

V(A). Planned Program (Summary)

Program # 9

1. Name of the Planned Program

Global Food Security and Hunger: Aquaculture and Fisheries Development Program

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	30%		30%	
111	Conservation and Efficient Use of Water	30%		30%	
112	Watershed Protection and Management	10%		10%	
135	Aquatic and Terrestrial Wildlife	30%		30%	
	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	2.0	0.0	1.0	0.0
Actual Paid Professional	1.2	0.0	0.8	0.0
Actual Volunteer	4.0	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
80832	0	21300	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	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

NMC CREES' Aquaculture & Fisheries Development Program (A&FDP) has become a major focal point in our program delivery. Although the actual personnel dedicated towards this program are fairly small when compared to many well-established Land Grant colleges offering such similar services, the A&FDP has been instrumental in the revival of the agriculture industry in our small locale. The following activities highlight the major undertakings and noteworthy accomplishments the program has made during this reporting cycle:

1. **Tilapia Feed Project:** Based on stakeholder feedback from the 2011- 2015, CNMI, Aquaculture, Strategic, Development, Plan (CNMIASDP), the A&FDP wrote and submitted a proposal in early 2013, and was subsequently awarded a grant in the amount of \$32,900 to build capacity among the Tilapia farmers in the production of Tilapia feed using locally available ingredient like taro, sweet potato, banana, etc. Using funds from the grant, the A&FDP arranged for eight (8) farmers to travel to Thailand in October for a weeklong training in feed making at the Asian Institute of Technology (AIT). Of the 8 farmers, one has already started using his knowledge from the training in making feed for his backyard Tilapia grow-out production.

2. **Community-based, Rabbitfish Development Project:** In the A&FDP's efforts to expand the aquaculture industry in the CNMI and to provide an alternative species for grow out, the program embarked on a project to conduct research on the captive reproduction of the Forktail Rabbitfish specie, a popular indigenous food fish, with a huge commercial potential in the Marianas. With commercial successes in marine shrimp and Tilapia production as a result A&FDP's efforts in research and demonstrations, the program turned its attention to marine finfish as the next aquaculture commodity to develop. In the summer of 2012, a community meeting was held to determine the specific, marine finfish species for development, and Rabbitfish, was the overwhelming choice by those present. As a result, a proposal was submitted to conduct the research in producing juveniles in captivity for eventual distribution to farmers for grow-out. A&FDP was awarded a grant of \$69,000 to conduct the research and to date the program have successfully spawned the locally collected broodstock in captivity. Project is ongoing.

3. **A&FDP Outreach:** To ensure the sustainability of the aquaculture industry in the CNMI, the A&FDP continues to conduct numerous outreach activities in the community throughout the year. One of these events, where large crowds can be engaged and educated about the activities of the program, were the annual, CNMI-wide, Agriculture Fairs. In these Fairs, displays were erected to highlight, promote, and educate the public on ongoing projects like aquaponics and Tilapia feed making. Additionally, the program welcomed and gave tours to adults and youths alike to the A&FDP wet laboratory on campus where visitors can observe the actual research projects being investigated or technology being demonstrated. In-classroom presentations, may it be on campus or in the schools, were also undertaken. The program conducted many workshops throughout the program year to improve the knowledge base of aquaculture farmers and the community in hopes of improving production at the farm site.

2. Brief description of the target audience

Youth and Adults
Aquaculture Producers
Government Agencies
Non Governmental Organizations
Business Community
Retirees looking at new investment

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	960	3000	493	800

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	0	0	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of aquaculture workshops

Year	Actual
2013	8

Output #2

Output Measure

- Number of aquaculture research project

Year	Actual
2013	1

Output #3

Output Measure

- number of short course/training

Year	Actual
2013	9

Output #4

Output Measure

- Number of aquaculture demonstration project

Year	Actual
2013	4

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Number of farmers familiar with Recirculating Aquaculture Systems
2	Number of farmers learning how to use locally available ingredients in the on-island production of feed
3	Number of youths familiar with aquaculture and aquaponics
4	Number of individuals that will venture into aquaculture

Outcome #1

1. Outcome Measures

Number of farmers familiar with Recirculating Aquaculture Systems

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	467

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Due to the CNMI's stringent waste discharge regulations, limited space, and mostly limestone-based soils, Recirculating Aquaculture System (RAS) is the preferred culture method for the production of aquatic animals and plants.

What has been done

Outreach in major public events, workshops, and trainings were some of the efforts undertaken to increase knowledge in RAS among the farmers.

Results

As a result of these extraordinary measures taken by the program, a new farm was started on the island of Saipan.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
111	Conservation and Efficient Use of Water
112	Watershed Protection and Management
135	Aquatic and Terrestrial Wildlife

Outcome #2

1. Outcome Measures

Number of farmers learning how to use locally available ingredients in the on-island production of feed

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	8

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Feed availability and cost has been identified by stakeholders as one of the constraints to expansion of the aquaculture industry in the CNMI.

What has been done

The A&FDP submitted and was awarded an external grant to build up capacity among CNMI farmers in the production of Tilapia feed using locally available ingredients. To this end, the program brought eight (8) farmers to the Asian Institute of Technology (AIT) in Thailand for hands-on training on Tilapia feed making.

Results

As a result, one of the farmers that participated in the Tilapia feed training in Thailand has started using his newly, learned skill to make feed using local ingredients like banana for his small scale Tilapia operation. As a result of applying knowledge gained from the AFDP, the farmer saved around \$1,000 on tilapia feed.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
111	Conservation and Efficient Use of Water
112	Watershed Protection and Management
135	Aquatic and Terrestrial Wildlife

Outcome #3

1. Outcome Measures

Number of youths familiar with aquaculture and aquaponics

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	493

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

The longevity and sustainability of the aquaculture and aquaponics industries in the CNMI will largely depend on the next generation of farmers. To this end, the A&FDP is very active in engaging youths in activities that promote and educate on aquaculture and aquaponics production.

What has been done

The A&FDP has been actively promoting aquaculture and aquaponics to the youth by way of school presentations, agriculture fair displays, field trips to active farms, and leading tours and demonstrations of the NMC CREES Aquaculture Wet Laboratory.

Results

As a result, the A&FDP is entertaining requests by schools for onsite aquaculture and aquaponics demonstration systems where the units will be used as science teaching tool.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
111	Conservation and Efficient Use of Water
112	Watershed Protection and Management
135	Aquatic and Terrestrial Wildlife

Outcome #4

1. Outcome Measures

Number of individuals that will venture into aquaculture

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	3

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

All indicators are pointing to the continued expansion of aquaculture worldwide as wild fisheries catch continues to decline. Half of seafood consumed today comes from fish farming. The situation in the CNMI is no different as growth in population has reduced the number of wild fish catch. However, the demand for seafood continues to grow and opportunities abound for aquaculture expansion in the CNMI.

What has been done

The ongoing activities that A&FDP is investigating in such as lowered feed and energy costs, capacity building, and new species development is providing current and potential farmers the sense of optimism that results in further investment and industry expansion.

Results

As a result of the program's outreach and the dynamics in the CNMI aquaculture industry itself, i.e., first CNMI shrimp farm acquired by multi-national company, three entrepreneurs are seriously looking into investing in aquaculture.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
111	Conservation and Efficient Use of Water
112	Watershed Protection and Management
135	Aquatic and Terrestrial Wildlife

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

The CNMI has been fortunate because it has not had a major storm in recent years. Unfortunately, it is also located in what's called "Typhoon Alley" so typhoons are a major threat to any agricultural activity in the Marianas and farmers are advised on the appropriate technology to address these concerns. Government regulations and competing public priorities are the only other externalities that are considered constraints to further expansion of the industry especially when it comes to permitting and allocation of government resources mostly going to the visitor industry.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

The tremendous growth of aquaculture in the CNMI in the last several years is testament to the efficacy of the program in knowledge and technology transfer to the farmers. Farmer sentiment, positive feedbacks, and word of mouth that result in referrals are proof of the strength of program delivery to the client.

Key Items of Evaluation