

# 2011 Northern Marianas College Combined Research and Extension Plan of Work

Status: Accepted

Date Accepted: 06/25/2010

## I. Plan Overview

### 1. Brief Summary about Plan Of Work

For 29 years of successful program existence in the Commonwealth of the Northern Mariana Islands (CNMI), the Northern Marianas College- Cooperative Research Extension and Education Service (NMC-CREES) is still adhering to its land-grant roots of teaching, research and extension while concurrently transforming into an interdisciplinary unit that is attracting a larger and more diverse group of clients. This 5-year Plan of Work is a cohesive vision for our preferred future in agricultural research and extension, and family and consumer sciences that addresses the current USDA program priorities. The (ARE) Agricultural Research and Extension focuses on Aquaculture Development, Crop Improvement, Plant Protection, Soil and Water Quality, and Livestock Improvement Program. These programs are geared to improve the Food Security and Hunger not only in the CNMI but to other countries impacted by our success. On the other hand, Family Consumer Sciences (FCS) focuses on Food Safety and Quality, Expanded Food and Nutrition Education Program (EFNEP), Diet, Physical Activity, and Health (DPAH), Community Development and Resource Management (CDRM) The knowledge areas were selected for their significant potential for establishing mutually beneficial partnership with farmers, ranchers, homemakers, advisory councils, industry, and government agencies.

With the current economic downturn, increase in population, increased pressure to natural resources such as climate change and energy problems, and food security issues, this plan recognizes that NMC-CREES must be positioned to respond rapidly and effectively to emerging issues that affect the profitability and sustainability of the CNMI's agriculture, now and in the years ahead. This plan has grown out of discussions and listening sessions from people around the CNMI and emanated from reviews of the national goals of the United States Department of Agriculture (USDA), the needs of the commonwealth, faculty expertise and interest. Combining agricultural research and extension, and family consumer science into one unit will facilitate and strengthen this research-extension-client interaction to better focus the efforts of our scientists on high priority research problems and improve the level of technical competence of the extension staff.

The CREES portfolio is strengthened through partnerships and collaboration with other land grant colleges and universities, as well as with stakeholders throughout the CNMI and the region. Our interactions with collaborators enables us to promote educational programs, extension services and our research projects that are the results of the growing needs and challenges that the CNMI community faces and must satisfy in order to improve the standard of living for its residents. The mission of the NMC-CREES is committed to enhancing the well-being and quality of life of the CNMI community through research and extension in agriculture, family and consumer science.

### Estimated Number of Professional FTEs/SYs total in the State.

Year	Extension		Research	
	1862	1890	1862	1890
2011	28.0	0.0	12.0	0.0
2012	29.0	0.0	12.0	0.0
2013	30.0	0.0	12.0	0.0
2014	30.0	0.0	12.0	0.0
2015	0.0	0.0	0.0	0.0

## II. Merit Review Process

### 1. The Merit Review Process that will be Employed during the 5-Year POW Cycle

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

## 2. Brief Explanation

Since the number of CREES staff is relatively small, all non-instructional faculty are encouraged to participate in the Merit Peer Review. Also, external collaborators from other universities may send their comments before the Peer Review. 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 draft of the 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 proposals; 3) the quality and scientific value of the proposed research or extension activities and 4) the opportunities for cooperation with others, and (5) available resources. The proposals are revised to incorporate the suggestions given during the merit review and approved by the Director prior to submission.

## III. Evaluation of Multis & Joint Activities

### 1. How will the planned programs address the critical issues of strategic importance, including those identified by the stakeholders?

The planned programs were based on input from stakeholder groups and/or local scientists who identified the most critical issues. They utilize and conduct a number of forums, client visitations, conferences and periodic meetings to solicit advice to discuss agricultural and family consumer science research and extension needs and priorities.

### 2. How will the planned programs address the needs of under-served and under-represented populations of the

The planned programs for both research and extension aim to increase promotion in the grass-root levels via program visibility and outreach through provisions of professional experts such as language interpreters, agriculture scientists and extension specialists, from both local and off-island. The program will apply surveys, comparisons, and diverse methodologies using scientific approach (intrinsic and extrinsic factors) that will dictate priorities.

### 3. How will the planned programs describe the expected outcomes and impacts?

The planned programs developed specific outcomes that would occur over a period of 5 years through pre- and post evaluation (either short, medium and long term), changes in learning behavior, change in action and change in condition such as lifestyle, environmental improvement and positive economic impact.

### 4. How will the planned programs result in improved program effectiveness and/or efficiency?

NMC-CREES research and extension activities have always involved multi-disciplinary/multi-regional projects that have brought positive impacts locally and regionally. Due to our isolated physical location far from the US mainland, partnerships and collaboration plays a big role on project success. Results are well advertised in media prints and television together with program updates that provides avenues for feedback mechanisms such as e-mail, suggestion box, and improved and updated websites.

## IV. Stakeholder Input

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

- Use of media to announce public meetings and listening sessions
- Targeted invitation to traditional stakeholder groups
- Targeted invitation to non-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 above listed activities have been the most effective tool to generate stakeholder input and participation based on our history. It also covers a broad range of targeted audiences.

**2(A). A brief statement of the process that will be 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
- Use Surveys

**Brief explanation.**

Individuals with experience relevant to NMC-CREES' mission, goals and objectives are selected to serve on Advisory Councils. Community leaders are represented as advisory groups and represent community issues and priorities. Internal focus groups are also involved in identifying issues and concerns that needs assessments. The use of satisfaction surveys in our community outreach are very helpful in achieving the best outcome of our goals.

**2(B). A brief statement of the process that will be 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
- Survey of traditional Stakeholder individuals
- Meeting with the general public (open meeting advertised to all)
- Meeting with invited selected individuals from the general public

**Brief explanation.**

Meetings and surveys will be used as this has proven to be the most effective method for CNMI clientele.

**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.**

Groups and program leaders based their needs on extension and research priorities and emerging problems in the CNMI.

**V. Planned Program Table of Content**

<b>S. No.</b>	<b>PROGRAM NAME</b>
1	Plant Protection Program
2	Livestock Improvement Program
3	Crop Improvement Program
4	Soil and Water Quality Program
5	Community Resource Development
6	Diet, Physical Activity, and Health
7	Food Safety and Quality Program
8	4-H Youth Development
9	Aquaculture and Fisheries Development Program

**V(A). Planned Program (Summary)****Program # 1****1. Name of the Planned Program**

Plant Protection Program

**2. Brief summary about Planned Program**

The islands in the Commonwealth of the Northern Mariana Islands (CNMI) are relatively isolated from large landmasses. These island systems are extremely fragile and vulnerable to the impacts of invasive species; therefore, any intrusion of alien species could be very devastating to the ecological balance. Technological development of our transportation systems have brought these islands conceptually close to and easily accessible from large landmasses, from which biota can be transported to the islands. There are already present in the CNMI numerous exotic invasive species that are seriously impacting agriculture development. Our combined research and extension efforts are aimed at enhancing traditional agricultural practices, developing complementary methods of best management practices, and adopting already proven methods of addressing invasive species. Our program will attempt to catalog the invasive species that have already reached these islands and any future arrivals. In addition, we will develop reference collections of invasive species and general entomological specimens for educational purposes. We will continue to collaborate with regional expertise to develop systems to contain or to minimize the deleterious impacts of these invasive species on agriculture. We will continue to monitor ports of entries for early detection of invading unwanted plants and animals from without the CNMI. Our biological control program will enhance production of beneficial organisms that will be utilized by our integrated pest management program to minimize the need for pesticides. Early detection of crop pests and diseases is important to prevent the build up of pest populations and the spread of diseases. Our early detection and identification of insects, nematodes, mites, mollusk and other invertebrates, plant pathogens, weeds, and vertebrates, will enhance our integrated plant protection programs and will result in preventing crop damage of epidemic proportion. We plan to create an illustrated list of the nematodes and invertebrate pest of the Mariana Islands. This will be published electronically and in a book form. This list will include recommended best management practices.

**3. Program existence :** Intermediate (One to five years)

**4. Program duration :** Long-Term (More than five years)

**5. Expending formula funds or state-matching funds :** Yes

**6. Expending other than formula funds or state-matching funds :** Yes

**V(B). Program Knowledge Area(s)****1. Program Knowledge Areas and Percentage**

<b>KA Code</b>	<b>Knowledge Area</b>	<b>%1862 Extension</b>	<b>%1890 Extension</b>	<b>%1862 Research</b>	<b>%1890 Research</b>
211	Insects, Mites, and Other Arthropods Affecting Plants	30%		25%	
212	Pathogens and Nematodes Affecting Plants	20%		25%	
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%	
	<b>Total</b>	100%		100%	

**V(C). Planned Program (Situation and Scope)**

## 1. Situation and priorities

The CNMI has very limited agricultural resources. Most agricultural production is at subsistence level and any threat to these resources can seriously affect the livelihood of the CNMI community and its economy. Invasive species of both plants and animals pose a serious threat to our limited resources and would, therefore, hinder sustainable agriculture development in the CNMI. There are already large numbers of invasive species in the CNMI. These must be controlled or eradicated. Their impacts and damages to crops must be minimized or eliminated. We will strive to increase our capability to address the problems of invasive species, to improve best management methods and to extend these methods to our full time and subsistence farmers and other interested stakeholders. An illustrated list of the invertebrate pest of the Mariana Islands is being developed. This will assist our stakeholders and agriculture professionals in identifying pest and applying appropriate control methods.

## 2. Scope of the Program

- In-State Extension
- In-State Research
- Integrated Research and Extension
- Multistate Integrated Research and Extension

### V(D). Planned Program (Assumptions and Goals)

#### 1. Assumptions made for the Program

We assume funding will increase and additional FTEs will be available. External funding source will be secured. Farmers and other stakeholders will have sufficient information on invasive species and understand the relationship between invasive species and agriculture production. Farmers, with assistance from research and extension staff of NMC-CREES, will be able to minimize the impacts and damages of invasive species to their crops, and therefore their crop production will increase. The deleterious effects of invasive species can be controlled or suppressed. Invasive species can be controlled and some can be eradicated.

#### 2. Ultimate goal(s) of this Program

The ultimate goals of our program are: 1) to identify invasive species and reduce their negative impact on agricultural crops, 2) to control or eradicate invasive species, 3) strive for development of sustainable agriculture, 5) improve pest management practices, 6) provide environmentally-friendly and effective pest control practices, 7) increase farmers knowledge of invasive species and pest control through workshops, trainings, field days, extension publications, media and extension visits, 8) provide proven IPM practices that are economical, safe and sustainable.

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

#### 1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2011	4.3	0.0	5.3	0.0
2012	4.3	0.0	5.3	0.0
2013	4.3	0.0	5.3	0.0
2014	5.3	0.0	5.3	0.0
2015	5.3	0.0	5.3	0.0

### V(F). Planned Program (Activity)

**1. Activity for the Program**

Our program will conduct research to identify and control plant parasitic nematodes and other invertebrate pest. We plan to make an illustrated list of the nematodes of the Mariana Islands. Biocontrol of invasive weeds, and invertebrates will continue to be a priority. The weed, *Coccinia grandis*, came to Saipan in the 1980's, and spread throughout the island of Saipan, Tinian and Rota. This invasive species has inundated the forest areas climbing and covering vegetation, including indigenous plants. In Hawaii, this invasive species is controlled by two beetles (*Acythopeus coccinae* and *A. burkhardtorum*) and a species of moth (*Melittia oedipus*). The two species of weevils were introduced in 2002; however only *A. coccinae* has become established and is causing severe defoliation. In August 2007, we introduced *Melittia oedipus* moth into Saipan and into Rota in October 2007. In Saipan the moth is established, but the population is still low. The program aims to continue research on this weed and its parasites. Another example is the recently introduced Cuban slug, *Veronicella cubensis*, into the island of Rota, where it is invasive. It has spread throughout most of the farm areas causing extensive damage to many crops. It has become a major agriculture pest and it has also become a threat to other islands in the CNMI where this pest is not present. In August 2007, a USDA Malacologist and accompanying staff conducted experiment on various molluscicides to determine how best to control this pest. 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. In October 2006, we found *Erythrina* gall wasp (*Quadrasticus erythrinae*) infesting *Erythrina variegata* in Saipan. We found the gall wasp also infesting *Erythrina* in Tinian and Rota. In September 2006, a single specimen of the Coconut Rhinoceros Beetle (CRB) 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 will continue surveillance of this pest in the CNMI, particularly since it is established in Guam, which is only 40 miles south of the island of Rota. There have been additional sightings in 2009, but they were not confirmed. Our surveys and traps have not lead to a find. We plan to set up fruit fly monitoring stations in sea ports and other selected location in the CNMI and import biocontrol for *Mimosa diplotricha* and *Chromolaena odorata*. We intend to continue to apply best management methods including biopesticides like Neem and to introduce natural enemies. 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.

**2. Type(s) of methods to be used to reach direct and indirect contacts**

**Extension**

Direct Methods	Indirect Methods
<ul style="list-style-type: none"> <li>● Education Class</li> <li>● Workshop</li> <li>● Group Discussion</li> <li>● One-on-One Intervention</li> <li>● Demonstrations</li> <li>● Other 1 (presentation)</li> </ul>	<ul style="list-style-type: none"> <li>● Public Service Announcement</li> <li>● Newsletters</li> <li>● TV Media Programs</li> <li>● Web sites</li> <li>● Other 1 (Free Air Time)</li> </ul>

**3. Description of targeted 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(G). Planned Program (Outputs)**

**1. Standard output measures**

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

	Direct Contact Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
2011	500	1000	500	1000
2012	500	1500	500	1000
2013	500	1500	500	1000
2014	500	1500	500	1000
2015	500	1500	500	1000

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

**2011:0                      2012:0                      2013:0                      2014:0                      2015:0**

**3. Expected Peer Review Publications**

Year	Research Target	Extension Target	Total
2011	1	0	1
2012	1	0	1
2013	2	0	2
2014	1	0	1
2015	1	0	1

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

**1. Output Target**

- Number of Research Projects completed on invertebrate pest, such as nematodes, invasive species such as scarlet gourd, melon fly, papaya mealy bug, and Cuban slug).

**2011:1                      2012:2                      2013:2                      2014:2                      2015:1**

**V(I). State Defined Outcome**

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, and nematodes) by certain percentage:
3	Number of clients learning Pesticide Safety

**Outcome # 1**

**1. Outcome Target**

Number of farmers using Integrated Pest Management to control invasive species

**2. Outcome Type : Change in Action Outcome Measure**

**2011:3                      2012:3                      2013:3                      2014:3                      2015:0**

**3. Associated Knowledge Area(s)**

- 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

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome # 2**

**1. Outcome Target**

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

**2. Outcome Type : Change in Condition Outcome Measure**

**2011:30                      2012:30                      2013:30                      2014:30                      2015:0**

**3. Associated Knowledge Area(s)**

- 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

**4. Associated Institute Type(s)**

- 1862 Research

**Outcome # 3**

**1. Outcome Target**

Number of clients learning Pesticide Safety

**2. Outcome Type : Change in Knowledge Outcome Measure**

2011:50

2012:50

2013:50

2014:50

2015:50

**3. Associated Knowledge Area(s)**

- 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

**4. Associated Institute Type(s)**

- 1862 Extension

**V(J). Planned Program (External Factors)****1. External Factors which may affect Outcomes**

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

**Description**

The Mariana Islands Archipelago, which includes the islands in the CNMI, lies in the path of tropical storms and typhoons, which are usually generated from east or south east of the archipelago. Several storms or typhoons pass the CNMI practically every year, some of which become super typhoons generating wind velocity as strong as 200 miles per hour. A number of these typhoons can inflict total damage to agricultural crops and various private and public facilities. These conditions definitely affect the outcomes of our programs. The recent change in the free trade agreement has drastically impacted the local economy, particularly in the garment industry. During the past few years, many garment manufacturers in the CNMI have closed down due to increased competition by foreign countries importing garments into the United States. Local government revenue consequently has substantially decreased. In addition, the two major airlines (Continental and Northwest airlines) bringing tourists to the islands have drastically decreased their flights into the CNMI, which has further decreased government revenue. These turn of events are reflected in the dismal economic conditions of the CNMI presently. As a result of the substantial decrease in government revenue, the local government has shifted its priorities. Government spending decreased substantially in 2006-2009. Unfortunately, agriculture development is not considered one of the priorities of the government, therefore, local funding for agriculture development is dismally lacking since 2006.

**V(K). Planned Program (Evaluation Studies and Data Collection)****1. Evaluation Studies Planned**

- Time series (multiple points before and after program)

**Description**

Invasive species that are being managed will be monitored at various intervals before and after implementation of biological control methods, and or comprehensive integrated or best management practices. Insects and other arthropods entering the CNMI through air and ocean vessels on their cargoes and passengers will be monitored in collaboration with Agriculture Quarantine. Agriculture pest surveys, which were initiated in July 2006, will continue to monitor existing pests and will detect newly introduced invasive species through samplings, observations and survey questionnaires.

## **2. Data Collection Methods**

- Sampling
- On-Site
- Observation

### **Description**

For nematode research soil samples will be taken from mayor crops in the three mayor islands of the CNMI. Nematodes extracted will be identified to the lowest possible taxon. Monitoring sites on each island (Saipan, Rota, and Tinian) will be selected for periodical collection specimens for detection and identification of invasive species. Information on species collected will be recorded and tabulated for further analysis. Survey questionnaire Form questionnaire will be developed and distributed to farmers to ascertain what invasive species they have noticed on their crops. Information will be collected and tabulated. If pests are reported active, Extension Agents will be dispatched to the affected farms to make recommendations on management and control of target pests. Observation Periodic visits will be made to various farms to observe farm activities, note type of crops planted and observe the conditions of crops.

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

### **Program # 2**

#### **1. Name of the Planned Program**

Livestock Improvement Program

#### **2. Brief summary about Planned Program**

Through partnerships and collaboration with other land grant colleges, local government agencies such as the Department of Land and Natural Resources (DLNR), federal organizations like Western Sustainable Agriculture Research and Education (WSARE), Farm Service Agency (FSA), Natural Resource Conservation Service (NRCS), Animal and Plant Health Inspection Service (APHIS), and regional organization such as the Secretariat of the Pacific Community (SPC) and the Agricultural Development in the American Pacific (ADAP), the Livestock Improvement Program (LIP) will improve the competitiveness of CNMI cattle, goat, swine and poultry produced, by reducing costs of production, increasing productivity and profits. The program will improve the safety of animal products by assisting in the development of suitable slaughter facilities and meat inspections. The program aims to adopt best management practices and promote sustainable agriculture. The program will focus on eradicating livestock diseases of economic and public health importance. It also aims to focus on offering new opportunities for alternative livestock enterprise such as duck, pigeon and rabbit production. Continued promotion and training of local paravets to assist the CNMI Veterinarian for effective and high quality veterinary services. Research and extension emphasis on the emerging CNMI Livestock industry will be strengthened through securing external funding from local and federal agencies. This will include improving animal products (before harvest), reproductive performance through genetic upgrading via Artificial Insemination in ruminants and swine, alternative animal feed nutrition, and alternative medicine for livestock health care. Supplemental local feed stuff and sustainable pastured beef and poultry will be continuously promoted and will be adopted by farmers. The program will also empower other producers as well as agricultural professionals to get involved in research, extension and education service through professional development program and small research and educational outreach programs.

**3. Program existence :** Mature (More than five years)

**4. Program duration :** Long-Term (More than five years)

**5. Expending formula funds or state-matching funds :** Yes

**6. Expending other than formula funds or state-matching funds :** Yes

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

## 1. Program Knowledge Areas and Percentage

<b>KA Code</b>	<b>Knowledge Area</b>	<b>%1862 Extension</b>	<b>%1890 Extension</b>	<b>%1862 Research</b>	<b>%1890 Research</b>
301	Reproductive Performance of Animals	10%		10%	
302	Nutrient Utilization in Animals	15%		15%	
303	Genetic Improvement of Animals	15%		20%	
307	Animal Management Systems	20%		15%	
311	Animal Diseases	20%		30%	
312	External Parasites and Pests of Animals	3%		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	5%		5%	
902	Administration of Projects and Programs	5%		5%	
	<b>Total</b>	100%		100%	

**V(C). Planned Program (Situation and Scope)****1. Situation and priorities**

The livestock industry is made up of 90% small-scale producers, meaning ranchers/farmers with limited resources, most of them lack technical knowledge in the operations and are subsistence farmers. The high cost of feeds for swine, ruminants, and poultry discourages them from farming. Feed cost must be regulated in the CNMI in order to encourage livestock operations. Levels of cattle and goats productivity raised on poorly managed pasture are low. Although recent tests reveal negative results, there remains a need for further surveillance of economic and public health related diseases such as Brucellosis, TGE, Parvo and Swine flu, colibacillosis and parasitism that affect animal performance and productivity. Avian flu scares in the neighboring countries are preventing our present export capacity. Inbreeding is also a major problem due to a continual shortage of imported breeding males or new breeding stock. Only a small part of the locally produced beef and goat, or pork meat is inspected and receives USDA approval. There are presently no USDA approved slaughterhouse facilities on the islands. There is a technical need for new grazing strategies and animal husbandry knowledge among CNMI producers.

**2. Scope of the Program**

- In-State Extension
- In-State Research
- Multistate Extension
- Integrated Research and Extension
- Multistate Integrated Research and Extension

**V(D). Planned Program (Assumptions and Goals)**

**1. Assumptions made for the Program**

- Additional FTE's for other islands (inclusion of Extension agents)
- Certification and licensing of Veterinarian and Paravets
- Provision of slaughtering house and meat inspector
- Increase funding for animal health research and extension program
- More Train the Trainers Programs
- Provision of small scale feed mill industry and Feed Cost Regulation
- Development of Alternative Livestock Enterprise
- Increased research and extension collaboration with other universities, federal and local agencies
- Funding will remain constant or increase.

**2. Ultimate goal(s) of this Program**

Improve the competitiveness of the CNMI cattle, goat, swine, and poultry produced, by reducing cost of production and increasing productivity and profits.

- To ensure viability of small scale farmers engaged in alternative livestock enterprise
- To train more paravets/ animal health technicians regarding animal health and production
- To remain free of Avian flu

- Reduced reliance on foreign meat imports
- Improve the health of the people of the CNMI
- Further promote the CNMI's livestock sector

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

**1. Estimated Number of professional FTE/SYs to be budgeted for this Program**

Year	Extension		Research	
	1862	1890	1862	1890
2011	2.0	0.0	1.0	0.0
2012	2.0	0.0	1.0	0.0
2013	2.0	0.0	1.0	0.0
2014	2.0	0.0	1.0	0.0
2015	3.0	0.0	0.0	0.0

**V(F). Planned Program (Activity)**

**1. Activity for the Program**

- Training of local Paravets and other extension personnel-provision of animal health technicians
- Continue Animal disease survey for the CNMI
- Implement animal health program -USDA
- Conduct farm training for small farmers- livestock enterprise and genetic upgrading, animal welfare, animal nutrition and husbandry management, etc
  - Conduct animal health and management workshops
  - Conduct mini-workshop on alternative livestock enterprise
  - Promote alternative plant medicine to livestock health care Implement and promote sustainable livestock waste management

- Educate community on zoonotic diseases such as Avian Flu, Brucellosis etc
- Grant writing workshop for research funding
- Extension services including promotion, facilitation and networking in Sustainable Agriculture Programs

**2. Type(s) of methods to be used to reach direct and indirect contacts**

**Extension**

Direct Methods	Indirect Methods
<ul style="list-style-type: none"> <li>• Education Class</li> <li>• Workshop</li> <li>• Group Discussion</li> <li>• One-on-One Intervention</li> <li>• Demonstrations</li> <li>• Other 1 (Mini Workshops)</li> <li>• Other 2 (Presentations)</li> </ul>	<ul style="list-style-type: none"> <li>• Public Service Announcement</li> <li>• Newsletters</li> <li>• TV Media Programs</li> <li>• Web sites</li> <li>• Other 1 (Video/Radio)</li> <li>• Other 2 (Brochures/flyers/Calendar)</li> </ul>

**3. Description of targeted audience**

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

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

**1. Standard output measures**

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

	Direct Contact Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
2011	300	1000	300	1500
2012	400	1500	300	2000
2013	500	1500	300	2000
2014	500	1500	300	2000
2015	500	2000	500	3000

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

2011:0                      2012:0                      2013:0                      2014:0                      2015:0

**3. Expected Peer Review Publications**

Year	Research Target	Extension Target	Total
2011	1	1	2
2012	2	2	4

<b>Year</b>	<b>Research Target</b>	<b>Extension Target</b>	<b>Total</b>
2013	2	2	4
2014	2	2	4
2015	2	2	4

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

**1. Output Target**

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

**2011:2                      2012:2                      2013:2                      2014:2                      2015:2**

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

**2011:5                      2012:5                      2013:5                      2014:5                      2015:5**

**V(I). State Defined Outcome**

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 Target**

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

**2. Outcome Type : Change in Action Outcome Measure****2011:8****2012:10****2013:10****2014:12****2015:12****3. Associated Knowledge Area(s)**

- 301 - Reproductive Performance of Animals
- 302 - Nutrient Utilization in Animals
- 303 - Genetic Improvement of Animals
- 307 - Animal Management Systems
- 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

**4. Associated Institute Type(s)**

- 1862 Extension
- 1862 Research

**Outcome # 2****1. Outcome Target**

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

**2. Outcome Type : Change in Knowledge Outcome Measure****2011:20****2012:20****2013:20****2014:20****2015:20****3. Associated Knowledge Area(s)**

- 301 - Reproductive Performance of Animals
- 302 - Nutrient Utilization in Animals
- 303 - Genetic Improvement of Animals
- 307 - Animal Management Systems
- 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

**4. Associated Institute Type(s)**

- 1862 Extension
- 1862 Research

**Outcome # 3**

**1. Outcome Target**

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

**2. Outcome Type : Change in Knowledge Outcome Measure**

<b>2011:20</b>	<b>2012:20</b>	<b>2013:20</b>	<b>2014:20</b>	<b>2015:20</b>
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**3. Associated Knowledge Area(s)**

- 301 - Reproductive Performance of Animals
- 302 - Nutrient Utilization in Animals
- 303 - Genetic Improvement of Animals
- 307 - Animal Management Systems
- 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

**4. Associated Institute Type(s)**

- 1862 Extension
- 1862 Research

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

**1. External Factors which may affect Outcomes**

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

**Description**

Economic downturn conditions of the CNMI can change producers priority. Presence of disaster (CNMI as typhoon prone area), climate change -temperature change, availability of resources both local and federal appropriations, political status and government regulations may affect programs. Government laws. Expected

military build-up in the CNMI and the relocation of almost 4,000 military personnel including their dependents to the Island of Tinian

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

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

- Before-After (before and after program)
- During (during program)
- Time series (multiple points before and after program)
- Comparisons between different groups of individuals or program participants experiencing different levels of program intensity.
- Other (Questionnaire/survey, evaluation)

#### **Description**

Animal performance, as well as the best management practices utilized or tested will be monitored before and after and during the program for both control and treatment tests. Results will be analyzed and compared with basal data. Data's are gathered thru observation, laboratory tests and sampling. Post -workshops surveys will be given to participants to gauge satisfaction and effectiveness.

### **2. Data Collection Methods**

- Sampling
- Whole population
- Telephone
- On-Site
- Unstructured
- Observation
- Tests

#### **Description**

Data will be gathered throughout the entire population affected by the disease thru sampling representative or specimen as part of the subject for experiment or research test. Additional inputs maybe taken via telephone as part of the behavioral results from client observations and analysis (based on animal performance, environment effect and economic feasibility).

**V(A). Planned Program (Summary)****Program # 3****1. Name of the Planned Program**

Crop Improvement Program

**2. Brief summary about Planned Program**

The Crop Improvement program aims to increase the quality and quantity of produce grown in the CNMI. This will be accomplished through an integrated approach, utilizing information gained from locally inspired research projects, from which information can then be directly disseminated through extension activities. In an effort to improve farm productivity, sustainability, and competitiveness in the regional marketplace, this project aims to introduce appropriate technologies and improved plant genetic resources to the farming and gardening community. Tissue culture of economically important crops will be conducted such as banana, sweet potato, taro etc. to produce quality and disease free plants. Field trials and evaluations of new varieties in fruits, root crops and vegetables will be conducted in local soil and climatic conditions of the CNMI. Soil and water conservation techniques, soil analysis and nursery propagation of fruits and vegetables, grafting will be conducted.

**3. Program existence :** Intermediate (One to five years)

**4. Program duration :** Long-Term (More than five years)

**5. Expending formula funds or state-matching funds :** Yes

**6. Expending other than formula funds or state-matching funds :** Yes

**V(B). Program Knowledge Area(s)****1. Program Knowledge Areas and Percentage**

<b>KA Code</b>	<b>Knowledge Area</b>	<b>%1862 Extension</b>	<b>%1890 Extension</b>	<b>%1862 Research</b>	<b>%1890 Research</b>
102	Soil, Plant, Water, Nutrient Relationships	10%		10%	
125	Agroforestry	5%		5%	
202	Plant Genetic Resources	15%		15%	
204	Plant Product Quality and Utility (Preharvest)	20%		20%	
205	Plant Management Systems	30%		30%	
212	Pathogens and Nematodes Affecting Plants	10%		10%	
901	Program and Project Design, and Statistics	5%		5%	
902	Administration of Projects and Programs	5%		5%	
	<b>Total</b>	100%		100%	

**V(C). Planned Program (Situation and Scope)****1. Situation and priorities**

The People of the CNMI are highly dependent on imported foods. The great majority of produce sold in stores comes from Mexico, the U.S., China and other distant countries. In essence, farmers in the CNMI are competing with large-scale producers who are able to produce consistently and in great volumes, over thousands of miles. Farmers in the CNMI have an opportunity to capture a certain fraction of these markets, not by matching the volume of produce imported from producers abroad, but by offering distributors, hotels and markets a better quality product that is fresher and tastier. Therefore, it is a

priority of this program to identify improved genetic plant resources and materials and conducting trials to monitor their performance. By increasing the availability and quality of genetic plant materials that have been tried and tested here in the islands, farmers and gardeners should observe improved production, improved resistance to pathogens, and improved quality of their produce. Furthermore, it is a priority of this program to promote sustainable farming systems that improve the chances of farms achieving long-term success.

**2. Scope of the Program**

- In-State Extension
- In-State Research
- Integrated Research and Extension

**V(D). Planned Program (Assumptions and Goals)**

**1. Assumptions made for the Program**

- Funding will remain constant or increase.
- Additional FTE will be available.
- More regional collaborations with other land grant colleges and universities as well as federal and local agencies.
  - Program will be extended to more fruits crops and vegetables for production and improvement.
  - Extension publications and peer review papers of research findings will be focused.
  - More workshops and training programs for the farming community in crop production.

**2. Ultimate goal(s) of this Program**

To raise the quality and quantity of crops produced in the CNMI  
 Improve competitiveness of fruits, vegetables and other crops and reduce production cost

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

**1. Estimated Number of professional FTE/SYs to be budgeted for this Program**

Year	Extension		Research	
	1862	1890	1862	1890
2011	3.0	0.0	2.0	0.0
2012	3.0	0.0	1.0	0.0
2013	3.0	0.0	1.0	0.0
2014	3.0	0.0	1.0	0.0
2015	0.0	0.0	0.0	0.0

**V(F). Planned Program (Activity)**

**1. Activity for the Program**

- Micropropagation of staple crops such as banana, sweet potato and taro to produce quality and disease free plants.
- Field trials and evaluations of new varieties in fruits, root crops and vegetables conducted in local soil and climatic

conditions of CNMI.

- Research and extension programs on underutilized crops (specialty crops) and medicinal plants
- Disease diagnosis and disorder in the crops
- Organize field days and taste testing (sensory evaluation) of new varieties of taro, sweet potato and banana.
- Conduct hands on training and workshops for farmers, extension agents, and students on fruit trees grafting, soil and water conservation techniques, sustainable production of fruits and vegetables and composting.
- Video production
- Publications (brochures and fact sheets) and presentations through informational seminars and lectures.

Involve grade school, high school and college students in activities and presentations

- Implement best management practices on farms.
- Present results of research finds in national and interantional scientific meetings and conferences.

**2. Type(s) of methods to be used to reach direct and indirect contacts**

**Extension**

Direct Methods	Indirect Methods
<ul style="list-style-type: none"> <li>• Education Class</li> <li>• Workshop</li> <li>• Group Discussion</li> <li>• One-on-One Intervention</li> <li>• Demonstrations</li> <li>• Other 1 (Technical Presentations)</li> </ul>	<ul style="list-style-type: none"> <li>• Public Service Announcement</li> <li>• Newsletters</li> <li>• Web sites</li> <li>• Other 1 (Free Air Time)</li> </ul>

**3. Description of targeted audience**

- Government /Agency Collaborators
- Research assistants and Agriculture Extension agents
- 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(G). Planned Program (Outputs)**

**1. Standard output measures**

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

	Direct Contact Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
2011	100	500	100	500
2012	100	500	100	500
2013	100	500	100	500
2014	150	600	150	600
2015	175	650	175	650

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

**2011:0**

**2012:0**

**2013:0**

**2014:0**

**2015:0**

**3. Expected Peer Review Publications**

Year	Research Target	Extension Target	Total
2011	2	3	5
2012	2	2	4
2013	2	2	4
2014	2	3	5
2015	3	3	6

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

**1. Output Target**

- Number of research projects completed on Crop Improvement Issues

**2011:3**

**2012:4**

**2013:4**

**2014:4**

**2015:5**

**V(I). State Defined Outcome**

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.

**Outcome # 1**

**1. Outcome Target**

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

**2. Outcome Type : Change in Action Outcome Measure**

<b>2011:20</b>	<b>2012:30</b>	<b>2013:30</b>	<b>2014:35</b>	<b>2015:35</b>
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**3. Associated Knowledge Area(s)**

- 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

**4. Associated Institute Type(s)**

- 1862 Extension
- 1862 Research

**Outcome # 2**

**1. Outcome Target**

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

**2. Outcome Type : Change in Knowledge Outcome Measure**

<b>2011:12</b>	<b>2012:12</b>	<b>2013:14</b>	<b>2014:14</b>	<b>2015:15</b>
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**3. Associated Knowledge Area(s)**

- 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

**4. Associated Institute Type(s)**

- 1862 Extension
- 1862 Research

**Outcome # 3**

**1. Outcome Target**

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

**2. Outcome Type : Change in Action Outcome Measure**

**2011:10**

**2012:12**

**2013:12**

**2014:14**

**2015:15**

**3. Associated Knowledge Area(s)**

- 102 - Soil, Plant, Water, Nutrient Relationships
- 125 - Agroforestry
- 204 - Plant Product Quality and Utility (Preharvest)
- 205 - Plant Management Systems

**4. Associated Institute Type(s)**

- 1862 Extension
- 1862 Research

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

**1. External Factors which may affect Outcomes**

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

**Description**

The tropical islands of the Northern Marianas have year-round agricultural management problems that are heavily influenced by the climate. The economy is also heavily dependent on the Asian economy, and not the mainland USA economy; whatever happens in Asia is multiplied onto the CNMI. New plagues of pest may be delivered by tropical storms and typhoons.

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

**1. Evaluation Studies Planned**

- Time series (multiple points before and after program)

**Description**

A benchmark data on crop yield, objective assessment of the lower costs and higher output that will result from an improved crop production. This will require the preparation and up to date farm budgets for producing crops.

**2. Data Collection Methods**

- Sampling
- Telephone
- On-Site
- Structured
- Observation

**Description**

A benchmark data on crop yield, objective assessment of the lower costs and higher output that will result from an improved crop production. This will require the preparation and up to date farm budgets for producing crops.

**V(A). Planned Program (Summary)****Program # 4****1. Name of the Planned Program**

Soil and Water Quality Program

**2. Brief summary about Planned Program**

The Soil and Water Management program will promote the wise conservation, management and sustainable development of Soil and Water Resources here in the CNMI. This program aims to decrease the community's reliance on municipal water wells by promoting the use of rain catchments system. There is also a strong need to introduce and test appropriate technologies or best management practices for soil strengthening and conditioning to further reduce the need for water consumption on the farm. Furthermore, it is envisioned that these practices will improve the economics and competitiveness of the farming systems here by utilizing organic materials available here on island whenever possible, further decreasing the reliance on imported fertilizers, pesticides and feeds. This program also aims to educate the people of the CNMI on the value of aluminum recycling through capacity building and education.

**3. Program existence :** Mature (More than five years)

**4. Program duration :** Long-Term (More than five years)

**5. Expending formula funds or state-matching funds :** Yes

**6. Expending other than formula funds or state-matching funds :** Yes

**V(B). Program Knowledge Area(s)****1. Program Knowledge Areas and Percentage**

<b>KA Code</b>	<b>Knowledge Area</b>	<b>%1862 Extension</b>	<b>%1890 Extension</b>	<b>%1862 Research</b>	<b>%1890 Research</b>
102	Soil, Plant, Water, Nutrient Relationships	20%		20%	
111	Conservation and Efficient Use of Water	50%		50%	
403	Waste Disposal, Recycling, and Reuse	30%		30%	
	<b>Total</b>	100%		100%	

**V(C). Planned Program (Situation and Scope)****1. Situation and priorities**

The People of the CNMI are highly dependent on imported goods. The high cost of shipping relative to the enormous distance between the Marianas Islands and the U.S. Mainland has had an adverse impact on the price of all commodities brought to the island. The high cost of living in the islands is especially discomfoting in respect to the rising cost of operating a farm. The high cost of feeds and fertilizers, for example, have had a detrimental effect on the ability of the indigenous people to sustain their farming endeavors. Furthermore, the islands' have observed a continuous and steady decline of available land, water and soil resources. Due to the geographic nature of the islands, soils here are either highly erodible or porous requiring extra effort in protecting soil and water resources from overuse, potential contamination or total loss. This is especially significant when you consider the high frequency of heavy rains and typhoons. Priority will be given to promoting sustainable agriculture techniques that protect and nurture soil and water resources such as cover cropping, dry litter waste management system for hogs, no-till farming, mulchings, composting and organic farming in general. This program aims to focus mainly on promoting simple best management practices for conserving and developing the islands soil and water resources to ensure that they may be available and healthy for many generations to come.

**2. Scope of the Program**

- In-State Extension
- In-State Research
- Integrated Research and Extension

**V(D). Planned Program (Assumptions and Goals)**

**1. Assumptions made for the Program**

Funding will remain constant or increase. External funding sources will be secured for projects that are significant to the CNMI. Soil and water conservation efforts will increase over time as more and more farmers and members of the community adopt the said activities on their own. Additional FTE's will be available

**2. Ultimate goal(s) of this Program**

The Soil and Water Management program will promote the wise conservation, and management and sustainable development of Soil and Water Resources here in the CNMI. Furthermore, it is the ultimate goal of this program to reduce the demand for imported food commodities, as farmers are better able to supply these commodities with improved soil and water quality.

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

**1. Estimated Number of professional FTE/SYs to be budgeted for this Program**

Year	Extension		Research	
	1862	1890	1862	1890
2011	1.0	0.0	1.0	0.0
2012	1.0	0.0	1.0	0.0
2013	1.0	0.0	1.0	0.0
2014	1.0	0.0	1.0	0.0
2015	1.0	0.0	1.0	0.0

**V(F). Planned Program (Activity)**

**1. Activity for the Program**

Demonstration/research projects will be introduced as learning tools. The Dry Litter Waste Management system demonstration along with composting demonstration will be continued and documented. To maximize the exposure of the demonstrations themselves, an educational video series will be produced. Efforts will be made to either receive free or purchase airtime on the local cable T.V. station to maximize viewer exposure to the educational video series. Furthermore, a goal of this program will be to supply video rental stores with these educational videos for increased viewer numbers. Still photography will also be used to document research and demonstration projects for use in publications (brochures and fact sheets) and presentations to be produced and disseminated through informational seminars and lectures. Farmer-type gatherings such as association meetings, soil and water conservation district meetings and forums will be targeted. Students from the grade school, high school and college will also be involved in activities and presentations when ever possible. Soil sampling for farmers will be ongoing. As a pollution prevention activity, recycling will be promoted and encouraged through capacity building, outreach and education.

**2. Type(s) of methods to be used to reach direct and indirect contacts**

**Extension**

<b>Direct Methods</b>	<b>Indirect Methods</b>
-----------------------	-------------------------

- |  |  |
|--|--|
| <ul style="list-style-type: none"> <li>● Education Class</li> <li>● Workshop</li> <li>● Group Discussion</li> <li>● One-on-One Intervention</li> <li>● Demonstrations</li> <li>● Other 1 (Presentation, Field Days)</li> </ul> | <ul style="list-style-type: none"> <li>● Public Service Announcement</li> <li>● Newsletters</li> <li>● TV Media Programs</li> <li>● Web sites</li> </ul> |
|--|--|

**3. Description of targeted audience**

Government /Agency Collaborators

All farm crop 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(G). Planned Program (Outputs)**

**1. Standard output measures**

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

	Direct Contact Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
2011	100	500	100	500
2012	100	500	100	500
2013	100	500	100	500
2014	100	500	100	500
2015	100	500	500	500

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

2011:0                      2012:0                      2013:0                      2014:0                      2015:0

**3. Expected Peer Review Publications**

Year	Research Target	Extension Target	Total
2011	1	1	0
2012	1	1	0
2013	1	1	0
2014	1	1	0
2015	1	1	0

## **V(H). State Defined Outputs**

### **1. Output Target**

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

**2011:1**

**2012:1**

**2013:1**

**2014:1**

**2015:1**

**V(I). State Defined Outcome**

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 Target**

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

**2. Outcome Type : Change in Action Outcome Measure**

<b>2011:20</b>	<b>2012:20</b>	<b>2013:20</b>	<b>2014:20</b>	<b>2015:20</b>
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**3. Associated Knowledge Area(s)**

- 403 - Waste Disposal, Recycling, and Reuse

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome # 2**

**1. Outcome Target**

Number of households learning to safely use Rain-catchments systems

**2. Outcome Type : Change in Knowledge Outcome Measure**

<b>2011:8</b>	<b>2012:10</b>	<b>2013:10</b>	<b>2014:10</b>	<b>2015:10</b>
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**3. Associated Knowledge Area(s)**

- 111 - Conservation and Efficient Use of Water

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome # 3**

**1. Outcome Target**

Number of farmers using Dry Litter Waste Management Systems for Hogs

**2. Outcome Type : Change in Action Outcome Measure**

<b>2011:12</b>	<b>2012:12</b>	<b>2013:10</b>	<b>2014:10</b>	<b>2015:10</b>
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**3. Associated Knowledge Area(s)**

- 111 - Conservation and Efficient Use of Water
- 403 - Waste Disposal, Recycling, and Reuse

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome # 4**

**1. Outcome Target**

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

**2. Outcome Type : Change in Knowledge Outcome Measure**

2011:40	2012:50	2013:50	2014:50	2015:50
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**3. Associated Knowledge Area(s)**

- 111 - Conservation and Efficient Use of Water
- 403 - Waste Disposal, Recycling, and Reuse

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome # 5**

**1. Outcome Target**

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

**2. Outcome Type : Change in Action Outcome Measure**

2011:20	2012:20	2013:20	2014:20	2015:20
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**3. Associated Knowledge Area(s)**

- 102 - Soil, Plant, Water, Nutrient Relationships
- 111 - Conservation and Efficient Use of Water
- 403 - Waste Disposal, Recycling, and Reuse

**4. Associated Institute Type(s)**

- 1862 Extension

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

**1. External Factors which may affect Outcomes**

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

**Description**

Extreme economic downturn which might affect manpower availability; excessive turnover of technical staff involved in this program; and unavailability of needed facilities and equipment to conduct research.

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

**1. Evaluation Studies Planned**

- Before-After (before and after program)
- During (during program)

- Time series (multiple points before and after program)

### **Description**

Best management practices utilizes or tested will be monitor before and after, and during the program for both control and treatment tests.

## **2. Data Collection Methods**

- Sampling
- On-Site
- Observation
- Tests

### **Description**

Farms, Farmers and people within the community will be questioned, observed and documented before and after having implemented the said technologies.

Soil and water will undergo laboratory tests under sampling method and be subjected for analysis depending on the objectives of the research.

**V(A). Planned Program (Summary)****Program # 5****1. Name of the Planned Program**

Community Resource Development

**2. Brief summary about Planned Program**

The Community Resource Development Program aims to decrease the Commonwealth of the Northern Mariana Islands' (CNMI) community reliance on outside sources for household goods and daily family consumption via educating and promoting home -canning/food preservation, container gardening, money management for youths and adults, home arts and designs, local handicrafts and sewing programs for families with limited resources.

The ultimate goal is to improve the quality of life for all CNMI residents by understanding and addressing our immediate community needs as well as breaking the cycle of social problems often caused by a lack of job skills and self-worth. The proposed activities aim to increase competency in life skills which would ultimately benefit the poverty stricken.

**3. Program existence :** Mature (More than five years)

**4. Program duration :** Long-Term (More than five years)

**5. Expending formula funds or state-matching funds :** Yes

**6. Expending other than formula funds or state-matching funds :** Yes

**V(B). Program Knowledge Area(s)****1. Program Knowledge Areas and Percentage**

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

**V(C). Planned Program (Situation and Scope)****1. Situation and priorities**

The CNMI's revenue relies now heavily on tourism as a result of the recent departure of the garment factories. Revenue generated from tourism fluctuates from time to time but generally it is still considered to be very low. As a result of the decrease in money circulating in the CNMI, businesses are cutting back on the jobs being offered. With less money circulating, residents are becoming thrifter than ever, and as a result are looking at ways at being more efficient with the resources they already have.

The home canning and food preservation program will be combined with the container gardening program so that interested individuals regardless whether they are into commercial farming or small backyard gardening can make use of the services and training that the program has to offer

Useful information on money management will also be found throughout the community via a community wide campaign on "how to develop a budget, budgeting your food stamps and smart shopping".

**2. Scope of the Program**

- In-State Extension
- Multistate Extension

**V(D). Planned Program (Assumptions and Goals)**

**1. Assumptions made for the Program**

Decreased reliance on outside sources for household items and daily family consumptions &ndash i.e. more CNMI residents will be canning and preserving food for home consumption and sewing cloths for their families.

Increased community knowledge on issues related to money management and hands-on training for developing skills in the art of making local handicrafts to be sold in gifts shops throughout the three most populated islands in the CNMI.

**2. Ultimate goal(s) of this Program**

The ultimate goal is to improve the quality of life for all CNMI residents by understanding and addressing our immediate community needs as well as breaking the cycle of social problems often caused by a lack of knowledge and self-worth.

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

**1. Estimated Number of professional FTE/SYs to be budgeted for this Program**

Year	Extension		Research	
	1862	1890	1862	1890
2011	3.0	0.0	0.0	0.0
2012	3.0	0.0	0.0	0.0
2013	3.0	0.0	0.0	0.0
2014	3.0	0.0	0.0	0.0
2015	3.0	0.0	0.0	0.0

**V(F). Planned Program (Activity)**

**1. Activity for the Program**

NMC-CREES, CRD program will coordinate training for certification in sewing, safe home canning and food preservation. NMC-CREES', Food scientist and volunteers from the USDA representatives conducted workshops and training on the methods of safe home canning and food preservation and attended by all of Family and Consumer Sciences staff on the three most populated islands in the CNMI. The overwhelming popularity of such preservation techniques calls for more workshops focusing on such topics.

Numerous community workshops will be provided by trained staff on safe and effective methods of home canning and food preservation. The food scientist will focus on improving value added products for both crops and animal products. Sewing Classes for Beginners will continue to be offer on all three islands and certificate of successful completion will be issued to those students who successfully complete the 12 sewing projects on their graduation day.

Workshops on Youth and Adults Money Management will also be offer on the islands of Saipan, Tinian and Rota.

**2. Type(s) of methods to be used to reach direct and indirect contacts**

**Extension**

<b>Direct Methods</b>	<b>Indirect Methods</b>
-----------------------	-------------------------

- |   |   |
|---|---|
| <ul style="list-style-type: none"> <li>• Education Class</li> <li>• Workshop</li> <li>• Demonstrations</li> <li>• Other 1 (Village Meetings)</li> <li>• Other 2 (Afterschool Activities)</li> </ul> | <ul style="list-style-type: none"> <li>• Public Service Announcement</li> <li>• Newsletters</li> <li>• TV Media Programs</li> <li>• Web sites</li> <li>• Other 1 (Telephone)</li> </ul> |
|---|---|

**3. Description of targeted 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

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

**1. Standard output measures**

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

	Direct Contact Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
2011	500	2000	3000	5000
2012	500	2000	3000	5000
2013	500	2000	3000	5000
2014	500	2000	3000	5000
2015	500	2000	3000	5000

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

**2011:0                      2012:0                      2013:0                      2014:0                      2015:0**

**3. Expected Peer Review Publications**

Year	Research Target	Extension Target	Total
2011	0	2	0
2012	0	2	0
2013	0	3	0
2014	0	3	0

Year	Research Target	Extension Target	Total
2015	0	0	0

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

**1. Output Target**

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

**2011:200                      2012:300                      2013:300                      2014:300                      2015:300**

- Number of established Entrepreneurs projects

**2011:8                      2012:10                      2013:10                      2014:15                      2015:20**

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

**2011:200                      2012:200                      2013:200                      2014:250                      2015:250**

**V(I). State Defined Outcome**

O. No.	Outcome Name
1	Number of participants that complete 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 Target**

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

**2. Outcome Type :** Change in Knowledge Outcome Measure

2011:200                      2012:200                      2013:200                      2014:200                      2015:200

**3. Associated Knowledge Area(s)**

- 801 - Individual and Family Resource Management

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome # 2**

**1. Outcome Target**

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

**2. Outcome Type :** Change in Knowledge Outcome Measure

2011:200                      2012:200                      2013:200                      2014:200                      2015:200

**3. Associated Knowledge Area(s)**

- 801 - Individual and Family Resource Management

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome # 3**

**1. Outcome Target**

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

**2. Outcome Type :** Change in Knowledge Outcome Measure

2011:300                      2012:300                      2013:300                      2014:300                      2015:300

**3. Associated Knowledge Area(s)**

- 801 - Individual and Family Resource Management

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome # 4**

**1. Outcome Target**

Number of youths and adults applying knowledge gained.

**2. Outcome Type :** Change in Action Outcome Measure

**2011:**150

**2012:**150

**2013:**150

**2014:**200

**2015:**200

**3. Associated Knowledge Area(s)**

- 802 - Human Development and Family Well-Being

**4. Associated Institute Type(s)**

- 1862 Extension

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

**1. External Factors which may affect Outcomes**

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Competing Public priorities
- Populations changes (immigration, new cultural groupings, etc.)

**Description**

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(K). Planned Program (Evaluation Studies and Data Collection)**

**1. Evaluation Studies Planned**

- After Only (post program)
- Before-After (before and after program)

**Description**

Program evaluation will be done before and after each activity.

**2. Data Collection Methods**

- Telephone
- On-Site
- Observation
- Other (home visits,)

**Description**

Data collected on-site survey and program/project observation and also home visits.

**V(A). Planned Program (Summary)****Program # 6****1. Name of the Planned Program**

Diet, Physical Activity, and Health

**2. Brief summary about Planned Program**

Diet, Physical Activity, and Health is a program that will use scientific evidence and best practices recommendations/models to bring about changes that are conducive to improved health at the population level. Policy and environmental approaches and interventions in relation to diet, physical activity, and health promotion are the main focus of this program.

**3. Program existence :** Mature (More than five years)

**4. Program duration :** Long-Term (More than five years)

**5. Expending formula funds or state-matching funds :** Yes

**6. Expending other than formula funds or state-matching funds :** Yes

**V(B). Program Knowledge Area(s)****1. Program Knowledge Areas and Percentage**

<b>KA Code</b>	<b>Knowledge Area</b>	<b>%1862 Extension</b>	<b>%1890 Extension</b>	<b>%1862 Research</b>	<b>%1890 Research</b>
703	Nutrition Education and Behavior	50%		0%	
724	Healthy Lifestyle	50%		0%	
	<b>Total</b>	100%		0%	

**V(C). Planned Program (Situation and Scope)****1. Situation and priorities**

According to the World Health Organization the indigenous Chamorro and Carolinian populations within the CNMI have the third highest rate of Type II diabetes in the world per capita. Additionally, Atherosclerotic diseases is another leading cause of death. Obesity, a major risk factor for chronic diseases, is widespread among the adult population. Unhealthy diet, sedentary lifestyle, and tobacco use are major risk factors that contribute to the early onset and complication of the aforementioned diseases. Awareness of the underlying causes of chronic diseases are lacking in the CNMI. As a result of a lack of awareness, the majority of the population do not have the behavior-related knowledge needed to make lifestyle changes. While the majority of community efforts have been focused on diet, there is a demonstrated need to focus on the health benefits of physical activity. Currently, the CNMI lacks its' own dietary and physical activity guidelines. Uniform guidelines are needed for not only consistency of messages being propagated to the community, but to guide policy development as well. There is an urgent need for population-wide interventions in the areas of diet, physical activity, and health promotion (policy and environmental interventions).

**2. Scope of the Program**

- In-State Extension
- Integrated Research and Extension

**V(D). Planned Program (Assumptions and Goals)****1. Assumptions made for the Program**

Diet, Physical Activity, and Health Promotion will work with various agencies and diverse stakeholders as well as with regional partners from Pacific institutions of higher learning and others who can contribute to bringing about healthier living. The program intends to use its policy and environmental intervention strategies to compliment the efforts of existing educational programs, such as EFNEP & Department of Public Health-Diabetes Prevention and Control Program. We assume that more awareness of the burden of lifestyle disease will result in increased community action to curb the incidence of such diseases. In addition to raising awareness about the burden of NCDs, increasing physical activity and fruit and vegetable consumption will be encouraged and taught.

**2. Ultimate goal(s) of this Program**

This program seeks to bring about population-wide interventions that will result in an increase in positive behaviors relating to diet and physical activity; thereby reducing the burden of lifestyle diseases. This will be achieved in part, by establishing the CNMI Health Promotion Council, a body which will work to better coordinate multi-sector efforts to bring about a healthier CNMI.

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

**1. Estimated Number of professional FTE/SYs to be budgeted for this Program**

Year	Extension		Research	
	1862	1890	1862	1890
2011	2.5	0.0	1.0	0.0
2012	2.0	0.0	1.0	0.0
2013	2.0	0.0	1.0	0.0
2014	2.0	0.0	1.0	0.0
2015	0.0	0.0	0.0	0.0

**V(F). Planned Program (Activity)**

**1. Activity for the Program**

- Social marketing/awareness campaign on the burden of non-communicable diseases/lifestyle diseases and role of diet, physical activity, and tobacco cessation in NCD prevention
- Establishment of CNMI Health Promotion Council
- Development of Health Promotion Strategic Plan (guide for policy development and environmental strategies)
- Development of CNMI dietary guidelines (will be included in Strategic Plan)
- Development of CNMI physical activity guidelines (will be included in Strategic Plan)
- Collaboration with the Department of Public Health and other key agencies to complete the World Health Organization's STEPs Survey

**2. Type(s) of methods to be used to reach direct and indirect contacts**

**Extension**

<b>Direct Methods</b>	<b>Indirect Methods</b>
-----------------------	-------------------------

- |  |  |
|--|--|
| <ul style="list-style-type: none"> <li>● Education Class</li> <li>● Workshop</li> <li>● Group Discussion</li> <li>● One-on-One Intervention</li> <li>● Demonstrations</li> </ul> | <ul style="list-style-type: none"> <li>● Public Service Announcement</li> <li>● Billboards</li> <li>● Newsletters</li> <li>● TV Media Programs</li> <li>● Web sites</li> <li>● Other 1 (Culturally approp. brochures)</li> </ul> |
|--|--|

**3. Description of targeted 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) the majority of the general population can be considered "at risk".

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

**1. Standard output measures**

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

	Direct Contact Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
2011	175	7000	175	2000
2012	175	7000	175	2000
2013	200	7000	200	2000
2014	200	7000	200	2000
2015	0	0	0	0

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

2011:0                      2012:0                      2013:0                      2014:0                      2015:0

**3. Expected Peer Review Publications**

Year	Research Target	Extension Target	Total
2011	0	0	0
2012	0	0	0
2013	0	0	0
2014	0	0	0
2015	0	0	0

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

**1. Output Target**

- Greater understanding of diet, physical activity, and health

**2011:2**

**2012:2**

**2013:2**

**2014:2**

**2015:0**

**V(I). State Defined Outcome**

O. No.	Outcome Name
1	Development of Physical Activity Social Marketing Campaign (PASMCM)
2	Completion of STEPS Survey

**Outcome # 1**

**1. Outcome Target**

Development of Physical Activity Social Marketing Campaign (PASMC)

**2. Outcome Type : Change in Knowledge Outcome Measure**

<b>2011:1</b>	<b>2012:1</b>	<b>2013:1</b>	<b>2014:1</b>	<b>2015:0</b>
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**3. Associated Knowledge Area(s)**

- 703 - Nutrition Education and Behavior
- 724 - Healthy Lifestyle

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome # 2**

**1. Outcome Target**

Completion of STEPS Survey

**2. Outcome Type : Change in Action Outcome Measure**

<b>2011:1</b>	<b>2012:0</b>	<b>2013:0</b>	<b>2014:0</b>	<b>2015:0</b>
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**3. Associated Knowledge Area(s)**

- 724 - Healthy Lifestyle

**4. Associated Institute Type(s)**

- 1862 Extension

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

**1. External Factors which may affect Outcomes**

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Competing Public priorities
- Other (lack of collaboration)

**Description**

Although we have no control over the external factors mentioned, we will do our best to be efficient and effective in reaching our outcomes. Collaboration is a key component of reaching our outcomes; this external factor is more concerned with interagency collaboration and internal collaboration.

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

**1. Evaluation Studies Planned**

- Before-After (before and after program)
- Other (process evaluation)

## **Description**

### *Pre and post evaluation*

This will be incorporated into the PA questionnaire; it will be administered before and after the PA Social Marketing Campaign to assess the effectiveness of the campaign.

### *Process evaluation*

This will be used to gauge the NCD-related (Task Force and Strategic Plan creation). It will also be used to monitor policies conducive to improving health that have been created as a result of the NCD Strategic Plan.

## **2. Data Collection Methods**

- Whole population
- Observation
- Other (Population-based questionnaire)

## **Description**

A variety of methods will be used to collect data. The population questionnaire will be used to establish baseline data in the area of physical activity practices among adults. Observation will be used to assess whether there has been an increase in the utilization of the Beach Road Pathway and other areas of interest.

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

### **Program # 7**

#### **1. Name of the Planned Program**

Food Safety and Quality Program

#### **2. Brief summary about Planned Program**

Even if a wide variety of agricultural produce are harvested in the CNMI, these local produce are sold in local markets for only domestic consumption as fresh fruits and vegetables. Hardly any fruits and vegetables are exported to the outside markets due to quarantine restrictions from the melon fly, which is found on all of the islands in the CNMI. For this reason, the Food Safety and Quality Program of NMC-CREES has endeavored to establish a community kitchen. The community kitchen will provide NMC-CREES with a facility to conduct basic and applied research on alternative food processing technologies and to develop value-added products using local agricultural commodities. These alternative food processing technologies could be easily developed and gradually transferred to local processors in order to create additional profits for local farmers and producers. The community kitchen could provide basic food processing equipments including heat processing retort, juice making press, evaporator, convection drying machine, fermenting, and packaging machine.

Even if the production of value-added fruit products is still undeveloped and limited in the CNMI, it can be a promising industry to generate beneficial economic influence and a key element for our local economy by increasing producers' income and providing jobs to this community. In addition, the Food Safety and Quality Program will provide hands-on practical value-adding processing workshops to farmers, producers, food processors, and to people who are involved in general food preparation. These workshops will be conducted on all of the three major islands. As a continuous outreach educational activity, the Food Safety and Quality program will help low income households in the CNMI to consume safe and quality food by teaching stakeholders proper sanitation measures and safe handling procedures.

Furthermore, basic research on good post harvest practices and technologies are also necessary to prolong the shelf life of fresh fruits and vegetables produced in the CNMI. The major factors affecting food deterioration during the post-harvesting period include growth and activities of microorganisms, activities of enzymes and other chemical reaction, gain or loss of moisture, inappropriate temperature, reaction with oxygen, light, physical stress or damage, and time. The results of such research are analyzed and released to the public through the cooperative extension system. All the information obtained from these activities will be published in internationally peer-reviewed scientific journals and presented in international food safety conference. It is our goal that these efforts of the Food Safety and Quality program will increase the local farmers and producers' income.

**3. Program existence** : Intermediate (One to five years)

**4. Program duration** : Long-Term (More than five years)

**5. Expending formula funds or state-matching funds** : Yes

**6. Expending other than formula funds or state-matching funds** : Yes

**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%	
	<b>Total</b>	100%		100%	

**V(C). Planned Program (Situation and Scope)****1. Situation and priorities**

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. Fortunately a wide variety of fresh agricultural produce are harvested in the CNMI and these local produce are very environmental-friendly grown. 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. However, these local produce are sold in local markets for only domestic consumption. It is essential to develop various value-added food products using local fresh produce such as noni, bananas, papayas, sour sops, lemons, coconuts, pineapples, mangoes, guavas, and so forth and unique value-added products can be developed and exported using exotic tropical fruits in the CNMI although the production of value-added fruit products is still undeveloped and limited in the CNMI. Value-added food production can be a promising industry to generate beneficial economic influence and these food processing operations could contribute to local economy by creating producers' additional income and providing jobs to this community. For these reasons, the Food Safety and Quality program has been assisting local farmers and producers to develop value-added products using local produce.

In addition, concerns within the CNMI about the safety of its food supply have risen to new historic levels. Changing patterns of consumption, an aging population, more persons with chronic illness, and a wide variation in food handling and preparation practices are some of the factors contributing to the increased vulnerability of the population. Food importation from neighboring developing countries is also a growing problem. Therefore, the Food Safety and Quality program needs to teach and assist individuals in the areas of basic food microbiology, processing and preservation, and post harvest biology. Furthermore, the program will concentrate primarily on public education about basic food safety issues in order to prevent potential food borne illnesses and ensure public health. Also, the program will provide useful information to maintain food quality, handle food materials properly, and prepare healthy food through the extension outreach activities such as workshops and public presentations.

**2. Scope of the Program**

- In-State Extension
- In-State Research
- Integrated Research and Extension

**V(D). Planned Program (Assumptions and Goals)**

**1. Assumptions made for the Program**

We assume available funding will remain constant or increase. Additional FTE's will be available. Basic food processing equipments and facilities will be established for the program.

**2. Ultimate goal(s) of this Program**

The program intends on developing value-added products using local agricultural commodities and to lead people in the CNMI to consume safe and wholesome food.

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

**1. Estimated Number of professional FTE/SYs to be budgeted for this Program**

Year	Extension		Research	
	1862	1890	1862	1890
2011	2.0	0.0	2.0	0.0
2012	2.0	0.0	2.0	0.0
2013	2.0	0.0	2.0	0.0
2014	2.0	0.0	2.0	0.0
2015	2.0	0.0	2.0	0.0

**V(F). Planned Program (Activity)**

**1. Activity for the Program**

- | Establishment of good post-harvest practices
- | Establishment of outstanding food safety training programs
- | Development of various value-added food products using local produce
- | Introduction of new food processing technologies to the CNMI
- | Conduction of basic and applied research to intensify the Food Safety and Quality Program

**2. Type(s) of methods to be used to reach direct and indirect contacts**

**Extension**

Direct Methods	Indirect Methods
<ul style="list-style-type: none"> <li>● Education Class</li> <li>● Workshop</li> <li>● Group Discussion</li> <li>● One-on-One Intervention</li> <li>● Demonstrations</li> </ul>	<ul style="list-style-type: none"> <li>● Public Service Announcement</li> <li>● Newsletters</li> <li>● TV Media Programs</li> <li>● Web sites</li> </ul>

**3. Description of targeted 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(G). Planned Program (Outputs)**

**1. Standard output measures**

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

	Direct Contact Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
2011	100	500	100	500
2012	100	500	100	500
2013	100	500	100	500
2014	100	500	100	500
2015	100	500	100	500

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

2011:0                      2012:0                      2013:0                      2014:0                      2015:0

**3. Expected Peer Review Publications**

Year	Research Target	Extension Target	Total
2011	1	0	1
2012	1	0	1
2013	1	0	1
2014	1	0	1
2015	1	0	1

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

**1. Output Target**

- Number of research on food quality improvements

<b>2011:2</b>	<b>2012:2</b>	<b>2013:2</b>	<b>2014:2</b>	<b>2015:2</b>
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- Number of novel food processing technology workshops

<b>2011:4</b>	<b>2012:4</b>	<b>2013:4</b>	<b>2014:4</b>	<b>2015:4</b>
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- Number of workshops related with food safety and quality

<b>2011:4</b>	<b>2012:4</b>	<b>2013:4</b>	<b>2014:4</b>	<b>2015:4</b>
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- Numbers of newly developed value-added products

<b>2011:3</b>	<b>2012:4</b>	<b>2013:4</b>	<b>2014:4</b>	<b>2015:4</b>
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- Numbers of technical information provided to the public

<b>2011:4</b>	<b>2012:4</b>	<b>2013:4</b>	<b>2014:4</b>	<b>2015:4</b>
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**V(I). State Defined Outcome**

O. No.	Outcome Name
1	Numbers of farmers/producers that develop value added products
2	Number of farmers/producers implementing good post-harvest practices

**Outcome # 1**

**1. Outcome Target**

Numbers of farmers/producers that develop value added products

**2. Outcome Type : Change in Action Outcome Measure**

<b>2011:10</b>	<b>2012:20</b>	<b>2013:20</b>	<b>2014:20</b>	<b>2015:20</b>
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**3. Associated Knowledge Area(s)**

- 501 - New and Improved Food Processing Technologies
- 502 - New and Improved Food Products
- 504 - Home and Commercial Food Service

**4. Associated Institute Type(s)**

- 1862 Extension
- 1862 Research

**Outcome # 2**

**1. Outcome Target**

Number of farmers/producers implementing good post-harvest practices

**2. Outcome Type : Change in Knowledge Outcome Measure**

<b>2011:10</b>	<b>2012:20</b>	<b>2013:30</b>	<b>2014:30</b>	<b>2015:30</b>
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**3. Associated Knowledge Area(s)**

- 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

**4. Associated Institute Type(s)**

- 1862 Extension
- 1862 Research

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

**1. External Factors which may affect Outcomes**

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

## **Description**

The CNMI is located in the path of tropical storms and typhoons and some of which may cause severe damage to agricultural crops and various properties. The economy of the CNMI heavily depends on other Asian countries as well as the mainland United States and the economical recession in the CNMI will affect the achievement of the program.

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

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

- Other (summative, implementation, progress)

## **Description**

Periodic evaluations will be conducted in order to see if the program is implemented as it is planned. General implementation evaluation will be assessed monthly base and corrective action will be conducted when every variation is caused. The progress of the program will be assessed quarterly base. Data collected from the implementation evaluation will be analyzed to evaluate the outputs of the program activities. In summative evaluation, the program achievement will be annually assessed based on the extent to which the outcomes of the program are accomplished.

#### **2. Data Collection Methods**

- On-Site
- Observation
- Other (experiment)

## **Description**

Periodic visits will be made to various farms and processing facilities to observe their post-harvest practices, food handling procedures, and other operations related to food processing. If there are problems in the field, program extension agents or research assistant will inspect and provide on-site consultation. In order to improve qualities of agricultural crops in the CNMI, a multitude of scientific studies will be needed to get practical data on post-harvest practices and food qualities of various agricultural commodities.

**V(A). Planned Program (Summary)****Program # 8****1. Name of the Planned Program**

4-H Youth Development

**2. Brief summary about Planned Program**

The CNMI 4-H Program aims to develop the local youth by linking children with caring adults in order to foster relationships that encourage the youth to envision their potential and acquire positive attitudes towards themselves and others. 4-H Program activities such as gardening, canoeing, traditional fishing, self esteem building and much more will provide the children with a multitude of educational, vocational and fun activities such that participants can strengthen their ability to make intelligent decisions, solve problems and obtain life skills that are relevant to life on the islands, are culturally appropriate and serve to embrace and preserve the island culture whenever possible. As club activities take place and relationships and positive attitudes are reinforced, children will begin to improve their skills in personal communication and self-expression, building leadership skills and capabilities. With physical and mental health as a basic principle within all 4-H program activities, children will begin to envision their role in the community and will be encouraged to take involvement in public affairs, ultimately taking a leadership role of their own lives and contributing to the well-being of the community as a whole. The CNMI 4-H Program will place some emphasis on student high school achievement and developing programs for children at risk in the community. Personal physical and mental health will be an underlying theme in all CNMI 4-H programs.

**3. Program existence :** Mature (More than five years)**4. Program duration :** Long-Term (More than five years)**5. Expending formula funds or state-matching funds :** Yes**6. Expending other than formula funds or state-matching funds :** Yes**V(B). Program Knowledge Area(s)****1. Program Knowledge Areas and Percentage**

<b>KA Code</b>	<b>Knowledge Area</b>	<b>%1862 Extension</b>	<b>%1890 Extension</b>	<b>%1862 Research</b>	<b>%1890 Research</b>
802	Human Development and Family Well-Being	10%		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	70%		0%	
	<b>Total</b>	100%		0%	

**V(C). Planned Program (Situation and Scope)****1. Situation and priorities**

The Commonwealth of the Northern Marianas Islands is located thousands of miles from the U.S. mainland in the middle of the Western Pacific Ocean, closer to the Philippines than it is to the closest state of Hawaii. The sheer distance from the NMI to the rest of the nation and other countries results in an enormously high cost of living since nearly all goods and resources must be imported. Further compounding the issue is that resources such as land, water and electricity are limited in quantity, driving prices higher and decreasing opportunities for the communities to be self-sustaining. Many people are attracted to these islands in order that they might work and live in a beautiful environment under U.S. Governance, partially. The situation is such that we have a high human population density made up of persons from all over Asia, Micronesia and the rest of world. This phenomenon poses serious risks for youth as they are forced to grow up in an environment with little personal

space, support, resources, guidance and in some cases a lack of love.

**2. Scope of the Program**

- In-State Extension

**V(D). Planned Program (Assumptions and Goals)**

**1. Assumptions made for the Program**

Funding will remain constant or increase.

**2. Ultimate goal(s) of this Program**

To provide community and culturally-focused experiential learning opportunities that encourage youth development and build capacity amongst children in order to foster in them a desire to learn, love life, lead and meet their potential. To build and strengthen relationships between youth and caring adults in order that they may take a positive leadership role in their future and contribute to the community in a positive way.

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

**1. Estimated Number of professional FTE/SYs to be budgeted for this Program**

Year	Extension		Research	
	1862	1890	1862	1890
2011	3.0	0.0	0.0	0.0
2012	3.0	0.0	0.0	0.0
2013	3.0	0.0	0.0	0.0
2014	3.0	0.0	0.0	0.0
2015	3.0	0.0	0.0	0.0

**V(F). Planned Program (Activity)**

**1. Activity for the Program**

The CNMI 4-H program will collaborate with other government and non-government groups to develop relationships and design programs for youth development. Funding will be sought through proposal development and other efforts in order to support staffing and program facilitation. Volunteers will be recruited and clubs formed as a venue for 4-H curricula and programming. Information on the CNMI 4-H programs will be 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. Type(s) of methods to be used to reach direct and indirect contacts**

**Extension**

Direct Methods	Indirect Methods

- Education Class
- Workshop
- Group Discussion
- One-on-One Intervention
- Demonstrations

- Public Service Announcement
- Newsletters
- TV Media Programs
- Web sites

**3. Description of targeted 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(G). Planned Program (Outputs)**

**1. Standard output measures**

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

	Direct Contact Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
2011	100	500	200	500
2012	100	500	200	500
2013	100	500	200	500
2014	100	500	200	500
2015	100	500	200	500

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

**2011:0                      2012:0                      2013:0                      2014:0                      2015:0**

**3. Expected Peer Review Publications**

Year	Research Target	Extension Target	Total
2011	0	0	0
2012	0	0	0
2013	0	0	0
2014	0	0	0
2015	0	0	0

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

**1. Output Target**

- Number of youth participating in 4-H sponsored events

**2011:600**

**2012:700**

**2013:800**

**2014:800**

**2015:800**

**V(I). State Defined Outcome**

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 Target**

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

**2. Outcome Type :** Change in Action Outcome Measure

**2011:60                      2012:80                      2013:100                      2014:100                      2015:100**

**3. Associated Knowledge Area(s)**

- 805 - Community Institutions, Health, and Social Services

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome # 2**

**1. Outcome Target**

Number of 4-h volunteers recruited

**2. Outcome Type :** Change in Action Outcome Measure

**2011:6                      2012:8                      2013:10                      2014:10                      2015:10**

**3. Associated Knowledge Area(s)**

- 806 - Youth Development

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome # 3**

**1. Outcome Target**

Number of youth participants attending 4-H workshop activities

**2. Outcome Type :** Change in Action Outcome Measure

**2011:100                      2012:120                      2013:140                      2014:140                      2015:140**

**3. Associated Knowledge Area(s)**

- 806 - Youth Development

**4. Associated Institute Type(s)**

- 1862 Extension

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

**1. External Factors which may affect Outcomes**

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

**Description**

- Natural disasters such as typhoons, flooding, drought and other extreme weather conditions
- Extreme economic downturn which might affect manpower availability; excessive turnover of technical staff involved in this program; and unavailability of needed facilities
- Competing public priorities

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

**1. Evaluation Studies Planned**

- Before-After (before and after program)
- During (during program)
- Time series (multiple points before and after program)

**Description**

Our 4-H staff and volunteers will conduct before and after surveys of participants attending our various trainings and events. In some of our programs, we will follow-up with periodic surveys and reports that provide updates and longterm progress on effectiveness of the programs.

**2. Data Collection Methods**

- Sampling
- On-Site
- Observation
- Tests

**Description**

Workshop and program evaluations will be conducted via surveys before and after events.

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

### Program # 9

#### 1. Name of the Planned Program

Aquaculture and Fisheries Development Program

#### 2. Brief summary about Planned Program

The Aquaculture and Fisheries Development Program (A&FDP) at Northern Marianas College's Cooperative Research, Education, and Extension Service (NMC CREES) intends to fulfill its mandate, as a result of Public Law 15 &ndash 43, which designates NMC CREES as the lead agency responsible for the development of aquaculture and fisheries within the CNMI. To fulfill this mandate, the A&FDP, with the assistance of the Secretariat of the Pacific Community (SPC) Aquaculture Section will hold a planning workshop on April 26-30, 2010 in the three main islands of the CNMI to gather public comments on the proposed CNMI Aquaculture & Fisheries 5-year Development Plan; 2011 - 15. This plan must be consistent with the United States' National Aquaculture Plan but mindful of the uniqueness of the Northern Mariana Islands. The CNMI Aquaculture & Fisheries Development Plan will help the CNMI chart a course for aquaculture and fisheries development for the foreseeable future. Public Law 15 &ndash 43, stipulates as well the need for aquaculture infrastructures that can support research activities that will enhance the aquaculture industry in the CNMI. As such, this objective will be pursued with the establishment of an aquaculture park in the island of Tinian modeled after the Natural Energy Laboratory of Hawaii Authority (NELHA) in Kona, Hawaii.

Meanwhile, on going programs in Tilapia and shrimp production will continue. New varieties of Tilapia will be introduced with characteristics palatable to the local, live, fresh market. To address the lack of Tilapia fry supply, efforts are underway to start production of Tilapia fry by using the artificial egg incubation technology to improve the availability of Tilapia fry and help increase the number of Tilapia farmers locally.

Production cost for Tilapia and shrimp has increased tremendously in the last two years with higher energy and feed cost. The A&FDP program is beginning to look into current alternative energy technology than can be transferred to farmers to help lower their production cost. Feed for aquaculture production continues to be imported and the hike in the cost of transporting these feeds to the CNMI is passed on to the farmers. As a result, the program will investigate ways to bring the cost of feed down through the use locally available feed ingredients, promotion of high value species that feeds on aquatic flora instead of formulated feeds, and seek feed suppliers with lower cost than currently available on island.

Shrimp production for meat continues to improve with monthly production of live, fresh shrimp for the local and regional market increasing from 5mt to 6mt. With the success in the shrimp for meat sector, more attention will be given to the development of the shrimp Broodstock industry with legislation to restrict the importation of live or moribund crustaceans from countries with known disease problems and partnership with the University of Guam Hatchery in the development of Specific Pathogen Free or Resistant shrimp stocks. Furthermore, bio-security education and demonstration for shrimp farmers will continue.

As the shrimp and Tilapia sectors continue to improve, the need to expand the choice of aquatic species to culture remains paramount in the action plans of the A&FDP. As such, the program has successfully obtained funding to conduct research on the highly prized grouper, marine finfish for the local and export market. A live, fresh, market size Leopard Coral Grouper can fetch prices above \$50.00 lb in Hong Kong and mainland China. The project intends to test the viability of growing groupers using dry feed as the main source of nutrition in Recirculating Aquaculture Systems (RAS). For the duration of this POW, the A&FDP will attempt to further expand its existing aquatic selection through the introduction of rabbit fish, mullets, milkfish, amberjacks, snapper, abalone, seaweed, and freshwater prawn through intensive inland tank or pond culture or near-shore and off-shore cage cultures.

**3. Program existence :** Intermediate (One to five years)

**4. Program duration :** Long-Term (More than five years)

**5. Expending formula funds or state-matching funds :** Yes

**6. Expending other than formula funds or state-matching funds :** Yes

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

## 1. Program Knowledge Areas and Percentage

<b>KA Code</b>	<b>Knowledge Area</b>	<b>%1862 Extension</b>	<b>%1890 Extension</b>	<b>%1862 Research</b>	<b>%1890 Research</b>
301	Reproductive Performance of Animals	15%		15%	
307	Animal Management Systems	50%		50%	
308	Improved Animal Products (Before Harvest)	35%		35%	
	<b>Total</b>	100%		100%	

**V(C). Planned Program (Situation and Scope)****1. Situation and priorities**

The population of the CNMI, with the Asian guest workers and tourists, are traditionally large consumers of fish. With the decline of the fisheries in the oceans surrounding the CNMI, aquaculture seems attractive, logical, and feasible on the islands. At present the CNMI is highly dependent on imported seafood from other markets. Producing or harvesting more fish locally, may lead to the improvement of the Commonwealth's economy; provide increased employment to local fishermen and farmers; improve the health of its citizenry through increased consumption of seafood; and improve the supply, quality, and freshness of the seafood consumed locally. These are long term issues in the CNMI.

**2. Scope of the Program**

- In-State Extension
- In-State Research
- Integrated Research and Extension
- Multistate Integrated Research and Extension

**V(D). Planned Program (Assumptions and Goals)****1. Assumptions made for the Program**

- Through continued public education on aquaculture and fisheries subject areas, stakeholder knowledge on best aquaculture practices will improve and farm profits increase

- As research based information becomes available on the types of species that can be cultured in the CNMI, diversification will take place in the industry

- As the CNMI economy worsens, interest in aquaculture and fisheries will increase and, thus, investment in this industry will rise

- Research & Development and the need for infrastructure development for aquaculture related activities will be necessary

**2. Ultimate goal(s) of this Program**

- To improve the economic profitability of aquaculture farmers
- To reduced reliance on foreign seafood imports
- To improve the food security situation in the CNMI
- To improve the health of the people of the CNMI
- To protect the CNMI's aquaculture industry
- To prevent the introduction and establishment of foreign pathogens
- To minimize the impact on native species in surrounding waters
- To present an approach the recognizes the economic needs of the CNMI and the protection of the CNMI's fragile ecosystem

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

**1. Estimated Number of professional FTE/SYs to be budgeted for this Program**

Year	Extension		Research	
	1862	1890	1862	1890
2011	3.0	0.0	1.0	0.0
2012	4.0	0.0	2.0	0.0
2013	4.0	0.0	2.0	0.0
2014	4.0	0.0	3.0	0.0
2015	5.0	0.0	0.0	0.0

**V(F). Planned Program (Activity)**

**1. Activity for the Program**

We will conduct research on production specifics of grouper and sea bass grow-out and then move on to mullet, rabbitfish, milkfish, and trevally. We will also conduct concurrent research on growing freshwater prawns through inland, intensive, tank culture. We will conduct workshops and demonstrations on the production of these aquatic species and demonstrate bio-security controls that will help farmers protect their fish and shrimp stocks. We will be targeting existing farmers for further expansion as well as potential investment.

**2. Type(s) of methods to be used to reach direct and indirect contacts**

**Extension**

<b>Direct Methods</b>	<b>Indirect Methods</b>
-----------------------	-------------------------

- |  |  |
|--|--|
| <ul style="list-style-type: none"> <li>• Workshop</li> <li>• Group Discussion</li> <li>• One-on-One Intervention</li> <li>• Demonstrations</li> <li>• Other 1 (client visitations)</li> <li>• Other 2 (classroom presentations)</li> </ul> | <ul style="list-style-type: none"> <li>• Public Service Announcement</li> <li>• Billboards</li> <li>• Newsletters</li> <li>• TV Media Programs</li> <li>• Web sites</li> <li>• Other 1 (public radio)</li> </ul> |
|--|--|

**3. Description of targeted audience**

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

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

**1. Standard output measures**

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

	Direct Contact Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
2011	75	1500	200	1600
2012	80	1600	250	1700
2013	85	1700	275	1800
2014	90	1800	280	1900
2015	100	2000	300	2000

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

**2011:0                      2012:0                      2013:0                      2014:0                      2015:0**

**3. Expected Peer Review Publications**

Year	Research Target	Extension Target	Total
2011	2	2	4
2012	2	2	4
2013	2	2	4
2014	2	2	4
2015	3	3	6

## V(H). State Defined Outputs

### 1. Output Target

- Number of Research Projects completed on aquatic species production

**2011:1**

**2012:2**

**2013:2**

**2014:3**

**2015:0**

- Number of Aquaculture Workshops

**2011:5**

**2012:6**

**2013:6**

**2014:8**

**2015:0**

**V(I). State Defined Outcome**

O. No.	Outcome Name
1	Number of farmers learning how to produce new aquatic species

**Outcome # 1**

**1. Outcome Target**

Number of farmers learning how to produce new aquatic species

**2. Outcome Type : Change in Knowledge Outcome Measure**

<b>2011:60</b>	<b>2012:65</b>	<b>2013:70</b>	<b>2014:75</b>	<b>2015:80</b>
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**3. Associated Knowledge Area(s)**

- 301 - Reproductive Performance of Animals
- 307 - Animal Management Systems
- 308 - Improved Animal Products (Before Harvest)

**4. Associated Institute Type(s)**

- 1862 Extension
- 1862 Research

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

**1. External Factors which may affect Outcomes**

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

**Description**

- Rising prices of agricultural inputs
- Shipping difficulties
- Division of Environmental Quality & Coastal Resources Management Regulations
- Stakeholders Limited Resources
- Quarantine/Division of Fish & Wildlife Restrictions
- Stakeholder priorities (popularity of one of the species over others)
- Natural Disasters (Typhoons slowing down construction efforts)

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

**1. Evaluation Studies Planned**

- Before-After (before and after program)
- During (during program)
- Time series (multiple points before and after program)
- Other (client visitations)

**Description**

**2. Data Collection Methods**

- Sampling
- Telephone
- On-Site
- Unstructured
- Observation
- Tests

**Description**

Each aquatic species will be monitored for production rates and their differences in profit margin. Daily water quality analysis of water quality parameters are essential to ensure that environmental conditions are optimal for the culture species. Weekly growth sampling will be conducted for feed management purposes. Quarterly sampling for disease surveillance purposes is recommended.

- Sampling
- Observation
- Feasibility study