

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: 2012	Extension		Research	
	1862	1890	1862	1890
Plan	2.0	0.0	3.0	0.0
Actual Paid Professional	4.8	0.0	3.0	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
128920	0	146554	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
10944	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: We worked in collaboration with the Palau Pacific Adaptation to Climate Change (PACC) Program in conducting the socio economic survey on the impacts of climate change in Palau. Integrated Pest Management and Livestock Management trainings were conducted to enable the farmers to cope with climate change issues. Continuing educational promotion on alternative dry litter waste management was conducted to students, community people and farmers.

CMI: High tides caused widespread sea water surges and flooding, surges occurred at 1 meter (3 ft. 3 in) above sea level and outreach programs continued to deliver necessary information on climate change in the communities and at schools. Pamphlets were translated into Marshallese for the non-English speakers.

COM-FSM: Atoll dwellers, increasingly aware of the impacts of salt-water inundation to their plants, improvised raised beds, planted crops in containers and built seawalls around taro patches. Collection of giant swamp taro cultivars grown in low-lying areas was also conducted. Research for salt tolerant varieties of staple root crops has been initiated. Salt tolerant local varieties have been collected for further testing and distributed to needy areas. Training has been conducted on planting and best management practices for sweet potato as a quick recovery crop after disasters. Research has been initiated on 'Climate Smart' agricultural practices. Collaboration has been established with international, local and federal agencies and Embassies to address and respond to the climate change effects.

2. Brief description of the target audience

PCC: The research program on climate change in Palau caters to 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 climate change programs.

CMI: Everyone on the low-lying atolls was targeted. The climate change interest in RMI is growing even greater as sea level rises and inundation of water surges continue devastating shore lines and endangering the food and livelihoods of the citizens. With the growing concerns by the interest groups as well as leaders, mitigation solutions to sea level rise, in these low lying atolls continue finding solutions.

COM-FSM: Micronesian islanders are being affected by global climate change phenomena. Farmers in the region are more vulnerable to these impacts of climate change because of their geographic exposure, low incomes, and greater reliance on agriculture as well as limited capacity to seek alternative livelihoods. Small-scale farmers work with a wide diversity of production systems, traditional knowledge, exchange systems, and cultures and often contribute to extended networks both within and outside their community. Smallholder farmers who produce a variety of crops can continually harvest food both for the family's own consumption and potentially for income generation at the market. The food security of the island nation rests in the hands of small scale farmers who have developed relationship with local environment, local markets and local customers. Providing appropriate outreach, technical assistance and education efforts help the community to adapt to changing climate and ensure food security effectively.

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2012	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	255	301	295	410

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

Patent Applications Submitted

Year: 2012
 Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2012	Extension	Research	Total
Actual	2	2	4

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of awareness training conducted.

Year	Actual
2012	6

Output #2

Output Measure

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

Year	Actual
2012	3

Output #3

Output Measure

- Number of people who adopted sustainable food production technologies.

Year	Actual
2012	1055

Output #4

Output Measure

- Increased staple food crop production.
Not reporting on this Output for this Annual Report

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
2012	955

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

PCC: Palau is greatly affected by the severe impacts of climate change resulting from reduced food production due to saltwater intrusion and soil salinity, excessive rainfall, increased flooding and soil erosion.

CMI: Marshall Islands consists of 34 low-lying coral atolls and islands and are endanger of climate change as sea level rises as well as the effects of drought, El Nino, etc.

COM-FSM: The Micronesian islands are the canaries in the mines for climate change effects. Atoll dwellers are particularly vulnerable to sea level change and salt intrusion in gardens and water sources.

What has been done

PCC: A socio-economic household survey was conducted to determine the awareness of the community on climate change and its mitigation in Palau. Trainings on pest and livestock management were conducted to ensure adaptation to climate change.

CMI: On scheduled outreach activities, extension agents provided awareness programs on topics concerning climate change, focusing on land scarcity and food security as many fruit trees were affected as a result of sea level rise.

COM-FSM: Research of salt tolerant staple crops, demonstrations of food preservation and water catchment and distribution of known salt tolerant crop varieties took place.

Results

PCC: The community is now aware that impacts of climate change through the multi-agency initiative of the PACC. Salt water intrusion and inundation has been a problem in many taro patches affecting the growth and yield of taro.

CMI: People had gained the necessary knowledge that was not clearly explained to them before, detailing the impacts of climate change. Flyers were translated by extension agents and distributed during outreach activities.

COM-FSM: People dwelling on the atolls have increased planting of salt tolerant crops and quick recovery crops such as sweet potato. They constructed raised beds to stay above salt water intrusion. Improved communication with outer atoll islands allows for a quicker response for food distribution and provision of planting materials.

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
2012	523

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

PCC: Community members are affected by the disastrous impacts of climate change in Palau; via such salt water intrusion into taro patches.

CMI: People lack information about the climate change and its implications on land, food and safety of all.

COM-FSM: Residents in atolls and low-lying areas are the most impacted by the big wave surges, inundation by salt water and threats of life and property losses. Soil erosion, receding shorelines and decline in food production are virtual effects of climate change in these small islands.

What has been done

PCC: Trainings on pest and livestock management, and evaluation of salt tolerant taro was conducted to ensure improved production and reduce the vulnerability of the community to the impacts of climate change.

CMI: Trainings and workshops on climate change were conducted at schools and in communities.

COM-FSM: Community meetings, information and education campaigns about impacts of climate change to food security and collection of giant swamp taro were done. Demonstrations of water catchments and food preservation techniques took place.

Results

PCC: The socio-economic survey provided baseline information on impacts of climate change. Participants to the Pest and Livestock Management trainings adopted the technologies to enhance food production and awareness as intervention on the impacts of climate change.

CMI: People are now aware of the impact and are fully aware of the environmental and economic impact.

COM-FSM: Community awareness through programs in Information, Education and Communication was raised. Consultations prompted affected residents in atolls and low-lying areas to adjust their cropping practices by putting seawalls around their taro patches, using elevated seedbeds, planting in upland areas, practicing container gardening and mixed cropping.

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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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
2012	150

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

PCC: Best management practices and salt tolerant taro should be adopted by farmers in communities affected by climate change to improve productivity.

CMI: Farmers lack knowledge of planting crops that they can harvest during different sessions.

COM-FSM: Communities in atolls and low-lying areas are vulnerable to impacts of climate change in their plant, soil and animal resources and to personal properties especially houses.

What has been done

PCC: Proper cultural management and evaluation of salt tolerant taro were done by farmers.

CMI: People were provided information on how to protect their crops and drinking water sanitization measures were extended to the communities.

COM-FSM: Atoll communities sought assistance in securing planting materials and maintaining plants as affected by salt spray, flooding, etc.

Results

PCC: Use of disease-free, high yielding planting materials and adequate fertilization were essential for high yield and productivity of root crops. Technologies learned in the trainings were adopted by farmers. Evaluation of salt tolerant taro is still on going. Conservation and protection of natural resources have improved water quality and the environment.

CMI: Adults, youths and students gained the necessary knowledge that was not clearly explained to them earlier, detailing the impact of climate change. Flyers were translated by extension agents and distributed during the outreach activities.

COM-FSM: Agroforestry plant nurseries in five regions of Chuuk were maintained for availability of planting materials to islanders. Information campaigns were done to reduce vulnerabilities to loss of food sources, properties and lives of people in low-lying areas.

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
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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: None

CMI: Constant delay and other transportation issues affecting the delivery of program activities to the remote islands.

COM-FSM: External factors affecting the outcomes were low budget for visiting atolls; lack of educational materials, inclement weather, care free attitudes of people and lack of trained extension personnel.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

PCC: The root crops germplasm collection at has been a reliable source of planting materials of taro, sweet potato and cassava, which are essential components to reduce the vulnerability to climate change and increase productivity. Biocontrol agents have effectively controlled pests of taro and cassava. Participants gained knowledge and valued their health, water resources and environment.

CMI: Farmers are increase in number as a result of others being successful, more and more people in the community are now motivated to continue cleaning their water tanks. Students and landowners continued planting trees, especially along the shorelines, having to protect the shorelines from sea level rise and coastal erosion.

COM-FSM: Through community consultations and information sharing about impacts of climate change on their food sources, properties and lives, atoll communities are gradually becoming prepared in protecting their crops. They protected their plants from salt spray and submergence in salt water by using raised beds, windbreaks and diverse crop planting.

Key Items of Evaluation

PCC: The community is now aware of the impacts and vulnerability to climate

change and food production can be reduced by the root crops planting materials. Taro varieties are being evaluated for performance in salt water intruded taro patches. Biocontrol agents have been successful in controlling pests of root crops and invasive weeds in Palau. Water education campaign and dry litter waste management workshops and demonstrations have been successful in providing continuous education and awareness to farmers, youths, community groups, and government and private organizations.

CMI: All the islands and atolls in the Marshall Islands are low lying islands and therefore are very much vulnerable to all types of extreme weather conditions.

COM-FSM: The villagers and political leaders from affected areas sought technical assistance in coping with the negative consequences of possible damage to their crops, soil, homes and livelihood by climate change impacts,. They have secured their staple crops through preservation of planting materials and adopting sustainable land management like composting, mulching and mixed planting of crops.