

2010 Northern Marianas College Combined Research and Extension Plan of Work

Status: Accepted
Date Accepted: 05/29/09

I. Plan Overview

1. Brief Summary about Plan Of Work

With 28 years of 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. The (ARE) Agricultural Research and Extension focuses on Aquaculture Development, Crop Improvement, Plant Protection, Soil and Water Quality, and Livestock Improvement. 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). 4-H Youth Development Program will be a separate program from the CDRM and Aquaculture program will stand alone starting this year from Livestock Improvement Program, thus , focusing more in details. 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, increase pressure to natural resources, 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 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
2010	28.0	0.0	12.0	0.0
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

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 and in some extent with the NMC President approval 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. More formal and objective methods of involving local and regional stakeholders in the process of problem identification, estimation of problem significance, problem diagnosis, assessment of research and extension priorities, program and project planning, program implementation and program evaluation will be developed, implemented and explained in updates to this 5 year plan.

2. How will the planned programs address the needs of under-served and under-represented populations of the State(s)?

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 interpreter, agriculture scientist and extension specialist, both local and off-island. The program will apply surveys, comparison, 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, partnership and collaboration plays a big role for 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

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

Brief explanation.

The above listed activities have been the most effective tool to generate stakeholders' input and participation based on 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 Internal Focus Groups
- Needs Assessments
- Use Advisory Committees

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.

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

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

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

S. NO.	PROGRAM NAME
1	Livestock Improvement Program
2	Plant Protection 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

Livestock Improvement Program

2. Brief summary about Planned Program

Through partnership 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 the 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 CNMI Veterinarian for effective and high quality veterinary services. Research and extension emphasis on 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, alternative animal feed nutrition, and alternative medicine for livestock healthcare. Supplemental local feedstuff 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

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
301	Reproductive Performance of Animals	10%		10%	
302	Nutrient Utilization in Animals	10%		10%	
303	Genetic Improvement of Animals	10%		10%	
307	Animal Production Management Systems	20%		20%	
308	Improved Animal Products (Before Harvest)	3%		3%	
311	Animal Diseases	20%		20%	
312	External Parasites and Pests of Animals	5%		5%	
313	Internal Parasites in Animals	5%		5%	
314	Toxic Chemicals, Poisonous Plants, Naturally Occurring Toxins, and Other Hazards Affecting Animals	2%		2%	
722	Zoonotic Diseases and Parasites Affecting Humans	5%		5%	
902	Administration of Projects and Programs	10%		10%	
	Total	100%		100%	

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

1. Situation and priorities

The livestock industry is made up of 80% 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. There are animal health problems such as Brucellosis, TGE, Parvo and Swine flu, colibacillosis and parasitism that affect animal performance and productivity. Avian flu scares in the neighboring countries that prevent export. Inbreeding is 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 is lack of USDA approved slaughterhouse facility. There is a technical need for new grazing strategies and animal husbandry knowledge among CNMI producers.

2. Scope of the Program

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

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 slaughter house and meat inspector
- Increase funding for animal health research and extension program
- More Train the Trainers Program
- Provision of small scale feed mill industry and Feed Cost Regulation
- Development of Alternative Livestock Enterprise

Increase research and extension collaboration with other Land Grant Universities, federal and local agencies for livestock and aquaculture

Funding will remain constant or increase.

2. Ultimate goal(s) of this Program

Improve the competitiveness of the CNMI cattle, goat, swine, aquaculture, 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 technician regarding animal health and production
- To be free Avian flu CNMI
- Reduced reliance on foreign meat imports
- Improve the health of the people of the CNMI
- Further promote the CNMI's livestock industry

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
2010	1.8	0.0	1.3	0.0
2011	1.8	0.0	1.3	0.0
2012	1.8	0.0	1.3	0.0
2013	1.8	0.0	1.3	0.0
2014	1.8	0.0	1.3	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

- Conduct 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

- Implement and promote sustainable livestock waste management

Promote alternative plant medicine to livestock healthcare

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

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 Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
2010	300	1000	300	1500
2011	300	1000	300	1500
2012	400	1500	300	2000
2013	500	1500	300	2000
2014	500	1500	300	2000

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

Expected Patent Applications

2010 :0 2011 :0 2012 :0 2013 :0 2014 :0

3. Expected Peer Review Publications

Year	Research Target	Extension Target	Total
2010	2	3	5
2011	2	3	5
2012	2	3	5
2013	3	3	6
2014	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

2010 3 2011 3 2012 3 2013 3 2014 3

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

2010 6 2011 5 2012 5 2013 5 2014 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

2010 8 **2011** : 8 **2012** : 10 **2013** :10 **2014** :15

3. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

4. Associated Knowledge Area(s)

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

Outcome #2

1. Outcome 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

2010 20 **2011** : 20 **2012** : 20 **2013** 20 **2014** :20

3. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

4. Associated Knowledge Area(s)

- 301 - Reproductive Performance of Animals
- 302 - Nutrient Utilization in Animals
- 303 - Genetic Improvement of Animals
- 307 - Animal Production Management Systems
- 308 - Improved Animal Products (Before Harvest)
- 311 - Animal Diseases
- 312 - External Parasites and Pests of Animals

- 313 - Internal Parasites in Animals
- 314 - Toxic Chemicals, Poisonous Plants, Naturally Occurring Toxins, and Other Hazards Affecting Animals
- 722 - Zoonotic Diseases and Parasites Affecting Humans

Outcome #3

1. Outcome 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

2010 :20	2011 :20	2012 :20	2013 :20	2014 :20
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3. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

4. Associated Knowledge Area(s)

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

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

- Public Policy changes
- Natural Disasters (drought,weather extremes,etc.)
- Economy
- Government Regulations
- Appropriations changes
- Other (Cultural)
- Competing Programmatic Challenges

Description

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

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

1. Evaluation Studies Planned

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

2. Data Collection Methods

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

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 #2****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), relatively isolated from large landmasses, have evolved into an ecological system that is unique to the islands, and their biota has reached the so-called ecological balance. 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. Ironically, technological development of our transportation systems have brought these islands conceptually close to and easily accessible from large landmasses, from which biota from these large landmasses can be transported to the islands. There are already present in the CNMI numerous alien species (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 pernicious 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, mites and other arthropods, plant pathogens, weeds, vertebrates, mollusks and other pests affecting plants will enhance our integrated plant protection programs and will result in preventing crop damage of epidemic proportion.

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
211	Insects, Mites, and Other Arthropods Affecting Plants	40%		40%	
212	Pathogens and Nematodes Affecting Plants	5%		5%	
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	20%		20%	
	Total	100%		100%	

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

1. Situation and priorities

The CNMI has very limited agricultural resources. Most agricultural productions are 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 most serious threat to our meager 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.

2. Scope of the Program

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

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

1. Assumptions made for the Program

We assume funding will remain constant or increase and additional FTE's will be available. External funding source will be secured. Farmers and other stakeholders will have sufficient information on invasive species and to 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 invasive to their crops, and therefore their crop production will increase. The deleterious effects of invasive species can be curtailed or minimized. 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 minimize or curtail the deleterious impacts of invasive species on agricultural crops, 2) to control

or eradicate invasive species.3) strive for development of sustainable agriculture.

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
2010	4.3	0.0	5.3	0.0
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	0.0	0.0	0.0	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

Our program staff will conduct research on biological and other methods of control against invasive weeds, insect pests, mollusks and plant diseases. As an example, the weed, *Coccinia grandis*, which came to the island of Saipan in the late 1980's, has since spread throughout the island of Saipan and recently found its way to the islands of Tinian and Rota. On Saipan, this invasive species has inundated even the forest areas climbing and covering all types of vegetation, including indigenous plants. In Hawaii, this invasive species is controlled by two species of beetles (*Acythopeus coccinae* and *A. burkhartorum*) and a species of moth (*Melittia oedipus*). The two species of weevils were introduced in 2002; however only *A. coccinae* has become established and exerting some control on *Coccinia grandis*. In August 2007, we introduced *Melittia oedipus* moth into Saipan and into Rota in October 2007. We aim to continue research on this weed and its parasites. Another example is the recently introduced Cuban slug, *Veronicella cubensis*, into the island of Rota, CNMI, where it become established, multiplied and 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 molluscacides 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. Upon further survey, we found the gall wasp also infesting Erythrina in Tinian and Rota. In September 2006, a single specimen of the Coconut Rhinoceros Beetle (CRB) (*Oryctes rhinoceros*) was collected in a warehouse on cement pallet at the Charley Dock in Saipan. We surveyed the coconut palms and potential breeding sites in the vicinity, but we found no sign of other CRB. Interestingly, in September 2007, the CRB was detected in Tumon, Guam. Infestations include adult beetle damage to coconut palms and larvae breeding in dead coconut stumps and debris. We 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 in the CNMI. We intend to continue to apply the best management methods of control and to find natural enemies to supplement other methods of control. There are many more existing weeds, arthropods and other crop pests and diseases that require continuous application of best management methods. We will continue to improve on these methods and to extend the knowledge to our stakeholders. We will also continue to collect arthropods of economic importance, expand and enhance the economic insect collection, and the general invertebrate collection for reference, for taxonomic studies, and for educational purposes.

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"> ● Education Class ● Workshop ● One-on-One Intervention ● Other 1 (presentation) 	<ul style="list-style-type: none"> ● Newsletters ● Web sites ● TV Media Programs ● Public Service Announcement

- Group Discussion
- Demonstrations

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 Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
2010	500	1000	500	1000
2011	500	1000	500	1000
2012	500	1000	500	1000
2013	500	1000	500	1000
2014	0	0	0	0

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

Expected Patent Applications

2010 :0 2011 :0 2012 :0 2013 :0 2014 :0

3. Expected Peer Review Publications

Year	Research Target	Extension Target	Total
2010	1	0	0
2011	1	0	0
2012	1	0	0
2013	1	0	0
2014	0	0	0

V(H). State Defined Outputs

1. Output Target

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

2010 2 2011 2 2012 2 2013 3 2014 3

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 infestation) 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

2010 : 3 **2011 :** 3 **2012 :** 3 **2013 :** 3 **2014 :** 3

3. Associated Institute Type(s)

•1862 Extension

4. 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

Outcome #2

1. Outcome Target

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

2. Outcome Type : Change in Condition Outcome Measure

2010 : 30 **2011 :** 30 **2012 :** 30 **2013 :** 30 **2014 :** 30

3. Associated Institute Type(s)

•1862 Research

4. 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

Outcome #3

1. Outcome Target

Number of clients learning Pesticide Safety

2. Outcome Type : Change in Knowledge Outcome Measure

2010 : 30 **2011 :** 30 **2012 :** 30 **2013 :** 30 **2014 :** 30

3. Associated Institute Type(s)

•1862 Extension

4. Associated Knowledge Area(s)

- 211 - Insects, Mites, and Other Arthropods Affecting Plants
- 216 - Integrated Pest Management Systems

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

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

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 and 2007. More reduction is expected in 2008 and 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

- Observation
- Sampling
- On-Site

Description**Sampling**

Five sites on each island (Saipan, Rota, and Tinian) will be selected to periodically collect 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 #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.

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
202	Plant Genetic Resources and Biodiversity	10%		10%	
204	Plant Product Quality and Utility (Preharvest)	40%		40%	
205	Plant Management Systems	50%		50%	
	Total	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

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

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

2. Ultimate goal(s) of this Program

To raise the quality and quantity of crops produce grown in the 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
2010	3.0	0.0	2.0	0.0
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

V(F). Planned Program (Activity)

1. Activity for the Program

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 CNMI. Research projects in the form of fruit and vegetable variety trials will be performed locally. Research and extension programs on underutilized crops (specialty crops) and medicinal plants will be conducted. Field days will be organized for the new variety of taro, sweet potato and banana. Workshops will be conducted for farmers, extension agents, and students on fruit tree grafting, crop production and improvement along with other propagation techniques. Video production will be used whenever possible. Publications (brochures and fact sheets) and presentations will 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. Implement best management practices on farms.

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

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 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 Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
2010	100	500	100	500
2011	100	500	100	500
2012	100	500	100	500
2013	100	500	100	500
2014	150	600	150	600

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

Expected Patent Applications

2010 :0 2011 :0 2012 :0 2013 :0 2014 :0

3. Expected Peer Review Publications

Year	Research Target	Extension Target	Total
2010	1	0	0
2011	2	0	0
2012	2	0	0
2013	4	0	0
2014	4	0	0

V(H). State Defined Outputs

1. Output Target

- Number of research projects completed on Crop Improvement Issues

2010 3 2011 3 2012 4 2013 4 2014 4

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

2010 :20 **2011** : 20 **2012** : 30 **2013** :30 **2014** :35

3. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

4. Associated Knowledge Area(s)

- 204 - Plant Product Quality and Utility (Preharvest)
- 205 - Plant Management Systems

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

2010 :10 **2011** : 12 **2012** : 12 **2013** :14 **2014** :14

3. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

4. Associated Knowledge Area(s)

- 205 - Plant Management Systems

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

2010 :10 **2011** : 10 **2012** : 12 **2013** :12 **2014** :14

3. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

4. Associated Knowledge Area(s)

- 205 - Plant Management Systems

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

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

- Telephone
- Observation
- On-Site
- Sampling

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

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
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%	
	Total	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

- Integrated Research and Extension
- In-State Extension
- In-State Research
- Multistate 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 source will be secured for projects that are significance to 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
2010	1.0	0.0	1.0	0.0
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

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	
Direct Methods	Indirect Methods
<ul style="list-style-type: none"> ● Workshop ● One-on-One Intervention ● Education Class ● Other 1 (Presentation, Field Days) 	<ul style="list-style-type: none"> ● TV Media Programs ● Public Service Announcement ● Web sites ● Newsletters

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

2010 20 **2011** : 20 **2012** : 20 **2013** 20 **2014** :20

3. Associated Institute Type(s)

•1862 Extension

4. Associated Knowledge Area(s)

- 403 - Waste Disposal, Recycling, and Reuse

Outcome #2

1. Outcome Target

Number of households learning to safely use Rain-catchments systems

2. Outcome Type : Change in Knowledge Outcome Measure

2010 6 **2011** : 8 **2012** : 10 **2013** :10 **2014** :10

3. Associated Institute Type(s)

•1862 Extension

4. Associated Knowledge Area(s)

- 111 - Conservation and Efficient Use of Water

Outcome #3

1. Outcome Target

Number of farmers using Dry Litter Waste Management Systems for Hogs

2. Outcome Type : Change in Action Outcome Measure

2010 8 **2011** : 12 **2012** : 12 **2013** :10 **2014** :10

3. Associated Institute Type(s)

•1862 Extension

4. Associated Knowledge Area(s)

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

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

2010 30 **2011** : 40 **2012** : 50 **2013** 50 **2014** :50

3. Associated Institute Type(s)

•1862 Extension

4. Associated Knowledge Area(s)

- 111 - Conservation and Efficient Use of Water

- 403 - Waste Disposal, Recycling, and Reuse

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

2010 :10 **2011** :20 **2012** : 20 **2013** 20 **2014** :20

3. Associated Institute Type(s)

- 1862 Extension

4. Associated Knowledge Area(s)

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

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

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.

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

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

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

1. Situation and priorities

The CNMI's revenue relies heavily on tourism and garment factories. Revenue generated from tourism continues to fluctuate but is still considered to be very low.

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

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

Increase 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
2010	3.0	0.0	0.0	0.0
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

V(F). Planned Program (Activity)

1. Activity for the Program

NMC-CREES, CRD program will coordinate training/certification our newly acquired food scientist and volunteers from the USDA representatives on the methods of safe home canning and food preservation to all Family and Consumer Sciences staff on the three most populated islands in the CNMI. 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 produce.

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 completed 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	
Direct Methods	Indirect Methods
<ul style="list-style-type: none"> ● Workshop ● Demonstrations ● Other 2 (Afterschool Activities) ● Education Class ● Other 1 (Village Meetings) 	<ul style="list-style-type: none"> ● TV Media Programs ● Newsletters ● Web sites ● Other 1 (Telephone) ● Public Service Announcement

3. Description of targeted audience

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 Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
2010	400	2000	3000	5000
2011	500	2000	3000	5000
2012	500	2000	3000	5000
2013	500	2000	3000	5000
2014	500	2000	3000	5000

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

Expected Patent Applications

2010 :0 2011 :0 2012 :0 2013 :0 2014 :0

3. Expected Peer Review Publications

Year	Research Target	Extension Target	Total
2010	0	1	0
2011	0	2	0
2012	0	2	0
2013	0	3	0
2014	0	3	0

V(H). State Defined Outputs

1. Output Target

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

2010 200 2011 200 2012 :300 2013 300 2014 300

- Number of established Entrepreneurs projects

2010 8 2011 8 2012 :10 2013 :10 2014 :15

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

2010 :150 2011 200 2012 :200 2013 200 2014 250

V(I). State Defined Outcome

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

Outcome #1**1. Outcome Target**

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

2. Outcome Type : Change in Knowledge Outcome Measure

2010 200 **2011** : 200 **2012** : 200 **2013** 200 **2014** :200

3. Associated Institute Type(s)

•1862 Extension

4. Associated Knowledge Area(s)

- 801 - Individual and Family Resource Management

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

2010 200 **2011** : 200 **2012** : 200 **2013** 200 **2014** :200

3. Associated Institute Type(s)

•1862 Extension

4. Associated Knowledge Area(s)

- 801 - Individual and Family Resource Management

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

2010 250 **2011** : 300 **2012** : 300 **2013** 300 **2014** :300

3. Associated Institute Type(s)

•1862 Extension

4. Associated Knowledge Area(s)

- 801 - Individual and Family Resource Management

Outcome #4**1. Outcome Target**

Number of youths and adults applying knowledge gained.

2. Outcome Type : Change in Action Outcome Measure

2010 :125 **2011** : 150 **2012** : 150 **2013** :150 **2014** :200

3. Associated Institute Type(s)

•1862 Extension

4. Associated Knowledge Area(s)

- 802 - Human Development and Family Well-Being

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

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

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

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

Description

Program evaluation will be done before and after each activity.

2. Data Collection Methods

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

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 : No

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

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

V(C). Planned Program (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

- Integrated Research and Extension
- In-State 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
2010	2.5	0.0	1.0	0.0
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

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 and physical activity 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)

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

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 Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
2010	150	7000	150	2000
2011	175	7000	175	2000
2012	175	7000	175	2000
2013	200	7000	200	2000
2014	200	7000	200	2000

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

Expected Patent Applications

2010 :0 2011 :0 2012 :0 2013 :0 2014 :0

3. Expected Peer Review Publications

Year	Research Target	Extension Target	Total
2010	0	0	0
2011	0	0	0
2012	0	0	0
2013	0	0	0
2014	0	0	0

V(H). State Defined Outputs

1. Output Target

- Greater understanding of diet, physical activity, and health

2010 2 2011 2 2012 2 2013 2 2014 2

V(I). State Defined Outcome

O. No	Outcome Name
1	Development of Physical Activity Social Marketing Campaign (PASMIC)

Outcome #1

1. Outcome Target

Development of Physical Activity Social Marketing Campaign (PASMCM)

2. Outcome Type : Change in Knowledge Outcome Measure

2010 :1	2011 : 1	2012 : 1	2013 :1	2014 :1
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3. Associated Institute Type(s)

•1862 Extension

4. Associated Knowledge Area(s)

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

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

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

Description

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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
- Other (Population-based questionnaire)
- Observation

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 vegetable 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%	
	Total	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. Especially, 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

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

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
2010	1.5	0.0	1.5	0.0
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

V(F). Planned Program (Activity)

1. Activity for the Program

- I Establishment of good post-harvest practices
- I Establishment of outstanding food safety training programs
- I Development of various value-added food products using local produce
- I Introduction of new food processing technologies to the CNMI
- I Conduction of basic and applied researches 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"> ● One-on-One Intervention ● Group Discussion ● Demonstrations ● Education Class ● Workshop 	<ul style="list-style-type: none"> ● Public Service Announcement ● TV Media Programs ● Newsletters ● Web sites

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 Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
2010	100	500	100	500
2011	100	500	100	500
2012	100	500	100	500
2013	100	500	100	500
2014	100	500	100	500

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

2010 :0

2011 :0

2012 :0

2013 :0

2014 :0

3. Expected Peer Review Publications

Year	Research Target	Extension Target	Total
2010	1	0	0
2011	1	0	0
2012	1	0	0
2013	1	0	0
2014	1	0	0

V(H). State Defined Outputs**1. Output Target**

- Number of research on food quality improvements

2010 :1

2011 :2

2012 :2

2013 :2

2014 :2

- Number of novel food processing technology workshops

2010 :4

2011 :4

2012 :4

2013 :4

2014 :4

- Number of workshops related with food safety and quality

2010 :4

2011 :4

2012 :4

2013 :4

2014 :4

- Numbers of newly developed value-added products

2010 :2

2011 :3

2012 :4

2013 :4

2014 :4

- Numbers of technical information provide to the public

2010 4

2011 4

2012 4

2013 4

2014 4

V(I). State Defined Outcome

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

Outcome #1

1. Outcome Target

Numbers of farmers/producer to develop value added products

2. Outcome Type : Change in Action Outcome Measure

2010 5 **2011** : 10 **2012** : 20 **2013** 20 **2014** :20

3. Associated Institute Type(s)

- 1862 Research

4. Associated Knowledge Area(s)

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

Outcome #2

1. Outcome Target

Number of farmers/producers implementing good post-harvest practices

2. Outcome Type : Change in Knowledge Outcome Measure

2010 5 **2011** : 10 **2012** : 20 **2013** 30 **2014** :40

3. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

4. 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

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

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

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,progres)

Description

Implementation evaluation will be conducted in order to 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

- Other (experiment)
- On-Site
- Observation

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

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
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%	
	Total	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
2010	3.0	0.0	0.0	0.0
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

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
<ul style="list-style-type: none"> ● Education Class ● Workshop ● Group Discussion ● Demonstrations 	<ul style="list-style-type: none"> ● Newsletters ● TV Media Programs ● Public Service Announcement ● Web sites

- One-on-One Intervention

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 Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
2010	100	500	200	500
2011	100	500	200	500
2012	100	500	200	500
2013	100	500	200	500
2014	100	500	200	500

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

Expected Patent Applications

2010 :0 2011 :0 2012 :0 2013 :0 2014 :0

3. Expected Peer Review Publications

Year	Research Target	Extension Target	Total
2010	0	0	0
2011	0	0	0
2012	0	0	0
2013	0	0	0
2014	0	0	0

V(H). State Defined Outputs

1. Output Target

- Number of youth participating in 4-H sponsored events

2010 500 2011 600 2012 :700 2013 800 2014 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

2010 :40 **2011 :**60 **2012 :**80 **2013 :**100 **2014 :**100

3. Associated Institute Type(s)

•1862 Extension

4. Associated Knowledge Area(s)

- 805 - Community Institutions, Health, and Social Services

Outcome #2

1. Outcome Target

Number of 4-h volunteers recruited

2. Outcome Type : Change in Action Outcome Measure

2010 :4 **2011 :**6 **2012 :**8 **2013 :**10 **2014 :**10

3. Associated Institute Type(s)

•1862 Extension

4. Associated Knowledge Area(s)

- 806 - Youth Development

Outcome #3

1. Outcome Target

Number of youth participants attending 4-H workshop activities

2. Outcome Type : Change in Action Outcome Measure

2010 :80 **2011 :**100 **2012 :**120 **2013 :**140 **2014 :**140

3. Associated Institute Type(s)

•1862 Extension

4. Associated Knowledge Area(s)

- 806 - Youth Development

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

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

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

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

Description

2. Data Collection Methods

- Tests
- Sampling
- On-Site
- Observation

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 – 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 will need to seek and secure funding for a CNMI Aquaculture & Fisheries Development Plan as stipulated in PI 15 - 34. 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 – 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 transfer the "Hapa" and 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**

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
301	Reproductive Performance of Animals	15%		15%	
307	Animal Production Management Systems	50%		50%	
308	Improved Animal Products (Before Harvest)	35%		35%	
	Total	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
- Multistate Integrated Research and Extension
- In-State Research

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 that 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
2010	2.0	0.0	1.0	0.0
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

V(F). Planned Program (Activity)

1. Activity for the Program

We will conduct research on production specifics of grouper and tropical abalone grow-out and then move on to mullet, milk fish, and rabbit fish. 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	
Direct Methods	Indirect Methods
<ul style="list-style-type: none"> ● Other 2 (classroom presentations) ● Group Discussion ● Other 1 (client visitations) ● Workshop ● Demonstrations 	<ul style="list-style-type: none"> ● Other 1 (public radio) ● Web sites ● Public Service Announcement ● Billboards ● Newsletters ● TV Media Programs

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 Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
2010	60	1000	100	1500
2011	70	1000	150	1500
2012	75	1000	200	1500
2013	80	1000	250	1500
2014	85	1000	300	1500

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

Expected Patent Applications

2010 :0 2011 :0 2012 :0 2013 :0 2014 :0

3. Expected Peer Review Publications

Year	Research Target	Extension Target	Total
2010	1	1	2
2011	2	2	4
2012	2	2	4
2013	2	2	4
2014	2	2	4

V(H). State Defined Outputs

1. Output Target

- Number of Research Projects completed on aquatic species production

2010 :1 2011 :1 2012 :2 2013 :2 2014 :3

- Number of Aquaculture Workshops

2010 :4 2011 :5 2012 :6 2013 :6 2014 :8

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

2010 :50 **2011** : 60 **2012** : 65 **2013** : 70 **2014** :75

3. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

4. Associated Knowledge Area(s)

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

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

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

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

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

Description

2. Data Collection Methods

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

Description

Each aquatic species will be monitored for production rates and their differences in profit margin. Daily water quality analyses 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