# 2015 University of Guam Combined Research and Extension Annual Report of Accomplishments and Results

**Status: Accepted**

**Date Accepted: 06/15/2016**

## 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 180,000 and increasing. The ethnic background of the island includes: Chamorro (native islanders), Filipinos, Caucasians (including members of the U.S. Armed Forces and their dependents), other islanders (Micronesians and Palauans) 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 to protect the natural environment. The WPTRC conducts research for the protection of our natural environment as well as the development of the island's agriculture and aquaculture industry. 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 2015, seven full time researcher faculty published 19 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 2015 was evident. In addition, we were finally able to hire a Plant Pathologist, whose primary role is research. 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. As part of this rejuvenation, CNAS held an all-client priority listing session on Nov 4, 2015 as a way to get community input on priority research, extension, and education needs. This document is becoming our loadstar in our upgrade.

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

| Year: 2015 | Extension | | Research | |
|---|---|---|---|---|
| | 1862 | 1890 | 1862 | 1890 |
| Plan | 23.0 | 0.0 | 8.0 | 0.0 |
| Actual | 19.0 | 0.0 | 25.0 | 0.0 |

## II. Merit Review Process

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

- Internal University Panel
- Combined External and Internal University Panel
- Other (Community priority listing sessions )

### 2. Brief Explanation

For Cooperative Extension and Outreach (C-E&O), internal plans of work get reviewed by the Associate Dean for Extension & Outreach and then the Dean of our college. Project efforts often have advisory boards to help them gather input on pressing needs and that data in brought into consideration when the faculty writes their annual plan of work. With the Nov 4, 2015 priority listing session, faculty are being pointed toward priority needs of clients. C-E&O does not have the amount of funds typically available to research, so our faculty concentrate on small effort within a small budget and also are pointed toward competitive grants. This more focused pathway is new, but will yield dividends as competitive funds are captured and new projects get rolled out.

For the 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 2015 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. Our main contact event was the Nov 4, 2015 all-client listing

session which has given us a large set of work options for the future.

**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
- Use Surveys

**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 also use the newspaper and press releases to advertise our efforts. Our new website includes a feature where clients can sign up to receive our news briefs.

**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
- 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.

On November 4, 2015, the College of Natural & Applied Sciences (CNAS) at the University of Guam hosted an all-community stakeholder priority listing session on the University of Guam campus. Invitations were sent out via email, phone calls, and the media to all points of Guam reaching many thousands of people. About 150 people from the private sector, different government offices, and CNAS came to the session to contribute their thoughts in the areas of: agriculture and gardening; natural resource quality & use: land, ocean, water; families, youth, and communities; and nutrition, health, and food. The questions we sought answers to included:

• What is a SIGNIFICANT problem or issue on Guam, or the immediate region, that you feel needs to be researched?
• What skills could we teach, during an Extension & Outreach short course for example, that would have SIGNIFICANT value in your life?
• What type of advising could you get that would have SIGNIFICANT value in your life?
• What information products (factsheets, booklets, books, videos, websites) could be made that would have a SIGNIFICANT value to your life or what you do?
• What technology can we use to deliver science-based information and communicate with you?
• If you were to hire a CNAS student after graduation, what ONE skill or class do they need to have to contribute SIGNIFICANTLY to your organization or business?
• What non-CNAS type of service or support do you need that would propel you or your client group forward SIGNIFICANTLY?

The answers to each question, found here: http://cnas-re.uog.edu/priorities/ , were prioritized and it gave the community, not just CNAS, a working priority list of projects.

**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.
As an example, the prioritized list from the November 4, 2015 UOG Listening Session was used by the Dean/Director to establish a competitive project contest and has now started requiring that all faculty focus their efforts, to some degree, on this very targeted list of stakeholder needs. This requirement includes projects funded by Hatch and Smith-Lever dollars.

**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.
The answers to each question collected during the November 4, 2015 UOG Listening Session can be found here: http://cnas-re.uog.edu/priorities/ , were prioritized and it gave the community, not

just CNAS, a working priority list of projects.

## IV. Expenditure Summary

| 1. Total Actual Formula dollars Allocated (prepopulated from C-REEMS) | | | |
|---|---|---|---|
| Extension | | Research | |
| Smith-Lever 3b & 3c | 1890 Extension | Hatch | Evans-Allen |
| 1223034 | 0 | 1289278 | 0 |

| 2. Totaled Actual dollars from Planned Programs Inputs | | | | |
|---|---|---|---|---|
| | Extension | | Research | |
| | Smith-Lever 3b & 3c | 1890 Extension | Hatch | Evans-Allen |
| Actual Formula | 611517 | 0 | 1289278 | 0 |
| Actual Matching | 611517 | 0 | 1189481 | 0 |
| Actual All Other | 0 | 0 | 0 | 0 |
| Total Actual Expended | 1223034 | 0 | 2478759 | 0 |

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

# V. Planned Program Table of Content

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

**Program # 1**

**1. Name of the Planned Program**

Community Development and Economic Systems

☑ 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 | 40% | | 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 | 20% | | 0% | |
| 805 | Community Institutions, Health, and Social Services | 20% | | 0% | |
| | **Total** | 100% | | 0% | |

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

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

| Year: 2015 | Extension | | Research | |
|---|---|---|---|---|
| | 1862 | 1890 | 1862 | 1890 |
| **Plan** | 3.0 | 0.0 | 0.0 | 0.0 |
| **Actual Paid** | 3.0 | 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** |
| 96555 | 0 | 0 | 0 |
| **1862 Matching** | **1890 Matching** | **1862 Matching** | **1890 Matching** |
| 96555 | 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

Several activities were completed this reporting year. The first project was collaboration with the University of Guam's School of Business and Public Administration's One Village One Product (OVOP). For one year, one (1) extension FTE was dedicated to this partnership/project. The OVOP project is an economic development strategy that integrates heritage tourism, food and agriculture trade in Guam by increasing local food production and other heritage-based consumables to reduce Guam's 90% reliance on food and agricultural products. The survey was designed to collect data in the following central areas:

- the different farm products that are currently being produced on Guam, along with the specific village(s) in which their production is taking place;
- the different value-added products that are currently being produced on Guam, along with the specific village(s) in which their production is taking place; and
- the different farm products or value-added products that used to be produced in the different villages on Guam and the reason(s) why they are no longer being produced.
- types of trainings and workshops that value added producers need.

Using the Soil and Water Conservation Districts of Guam farmer list of 384 farmers, 54 farmers participated in the survey. The sample distribution was designed to be proportionate to the number of farmers in village districts with 39% of the sample residing in the northern villages, 37% in southern villages, and 24% in central villages. Telephone and face-to-face interviews were conducted.
Because farmer response rates have been relatively low (historically), the team employed a two-pronged approach: 1) Work with village mayors; and 2) Conduct community outreach sessions and visit village markets. The team worked with village mayors as a way to introduce the project and elicit ideas and insights into how the team could best proceed in contacting farmers/residents. The team conducted meetings with mayors of all 19 villages on Guam. Meetings were conducted in the villages of Agana Heights, Agat, Asan-Maina, Barrigada, Chalan Pago-Ordot, Dededo, Hagatna, Inarajan, Mangilao, Merizo, Mong Mong-Toto-Maite, Piti, Santa Rita, Sinajana, Talofofo, Tamuning-Tumon-Harmon, Umatac, Yigo, and Yona. The mayors provided valuable information to increase the level of response. At the same time, mayors completed and disseminated product/service portion of the survey. Furthermore, the project team visited village markets, including night market in Agat (Tuesday), Hagatna (Wednesday), Mangilao (Thursday), Yigo (Friday), and the weekend market in Dededo. At these events, farmers and other attendees were encouraged to complete surveys and provide information of possible producers of tourism, cultural, heritage and/or food products.
As a result of the survey the following workshops were conducted: food preservation costs and equipment, food safety and packaging, setting up a commercial kitchen, pricing, marketing and packaging strategies, federal grants, financing, and technical assistance programs, and citrus juice-processing, as well as information on USDA Rural Development's value-added producer grant.

Activities for this program include:

1. Conduting community development 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. Conducting community asset mapping
3. Poviding provide technical assistance in strategic planning, conducting needs assessments, survey design to help people understand the economic impact of policy changes, and implementation capabilities
4. Accessing, interpreting and applying objective data and conduct assessments (suvey design and field data collection)
5. Establish and maintain collaborations with local and federal government
6. Establish partnership and/or collaborativeMOAs and MOUs
7. establish coalitions for placed based economic development (community-based entreprenuership)
8. Conduct focus groups sessions and provide training on how to conduct community needs assessments

Under the K@GI project, this programming approach is based on assisting community partners and government agencies address their need to compile and assess data issues related to their programs and help develop strategies for incorporating the community capitals framework in their planning and programming efforts. During this period a four strategy maps were developed as a planning tool to address important program issues and capacity issues for program planning and data collection.

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

The target audiences in the program include: general public interested in value added production, already established value added producers, farmers, local government, numerous commissions and boards; non-governmental organizations, youth ages 14-17. Other target audiences also include economic development professionals, small businesses and industries, community groups and the general public. Under the K@GI, target audiences include community partners, government agencies involved in managing federal programs and strategic planning practitioners.

**3. How was eXtension used?**

eXtension was used to source value added information and ideas for types of workshops.
Under K@GI, eXtension community of practice and program references provided innovative solutions to localize ideas around community data and planning approaches.

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

**1. Standard output measures**

| 2015 | Direct Contacts Adults | Indirect Contacts Adults | Direct Contacts Youth | Indirect Contacts Youth |
|---|---|---|---|---|
| **Actual** | 200 | 300 | 10 | 20 |

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

**Patent Applications Submitted**

| | |
|---|---|
| Year: | 2015 |
| Actual: | 0 |

**Patents listed**

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

**Number of Peer Reviewed Publications**

| 2015 | Extension | Research | Total |
|---|---|---|---|
| Actual | 0 | 0 | 0 |

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

**Output Target**

**Output #1**

**Output Measure**

- number of extension articles

Not reporting on this Output for this Annual Report

**Output #2**

**Output Measure**

- number of workshops

| Year | Actual |
|---|---|
| 2015 | 15 |

**Output #3**

**Output Measure**

- number of brochures

| Year | Actual |
|---|---|
| 2015 | 2 |

**Output #4**

**Output Measure**

- number of disseminated research results, new technology and information

| Year | Actual |
|---|---|
| 2015 | 0 |

**Output #5**

**Output Measure**

- number of surveys

| Year | Actual |
|---|---|
| 2015 | 3 |

**Output #6**

**Output Measure**

- number of focus groups conducted

| Year | Actual |
|---|---|
| 2015 | 2 |

**Output #7**

**Output Measure**

- number of popular articles in newsletters, magazines and newspapers

| Year | Actual |
|---|---|
| 2015 | 7 |

**Output #8**

**Output Measure**

- number of one to one assistance

| Year | Actual |
|---|---|
| 2015 | 50 |

**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 |
| 6 | Number of individuals learning business aspects of producing/pricing/marketing/and packaging value added products |

**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 |
|---|---|
| 2015 | 0 |

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

**Issue (Who cares and Why)**
Community planning priorities include providing technical assistance in helping develop strategic plans for the ServeGuam Commission four year plan.

**What has been done**
Provided the overall review and guidance in drafting and finalizing the ServeGuam Strategic Plan.

**Results**
Finalize Strategic plan to meet funder requirements.

**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 |
|---|---|
| 2015 | 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 |
| 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 |
|---|---|
| 2015 | 0 |

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

**Issue (Who cares and Why)**
{No Data Entered}

**What has been done**
{No Data Entered}

**Results**
{No Data Entered}

**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 Knowledge Outcome Measure

**3b. Quantitative Outcome**

| Year | Actual |
|---|---|
| 2015 | 40 |

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

**Issue (Who cares and Why)**
The importance of increasing Guam?s agricultural production has multiple benefits to businesses, farmers, new entrepreneurs, individuals and the community as a whole. By reducing imports and replacing it with as little as 10% of selected agricultural production, Guam stands to gain a great economic benefit.

Under the K@GI, mayors continue to turn to Cooperative Extension for technical assistance in providing information and helping conduct asset and strategy maps.

**What has been done**
Non-government and government organizations have partnered and collaborated for interested value producers and already established producers. Guam Vistors Bureau, Guam Economic Development Authority, Farm to Table, Buy Local First, USDA Farm Services, USDA Rural Development all partnered with OVOP project providing alternative ways to think about increasing local food and agricultural production on Guam. As well several conferences and roundtables were convened around this important topic

Under the K@GI, providing information and networking with cooperators, and funders.

**Results**
OVOP has become the central organization that brings multiple collaborators together. Two individuals have applied for several government grants. Three non-profit organizations have teamed up to provide a Kiosk (booth) at a popular mall, displaying and selling value added products.

Under the K@GI, networks continue to expand and strategy maps continue to be used as starting points for planning and funding strategies.

**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 #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 |
|---|---|
| 2015 | 0 |

### 3c. Qualitative Outcome or Impact Statement

**Issue (Who cares and Why)**
{No Data Entered}

**What has been done**
{No Data Entered}

**Results**
{No Data Entered}

### 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 #6**

**1. Outcome Measures**

Number of individuals learning business aspects of producing/pricing/marketing/and packaging value added products

**2. Associated Institution Types**

- 1862 Extension

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

| Year | Actual |
|---|---|
| 2015 | 45 |

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

**Issue (Who cares and Why)**
The importance of increasing Guam?s agricultural production has multiple benefits to businesses, farmers, new entrepreneurs, individuals and the community as a whole. By reducing imports and replacing it with as little as 10% of selected agricultural production, Guam stands to gain a great economic benefit.For entrepreneurs looking to use agricultural products in new and innovative ways, the findings of this study show that there is a great supply in unused or unsold fruits and vegetables. Value-added products tied to cultural foods such as coconut eggplant can be canned and made available to local and visiting consumers at various outlets. Marmalades and jams using sweet lemons such as calamansi have the potential to be marketed as Guam staples; the possibilities of value-added agricultural products are significant.

**What has been done**
As a result of the survey the following workshops were conducted: food preservation costs and equipment, food safety and packaging, setting up a commercial kitchen, pricing, marketing and packaging strategies, federal grants, financing, and technical assistance programs, and citrus juice-processing, as well as information on USDA Rural Development?s value-added producer grant.

**Results**
Forty-five individuals attended the workshops. Three value added producers have adjusted and adopted what they have learned in the workshops by adjusting pricing, changing packaging, and marketing their product in both new avenues and to new customers.

**4. Associated Knowledge Areas**

| KA Code | Knowledge Area |
|---|---|
| 608 | Community Resource Planning and Development |

| | |
|---|---|
| 801 | Individual and Family Resource Management |
| 803 | Sociological and Technological Change Affecting Individuals, Families, and Communities |

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

### External factors which affected outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Competing Programmatic Challenges

### Brief Explanation

Much of the work in this planned program was conducted by only two (2) FTE extension faculty. This program has had a reduction in both faculty and staff support that affected reaching outcomes.

## V(I). Planned Program (Evaluation Studies)

### Evaluation Results

According to the study described on the activities portion of this planned program, surveys results indicate the following:

• Most farmers on Guam are small farmers, with 34% farming land that is less than one acre, most likely located in their backyard, hence the term "backyard farmer." Eighty percent of the 50 farmers who participated in the survey have 4 acres or smaller lands.

• Of the total acreage of land that farmers owned, only 71.41% on average (80% median) was used yearly for farming and an estimated average of 4.20 acres (1.5 acres median).

• Crop production - Because the 52 farmers participating in this survey were allowed to give multiple answers, especially in cases when farmers engaged in diversified farming and thus combine two or more farming activities, a total of 68 responses were received. Of this total, crop production received the highest response (66.15%), followed by livestock production at 17.65%; responses from 22 farmers of the 45 farmers who participated in the survey reveal that a total of 362,489 lbs. of crops (plus $5,000 value not expressed in lbs.) were harvested. This suggests that 22 of the 45 farmers who participated in the survey were unable to provide estimates of their crop production. This is particularly true for non-commercial farmers, who had little or no reason to keep track of their production

• Results also shows that very few Guam farmers engage in aquaculture production (2.94%) while 8.82% use their farms to grow herbs, landscape/ornamental plants, or for personal use or as bee forage.

• The most commonly grown crops are bananas, cucumbers, eggplants, papayas, peppers and tomatoes. These crops were grown by at least 14 farmers located in the different villages on Guam. In terms of livestock production, 12 farmers engaged in this activity between August 2012 and July 2013, which yielded 61 chickens, 0 pigs, 8-9 goats and 12-13 other livestock not identified. Although farmers indicated raising cattle or duck, they did not provide estimates of their output.

• Unsold /unused products - 64.62% indicated that farmers gave them to friends and families and only a small percent (3.08%) indicated throwing away products that they were unable to sell; 29.23% indicated that they were used for personal consumption, fed to pigs and other animals, donated to churches, public agencies and civic organizations, invested in repotting and sizing, used as mulch/fertilizer, or "reconditioned to be sold"

Inventory of the different farm and value added products that are currently being produced in specific villages on Guam:

- Farmers identified agricultural cooperatives to be most important (27.55 percent of all respondents), followed by business cooperatives at 19.39 percent, and then village cooperatives at 17.35 percent.
- Current and past production data in the 19 villages showed a variety of value-added products that are currently being produced but not yet known to many long-term residents of Guam. Results in this area also indicate many non-consumable, such as handicrafts, herbal merchandise, and landscaping plants.
- There a number of products that have potential to return to higher production levels that can eventually lead to the sales of popular products, such as Guam made coffee, uniquely flavored banana chips, and locally produced coconut oil.

Results from the survey questions regarding training and workshops show the highest interest in workshops/training in"Pricing/Marketing/Packaging", (24%); 18.34% were interested "Working with Retailers" and "Financing for Small Businesses."

Under the K@I, the need for a systematic approach for identifying community data sets and compilation of updated data sets and metrics continue to be an ongoing area of need.

**Key Items of Evaluation**

The importance of increasing Guam's agricultural production has multiple benefits to businesses, farmers, new entrepreneurs, individuals and the community as a whole. By producing some coffee, rice, nuts and spices on island and replacing 10 percent of what is currently imported as well as producing some agricultural value-added products and reducing 10 percent of current imports of these products, local producers and businesses would realize additional income of $6 million, increase the local spending multiplier to 1.3723, increase the nominal GIP by $8.25 million, create 121 additional jobs, increase GRT by $330,000 and income taxes by $1.2 million.
Given the federal funding portfolio for Guam, the need for information and analysis continues to be an important priority when addressing the range of public issues and community development work. Given that Guam is not part of the American Community Survey, having access to timely datasets, contribute to an ongoing gap in conducting important data analysis i.e. the Household Income Expenditure Data (HIES).

## 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 |
|---|---|---|---|---|---|
| 502 | New and Improved Food Products | 30% | | 40% | |
| 712 | Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins | 50% | | 60% | |
| 806 | Youth Development | 20% | | 0% | |
| | **Total** | 100% | | 100% | |

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

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

| Year: 2015 | Extension | | Research | |
|---|---|---|---|---|
| | 1862 | 1890 | 1862 | 1890 |
| **Plan** | 1.0 | 0.0 | 0.0 | 0.0 |
| **Actual Paid** | 1.0 | 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** |
| 32185 | 0 | 25758 | 0 |
| **1862 Matching** | **1890 Matching** | **1862 Matching** | **1890 Matching** |
| 32185 | 0 | 23789 | 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 conducted workshops and training sessions in food safety and food processing in the community and provided one-to-one consultant services to targeted audiences in the areas of food safety and food technology. We developed tropical value-added food products, such as processing local and shelf-stable citrus juice, and educated the technology to targeted audiences. We disseminated various scientific-based information and technologies related to food safety, food processing, and marketing safe and wholesome food products in the community. We determined the antimicrobial activity of lemon grass essential oils against mesophilic bacteria and molds and yeasts on the surface of papaya fruit during cleaning and washing step.

**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**

| 2015 | Direct Contacts Adults | Indirect Contacts Adults | Direct Contacts Youth | Indirect Contacts Youth |
|---|---|---|---|---|
| **Actual** | 2114 | 1931 | 1652 | 410 |

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

**Patent Applications Submitted**

| | |
|---|---|
| Year: | 2015 |
| Actual: | 0 |

**Patents listed**

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

**Number of Peer Reviewed Publications**

| 2015 | Extension | Research | Total |
|---|---|---|---|
| **Actual** | 0 | 1 | 0 |

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

**Output Target**

**Output #1**

**Output Measure**

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

**Output #2**

**Output Measure**

- # of non-peer reviewed publications

| Year | Actual |
|---|---|
| 2015 | 2 |

**Output #3**

**Output Measure**

- # of workshops

| Year | Actual |
|---|---|
| 2015 | 7 |

**Output #4**

**Output Measure**

- # of dissemination of science-based information

| Year | Actual |
|---|---|
| 2015 | 800 |

**Output #5**

**Output Measure**

- # of work with media

| Year | Actual |
|---|---|
| 2015 | 3 |

### 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

### 3a. Outcome Type:

Change in Knowledge Outcome Measure

### 3b. Quantitative Outcome

| Year | Actual |
|---|---|
| 2015 | 0 |

### 3c. Qualitative Outcome or Impact Statement

**Issue (Who cares and Why)**
Knowledge in food safety and food handling practice

**What has been done**
Pre- and post-test

**Results**
Eighty percent of participants in food safety training improve the knowledge

### 4. Associated Knowledge Areas

| KA Code | Knowledge Area |
|---|---|
| 502 | New and Improved Food Products |
| 712 | Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins |

## 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

### 3a. Outcome Type:

Change in Action Outcome Measure

### 3b. Quantitative Outcome

| Year | Actual |
|---|---|
| 2015 | 6 |

### 3c. Qualitative Outcome or Impact Statement

**Issue (Who cares and Why)**
Food safety practice in properly handling foods

**What has been done**
Follow up tests were conducted to evaluate the food safety practice of participants.

**Results**
Fifty nine percent of participants followed the recommended practices in personal hygiene. Seventy five percent of participants followed the recommended practices of avoid temperature abuse for foods. Eighty three percent of participants improved one or two food safety practices.

### 4. Associated Knowledge Areas

| KA Code | Knowledge Area |
|---|---|
| 502 | New and Improved Food Products |
| 712 | Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins |

**Outcome #3**

**1. Outcome Measures**

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

**2. Associated Institution Types**

- 1862 Extension

**3a. Outcome Type:**

Change in Condition Outcome Measure

**3b. Quantitative Outcome**

| Year | Actual |
|---|---|
| 2015 | 0 |

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

**Issue (Who cares and Why)**
{No Data Entered}

**What has been done**
{No Data Entered}

**Results**
{No Data Entered}

**4. Associated Knowledge Areas**

| KA Code | Knowledge Area |
|---|---|
| 502 | New and Improved Food Products |
| 712 | Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins |
| 806 | Youth Development |

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

**External factors which affected outcomes**

- Economy
- Competing Programmatic Challenges

### Brief Explanation

Competing projects in other fields and limited funding affected the outcomes of the programs

## V(I). Planned Program (Evaluation Studies)

### Evaluation Results

We conduct pre- and post-tests and follow-up tests to evaluate the changes in food safety knowledge and food handling practices of participants in the training sessions and workshops.

### Key Items of Evaluation

We observed that 80% of participants improved their knowledge in food safety and 50-75% of participants improved their food handling practices after training and workshops.

## 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: 2015 | Extension | | Research | |
|---|---|---|---|---|
| | 1862 | 1890 | 1862 | 1890 |
| **Plan** | 2.0 | 0.0 | 0.0 | 0.0 |
| **Actual Paid** | 2.2 | 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** |
| 70807 | 0 | 0 | 0 |
| **1862 Matching** | **1890 Matching** | **1862 Matching** | **1890 Matching** |
| 70807 | 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 2015, 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 3,580 youth. Activities include 42 workshops with community clubs, 64 workshops with school clubs, 18 workshops with 4H after school clubs with military 4H clubs. We also conducted 32 special interest/short term programs, a 3-week day camping program, 24 after-school enrichment programs, 19 individual study/mentoring/family learning program, 9 after school program using 4H curriculum on staff training, and 7 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 nongovernment 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 senior citizens center 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.

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

**1. Standard output measures**

| 2015 | Direct Contacts Adults | Indirect Contacts Adults | Direct Contacts Youth | Indirect Contacts Youth |
|---|---|---|---|---|
| **Actual** | 651 | 1006 | 3580 | 2867 |

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

**Patent Applications Submitted**

| | |
|---|---|
| Year: | 2015 |
| Actual: | 0 |

**Patents listed**

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

**Number of Peer Reviewed Publications**

| 2015 | Extension | Research | Total |
|---|---|---|---|
| **Actual** | 2 | 0 | 2 |

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

**Output Target**

**Output #1**

**Output Measure**

- (1) # of club members

| Year | Actual |
|---|---|
| 2015 | 1280 |

**Output #2**

**Output Measure**

- (2) # of volunteer leaders

| Year | Actual |
|---|---|
| 2015 | 173 |

**Output #3**

**Output Measure**

- (3) # of workshops

| Year | Actual |
|---|---|
| 2015 | 141 |

**Output #4**

**Output Measure**

- (4) # of brochures

| Year | Actual |
|---|---|
| 2015 | 3 |

**Output #5**

**Output Measure**

- (5) # of surveys

| Year | Actual |
|---|---|
| 2015 | 2 |

**Output #6**

**Output Measure**

- (6) # of media articles and promotions

| Year | Actual |
|---|---|
| 2015 | 8 |

**Output #7**

**Output Measure**

- (7) # of focus group

| Year | Actual |
|---|---|
| 2015 | 2 |

**Output #8**

**Output Measure**

- (8) # of volunteers trained

| Year | Actual |
|---|---|
| 2015 | 82 |

**Output #9**

**Output Measure**

- (9) # of extension staff trained

| Year | Actual |
|---|---|
| 2015 | 24 |

**Output #10**

**Output Measure**

- (10)# of collaboration established

| Year | Actual |
|---|---|
| 2015 | 46 |

**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 |
|---|---|
| 2015 | 3580 |

### 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 3,580 youth participating in the life skills sessions that increased their knowledge and skills in communication and expressive arts.

**Results**
3,580 participated in civic engagement, 1347 learned skills in community/volunteer service, 2233 increased their leadership and personal development skills, and 3,580 increase 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 |
|---|---|
| 2015 | 2417 |

**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, 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**
2417 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 |
|---|---|
| 2015 | 2417 |

**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 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 processing and preparations. Additionally, youth learned about the science of entomology and how insects play a major role in our environment connectedness.

**Results**
2,417 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 |
|---|---|
| 2015 | 1912 |

**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. CES 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**
1912 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 |
|---|---|
| 2015 | 3580 |

**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**
141 STEM workshops were conducted in the GDOE, local 4H Clubs, community organizations, summer break including 8 with the Military installation 4H Clubs.

**Results**
3,184 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 |
|---|---|
| 2015 | 164 |

**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 and community.

**What has been done**
164 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 |
|---|---|
| 2015 | 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 141 workshops within Guam public schools, local 4H Clubs, community organizations and during summer break including 8 Military installations. Workshops in budgeting, understanding where money goes, value of money, and simple business plans were conducted.

**Results**
1,412youth 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 |
|---|---|
| 2015 | 3850 |

**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**
3850 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 |
|---|---|
| 2015 | 3850 |

**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**
3850 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), 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 |
|---|---|---|---|---|---|
| 701 | Nutrient Composition of Food | 15% | | 0% | |
| 702 | Requirements and Function of Nutrients and Other Food Components | 10% | | 0% | |
| 703 | Nutrition Education and Behavior | 20% | | 30% | |
| 704 | Nutrition and Hunger in the Population | 10% | | 0% | |
| 724 | Healthy Lifestyle | 20% | | 30% | |
| 802 | Human Development and Family Well-Being | 10% | | 30% | |
| 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: 2015 | Extension | | Research | |
|---|---|---|---|---|
| | 1862 | 1890 | 1862 | 1890 |
| **Plan** | 4.0 | 0.0 | 0.0 | 0.0 |
| **Actual Paid** | 4.0 | 0.0 | 2.5 | 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** |
| 128740 | 0 | 128927 | 0 |
| **1862 Matching** | **1890 Matching** | **1862 Matching** | **1890 Matching** |
| 128740 | 0 | 118947 | 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, food, and health that include: 'MyPlate'; Food Safety (Kitchen & Safe Food Handling); Importance of Physical Activity; Fruits & Vegetables (Vitamins); Shopping Tips; Food Resource Management; 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 classes/workshops to target population. (3) Develop culturally relevant curricula for promoting physical activity; obesity prevention education; general nutrition education materials (brochures/pamphlets); and food portion control. (4) Develop recipe cards that feature healthy popular local recipes. (5) Conduct food demonstrations on local dishes that incorporate healthful modifications. (6) Develop material 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 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. (11) Establish and maintain partnership with local agencies to create/revise policy that support healthy lifestyle behaviors. (12) Maintain partnerships with stakeholders to extend the reach of nutrition education and expand the type of activities of obesity prevention beyond nutrition education. (13) Work with the media and develop products for social media outlets.

### 2. Brief description of the target audience

The target audiences of the programs 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

| 2015 | Direct Contacts Adults | Indirect Contacts Adults | Direct Contacts Youth | Indirect Contacts Youth |
|---|---|---|---|---|
| **Actual** | 4890 | 6477 | 6827 | 8462 |

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

**Patent Applications Submitted**

Year: 2015

Actual: 0

**Patents listed**

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

**Number of Peer Reviewed Publications**

| 2015 | Extension | Research | Total |
|---|---|---|---|
| **Actual** | 0 | 5 | 0 |

## V(F). State Defined Outputs

**Output Target**

**Output #1**

**Output Measure**

- # of workshops

| Year | Actual |
|---|---|
| 2015 | 137 |

**Output #2**

**Output Measure**

- # of brochures

| Year | Actual |
|---|---|
| 2015 | 11 |

**Output #3**

**Output Measure**

- # of dissemination of research results and new technology and information
  Not reporting on this Output for this Annual Report

**Output #4**

**Output Measure**

- # of one to one intervention
  Not reporting on this Output for this Annual Report

**Output #5**

**Output Measure**

- # of focus group

| Year | Actual |
|---|---|
| 2015 | 5 |

**Output #6**

**Output Measure**

- # of work with media

| Year | Actual |
|---|---|
| 2015 | 8 |

**Output #7**

**Output Measure**

- # of articles in newsletter, magazines, and newspapers

| Year | Actual |
|---|---|
| 2015 | 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 |
| 4 | # of children on Guam will practice healthy eating patterns |
| 5 | # of families, children, and youth have access to healthy food |

## Outcome #1

### 1. Outcome Measures

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

### 2. Associated Institution Types

- 1862 Extension

### 3a. Outcome Type:

Change in Knowledge Outcome Measure

### 3b. Quantitative Outcome

| Year | Actual |
|---|---|
| 2015 | 6107 |

### 3c. Qualitative Outcome or Impact Statement

**Issue (Who cares and Why)**
The high prevalence of obesity and chronic disease in Guam implies inadequate practices of healthy behaviors. Nutrition, exercise, and obesity prevention information is a tool or vehicle for adopting healthy attitudes and behaviors that promote a healthy weight and, ultimately, reduce and prevent obesity.

**What has been done**
Developmentally appropriate and evidenced-based curricula designed to improve food choices (i.e. increase fruits and vegetables and reduce added sugar and sodium) and increase physical activity have been delivered to youth and adults in Guam. Moreover, community members (e.g., teachers and volunteers) and extension staff have been trained in the same curricula to sustain healthy behaviors of residents who have completed the training.

**Results**
Most participants exposed to nutrition, exercise, and obesity prevention information completed a pre-/post-test, program evaluation, and/or diet or body composition assessment. Nearly half of participants report more often planning meals, eating breakfast, using the Nutrition Facts to make food choices, or prepare meals without adding salt.

### 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 #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 |
|---|---|
| 2015 | 1205 |

**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 #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

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

| Year | Actual |
|---|---|
| 2015 | 6107 |

**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 #4**

**1. Outcome Measures**

# of children on Guam will practice healthy eating patterns

**2. Associated Institution Types**

- 1862 Extension

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

| Year | Actual |
|---|---|
| 2015 | 912 |

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

## Outcome #5

### 1. Outcome Measures

# of families, children, and youth have access to healthy food

### 2. Associated Institution Types

- 1862 Extension

### 3a. Outcome Type:

Change in Knowledge Outcome Measure

### 3b. Quantitative Outcome

| Year | Actual |
|---|---|
| 2015 | 526 |

### 3c. Qualitative Outcome or Impact Statement

**Issue (Who cares and Why)**
The physical and built environment of a community/neighborhood and economic status of a family influences access to healthy food. Food resource management knowledge and skills can improve access to healthy food that will promote healthy food intake. Moreover, improved access to food also alleviates hunger and food insecurity.

**What has been done**
Evidenced-based curricula have been conducted as part of a workshop series to include meal planning, unit pricing, and benefits of farmers markets and gardens. Outreach events have occurred at supplemental nutrition assistance programs (SNAP), farmers' markets, and schools with >50% of students on the free or reduced-lunch programs. Cooking demonstrations conducted at local grocery stores on days closest to the SNAP distribution of benefits timeline. Completed CX3 data collection and analysis in select villages, which describes the food environment.

**Results**

Workshops and outreach events have created new partnerships with the community to expand program reach and impact where more food stores are interested in cooking demonstrations and healthy messaging. As well as, other organizations taking a new or renewed interest in workshops and healthy messaging supported by program campaigns. Existing partnerships have been maintained to explore changing the built environment to promote active transport to access food, including a walking program and healthy message marketing campaign.

**4. Associated Knowledge Areas**

| KA Code | Knowledge Area |
|---|---|
| 703 | Nutrition Education and Behavior |
| 704 | Nutrition and Hunger in the Population |
| 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 Marshal 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 $CX^3$score 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 FY2016 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% | | 15% | |
| 211 | Insects, Mites, and Other Arthropods Affecting Plants | 5% | | 10% | |
| 212 | Pathogens and Nematodes Affecting Plants | 20% | | 10% | |
| 213 | Weeds Affecting Plants | 5% | | 5% | |
| 214 | Vertebrates, Mollusks, and Other Pests Affecting Plants | 5% | | 0% | |
| 215 | Biological Control of Pests Affecting Plants | 10% | | 40% | |
| 216 | Integrated Pest Management Systems | 40% | | 20% | |
| | **Total** | 100% | | 100% | |

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

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

| Year: 2015 | Extension | | Research | |
|---|---|---|---|---|
| | 1862 | 1890 | 1862 | 1890 |
| **Plan** | 3.0 | 0.0 | 0.0 | 0.0 |
| **Actual Paid** | 2.0 | 0.0 | 4.5 | 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** |
| 64370 | 0 | 232069 | 0 |
| **1862 Matching** | **1890 Matching** | **1862 Matching** | **1890 Matching** |
| 64370 | 0 | 214105 | 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

In response to the arrival of Ageratum yellow vein virus (AYVV) in Guam, a Western Sustainable Agriculture Research and Education proposal for $47,500 was written and approved. Commercial tomato varieties were screened for virus resistance and production suitability. The top 5 varieties were selected from the wet season variety trial of 17 varieties. These 5 varieties were further screened for AYVV resistance and production suitability against the control 'Season Red' variety during Guam's dry season. Field layouts were randomized with 5 plant replications for each variety with 2 border rows of 'Season Red'. Plants were surveyed and ranked for AYVV severity three times during the trial. Plant samples were collected and sent to the USDA ARS Vegetable Laboratory for Real-time PCR analyses. A workshop was conducted to present the findings of the dry season variety trial.
Five 90-minute workshops, four to Guam high school biology classes and one to students in participating in the University of Guam CariPac Agriculture Experiential Program, were held on Integrated Pest Management. In the four high school workshops, eighty three juniors and seniors from George Washington High School, Father Duenas Memorial School, and John F. Kennedy High School participated in the workshop sessions. The CariPac workshop included nine students from Palau, Yap, Kosrae, and Pohnpei attending either the Palau Community College or the College of the Marshall Islands. The workshop series was a combination of IPM lecture and hands on practice. Participants learned 1) IPM methods and practices, 2) insect, weed, and disease identification, 3) pest reporting and monitoring, and 4) education on a whitefly transmitted virus affecting Guam's tomato crops that has been identified as Ageratum yellow vein virus Guam strain. Hands on experience involved the use of a microscope and/or a dissecting scope to examine four common pests (whiteflies, rust, mealybugs, and cycad scales) and conduct a heat treatment experiment on whiteflies.
The Guam Cucurbit Guide which was produced in 1998 was updated and revised to include new pests, weeds, diseases, and IPM practices (refer to link below). The Guide's 2$^{nd}$ edition is now titled "Guam Cucurbit Guide: A Guide to production and IPM practices for Melons, Cucumber, and Squash on Guam" and is available on the University of Guam/Cooperative Extension Service website. The 2$^{nd}$ edition now includes a comprehensive approach of IPM strategies as well as chapter improvements throughout the guide. Furthermore, updates to the directory involved the conversion of the original Adobe file to an InDesign program. The new InDesign file improves the ability to edit, update, upload, and print the guide. Copies of the Guam Cucurbit Guide were distributed at the Annual UOG Charter Day events and at high school IPM workshops.

### 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

| 2015 | Direct Contacts Adults | Indirect Contacts Adults | Direct Contacts Youth | Indirect Contacts Youth |
|---|---|---|---|---|
| **Actual** | 3650 | 3510 | 550 | 1040 |

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

**Patent Applications Submitted**

| | |
|---|---|
| Year: | 2015 |
| Actual: | 0 |

**Patents listed**

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

**Number of Peer Reviewed Publications**

| 2015 | Extension | Research | Total |
|---|---|---|---|
| **Actual** | 1 | 2 | 3 |

### V(F). State Defined Outputs

**Output Target**

**Output #1**

**Output Measure**

- # of research papers

| Year | Actual |
|---|---|
| 2015 | 5 |

**Output #2**

**Output Measure**

- # of research citations

| Year | Actual |
|---|---|

| | |
|---|---|
| 2015 | 85 |

**Output #3**

**Output Measure**

- # of extension fact sheets or articles

| Year | Actual |
|---|---|
| 2015 | 3 |

**Output #4**

**Output Measure**

- # of workshops/trainings/classes

| Year | Actual |
|---|---|
| 2015 | 8 |

**Output #5**

**Output Measure**

- # of brochures

| Year | Actual |
|---|---|
| 2015 | 2 |

**Output #6**

**Output Measure**

- # of research or new technology reports

| Year | Actual |
|---|---|
| 2015 | 1 |

**Output #7**

**Output Measure**

- # of one-on-one interventions

| Year | Actual |
|---|---|
| 2015 | 880 |

**Output #8**

**Output Measure**

- # of surveys

| Year | Actual |
|---|---|
| 2015 | 6 |

**Output #9**

**Output Measure**

- # of focus groups

| Year | Actual |
|---|---|
| 2015 | 1 |

**Output #10**

**Output Measure**

- # of news media activities (TV and radio)

| Year | Actual |
|---|---|
| 2015 | 1 |

**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 |
|---|---|
| 2015 | 87 |

**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**
Six workshops/trainings were held on insect identification.

**Results**
Eighty-seven percent of participants gained skills in identification of insects and related pests.

**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 |
|---|---|
| 2015 | 90 |

**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**
Eight workshops/trainings were held on the identification of plant diseases.

**Results**
Ninety percent of participants gained skills in identification of plant diseases.

**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 |
|---|---|
| 2015 | 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 gained skills in identification of weeds.

**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 |
|---|---|
| 2015 | 88 |

### 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**
Eighty-eight percent of participants gained knowledge about pesticides and their application.

### 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 Action Outcome Measure

### 3b. Quantitative Outcome

| Year | Actual |
|---|---|
| 2015 | 89 |

### 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**
Eighty-nine percent of participants reduced indiscriminate use of chemical pesticides .

### 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 Condition Outcome Measure

**3b. Quantitative Outcome**

| Year | Actual |
|---|---|
| 2015 | 0 |

**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**
Six workshops were held on Establishing IPM practices. Also, farmers and home gardeners were given instruction on and monitored for establishing IPM practices.

**Results**
Ninety-six percent of participants adopted some established IPM practices.

**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.)
- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities

### Brief Explanation

There were no external factors which affected outcomes.

## V(I). Planned Program (Evaluation Studies)

### Evaluation Results

Evaluation results were a combined grade of ninety-two 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 |
|---|---|---|---|---|---|
| 302 | Nutrient Utilization in Animals | 20% | | 30% | |
| 307 | Animal Management Systems | 60% | | 60% | |
| 601 | Economics of Agricultural Production and Farm Management | 20% | | 10% | |
| | **Total** | 100% | | 100% | |

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

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

| Year: 2015 | Extension | | Research | |
|---|---|---|---|---|
| | 1862 | 1890 | 1862 | 1890 |
| **Plan** | 2.3 | 0.0 | 0.0 | 0.0 |
| **Actual Paid** | 4.8 | 0.0 | 6.0 | 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** |
| 154489 | 0 | 283672 | 0 |
| **1862 Matching** | **1890 Matching** | **1862 Matching** | **1890 Matching** |
| 154489 | 0 | 261692 | 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 addressed areas such as:

1. Reduced reliance on use of commercial feeds. Collaborated with Research faculty on the use of local feeds. Feeding trials were conducted at a local pig farm using brewer grain and food-waste combination.
2. Conducted field tours to educate students and youth tours of the program demonstrations.
3. Conducted a series of New and Veteran Farmer Saturday workshops.
4 Provided one on one technical support to farmers and gardeners
5. Targeted farmers with agricultural land leases who are not utilizing the land for agricultural or underutilizing the land for recruitment into the education and demonstration activities and surveyed them on their desired topics for workshops to assist in their agriculture implementation.
6. Targeted home gardeners and community groups starting school and community gardens for recruitment into these programs.
7. Increased the skills of island agricultural professionals by holding train-the-trainer workshops on program curriculum prior to holding workshops at the demonstration sites for the general public.
8. Held planning meetings between the cooperating agencies to identify priorities for grant funding to address these priorities. Funded grants are a planned output of this POW, demonstrating capacity building through training, collaborative planning and presentation of needs.
9.Genetic improvement of shrimp and tilapia via selective breeding program at UOG hatchery is to make the specific pathogen free seed-stock available to local aquaculture farms and shrimp industry worldwide.
10. Demonstrated best management conservation and sustainable agricultural practices on multi-agency, University, and farmer demonstration areas. New enterprises and production methods were also demonstrated.
11. Developed and delivered education programs promoting 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.

**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 idenified 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. Identified the there are many US military war Veterans who wish to learn about agricultural production as both an income source and as therapy. Identified 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 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**

| 2015 | Direct Contacts Adults | Indirect Contacts Adults | Direct Contacts Youth | Indirect Contacts Youth |
|---|---|---|---|---|
| **Actual** | 2980 | 8700 | 942 | 500 |

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

**Patent Applications Submitted**

| | |
|---|---|
| Year: | 2015 |
| Actual: | 0 |

**Patents listed**

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

**Number of Peer Reviewed Publications**

| 2015 | Extension | Research | Total |
|---|---|---|---|
| **Actual** | 7 | 0 | 7 |

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

**Output Target**

**Output #1**

**Output Measure**

- # of workshops or conferences

| Year | Actual |
|---|---|
| 2015 | 22 |

**Output #2**

**Output Measure**

- # of applied research and best management practice demonstrations conducted on farms or institutional sites

| Year | Actual |
|---|---|
| 2015 | 36 |

**Output #3**

**Output Measure**

- # of one to one contacts

| Year | Actual |
|---|---|
| 2015 | 980 |

**Output #4**

**Output Measure**

- # of popular articles in newsletters, magazines and newspapers

| Year | Actual |
|---|---|
| 2015 | 9 |

**Output #5**

**Output Measure**

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

| Year | Actual |
|---|---|
| 2015 | 18 |

**Output #6**

**Output Measure**

- # of research and extension advisory councils and boards

| Year | Actual |
|---|---|
| 2015 | 9 |

**Output #7**

**Output Measure**

- # of workshop curriculum developed and piloted with agricultural professionals

| Year | Actual |
|---|---|

| | |
|---|---|
| 2015 | 13 |

**Output #8**

**Output Measure**

- # adults participating in food system knowledge and skill enhancement programs

| Year | Actual |
|---|---|
| 2015 | 648 |

**Output #9**

**Output Measure**

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

| Year | Actual |
|---|---|
| 2015 | 9 |

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

## V. State Defined Outcomes Table of Content

| O. No. | OUTCOME NAME |
|---|---|
| 1 | # of program participants indicating adoption of recommended program practices, activities, and technology |
| 2 | # of producers decreasing 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 | Develpment of Shrimp and Tilapia pathogen free genetic resources. |

**Outcome #1**

**1. Outcome Measures**

# of program participants indicating adoption of recommended program practices, activities, and technology

**2. Associated Institution Types**

- 1862 Extension

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

| Year | Actual |
|---|---|
| 2015 | 68 |

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

**Issue (Who cares and Why)**
Participants of the Veteran and New Farmers workshop, who want to start farming, learned various aspects of agriculture technology including horticultural techniques, soil quality, business planning, marketing, and overall sustainability.

**What has been done**
Ten 4 hour workshops/lectures and field activities were conducted with participants on agricultural business and marketing, plant propagation methods, composting, mulching, and proper plant care.

**Results**
Many of the participants have called upon Extension faculty assistance as they have engaged in farm planning, practicing plant propagation and soil-building technologies taught from agricultural professionals in the workshops.

**4. Associated Knowledge Areas**

| KA Code | Knowledge Area |
|---|---|
| 601 | Economics of Agricultural Production and Farm Management |

**Outcome #2**

**1. Outcome Measures**

# of producers decreasing imported ag production inputs

**2. Associated Institution Types**

- 1862 Extension

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

| Year | Actual |
|---|---|
| 2015 | 32 |

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

**Issue (Who cares and Why)**
Imports shipped into the island increase the cost of our production systems and bring in the danger of imported invasive species.

**What has been done**
Farmers were taught a variety of local waste materials that can be used as soil ammendments, and methods of using these materials to build soil and create potting soils. They were taught how to propagate their own plants (reducing the need for imported fruit trees).

**Results**
Many farmers are using local materials to make their own potting soil, muclh and local nitrogen sources. Some have set up their own small farm fruit tree nurseries

**4. Associated Knowledge Areas**

| KA Code | Knowledge Area |
|---|---|
| 302 | Nutrient Utilization in Animals |
| 307 | Animal Management Systems |
| 601 | Economics of Agricultural Production and Farm Management |

**Outcome #3**

**1. Outcome Measures**

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

**2. Associated Institution Types**

- 1862 Extension

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

| Year | Actual |
|---|---|
| 2015 | 229 |

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

**Issue (Who cares and Why)**
We have a large number of people on Guam who wish to learn sustainable farming techniques.

**What has been done**
Many have attended our workshops they indicate in post workshop evaluation that they have learned a great deal.

**Results**
These participants are now set to apply the lessons they have learned in their farms and yards.

**4. Associated Knowledge Areas**

| KA Code | Knowledge Area |
|---|---|
| 302 | Nutrient Utilization in Animals |
| 307 | Animal Management Systems |
| 601 | Economics of Agricultural Production and Farm Management |

**Outcome #4**

**1. Outcome Measures**

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

**2. Associated Institution Types**

- 1862 Extension

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

| Year | Actual |
|---|---|
| 2015 | 3 |

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

**Issue (Who cares and Why)**
Cattle production on Guam significantly decreased due to absence of genetic upgrading program. It is very costly to bring in live bulls from the United States mainland. Quarantine rules and regulation between Guam and Saipan are strict due local legislation on certain cattle diseases.

**What has been done**
Most recent cattle disease survey indicate that this particular cattle disease are both present on Guan and Saipan; so there is no need to protect such entry of this disease. Cattle producers asked the Guam Legislature to waive the quarantine policy.

**Results**
For the past two years, cattle of improved genetic make-up has been brought into Guam from Saipan. Frozen bull semen has also been brought in for artificial breeding. As of this time, no incidence report of disease outbreak has been reported that can be traced to the imported cattle from Saipan.

**4. Associated Knowledge Areas**

| KA Code | Knowledge Area |
|---|---|
| 307 | Animal 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

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

| Year | Actual |
|---|---|
| 2015 | 5 |

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

**Issue (Who cares and Why)**
On Guam, our Community Outreach organizations have limited staff. Where we can develop common messages and curriculum we leverage our efforts and expand our impact.

**What has been done**
Partnerships have been formed with local and federal agencies to develop and deliver New Farmer Curriculum programs. Each year new modules are added. This year a series of farm management curriculum/lesson outlines were developed for the New and Veteran Farmer program.

**Results**
Hundreds of New and Veteran participants were able to attend the workshops using this curriculum. More than 10 have develop first drafts of their farm plans and several are already implementing these plans.

**4. Associated Knowledge Areas**

| KA Code | Knowledge Area |
|---|---|
| 302 | Nutrient Utilization in Animals |
| 307 | Animal Management Systems |
| 601 | Economics of Agricultural Production and Farm Management |

**Outcome #6**

**1. Outcome Measures**

Develpment of Shrimp and Tilapia pathogen free genetic resources.

**2. Associated Institution Types**

- 1862 Research

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

| Year | Actual |
|---|---|
| 2015 | 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 remained free of OIE or USMSFC listed pathogens for over a decade. The breeding program was started in 2007 and generated 33-50 families each year. Various strains of Tilapia are bred to supply the local farmers.

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

**4. Associated Knowledge Areas**

| KA Code | Knowledge Area |
|---|---|
| 302 | Nutrient Utilization in Animals |
| 307 | Animal Management Systems |

## 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

In the past year no unexpected external factors impacted the planned programs.

## V(I). Planned Program (Evaluation Studies)

### Evaluation Results

Most participants indicated both improved knowledge change and planned behavior change due to our educational outreach efforts.

### Key Items of Evaluation

## 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: 2015 | Extension | | Research | |
|---|---|---|---|---|
| | 1862 | 1890 | 1862 | 1890 |
| **Plan** | 0.0 | 0.0 | 1.0 | 0.0 |
| **Actual Paid** | 0.0 | 0.0 | 4.0 | 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 | 206284 | 0 |
| **1862 Matching** | **1890 Matching** | **1862 Matching** | **1890 Matching** |
| 0 | 0 | 190316 | 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**

Studied the effects of surface crop residues and subsurface macroporosity on water infiltration into the soil profile.Effect of crop residue on soil quality improvement for agricultural sustainability.

Investigated watershed management and use of Vetiver Technology for trapping sediment to control soil erosion on slopping lands and to slow storm water flow and trap sediment and nutrients for improving water quality downstream.

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

Farmers, landscapers, students, general public, other government agencies.

**3. How was eXtension used?**

eXtension was not used in this program

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

**1. Standard output measures**

| 2015 | Direct Contacts Adults | Indirect Contacts Adults | Direct Contacts Youth | Indirect Contacts Youth |
|---|---|---|---|---|
| **Actual** | 45 | 200 | 25 | 63 |

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

**Patent Applications Submitted**

Year: 2015

Actual: 0

**Patents listed**

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

**Number of Peer Reviewed Publications**

| 2015 | Extension | Research | Total |
|---|---|---|---|
| **Actual** | 0 | 0 | 0 |

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

**Output Target**

**Output #1**

**Output Measure**

- Conference Presentations

| Year | Actual |
|---|---|
| 2015 | 3 |

### V(G). State Defined Outcomes

## V. State Defined Outcomes Table of Content

| O. No. | OUTCOME NAME |
|---|---|
| 1 | Adopt sustainable natural resource management practices |

**Outcome #1**

**1. Outcome Measures**

Adopt sustainable natural resource management practices

**2. Associated Institution Types**

- 1862 Research

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

| Year | Actual |
|---|---|
| 2015 | 1 |

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

**Issue (Who cares and Why)**
Vetiver technology may become a practical mitigation technique for controlling sedimentation in Guam and other neighboring islands of Micronesia

**What has been done**
Experiments using Vetiver grass for controlling siltation have been conducted.

**Results**
Watershed Soil Loss Assessment project was initiated and continued in 2015. Results indicated that Vetiver grass technology is very viable method for reducing soil erosion.

**4. Associated Knowledge Areas**

| KA Code | Knowledge Area |
|---|---|
| 102 | Soil, Plant, Water, Nutrient Relationships |

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

### External factors which affected outcomes

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

### Brief Explanation

In the past year, no unexpected external factors impacted planned program

## V(I). Planned Program (Evaluation Studies)

### Evaluation Results

Performance of this program was rated high by Guam's stakeholders including farmers, NRCS, students and general public. WPTRC administrators received many positive signals expressing appreciation for excellent conductance of this particular program. WPTRC program was rated as one of the best programs at the University of Guam with additional appropriations promised in coming years.

### Key Items of Evaluation

Positive evaluation of this program was based on regional focus and high productivity.

## 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: 2015 | Extension | | Research | |
|---|---|---|---|---|
| | 1862 | 1890 | 1862 | 1890 |
| **Plan** | 0.0 | 0.0 | 7.0 | 0.0 |
| **Actual Paid** | 2.0 | 0.0 | 8.0 | 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** |
| 64371 | 0 | 412568 | 0 |
| **1862 Matching** | **1890 Matching** | **1862 Matching** | **1890 Matching** |
| 64371 | 0 | 380632 | 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 2015. 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 100m2 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 brings mixed results.

An insect forest pest survey was initiated in FY2015. The goal is to build a list of native and invasive species of insects attacking forest plants on Guam.

Studies continued to evaluate production of local seeds and tissue-cultured plants in improvement of vegetable production on Guam.
Plant Ecologist studied the complex social life of plants. He noticed that when confronted with a competing plant, some species have been shown that they can recognize if the competitor is a relative. Many plants use that recognition skill to be selfish and compete more strongly for soil resources when confronted by a non-relative, but to exhibit altruism and reduce acquisition of soil resources when confronted by a relative. This study unequivocally demonstrates that particular cycads species possesses the ability to recognize kin. These results can inform cycad conservation decisions including which genotypes to conserve and how to design the planting layout to take advantage of the non-kin incentive to encourage more vigorous root growth.

### 2. Brief description of the target audience

Our target audience are research community, federal and territorial agencies, farmers, landscapers general public etc.

### 3. How was eXtension used?

eXtension was not used in this program

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

### 1. Standard output measures

| 2015 | Direct Contacts Adults | Indirect Contacts Adults | Direct Contacts Youth | Indirect Contacts Youth |
|---|---|---|---|---|
| **Actual** | 934 | 9467 | 75 | 708 |

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

**Patent Applications Submitted**

Year: 2015

Actual: 0

**Patents listed**

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

**Number of Peer Reviewed Publications**

| 2015 | Extension | Research | Total |
|---|---|---|---|
| **Actual** | 0 | 14 | 14 |

## V(F). State Defined Outputs

**Output Target**

**Output #1**

**Output Measure**

- Journal Publications

| Year | Actual |
|---|---|
| 2015 | 14 |

**Output #2**

**Output Measure**

- Newspaper, magazine, and other non peer reviewed publications

| Year | Actual |
|---|---|
| 2015 | 39 |

**Output #3**

**Output Measure**

- Abstracts and conference presentations

| Year | Actual |
|---|---|
| 2015 | 15 |

### V(G). State Defined Outcomes

## V. State Defined Outcomes Table of Content

| O. No. | OUTCOME NAME |
|---|---|
| 1 | Control of invasive insects such as little fire ant (LFA) |

**Outcome #1**

**1. Outcome Measures**

Control of invasive insects such as little fire ant (LFA)

**2. Associated Institution Types**

- 1862 Research

**3a. Outcome Type:**

Change in Condition Outcome Measure

**3b. Quantitative Outcome**

| Year | Actual |
|---|---|
| 2015 | 1 |

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

**Issue (Who cares and Why)**
LFA have been found infesting forest and residential properties at many sites throughout Guam

**What has been done**
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

**Results**
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

**4. Associated Knowledge Areas**

| KA Code | Knowledge Area |
|---|---|
| 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

Reduction of professional capacity in the plant protection field on Guam and the region has put a huge strain on University of Guam faculty to meet local and regional biosecurity needs.

## V(I). Planned Program (Evaluation Studies)

### Evaluation Results

Programs are being evaluated by stakeholders and University; and feedback has been positive.

### Key Items of Evaluation

Programs were rated as excellent by University of Guam "Good to Great" assessment process

## VI. National Outcomes and Indicators

### 1. NIFA Selected Outcomes and Indicators

| | |
|---|---|
| **Childhood Obesity (Outcome 1, Indicator 1.c)** | |
| 912 | 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)** | |
| 68 | 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. |