# 2010 Northern Marianas College Combined Research and Extension Annual Report of Accomplishments and Results

**Status: Accepted**

**Date Accepted: 07/22/2011**

## I. Report Overview

### 1. Executive Summary

Agriculture in the Commonwealth of the Northern Marianas Islands (CNMI) is often viewed as being insignificant due to the small acreage of arable land being occupied for food production. Although small in size, this territorial possession is a unique asset to the United States of America. The CNMI is one of only a few places where the U.S. flag is flown within a tropical climate making it thus far an untapped national resource with the potential in the area of specialty crop diversification and mariculture research.

The CNMI consisting of a population of 45, 000 post garment factory era is now facing an uphill battle with its ever dwindling economy. Due to the price increases in goods and commodities, as well as the implementation of federal immigration reform, people have found themselves going back to working the land for not only commercial production but personal consumption as well. This move back to agriculture has created a demand for a qualified agriculture workforce in which Northern Marianas College by virtue of its mandate must respond to.

The Northern Marianas College-Cooperative Research Extension and Education Service (NMC-CREES)
provides quality technical programs, services, and information to benefit the people, the environment, and the economy of the Commonwealth of the Northern Mariana Islands. With continuous interaction, collaboration and a unified direction, the department is dedicated to helping improve the economic well being, living conditions and overall quality of life of it stakeholders. Our stakeholders include: farmers, families, youth, individuals, government agencies, and various ethnic communities.

The CNMI's relatively small population coupled with the presence of the land grant system has strengthened the agricultural competitiveness of stakeholders, however much is still needed to attain sustainability. When compared to other Land Grant Institutions, NMC-CREES is small in size, with fewer than 30 employees distributed amongst the three most populated islands of Saipan, Tinian, and Rota. Although the institution may lack key human resources on paper, it makes up this difference by taking a creative approach at program delivery. In order to provide equitable services to our stakeholders, NMC-CREES relies on key partnerships with government agencies, non-profit organizations and other entities locally, regionally and nationally. These community partnerships enable us to promote our educational programs, extension services, and research projects, while steadily growing our professional capacity to support their respective organizations.

Extension services and research projects are primarily stakeholder driven as a result of the growing needs and challenges that the CNMI community must satisfy and face. These concerns raised by the CREES Advisory Council comprised of various faucets of our community to include representatives from the youth, families, government, business, and agriculture areas respectively.

The NMC-CREES mission "To be the leader in providing quality programs, services, and information in order to improve the CNMI's people, environment, and economy through agriculture, and the family consumer sciences," is accomplished through a range of technical programs offered through its two divisions of Agriculture Research & Extension (ARE) and Family & Consumer Sciences (FCS). NMC-CREES' integrated approach amongst its two divisions encourages a multidiscipline and multi-level alliance that encourages effectiveness and sturdy networking among research and extension faculty. This team endeavor shows the transition towards the recent publication of the National Goals established by the United States Department of Agriculture:

Strategic Goal 1: Assist rural communities to create prosperity so they are self-sustaining, repopulating, and economically thriving;
Strategic Goal 2: Ensure our national forests and private working lands are conserved, restored, and made more resilient to climate change, while enhancing our water resources;
Strategic Goal 3: Help America promote agricultural production and biotechnology exports as America works to increase food security;
Strategic Goal 4: Ensure that all of America's children have access to safe, nutritious, and balanced meals.

**CREES PROGRAMS**

**Programs involved in Agriculture Research & Extension (ARE) include:**

A. Livestock Improvement
B. Soil & Water Management
C. Plant Protection
D. Crop Production Improvement
E. Aquaculture Development Program

**The Family Consumer Sciences programs (FCS) include:**

A. Expanded Food & Nutrition Education (EFNEP)
B. Diet, Physical Activity, and Health
C. Community Resource Development

- Family Financial Management
- Sewing for Families with Limited Resources

D. 4-H Youth Development

**Total Actual Amount of professional FTEs/SYs for this State**

| Year: 2010 | Extension | | Research | |
|---|---|---|---|---|
| | 1862 | 1890 | 1862 | 1890 |
| Plan | 28.0 | 0.0 | 12.0 | 0.0 |
| Actual | 18.9 | 0.0 | 7.8 | 0.0 |

## II. Merit Review Process

### 1. The Merit Review Process that was Employed for this year

- Expert Peer Review
- Other (Program Leaders and Stakeholders representative )

### 2. Brief Explanation

**The Merit Review Process that was used for this year**

- Expert Peer Review
- Other (Program Leaders and Stakeholders)
- Internal University Panel

**Brief Explanation**

Since the number of CREES faculty is relatively small, all professional level staff are encouraged to participate in Merit Peer Review. Also, external collaborators including other institutions of higher learning may send their comments before the Peer Review Committee. A draft of the proposal to be reviewed is e-mailed to all of the CREES staff for suggestions and comments, well before the review meeting. The suggestions and commentary from the team are collated and submitted to who initiated the proposal. The draft proposal is revised and made available to all of the staff for the merit or peer review. All available professional research and extension staff participates in the review. During the review, we assess 1) the priority of importance of the proposed project; 2) the relevance of the proposal; 3) the quality and scientific value of the proposed research or extension activities and 4) the opportunities for partnering with others. The proposals are revised to incorporate the suggestions given during the merit review and approved by the Director of CREES who is recognized as both the State Agriculture Experiment Station Director and Cooperative Extension Director.

## III. Stakeholder Input

### 1. Actions taken to seek stakeholder input that encouraged their participation

- Use of media to announce public meetings and listening sessions
- Targeted invitation to traditional stakeholder groups
- Targeted invitation to traditional stakeholder individuals
- Targeted invitation to selected individuals from general public
- Survey of traditional stakeholder groups
- Survey of the general public

**Brief explanation.**

The following methods were used to encourage stakeholder participation:

- Use of print and electronic media to announce public meetings and listening sessions
- Targeted invitation to traditional stakeholder groups and demographics
- Targeted invitation to traditional stakeholder individuals
- Targeted invitation to selected individuals from general public
- Survey of traditional stakeholder groups
- Survey of the general public

Brief Explanation:
NMC-CREES continues to culture and nourish its relationship with its established advisory councils on the islands of Rota, Tinian and Saipan. The advisory council members include stakeholders within agriculture, homemakers, youth, businesses, various ethnic groups, and the indigenous population (Chamorros and Carolinians). These individuals are appointed to serve 2-year terms by the Northern Marianas College President and serve as the main instrument for program mapping and review.

**2(A). A brief statement of the process that was used by the recipient institution to identify individuals and groups stakeholders and to collect input from them**

**1. Method to identify individuals and groups**

- Use Advisory Committees
- Use Internal Focus Groups
- Needs Assessments

**Brief explanation.**

● Use Advisory Committees
● Use Internal Focus Groups
● Needs Assessments

Brief Explanation:

NMC-CREES has developed over the years as a major catalyst for the integration of technology via the
promotion of agriculture and food sciences areas. Because of its continued exposure and reliability of services in the community, the department has a strong following of supporters. Due to the financially unstable times, the department is experiencing a major increase in requests for agricultural and family consumer science consultations. Since we represent a largely diverse population, we make efforts at continuously looking for new stakeholders to serve. Our program staff provide the administration with a list of viable entities based on service delivery data collected in previous years. By providing such a list, the administration then forwards these individuals and/or entities with invitations to participate in the program review process.

**2(B). A brief statement of the process that was used by the recipient institution to identify individuals and groups who are stakeholders and to collect input from them**

**1. Methods for collecting Stakeholder Input**

- Meeting with traditional Stakeholder groups
- Meeting with traditional Stakeholder individuals
- Meeting with the general public (open meeting advertised to all)
- Meeting with invited selected individuals from the general public

**Brief explanation.**

● Meeting with traditional Stakeholder groups
● Meeting with traditional Stakeholder individuals
● Meeting with the general public (open meeting advertised to all)
● Meeting with invited selected individuals from the general public

Brief Explanation:
The Advisory Councils continue to hold their quarterly meetings and members discuss concerns that were brought to their attention from other farmers, homemakers, and community leaders. NMC-CREES held periodic meetings with stakeholders and solicited advice on community needs and priorities. In addition to such actions, our program personnel reciprocated such by

actively participating in meetings held by our partners. These include:

- CNMI Farmer Support Group Meetings
- Traditional Medicine
- The 1st and 2nd CNMI Agriculture Summit
- Soil and Water Conservation District meetings
- Head Start Health Advisory Council
- Division of Environmental Quality meetings
- Parent Teacher Association meetings
- Division of Youth Services meetings
- Farm Service Agency meetings & Other stakeholder associations

**3. A statement of how the input will be considered**

- In the Budget Process
- To Identify Emerging Issues
- Redirect Extension Programs
- Redirect Research Programs
- In the Staff Hiring Process
- In the Action Plans
- To Set Priorities

**Brief explanation.**

**A statement of how the input was considered**

- Identified Emerging Issues
- Redirect Extension Programs
- Redirect Research Programs
- In the Staff Hiring Process

**Brief explanation:**

Our department uses the community's input in program and activity planning.Such input also affects our
decision making process on whether or not such should be repeated again. NMC-CREES understands that in order to provide exemplary services to stakeholders, it must take the provided input in order to remain target specific.

- In Creating Action Plans
- To Set Funding Priorities

**Brief Explanation of what you learned from your Stakeholders**

**Brief Explanation of what you learned from your Stakeholders**

Because of input provided by our stakeholders we put focus on the following initiatives:

1. Put effort into identifying commodities that are less labor intensive;
2. Put effort at expanding on our value added commodities;
3. Concentrate on Aquaculture species that do not require the need to import feed.

## IV. Expenditure Summary

| 1. Total Actual Formula dollars Allocated (prepopulated from C-REEMS) | | | |
|---|---|---|---|
| Extension | | Research | |
| Smith-Lever 3b & 3c | 1890 Extension | Hatch | Evans-Allen |
| 911968 | 0 | 788157 | 0 |

| 2. Totaled Actual dollars from Planned Programs Inputs | | | | |
|---|---|---|---|---|
| | Extension | | Research | |
| | Smith-Lever 3b & 3c | 1890 Extension | Hatch | Evans-Allen |
| Actual Formula | 874253 | 0 | 611567 | 0 |
| Actual Matching | 0 | 0 | 0 | 0 |
| Actual All Other | 0 | 0 | 0 | 0 |
| Total Actual Expended | 874253 | 0 | 611567 | 0 |

| 3. Amount of Above Actual Formula Dollars Expended which comes from Carryover funds from previous | | | | |
|---|---|---|---|---|
| Carryover | 232628 | 0 | 154006 | 0 |

# V. Planned Program Table of Content

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

**Program # 1**

**1. Name of the Planned Program**

Livestock Improvement 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 |
|---|---|---|---|---|---|
| 301 | Reproductive Performance of Animals | 15% | | 15% | |
| 302 | Nutrient Utilization in Animals | 10% | | 10% | |
| 303 | Genetic Improvement of Animals | 15% | | 20% | |
| 307 | Animal Management Systems | 20% | | 15% | |
| 308 | Improved Animal Products (Before Harvest) | 5% | | 0% | |
| 311 | Animal Diseases | 15% | | 30% | |
| 312 | External Parasites and Pests of Animals | 5% | | 0% | |
| 313 | Internal Parasites in Animals | 5% | | 0% | |
| 314 | Toxic Chemicals, Poisonous Plants, Naturally Occurring Toxins, and Other Hazards Affecting Animals | 2% | | 0% | |
| 722 | Zoonotic Diseases and Parasites Affecting Humans | 3% | | 5% | |
| 902 | Administration of Projects and Programs | 5% | | 5% | |
| | **Total** | 100% | | 100% | |

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

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

| Year: 2010 | Extension | | Research | |
|---|---|---|---|---|
| | 1862 | 1890 | 1862 | 1890 |
| Plan | 1.8 | 0.0 | 1.3 | 0.0 |
| Actual | 0.5 | 0.0 | 0.5 | 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** |
| 61520 | 0 | 86166 | 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

At the present, the financial status of the CNMI is in total disarray. The central government has instituted a reduction of work hours from 80 hours per pay period to 64 hours. This amounts to a 20% reduction in pay for all its employees, as cuts on major appropriations. Compounded by the exodus of the textile industry which was a major contributor to the local economy through it's exports of finished goods. This allowed for cheaper pricing of day-to-day goods purchased by CNMI consumers. Absent their contributions, we are experiencing hikes in all goods and services. This crisis has ultimately resulted in a recession thus lowering the quality of life in this U.S. territory. The indigenous population's diet consists of a high protein diet filled by meat products. As people earn less these days, we are noticing them going back to the fields and living off of their land as their ancestors once thrived doing so previously. We are once again seeing the clearing of land for subsistence farming while others are now erecting facilities for the raising of goats, chickens, swine and cattle. As the demand for knowledge in the management of livestock continues to rise, the following activities were implemented to assist stakeholders in this transition period:

· Livestock faculty trained two local individuals to become Para Veterinary practitioners (Paravets) and one extension personnel from the CNMI Division of Agriculture on the topics of disease monitoring, sample and specimen collections as well as Non-infectious shipping instructions while conducting the Hatch approved CNMI Animal Health Survey;

· Staff conducted animal disease survey for the CNMI, in which we classified economic diseases based on their public health importance. Results were shared with the CNMI Department of Lands and Natural Resources (DLNR) on animal health regimen recommendations and USDA APHIS for future implementation of animal health programs;

· Personnel conducted on farm trainings (workshops, one on one farmer intervention and small group discussions for small farmers) on topics such as starting a livestock enterprise, genetic upgrading, animal welfare, animal nutrition and husbandry management, etc. Trained 13 ranchers on the use of artificial insemination as a technique to upgrade animal genetics. Currently, the CNMI has two certified AI technicians capable of providing such essential services to the community at large;

· The program continued promoting sustainable livestock waste management techniques at several island conferences, workshops and at field visits when such services are requested.

· After the successful acquisition of WSARE PDP funding, the program promoted alternative plant medicine as a practical solution to livestock healthcare. Surveys were collected from the CNMI and regional partners from Palau, Yap, Chuuk, Pohnpei, Kosrae and the Marshall Islands on the uses of local plants known for their medicinal properties;

· Educated community on zoonotic diseases such as Avian Flu, Brucellosis, etc. via flyers, e-mail reminders and during field visits;

· Performed grant writing workshops to promote SARE funding as a resource to tap as well as to develop interest among potential technical advisers in the field of agriculture within the CNMI;
· Organized sub-regional SARE conference in order to promote SARE funded projects in the CNMI for greater information sharing. Among those that attended included farmers and Agriculture professionals from Pacific region;
· Assisted numerous agriculture professionals in the promotion of agricultural practices in various fields through the use of Western SARE's PDP State Implementation funds
· Conducted the CNMI Animal Census with the assistance and partnership of DLNR in anticipation of the potential re-opening of a CNMI slaughterhouse.
Continued to seek out advancements in the field of veterinary science by enrolling in short courses pertaining to Animal Diseases and Reproduction as part of keeping up with new technological developments. This investment in capacity building would be transferred to other professionals in the CNMI and ultimately the farmer who is the end user.

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

*Youth and adult *Ranchers/farmers *Livestock producers *Government agencies *Leaders *Retirees looking at new investment *Entrepreneurs

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

**1. Standard output measures**

| 2010 | Direct Contacts Adults | Indirect Contacts Adults | Direct Contacts Youth | Indirect Contacts Youth |
|---|---|---|---|---|
| **Actual** | 375 | 1300 | 200 | 1300 |

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

**Patent Applications Submitted**

Year: 2010
Actual: 0

**Patents listed**

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

**Number of Peer Reviewed Publications**

| 2010 | Extension | Research | Total |
|---|---|---|---|
| **Actual** | 1 | 1 | 2 |

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

**Output Target**

**Output #1**

**Output Measure**

- Number of Research projects on Animal Diseases and management, Animal genetic upgrading, Animal nutrition, and Animal science

| Year | Actual |
|---|---|
| 2010 | 4 |

**Output #2**

**Output Measure**

- Number of Workshops and professional development trainings for livestock program (Production, Animal Health, etc.)and sustainable agriculture program

| Year | Actual |
|---|---|
| 2010 | 7 |

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

## V. State Defined Outcomes Table of Content

| O. No. | OUTCOME NAME |
|---|---|
| 1 | Numbers of clients adopted livestock best management practices as well as sustainable agriculture that resulted to creation of alternative livestock enterprise |
| 2 | Numbers of new client gained knowledge and skills about animal science, production, health and management,animal husbandry and sustainable agriculture |
| 3 | Number of clients that improved quality of life through increase income from animal husbandry and sustainable agriculture |

**Outcome #1**

**1. Outcome Measures**

Numbers of clients adopted livestock best management practices as well as sustainable agriculture that resulted to creation of alternative livestock enterprise

**2. Associated Institution Types**

- 1862 Extension
- 1862 Research

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

| Year | Quantitative Target | Actual |
|---|---|---|
| 2010 | 8 | 8 |

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**
Due to high price of commercial feeds available on island, more than eight ranchers that has been identified adopted the results from SARE funded projects on local feed utilization. Although, ration monitoring is a problem and recommendations were not followed thus affecting efficiency. Artificial insemination had a problem in Liquid nitrogen availability on island.

Clients are aware of diseases encountered in their farm. They were told of first aid to prevent from further occurance.

**What has been done**
SARE funded results were shared to the three islands, giving a recommendations of 1/3 commercial feed, 1/3 cooked slop and 1/3 available natural resource such as coconut, banana breadfruit etc. Feed analysis were also shared to public in both dry and wet matter analysis.

Careful planning should be done and order must be annual to lessen expenses.

Local rancher offers a fee for AI service, this provide sustainability for the program.

Disease survey were forwarded to DLNR Secretary/Veterinarian for Animal Health Regimen. For review and approval

**Results**
Proper feed management
22 AI calves and 6 AI pigs on the ground
Pending animal health regimen from local Ag

**4. Associated Knowledge Areas**

| KA Code | Knowledge Area |
|---|---|
| 301 | Reproductive Performance of Animals |
| 302 | Nutrient Utilization in Animals |
| 303 | Genetic Improvement of Animals |
| 307 | Animal Management Systems |
| 308 | Improved Animal Products (Before Harvest) |
| 311 | Animal Diseases |
| 312 | External Parasites and Pests of Animals |
| 313 | Internal Parasites in Animals |
| 314 | Toxic Chemicals, Poisonous Plants, Naturally Occurring Toxins, and Other Hazards Affecting Animals |
| 722 | Zoonotic Diseases and Parasites Affecting Humans |
| 902 | Administration of Projects and Programs |

**Outcome #2**

**1. Outcome Measures**

Numbers of new client gained knowledge and skills about animal science, production, health and management,animal husbandry and sustainable agriculture

**2. Associated Institution Types**

- 1862 Extension
- 1862 Research

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

| Year | Quantitative Target | Actual |
|---|---|---|
| 2010 | 20 | 300 |

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**
Because of the economic downturn, more and more people are interested with venturing to livestock farming. Some wanted improvements and registered at the Marianas Grazing Academy. Initial build up capital was the main problem for some.

**What has been done**
Series of workshops and hands on training for the Marianas Grazing Academy for local ranchers

Continued service for poultry layer/broiler production

Continued genetic improvement through Artificial Insemination

Initial importation of livestock feeds to resolve some pricing issues

Alternative feeding by use of local feeds stuff

More and more ranchers and farmers would like to avail grant monies to better improve their farm operation and provide solution to their current problems- They were offered a grant writing workshop  one on one and in groups

**Results**
Increased engagement and interest to livestock
Increased numbers of submitted grants and successful grant funded

**4. Associated Knowledge Areas**

| KA Code | Knowledge Area |
|---|---|
| 301 | Reproductive Performance of Animals |
| 302 | Nutrient Utilization in Animals |
| 303 | Genetic Improvement of Animals |
| 307 | Animal Management Systems |
| 308 | Improved Animal Products (Before Harvest) |
| 311 | Animal Diseases |
| 312 | External Parasites and Pests of Animals |
| 313 | Internal Parasites in Animals |
| 314 | Toxic Chemicals, Poisonous Plants, Naturally Occurring Toxins, and Other Hazards Affecting Animals |
| 722 | Zoonotic Diseases and Parasites Affecting Humans |

**Outcome #3**

**1. Outcome Measures**

Number of clients that improved quality of life through increase income from animal husbandry and sustainable agriculture

**2. Associated Institution Types**

- 1862 Extension
- 1862 Research

**3a. Outcome Type:**

Change in Condition Outcome Measure

**3b. Quantitative Outcome**

| Year | Quantitative Target | Actual |
|---|---|---|
| 2010 | 20 | 10 |

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**
Marketing and transportation is a limiting factor
No USDA approved slaughter house in the CNMI
Lower price of imports versus local produce

**What has been done**
Encourage investors to build slaughterhouse- on a feasibility study
Animal Survey for the CNMI for the feasibility study

**Results**
Pending slaughterhouse and marketing problems

**4. Associated Knowledge Areas**

| KA Code | Knowledge Area |
|---|---|
| 301 | Reproductive Performance of Animals |
| 302 | Nutrient Utilization in Animals |
| 303 | Genetic Improvement of Animals |
| 307 | Animal Management Systems |
| 308 | Improved Animal Products (Before Harvest) |
| 311 | Animal Diseases |
| 312 | External Parasites and Pests of Animals |
| 313 | Internal Parasites in Animals |
| 314 | Toxic Chemicals, Poisonous Plants, Naturally Occurring Toxins, and Other Hazards Affecting Animals |
| 722 | Zoonotic Diseases and Parasites Affecting Humans |

## 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
- Other (Cultural)

### Brief Explanation

Government lack of funding to support marketing structures in the CNMI
High shipping and freight charges not abale to compete with other silands like Hawaii

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

### Evaluation Results

In order to attain improvement of program success, the following point should be coordinated with government support:

Provision of small scale slaughterhouse
Provide solution to shipping/freight charges
Control of importation of meat products- compete with local produce
Provision of an approved anaimal health regimen for local ranchers guidance from DLNR
Regulations of livestock feed price
Creation of cooperatives from local ranchers

### Key Items of Evaluation

NIFA provisison of slaughter house funding.
Delegation of a Veterinarian in the CNMI.

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

**Program # 2**

**1. Name of the Planned Program**

Plant Protection 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 |
|---|---|---|---|---|---|
| 211 | Insects, Mites, and Other Arthropods Affecting Plants | 30% | | 20% | |
| 212 | Pathogens and Nematodes Affecting Plants | 20% | | 30% | |
| 213 | Weeds Affecting Plants | 10% | | 10% | |
| 214 | Vertebrates, Mollusks, and Other Pests Affecting Plants | 5% | | 5% | |
| 215 | Biological Control of Pests Affecting Plants | 20% | | 20% | |
| 216 | Integrated Pest Management Systems | 15% | | 15% | |
| | **Total** | 100% | | 100% | |

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

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

| Year: 2010 | Extension | | Research | |
|---|---|---|---|---|
| | 1862 | 1890 | 1862 | 1890 |
| Plan | 4.3 | 0.0 | 5.3 | 0.0 |
| Actual | 2.0 | 0.0 | 1.8 | 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 |
| 135357 | 0 | 123450 | 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

Biological and other methods of control against invasive weeds, insect pests, mollusks and plant diseases were used this past year. As an example, the weed, Coccinia grandis, which came to the island of Saipan in the late 1980's, has since spread throughout the island of Saipan and recently found its way to the islands of Tinian and Rota.On Saipan, this invasive species has inundated even the forest areas climbing and covering all types of vegetation, including indigenous plants. In Hawaii, this invasive species is controlled by two species of beetles (Acythopeus coccinae and A. burkhartorum) and a species of moth (Mellitia oedipus). The two species of weevils were introduced in 2002; however only A. coccinae has become established and exerting some control on Coccinia grandis. In August 2007, we introduced Melittia oedipus moth into Saipan and into Rota in October 2007, monitoring is ongoing and A. coccinae and Melittia oedipus is established. A Psyllid has been introduced for control of the invasive weed Mimosa diplotricha, its establishment is being monitored. Control of the Cuban slug,Veronicella cubensis, in the island of Rota, is ongoing. In March 2006, the Papaya Mealybug (Paracoccus marginatus) was detected in Tinian, and in June and August 2007, we introduced three (3) parasitoids to control this pest, this pest has not been a problem since. In October 2006, we found Erythrina gall wasp (Quadrasticus erythrinae) infesting Erythrina variegata in Saipan. Upon further survey, we found the gall wasp also infesting Erythrina in Tinian and Rota, a permit from USDA-APHIS has been acquired to import its biological control, additionally, we have secured funding for this work. In September 2006, a single specimen of the Coconut Rhinoceros Beetle (CRB) (Oryctes rhinoceros) was collected in a warehouse on cement pallet at the Charley Dock in Saipan. We surveyed the coconut palms and potential breeding sites in the vicinity, but we found no sign of other CRB. Interestingly, in September 2007, the CRB was detected in Tumon, Guam. Infestations include adult beetle damage to coconut palms and larvae breeding in dead coconut stumps and debris. We are monitoring this pest in the CNMI, since it is established in Guam, monitoring traps have been placed in ports of entry, and hotels. We intend to continue to apply the best management methods of control and to find natural enemies to supplement other methods of control. There are many more existing weeds, arthropods and other crop pests and diseases that require continuous application of best management methods. We will continue to improve on these methods and to extend the knowledge to our stakeholders. We will also continue to collect arthropods of economic importance, expand and enhance the economic insect collection, and the general invertebrate collection for reference, for taxonomic studies, and for educational purposes. Nematodes in banana, pineapple, and other important crops have been identified. Knowledge has been given to our stakeholders through workshops. Preparation of publications is ongoing. Nematodes of Casuarina tree have been identified.

### 2. Brief description of the target audience

- Farmers, other crop producers and farm helpers
- Business operators that promote or sell farm products
- Grade schools, high schools and college students interested in further knowledge in agriculture
- Adult Volunteer Leaders (4-H Clubs)

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

### 1. Standard output measures

| 2010 | Direct Contacts Adults | Indirect Contacts Adults | Direct Contacts Youth | Indirect Contacts Youth |
|---|---|---|---|---|
| **Actual** | 500 | 1500 | 600 | 1000 |

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

**Patent Applications Submitted**

Year: 2010

Actual: 0

**Patents listed**

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

**Number of Peer Reviewed Publications**

| 2010 | Extension | Research | Total |
|---|---|---|---|
| **Actual** | 2 | 0 | 2 |

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

**Output Target**

**Output #1**

**Output Measure**

- Number of Research Projects completed on Invasive Species such as scarlet guard, melon fly, papaya mealy bug, and Cuban slug)

| Year | Actual |
|---|---|
| 2010 | 3 |

## V(G). State Defined Outcomes

# V. State Defined Outcomes Table of Content

| O. No. | OUTCOME NAME |
|---|---|
| 1 | Number of farmers using Integrated Pest Management to control invasive species |
| 2 | Decrease the population of the various invasive species (Cuban Slug; Melon Fly; Sweet potato Weevil; Whiteflies infestation) by certain percentage: |
| 3 | Number of clients learning Pesticide Safety |

**Outcome #1**

**1. Outcome Measures**

Number of farmers using Integrated Pest Management to control invasive species

**2. Associated Institution Types**

- 1862 Extension

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

| Year | Quantitative Target | Actual |
|---|---|---|
| 2010 | 3 | 20 |

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**
Farmers in the CNMI generally have low knowledge of pest identification or biology, so most problems are solved using insecticides such as Seven or Malathion, even though the problem might not be an insect it might not be the best time for spray. This results in low effectiveness and high impact on non-targets, especially biological control and pollinators.
Nematodes, such as Meloidogyne and Helicotylenchus are common problems in farms. Farmers were unaware of them being below the soil. The damage is extensive.

**What has been done**
Workshops on pest identification and integrated pest management have been conducted. Farmer visits are frequent. Pheromone traps for sweet potato weevil and melon fly are provided. Neem trees have been distributed to farmers and education on how make the extract with Neem and dish washing soap have been provided. Effectiveness demonstrations are common at fairs, open house, workshops and farm visits. Brochures and videos are provided to achieve success at different levels.
For Nematodes, workshops have been provided on best management practices, brochures and videos are currently being produced.

**Results**
Farmers have greater knowledge of pest identity and management. The pheromone traps are in high demand. Neem extract is a common pest management method used as a result of our continuous outreach efforts.
A number of farmer now know what nematodes are and are interested in using the management practices recommended. Seeds of Sunnhemp cover crop are being distributed. Sunnhemp has nematicidal properties.

**4. Associated Knowledge Areas**

| KA Code | Knowledge Area |
|---|---|
| 211 | Insects, Mites, and Other Arthropods Affecting Plants |
| 212 | Pathogens and Nematodes Affecting Plants |
| 213 | Weeds Affecting Plants |
| 214 | Vertebrates, Mollusks, and Other Pests Affecting Plants |
| 215 | Biological Control of Pests Affecting Plants |
| 216 | Integrated Pest Management Systems |

**Outcome #2**

**1. Outcome Measures**

Decrease the population of the various invasive species (Cuban Slug; Melon Fly; Sweet potato Weevil; Whiteflies infestation) by certain percentage:

**2. Associated Institution Types**

- 1862 Extension
- 1862 Research

**3a. Outcome Type:**

Change in Condition Outcome Measure

**3b. Quantitative Outcome**

| Year | Quantitative Target | Actual |
|---|---|---|
| 2010 | 30 | 30 |

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

The Cuban slug is a serious problem in Rota and poses a threat to the other neighboring islands'. It consumes most agricultural plants and is a possible vector of the rat lungworm. Farmers do not have management strategies for this new invasive pest.

The Melon fly is another devastating problem affecting cucurbit crops, especially bitter melon. Management practices are difficult and somewhat labor intensive, such as the bagging of fruits. Because of the infestation of the invasive weed scarlet gourd, which is also a host for melon fly, the numbers of melon fly is high and cannot be reasonably controlled.

The Sweet Potato Weevil is the worst pest of sweet potato in the CNMI. It is widely distributed, and because a great part of its life is below the soil in the sweet potato, it is not easy to control with common insecticides.

**What has been done**

For Cuban Slug, duck have been introduced and trained as predators of cuban slugs, Neem extract and baits are used and have been effective in controlling the problem.

Pheromone traps for melon fly and sweet potato weevil are provided to farmer and they provide some control. In addition other management practices are recommended.

**Results**
The populations of these pest are controlled in the farm areas and this makes it possible for farmers to grow their crops.

**4. Associated Knowledge Areas**

| KA Code | Knowledge Area |
|---|---|
| 211 | Insects, Mites, and Other Arthropods Affecting Plants |
| 212 | Pathogens and Nematodes Affecting Plants |
| 213 | Weeds Affecting Plants |
| 214 | Vertebrates, Mollusks, and Other Pests Affecting Plants |
| 216 | Integrated Pest Management Systems |

**Outcome #3**

**1. Outcome Measures**

Number of clients learning Pesticide Safety

Not Reporting on this Outcome Measure

**V(H). Planned Program (External Factors)**

**External factors which affected outcomes**
- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Competing Public priorities

**Brief Explanation**

Many of the problems that we are tackling as a program require time in which can not be listed in one reporting period. Efforts are underway, yet results are still years away from being realized. As such, many of the impacts we expect are not quite available for reporting.

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

**Evaluation Results**

**Key Items of Evaluation**

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

**Program # 3**

**1. Name of the Planned Program**

Crop Improvement 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 | 5% | | 5% | |
| 125 | Agroforestry | 5% | | 5% | |
| 136 | Conservation of Biological Diversity | 5% | | 5% | |
| 202 | Plant Genetic Resources | 10% | | 10% | |
| 204 | Plant Product Quality and Utility (Preharvest) | 20% | | 20% | |
| 205 | Plant Management Systems | 30% | | 30% | |
| 212 | Pathogens and Nematodes Affecting Plants | 10% | | 10% | |
| 401 | Structures, Facilities, and General Purpose Farm Supplies | 5% | | 5% | |
| 901 | Program and Project Design, and Statistics | 5% | | 5% | |
| 902 | Administration of Projects and Programs | 5% | | 5% | |
| | **Total** | 100% | | 100% | |

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

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

| Year: 2010 | Extension | | Research | |
|---|---|---|---|---|
| | 1862 | 1890 | 1862 | 1890 |
| Plan | 3.0 | 0.0 | 2.0 | 0.0 |
| Actual | 1.3 | 0.0 | 3.5 | 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** |
| 94178 | 0 | 208311 | 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

Tissue culture (Micropropagation) of economically important food crops such as banana, sweet potato and taro continue to produce quality and disease free plants. Field trials and evaluations of new varieties in fruits, root crops and vegetables were conducted in local soil and climatic conditions of CNMI. Research projects in the form of fruit and vegetable variety trials were performed locally.New projects on dragonfruit (pitaya) and papaya breeding were initiated. Field days and taste testing (sensory evaluation) were organized for the new varieties of taro, sweet potato and banana. Hands on training and workshops conducted targeting farmers, extension agents, and students on topics that include fruit tree grafting, pruning, plant diseases identification and propagationmethodologies. The program continues to care and maintain citrus rootstocks and germplasm at the NMC-CREES experimental station on the neighboring isla nd of Tinian. Video production was used whenever possible to ensure the longevitity of the projects conducted way beyond the proposed lifespan of the projects performed.Publications (brochures and fact sheets) were coupled with onsite presentations were done in order to reach an array of different target audiences. Farmer type gatherings such as association meetings, soil and water conservation district meetings and forums were some of the venues that helped promote advancements in agriculture. Students from the grade school, high school and collegieate level were involved in activities and presentations when ever possible. The program promoted the implementation of best management practices on farms throughout the community in an effort to increase agricultural success and the overall economies of stakeholders served. Results of the resaerch projects were presented in national and interantional scientific meetings and conferences in order to attract scientific talent internationally in the hopes of tackling some of our common defficiencies.

### 2. Brief description of the target audience

* Government /Agency Collaborators
* All farm crop producers and farm helpers in the CNMI
* Business operators that promote or sell farm products
* Grade school, High School and College student
* Adult Volunteer Leaders (4-H Clubs)

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

### 1. Standard output measures

| 2010 | Direct Contacts Adults | Indirect Contacts Adults | Direct Contacts Youth | Indirect Contacts Youth |
|---|---|---|---|---|
| **Actual** | 130 | 500 | 150 | 510 |

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

**Patent Applications Submitted**

Year: 2010

Actual: 0

**Patents listed**

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

**Number of Peer Reviewed Publications**

| 2010 | Extension | Research | Total |
|---|---|---|---|
| **Actual** | 3 | 2 | 5 |

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

**Output Target**

**Output #1**

**Output Measure**

- Number of research projects completed on Crop Improvement Issues

| Year | Actual |
|---|---|
| 2010 | 3 |

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

## V. State Defined Outcomes Table of Content

| O. No. | OUTCOME NAME |
|---|---|
| 1 | Number of households that begin to grow food in their own garden |
| 2 | Number of farmers that learn to use Organic agriculture production systems on farm |
| 3 | Number of farmers using Sustainable Agriculture techniques (best management practices) such as cover cropping, mulching, rotational grazing, no-till farming, composting, etc. |
| 4 | Number of farmers begin plant propagation and grafting techniques |

**Outcome #1**

**1. Outcome Measures**

Number of households that begin to grow food in their own garden

**2. Associated Institution Types**

- 1862 Extension
- 1862 Research

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

| Year | Quantitative Target | Actual |
|---|---|---|
| 2010 | 20 | 20 |

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**
Farmers throughout the CNMI are finding it increasingly difficult to farm competitively as a result of the various constraints that include increases in water rates,the newly implemented increase in minimum wage, the ban of more effective pesticides, and the introduction of invasive species that are highly expensive to combat.

**What has been done**
The three islands collaborators contributed to the success of these programs through initiating field days, taste testing events,continuous workshops, extension visits, and one on one sessions with the farmers. These events were organized in order to assist farmers in identifying more marketable crops and introducing them to the benefits of using tissue cultured plant material. The program put much effort at increasing the availability of different varieties this past year. The department through the advice of farmers now has over fifty new varieties of taro, sweet potato and banana produced through tissue culture. Fruit trees such as noni, dao'k, papaya, breadfruit, mango, canarium, citrus and avocado are also being propagated at the request of farmers. The team serviced over 175 farmers for 2010. Client visitation and consultation continue to be done on a
regular basis that covers disease diagnosis, soil and nutrient management, soil analysis, disease prevention and treatment, composting and other related fields of crop production. New programs on dragonfruit(pitaya)and papaya breeding were initiated because of their low water requirements and ease of care due to the increasing labor costs farmers are now facing.

**Results**
The department's introduction of varieties coupled with the current hardships being faced has resulted in an increase of the number of clients requesting agricultural consultation. Due to our continuous promotion of alternative pesticides such as neem and bascilius thurengiensis,farmers

are now reporting successful gains in revenue and overall productivity.
With the use of tissue culture plants in taro, sweet potato and banana, it is estimated that crop production and efficiency have improved well in three crops and in general overall crop production due to improved plant health services.
Increasing number of farmers are showing interest in grafting of fruit trees such as mango, avocado, citrus as a result of our short courses.
Farmers have reported that as a result of such workshops they now have a better grasp of more effective methods of propagation and why some although difficult may increase their chances of success.

**4. Associated Knowledge Areas**

| KA Code | Knowledge Area |
|---|---|
| 102 | Soil, Plant, Water, Nutrient Relationships |
| 125 | Agroforestry |
| 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 |
| 401 | Structures, Facilities, and General Purpose Farm Supplies |
| 901 | Program and Project Design, and Statistics |
| 902 | Administration of Projects and Programs |

**Outcome #2**

**1. Outcome Measures**

Number of farmers that learn to use Organic agriculture production systems on farm

**2. Associated Institution Types**

- 1862 Extension
- 1862 Research

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

| Year | Quantitative Target | Actual |
|---|---|---|
| 2010 | 10 | 10 |

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**
Farmers throughout the CNMI recognize the environmental and nich market benefits to adopting organic agriculture. Although this is apparent, many do not understand in great depth the necessary steps at to receive such certification.

**What has been done**
Demonstration plots on various farm sites in the form of vegetable variety trials were performed throughout the three
populated islands of the CNMI. A workshop on pest identification and herbal medicine were also conducted through out the three islands Saipan, Rota and Tinian. The workshop covered training and demonstration on soil, nutrient, pest and disease management. The sponsored workshops were attended by over 120 farmers/stakeholders showing strong promise of greater acceptance.

**Results**
Although we have had numerous attendance at workshops, we do not have quantitative numbers at the present. Farmers are currently using some of the techniques learned, however none have been organically certified.

**4. Associated Knowledge Areas**

| KA Code | Knowledge Area |
|---|---|
| 102 | Soil, Plant, Water, Nutrient Relationships |
| 202 | Plant Genetic Resources |
| 204 | Plant Product Quality and Utility (Preharvest) |
| 205 | Plant Management Systems |
| 212 | Pathogens and Nematodes Affecting Plants |
| 401 | Structures, Facilities, and General Purpose Farm Supplies |

**Outcome #3**

**1. Outcome Measures**

Number of farmers using Sustainable Agriculture techniques (best management practices) such as cover cropping, mulching, rotational grazing, no-till farming, composting, etc.

**2. Associated Institution Types**

- 1862 Extension

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

| Year | Quantitative Target | Actual |
|---|---|---|
| 2010 | 10 | 95 |

### 3c. Qualitative Outcome or Impact Statement

**Issue (Who cares and Why)**
Commercial Fertilizers are simply too expensive or not even available, on many pacific islands. Furthermore,the risk of continued use commercial fertilizers and tilling are a threat to the sensitive ecosystems in the islands. Although, local production of food is critical to public health and security. Food Security is a major issue for Pacific Islands. Although, the threat of unsustainable farming practices is considerable. It is really important for all islanders, farmers, landscapers, and members of the general community adopt BEST management practices in order to protect water resources and coral reefs from pollution.

**What has been done**
Continued outreach and education on composting practices was facilitated through workshops, demonstrations, and one-on-one consultation.

**Results**
More producers are beginning to compost animal and yard scraps. The use of compost has become more popular among growers.

### 4. Associated Knowledge Areas

| KA Code | Knowledge Area |
|---|---|
| 102 | Soil, Plant, Water, Nutrient Relationships |
| 401 | Structures, Facilities, and General Purpose Farm Supplies |
| 901 | Program and Project Design, and Statistics |

## Outcome #4

### 1. Outcome Measures

Number of farmers begin plant propagation and grafting techniques

### 2. Associated Institution Types

- 1862 Extension
- 1862 Research

### 3a. Outcome Type:

Change in Knowledge Outcome Measure

### 3b. Quantitative Outcome

| Year | Quantitative Target | Actual |
|---|---|---|
| 2010 | {No Data Entered} | 15 |

### 3c. Qualitative Outcome or Impact Statement

**Issue (Who cares and Why)**

Issues with seeds viability, abnormality in fruits and vegetables, lack of planting material, diseases in root stocks are continue being experienced in the farming community. Demand for fruits and vegetables seedlings among the farming community has increased. However, there is a lack of training, knowledge and skills in various methods of
plant propagation.

**What has been done**

Crop Improvement team put together various workshops and "hands on" training sessions throughout the three islands Saipan, Rota and Tinian. Workshop on plant propagation, in which various methods of propagation
demonstrated with special focus on grafting in fruit trees, such as mango, avocado and citrus. A project with a farmer was conducted in Saipan that showcase various techniques on how to increase plantings of pineapple plants using various plant parts, such as quartering of crowns, suckers and stems to increase slips materials.

**Results**

Farmers, agriculture extension agents, students and other interested people from the community learned the techniques of grafting, air layering and budding in fruit trees. Increased knowledge in the various plant propagation methods and understanding. Scion budwoods of new cultivars of mango, avocado and citrus grafted on local varieties with different grafting techniques such as wedge, cleft, bark and side veneer graft in mango,avocado and T-budding in citrus demonstrated in three islands Saipan, Rota and Tinian. Grafted rootstocks and
take transferred in the experimental farm in Saipan, Rota and Tinian.
Crop Production program leader received blue ribbon extension communication award from the American Horticultural Society for Horticulture Science (ASHS)-Southern Region in annual conference held in Corpus Christie, Texas.

**4. Associated Knowledge Areas**

| KA Code | Knowledge Area |
|---|---|
| 202 | Plant Genetic Resources |
| 204 | Plant Product Quality and Utility (Preharvest) |
| 205 | Plant Management Systems |

## V(H). Planned Program (External Factors)

**External factors which affected outcomes**

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Competing Public priorities

**Brief Explanation**

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Competing Public priorities

Brief Explanation

We did not experience any external factors that would hinder the progress of our projects

for this fiscal year.

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

### Evaluation Results

### Key Items of Evaluation

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

**Program # 4**

**1. Name of the Planned Program**

Soil and Water Quality 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 | 60% | | 0% | |
| 111 | Conservation and Efficient Use of Water | 30% | | 0% | |
| 403 | Waste Disposal, Recycling, and Reuse | 10% | | 0% | |
| | **Total** | 100% | | 0% | |

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

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

| Year: 2010 | Extension | | Research | |
|---|---|---|---|---|
| | 1862 | 1890 | 1862 | 1890 |
| Plan | 1.0 | 0.0 | 1.0 | 0.0 |
| Actual | 1.0 | 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 |
| 40816 | 0 | 0 | 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**

Development and promotion of alternative waste managements systems, mainly The Dry Litter

Waste Management system fo hogs, was invigorated in 2010, increasing the body of knowledge that exists for these technologies. Through a variety of delivery methods, the network of advocates and supporters of agriculture technology transfer and continued education of producers and change agents was facilitated through demonstrations, communication, and collaboration. As approval and interest in Dry Technologies increases, outreach efforts have served to meet the demand for information and guidance, which has served to reduce the opportunities for mistakes, particularly with designs and standard operating procedures. In essence, our team has become a regional source for information and guidance. This years activities with workshops, working meetings, and consultation comprised much of this years activites.

The soil and water program has also continued to work with federal and local parnters on soils and water testing, recommending BEST management practices, and documenting these finding in order to provide producers and advisers information, especially for critical areas of concern where erosion or pollution are likely.

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

Environmental Protection Agency, Natural Resources Conservation Service, Farm Service Agency, United States Geological service, University of Hawaii CRE, Palau Community College, University of Guam, Department of Environmental Quality, Department of Land and Natural Resources, Coastal Resources Management.
All farm producers and farm helpers in the (CNMI Business operators that promote or sell farm produce)
Grade school, High School and College students
Adult Volunteer Leaders (4-H Clubs)

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

**1. Standard output measures**

| 2010 | Direct Contacts Adults | Indirect Contacts Adults | Direct Contacts Youth | Indirect Contacts Youth |
|---|---|---|---|---|
| **Actual** | 95 | 400 | 60 | 400 |

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

**Patent Applications Submitted**

Year: 2010
Actual: 0

**Patents listed**

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

**Number of Peer Reviewed Publications**

| 2010 | Extension | Research | Total |
|---|---|---|---|
| **Actual** | 0 | 0 | 0 |

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

**Output Target**

**Output #1**

**Output Measure**

- Number of research projects completed on Soil and Water Quality Issues

| Year | Actual |
|---|---|
| 2010 | 0 |

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

## V. State Defined Outcomes Table of Content

| O. No. | OUTCOME NAME |
|---|---|
| 1 | Number of households recycling aluminum cans or other recyclable commodities such as paper and plastic |
| 2 | Number of households learning to safely use Rain-catchments systems |
| 3 | Number of farmers using Dry Litter Waste Management Systems for Hogs |
| 4 | Number of farmers or members of the community learning to compost animal wastes, yard scraps, etc. |
| 5 | Number of farmers using Sustainable Agriculture techniques (best management practices) such as cover cropping, mulching, rotational grazing, no-till farming, composting, etc... |

**Outcome #1**

**1. Outcome Measures**

Number of households recycling aluminum cans or other recyclable commodities such as paper and plastic

**2. Associated Institution Types**

- 1862 Extension

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

| Year | Quantitative Target | Actual |
|---|---|---|
| 2010 | 20 | 85 |

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**
There is a deep desire across the community to change the culture of throwing trash everywhere. The ecosystems,and water resources in particular are sensitive and threatened. Pollution of water resources and coral reefs can be avoided with better cultural practices, such as recycling.

**What has been done**
Continued promotion and education on watershed processes and recycling eduction, especially among the youth.

**Results**
Many people in the CNMI continue or have begun recycling. Recycling Businesses are continuing to pop up in order to meet the demand for processing and marketing of these commodities.

**4. Associated Knowledge Areas**

| KA Code | Knowledge Area |
|---|---|
| 403 | Waste Disposal, Recycling, and Reuse |

**Outcome #2**

**1. Outcome Measures**

Number of households learning to safely use Rain-catchments systems

Not Reporting on this Outcome Measure

**Outcome #3**

**1. Outcome Measures**

Number of farmers using Dry Litter Waste Management Systems for Hogs

**2. Associated Institution Types**

- 1862 Extension

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

| Year | Quantitative Target | Actual |
|---|---|---|
| 2010 | 8 | 29 |

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**
Leptosporosis, which thrives in Hog Urine and feces, continues to create a threat to public health in the Pacific Islands where hog production is most important and culturally significant. Identifying technologies that allow for sustainable hog production has become critical for keeping producers in business, while protecting and enhancing these small island environments.

**What has been done**
Continued documentation and dissemination of information regarding design parameters, challenges, and safety of Dry Litter Techologies has continued.

**Results**
Quality designs for Dry Piggeries has gotten the attention and efforts of Engineers involved into program, improving the level of acceptance of the system among farmers and farm advocates(funding agencies). These designs have set a new standard and allowed producers to renovate or build their piggeries correctly on the first shop, improving the chance of operational success and contentment with this technology. Meeting and discussing the progress in terms of the transfer of Dry Technology among producers and change agents in the region has gotten us one step further towards convincing NRCS that standards need to be adopted by their agency to meet the demand for the number of producers wanted to change over to Dry Systems.

**4. Associated Knowledge Areas**

| KA Code | Knowledge Area |
|---|---|
| 111 | Conservation and Efficient Use of Water |
| 403 | Waste Disposal, Recycling, and Reuse |

**Outcome #4**

**1. Outcome Measures**

Number of farmers or members of the community learning to compost animal wastes, yard scraps, etc.

**2. Associated Institution Types**

- 1862 Extension

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

| Year | Quantitative Target | Actual |
|---|---|---|
| 2010 | 30 | 95 |

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**
Commercial Fertilizers are simply too expensive or not even available, on many pacific islands. Furthermore,the risk of continued use commercial fertilizers and tilling are a threat to the sensitive ecosystems in the islands. Although, local production of food is critical to public health and security.

**What has been done**
Continued outreach and education on composting practices was facilitated.

**Results**
A number of producers and citizens are composting yard scraps or animal waste and applying compost to crops and soils.

**4. Associated Knowledge Areas**

| KA Code | Knowledge Area |
|---|---|
| 111 | Conservation and Efficient Use of Water |
| 403 | Waste Disposal, Recycling, and Reuse |

**Outcome #5**

**1. Outcome Measures**

Number of farmers using Sustainable Agriculture techniques (best management practices) such as cover cropping, mulching, rotational grazing, no-till farming, composting, etc...

**2. Associated Institution Types**

- 1862 Extension

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

| Year | Quantitative Target | Actual |
|---|---|---|
| 2010 | 10 | 25 |

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**
Food Security is a major issue for Pacific Islands. Although, the threat of unsustainable farming practices is considerable. It is really important for all islanders that farmers, landscapers, and members of the general community adopt BEST management practices in order to protect water resources and coral reefs from pollution.

**What has been done**
Workshops, demonstrations, and one-on-one consultation

**Results**
More producers are beginning to compost animal and yard scraps. The use of compost has become more popular amongs growers.

**4. Associated Knowledge Areas**

| KA Code | Knowledge Area |
|---|---|
| 102 | Soil, Plant, Water, Nutrient Relationships |
| 111 | Conservation and Efficient Use of Water |
| 403 | Waste Disposal, Recycling, and Reuse |

## V(H). Planned Program (External Factors)

### External factors which affected outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Competing Public priorities

### Brief Explanation

We have had some pretty extreme droughts recently. Furthermore, producers are increasingly plaqued by the rising costs of production and competition for land and other resources.

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

### Evaluation Results

### Key Items of Evaluation

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

**Program # 5**

**1. Name of the Planned Program**

Community Resource Development

### V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

| KA Code | Knowledge Area | %1862 Extension | %1890 Extension | %1862 Research | %1890 Research |
|---|---|---|---|---|---|
| 801 | Individual and Family Resource Management | 50% | | 0% | |
| 802 | Human Development and Family Well-Being | 50% | | 0% | |
| | **Total** | 100% | | 0% | |

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

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

| Year: 2010 | Extension | | Research | |
|---|---|---|---|---|
| | 1862 | 1890 | 1862 | 1890 |
| Plan | 3.0 | 0.0 | 0.0 | 0.0 |
| Actual | 3.0 | 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 |
| 115472 | 0 | 0 | 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**

The NMC-CREES, CRD Program, conducted a series of workshops focused on Legal Considerations Facing Older Adults in the CNMI, Family Financial Management, Traditional Home Arts & Designs and issued certificates of successful completion to those participants completing the established

program requirements. The CRD Sewing Class for Beginners continues to see an increase in the number of students successfully completing the 3-month course.

In addition, the CRD Program continues to collaborate and coordinate the Safe Home-Canning and Food Preservation workshops as part of its collaborative work with the NMC-CREES, Food Science Program. The NMC-CREES Food Scientist conducted workshops and training on the methods of Safe Home Canning and Food Preservation on Saipan, Tinian and Rota, which covers this reporting period. As a result of its partnership, the CRD Program Manager and NMC-CREES, Food Scientist also created training opportunities on the marketing and value adding of locally available commodities to not only help homemakers save money but possibly look at this new educational tool as an entrepreneurship opportunity.

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

- Kids (6-7)
- Youth (8-17)
- Youth Leaders (18-21)
- Adult Volunteers for Leaders
- Economically Disadvantaged
- Senior Citizens (Man Am'ko)
- Caregivers for the elderly
- General Public
- First Time Business Owners

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

**1. Standard output measures**

| 2010 | Direct Contacts Adults | Indirect Contacts Adults | Direct Contacts Youth | Indirect Contacts Youth |
|---|---|---|---|---|
| **Actual** | 1110 | 2000 | 1500 | 5000 |

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

**Patent Applications Submitted**

Year: 2010

Actual: 0

**Patents listed**

None

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

**Number of Peer Reviewed Publications**

| 2010 | Extension | Research | Total |
|---|---|---|---|
| Actual | 0 | 0 | 0 |

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

**Output Target**

**Output #1**

**Output Measure**

- Number of Youth and Adults completing Money Management and Family Financial Management workshops.

| Year | Actual |
|---|---|
| 2010 | 370 |

**Output #2**

**Output Measure**

- Number of established Entrepreneurs projects

| Year | Actual |
|---|---|
| 2010 | 17 |

**Output #3**

**Output Measure**

- Number of participants completed workshop and training on home canning and food preservation

| Year | Actual |
|---|---|
| 2010 | 400 |

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

## V. State Defined Outcomes Table of Content

| O. No. | OUTCOME NAME |
|---|---|
| 1 | Number of participants completed workshop and training on home canning and food preservation. |
| 2 | Number of youths and adults successfully completing the Sewing for Beginners on the islands of Saipan, Tinian and Rota. |
| 3 | Number of youths and adults completing workshops on Youth and Adult Money Management. |
| 4 | Number of youths and adults applying knowledge gained. |

**Outcome #1**

**1. Outcome Measures**

Number of participants completed workshop and training on home canning and food preservation.

**2. Associated Institution Types**

- 1862 Extension

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

| Year | Quantitative Target | Actual |
|---|---|---|
| 2010 | 200 | 400 |

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**
The lack of jobs available coupled with the drastic cut in employees' work hours in both private and public sectors in the CNMI has directly affected the way of life on the islands.

**What has been done**
The NMC-CREES, Food Scientist conducted several workshops and training on marketing, value added, safe home-canning and food preservation on the islands of Rota, Tinian and Saipan. The Food Science program has developed many leaflets that target ways of best using available produce and other commodities. The CRD program disseminated educational information and recruited participants for workshops and training in order to inspire stakeholders at making usable items out of existing materials around them. The NMC-CREES Annual Open House gives opportunities to the general public to taste processed jams, wine, tea and ice cream made from locally grown fruits. The CRD program continues to distribute educational materials generated by the cooperative extension system. The Pacific Northwest Extension publications in particular have been helpful in our program delivery. These publications were produced by the States of Washington, Oregon and Idaho. Although separated in distance many of their publications have served relevant to our stakeholder needs.

**Results**
We were able to witness a large increase in the number of participants taking advantage of the many free workshops and training that NMC-CREES has offered. Saipan alone has more than 50 homemakers who are now processing hot pepper paste and various pickles (papaya,mango and cucumber) Many of them are now making attempts at expanding their horizons by marketing them at various retail stores on island. Three individuals developed a website in an effort to sell

their locally processed products. Increasing number of retail stores continue to display coconut, papaya, cassava, ripe mango and banana in their frozen section already mixed and ready for baking pastries.

**4. Associated Knowledge Areas**

| KA Code | Knowledge Area |
|---|---|
| 801 | Individual and Family Resource Management |

**Outcome #2**

**1. Outcome Measures**

Number of youths and adults successfully completing the Sewing for Beginners on the islands of Saipan, Tinian and Rota.

**2. Associated Institution Types**

- 1862 Extension

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

| Year | Quantitative Target | Actual |
|---|---|---|
| 2010 | 200 | 256 |

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**
In 2009, Northern Marianas College opted at ceasing its hiring of sewing instructors via Professional Service Contracts. As a result, "Sewing Class for Beginners" on the islands of Rota and Tinian also were discontinued. A needs assessment was conducted shortly thereafter which revealed that there remains a strong demand for the continuance of sewing courses.

**What has been done**
As a result of the community needs assessment, the department hired a sewing instructor, and a CRD Assistant in 2010. Classes once again are in full swing at the Garapan facility chosen for its easy accessibility and central location.

**Results**
In 2010, more than 500 individuals attempted enrolling for such courses however the CRD Program could only accommodate 280 due to limited space and manpower resources available. 260 clients successfully completed the class and received a certificate of successful completion.

**4. Associated Knowledge Areas**

| KA Code | Knowledge Area |
|---|---|
| 801 | Individual and Family Resource Management |

**Outcome #3**

**1. Outcome Measures**

Number of youths and adults completing workshops on Youth and Adult Money Management.

**2. Associated Institution Types**

- 1862 Extension

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

| Year | Quantitative Target | Actual |
|---|---|---|
| 2010 | 250 | 370 |

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**
Unemployment and limited knowledge in family financial budgeting, compounded with limited ability for those receiving public assistance such as food stamps, to wisely budget their coupons has been reported to be one of the causes of domestic violence.

95% of our workshops' participants are unemployed and have very limited income to budget. Public agencies, such as the Nutrition Assistance Program, Parole and Probation offices, continue to refer clients for registration in our Money Management workshops.

**What has been done**
CRD has asserted more focus in incorporating lessons on ways on how to earn money. In 2010, we conducted several workshops focused on money management throughout the islands of Rota, Tinian, and Saipan.

**Results**
100% of participants claimed that the course was useful to them and will apply what they have learned immediately. 60% of clients served claimed that they used to shop without a shopping list prior to attending a CRD sponsored short course. 100% of attendees agreed that they now use a shopping list and have realized a savings as a result of adopting such a practice.

A majority of those who have completed the training and workshops on safe home-canning,food preservation and sewing are now charging a basic fee when their services are requested.

**4. Associated Knowledge Areas**

| KA Code | Knowledge Area |
|---|---|
| 801 | Individual and Family Resource Management |

**Outcome #4**

**1. Outcome Measures**

Number of youths and adults applying knowledge gained.

**2. Associated Institution Types**

- 1862 Extension

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

| Year | Quantitative Target | Actual |
|---|---|---|
| 2010 | 125 | 300 |

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**
The overall quality of life in the CNMI has diminished greatly as a result of our continued fall into recession. The disappearance of the textile industry and the decline in tourist arrivals has our citizens looking for new ways to save and make money.

**What has been done**
Participants' interest has shifted more to learning how to earn money and a good number of our clients have now enrolled into a vocational/trade school. CRD has shifted gears and has incorporated lessons on various avenues at making money. Some short courses were provided in response to this issue by way of topics such as money management, value adding, home arts and design.

**Results**
100% of participants claim to have gained a skill they did not possess prior. 60% of students claim they now practice at least one aspect they learned in the course. 100% agreed that a shopping list was a valuable tool they walked away with.

**4. Associated Knowledge Areas**

| KA Code | Knowledge Area |
|---|---|
| 802 | Human Development and Family Well-Being |

## V(H). Planned Program (External Factors)

### External factors which affected outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Competing Public priorities

### Brief Explanation

Natural disasters such as typhoons, flooding, drought and other extreme weather conditions and extreme economic downturn, which might affect manpower availability; and unavailability of, needed facilities and equipment to conduct extension.

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

### Evaluation Results

Evaluation Results:

1. Safe Home-Canning and Food Preservation.
   Presentation: Above Average, Venue: Average (Recommended bigger room), Educational materials and supplies for use by participants and demo by presenters: Above Average. 100% learned something new, 100% would like to attend future planned workshops.
2. Sewing Class for Beginners.
   100% of the students can make patterns based on body measurement and can sew with supervision.
   100% claimed to have noticed a big decreased in the budget for family clothing and won't worry purchasing curtains, pillow case etc. 17 opened a small dress shops.
3. Youth and Adult Money Management.
   100% gained knowledge and can develop a bi-weekly family budget.
   100% food stamp recipients learned to budget their coupons and shop wisely.
   100% of Youth participants made a their own piggy bank from reused materials such as cookie cans
   before completing the workshop. 100% deposited their first quarter along with a 6 month to 1 year savings goal.
   60% don't see a need to develop a bi-weekly family budget due to unemployment.
   100% appreciated the new lesson on how to make or earn money.

### Key Items of Evaluation

Pre and Post Test
Observations
Verbal Input from participants

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

**Program # 6**

**1. Name of the Planned Program**

Diet, Physical Activity, and Health

### V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

| KA Code | Knowledge Area | %1862 Extension | %1890 Extension | %1862 Research | %1890 Research |
|---|---|---|---|---|---|
| 703 | Nutrition Education and Behavior | 50% | | 0% | |
| 724 | Healthy Lifestyle | 50% | | 0% | |
| | **Total** | 100% | | 0% | |

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

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

| Year: 2010 | Extension | | Research | |
|---|---|---|---|---|
| | 1862 | 1890 | 1862 | 1890 |
| Plan | 2.5 | 0.0 | 1.0 | 0.0 |
| Actual | 5.3 | 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 |
| 137480 | 0 | 0 | 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**

**Awareness Campaign: The Role of Diet and Physical Activity in Non-Communicable Disease Prevention**

Program personnel used a variety of avenues to inform the community about the role that healthy diet and physical activity plays in staying healthy and preventing NCDs. Extension agents conducted presentations at Head Start centers, elementary schools, Northern Marianas College, Department of Public Health, health-related conferences, and community forums on the islands of Saipan, Tinian, and Rota. These presentations focused on healthy eating recommendations (Dietary Guidelines for Americans) and following the Secretariat of the Pacific Community's "Promoting Pacific Physical Activity in Pacific Island Communities" guidelines. Around 85% of those who attended one of the aforementioned presentations, reported that they would make at least one positive behavior change related to diet or physical activity in order to decrease risk for developing an NCD.

**Youth Engaged in Advancing Health Project**

Through the collaborative efforts of the Public School System-Food and Nutrition Service and the Northern Marianas College-Cooperative Research, Extension, and Education Service, the Youth Engaged in Advancing Health (YEAH) Project was launched. The YEAH Project aims to empower students to take the lead in making changes that encourage healthy behaviors in the school environment. A workshop was held for students and advisors of schools selected. Topics covered at the workshop included: using information to assess the health status of your school and planning a project: developing a measurable plan. Fifth and sixth grade students as well as their school advisors were then asked to develop a draft plan with the assistance of facilitators from NMC-CREES and PSS-FNS.

To date, students have planned and lead projects in the areas of increasing physical activity, improving food policies, and health promotion campaigns at their respective schools. Students have also taken the project a step further by designing ways to collect project-specific information that was not previously available; the data was then used to plan projects. Some schools have already begun planning for next year's sixth grade students to assist with the training of next year's fifth grade students to plan and carry out YEAH projects. As a result of the outcomes achieved thus far, the YEAH Project will continue into next school year.

**Addressing Tobacco Use as a Modifiable Risk-Factor for Non-Communicable Disease**

In response to the passage of "Public Law 16-46: the CNMI Smoke-Free Air Act", and the need to focus on tobacco use as a modifiable risk-factor for Non-Communicable Diseases, NMC-CREES co-authored the rules and regulations stipulating the specificity of the enforcement of "Public Law 16-46: Smoke Free Air Act of 2008". Through collaborative efforts, the rules and regulations were drafted and approved, thereby adding enforcement responsibilities to the appropriate agencies and penalties to violators.

Aside from publishing the rules and regulations, a tobacco cessation class cycle was successfully delivered at Northern Marianas College and the two outer islands of Rota & Tinian to a total of 16 people through the use of video teleconferencing. These can be considered milestones for the CNMI in two ways: tobacco cessation class cycle was previously never offered in Rota and Tinian and tobacco cessation class cycle was offered at a work and college site for the first time.

The program continues to inform the general population regarding the law and its associated rules and regulations.

## 2. Brief description of the target audience

The target audience includes the general public, elementary to high school students, and their parents. Particular emphasis will be paid on areas of the islands that have a majority of its' residence at or

below the poverty level. Taking into consideration social-economic status, educational attainment, and lifestyle (diet, physical activity, tobacco use) the majority of the general population can be considered "at risk".

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

**1. Standard output measures**

| 2010 | Direct Contacts Adults | Indirect Contacts Adults | Direct Contacts Youth | Indirect Contacts Youth |
|---|---|---|---|---|
| **Actual** | 2500 | 10000 | 500 | 4000 |

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

**Patent Applications Submitted**

Year: 2010

Actual: 0

**Patents listed**

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

**Number of Peer Reviewed Publications**

| 2010 | Extension | Research | Total |
|---|---|---|---|
| **Actual** | 0 | 0 | 0 |

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

**Output Target**

**Output #1**

**Output Measure**

- Greater understanding of diet, physical activity, and health
  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 | Development of Physical Activity Social Marketing Campaign (PASMC) |

**Outcome #1**

1. **Outcome Measures**

Development of Physical Activity Social Marketing Campaign (PASMC)

Not Reporting on this Outcome Measure

**V(H). Planned Program (External Factors)**

**External factors which affected outcomes**

- Economy
- Public Policy changes
- Competing Public priorities
- Other (lack of collaboration)

**Brief Explanation**

The 2010 Plan of Work was laregly based on partnering and working in the spirit of collaboration with the Department of Public Health-Diabetes Prevention and Control Program (DPH-DPCP). Prior to 2010, NMC-CREES and DPH-DPCP collaborated on a number of projects that resulted in postive outcomes. However, due to changes in administration and personnel at the DPH, the aforementioned partnership is no longer conducive to CREES successfully carrying out its' POW. Since several of the planned activities required partnership with DPH-DPCP, significant changes had to be made to the Diet, Physical Activity, and Health Plan of Work mid-year to continue to address NCDs while adjusting to circumstances beyond NMC-CREES control.

Furthermore, due to the implementation of "Public Law 16-46: CNMI Smoke-Free Air Act" there was a need to include a focus on curbing tobacco use as a means to prevent and control non-communicable diseases.

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

**Evaluation Results**

{No Data Entered}

**Key Items of Evaluation**

{No Data Entered}

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

**Program # 7**

**1. Name of the Planned Program**

Food Safety and Quality 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 |
|---|---|---|---|---|---|
| 501 | New and Improved Food Processing Technologies | 10% | | 10% | |
| 502 | New and Improved Food Products | 20% | | 20% | |
| 503 | Quality Maintenance in Storing and Marketing Food Products | 20% | | 20% | |
| 504 | Home and Commercial Food Service | 20% | | 20% | |
| 711 | Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources | 20% | | 20% | |
| 712 | Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins | 10% | | 10% | |
| | **Total** | 100% | | 100% | |

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

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

| Year: 2010 | Extension | | Research | |
|---|---|---|---|---|
| | 1862 | 1890 | 1862 | 1890 |
| Plan | 1.5 | 0.0 | 1.5 | 0.0 |
| Actual | 1.0 | 0.0 | 1.0 | 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** |
| 58536 | 0 | 91157 | 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

After produce are harvested, their quality are deteriorated in proportion to their storage period. It is essential for the program to establish an appropriate post-harvest practice to maintain the peak quality of fruits and vegetables in this area because tropical produce is highly perishable and the shelf-life of such produce is comparatively short.

Even though producers provide high quality produce, serious health problems such as food borne diseases may be caused if the food preparation process is not maintained well based on safe food handling procedures. For this reason, the program trains many food service facilities employees to ensure and provides valuable information to food manufacturers.

In order to develop unique value-added product using local produce, the demands and needs of local farmers should be understood and also the most interested produce and value-added products should be identified prior to developing value-added processing.The program helps farmers and producers to select the most characteristic tropical produce in the CNMI in order to develop desirable value-added products.

The program also makes efforts to introduce new food processing technologies for the farmers and producers in the CNMI.There are many recent food processing technologies to extend shelf-life of produce and process value-added products such as blast quick freezing, modified atmosphere packaging, fine ultra filtration, and so on. These technologies are not cutting-edge but have not introduced to the region. Different basic and applied researches in the food processing and safety area are conducted in order to intensify the Food Safety and Quality Program. The program conducts a study to improve the post-harvest quality of a specialty crop, betel nut that accounts for millions of dollar business in the CNMI. Also the program conducts microbiological quality evaluation to test major value-added products such as hot pepper sauce.

### 2. Brief description of the target audience

- Farmers, other crop producers, and farm helpers
- Individuals involved in food industry such as processors, managers, food handlers, vendors
- Grade schools, high schools and college students interested in food safety and quality
- Government agency/collaborators

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

**1. Standard output measures**

| 2010 | Direct Contacts Adults | Indirect Contacts Adults | Direct Contacts Youth | Indirect Contacts Youth |
|---|---|---|---|---|
| **Actual** | 105 | 500 | 130 | 500 |

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

**Patent Applications Submitted**

Year: 2010

Actual: 0

**Patents listed**

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

**Number of Peer Reviewed Publications**

| 2010 | Extension | Research | Total |
|---|---|---|---|
| **Actual** | 0 | 0 | 0 |

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

**Output Target**

**Output #1**

**Output Measure**

- Number of research on food quality improvements

| Year | Actual |
|---|---|
| 2010 | 2 |

**Output #2**

**Output Measure**

- Number of novel food processing technology workshops

| Year | Actual |
|---|---|
| 2010 | 5 |

**Output #3**

**Output Measure**

- Number of workshops related with food safety and quality

| Year | Actual |
|---|---|
| 2010 | 6 |

**Output #4**

**Output Measure**

- Numbers of newly developed value-added products

| Year | Actual |
|---|---|
| 2010 | 4 |

**Output #5**

**Output Measure**

- Numbers of technical information provide to the public

| Year | Actual |
|---|---|
| 2010 | 5 |

### V(G). State Defined Outcomes

## V. State Defined Outcomes Table of Content

| O. No. | OUTCOME NAME |
|---|---|
| 1 | Numbers of farmers/producer to develop value added products |
| 2 | Number of farmers/producers implementing good post-harvest practices |

**Outcome #1**

**1. Outcome Measures**

Numbers of farmers/producer to develop value added products

**2. Associated Institution Types**

- 1862 Research

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

| Year | Quantitative Target | Actual |
|---|---|---|
| 2010 | 5 | 6 |

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**
Recently consumers around the world seek for more convenient, fresh, low-calorie, and healthy natural food and they are creating potential markets for well-being foods. Major Asian cities such as Tokyo, Seoul, and Shanghai can be unlimited markets for these value added product since these cities are geographically close and have huge population. The military build-up in Guam may provide additional markets for these export products. For these reasons, it is essential to develop appropriate food processing technologies and facilities in order to produce value-added products using agricultural produce in this area. In addition, concerns within the CNMI about the safety of its food supply have risen to new historic levels and the Food Safety and Quality program have taught and assisted individuals in the areas in food processing and food catering services.

**What has been done**
Local farmers and producers have been encouraged to develop unique value-added products using exotic tropical fruits in the CNMI such as noni, bananas, papayas, soursops, lemons, coconuts, pineapples, mangoes, guavas, and so forth. The Food Safety and Quality program have been helping local farmers and producers to develop value added food products and taught them the importance of food safety and safe food handling by several value added processing workshops.

**Results**
Even if the production of value-added fruit products is still undeveloped and limited in the CNMI, several farmers and producers have been trying to develop value added food products to generate beneficial economic influence.

**4. Associated Knowledge Areas**

| KA Code | Knowledge Area |
|---|---|
| 501 | New and Improved Food Processing Technologies |
| 502 | New and Improved Food Products |
| 504 | Home and Commercial Food Service |

**Outcome #2**

**1. Outcome Measures**

Number of farmers/producers implementing good post-harvest practices

**2. Associated Institution Types**

- 1862 Extension
- 1862 Research

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

| Year | Quantitative Target | Actual |
|---|---|---|
| 2010 | 5 | 5 |

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**
It is very important to post-harvesting handling, transportation, distribution systems and technology. It is essential to help better maintain the local produce, preserve, nutritional value, and increase the shelf-life of local produce. These practices are including, but not limited to logistics, sorting, inspection, waste stream management, and packaging. Recently, it has been one of the most important issues to produce and supply high quality agricultural commodities since the military build-up in Guam may provide additional markets for farmers/producers in the CNMI. For these reasons, it is very important for farmers and producers in the CNMI to implement good post-harvest practices.

**What has been done**
Farmers and producers in the CNMI have been encouraged to implement good post-harvest practice to maintain the quality of their produce as well as developing value-added food products. The Food Safety Quality program has been helping local farmers and producers to develop their own post-harvest procedures by personal visitation and consultation. In addition, the Food Safety and Quality Program has provided various information about the importance of food safety and safe food handling after harvesting by several food safety workshops.

**Results**
The implementation of good post-harvest practices in the CNMI is a very initial phase in order to

maintain good quality of local produce. The good post-harvest practice also varies in types of produce and working environment conditions. The Food Safety and Quality Program has helped to implement the good post-harvest practice by personal consultation in addition to food quality and safety workshops.

**4. Associated Knowledge Areas**

| KA Code | Knowledge Area |
|---|---|
| 501 | New and Improved Food Processing Technologies |
| 503 | Quality Maintenance in Storing and Marketing Food Products |
| 711 | Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources |
| 712 | Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins |

**V(H). Planned Program (External Factors)**

**External factors which affected outcomes**

- Natural Disasters (drought, weather extremes, etc.)
- Economy

**Brief Explanation**

We did not experience any external factors that would hinder the progress of the program.

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

**Evaluation Results**

In implementation evaluation, it is concluded that the program has been implemented as planned. General implementation evaluation was assessed monthly base and corrective action was conducted when it is necessary. According to the progress evaluation, all outcomes from the program activities were very successful. As a whole the program achievement was very productive based on the outcomes of the program.

**Key Items of Evaluation**

- Number of research projects on noble food processing technologies
- Number of research projects on food quality improvement
- Number of newly developed value-added products
- Number of technical information provide to the public
- Number of novel food processing technology and food safety workshops
  - Number of newly developed value-added products

- Number of farmers/producers implementing post-harvest practices
- Number of farmers/producers to develop value added products

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

**Program # 8**

**1. Name of the Planned Program**

4-H Youth Development

### V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

| KA Code | Knowledge Area | %1862 Extension | %1890 Extension | %1862 Research | %1890 Research |
|---|---|---|---|---|---|
| 802 | Human Development and Family Well-Being | 20% | | 0% | |
| 803 | Sociological and Technological Change Affecting Individuals, Families, and Communities | 10% | | 0% | |
| 805 | Community Institutions, Health, and Social Services | 10% | | 0% | |
| 806 | Youth Development | 60% | | 0% | |
| | **Total** | 100% | | 0% | |

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

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

| Year: 2010 | Extension | | Research | |
|---|---|---|---|---|
| | 1862 | 1890 | 1862 | 1890 |
| Plan | 3.0 | 0.0 | 0.0 | 0.0 |
| Actual | 3.0 | 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 |
| 141151 | 0 | 0 | 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**

The CNMI 4-H program has collaborated with other government and non-government groups to develop relationships and design programs for youth development. Funding was sought through proposal development and other efforts in order to support staffing and program facilitation. Volunteers were recruited and clubs formed as a venue for 4-H curricula and programming. Information on the CNMI 4-H programs has been developed and continuously disseminated through publications and other media.4-H programs will sponsor experiential learning opportunities for youth and parents such as workshops, field days, and hands-on activities related to the 4-H mission and purpose.

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

- Government Officials/Agency Collaborators
- Business operators
- Grade school, High School and College students, teachers and staff
- Adult Volunteer Leaders (4-H Clubs) from the general public

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

**1. Standard output measures**

| 2010 | Direct Contacts Adults | Indirect Contacts Adults | Direct Contacts Youth | Indirect Contacts Youth |
|---|---|---|---|---|
| **Actual** | 65 | 500 | 350 | 850 |

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

**Patent Applications Submitted**

Year: 2010

Actual: 0

**Patents listed**

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

**Number of Peer Reviewed Publications**

| 2010 | Extension | Research | Total |
|---|---|---|---|
| **Actual** | 0 | 0 | 0 |

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

**Output Target**

**Output #1**

**Output Measure**

- Number of youth participating in 4-H sponsored events

| Year | Actual |
|---|---|
| 2010 | 350 |

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

## V. State Defined Outcomes Table of Content

| O. No. | OUTCOME NAME |
|---|---|
| 1 | Number of household recycling aluminum cans or other recyclable commodities such as paper and plastic |
| 2 | Number of 4-h volunteers recruited |
| 3 | Number of youth participants attending 4-H workshop activities |

**Outcome #1**

**1. Outcome Measures**

Number of household recycling aluminum cans or other recyclable commodities such as paper and plastic

**2. Associated Institution Types**

- 1862 Extension

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

| Year | Quantitative Target | Actual |
|---|---|---|
| 2010 | 40 | 25 |

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**
There is continued concern for the well-being the public, coral reefs , and watersheds as the culture of throwing trash any where persists.

**What has been done**
Continued Environmental and Recycling Eduction. Agriculture Education

**Results**
Many youth have been quick to adopt recycling and other sustainable habits in order to protect and enhance their communities.

**4. Associated Knowledge Areas**

| KA Code | Knowledge Area |
|---|---|
| 805 | Community Institutions, Health, and Social Services |

**Outcome #2**

**1. Outcome Measures**

Number of 4-h volunteers recruited

**2. Associated Institution Types**

- 1862 Extension

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

| Year | Quantitative Target | Actual |
|---|---|---|
| 2010 | 4 | 4 |

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**
Volunteers are critical to providing the youth with meaningful and bonding experiences.

**What has been done**
Continued recruitment of volunteers for the 4-H program through presentations and personal communication.

**Results**
We have increased the overal network of volunteers in the region, allowing our team to produce more good work and lasting impacts on the youth and their attitudes/behaviors.

**4. Associated Knowledge Areas**

| KA Code | Knowledge Area |
|---|---|
| 806 | Youth Development |

**Outcome #3**

**1. Outcome Measures**

Number of youth participants attending 4-H workshop activities

**2. Associated Institution Types**

- 1862 Extension

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

| Year | Quantitative Target | Actual |
|---|---|---|

| | | |
|---|---|---|
| 2010 | 80 | 250 |

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

The youth in the islands are plaqued with the lack of resources to stay busy. Often times, they are stuck with seemingly no constructive activities after school, so they begin to find ways to entertain themselves, often choosing the more exciting activities such as vandalism, intoxication, sex, etc.. Its important for Pacific island cultures to re-define their cultural habits and borders to guide children towards a modern culture of constructive behavior, through nurturing, eduction, and acceptance.

**What has been done**

Continued workshop events, youth activities, and the development of island specific curriculum, such as the Sustainability Communities curriculum for the youth.

**Results**

The youth have really soaked up the information that we have provided them and quick to adopt and promote positive habits that protect themselves, the general public, and the environment.

**4. Associated Knowledge Areas**

| KA Code | Knowledge Area |
|---|---|
| 806 | Youth Development |

**V(H). Planned Program (External Factors)**

**External factors which affected outcomes**

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Appropriations changes
- Competing Public priorities

**Brief Explanation**

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

**Evaluation Results**

**Key Items of Evaluation**

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

**Program # 9**

**1. Name of the Planned Program**

Aquaculture and Fisheries Development 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 |
|---|---|---|---|---|---|
| 301 | Reproductive Performance of Animals | 20% | | 10% | |
| 307 | Animal Management Systems | 60% | | 80% | |
| 308 | Improved Animal Products (Before Harvest) | 20% | | 10% | |
| | **Total** | 100% | | 100% | |

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

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

| Year: 2010 | Extension | | Research | |
|---|---|---|---|---|
| | 1862 | 1890 | 1862 | 1890 |
| Plan | 2.0 | 0.0 | 1.0 | 0.0 |
| Actual | 1.8 | 0.0 | 1.0 | 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 |
| 89743 | 0 | 102483 | 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**

The Aquaculture and Fisheries Development (AF&D) program during this reporting period conducted

research on production of several aquatic species of interest. Efforts are currently underway to conduct workshops and demonstrations on the production of these aquatic species while being the role model in showcasing the importance of bio-security controls that will help farmers protect their fish and shrimp investments. Because of our increased exposure via our extension efforts and the success of our constituents, aquaculture is now being viewed by many as a viable industry and should be further explored. This was the resounding sentiment at the recent CNMI Economic Summit. With this resurgence of interest, we predict the further expansion of our program offerings as well as the level of our research commitment in this area of science.

Due to stakeholder interests initial trials of tropical abalone, various mullet families, milkfish, and rabbit fish grow out were performed and continued efforts on their production methods are still being showcased at our As Terlaje wet laboratory. The following are the specific activities that were performed during FY 2010:

- As a result of their larger body mass when compared to marine shrimp, our department conducted concurrent research on growing freshwater prawns through inland tank culture with emphasis on semi-intensive to super-intensive systems.
- The AF&D program also started a grow-out project of native, Blue spot and Yellow Tail mullets. Two thousand mullet juveniles were captured from the shores of Saipan and stocked in a Re-circulating Aquaculture System (RAS) raceway. The project intends to investigate whether wild caught mullets can be stocked and grown in a RAS and raised with formulated feed.
- An aquaculture producers association was formed to promote and improved the aquaculture industry in the CNMI. The intention of such unification is to maximize efforts at importing feed and aquaculture related equipment by serving as a purchasing cooperative. Nineteen Tilapia and shrimp farmers comprise the membership of the CNMI Aquaculture Producers Association (CAPA).
- A sustainable Tilapia production workshop featuring Dr. Kevin Fitzsimmons, a renowned researcher in the field of tilapia was conducted in 2010. The workshop was conducted as a result of the advancements in the production methods of aquaculture.
- A stakeholders meeting to gather input from the CNMI community was held in Saipan, Tinian, and Rota for the development of the CNMI, 5-Year, Aquaculture Strategic Plan.

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

- All aquaculture producers in the CNMI
- Retirees looking at new opportunities
- Entrepreneurs
- Non Government Organizations (NGO)

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

**1. Standard output measures**

| 2010 | Direct Contacts Adults | Indirect Contacts Adults | Direct Contacts Youth | Indirect Contacts Youth |
|---|---|---|---|---|
| **Actual** | 361 | 5000 | 717 | 8000 |

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

**Patent Applications Submitted**

Year: 2010
Actual: 0

**Patents listed**

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

**Number of Peer Reviewed Publications**

| 2010 | Extension | Research | Total |
|---|---|---|---|
| **Actual** | 1 | 1 | 1 |

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

**Output Target**

**Output #1**

**Output Measure**

- Number of Research Projects completed on aquatic species production

| Year | Actual |
|---|---|
| 2010 | 1 |

**Output #2**

**Output Measure**

- Number of Aquaculture Workshops

| Year | Actual |
|---|---|
| 2010 | 7 |

## V(G). State Defined Outcomes

# V. State Defined Outcomes Table of Content

| O. No. | OUTCOME NAME |
|---|---|
| 1 | Number of farmers learning how to produce new aquatic species |

**Outcome #1**

**1. Outcome Measures**

Number of farmers learning how to produce new aquatic species

**2. Associated Institution Types**

- 1862 Extension
- 1862 Research

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

| Year | Quantitative Target | Actual |
|---|---|---|
| 2010 | 50 | 91 |

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**
High Production Cost, i.e., feed, energy

**What has been done**
- testing alternative energy systems like solar to reduce energy cost
- looking into locally made feed using locally available ingredients

**Results**
- helped farmer get WSARE farmer rancher grant to test solar panels to power aquaculture aeration equipment
- wrote a WSARE PDP proposal for capacity building on making feed locally

**4. Associated Knowledge Areas**

| KA Code | Knowledge Area |
|---|---|
| 301 | Reproductive Performance of Animals |
| 307 | Animal Management Systems |
| 308 | Improved Animal Products (Before Harvest) |

## V(H). Planned Program (External Factors)

### External factors which affected outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Government Regulations
- Competing Programmatic Challenges
- Other (shipping difficulties,)

### Brief Explanation

• Reduced airline flights into the CNMI has made it even harder to import seedstock to stock culture tanks. Flights reduced as a result of low demand in visitors coming to the CNMI.

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

### Evaluation Results

### Key Items of Evaluation