2016 University of Guam Combined Research and Extension Annual Report of Accomplishments and Results

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I. Report Overview

1. Executive Summary

Guam, an unincorporated Territory of the United States, is located in the Western Pacific at 13 degrees north latitude and 144.4 degrees east longitude. It is the largest of 16 islands in the Marianas. It is approximately 3,600 miles west-southwest of the Hawaiian Islands and about 1,500 miles due east of Manila, Philippines. Guam's population is approximately 170,000 and increasing. The ethnic background of the island includes: Chamorro (indigenous islanders), Filipinos, Caucasians (including members of the U.S. Armed Forces and their dependents), other islanders (Micronesians) and Asians (Koreans, Japanese and Chinese). The University of Guam, a 1862 Land Grant institution and its College of Natural and Applied Sciences (CNAS) facilitates the tripartite functions of the college: research, extension, and teaching. The Dean of CNAS serves as Director of the Agriculture Experiment Station and the Director of Cooperative Extension & Outreach (CNAS C-E&O).

Since 2006, AES has operated as the Western Pacific Tropical Research Center (WPTRC), a title that reflects our broad mission and research priorities. The primary mission of WPTRC is to conduct applied and basic research in agriculture (and aquaculture) and to protect the natural environment. CNAS's C-E&O translates and delivers research and technical information, and conducts informal education programs for farmers, homemakers, families, youth, and the community.

Research productivity over the last years was good. In 2016, eight full time researcher faculty published 18 refereed journal papers, which placed us among other successful and productive research units on campus. Further significant growth in refereed journal publications as well as substantial increase in successful grant proposals in 2016 was evident. Unfortunately, there were also some setbacks that impacted our productivity. Recent investments related to the military buildup on Guam were put on hold due to US budgetary cuts. Declining island's economy affected University as well. Hiring freezes and permanent elimination of several faculty vacancies have been very challenging.

CNAS C-E&O is going through a refreshing with new faculty in nutrition and new faculty being recruited in other disciplines, and a clearer emphasis on lay-publishing, and more workshops. A new website is also bringing more content to the public and more data on operations. In addition, there is an increased focused on the development of externally-funded proposals.

Total Actual Amount of professional FTEs/SYs for this State

Year: 2016	Extension		Research	
	1862	1890	1862	1890
Plan	22.0	0.0	24.0	0.0
Actual	19.0	0.0	28.7	0.0

II. Merit Review Process

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

- Internal University Panel
- External University Panel
- External Non-University Panel
- Combined External and Internal University Panel
- Combined External and Internal University External Non-University Panel
- Expert Peer Review

2. Brief Explanation

Cooperative Extension & Outreach (C-E&O) of the College of Natural & Applied Sciences, of the University of Guam, has been in a rebuilding phased since November 2014 with more focus on bringing together content that can be packaged into Do-It-Yourself learning, on-site client coaching, and/or workshops. Our work spans the typical Land Grant offerings for growers, agricultural service providers, families, and youth, among other niche groups and topics. We are drawing some work topics from a November 5, 2015 all community Listening Session: http://cnas-re.uog.edu/priorities/ This listening session not only provided CNAS with possible "to-dos" the list was also made available as stakeholder input for other service providers in the community.

Unlike the WPTRC, the amount of funds available for projects within C-E&O is relatively small - we want to encourage the acquisition of outside funding by all faculty members and some line staff. Faculty submit an annual plan of work called a, Comprehensive Faculty Evaluation System (CFES), that covers a range of activities that are within a typical University of Guam faculty portfolio. Non-faculty employees paid by Smith-Lever funds, use the same standard form developed by C-E&O for faculty, but their loads are very project based rather than broader like faculty. Each faculty member is given $4,000/yr to support basic work activities within their CFES and that work plan is discussed, modified (as necessary), and approved by the Associate Director/Dean and the Director/Dean prior to the faculty receiving their funds. Non-faculty are given less money based on what tasks they need to accomplish.

During the time of this grant, more than 20 new and revised publications have been posted on the College's website:
http://cnas-re.uog.edu/new-and-refreshed-cnas-publications-posters/ Most authors are from C-E&O. Additionally, there has been a great "harvesting" effort to scan and post historical documents from the college that have benefit to Guam's community. That database is here: http://cnas-re.uog.edu/useful-cnas-documents-posters/ And, as CNAS does not operate in a vacuum, Guam and regional content that did not come from our College but is of importance to our clients, has been placed here: http://cnas-re.uog.edu/other-non-cnas-publications/

For CNAS' WPTRC (AES), review of individual Plans of Work and projects has been conducted mostly by WPTRC administrators (Director and Associate Director). They usually utilize external reviewers as well as their knowledge and experiences to ensure that the planned programs and activities address the critical issues of strategic importance, including those identified by the stakeholders during the development of Strategic Plans. All new research proposals (such as Hatch, McIntire Stennis, Regional Research etc.) are submitted to WPTRC Associate Director who checks the proposal for completeness and format. There are very few peers at the university with expertise to review research proposals in agriculture fields. Therefore,

a draft proposal that is ready for review may be submitted to an external ad hoc Peer Review Committee. The committee would be comprised of three faculty members from other universities who are familiar with the issues addressed by the project. Based on the review, that includes assessment of (1) significance, (2) need, (3) approach, (4) new knowledge to be generated, (5) potential for impact, and (6) potential for success.

The crucial issues addressed by WPTRC planned programs fall within the strategic goals of WPTRC adopted by the faculty during Strategic Planning Retreat. It was agreed that all programs must address issues that are relevant to the needs of the region, serve interest of scientific community and are linked to the needs of our stakeholders. Indeed, numerous research projects address environmental issues, integrated plant protection, bio-control as well as serve ethnic needs of local population. Some examples of work performed by WPTRC scientists in 2016 included: working on biological control in pest management systems, food safety education and traditional food modification, plant genetic resources conservation and utilization, carbon sequestration and distribution in eroded soils, eco-physiology of Guam's endemic and indigenous forest species, best management practices for papaya production production of local seeds and tissue-cultured plants, improvement of vegetable production, shrimp research and economics of aquaculture on Guam soil management practices for agricultural sustainability and environmental quality, integrated pest management of aphids and whiteflies on cucurbits and vegetables, genetic structure of the cycas population in the Mariana Islands, bionomics of the chromolaena gallfly, biological control of cycad aulacaspis scale semiochemical attractants and trapping systems for monitoring and control of invasive scarab beetles in Micronesia, development of sustainable aquaculture on Guam, research on diseases of traditional Pacific island crop plants, development of efficient semiochemical-based control methods for weevil pests, evaluating the influence of ant attendance on natural enemies and their hosts on Cycas micronesica, phytochemicals, biological properties, and safety of tropical and subtropical foods, plants, or herbals, small-scale integrated farming system in an insular urban environment, beneficial and adverse effects of natural, bioactive dietary chemicals on human health and food safety, as well as child obesity prevention. In addition, faculty participated in yearly meetings, exchanged information and coordinated their multistate activities.

WPTRC (AES) administrators require annual reports to be submitted for all projects. Reports must contain sections called outputs and outcomes. Reported outcomes are categorized as short, medium and long term. Overall, AES projects produce valuable outcomes and impacts for our stakeholders and represent sound investments of our federal funding. WPTRC (AES) faculty scientists have been able to obtain additional, significant funding from extramural federal and non-federal sources to support some of our programs. These types of funding mechanisms indicate that conducted research is appreciated and considered to be trustworthy.

III. Stakeholder Input

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

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

- Survey specifically with non-traditional groups

Brief explanation.

Both CNAS C-E&O and WPTRC employed several stakeholder input methods including gathering input from local community groups, individual farmers, farmers groups and organizations, representatives of the industry and representatives from federal and local agencies. Because of relatively small number of faculty and stakeholders on Guam, it has been a long-lasting practice to invite stakeholders for various functions in the college and give them frequent opportunities to express their needs in informal settings such as personal contact with faculty members. Periodically, stakeholders (farmers, golf course superintendents, owners of nurseries etc.) are invited to the college to make presentations and express their needs and concerns in more formalized manner. Both methods seem to work well and UOG administrators plan to continue with this way of providing stakeholders' input. Of particular importance is to generate good understanding (between stakeholders and UOG) why issues related to the natural environment receive so much of attention and need stakeholders' support.

In addition, CNAS held a all-community listening session in November 5, 2015 that has provided some guidance and "to-dos" for some of our efforts. Where appropriate, we tie in plans of work to this list.
http://cnas-re.uog.edu/priorities/

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

1. Method to identify individuals and groups

- Use Advisory Committees
- Use Internal Focus Groups
- Use External Focus Groups
- Open Listening Sessions
- Needs Assessments

Brief explanation.

Stakeholders for both CNAS C-E&O and WPTRC are well identified. There are approximately 250 Bona Fide farmers on Guam and another 300 individuals who supplement their income with some sort of agricultural sales. Their participation and input to define agriculture research ranges from substantial (full time farmers) to insignificant. Farmers on Guam do not form strong and focused commodity groups. Their associations are rather loose and based on personal contacts, friendships, etc. In addition, we have extensive contacts within all government agencies and with trade groups. We use the newspaper and press releases to advertise our efforts. Our website includes a feature where clients can sign up to receive our news briefs. We also have deep relationships in other areas where we work - health, environment, families and youth. Our employees spend a lot of time with stakeholders and service providers in the community, and that is our main source of client intel.

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

1. Methods for collecting Stakeholder Input

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

Brief explanation.

Guam is a relatively small and close-knit community. Most UOG faculty work closely with stakeholders. These include community organizations, individual farmers, golf course superintendents, homeowners, school teachers, state legislature and government agencies. Informal and formal input was provided to UOG on a regular basis during workshops, open houses, telephone calls, and letters. Several faculty members conducted research on stakeholders' farms. Some faculty and administrators were invited for informal or formal meetings such as for example Guam Soil and Water Conservation District where UOG receives an input and feedback from stakeholder groups.

In the non-agriculture groups, we had the big listening session back in November 2015, but also spend a lot of time with clients and service providers. Most faculty are in meetings with the public on a monthly basis.

3. A statement of how the input will be considered

- To Identify Emerging Issues
- Redirect Extension Programs
- In the Staff Hiring Process
- To Set Priorities

Brief explanation.

Stakeholder input has been used extensively in planning new programs and improving existing programs/projects. As a result of the received input, faculty modify their research plans to improve service and to provide specific opportunities for continued feedback. Information is disseminated to communities through newsletters, local newspaper coverage, radio and sometimes television programs. Administrators use stakeholders input to prioritize resource allocations. Recommendations from various groups of stakeholders are useful in developing research programs that reach the island community. Again, the November 2015 listing session has helped provide ideas to our work. Faculty and administrators also have facilitated meetings where we have helped

stakeholder surface issues needing attention.

Brief Explanation of what you learned from your Stakeholders

Faculty maintain close contacts with local farmers, landscapers, aquaculture producers, and local environmentalists. Because of the breadth of experience on other islands in the region, UOG-CNAS scientists and extension agents are able to identify, characterize and provide a rational method of management for invasive species, new disease outbreaks and other concerns on Guam. After identifying the challenges, researchers apply for funding for more in depth investigations.

We also address the needs of non-agricultural clients. There are a variety of needs for information and education for youth, families, and the elderly on Guam. More information is found on our November 2015 listening session notes: http://cnas-re.uog.edu/priorities/

IV. Expenditure Summary

1. Total Actual Formula dollars Allocated (prepopulated from C-REEMS)			
Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
1327771	0	1385766	0

2. Totaled Actual dollars from Planned Programs Inputs				
	Extension		Research	
	Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
Actual Formula	1327772	0	1385766	0
Actual Matching	1053399	0	1025670	0
Actual All Other	0	0	0	0
Total Actual Expended	2381171	0	2411436	0

3. Amount of Above Actual Formula Dollars Expended which comes from Carryover funds from previous				
Carryover	0	0	0	100

V. Planned Program Table of Content

S. No.	PROGRAM NAME
1	Community Development
2	Food Safety
3	4-H and Youth Development
4	Childhood Obesity
5	Plant Health and Pest Management
6	Global Food Security and Hunger
7	Sustain, Protect, and Manage Guam's Natural Environment and Resources.
8	Development and Protection of Diverse Natural Resources on Guam and Throughout

V(A). Planned Program (Summary)

Program # 1

1. Name of the Planned Program

Community Development

☑ Reporting on this Program

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
608	Community Resource Planning and Development	30%		0%	
704	Nutrition and Hunger in the Population	10%		0%	
801	Individual and Family Resource Management	10%		0%	
802	Human Development and Family Well-Being	10%		0%	
803	Sociological and Technological Change Affecting Individuals, Families, and Communities	15%		0%	
805	Community Institutions, Health, and Social Services	25%		0%	
	Total	100%		0%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2016	Extension		Research	
	1862	1890	1862	1890
Plan	4.0	0.0	0.0	0.0
Actual Paid	4.0	0.0	0.0	0.0
Actual Volunteer	0.0	0.0	0.0	0.0

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

Extension		Research	
Smith-Lever 3b & 3c	**1890 Extension**	**Hatch**	**Evans-Allen**
279531	0	0	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
221768	0	0	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
0	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Activities for this program include:
1. Conducting community development and strategic planning workshops and trainings that foster more inclusive decisionmaking process and action (to teach policy leaders to interpret and apply economic data to local development decisions).
2. Promote and apply the use of the Cooperative Extension Program Development Model (PDM) Program Development (Needs assessments, focus groups sessions and provide training on how to conduct community needs assessments).
3. Conducting community/organizational strategy and asset mapping.
4. Providing technical assistance in public issues education using the PDM.
5. Promoting the use of the Knowledge@Guam Initiative and the Community Capitals Framework (CCF) as a framework for accessing, interpreting and applying objective data and assessments (survey design and field data collection and issue monographs and briefs).
6. Establish and maintain collaborations with local and federal government organizations through the use of partnership and/or collaborative Memorandums of Agreements (MOA) and Memorandum of Understanding (MOU)
7. Establish coalitions for placed based economic development (community-based entrepreneurship)

2. Brief description of the target audience

The target audiences in the program include:

- Local government boards and commissions
- Non-governmental organizations
- Youth ages 14-17
- Economic development professionals, small businesses and industries
- Regional collaborators and organizations.

3. How was eXtension used?

eXtension used for the following:

- Keeping abreast to "cutting edge learning" events
- As a resource for keeping abreast of National Extension Initiatives, community development news
- Obtain latest training and program information related to Community of Practice interests
- Participated in webinars and podcasts
- Expanding on networks and partnerships

V(E). Planned Program (Outputs)

1. Standard output measures

2016	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	150	100	50	50

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

Patent Applications Submitted

Year: 2016

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2016	Extension	Research	Total
Actual	1	0	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- number of extension articles

Year	Actual
2016	1

Output #2

Output Measure

- number of workshops

Year	Actual
2016	6

Output #3

Output Measure

- number of brochures

Year	Actual
2016	4

Output #4

Output Measure

- number of disseminated research results, new technology and information

Year	Actual
2016	0

Output #5

Output Measure

- number of surveys

Year	Actual
2016	0

Output #6

Output Measure

- number of focus groups conducted

Year	Actual
2016	1

Output #7

Output Measure

- number of popular articles in newsletters, magazines and newspapers

Year	Actual
2016	0

Output #8

Output Measure

- number of one to one assistance

Year	Actual
2016	100

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Number of organizations individuals increasing leadership skills.
2	Number of individuals and organizations increasing knowledge of program development skills.
3	Number of individuals and organizations increasing knowledge of effective strategies for public decision making
4	Number of individuals and organizations crafting, evaluating, and implementing alternative solutions to address public issues
5	Number of individuals and organizations building skills and identifying opportunities to enhance effective participation in public decision making processes

Outcome #1

1. Outcome Measures

Number of organizations individuals increasing leadership skills.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2016	2

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Government organizations (Commissions and Boards) continue to request for strategic planning technical assistance and support. Organizations receiving funding support require the development of program plans, strategy development and action plans.

What has been done
During this reporting period, Extension provided technical assistance and support on the following: Strategic planning workgroup discussions, meetings and presentations, participating in questions and answer sessions and final plan development.

Results
Strategic plans adopted:
Guam workforce development Board
ServeGuam Commission

4. Associated Knowledge Areas

KA Code	Knowledge Area
608	Community Resource Planning and Development
801	Individual and Family Resource Management
802	Human Development and Family Well-Being
803	Sociological and Technological Change Affecting Individuals, Families, and Communities
805	Community Institutions, Health, and Social Services

Outcome #2

1. Outcome Measures

Number of individuals and organizations increasing knowledge of program development skills.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2016	10

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Government planners and community organizations continue to address the many resource challenges when facing critical issues faced by the community. Increased knowledge in program development skills and approaches allowed for innovative leadership, partnerships and leveraged resources.

What has been done
Continued program development technical assistance and capacity building through various workgroups. Continue technical assistance support in both content and process expertise to boards and commissions.

Results
Increased reliance on strategic plans and planning process.

4. Associated Knowledge Areas

KA Code	Knowledge Area
608	Community Resource Planning and Development
803	Sociological and Technological Change Affecting Individuals, Families, and Communities
805	Community Institutions, Health, and Social Services

Outcome #3

1. Outcome Measures

Number of individuals and organizations increasing knowledge of effective strategies for public decision making

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2016	10

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Public issues education continues to challenge government organizations, boards and commissions and the technical workgroup supporting these organizations to respond to the knowledge needs of the community. Workgroups continue to recognize the systematic effort to produce basic decisions and actions that help to guide and manage the resources of the organization and the need for timely informed decision-making.

What has been done
*Provide advisement and technical assistance roles
*Facilitated workgroup discussions and drawing all interested parties into issue discourse.
*Facilitated strategy mapping and issues identification
*Assist organizations assess needs and assess and understand implications

Results
Continued reliance on Knowledge@Guam Initiative through and use of issue monographs, strategy maps and continued relationship building.

4. Associated Knowledge Areas

KA Code	Knowledge Area
608	Community Resource Planning and Development
803	Sociological and Technological Change Affecting Individuals, Families, and Communities
805	Community Institutions, Health, and Social Services

Outcome #4

1. Outcome Measures

Number of individuals and organizations crafting, evaluating, and implementing alternative solutions to address public issues

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2016	5

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Issue identification work can be influenced by politics and the way issues/problems are framed affects the proposed solutions and policies that are considered or developed. Government agencies and established agency workgroups continue to seek content and process expertise and to provide technical assistance to analyze issues/problems and to help gain an understanding of their causes and effects.

What has been done
Content and process expertise continue to be provided to the various agency workgroups.

Results
Continued reliance on the Knowledge@Guam Initiative, Community Capitals Framework and issue briefs as part of our public issues education strategy. Expanding network and orientation to community development work.

4. Associated Knowledge Areas

KA Code	Knowledge Area
608	Community Resource Planning and Development
704	Nutrition and Hunger in the Population
801	Individual and Family Resource Management
802	Human Development and Family Well-Being
803	Sociological and Technological Change Affecting Individuals, Families, and Communities
805	Community Institutions, Health, and Social Services

Outcome #5

1. Outcome Measures

Number of individuals and organizations building skills and identifying opportunities to enhance effective participation in public decision making processes

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2016	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
608	Community Resource Planning and Development
704	Nutrition and Hunger in the Population
801	Individual and Family Resource Management
802	Human Development and Family Well-Being
803	Sociological and Technological Change Affecting Individuals, Families, and Communities
805	Community Institutions, Health, and Social Services

V(H). Planned Program (External Factors)

External factors which affected outcomes

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

Brief Explanation

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Building Planning and Reporting Capacity- Working with government organizations represents the core category of stakeholders due the nature of the programs and planning aligned closely with community development programming. It involves the organizations involved directly with managing program resources, involved with planning,reporting and developing programs. These agencies continue to respond to funders and policymakers on meeting program requirements and reporting.
Strengthening Collaborations & Partnerships- Over the years our existing network relationships with both government and community organizations continue to grow based on the community development support and technical assistance provided to our cooperators and collaborators. This involves participating in various organizational strategic planning processes, reporting and evaluations.

Key Items of Evaluation

Improved comprehensive planning based on community develoment collaboration and engagement Initiatives
The use of the Knowledge of Guam (K@GI) continues to be a key approach to support community development and strategic planning efforts. The KGI provides a platform for issues framing and use of strategy maps to address policies and informed decision-making and the use of issues monograph in the development of issue indicators and metrics.
KGI as a framework approach in using the commnity capitals framework indicators and metrics or data collection approaches. This continues to be a reinforced approach to evaluate the performance or outcomes of partner programs and initiatives.

V(A). Planned Program (Summary)

Program # 2

1. Name of the Planned Program

Food Safety

☑ Reporting on this Program

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
501	New and Improved Food Processing Technologies	10%		15%	
502	New and Improved Food Products	20%		45%	
503	Quality Maintenance in Storing and Marketing Food Products	10%		0%	
604	Marketing and Distribution Practices	5%		0%	
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins	50%		40%	
806	Youth Development	5%		0%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2016	Extension		Research	
	1862	1890	1862	1890
Plan	1.5	0.0	0.5	0.0
Actual Paid	1.2	0.0	1.0	0.0
Actual Volunteer	0.0	0.0	0.5	0.0

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

Extension		Research	
Smith-Lever 3b & 3c	**1890 Extension**	**Hatch**	**Evans-Allen**
104824	0	48285	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
83163	0	35738	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
0	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

The input activities include: (1) investigating factors affecting foodborne illness and food quality in food processing and preparation; (2) providing workshops and training in food safety and food processing in the community; (3) providing consultant services about food safety and food technology in community; (4) identifying phytochemicals and determining the values of tropical and subtropical of plants, fruits, and vegetables to benefit human health; (5) identifying and confirming toxic compounds in tropical crops and plants; (6) developing tropical value-added food products; and (7) disseminating scientific-based information and technologies related to food safety, food processing, and marketing safe and wholesome food products in the community.

2. Brief description of the target audience

The target audiences include entrepreneurs, food manufacturers, food workers, and food-safety educators, farmers, general consumers, college students, youth, and school children.

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2016	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	1630	2010	1138	750

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

Patent Applications Submitted

Year:	2016
Actual:	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2016	Extension	Research	Total
Actual	2	1	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- # of peer reviewed publications

Year	Actual
2016	3

Output #2

Output Measure

- # of non-peer reviewed publications
  Not reporting on this Output for this Annual Report

Output #3

Output Measure

- # of workshops

Year	Actual
2016	16

Output #4

Output Measure

- # of dissemination of science-based information

Year	Actual
2016	500

Output #5

Output Measure

- # of work with media

Year	Actual
2016	1

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Changes of participants (or residents) in gaining knowledge of principles and practices in food safety and food processing
2	Changes of participants (or residents) in improving practices and applying principles in food safety and food processing
3	Changes in magnitude of foodbonre illness and marketing safe and wholesome value-added food products in the community

Outcome #1

1. Outcome Measures

Changes of participants (or residents) in gaining knowledge of principles and practices in food safety and food processing

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2016	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The frequency of foodborne illness on Guam is greater than that in U.S. states. With estimation, each year one of four people in the island experience foodborne illness. Residents have relative poor knowledge and practice in unsafe temperatures, right cooking temperatures, and avoiding unsafe food sources.

What has been done
Workshops of home food processing, nutrition and food safety to low income residents, health eating for successful living among older adults were provided to residents in the community of Guam. One-to-one assistance in food safety and processing was provided to individuals requested from the community.

Results
After the workshops and one-to-one assistance, the target audiences improved their knowledge in food safety principles and processing. The areas include personal hygiene and sanitation, time and temperature control for the safety of foods, right cooking temperature, and avoiding unsafe foods.

4. Associated Knowledge Areas

KA Code	Knowledge Area
501	New and Improved Food Processing Technologies
502	New and Improved Food Products
503	Quality Maintenance in Storing and Marketing Food Products
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and

	Naturally Occurring Toxins
806	Youth Development

Outcome #2

1. Outcome Measures

Changes of participants (or residents) in improving practices and applying principles in food safety and food processing

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2016	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The frequency of foodborne illness on Guam is greater than that in U.S. states. With estimation, each year one of four people in the island experience foodborne illness. Residents have relative poor knowledge and practice in unsafe food storage temperatures, right cooking temperatures, and avoiding unsafe food sources.

What has been done
Workshops of home food processing, nutrition and food safety to low income residents, health eating for successful living among older adults were provided to residents in the community of Guam. One-to-one assistance in food safety and processing was provided to individuals requested from the community.

Results
The residents and target audiences improved behaviors and practices in food preparation and processing to reduce the risk of foodborne illness in the community. The areas include washing hands, using thermometer, avoiding temperature and time abuse, and washing fruits and vegetables before eating.

4. Associated Knowledge Areas

KA Code	Knowledge Area
501	New and Improved Food Processing Technologies
502	New and Improved Food Products

503	Quality Maintenance in Storing and Marketing Food Products
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins
806	Youth Development

Outcome #3

1. **Outcome Measures**

Changes in magnitude of foodbonre illness and marketing safe and wholesome value-added food products in the community

Not Reporting on this Outcome Measure

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Economy
- Competing Public priorities
- Competing Programmatic Challenges

Brief Explanation

Some research and extension projects competed with the time and efforts to the planned work. Funding is limited to hire research and extension professionals.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Pre- and post-tests were used to evaluate the results after workshops and sessions in the area of food safety. Interview and one-to-one contacts were also used in evaluating the extension outreach results.
After 6 weeks of session in Food Safety and Health, 70% of senior citizens improved their understanding in food safety principles and knowledge. After 8 weeks of Eating Smart Being Active curriculum, 66% of participants improved their behavior in washing hands before food preparation, 18% of participants improved their use of meat thermometer in cooking, 70% of participants improved in avoiding temperature and time abuse in storing foods, and 18% of participants improved in washing fruits and vegetables before eating. About 48% of children and youth improved general safe food handling practice.

Key Items of Evaluation

After intervention of food safety education, participants improved their behaviors in personal hygiene, cooking, and chilling foods during food preparation as well as washing fruits and vegetables before eating. Individuals improved their food processing in safe value-added products.

V(A). Planned Program (Summary)

Program # 3

1. Name of the Planned Program

4-H and Youth Development

☑ Reporting on this Program

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
801	Individual and Family Resource Management	25%		0%	
802	Human Development and Family Well-Being	25%		0%	
803	Sociological and Technological Change Affecting Individuals, Families, and Communities	25%		0%	
806	Youth Development	25%		0%	
	Total	100%		0%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2016	Extension		Research	
	1862	1890	1862	1890
Plan	3.2	0.0	0.0	0.0
Actual Paid	3.2	0.0	0.0	0.0
Actual Volunteer	2.2	0.0	0.0	0.0

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

Extension		Research	
Smith-Lever 3b & 3c	**1890 Extension**	**Hatch**	**Evans-Allen**
223625	0	0	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
177415	0	0	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
0	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

To achieve the 4-H program ultimate goals the following activities will be conducted based research proven and curriculum adopted Experiential Learning Model promoting life skills.
5 new 4-H Clubs will be organized and supported annually,
15 4-H school enrichment programs will be established and later chartered as 4-H Clubs,
10 special interest/short-term programs/Day Camps and 5 overnight camps will be conducted,
10 School-Aged Child Care Education Programs will be offered yearly,
5 technology related workshops will be conducted and

2 planned workshops for 4-H individual study/mentoring/family learning activities will be implemented.
In 2016, the UOG-C-E&O 4H Youth Development and Communities program conducted workshops using the Experiential Learning Model to promote life skills. UOG-C-E&O planned, organized, facilitated and conducted youth related outreach educational activities that reached 7,803 youth. Activities include 53 workshops with community clubs, 145 workshops with school clubs, 37 workshops with 4H after school clubs with military 4H clubs. We also conducted 47special interest/short term programs, a 3-week day camping program, 41 after-school enrichment programs, 20 individual study/mentoring/family learning program, 10 after school program using 4H curriculum on staff training, and 10 instructional TV/Video/Web programs. This year, 4H collaborate with Senior citizen department and had aligned interaction and relationships with adults and peer group to promote healthy life style choices to elders. 4H established great partnership with the office of Lieutenant Governor's office along with Guam youth workers from both government and non-government agencies. As a result of this meeting a total of 32 youth workers were presented. At this meeting, a survey question was distributed to name top 3 youth issues in Guam along with strategic plan on how to network with all youth development programs and implement positive youth development for Micronesian Youths.

Workshop topics included consumer family science, biological sciences, technology and engineering, physical science, environmental educational/earth science, and agriculture in the classroom. Participants learned, practiced and mastered life skill activities including: teamwork, managing feelings, healthy lifestyle choices, personal goal setting, resiliency, cooperation/collaboration with others, communication and social skills, leadership, wise use of resources, decision making, critical thinking, self-esteem/motivation, marketable skills, responsible citizenship, and learning to learn. The workshops also included STEM activities, as well as other activities that focus on workforce preparation, such as seamanship work preparation and marine related occupations. 4H program have successfully translated the life skills wheel into eight different Micronesian languages to augment language barriers. Moreover, the life skills presented is highly in support of college and career path. This year Guan 4H took initiative and translated Life skill wheel into eight different Micronesian island languages. The ideal and outcome was to augment the language barriers among youth in Guam.

2. Brief description of the target audience

Primary target audience includes children and youth in the community, public/private/military schools as well as their families/teachers/educators and organizations that requested our service in a collaborative manner. Extension continues its efforts to reach the population who are under-served. This year 4H partnered with the Guam Department of Education's Federal Programs providing life skills workshops to students whose first language is other than English, students who are primarily from the Federated States of Micronesia. We have established a partnership with JP Torres Alternative School dealing with high-risk students. We collaborated with Department of Youth Affairs to initiate programs and life skills to promote career path of clients. Our 4H program is working closely with community centers from different villages to promote youth and adult interaction and relationship.

3. How was eXtension used?

eXtension was used as a reference in developing and aligning our outreach program for youth at risk based on the national knowledge areas (KAs).

V(E). Planned Program (Outputs)

1. Standard output measures

2016	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	783	2821	7803	8745

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

Patent Applications Submitted

Year:	2016
Actual:	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2016	Extension	Research	Total
Actual	2	0	2

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- (1) # of club members

Year	Actual
2016	1941

Output #2

Output Measure

- (2) # of volunteer leaders

Year	Actual

2016	197

Output #3

Output Measure

- (3) # of workshops

Year	Actual
2016	361

Output #4

Output Measure

- (4) # of brochures

Year	Actual
2016	4

Output #5

Output Measure

- (5) # of surveys

Year	Actual
2016	3

Output #6

Output Measure

- (6) # of media articles and promotions

Year	Actual
2016	9

Output #7

Output Measure

- (7) # of focus group

Year	Actual
2016	3

Output #8

Output Measure

- (8) # of volunteers trained

Year	Actual
2016	143

Output #9

Output Measure

- (9) # of extension staff trained

Year	Actual
2016	36

Output #10

Output Measure

- (10)# of collaboration established

Year	Actual
2016	52

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	(1) Number of youth through communication and expressive arts programming demonstrate increased self efficacy in public speaking, presentations, visual arts and performing arts
2	(2) Number of youth participants in 4H natural resouces and environmental education programs demonstrate environmentally responsible behavior
3	(3) Number of youth participants who study plant, soil and entomology learn the interconnectedness of organisms and their environment
4	(4) Number of youth reporting positive attitude change and/or aspirations about learning and careers in a 4-H project area
5	(5) Number of youth increasing participation in science and technology educational programming/clubs
6	(6) Number of volunteers completing a training program and successfully leading a program, activity, event or club
7	(7) Number of youth indicating increased knowledge/skills related to economic education and/or entrepreneurship
8	(8) Number of youth indicating knowledge and/or skills related to leadership
9	(9) Number of youth reporting positive attitude change and/or aspiration related to volunteering and community service

Outcome #1

1. Outcome Measures

(1) Number of youth through communication and expressive arts programming demonstrate increased self efficacy in public speaking, presentations, visual arts and performing arts

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2016	7803

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Communication and expressive arts programs promotes effective communication, public speaking, citizenship skills, build leadership and personal development, increases community/volunteer services, and civic engagement. These programs help youth express themselves, increase self-confidence, develop good self-esteem, additionally the programs increase knowledge in critical thinking, decision making, goal setting, and problem solving. These are identified essential skills in youth development as youth prepare to enter into the workforce. Through these workshops youth were able to experience Mastery, Belonging, Independence, and Generosity. Each youth need to involve in these elements to become better citizen.

What has been done
4H Conducted with the total of 7,803 youth participating in the life skills sessions that increased their knowledge and skills in communication and expressive arts.

Results
2,147 participated in civic engagement, 4,183 learned skills in community/volunteer service, 4,723 increased their leadership and personal development skills, and 2,113increase their communication skills and participate in expressive arts and STEM.

4. Associated Knowledge Areas

KA Code	Knowledge Area
801	Individual and Family Resource Management
802	Human Development and Family Well-Being

803	Sociological and Technological Change Affecting Individuals, Families, and Communities
806	Youth Development

Outcome #2

1. Outcome Measures

(2) Number of youth participants in 4H natural resouces and environmental education programs demonstrate environmentally responsible behavior

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2016	3185

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
It is essential that youth take part in becoming leaders in our community and environmental issues. Sustainable community depends on our youth partnerships and leadership development. Youth need to understand the linkages between natural resources and environmental education program. By involving youth in ecological projects, they increase their sense of ownership, citizenship, Resiliency, social skills and environmental stewardship.

What has been done
A number of workshops were conducted to increase their knowledge and skills in natural resources and environmental education programs.

Results
3185 youth participants in the 4H natural resources and environmental programs increased their knowledge and demonstrated learned skills in environmental education programs including responsible behavior.

4. Associated Knowledge Areas

KA Code	Knowledge Area
801	Individual and Family Resource Management

802	Human Development and Family Well-Being
803	Sociological and Technological Change Affecting Individuals, Families, and Communities
806	Youth Development

Outcome #3

1. Outcome Measures

(3) Number of youth participants who study plant, soil and entomology learn the interconnectedness of organisms and their environment

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2016	3942

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Youth who participated in school gardening (eg. in the classroom) curriculum developed positive self-esteem, increased nutritional habits, developed leadership skills, increased awareness and appreciation for the nature and the environment, increase a sense of healthy-lifestyles, and increased science skills. Youth gained an understanding of value of food, food security, food processing and preparation as it related to healthy living. Youth outdoor activities increased their physical well-being.

What has been done
Workshops were conducted in the schools and 4H Clubs that helped increased youths knowledge and understanding of plants, soils, consumer sciences, food security, food processing and preparations. Additionally, youth learned about the science of entomology and how insects play a major role in our environment connectedness.

Results
3,942 youth learned new science skills and increased their knowledge with regard to plants, soil sciences, and how the sciences of entomology is interconnected to organisms and environment.

4. Associated Knowledge Areas

KA Code	Knowledge Area
801	Individual and Family Resource Management
802	Human Development and Family Well-Being
803	Sociological and Technological Change Affecting Individuals, Families, and Communities
806	Youth Development

Outcome #4

1. Outcome Measures

(4) Number of youth reporting positive attitude change and/or aspirations about learning and careers in a 4-H project area

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2016	2185

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
An essential element in youth development is independence. A skill that motivates youth to become critical thinkers, problem solvers, and good decision makers. To achieve these, CES provides opportunities for the youth to engage in learning that motivates them to be masters of the skills and practice learned skill through community services and citizenship activities. C-E&O promote different youth career path opportunity to middle and high school students.

What has been done
A number of workshops were conducted to help youth increase their knowledge and skills in critical thinking, problem solving, and good decision making. Youth reported positive attitude and/or aspirations about learning and career identification in 4H project area.

Results
2,185 youth increased their knowledge and changed their attitudes with regard to career choice and overall outlook of the future.

4. Associated Knowledge Areas

KA Code	Knowledge Area
801	Individual and Family Resource Management
802	Human Development and Family Well-Being
803	Sociological and Technological Change Affecting Individuals, Families, and Communities
806	Youth Development

Outcome #5

1. Outcome Measures

(5) Number of youth increasing participation in science and technology educational programming/clubs

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2016	4078

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
In partnership with our local education department and 4H military project, a demand for science, engineering and technology has been addressed. Resources identification and sharing had equipped our 4H staff to deliver needed life skills activities that serviced STEM programs. Our young people must learn life skills in STEM in order to be competitive in job market. College and career path had been developed to promote entrepreneurship in STEM.

What has been done
214 STEM workshops were conducted in the GDOE, local 4H Clubs, community organizations, summer break including 18 with the Military installation 4H Clubs.

Results
4,078 participants indicated an increased knowledge in basic sciences, engineering and math. Increased skills in measurements, plant identification, rocketry, marines sciences, and boating safety were identified to be activities that were also most enjoyed and learned.

4. Associated Knowledge Areas

KA Code	Knowledge Area
801	Individual and Family Resource Management
802	Human Development and Family Well-Being
803	Sociological and Technological Change Affecting Individuals, Families, and Communities
806	Youth Development

Outcome #6

1. Outcome Measures

(6) Number of volunteers completing a training program and successfully leading a program, activity, event or club

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2016	197

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Volunteers are vital resources necessary for the success of our youth development programs. They play an important role in extending partnerships through community involvement, building, collaboration and delivering the programs to address client needs in the community. The volunteers must be supported with development opportunities, capable management and leadership, as well as adequate resources in order for them to increase their own skills and knowledge base so they engage and work with the youth, collaborators and community.

What has been done
197 volunteers received training and orientation in the 4H Youth Development Program. 4H 101 training manual was used. The manual is extensive and provides a systematic approach to youth development programming.

Results
4H Community 4H Clubs, Special Interest 4H Clubs, School Based 4H Clubs, Military 4H Clubs were organized and chartered. 4H office continues to service clubs implementing life skills

activities as scheduled. Finally, volunteers have had a major impact in the increase enrollment of 4H membership as a whole.

4. Associated Knowledge Areas

KA Code	Knowledge Area
801	Individual and Family Resource Management
802	Human Development and Family Well-Being
803	Sociological and Technological Change Affecting Individuals, Families, and Communities
806	Youth Development

Outcome #7

1. Outcome Measures

(7) Number of youth indicating increased knowledge/skills related to economic education and/or entrepreneurship

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2016	1683

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The community is currently facing an economic challenge. Prices for gas, food, shelter, and health care continue to increase. Youth finance and entrepreneurship programs help to promote skills, behavior, knowledge, and attitude for participants to become proactive in their future financial challenges.

What has been done
4H staff conducted 361 workshops within Guam public schools, local 4H Clubs, community organizations and during summer break including 18 Military installation. Workshops in budgeting, understanding where money goes, value of money, and simple business plans were conducted.

Results

3,185 youth participants increased their knowledge and skills in money (finance) management, and practiced the development of a business plan. Youth indicated having increased their knowledge/skills related to economic education and/or entrepreneurship.

4. Associated Knowledge Areas

KA Code	Knowledge Area
801	Individual and Family Resource Management
802	Human Development and Family Well-Being
803	Sociological and Technological Change Affecting Individuals, Families, and Communities
806	Youth Development

Outcome #8

1. Outcome Measures

(8) Number of youth indicating knowledge and/or skills related to leadership

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2016	4723

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Leadership skills are critical in our democratic governance. Youth who serve in leadership roles are potentially the leader of our nation's future. We must cultivate these skills and increase our potential the leader or our nation's future. We must cultivate these skills and increase our potential if we are to become and continue to be a stronger nation. Our future depends on good leaderships with good leadership skills.

What has been done
Partnering with our schools, volunteers, local organizations, and military partners, 4H has conducted life skills training using Targeting Life Skills Model and Experiential Learning Model.

Results

4723 youth participated in workshop activities designed to increase skills in leadership that included targeted areas of communication, teamwork, self discipline, self responsibility, decision making, problem solving, concern for others, goal setting, critical thinking, cooperation, conflict resolution, good character and responsible citizenship.

4. Associated Knowledge Areas

KA Code	Knowledge Area
801	Individual and Family Resource Management
802	Human Development and Family Well-Being
803	Sociological and Technological Change Affecting Individuals, Families, and Communities
806	Youth Development

Outcome #9

1. Outcome Measures

(9) Number of youth reporting positive attitude change and/or aspiration related to volunteering and community service

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2016	4183

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Volunteering and community service are the key elements to successful youth development programming. Youth need to learn from adults and adults need to learn from youth as we engage in both community betterment and oneself. Successful programs nationwide are based on volunteerism and community service.

What has been done
UOG-C-E&O conducted workshops linking volunteer and community service to sustainable environment, community, individuals, families, and organizations resiliency.

Results
4183 youth and adult volunteers attended and participated in the workshops were able to report an increase in positive attitude regarding caring for the environment and their families. An increase in their generosity performance indicated that they want to share what they have learned (mastered), increase in participatory community service (belonging), while sharing their capabilities (independence).

4. Associated Knowledge Areas

KA Code	Knowledge Area
801	Individual and Family Resource Management
802	Human Development and Family Well-Being
803	Sociological and Technological Change Affecting Individuals, Families, and Communities
806	Youth Development

V(H). Planned Program (External Factors)

External factors which affected outcomes

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

Brief Explanation

Financial constrains have been most challenging. However, UOG-C-E&O continues its efforts to seek extramural funding sources.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Pre- and post-evaluation results indicate that youths who participated in 4H life skills activities demonstrate increased knowledge in subject matter areas, increased awareness of well-being (self esteem and self motivation), Citizenship, Leadership, Healthy living and increased levels of social skills. Service learning increased participation in teamwork, increased interest in STEM topics, and increased levels of critical thinking, problem solving, wise use of resources, and decision making skills.

Key Items of Evaluation

V(A). Planned Program (Summary)

Program # 4

1. Name of the Planned Program

Childhood Obesity

☑ Reporting on this Program

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
134	Outdoor Recreation	10%		10%	
701	Nutrient Composition of Food	15%		0%	
702	Requirements and Function of Nutrients and Other Food Components	10%		0%	
703	Nutrition Education and Behavior	10%		30%	
704	Nutrition and Hunger in the Population	10%		0%	
724	Healthy Lifestyle	20%		30%	
802	Human Development and Family Well-Being	10%		20%	
805	Community Institutions, Health, and Social Services	15%		10%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2016	Extension		Research	
	1862	1890	1862	1890
Plan	4.0	0.0	0.5	0.0
Actual Paid	4.0	0.0	3.0	0.0
Actual Volunteer	0.0	0.0	0.0	0.0

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

Extension		Research	
Smith-Lever 3b & 3c	**1890 Extension**	**Hatch**	**Evans-Allen**
279531	0	144854	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
221768	0	107213	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
0	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

(1) Provide basic nutrition education classes on topics that relate to nutrition and food which include: 'MyPlate'; Food Safety (Kitchen & Safe Food Handling); Importance of Exercise; Fruits & Vegetables (Vitamins); Shopping Tips; Budgeting; meal Planning; Reading Food labels; promoting use of herbs and spices to help reduce the intake of salts, fats and sugars; and chronic disease prevention. (2) Conduct nutrition workshops to target population. (3) Develop culturally relevant curriculum for promoting physical activity; education to prevent obesity; localized general nutrition education materials (brochures/pamphlets) and also develop a curriculum on food portion control and over-eating. (4) Develop recipe books that feature favorite local recipes with healthful modifications. (5) Conduct food demonstrations on local dishes that incorporate healthful modifications. (6) Develop booklet and/or calendar that identifies locally grown fruits and vegetables with high nutritive value and suggest ways to healthful ways to prepare the local produce. (7) Conduct workshops promoting locally grown fruits and vegetables with healthful recipes for both farmers and experienced cooks (marketing healthful recipes with locally grown produce). (8) Maintain partnership with local food sources businesses to promote a greater variety of healthful foods and education awareness within food source facilities. (9) Develop and disseminate fact sheets on foods/beverages and of common causes of preventable chronic diseases that are prevalent on Guam and show how related to poor lifestyle choices. (10) Develop and disseminate health and nutrition education curriculum for chronic disease prevention along with educational materials.

2. Brief description of the target audience

The target audiences of the program include: (1) school-aged children (elementary through high school level); (2) families in public assistance programs; (3) families with young children; (4) general consumers; (5) military families; (6) health educators; (7) school teachers; (8) local farmers; (9) working professionals; (10) other groups requesting services.

3. How was eXtension used?

Extension was used direct and indirect methods for this program. Direct methods are education class/workshop, staff and community training, focus groups and other community-based approaches, demonstrations, teleconference, and webinar or other distance delivery. Indirect methods are outreach events, newsletters, public service announcements, and media other than extension outlets.

V(E). Planned Program (Outputs)

1. Standard output measures

2016	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	4050	3566	8224	5833

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

Patent Applications Submitted

Year: 2016

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2016	Extension	Research	Total
Actual	0	3	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- # of workshops

Year	Actual
2016	740

Output #2

Output Measure

- # of brochures

Year	Actual
2016	3

Output #3

Output Measure

- # of dissemination of research results and new technology and information

Year	Actual

2016	0

Output #4

Output Measure

- # of one to one intervention

Year	Actual
2016	68

Output #5

Output Measure

- # of focus group

Year	Actual
2016	6

Output #6

Output Measure

- # of work with media

Year	Actual
2016	4

Output #7

Output Measure

- # of articles in newsletter, magazines, and newspapers

Year	Actual
2016	5

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	# of participants exposed to nutrition, exercise, and obesity prevention information
2	# of participants gaining an increase in physical activity knowledge and skills, especially as it pertains to maintaining mental and physical well-being, prevention of chronic disease, and improving overall health
3	# of participants who have been exposed to health and nutrition education for chronic disease prevention

Outcome #1

1. Outcome Measures

# of participants exposed to nutrition, exercise, and obesity prevention information

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2016	2655

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The most recent Guam BRFSS and YRBS report a high prevalence of inactive adults and youth, respectively. Inactivity is attributed to the development of chronic disease. An increase in physical activity knowledge and skills promotes the willingness to start or increase physical activity that can reduce risk for chronic disease

What has been done
Developmentally appropriate and evidence-based curricula has been delivered to the target audience. Additionally, community-based programs have been implemented with extension and stakeholder collaboration to promote walking. Media outlets have been used to support and enforce messages in the curricula and programs.

Results
Pre-/post-test, evaluations, and/or alternative assessments were administered to measure improvements in physical activity. The community-based program has provided a model for sustainable community-owned programs to be launched. Community relationships have been strengthened and more partners have been added to programs to support policy and sustainable programs.

4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior
724	Healthy Lifestyle
805	Community Institutions, Health, and Social Services

Outcome #2

1. Outcome Measures

of participants gaining an increase in physical activity knowledge and skills, especially as it pertains to maintaining mental and physical well-being, prevention of chronic disease, and improving overall health

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2016	574

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The high prevalence of chronic disease in Guam implies inadequate healthy behaviors. Health and nutrition education is a tool or vehicle for adopting healthy attitudes and behaviors and, in turn, reduce risk for chronic disease.

What has been done
In addition to the implementation of evidenced-based curricula, outreach events at health fairs, family engagement events, and worksite wellness activities has underscored exposure of health and nutrition education. Media outlets and extension products have reinforced health and nutrition education and/or disseminated health and nutrition information

Results
Extension products, like CHL newsletters, webpage content posted on websites, and local publications, have been developed to ensure exposure to health and nutrition information and education is far-reaching and sustained. Partnerships with community stakeholders and extension programs have been maintained.

4. Associated Knowledge Areas

KA Code	Knowledge Area
701	Nutrient Composition of Food
702	Requirements and Function of Nutrients and Other Food Components
703	Nutrition Education and Behavior
704	Nutrition and Hunger in the Population
724	Healthy Lifestyle

802	Human Development and Family Well-Being
805	Community Institutions, Health, and Social Services

Outcome #3

1. Outcome Measures

# of participants who have been exposed to health and nutrition education for chronic disease prevention

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2016	1929

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Childhood overweight and obesity is prevalent in Guam and the Pacific abroad related to children not meeting fruit and vegetable recommendations and/or exceeding energy and/or sugar recommendations. Healthy eating patterns implies a variety of healthy foods consumed routinely with little to no added sugars and saturated fat. A healthy eating pattern is possible with locally sourced
Pacific foods.

What has been done
Extension programs have worked in collaboration to deliver evidence-based curricula involving nutrition and garden concepts to connect nutrition and health to the source of food and environment. Cooking demonstrations have been conducted of healthy traditional recipes including local produce. Programs have maintained partnerships with institutions to improve policy to support healthy choices and substitutes

Results
Youth completed pre-/post-tests where most improved their abilities to choose foods according to Federal Dietary Recommendations. Cooking demonstrations were well-received wherever the education was provided and children who participate in some part of meal preparation shared they would attempt many of the recipes demonstrated as they found it "simple" and "good (tasty)." Partnerships with community stakeholders are maintained to continue the efforts towards supporting policy.

4. Associated Knowledge Areas

KA Code	Knowledge Area
134	Outdoor Recreation
703	Nutrition Education and Behavior
724	Healthy Lifestyle
802	Human Development and Family Well-Being
805	Community Institutions, Health, and Social Services

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Public Policy changes
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges
- Populations changes (immigration, new cultural groupings, etc.)

Brief Explanation

The Guam Non-Communicable Disease (NCD) consortium was established to reduce the burden of non-communicable diseases and has devised a strategic plan and collaborative programs addressing smoking, nutrition, alcohol, physical activity, and obesity. The collective consortium effort has raised awareness of public priorities - some of which compete with obesity prevention efforts with regard to priorities and programmatic challenges as new or expanding programs are targeted for the same audiences. Another external factor that continues to affect the outcomes of our programs is migration. Guam has seen a significant increase in population due to migration, especially from the five United States Affiliated Pacific Islands (USAPIs). The Compact of Free Association between the U.S. and the six USAPI (Guam, Commonwealth of the Northern Marianas Island, Palau, Republic of Marshall Islands, American Samoa, and the Federated States of Micronesia) has significantly increased the cultural and linguistic diversity in Guam. Moreover migration is a challenge with program retention as the migrant population is fluid with the transition to and from Guam. Lastly, public policy lack the changes needed to support childhood obesity prevention efforts made; however, there has been opportunities created with recent partnerships and program activities that will further develop to influence supportive public policy.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

From pre-post assessments completed from direct nutrition and behavior education approximately half of all participants had improved, at least, one behavior/knowledge in healthy food/diet, food safety, food resource management, physical activity, and/or chronic disease prevention. Evaluations of the program reveal a desire for more integration of cultural traditions, foods/recipes, and language; as well as, a internet-accessible products, like a Pacific cookbook. Community members shared the interest in web-based video tutorials or "how-to's" and/or an "app" for researching nutrient value of, recipe using, or growing local

produce. Community-based program evaluations revealed more community programs ingrained in the villages are welcomed as to support physical and social environments to promote physical activity and access to healthy eating. However, multi-lesson workshops or programs are challenging due to lack of transportation and competing family/work obligations underscoring cultural and economic challenges. The CX3 data collected from 22 food stores in Guam were analyzed. Majority were small markets or convenience stores. Results revealed less than half (39%) of all food stores were WIC or SNAP vendors. All three (3) villages had a CX3score of <75 (out of 100), which indicates there is much room for improvement with regard to the availability of health food items. Furthermore, all stores had an average of 3.2 out of 5 for healthy food availability and advertisement at checkout which is considered low. The results of the CX3 survey in FY2015 serves as the baseline data of available healthy food options and advertisements (food environment) in three villages, which were little to none. This data has guided the strategies and program projects to alter the food environment for these villages for our FY2017 Guam State Plan. For example, starting the social marketing campaign of 5-2-1-Almost None in, at least, one school, SNAP authorized food stores, faith-based organization in each village.

Key Items of Evaluation

- Media support (funding for technology-savvy products and for staffing expertise) - web-based products or applications can assist with providing multi-lesson series.
- Cultural relevance and preservation. Development of culturally-relevant curricula (extension and research funding).
- Physical and built environment support.
- Training in specialty areas for all extension staff, like working with minors and developmentally appropriate curricula and cross-training that will support the use of a curricula tool box and expand the skill set of staff to be more prepared for mobile lessons.

V(A). Planned Program (Summary)

Program # 5

1. Name of the Planned Program

Plant Health and Pest Management

☑ Reporting on this Program

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
102	Soil, Plant, Water, Nutrient Relationships	5%		0%	
205	Plant Management Systems	10%		25%	
211	Insects, Mites, and Other Arthropods Affecting Plants	5%		0%	
212	Pathogens and Nematodes Affecting Plants	20%		0%	
213	Weeds Affecting Plants	5%		0%	
214	Vertebrates, Mollusks, and Other Pests Affecting Plants	5%		0%	
215	Biological Control of Pests Affecting Plants	10%		50%	
216	Integrated Pest Management Systems	40%		25%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2016	Extension		Research	
	1862	1890	1862	1890
Plan	2.0	0.0	0.0	0.0
Actual Paid	3.0	0.0	0.5	0.0
Actual Volunteer	0.0	0.0	0.0	0.0

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

Extension		Research	
Smith-Lever 3b & 3c	**1890 Extension**	**Hatch**	**Evans-Allen**
209648	0	24142	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
166326	0	17869	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
0	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

The University of Guam Cooperative Extension & Outreach Service's Plant Health and Pest Management group performed educational outreach to the public sector, private sector, and government agencies. Subject areas covered included pesticide application, Integrated Pest Management (IPM) strategies, plant propagation, insect identification, weed identification, plant disease identification, soil nutrition and fertilizers, invasive species, and grafting. The group also provided plant disease diagnostics and insect identification for the island through the Cooperative Extension Service's Plant Health Clinic.
A three and one-half day workshop/training was held May 24 to May 27, 2016 on plant disease diagnostics for 13 professionals from the Northern Marianas College (3), CNMI Forestry (1), CNMI NRCS (1), Guam Department of Agriculture (2), Guam Customs and Quarantine (2), and the University of Guam (4). Topics included identifying plant disease symptoms of vegetables, ornamentals, fruit trees and forest trees. The workshops were hosted by the University of Guam PDP Project Coordinator Dr. Robert Schlub and his Extension Associate Mr. Roger Brown, University of Guam Research Plant Pathologist Dr. Anita Blas, University of Guam Ornamental Horticulturalist Dr. Jim McConnell, and Dr. Raghuwinder Singh, head of the Louisiana State Extension Plant Diagnostic Center.
The University of Guam's Extension & Outreach division conducted a joint workshop session that was free to the public and offered presentations on a new virus disease of tomato plants, Integrated Pest Management (IPM) of insects and plant diseases. The workshop was developed as a response to the resident gardeners' request for a workshop designed specifically to assist residential gardeners that dealt with IPM and horticultural production practices, with an emphasis on practices that are not dependent on the use of registered chemicals, expensive crop varieties or large capital outlays.

The Cooperative Extension publication "Eggplant, Pepper, and Tomato Production Guide for Guam" which was produced in 2002 was updated and revised. Its' new title is "Eggplant, Pepper, and Tomato Production Guide for Guam - Production and IPM Practices for Solanaceous crops in Guam (Second Edition)." The publication can be found at the University of Guam College of Natural and Applied Sciences website under the following link:
http://cnas-re.uog.edu/useful-cnas-documents-posters/
A major activity focused on developing Outreach skills with undergraduates at UOG. Students were asked to integrate knowledge from the AG323 Plant Pathology and other agriculture courses to create plant disease factsheets targeting different demographic groups (e.g., gardeners, farmers, and kids). Tabling skills for Outreach events were also covered.

2. Brief description of the target audience

The target audience for this program includes local farmers, homeowners, nurseries, landscapers and golf

course superintendents and their crews, teachers, school children, and government agencies.

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2016	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	2818	6090	690	815

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

Patent Applications Submitted

Year:	2016
Actual:	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2016	Extension	Research	Total
Actual	7	0	7

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- # of research papers

Year	Actual
2016	0

Output #2

Output Measure

- # of research citations

Year	Actual
2016	150

Output #3

Output Measure

- # of extension fact sheets or articles

Year	Actual
2016	11

Output #4

Output Measure

- # of workshops/trainings/classes

Year	Actual
2016	13

Output #5

Output Measure

- # of brochures

Year	Actual
2016	1

Output #6

Output Measure

- # of research or new technology reports

Year	Actual
2016	0

Output #7

Output Measure

- # of one-on-one interventions

Year	Actual
2016	501

Output #8

Output Measure

- # of surveys

Year	Actual
2016	3

Output #9

Output Measure

- # of focus groups

Year	Actual
2016	2

Output #10

Output Measure

- # of news media activities (TV and radio)

Year	Actual
2016	3

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	% of participants gaining skills in identification of insects and related pests
2	% of participants gaining skills in identification of plant diseases
3	% of participants gaining skills in identification of weeds
4	% of participants gaining knowledge about pesticides and their application
5	% of participants reducing indiscriminate use of chemical pesticides
6	% of participants adopting some established IPM practices

Outcome #1

1. Outcome Measures

% of participants gaining skills in identification of insects and related pests

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2016	95

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Local farmers, homeowners, nurseries, landscapers and golf course superintendents and their crews, students, teachers, government agencies and the general public. Identification is essential in determining the difference between beneficial insects and insect pests, and to insure that proper management practices for IPM and pesticide application are employed. These practices lead to improved plant health and crop yield, and reduce negative impacts on human and wildlife health and the environment.

What has been done
Three workshops/trainings were held on insect identification.

Results
Ninety-five percent of participants showed a gain in knowledge.

4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems
211	Insects, Mites, and Other Arthropods Affecting Plants
214	Vertebrates, Mollusks, and Other Pests Affecting Plants
216	Integrated Pest Management Systems

Outcome #2

1. Outcome Measures

% of participants gaining skills in identification of plant diseases

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2016	95

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Local farmers, homeowners, nurseries, landscapers and golf course superintendents and their crews, teachers, students, government agencies and the general public. Plant disease identification of biotic and abiotic caused diseases is essential to insure that proper management practices for IPM and pesticide application are employed. These practices lead to improved plant health and crop yield, and reduce negative impacts on human and wildlife health and the environment.

What has been done
Three workshops/trainings were held on the identification of plant diseases.

Results
Ninety-five percent of participants showed a gain in knowledge.

4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems
212	Pathogens and Nematodes Affecting Plants
216	Integrated Pest Management Systems

Outcome #3

1. Outcome Measures

% of participants gaining skills in identification of weeds

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2016	100

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Local farmers, homeowners, nurseries, landscapers and golf course superintendents and their crews, teachers, students, government agencies and the general public. Identification of specific weeds is essential to insure that proper management practices for IPM and pesticide application are employed. These practices lead to improved plant health and crop yield, and reduce negative impacts on human and wildlife health and the environment.

What has been done
A workshop was held on weed identification.

Results
One hundred percent of participants showed a gain in knowledge.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
205	Plant Management Systems
213	Weeds Affecting Plants
216	Integrated Pest Management Systems

Outcome #4

1. Outcome Measures

% of participants gaining knowledge about pesticides and their application

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2016	96

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Local farmers, homeowners, nurseries, landscapers and golf course superintendents and their crews, teachers, students, government agencies and the general public. Knowledge of pesticides and their application is crucial for the health and safety of the applicator, consumers of produce, the health of humans and wildlife, and the environment.

What has been done
Farmers and home gardeners were given instruction on pesticide application over the course of the year.

Results
Ninety-six percent of participants showed a gain in knowledge.

4. Associated Knowledge Areas

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

Outcome #5

1. Outcome Measures

% of participants reducing indiscriminate use of chemical pesticides

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2016	96

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Local farmers, homeowners, nurseries, landscapers and golf course superintendents and their crews, teachers, students, government agencies and the general public. Correct application in this area leads to improved plant health and crop yield, savings on pesticide purchases, and reduces negative impacts on human and wildlife health and the environment.

What has been done
Farmers and home gardeners were given instruction on reducing pesticide application over the course of the year.

Results
Ninety-six percent of participants showed a change in action.

4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems
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 #6

1. Outcome Measures

% of participants adopting some established IPM practices

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2016	91

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Local farmers, homeowners, nurseries, landscapers and golf course superintendents and their crews, teachers, students, government agencies and the general public. Correct application of IPM practices leads to improved plant health and crop yield, and reduces negative impacts on human and wildlife health and the environment.

What has been done
One workshop was held on Establishing IPM practices. Also, farmers and home gardeners were given instruction on and monitored for establishing IPM practices.

Results
Ninety-one percent of participants showed a change in condition.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
205	Plant Management Systems
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

V(H). Planned Program (External Factors)

External factors which affected outcomes

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

Brief Explanation

Typhoons and tropical storms caused delays.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Evaluation results were a combined grade of ninety 95 percent.

Key Items of Evaluation

Evaluation is based on internal review of the Plant Health and Pest Management group, stakeholder input, and pre/post testing.

V(A). Planned Program (Summary)

Program # 6

1. Name of the Planned Program

Global Food Security and Hunger

☑ Reporting on this Program

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
102	Soil, Plant, Water, Nutrient Relationships	10%		10%	
104	Protect Soil from Harmful Effects of Natural Elements	10%		10%	
125	Agroforestry	10%		5%	
201	Plant Genome, Genetics, and Genetic Mechanisms	0%		5%	
202	Plant Genetic Resources	0%		5%	
205	Plant Management Systems	15%		20%	
212	Diseases and Nematodes Affecting Plants	5%		5%	
302	Nutrient Utilization in Animals	10%		5%	
307	Animal Management Systems	10%		5%	
403	Waste Disposal, Recycling, and Reuse	10%		0%	
601	Economics of Agricultural Production and Farm Management	10%		10%	
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources	0%		10%	
806	Youth Development	10%		10%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2016	Extension		Research	
	1862	1890	1862	1890
Plan	3.3	0.0	3.0	0.0
Actual Paid	3.3	0.0	7.0	0.0
Actual Volunteer	0.0	0.0	0.0	0.0

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

Extension		Research	
Smith-Lever 3b & 3c	**1890 Extension**	**Hatch**	**Evans-Allen**
230613	0	337992	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
182959	0	250163	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
0	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

This program will address such areas such as:

1. Each year hold planning meetings between the cooperating agencies to identify priorities for grant funding to address these priorities. Funded grants and collaborative projects are a planned output of this POW, demonstrating capacity building through training, collaborative planning and presentation of needs.
2. Conduct applied research and field experiments at program demonstration sites, at both institutional and private (farmer) sites. Best management conservation and sustainable agricultural practices will be demonstrated on multi-agency, University, and farmer demonstration areas. New enterprises, varieties and production methods will also be demonstrated. Variety trials and potential new production enterprise identification are an ongoing effort.

3. Conduct workshops, trainings, field tours, conferences and other educational activities to local and regional producers, students, teachers and youth groups on program topics.

4. Identify producers on island and reach out on educational programs, also target farmers with agricultural land leases who are not utilizing the land for agricultural or under utilizing the land, for recruitment into the education and demonstration activities and survey them on barriers to their agriculture implementation.

5. Target home gardeners and community groups starting school and community gardens for recruitment into these programs and programs on promoting edible landscapes.

6. Increase the skills of island agricultural and food professionals by holding train the trainer workshops on program curriculum prior to holding workshops for the general public.

7. Promote waste management, mulching and composting as an alternative to land filling of solid organic waste and use of compost for soil quality enhancement as an alternative to synthetic fertilizers for crop production and for environmental integrity of natural resources. We will study the use of composted organic waste to increase organic matter content for improving soil physical properties in order to reduce soil erosion.

8. At least one workshop each year will be held on government (USDA) support and incentive programs and funding opportunities for farmers.

9. For the subsistence/home/community garden portions of this program will identify gardners/small farmers and their information needs on small (1/4 acre to 1 acre) production systems and develop

outreach efforts to address these educational needs through workshops and extension publications, in order to increase the substitution of local production for the current imported produce and home grown produce for purchased produce.

10. This plan of work will develop home and community produced food as alternatives to store bought food through farm, home, community gardening, and animal production programs, thus increasing local food diversity and self reliance.

11. Genetic improvement of shrimp and tilapia via selective breeding program at UOG hatchery is to make the specific pathogen free seedstock available to local aquaculture farms and shrimp industry worldwide. UOG shrimp stock has remain disease free of OIE or USMSFC listed pathogens for over a decades. The breeding program was started in 2007 and generated 33-50 families each year. Various strains of Tilapia are bred to supply for the local farmers.

2. Brief description of the target audience

Primary local clients will include former, existing and potential new plant and animal producers including home, small-scale and subsistence level garden/micro farm plots. Over the past decade, the Chamorro Land Trust Commission signed 1,000+ new agriculture land leases and the DoAg identified 300+ existing full and part time commercial and subsistence agricultural producers. Many producers possess limited resources and desperately need education and technical support programs. Additionally, new village based needs assessments indicate that there are hundreds if not thousands of local homeowners and community groups that want training in sustainable food production practices so this effort is being adapted to include them. Also identified is a strong desire among many of our communities to start community gardens so this will be a new target group.

The secondary target audience is the agricultural professional (both plant and animal) community on Guam. This program is a collaborative effort to build capacity and enhance performance of Guam's Cooperative Extension & Outreach Ag professionals and partner agencies so they can better identify issues and mobilize resources to provide broader technical assistance. Many non agricultural professionals are now promoting gardening and food production these professionals need agricultural training and materials to utilized in their outreach efforts. The Micronesian Chefs Association and Guam Community College Culinary program faculty have also become strong supporters of this program's efforts. Ag professionals with partner land grant programs throughout the American Affiliated Pacific have requested assistance. Regional workshops will address these requests.

The tertiary target group is island youth. The youth target population includes students, youth interested in entrepreneurial agricultural activities, and clients of mayors' offices interested in small scale and community agricultural activities.

A fourth audience is the University of Guam agricultural student cohort. The demonstration farm will be utilized as laboratory classroom for students enrolled in agriculture courses (Introduction to Agriculture and Introduction to Animal Science).

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2016	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	6484	5110	990	615

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

Patent Applications Submitted

Year: 2016

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2016	Extension	Research	Total
Actual	3	0	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- # of workshops or conferences

Year	Actual
2016	35

Output #2

Output Measure

- # of best management practice demonstrations conducted on private or institutional sites

Year	Actual
2016	115

Output #3

Output Measure

- # of popular articles in newsletters, magazines and newspapers, or TV and Radio presentations.

Year	Actual

2016	2

Output #4

Output Measure

- # of extension publications (fact sheets, white papers, web-based learning modules, etc.)

Year	Actual
2016	18

Output #5

Output Measure

- # of research and extension advisory councils and boards consulted in program planning and implementation.

Year	Actual
2016	6

Output #6

Output Measure

- # of new educational/workshop curriculum developed and/or piloted with program partners

Year	Actual
2016	16

Output #7

Output Measure

- # of either: Memorandums of Understanding, cooperative agreements, partnerships, or shared demonstrations initiated or continued

Year	Actual
2016	11

Output #8

Output Measure

- Number of Poster presentations.

Year	Actual
2016	1

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	# of program participants indicating intent to adopt recommended program practices, activities, and technology
2	# of producers indicating decreased imported ag production inputs
3	# of program participants indicating improved knowledge and skills of recommended practices
4	# of community strategic plans and policies implemented as a result of this program
5	# of cooperating agency and organization personnel adopting and utilizing curriculum materials developed under this POW (both Guam and Distance Education)
6	# of producers indicating intent to utilize recommended new varieties/species in production.
7	Genetic Improvement of Tilapia Seedstock & Pathogen Free Shrimp Seedstock

Outcome #1

1. Outcome Measures

# of program participants indicating intent to adopt recommended program practices, activities, and technology

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2016	562

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Over 35 workshops were conducted. Post-Evaluations show a clear majority of the participants show attitude and/or knowledge change. But most important are the participants that show either planned changed or who we observe change. One Faculty noted: Participants of the Veteran and New Farmers workshop (2016), UOG Yigo Experiment Station tours/workshops, and UOG CES/WPTRC workshops on Growing Bell Pepper and Chinese Kale included a wide range of age groups (10-70 yrs of age) from the general public with the objective to promote agriculture technology to enhance food security, environmental sustainability, and the local agriculture industry (subsistence and commercial)

What has been done
Post-workshop evaluations ask what will you do differently now, also we visit and see change in peoples farms. One faculty noted: Several lectures and activities were conducted with participants(adults and youth) on agricultural business and marketing, plant propagation methods, and proper plant care including other aspects of agriculture technology including horticultural techniques, soil quality,sustainability, composting, native plants and native ecosystems, growing high commodity and potential superior food crop varieties, integrated farm systems (poultry layer, organic multi-story cropping, and aquaponics), crop response to soil amendments, and detrimental effects of invasive species on local economy and environment.

Results
Across the faculty efforts we found 562 different changes/planned changes. One faculty noted: Several participants have called upon my assistance as they have engaged in practicing plant propagation, choosing appropriate crops for micro-climates and soil-building technologies taught

from agricultural professionals in the workshop

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
104	Protect Soil from Harmful Effects of Natural Elements
125	Agroforestry
205	Plant Management Systems
212	Diseases and Nematodes Affecting Plants
302	Nutrient Utilization in Animals
307	Animal Management Systems
403	Waste Disposal, Recycling, and Reuse
601	Economics of Agricultural Production and Farm Management
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources
806	Youth Development

Outcome #2

1. Outcome Measures

# of producers indicating decreased imported ag production inputs

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2016	26

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Being an isolated island imports drive up the cost of agricultural production inputs. Identifying or developing lower cost local substitutes has been a need identified across our agricultural sector. Many of our workshops have this as a key topic (soil building, feed, breeding stock, etc).

What has been done
Post-workshop evaluations ask what will you do differently now, also we visit and see change in peoples farms. In their descriptions they not where they are planning on using local inputs or by our field observations.

Results
Among the faculty efforts, 26 producers are using local substitutes (locally grown feeds and locally hatched baby purebred chicks: and compost, greenwaste, and other organic waste materials as soil amendments.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
125	Agroforestry
205	Plant Management Systems
302	Nutrient Utilization in Animals
307	Animal Management Systems
403	Waste Disposal, Recycling, and Reuse
601	Economics of Agricultural Production and Farm Management
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources

Outcome #3

1. Outcome Measures

# of program participants indicating improved knowledge and skills of recommended practices

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2016	203

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Over 35 workshops were conducted. Post-Evaluations show a clear majority of the participants show attitude and/or knowledge change.

What has been done
Post-workshop evaluations ask what you know before the workshop then degree to which your knowledge has increased. Over half indicate significant knowledge change on the topic.

Results
203 participants documented large degree of knowledge change due to our outreach efforts.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
104	Protect Soil from Harmful Effects of Natural Elements
125	Agroforestry
201	Plant Genome, Genetics, and Genetic Mechanisms
202	Plant Genetic Resources
205	Plant Management Systems
212	Diseases and Nematodes Affecting Plants
302	Nutrient Utilization in Animals
307	Animal Management Systems
403	Waste Disposal, Recycling, and Reuse
601	Economics of Agricultural Production and Farm Management
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources
806	Youth Development

Outcome #4

1. Outcome Measures

# of community strategic plans and policies implemented as a result of this program

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2016	1

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The University of Guam represents a treasure of the island in terms of technical and diverse knowledge. In times of limited resources one of the greatest impacts we can have is to provide our expertise to help other organizations develop action plans for community/policy change with their resources. It represents a unique opportunity to leverage our (the University's) impact across a broad range of disciplines.

What has been done
We try to track how many new strategic plans or policies we are able to guide into existence.

Results
In the past year we were able to assist the Guam Farmers' Cooperative in the development and beginning implementation of their strategic plan for the new farmers market location. Workshops were also held for farmers on planning.

4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems
601	Economics of Agricultural Production and Farm Management

Outcome #5

1. Outcome Measures

# of cooperating agency and organization personnel adopting and utilizing curriculum materials developed under this POW (both Guam and Distance Education)

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual

2016 7

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The USDA partners of NRCS, FSA, Rural Development, Cooperative Extension and Outreach, the Agricultural Experiment Station, Guam Small Business Development Center and the Local Department of Agriculture, and the Chamorro Land Trust Commission have limited funds for technical expertise so we all are short staffed. It is far more effective to identify common agreed on curriculum on best management practices and then develop this curriculum jointly and cross train each other on its delivery.

What has been done
A concerted effort has been ongoing for almost a decade to develop workshop curriculum jointly and jointly deliver the workshops. Each year we monitor new workshop curriculum developed and number of personnel delivering this curriculum to the island's population. One new faculty noted the following in his experience with this effort: Respective agencies assist each other and clients. Clients obtain knowledge of what type of assistance is available from respective agencies.

Results
This year 7 new workshops were developed they include 5 farm planning topics and 2 new vegetable crop workshops. These were delivered by partner groups. A new faculty observed post workshop followup: Clients have received conservation farm plans and professional technical assistance on improving plant production and sustaining natural resources.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
205	Plant Management Systems
212	Diseases and Nematodes Affecting Plants
307	Animal Management Systems
403	Waste Disposal, Recycling, and Reuse
601	Economics of Agricultural Production and Farm Management
806	Youth Development

Outcome #6

1. Outcome Measures

# of producers indicating intent to utilize recommended new varieties/species in production.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2016	1

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Need for improved local breed stock for laying chickens.

What has been done
One producer was assisted in obtaining and using incubators to produce new brood stock.

Results
One new farmer is hatching his own poultry.

4. Associated Knowledge Areas

KA Code	Knowledge Area
201	Plant Genome, Genetics, and Genetic Mechanisms
202	Plant Genetic Resources
212	Diseases and Nematodes Affecting Plants
307	Animal Management Systems

Outcome #7

1. Outcome Measures

Genetic Improvement of Tilapia Seedstock & Pathogen Free Shrimp Seedstock

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2016	1

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Genetic improvement of shrimp and tilapia via selective breeding program at UOG hatchery is to make the specific pathogen free seedstock available to local aquaculture farms and shrimp industry worldwide.

What has been done
UOG shrimp stock has remain disease free of OIE or USMSFC listed pathogens for over a decades. The breeding program was started in 2007 and generated 33-50 families each year. Various strains of Tilapia are bred to supply for the local farmers.

Results
The shrimp UOG stocks are disease free of all OIE or USMSFC listed pathogens, as well as the most recent ones such as EMS and EHP etc.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
302	Nutrient Utilization in Animals
307	Animal Management Systems
601	Economics of Agricultural Production and Farm Management
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Other (Change in government leaders)

Brief Explanation

Delays and cuts in local government funds slowed implementation of several planned projects. Fortunately leveraging efforts with our partner agencies helped mitigate these funding shortfalls to minimize any impact on program clients.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Most participants indicated both improved knowledge and planned behavior change due to our educational outreach efforts. In a compiled summary of evaluations from Five New and Veteran Farmer Workshops here are some highlights in response to:
- The content increased my knowledge on the subject matter 104 responded, 71 strongly agreed, 22 Agreed (on a five point scale)
- The workshop changed my attitude on the topic matter. 111 responded, 55 strongly agreed, 23 agreed

Will you be doing anything differently after this workshop. Here are some of the comments.
- Propagate more trees.
- Try to utilize our land at home for more plants such as fruits and vegetables.
- More thorough planning.
- Pay more attention to soil management.
- I'm realizing how little I know.
- I will use sheet mulching with shredded paper (local organic waste) and apply for EQIP with NRCS.
- Plan and evaluate my intentions and expand my horizons for my family, friend, and community.
- Very informative and enjoyable. The science about why procedures are done when farming is nice to hear about.

Key Items of Evaluation

In answer to "will I be able to do my work better if I knew more about". Below are some of the most common responses: Everything, Farming, Farm Management, Proper way of stating my own farm, Tree Selection, cuttings, growing seedlings, grafting, pruning, Air-layering, Live stock management, Organic farming/gardening (many times), Permaculture/tropical permaculture (one of the more common), Aquaponics (2nd most common), Soils and soil management (most common), Pest, Pest Management, Funding sources/grants, Plant diversity in peri-urban farms. chicken tractors, poultry animal

production, sheet mulching, water management, raised beds, farm business management, and food preservation (canning, pickling and drying specifically).

V(A). Planned Program (Summary)

Program # 7

1. Name of the Planned Program

Sustain, Protect, and Manage Guam's Natural Environment and Resources.

☑ Reporting on this Program

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
102	Soil, Plant, Water, Nutrient Relationships	0%		100%	
	Total	0%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2016	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	0.0	6.0	0.0
Actual Paid	0.0	0.0	3.0	0.0
Actual Volunteer	0.0	0.0	0.0	0.0

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

Extension		Research	
Smith-Lever 3b & 3c	**1890 Extension**	**Hatch**	**Evans-Allen**
0	0	144854	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
0	0	107213	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
0	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

We have developed various techniques, methodology and soil management practices to maintain Agricultural sustainability and environmental quality under different farming practices.

We are currently studying the effects of surface crop residues and subsurface macroporosity on water

infiltration into the soil profile. Also evaluating the effect of crop residue on soil quality improvement for agricultural sustainability.

We have already evaluated some watershed management techniques by using the Vetiver Technology for trapping sediment and controlling soil erosion on slopping lands in order to slow down the storm water flow and trap sediment as well as nutrients for improving water quality downstream.

We continue to conduct various experimentation by employing innovative techniques such as suction cup Lysimeters in order to trace and measure the chemical concentration as well as movement throughout the soil profile following the application of synthetic fertilizers as compared to land application of compost.

We are also developing techniques to evaluate the effects of no-tillage management and inter cropping strategies on chemical, physical and biological properties of the soil.

Meantime, we are promoting waste management and composting as an alternative to land filling of solid organic waste in Guam. We believe that land application of compost not only enhance the soil quality and improve soil health but it is also an alternative to synthetic fertilizers for crop production and maintains the integrity of the environment and the natural natural resources.

We have been applying the Vetiver System (VS) for the bio-remediation of sewage as well as drainage from the storm water not only for water quality improvement but also for restoration of water reservoirs and marine environments near the seashores of the island.

2. Brief description of the target audience

Farmers, landscapers, students, general public, as well as government agencies.

3. How was eXtension used?

Extension was used in the way of dissemination the information and the knowledge gained through demonstrations, TV interviews, Brochures, Conference Presentations, and various form of publications.

V(E). Planned Program (Outputs)

1. Standard output measures

2016	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	97	0	86	0

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

Patent Applications Submitted

Year:	2016
Actual:	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2016	Extension	Research	Total
Actual	1	1	2

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- # of workshops

Year	Actual
2016	5

Output #2

Output Measure

- # of popular articles in newsletters, magazines, and newspapers

Year	Actual
2016	4

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	# participants indicating improved knowledge and skills or recommended practices

Outcome #1

1. **Outcome Measures**

participants indicating improved knowledge and skills or recommended practices

Not Reporting on this Outcome Measure

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Appropriations changes

Brief Explanation

Project efforts get to be delayed due to purchasing policies and delays in implementation due to these issues.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Program still in implementation phase and evaluation techniques and results will be reported in future reporting periods.

Key Items of Evaluation

V(A). Planned Program (Summary)

Program # 8

1. Name of the Planned Program

Development and Protection of Diverse Natural Resources on Guam and Throughout Micronesia

☑ Reporting on this Program

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
136	Conservation of Biological Diversity	15%		15%	
202	Plant Genetic Resources	10%		10%	
205	Plant Management Systems	25%		25%	
211	Insects, Mites, and Other Arthropods Affecting Plants	25%		25%	
215	Biological Control of Pests Affecting Plants	10%		10%	
216	Integrated Pest Management Systems	10%		10%	
723	Hazards to Human Health and Safety	5%		5%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2016	Extension		Research	
	1862	1890	1862	1890
Plan	2.0	0.0	12.0	0.0
Actual Paid	3.5	0.0	14.2	0.0
Actual Volunteer	0.0	0.0	0.0	0.0

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

Extension		Research	
Smith-Lever 3b & 3c	**1890 Extension**	**Hatch**	**Evans-Allen**
0	0	685639	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
0	0	507474	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
0	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Little fire ant was detected on Guam in November 2011 and continued in 2016. Ants have been found infesting forest and residential properties at many sites from Merizo in the south along the western coastal hills to the karst-limestone forest of Yigo in the north. LFA infestations are still quite small but growing. Most of the infestation sites in residential areas cover about 100 square meters or less. This suggests that eradication from some sites is still within the realm of possibility if the spread of LFA by humans can be stopped, and if funds can be obtained to purchase chemicals and baits and to hire personnel to apply them periodically over the space of 1 to 2 years. Methods to eradicate and control LFA populations developed by the University of Hawaii-Hilo and the Hawaii Department of Agriculture are now being adopted on Guam.

Work on coconut rhinoceros beetle on Guam continued. Field releases of fungal spores into rhino beetle breeding sites were not sufficiently successful. Biocontrol with Rhino specific virus imported from New Zealand failed. Foreign exploration for a highly pathogenic isolate of virus has begun. Also doing surveillance trapping for CRB and LFA in Marshall Islands and the CNMI.
An insect forest pest survey was initiated in FY2015 and continued into FY2016. The goal is to build a list of native and invasive species of insects attacking forest plants on Guam.
Conducted an inventory of endangered and rare on island (ROI) plant species throughout Guam. Also conducting inventory of urban forests on Guam. Set up Micronesian challenge plots for long-term monitoring of forest plants; data will be submitted to and managed by the U.S. Forest Service. Propagated and out-planted some of the rare plant species. Monitoring included documenting pest problems.

2. Brief description of the target audience

Our target audience is the general public, farmers, landscapers, the research community at large, and federal, territorial, and regional government agencies and NGO's.

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2016	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	942	15450	879	1157

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

Patent Applications Submitted

Year: 2016

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2016	Extension	Research	Total
Actual	11	14	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- # of workshops

Year	Actual
2016	8

Output #2

Output Measure

- # of one-to-one contacts

Year	Actual
2016	603

Output #3

Output Measure

- # of popular articles in newsletters, magazines and newspapers

Year	Actual

2016	112

Output #4

Output Measure

- # of Extension publications (fact sheets, white papers, web-based learning modules, etc)

Year	Actual
2016	21

Output #5

Output Measure

- # of research or extension advisory boards and councils

Year	Actual
2016	10

Output #6

Output Measure

- # of participants in IPM training or workshops

Year	Actual
2016	15

Output #7

Output Measure

- # of peer-reviewed research publications

Year	Actual
2016	14

Output #8

Output Measure

- # of patents

Year	Actual
2016	0

Output #9

Output Measure

- # of presentations at professional international, national, or regional conference

Year	Actual
2016	25

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	# participants indicating improved knowledge and skills or recommended practices
2	# of strategic plans and policies implemented as a result of this program
3	# of cooperative agreements/partnerships initiated or continued as a result of this program

Outcome #1

1. Outcome Measures

participants indicating improved knowledge and skills or recommended practices

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2016	46

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Protecting island resources from invasive species was cited as one of the top 5 concerns during a recent island-wide stakeholders seminar. Island resources and public health are continually put at risk by the increasing flow of commercial, military and public commerce that increases the threat of new and dangerous introductions. On top of that, we are currently battling at least 3 uncontrolled outbreaks of invasive species (cycad scale, CRB, and LFA) which are decimating local ecosystems and pose a hazard to human health.

What has been done
Hands-on workshops to train local and regional plant protection professionals, farmers, and private land owners.

Results
We have local PPQ workers maintaining CRB and LFA surveillance on their home islands.

4. Associated Knowledge Areas

KA Code	Knowledge Area
136	Conservation of Biological Diversity
202	Plant Genetic Resources
205	Plant Management Systems
211	Insects, Mites, and Other Arthropods Affecting Plants
215	Biological Control of Pests Affecting Plants

216	Integrated Pest Management Systems
723	Hazards to Human Health and Safety

Outcome #2

1. Outcome Measures

# of strategic plans and policies implemented as a result of this program

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2016	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Many plans have been developed by local and federal government agencies, but implementation remains problematic due to funding limitations and lack of professional capacity.

What has been done
Continue to inform policy makers of the need to take action.

Results
Growing awareness on the part of policy makers and general public. But implementation still remains problematic.

4. Associated Knowledge Areas

KA Code	Knowledge Area
136	Conservation of Biological Diversity
202	Plant Genetic Resources
205	Plant Management Systems
211	Insects, Mites, and Other Arthropods Affecting Plants
215	Biological Control of Pests Affecting Plants
216	Integrated Pest Management Systems
723	Hazards to Human Health and Safety

Outcome #3

1. Outcome Measures

# of cooperative agreements/partnerships initiated or continued as a result of this program

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2016	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Protecting island resources from invasive species was cited as one of the top 5 concerns during a recent island-wide stakeholders seminar. Island resources and public health are continually put at risk by the increasing flow of commercial, military and public commerce that increases the threat of new and dangerous introductions. On top of that, we are currently battling at least 3 uncontrolled outbreaks of invasive species (cycad scale, CRB, and LFA) which are decimating local ecosystems and pose a hazard to human health.

What has been done
- FIA (Forest Inventory Analysis) cooperative agreement between UOG and US Forest Service.
- CNMI Dept. of Forestry and UOG have cooperative agreement, where UOG provides entomological expertise on issues deemed important by CNMI
- USDA APHIS PPQ - UOG research scientists are collaborators and provide inspection services, technical and scientific assistance
- DAWR (Guam Department of Agriculture) cooperative agreement to work on conservation of endangered butterflies
- Ag Research New Zealand and UOG have cooperative agreement to work on virus to control CRB
- UOG collaboration with Canada Agriculture and Agrifood to identify invasive aphids throughout Micronesia
- Collaboration with UH Hilo Ant Lab to develop control techniques for LFA in Micronesia
- Participate in National Honey Bee Survey
- Collaborate with SPC in plant protection, quarantine, biological control, and in training professionals
- Advise U.S. Fish & Wildlife on issues regarding federally listed plant species

Results
UOG expertise contributes to nearly all facets of island life by the amelioration of the natural and urban environments throughout Micronesia

4. Associated Knowledge Areas

KA Code	Knowledge Area
136	Conservation of Biological Diversity
202	Plant Genetic Resources
205	Plant Management Systems
211	Insects, Mites, and Other Arthropods Affecting Plants
215	Biological Control of Pests Affecting Plants
216	Integrated Pest Management Systems
723	Hazards to Human Health and Safety

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Appropriations changes
- Government Regulations

Brief Explanation

Typhoons are always possible on Guam and may delay advances of research and extension services
Lack of funding (cuts in formula funds and unsuccessful efforts for competitive funds) may reduce the scope of research and extension services
Limited and declining number of highly trained individuals in disciplines critical to natural resource management on Guam and Micronesia.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Programs are being evaluated formally and informally by stakeholders and by internal University; and feedback has been positive. Federal agencies lacking on-island personnel rely heavily on UOG scientific expertise. This is also true for private environmental firms and pest control companies.

Key Items of Evaluation

Programs are being evaluated formally and informally by stakeholders and by internal University; and feedback has been positive. Federal agencies lacking on-island personnel rely heavily on UOG scientific expertise. This is also true for private environmental firms and pest control companies. Recently had a new graduate program approved by the University of Guam upon recognition of its strategic importance in the region. In addition, 98% of our graduates successfully find employment in agriculture and environmental fields or acceptance into PhD and certification programs.

VI. National Outcomes and Indicators

1. NIFA Selected Outcomes and Indicators

Childhood Obesity (Outcome 1, Indicator 1.c)	
504	Number of children and youth who reported eating more of healthy foods.
Climate Change (Outcome 1, Indicator 4)	
0	Number of new crop varieties, animal breeds, and genotypes whit climate adaptive traits.
Global Food Security and Hunger (Outcome 1, Indicator 4.a)	
40	Number of participants adopting best practices and technologies resulting in increased yield, reduced inputs, increased efficiency, increased economic return, and/or conservation of resources.
Global Food Security and Hunger (Outcome 2, Indicator 1)	
0	Number of new or improved innovations developed for food enterprises.
Food Safety (Outcome 1, Indicator 1)	
0	Number of viable technologies developed or modified for the detection and
Sustainable Energy (Outcome 3, Indicator 2)	
0	Number of farmers who adopted a dedicated bioenergy crop
Sustainable Energy (Outcome 3, Indicator 4)	
0	Tons of feedstocks delivered.