

V(A). Planned Program (Summary)

Program # 4

1. Name of the Planned Program

Climate Change

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
111	Conservation and Efficient Use of Water	10%		10%	
112	Watershed Protection and Management	15%		15%	
125	Agroforestry	10%		10%	
131	Alternative Uses of Land	5%		5%	
132	Weather and Climate	10%		10%	
133	Pollution Prevention and Mitigation	10%		10%	
134	Outdoor Recreation	5%		5%	
135	Aquatic and Terrestrial Wildlife	5%		5%	
136	Conservation of Biological Diversity	5%		5%	
141	Air Resource Protection and Management	5%		5%	
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants	5%		5%	
315	Animal Welfare/Well-Being and Protection	10%		10%	
605	Natural Resource and Environmental Economics	5%		5%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2014	Extension		Research	
	1862	1890	1862	1890
Plan	2.0	0.0	3.0	0.0
Actual Paid	3.8	0.0	3.4	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
85052	0	168282	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
7390	0	0	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: Salt water intrusion into taro patches have been unfavorable for taro cultivation. Salt water intrusion was prevented by raising levels of the dike and construction of secondary dike inside the taro patches to hold and contain fresh water. Several taro varieties were evaluated for tolerance / susceptibility to saline soil conditions. Farmers and communities affected by Typhoon Bopha were also assisted in land preparation and planting root and vegetable crops to ensure food security.

CMI: Extension education and activities carried out to communities in the islands that were affected by drought and inundation of sea water into the land. Presentations on climate change were carried out in schools to students, faculty, staff and administration.

COM-FSM: Conducted community visits on awareness for climate change adaptation and mitigation with farmers and other clients. Salt tolerant crops were introduced to the farmers during community visits. Information about salt tolerant giant swamp taro varieties adaptable to coral atolls and other low-lying islands were provided.

2. Brief description of the target audience

PCC: Research activities on climate change in Palau is geared to farmers, state and government officials, scientists, extension agents, agriculture students, and professionals. Results are published in conference publications and scientific journals.

CMI: Targeted audiences are students, parents, school administrators, teachers, staff, land owners and families.

COM-FSM: Farmers, students within the island proper and the outer island community residences, gardeners, homemakers, students and teachers, community leaders, policy makers, state and local governments were targeted.

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2014	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	911	2131	310	580

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

Patent Applications Submitted

Year: 2014
 Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2014	Extension	Research	Total
Actual	0	4	4

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of awareness training conducted.

Year	Actual
2014	7

Output #2

Output Measure

- Number of salt-tolerant crops/plants developed and distributed.

Year	Actual
2014	15

Output #3

Output Measure

- Number of people who adopted sustainable food production technologies.

Year	Actual
2014	1461

Output #4

Output Measure

- Increased staple food crop production.

Year	Actual
2014	150

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Number of persons with increased awareness on impact and how to mitigate climate change in Micronesian life.
2	Number of program participants adopting sustainable food production technologies.
3	Number of persons who increased staple food crop production.

Outcome #1

1. Outcome Measures

Number of persons with increased awareness on impact and how to mitigate climate change in Micronesian life.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	1461

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

PCC: Climate change impacts as frequent as typhoons, excessive rainfall, increased flooding and soil erosion, sea level rise, salt water intrusion, and soil salinity has been adversely affecting the farming communities.

CMI: Island communities continued to be victimized by the natural phenomenon.

COM-FSM: Communities located in low-lying areas and atolls were concerned with rising sea level and intrusion of salt water into the taro patches.

What has been done

PCC: Root crops and vegetable planting materials were given to communities affected by Typhoon Haiyan. Continued evaluation of taro varieties for tolerance/susceptibility to salt water intrusion into taro patches were done.

CMI: Combine teams? efforts visited the affected islands and surveyed the communities? vegetation, water catchments, and ground wells after the drought in the affected islands.

COM-FSM: Selection of salt tolerant staple crops was distributed as well as distribution of vegetable and root crop planting materials. The establishments of demonstration plots of promising cultivars resilient to climate change were also done.

Results

PCC: The reality of climate change impacts was once again experienced and felt by communities affected by Typhoon Haiyan. The farmers were able to grow vegetables and root crops to ensure their resilience to climate change. Salt tolerant taro varieties were identified. Results of these research was presented in the International Horticultural Congress in Brisbane, Australia in August, 2014

CMI: Mobilization of organizations such as RMI Chief Secretary's office, Resources and Development (R&D), International Office of Migration (IOM), USAID, Environmental Protection Agency (EPA) and many NGOs delivered the necessary relieve efforts to the islands affected. People understood the impact, but cannot stop the inundations of sea water into their land.

COM-FSM: Strategic development plan on recovering the taro patches on the outer islands was developed but pending to implement due to lack of transportation. Program participants, families, and communities increased knowledge on securing food sources using adaptable varieties of root crops.

4. Associated Knowledge Areas

KA Code	Knowledge Area
111	Conservation and Efficient Use of Water
112	Watershed Protection and Management
125	Agroforestry
131	Alternative Uses of Land
132	Weather and Climate
133	Pollution Prevention and Mitigation
134	Outdoor Recreation
135	Aquatic and Terrestrial Wildlife
136	Conservation of Biological Diversity
141	Air Resource Protection and Management
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants
315	Animal Welfare/Well-Being and Protection
605	Natural Resource and Environmental Economics

Outcome #2

1. Outcome Measures

Number of program participants adopting sustainable food production technologies.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	682

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

PCC: Frequent typhoons, storm surges, sea level rise and salt water intrusion into taro patches are some of the climate change impacts in Palau that have adversely affected the communities.

CMI: People in the outer islands continued to be affected by inundation of salt water into many of their food crops.

COM-FSM: Communities resorted to abandoning taro patches and food gardens close to the seashore due to salt water intrusion and sea surges.

What has been done

PCC: Communities affected by Typhoon Haiyan were assisted in land preparation and given planting materials of root and vegetable crops. Several taro varieties were evaluated for tolerance to saline soil conditions.

CMI: Ongoing trainings and workshops to students, traditional leaders and people in the communities on climate change especially the issues affecting the people (Sea Level Rise and Droughts) were held. There were activities also involving students to plant local plants along the shorelines, including food trees that are salt resistance.

COM-FSM: Affected communities were provided with salt tolerant varieties of sweet potato and information about salt tolerant giant swamp taro local cultivars and guided to develop a strategic development plan for climate change.

Results

PCC: Seventy two families who have experienced the severe impacts of climate change were assisted in planting root and vegetable crops to enhance food production and food security of the communities.

CMI: The agriculture demonstration site has produced enough local plants and food trees to be distributed to the affected areas to minimize erosions. Others will be given to a re-plantation

project at the airport.

COM-FSM: Strategic development plan on recovering the taro patches on the outer islands has been developed awaiting implementation. Interested individuals secured their planting materials of root crops from the propagation sites established last year. Regular clean up and dumping in waste bins was observed.

4. Associated Knowledge Areas

KA Code	Knowledge Area
111	Conservation and Efficient Use of Water
112	Watershed Protection and Management
125	Agroforestry
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133	Pollution Prevention and Mitigation
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135	Aquatic and Terrestrial Wildlife
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605	Natural Resource and Environmental Economics

Outcome #3

1. Outcome Measures

Number of persons who increased staple food crop production.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
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2014

250

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

PCC: When frequent high intensity typhoons occur, sea level rise and salt water come into taro patches, there is the big problem of food security for the communities.

CMI: The inundation of sea water and droughts had affected food crops in many of the atolls. Sea level rise affected the runway and houses especially in the capital.

COM-FSM: Affected communities lost either portion or entire farms and taro patches along seashores.

What has been done

PCC: Communities affected by severe impacts of climate change after strong typhoons were immediately assisted with replanting of sweet potato, cassava and vegetable crops as well as salt tolerant taro varieties.

CMI: Awareness and informational sharing to the people were scheduled accordingly; food and waters were distributed to the people that were affected. Re-plantations of local food trees were carried out in villages.

COM-FSM: Planting materials from established propagation plots were distributed to affected communities.

Results

PCC: There was an increase in food supply of sweet potato, cassava, taro and vegetable crops as a result of immediate replanting of these crops in areas affected by the strong typhoon. High yield and productivity of these root crops and vegetable was ensured when the farmers practiced the recommended fertilization regime for the crops.

CMI: With the assistance from outside donors, reverse osmoses equipment were set up in communities that were affected by the drought. Food donations were given to the affected communities to supplement the local foods that were not available as a result of the droughts.

COM-FSM: Limited feed-back and observation indicated some program families have established farms.

4. Associated Knowledge Areas

KA Code	Knowledge Area
111	Conservation and Efficient Use of Water
112	Watershed Protection and Management
125	Agroforestry

131	Alternative Uses of Land
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133	Pollution Prevention and Mitigation
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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: Extreme weather conditions, sea level rise and salt water intrusion sometimes destroy the replanted crops used for rehabilitation of climate change affected areas in Palau.

CMI: The college is still without researchers which, limited the impacts of programs.

COM-FSM: Limited and irregulars scheduled trips to the outer islands, high costs of fuels for motor boats and inclement weather affected visits to island communities.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

PCC: Food supply in communities who have experienced strong typhoons, coastal erosion, sea level rise, and salt water intrusion have been severely affected. An essential measure to ensure resilience to impacts of climate change is the immediate replanting of root and vegetable crops in the affected communities.

CMI: As the percent of rain falls went up, a survey immediately got under way and it concluded that there will be more time for the vegetation to be restored and food crops to normally generate fruits again. Plans are now established to look into

the dry and salt resistance crops.

COM-FSM: Time and effort to fully carry out program was limited due to remoteness and limited/scheduled trips to the outer islands that were most vulnerable to climate change.

Producers though residing in challenging environments affected by climate change can still improve their livelihood by equipping them with knowledge, skills and access to appropriate technologies including new adaptive varieties of root crops and conserving environments by proper solid waste management.

Key Items of Evaluation

PCC: The most severe impact of climate change affecting food production is strong typhoons and salt water intrusion into taro patches. Identification and distribution of salt tolerant taro varieties is an essential remedial measure to ensure food production in the affected areas.

CMI: Vulnerability of the islands should be considered with urgency as these low-lying islands and atolls cannot survive along to live through climate change impacts. As these islands are known to only have 1-3 meter above sea level, it will be impossible for the people to continue to survive. All food crops on land will no longer be accessible and the end result will be obvious.

COM-FSM: Communities with awareness and access to technologies like new promising varieties of root crops can secure their food sources and even generate extra income from selling the produce. They had clean surroundings free from pest problems like mosquitoes and with safe produce from their gardens.