro. Local governments received selected varieties to establish multiplication plots. Integrated sustainable agriculture intervention programs to target socially disadvantaged island community promoted crop production skills. Additional income was generated through vegetable gardening efforts. Maternal and Child Health Program Coordinator reported an overall improvement in the health of the school children from the community ever since they began consuming homegrown vegetables, as measured by their blood hemoglobin count. Backyard poultry farming is established with families and individuals raising a few to several hundred layers to produce fresh eggs for home consumption and sell for extra income.

2. Brief description of the target audience

PCC: Our target audiences are scientists, extension agents, agriculture students and professionals, federal, state and national agencies, conference publications, and scientific journals. Farmers, students, parents, state and federal government officials and private individuals are also beneficiaries of our extension programs.

CMI: The audiences targeted were the schools and communities affected by the droughts and communities that were not visited in previous years

COM-FSM: Target audiences included gardeners, homemakers and young mothers engaged in Women in Farming, students, senior citizens, farmers and youths NGOs, government agencies, traditional leaders, women's groups, and community groups, church groups, policy makers, state, national project management staff, traditional smallholder farmers, and immigrant neighboring island populations. Scientists, extension staff, agricultural professionals, agriculture students, federal, state and national agencies, conference publications, and scientific journals are target audiences for research activities.

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2013	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	1792	7825	512	600

2. Number of Patent Applications Submitted (Standard Research Output)

Patent Applications Submitted

Year:	2013
Actual:	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2013	Extension	Research	Total
Actual	3	1	4

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of demonstration farms established.

Year	Actual
2013	44

Output #2

Output Measure

- Number of publications for lay use.

Year	Actual
2013	12

Output #3

Output Measure

- Number of conference papers and publications/presentations.

Year	Actual
2013	15

Output #4

Output Measure

- Expected professional journal publications

Year	Actual
2013	0

Output #5

Output Measure

- Expected gray literature.

Year	Actual
2013	2

Output #6

Output Measure

- Expected publications for lay use

Year	Actual

2013	2

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Number of persons with increased knowledge on appropriate production and processing technologies.
2	Number of program participants adopting recommended practices.
3	Number of established farms producing, utilizing, and/or selling produce and products.

Outcome #1

1. Outcome Measures

Number of persons with increased knowledge on appropriate production and processing technologies.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	2061

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

PCC: Knowledge of best management practices, high yielding planting materials and techniques to prepare new food products and prolong shelf life is essential to increase productivity and food security.

CMI: Students and farmers lack knowledge of improved agricultural practices and importance of local food production.

COM-FSM: Understanding of income generation opportunities from environmentally friendly sustainable practices in agriculture.

What has been done

PCC: Information on new varieties of crops, best management practices, bio control agents and publications were disseminated. Food technology trainings were conducted.

CMI: Small gardens in three schools were established to enhance students learning. 14 students at the college took the nutrition course (AH-101). Youth groups, women groups, families and landowners continue developing farms in order to have enough supplies of food.

COM-FSM: Workshops educated participants on environmentally friendly, economic opportunities in farming and food processing. Experimental trials were conducted using low-cost production methods of climate-smart farming.

Results

PCC: Visitors to Research Station understand the importance of root crops germplasm conservation, use of bio control agents to control pests of crops and invasive weeds, and current best management techniques to improve productivity and protect the environment. Participants in food technology trainings can prolong the shelf life of food products thus enhancing food security in the community.

CMI: Students in established school gardens have understanding of agriculture methods as they do their practical hands on experience. The small scale gardening have increased with more people demanding for seeds. During the world food day activities, people took home different varieties of food vegetation, especially the local food trees and plants to be planted around their homes.

COM-FSM: Participants have increased knowledge on composting, sustainable and economically viable farming and food processing. Participants have learned how to process feed for their laying chickens using tilapia and a variety of local materials.

4. Associated Knowledge Areas

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

Outcome #2

1. Outcome Measures

Number of program participants adopting recommended practices.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	1132

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

PCC: Limited planting materials and control of pests and diseases greatly affect farm productivity. Farm produce can be prepared in many ways to enhance food security for the family.

CMI: Poor condition of atoll soils limits sustainable crop production.

COM-FSM: Farmers need to adopt techniques to protect the environment while creating economic opportunities.

What has been done

PCC: Disease-free, high yielding planting materials were distributed to farmers to increase productivity. Food technology trainings were conducted to preserve foods.

CMI:Continuation of trainings and demonstrations on composting has extended this year to 11 underprivileged young men from the rural areas in Majuro. Dry litter waste management system and copra cakes mixing with organic materials methods were shared and passed on.

COM-FSM: The dry litter system of pig housing has been adopted to protect the environment and provide compost materials for soil improvement. Production of local feeds allows reduced costs.

Results

PCC: Food supply and production has been enhanced by improved yield in farms growing disease-free and high-yielding planting materials of root crops and using bio control agents to control pests of crops. Participants of food technology trainings were able to prepare new food products and preserve foods.

CMI: Eleven trainees have applied the composting techniques in their own respective farms. Outer islands? participants applied different composting as was demonstrated to them.

COM-FSM: Participants learned new techniques on farming and basic skills on food and feed processing. Farmers adopted compost and were selling locally made composts to earning extra income for family. 28 breeds of chicken were imported for egg production and breeding by 46 individuals. Processing and formulation of poultry and swine feeds using locally available materials was demonstrated and adopted. One family has increased their number of chickens from 20 to 200 layers. Patients of Public Health sought assistance in establishing home gardens using recommended practices. Fifty eight new youths and adults started establishing their farms and are cultivating different crops.

4. Associated Knowledge Areas

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

Outcome #3

1. Outcome Measures

Number of established farms producing, utilizing, and/or selling produce and products.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	263

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
PCC: Lack of best management practices limit farmers from improving productivity. Families are not capable of preparing new food products from their produce .

CMI: Space for farming, invasive species and good fertile soils are the major ongoing contributing factors for a vibrant and productive farming.

COM-FSM: Few new youths and adults are involved in farming and food processing activities. Migration patterns affect sustainability. Imported foods create price competition.

What has been done

PCC: Best management practices and quality planting materials were adopted by farmers. Participants acquired new skills and prepared new food products from the food technology classes.

CMI: With the collaborative partnership with R&D and Taiwan technical mission, efforts has made to introduced containers to be used in space that are limited, increased production of seedlings and composting was introduced and shared with schools? gardening as well as people in the town down areas.

COM-FSM: Multiplication of elite varieties of root crops to improve productivity took place. Fresh produce was donated to vulnerable populations to stimulate market interest.

Results

PCC: High productivity of root crops was attained through use of disease-free, high yielding planting materials and adequate fertilization. Practices showcased in the demonstration farms were adopted by farmers. Families prepared and have new food products from their produce for food security.

CMI: Container gardening had successfully produced about 50 small containers with cabbages and lettuces from a government school in the capital. At a scheduled open house, people attended were interested to set up small at their front yard with few containers.

COM-FSM: 70 container gardens were established. One family is making taro and tapioca flour. Farmers sell locally made compost earning extra income. 11 backyard poultry farms were established. One family sells 3 dozen eggs per week earning $51 per month. Another sells one dozen eggs per day to earn $127.50 per month. Increased numbers of family gardens use biodegradable wastes in composting. About 12% of participants provided technical assistance secured food from gardens they cultivated. Health status of children has improved after consumption of homegrown vegetables according to health officials. Five hundred pounds of fresh produce was donated to state hospital and vulnerable populations for consumption. Twenty new farmers are producing, selling and exporting their farm produce.

4. Associated Knowledge Areas

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

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges
- Populations changes (immigration, new cultural groupings, etc.)

Brief Explanation

PCC: Crops are destroyed during typhoons, heavy rains and salt water intrusion and inundation so raw materials for food processing is inadequate.

CMI: Continue challenges of transportation to outer islands are real. The availability of funds to buy containers for farming will be a set-back for the low income families. This year along inundation on dry land and droughts that affected the 15 atolls and islands make a huge impact on food security on the affected communities.

COM-FSM: Limited supplies and funding to carry out planned activities were major constraints in the program. Lack of transportation and fuel, extreme bad weather and conflict of activities within the communities affected the program outcomes. Establishments of plot demos in atolls and distant islands were affected by inclement weather, irregular availability of water transportation and high fuel costs. Typhoons and heavy rains affect chicken and pig farms resulting in lowering growth and production. Establishment of field trials was delayed due to non-availability of secure and accessible land.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

PCC: The root crops germplasm collection at PCC R & D Station has been a reliable source of high yielding varieties of taro, sweet potato and cassava which are essential components to increase productivity. Biocontrol agents have effectively controlled pests of taro and cassava. Participants in the food technology trainings were very eager to prepare new food products they have learned.

CMI: More people have planted more food vegetation around their houses. The 11 trainees who were trained had developed the skills necessary and have made their own farms.

COM-FSM: Members of the community, farmers and leaders are open to new

practices such as container gardens using local basket technique and used containers. Compost and home-made pesticides are also practiced. Solar drying and grinding techniques used as replacement of electric machines for drying and grinding crops for making home-made flour are preferred. Farmers, community leaders, teachers and parents were willing to test new innovative technologies to improve current practices and management styles. There were more collaboration between farmers/schools and free sharing of traditional knowledge and skills to complement new technologies and practices. Integrating nutrition information about crops to be introduced and their recommended practices is effective in convincing communities to establish their own gardens, consume and preserve produce for their families. About 20% of the clients helped have become involved and committed to raising pigs and chickens. About 5% (13 families) of clients have established poultry and piggeries.

Key Items of Evaluation

PCC: The tissue culture technique has been successful in providing a continuous supply of taro and banana planting materials to farmer clients. Bio control agents have been successful in controlling pests of root crops and invasive weeds in Palau. Families are now able to prepare new food products from their produce for food security.

CMI: Even if we continue to do perfectly with farming, the one important issue farmers encountered are the diseases that destroying their affecting food crops. They have put so much effort in the beginning and later witnessing the fruits being dying out and fall down. They have used all the methods they learnt, problem never drive out. Often time farmers abandoned their farm and seek better opportunities.

COM-FSM: Increased number of container gardens and increased number of people involved in the program. Improved lifestyle, family members are working together in gardens, making home-made flour, jams, ketchup. Increasing number of communities appreciated the importance of maintaining their own gardens for availability of healthy and fresh produce and for healthy physical fitness. Observations and surveys indicate clients need

- Increased germplasm types,
- Increased seedling production,
- Increased number of farmers,
- Increased number of agricultural farms,

With proper presentation, farmers adopted best practices and technologies resulting in increased yields, reduced inputs, increased efficiency, increased economic return, and conservation of resources, fresh produce donated to vulnerable populations for consumption developed community support. Extension activities resulted in improved knowledge, created awareness and developed skills of the participants in sustainable agriculture systems.