

# Small Island Agricultural Systems

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## V(A). Planned Program (Summary)

### 1. Name of the Planned Program

Small Island Agricultural Systems

## 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	8%		15%	
111	Conservation and Efficient Use of Water	5%		2%	
112	Watershed Protection and Management	10%		0%	
123	Management and Sustainability of Forest Resources	2%		0%	
133	Pollution Prevention and Mitigation	3%		3%	
136	Conservation of Biological Diversity	3%		5%	
202	Plant Genetic Resources	15%		15%	
204	Plant Product Quality and Utility (Preharvest)	3%		2%	
205	Plant Management Systems	13%		20%	
212	Pathogens and Nematodes Affecting Plants	3%		10%	
216	Integrated Pest Management Systems	15%		15%	
315	Animal Welfare/Well-Being and Protection	5%		0%	
601	Economics of Agricultural Production and Farm Management	15%		13%	
<b>Total</b>		100%		100%	

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

### 1. Actual amount of professional FTE/SYs expended this Program

Year: 2007	Extension		Research	
	1862	1890	1862	1890
<b>Plan</b>	19.8	0.0	7.0	0.0
<b>Actual</b>	23.0	0.0	6.9	0.0

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

Extension		Research	
<b>Smith-Lever 3b &amp; 3c</b> 448152	<b>1890 Extension</b> 0	<b>Hatch</b> 267232	<b>Evans-Allen</b> 0
<b>1862 Matching</b> 134573	<b>1890 Matching</b> 0	<b>1862 Matching</b> 12000	<b>1890 Matching</b> 0
<b>1862 All Other</b> 0	<b>1890 All Other</b> 0	<b>1862 All Other</b> 0	<b>1890 All Other</b> 0

## **V(D). Planned Program (Activity)**

### **1. Brief description of the Activity**

The germplasm collection in Palau consisted of 22 varieties of sweet potato, 53 varieties of cassava and 98 varieties of taro, which were maintained at the R&D station by continuous replanting, weeding and fertilization. This served as the core collection of root crops and as sources of planting materials for farmers. There were 5,101 cultures maintained in the laboratory, 2,302 plantlets acclimatized in foam cups in the greenhouse, while 3999 plantlets were transferred in plastic bags. A total of 6795 tissue-cultured taro plants were distributed to farmers in different states of Palau and thirty varieties of taro were conserved in vitro in the laboratory. Research and demonstration farms were established in three farmer cooperators' land and at the R&D station to showcase appropriate banana production technologies. Some of the farms were planted with tissue cultured Lacatan bananas that have no manure and fertilizer (control), some with manure and fertilizer at planting time, some with manure and fertilizer application every two months, and manure application every 2 months. Data gathering, fertilizer application, weeding and removal of sick leaves were done every two months. Over a year, the plants that were applied fertilizer and manure every two months were significantly taller and more vigorous growing than those applied with manure only every two months and other two treatments, which showed the need for continuous nutrient management as an appropriate banana production technology. An alarming problem was the increase incidence of the disease caused by the fungus, *Marasmiellus* sp., which affects the pseudostem. Four varieties of sweet potato consistently showed the absence of scab-infected leaves and shoots while the Hawaiian variety was susceptible to fungal infection. A collaborative project with the Northern Marianas College on Dry Litter Waste Management System in pigpens was undertaken with the use of coconut husk and wood chips as bedding materials, which conserves water and protects water and land from contamination with pig manure and urine.

Research in the FSM included testing of different types of media formulation and preparation using various combinations of plant growth regulators with other components like organic and inorganic nutrients, vitamins and amino acids to develop suitable multiplication and maintenance protocol for local and acquired germplasm. Inoculation, aseptic culture establishment and multiplication of different varieties of banana, sweet potato, and taro were done. Varieties of banana, sweet potato and taro were inoculated for micropropagation and conservation. An effort to remedy prevailing citrus canker prompted a literature search to identify the best available germplasm for rootstock and budwood. Initial communication has started with the University of California to procure virus-indexed rootstock and budwood of lime. A nematode research project assessed the potential damage to plants by parasitic nematodes and since nematodes are a limiting factor in crop production, it is important to gather information thru surveys and collection of soil and root samples. Data on nematode density are necessary to elucidate whether a given type of nematode is causing any significant damage to crops. Periodic surveys were carried out on a wide spectrum of field grown and pot-grown plants to identify, record and document plant-parasitic nematodes and several parasitic species known elsewhere in the Pacific were documented.

Extension activities included farm visits and on-site demonstrations, community meetings and training workshops on acclimatization of tissue-cultured plantlets, soil-based issues in sustainable agricultural practices, noni production and marketing, paravet and Avian Influenza. Eradication measures continued for false kava and other alien invasive species. Extension staffs were involved in a survey of all the wood pigeons in preparation for the eradication of an exotic and invasive parrot in Pohnpei. Collaboration continued with appropriate agencies to address agricultural production and marketing, pest and diseases, and degradation and degeneration of biodiversities.

In the Marshall, meetings between farmers, government agencies, and regional and international programs (Taiwan Technical Mission and SPC) were held to discuss community needs and strengthen partnership in addressing these needs. A task force was organized by the government as a rapid response team to address any outbreak in the bird flu and the agriculture extension agent was a member. The agent continued to provide appropriate information and demonstrated proper ways of managing home gardens and domestic livestock (pigs and chickens). Sweet potato was the focus of backyard gardening as it is easy to cultivate and has high nutrient value. A taste trial on 12 sweet potato varieties resulted in a number of varieties accepted by the local population. Educating students and teachers on water quality issues occurred at several elementary and high schools. Presentations on conserving water, treating drinking water, and water purification techniques were made at these schools.

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

In Palau, the main target audience were the root crop farmers, college, high school and elementary school students and faculty who visited the R&D station and viewed our exhibits during various civic events such as Earth Day, Vocational Education Week, Olechotel Belau Fair, World Food Day.

Information on control of pests of crops and improving crop production, use of tissue culture techniques and importance of root crops germplasm conservation, water quality education and dry litter waste management were disseminated to all our target audiences.

In both Marshall Islands and FSM, the target audience included both crop and livestock farmers, producers, exporters, students, youths, homemakers, traditional and political leaders and colleagues from local and international and organizations.

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

**1. Standard output measures**

**Target for the number of persons (contacts) reached through direct and indirect contact methods**

	<b>Direct Contacts Adults</b>	<b>Indirect Contacts Adults</b>	<b>Direct Contacts Youth</b>	<b>Indirect Contacts Youth</b>
<b>Year</b>	<b>Target</b>	<b>Target</b>	<b>Target</b>	<b>Target</b>
<b>Plan</b>	600	3000	300	600
2007	1116	3500	500	1200

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

**Patent Applications Submitted**

<b>Year</b>	<b>Target</b>
<b>Plan:</b>	0
2007:	1

**Patents listed**

Esguerra, N.M. and Del Rosario, A.G. (2007). Economic Entomology in Micronesia. PCC. 214 pp.

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

**Number of Peer Reviewed Publications**

	<b>Extension</b>	<b>Research</b>	<b>Total</b>
<b>Plan</b>			
2007	0	0	0

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

**Output Target**

**Output #1**

**Output Measure**

Expected Professional Journal Publications.

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2007	0	3

**Output #2**

**Output Measure**

Expected Gray Literatures

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2007	0	4

**Output #3**

**Output Measure**

Expected publications for lay use.

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2007	0	6

**Output #4**

**Output Measure**

Conference presentations

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2007	0	20

**Output #5**

**Output Measure**

Conference publications

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2007	0	6

**Output #6**

**Output Measure**

Number of publications for lay use.

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2007	0	8

**Output #7**

**Output Measure**

Number of conference paper publication/presentations.

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2007	0	6

**Output #8**

**Output Measure**

Number of demonstration farms established.

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2007	0	12

**V(G). State Defined Outcomes**

<b>O No.</b>	<b>Outcome Name</b>
1	Number of persons with increased knowledge on appropriate production technologies.
2	Number of program participants adopting recommended practices.
3	Number of established farms and farm related businesses by individuals and cooperatives.

**Outcome #1**

**1. Outcome Measures**

*Not reporting on this Outcome for this Annual Report*

**2. Associated Institution Types**

**3a. Outcome Type:**

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
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**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

**What has been done**

**Results**

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
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**V(H). Planned Program (External Factors)**

**External factors which affected outcomes**

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

**Brief Explanation**

The administration of PCC has repeatedly refused to implement an important Western SARE approved component of the banana project, which has adversely affected the outcome of the project and the agency responsible for providing the biocontrol agent has difficulty rearing the good insect thus causing a much delayed implementation of the project.

At CMI-CRE, results indicated that people would like to continue working on their gardens and that they have learned a lot from the trainings they attended. During the El Nino drought, clients mentioned that they boiled their drinking water instead of drinking straight from the catchments. They clean out their roof gutters that connect directly to their catchments at least once a month.

At the COM-FSM-CRE, high increase in fuel prices has negatively impacted delivery of programs and increased the cost of farm inputs. On the other hand, there has been a positive effect as demand for local produce increased tremendously.

## **V(I). Planned Program (Evaluation Studies and Data Collection)**

### **1. Evaluation Studies Planned**

Before-After (before and after program)

Comparisons between program participants (individuals,group,organizations) and non-participants

Comparisons 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

### **Evaluation Results**

The increased areas for crop production are due to the availability of planting materials and the reduced incidences of pests are due to the availability of biological control agents. There was also an increased understanding of IPM techniques and the improved growth rate of crops is due to adopted practices of continuous fertilization. An increase understanding of the dry litter waste management system has conserved water and prevents animal waste and contaminants from polluting water sources and the environment.

### **Key Items of Evaluation**

Through the tissue culture technology, farmers are assured of continuous supply of planting materials that are disease-free and as a result of the dry litter waste management system, animal waste and other contaminants were prevented from polluting water sources and the environment.