

**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	10%		10%	
315	Animal Welfare/Well-Being and Protection	5%		5%	
502	New and Improved Food Products	10%		10%	
601	Economics of Agricultural Production and Farm Management	10%		10%	
	<b>Total</b>	100%		100%	

**V(C). Planned Program (Inputs)**

**1. Actual amount of FTE/SYs expended this Program**

Year: 2015	Extension		Research	
	1862	1890	1862	1890
<b>Plan</b>	16.0	0.0	6.0	0.0
<b>Actual Paid</b>	12.7	0.0	8.9	0.0
<b>Actual Volunteer</b>	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
355245	0	367904	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
11276	0	13242	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: Major activities at the Research and Development Station are maintenance and conservation of the root crops germplasm collection of Palau. Continued multiplication and propagation of planting materials was done to ensure adequate supply of planting materials to our farmer clients. A total of 7,829 planting materials of taro, giant swamp taro, sweet potato, cassava, vegetable and fruit trees were distributed to 101 farmers. In addition, 72 farmers affected by the drought and salt water intrusion were assisted in establishing vegetable gardens and planting fruit trees to ensure food security. Mass propagation and conservation of the taro, cassava and sweet potato germplasm has been a major activity.

CMI: Small scale and urban gardening methods were presented to students at the college, primary and high schools. Presentations were conducted during the farmers' meeting, World Food Day activities and other events sponsored by the government, college and other NGO groups.

COM-FSM: Farmers are more vulnerable to the impacts of climate change because of their geographic exposure, low income, and greater reliance on agriculture and limited capacity for alternative livelihoods. Traditional agricultural systems are part of the solution by contributing to climate change adaptation, through carbon conservation, sequestration and substitution. Ecologically designed agricultural systems can provide a buffer against extreme events. Diversified small farms have risk-minimizing effects that lead to strengthened food security and resilience. They continually provide food for the family's own consumption and potentially income generation at the market. The food security of the island nation rests with small scale farmers who have developed relationships with local environment, markets and customers. They play a vital role in sustainable development respecting local cultures and local ecosystems, and reducing hunger and poverty for the vulnerable populations. Providing appropriate outreach, technical assistance and education efforts help the community to adapt to changing climate and ensure food security effectively.

In vitro and in vivo screenings was initiated or continued for salt tolerance in locally maintained germplasm. Two books (sweet potato cultivation guide and soft taro cultivation guide) have been published. High yielding sweet potato varieties were field propagated, evaluated, and demonstrated. Intercropping cassava with okra and long beans was promoted for food security and additional income. Planting materials of sweet potato, cholesterol spinach, sweet bandanus, moringa, okra, eggplant and long beans were distributed. 19 brochures on local crops about proper growing and nutrition were prepared and distributed.

**2. Brief description of the target audience**

Both crop, livestock and aquaculture farmers, potential farmers, researchers and extension agents, homemakers, students and others.

**3. How was eXtension used?**

eXtension was not used in this program

**V(E). Planned Program (Outputs)**

**1. Standard output measures**

2015	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
<b>Actual</b>	3454	13816	1722	3444

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

**Patent Applications Submitted**

Year: 2015

Actual: 0

**Patents listed**

**3. Publications (Standard General Output Measure)**

**Number of Peer Reviewed Publications**

2015	Extension	Research	Total
<b>Actual</b>	2	1	3

**V(F). State Defined Outputs**

**Output Target**

**Output #1**

**Output Measure**

- Number of demonstration farms established.

Year	Actual
2015	16

**Output #2**

**Output Measure**

- Number of publications for lay use.

<b>Year</b>	<b>Actual</b>
2015	13

**Output #3**

**Output Measure**

- Number of conference papers and publications/presentations.

<b>Year</b>	<b>Actual</b>
2015	8

**Output #4**

**Output Measure**

- Expected professional journal publications

<b>Year</b>	<b>Actual</b>
2015	2

**Output #5**

**Output Measure**

- Expected gray literature.

<b>Year</b>	<b>Actual</b>
2015	7

**Output #6**

**Output Measure**

- Expected publications for lay use

<b>Year</b>	<b>Actual</b>
2015	7

**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**

<b>Year</b>	<b>Actual</b>
2015	1256

### **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: People are not aware of the issues concerning storage of food and its implications.

COM-FSM: Most of the farmers and homemakers have limited knowledge in appropriate production and processing technologies.

#### **What has been done**

PCC: Workshops were conducted and information on new varieties of crops, best management practices, biocontrol agents and publications were disseminated. Eleven food technology trainings were conducted as a measure on food security.

CMI: Trainings, outreach education carried out with farmers and families. Fruit and vegetable were encourage to grow as it took only few months to harvest. Local food crops were also encourage to have available food at all time..

COM-FSM: Training/workshops, hands-on demonstrations, and one-on-one sessions, were conducted to increase the participant?s knowledge in appropriate farming, gardening, and processing technologies.

### **Results**

PCC: Techniques to improve crop productivity and the environment such as best management practices and use of biocontrol agents have been disseminated during workshops conducted and also to visitors to the Research and Development Station. Participants in food technology trainings can prolong the shelf life of food products thus enhancing food security in the community.

CMI: Participants trained have increased their knowledge and has recommended the program to others. As mentioned in last fiscal year report activities stated were completed during this fiscal year. More farmers were able to sell products from their farm as the farm grow and produce more.

COM-FSM: Participation increased in this program and an increased number gained knowledge from workshops, training sessions, community meetings and one-on-one sessions. Production areas covered include small scale vegetable gardening, food processing methods for food security, distribution of planting materials for disaster reparation and production management. Included was sharing of improved techniques in livestock management, primarily chickens and pigs. Across the FSM, a total of 5,176 participants gained knowledge based on observation at meetings.

## **4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
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
2015	815

### 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: Clients does not have the motivation to continue and established their own farm.

COM-FSM: Limitations to the adoption of sustainable farming practices is due to lack of motivation, poor soil and unavailable garden space or lack of resources to address the socioeconomic situation.

#### 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: Continue follow up trainings and outreach education was necessary to find out what is holding back on clients farming activities. Trainings and demonstrations continue to be carried out to new farmers and families as well as students. Working on little spaces each client have and methods of composting continue with new clients.

COM-FSM: Technical assistance and hands-on trainings organized for youth and adult in soil management, vegetable production and use and animal husbandry were provided including follow-up visits.

#### Results

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

CMI: There is an increased number of families? established urban gardening methods in the



urban area. Students continued to be successful in the introduction to agriculture courses.

COM-FSM: Typhoon recovery dominated the agricultural effort. Feedback indicates most participants adopted recommended production and food processing practices. More than 50% of clients successfully adopted one or more integrated small farm practices. In one state, based on observation, interview and follow up visits, 37 participants adopted recommended practices on food processing and 52 home gardens were established. In a second state, 50 farmers and families are growing vegetables, 34 are raising chickens for eggs and 4 raising pigs for home consumption and markets. Demonstration farms were established at four schools.

#### 4. Associated Knowledge Areas

<b>KA Code</b>	<b>Knowledge Area</b>
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)
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#### 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

<b>Year</b>	<b>Actual</b>
2015	870

### 3c. Qualitative Outcome or Impact Statement

#### Issue (Who cares and Why)

PCC: Best management practices should be adopted by farmers to improve productivity. Families should be capable of preparing new food products from their produce for food security.

CMI: Land and soil lack the proper nutrient contents for healthy and productive food crops.

COM-FSM: Vegetable and livestock production is limited owing to resources availability or lack of government support to farmers and pest problems. High living cost and limited income with lack of opportunities are major issues.

#### What has been done

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

CMI: Continued trainings and knowledge sharing to unaware farmers, families and students were carried out accordingly and on agreed scheduled time.

COM-FSM: Technical assistance has been given to farmers in establishing and expanding integrated farming activities contributing to vegetable and livestock production.

#### Results

PCC: Demonstration farms showcasing best management practices such as use of disease-free and high yielding planting materials and adequate fertilization led to high productivity of root crops. Families prepared and have new food products from their produce for food security.

CMI: With successful partnerships and trainings again this fiscal year, it was witnessed that there were again increased number of urban gardening sites in school campuses and in communities.

COM-FSM: Where typhoon damage was most severe, 5 program families maintained their gardens and produce with their own planting materials. In another state, 53 home gardens including a public school garden were established. 37 homemakers participated in the state fair to display recipes and earned money from sales of their products. In a third state, 35 farmers and families grew a variety of vegetables for the market. 5 are commercial growers. 34 families and farmers are producing eggs for consumption and local market and have reached production of about 80 dozen eggs per day, an increase of about 70% from last year. Egg production in Yap is meeting daily demand and is causing a drastic decline in imports.

### 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)
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#### **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: Climate change will be a continued challenging factor as water sources are limited. Population density will still be a major issue with a small island setting. High humidity and salt spray in the air continue impacting the performance of the food crops.

COM-FSM: Establishments of plot demos in atolls and distant islands were affected by inclement weather, irregular availability of water transportation and high fuel costs. Sometimes transportation, fuel, extreme bad weather, and conflict of activities within the communities and funerals are constraints at all sites of the country. Two major typhoons during the reporting period constrained extension activities in the immediately affected area and altered programs in neighboring states to provide support for those devastated areas.

#### **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: There is an increased number of clients interested in pursuing the gardening methods as a supplement for their food supply. Availability of nutritious diet will greatly impacted people's health, with less reliability on unhealthy diet.

COM-FSM: 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 them for their families. Family and school practiced container garden, using local basket and banana stem techniques. Compost and homemade pesticides are also practiced. Two program participants are generating family income by selling value-added products. Experiments are showing positive results and audiences are showing increased interest in developing farms. The extension activities have improved knowledge, created awareness and developed skills of participants in sustainable agriculture systems. Farmers, community leaders, teachers, and parents are willing to test new innovative technologies in order to improve on current practices and management styles. There are more collaboration between the farmers and schools and free sharing of traditional knowledge and skills to complement new technologies and practices. Ultimately extension activities have developed positive attitudes, zeal for learning techniques and farming aspects, and have changed the behavior and economic condition of the participants.

### **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. Biocontrol 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: With the knowledge acquired through these methods of small scale and urban gardening, it will be an excellent impend rigorous brilliant Food will be better presented if programs of cooking also included and established in order to have different cooking methods also be shared.

COM-FSM: Increasing number of communities appreciated the importance of maintaining their own gardens for availability of healthy and fresh produce and for healthy physical fitness. " Eating the Rainbow" slogan seemed easy to remember by people in growing and producing healthy local produce. There is an increased number of container gardens and increased number of people involved in the program. Participants produce and sell value-added products and generate family income.

Research now provides increased germplasm types and increased seedling production to more farmers. Those farmers work an increased number of farms, adopted best practices and technologies resulting in increased yields, reduced inputs, increased efficiency, increased economic return, and conservation of resources. Extension activities resulted in improved knowledge, created awareness and developed skills of the participants in sustainable agriculture systems and provided fresh produce to be donated to vulnerable populations for consumption. Researchers presented results of research and extension projects during scientific conferences and meetings, and developed publications related with the projects.