2012 University of Guam Research Annual Report of Accomplishments and Results

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I. Report Overview

1. Executive Summary

Guam, an unincorporated Territory of the United States, is located in the Western Pacific at 13 degrees north latitude and 144.4 degrees east longitude. It is the largest of 16 islands in the Marianas. It is approximately 3,600 miles west- southwest of the Hawaiian Islands and about 1,500 miles due east of Manila, Philippines. Guam's population is approximately 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 as a member of the 1862 Land Grant institutions. 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 also as Director of Cooperative Extension Service.

In 2006 AES was renamed to Western Pacific Tropical Research Center. This new name more accurately reflects the division's 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 Hatch funds and their respective Government of Guam matching funds are used to maintain operations of the Western Pacific Tropical Research Center.

The Western Pacific Tropical Research Center conducts research for the protection of natural environment as well as the development of the island's agriculture and aquaculture. The University of Guam Cooperative Extension Service translates and delivers technical information and conducts informal education programs for farmers, homemakers, families, youth and the community.

Research productivity over the last years was excellent. In 2012, eight full time researchers published over 20 refereed journal papers which placed us among successful and productive research units. Further significant growth in refereed journal publications as well as substantial increase in successful grant proposals in 2012 was evident. Unfortunately, there were also important setbacks that will likely impact our productivity in the future years. Recently created new tenure track Chemical Ecologist position was removed from the university staffing pattern after ecologist quit and moved off island. Plant Pathologist retired after 30 years of service and University decided not fill up this position in for at least two years. 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 freeze and permanent elimination of many vacancies will be very challenging. Last year we were reporting 2011 to be one of the most successful years in WPTRC (AES) history. Unfortunately, 2012 was a year of significant decline.

Total Actual Amount of professional FTEs/SYs for this State

Year: 2012	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	0.0	10.0	0.0
Actual	0.0	0.0	8.0	0.0

II. Merit Review Process

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

- Combined External and Internal University Panel

2. Brief Explanation

Since there are only eight full time scientists at WPTRC, review of individual projects was conducted by WPTRC administrators (Director and Associate Director). Planned programs and activities addressed the critical issues of strategic importance, including those identified by the stakeholders during the development of 2007-2012 Strategic Plans. All new research proposals were submitted to WPTRC Associate Director who checked proposals for completeness and format. Afterwards proposal were sent for review to external ad hoc peer reviewers. 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, WPTRC administrators are submitting proposals to CRIS and make decisions regarding allocation of resources.

III. Stakeholder Input

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

- Targeted invitation to traditional stakeholder groups
- Targeted invitation to traditional stakeholder individuals
- Targeted invitation to selected individuals from general public

Brief explanation.

In 2012, numerous research projects were driven by stakeholders demand and addressed environmental issues, integrated plant protection, biocontrol as well as served ethnic needs of local population. Relatively large portion of research aimed to develop control mechanisms for eradication/ suppression of non-indigenous/invasive species, to improve and implement effective early detection and prevention strategies, and to develop Integrated Pest Management strategies for major exotic insect plant pests and diseases. Another important research project continued to define the genetic structure of the Cycads populations among the island habitats of Guam, Rota, Yap, Palau, and the Philippines. We continued to focus on issues that assure the understanding and protection of natural environment and especially the soil. Most of research concentrated on sustained management of natural resources waste management, water quality and other resources vital for people of Guam.

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

- Open Listening Sessions
- Other (Guam's stakeholders are well identified)

Brief explanation.

WPTRC researchers employed several input methods to solicit input from individual farmers, farmers groups, representatives of the industry and representatives from federal and local agencies. Because of relatively small number of research faculty and stakeholders, 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 listening sessions, workshops and personal contact with faculty members. In 2012 stakeholders (farmers, golf course superintendents, managers from nurseries etc.) were invited to the college numerous times and expressed their needs and concerns. Of particular importance is continued understanding and stakeholders' support on issues related to the protection of Guam's natural environment.

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

1. Methods for collecting Stakeholder Input

- Meeting with traditional Stakeholder groups
- Meeting with traditional Stakeholder individuals
- Meeting with invited selected individuals from the general public

Brief explanation.

About fifty farmers who supplement their income with some type of agricultural production ranged in their activities from substantial (full time farmers) to hardly significant. One particular hydroponic farm is an important component of local food production. Farmer's associations are rather loose and based on personal contacts, friendships, etc. Their research requests are consequently not strong however researchers are expected to proactively address local farmers' concerns. Some researchers create their research programs to improve services to stakeholders and provided additional opportunities for continued feedback. Research information were disseminated to communities through internet, printed newsletters, local newspaper coverage, radio and television programs.

3. A statement of how the input will be considered

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

Brief explanation.

For the most part, our professionals know the primary stakeholders in their particular disciplines, and interact with them regularly in the course of their normal university duties. Input from

these interactions allows the faculty to tailor their programs to the unique needs of Guam's diverse community. WPTRC informal and formal contacts with stakeholders work well. Residents of Guam know that their input will be considered and they volunteer their concerns and observations directly to WPTRC scientists. An example of how stakeholder input is translated into action by CNAS is the rapid manner in which UOG is able to react to the sudden appearance of new disease or invasive species. Sudden appearance and spread of invasive fire ants resulted in quick response from Guam's residents. In response to local needs, entomologist modified his research focus and research directions substantially.

Brief Explanation of what you learned from your Stakeholders

Research scientists maintain close contacts with local farmers and 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 challenges researchers apply for funding for more in depth investigations.

IV. Expenditure Summary

1. Total Actual Formula dollars Allocated (prepopulated from C-REEMS)			
Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
0	0	1076833	0

2. Totaled Actual dollars from Planned Programs Inputs				
	Extension		Research	
	Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
Actual Formula	0	0	860000	0
Actual Matching	0	0	690000	0
Actual All Other	0	0	0	0
Total Actual Expended	0	0	1550000	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

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			100%	
	Total			100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2012	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	0.0	1.0	0.0
Actual Paid Professional	0.0	0.0	1.0	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	90000	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	70000	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 new techniques such as reduce tillage and conventional till in rotation with sun hemp were developed for soils of southern Guam's and are presently being evaluated for the treatment effect.

We have been testing no-tillage farming practices for maintaining plant residue on soil surface for controlling erosion. The effect of plant residue from the no-till plots on infiltration is currently being tested using rainfall simulators. Up-to-date data have been presented at professional conferences.

Experiments using Vetiver grass for controlling siltation have been conducted and up-to-date results from the experiments are encouraging. It is expected that Vetiver technology will become a practical mitigation technique for controlling sedimentation in Guam and other neighboring islands of Micronesia.

Environmental impacts of composted organic waste as compared with commercial fertilizers are being studied on porous soils of northern Guam in Yigo. Chemical transport and possibility of ground water contamination are being evaluated by using suction cup Lysimeters in 28 plots under aforementioned treatment plots at the UOG experiment stations in Yigo. Data is being collected from the on-going experiments and will be presented at appropriate conferences following the initial analysis.

In addition to suction cup Lysimeters we are planning to employ other techniques such as cat-scan tomography and/or dye in order to evaluate the pathways of the chemical transport within the soil matrix from the aforementioned study plots in Yigo.

Low level of watering via drip irrigation will be applied after each application of compost or commercial fertilizers as a management technique in order to retard the preferential flow due to the macrospores that might be present in porous soils of northern Guam in Yigo. Previous studies has shown that an initial low level water application will move the chemical to the stagnant region hence reducing the preferential flow from a major rainfall event that might be followed.

The distribution of the plant nutrients will be evaluated under conservation tillage practices currently being conducted at the UOG experiment station in Ija in southern Guam.

The effect of no-till management and other conservation tillage practices on chemical and physical properties of soils are currently being evaluated at the UOG experiment station in Ija in southern Guam. Numbers of soil parameters are being tested for this purpose.

The effect of land application of composted organic waste for soil quality improvement and agricultural sustainability is currently being evaluated on the calcareous soils of northern Guam. Up-to-date data are being presented before the farmers and local residents during the field demonstrations for educational purposes.

Application of composted organic waste on crop land not only improves soil quality for better yield and agricultural sustainability but also improves environmental quality by reducing the land filling of humongous amount of organic wastes that are generated in Guam and the other islands of Micronesia.

As indicated in previous studies, bio-remediation of contaminated soils is possible by enhancing the microbial activities via the application of composted organic waste on the affected soils.

In our recent study at the waste water treatment plant in the village of Inarajan in southern Guam we used Vetiver grass for treating the village swage water before its discharge to the ocean. Results from our study indicated that Vetiver grass technology is a viable method for treating swage water as an alternative to mechanical methods that are currently used for this purpose.

2. Brief description of the target audience

The target audiences are farmers, homeowners, landscapers, soil conservationists, Guam EPA and students.

3. How was eXtension used?

Several workshops and fild day was conducted for farmers and general public.

V(E). Planned Program (Outputs)

1. Standard output measures

2012	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	50	500	0	0

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

Patent Applications Submitted

Year: 2012

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2012	Extension	Research	Total
Actual	1	1	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Conference Presentations

Year	Actual
2012	4

Output #2

Output Measure

- Journal Publications

Year	Actual

2012	1

Output #3

Output Measure

- Newspaper, magazine and other non peer reviewed publications.

Year	Actual
2012	12

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Action outcomes : Adopt sustainable natural resource management practices. Condition Outcomes: Enhance the economic and environmental sustainability of Guam's agriculture Improve the lives of Guam's citizens through positive human development Learning Outcomes: Aspire to contribute to ecological health and biodiversity Learn about nutrient sources, recycling and delivery methods that are compatible with crop, soil and production systems Learn about water and land interaction, and related water-quality issues

Outcome #1

1. Outcome Measures

Action outcomes : Adopt sustainable natural resource management practices. Condition Outcomes: Enhance the economic and environmental sustainability of Guam's agriculture Improve the lives of Guam's citizens through positive human development Learning Outcomes: Aspire to contribute to ecological health and biodiversity Learn about nutrient sources, recycling and delivery methods that are compatible with crop, soil and production systems Learn about water and land interaction, and related water-quality issues

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	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
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

Brief Explanation

Overall economy and significant cuts to the university affected outcomes. Reduced appropriation of federal funds affected outcomes as well.

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.

Key Items of Evaluation

V(A). Planned Program (Summary)

Program # 2

1. Name of the Planned Program

Development and Protection of Guam's Diversified Tropical Plant Systems, and Aquaculture.

☑ 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
202	Plant Genetic Resources			10%	
205	Plant Management Systems			20%	
211	Insects, Mites, and Other Arthropods Affecting Plants			20%	
212	Pathogens and Nematodes Affecting Plants			10%	
215	Biological Control of Pests Affecting Plants			10%	
216	Integrated Pest Management Systems			10%	
307	Animal Management Systems			10%	
601	Economics of Agricultural Production and Farm Management			10%	
	Total			100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2012	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	0.0	8.0	0.0
Actual Paid Professional	0.0	0.0	7.0	0.0
Actual Volunteer	0.0	0.0	0.0	0.0

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

Extension		Research	
Smith-Lever 3b & 3c	**1890 Extension**	**Hatch**	**Evans-Allen**
0	0	750000	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
0	0	600000	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
0	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

The impact of invasive arthropod species on the cycad populations in Guam and Rota were studied in 2012. More than 20 trees per ha are dying every year, and the remaining trees are in poor health. The reasons that

Rhyzobius predatory control of cycad scale is not effective were alsostudied. This predator is too large to access all sites where scale can infest cycad plants.

A panel of microsatellite loci were developed for shrimp breeding program at University of Guam (UOG), and and applied in genetic evaluation. High genetic diversity was quantified and accurate parentage identification was achieved (100% accuracy with 12 or more loci) for the SPF P. vannamei stock using the molecular marker approach in UOG hatchery.

Collection of wild stock of coralgroupers, Plectopomus areolatus and health surveillance and disease diagnosis were performed with focus on PCR detection for viral nervous necrosis and iridovirus.

Maintained the breeding of tilapia stocks in support of the local aquaculture farming community and supply the seedlings.

Little fire ant was first detected on Guam in November 2011. Since that time it has been found infesting forest and residential properties at 10 additional sites from Merizo in the south along the western coastal hills to the karst-limestone forest of Yigo in the north. LFA infestations in the various sites are still quite small, with the largest and original site covering about 3 ha of karst-limestone forest in northern Guam. Most of the infestation sites in residential areas cover about 100m2 or less. This suggests that eradication from most if not all 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 should transfer readily to conditions on Guam.

Leaf decay studies continued and results confirmed a tighter relationship of potassium to decay rates than nitrogen or phosphorus. The proportion of remaining litter was positively correlated with initial carbon:potassium relationship close to 1:1.

Work on coconut rhinoceros beetle on Guam continued. Field releases of fungal spores into rhino beetle breeding sites were not sufficiently successful.

The sweetpotato weevil, still causes damage in the field and in storage. Conducted studies further

evaluated pheromone-based catches, including trap design, trap size, trap color, and height of the traps.

Conservation of local lines of sweet potato and chili pepper continued. More accessions of sun hemp were obtained and evaluated.

Studies continued to evaluate production of local seeds and tissue-cultured plants in improvement of vegetable production on Guam.

Research on diseases of traditional Pacific island crop plants continued. More banana cultivars were imported from Pacific countries in tissue culture. A new tissue culture lab was established in collaboration with Guam's Department of Agriculture. Numerous cultivars of taro and yams have been studied.

A small-scale integrated farming system in an insular urban environment research continued . On-farm demonstration of non-circulating hydroponic system showed the potential of leafy greens production using simple hydroponic system in the tropics.

Production of shrimps at the hatchery appeared was costly therefore economically questionable. There is insufficient need for brootstock on Guam and exporting it is not profitable.

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?

Workshops were conducted and extension publications have been produced.

V(E). Planned Program (Outputs)

1. Standard output measures

2012	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	50	100	500	500

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

Patent Applications Submitted

Year:	2012
Actual:	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2012	Extension	Research	Total
Actual	2	22	24

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Journal publications

Year	Actual
2012	22

Output #2

Output Measure

- Newspaper, magazine, and other non peer reviewed publications.

Year	Actual
2012	15

Output #3

Output Measure

- Abstracts and conference presentations.

Year	Actual
2012	45

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Action outcomes Adopt healthy lifestyle practices, Adopt independent living practices, Adopt sustainable living practices, Adopt sustainable natural resource management practices, Implement food safety practices at all stages of the food handling system, Improve and expand Integrated Pest Management. Condition Outcomes: Enhance the economic and environmental sustainability of Guam's agriculture and aquaculture. Improve the lives of Guam's citizens through positive human development, healthy lifestyles and nutrition Learning Outcomes Aspire to contribute to ecological health and biodiversity Learn about integrated pest management (IPM) Learn about invasive species Learn about IPM technologies and benefits Learn about new crops and varieties Learn about nutrient sources, recycling and delivery methods that are compatible with crop, soil and production systems Learn about principles of aquaculture resource management Learn about the environmental risks of handling and applying pesticides Learn about the risks of not handling food safely Learn about water and land interaction, and related water-quality issues Learn alternative pest management techniques that minimize pesticide use Learn appropriate food safety practices Learn proper food handling practices Learn sustainable living skills Learn to apply pesticides safely and effectively Learn to identify invasive species

Outcome #1

1. Outcome Measures

Action outcomes Adopt healthy lifestyle practices, Adopt independent living practices, Adopt sustainable living practices, Adopt sustainable natural resource management practices, Implement food safety practices at all stages of the food handling system, Improve and expand Integrated Pest Management. Condition Outcomes: Enhance the economic and environmental sustainability of Guam's agriculture and aquaculture. Improve the lives of Guam's citizens through positive human development, healthy lifestyles and nutrition Learning Outcomes Aspire to contribute to ecological health and biodiversity Learn about integrated pest management (IPM) Learn about invasive species Learn about IPM technologies and benefits Learn about new crops and varieties Learn about nutrient sources, recycling and delivery methods that are compatible with crop, soil and production systems Learn about principles of aquaculture resource management Learn about the environmental risks of handling and applying pesticides Learn about the risks of not handling food safely Learn about water and land interaction, and related water-quality issues Learn alternative pest management techniques that minimize pesticide use Learn appropriate food safety practices Learn proper food handling practices Learn sustainable living skills Learn to apply pesticides safely and effectively Learn to identify invasive species

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	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

202	Plant Genetic Resources
205	Plant Management Systems
211	Insects, Mites, and Other Arthropods Affecting Plants
212	Pathogens and Nematodes Affecting Plants
215	Biological Control of Pests Affecting Plants
216	Integrated Pest Management Systems
307	Animal Management Systems
601	Economics of Agricultural Production and Farm Management

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Economy
- Appropriations changes

Brief Explanation

Outcomes were affected by reduced number of positions (retirement, hiring freeze) as well as reduced appropriations of research funds.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

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

Key Items of Evaluation

V(A). Planned Program (Summary)

Program # 3

1. Name of the Planned Program

Food Safety

☑ Reporting on this Program

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
501	New and Improved Food Processing Technologies			50%	
502	New and Improved Food Products			50%	
	Total			100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2012	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	0.0	0.5	0.0
Actual Paid Professional	0.0	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
0	0	20000	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
0	0	20000	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
0	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Biological properties, and safety of tropical and subtropical foods, plants, or herbals in the Western Pacific was studied. The optimum conditions of pasteurization and quality of food under refrigeration were further studied and determined. Beneficial and adverse effects of natural, bioactive dietary chemicals on human health of different local food was studied and presented in several workshops.

2. Brief description of the target audience

food service
general public
students

3. How was eXtension used?

workshops, newspaper articles, TV program

V(E). Planned Program (Outputs)

1. Standard output measures

2012	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	20	100	100	0

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

Patent Applications Submitted

Year:	2012
Actual:	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2012	Extension	Research	Total
Actual	1	1	2

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Journal Publications

Year	Actual
2012	1

Output #2

Output Measure

- Newspaper articles

Year	Actual
2012	2

Output #3

Output Measure

- Presentations

Year	Actual
2012	5

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Implement food safety practices at all stages of the food handling system
2	Learn proper food handling practices

Outcome #1

1. Outcome Measures

Implement food safety practices at all stages of the food handling system

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	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
501	New and Improved Food Processing Technologies

Outcome #2

1. Outcome Measures

Learn proper food handling practices

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	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
501	New and Improved Food Processing Technologies
502	New and Improved Food Products

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Economy
- Appropriations changes

Brief Explanation

There was no external factors affected outcomes.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Stakeholders expressed their appreciation to administrators numerous times.

Key Items of Evaluation

V(A). Planned Program (Summary)

Program # 4

1. Name of the Planned Program

Global Food Security and Hunger

☐ Reporting on this Program

Reason for not reporting

No research activity in this program.

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2012	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	0.0	0.0	0.0
Actual Paid Professional	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}
Actual Volunteer	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}

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

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}
1862 Matching	1890 Matching	1862 Matching	1890 Matching
{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}
1862 All Other	1890 All Other	1862 All Other	1890 All Other
{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}

V(D). Planned Program (Activity)

1. Brief description of the Activity

no activity

2. Brief description of the target audience

no audience

3. How was eXtension used?

{No Data Entered}

V(E). Planned Program (Outputs)

1. Standard output measures

2012	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	0	0	0	0

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

Patent Applications Submitted

Year: 2012

Actual: {No Data Entered}

Patents listed

{No Data Entered}

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2012	Extension	Research	Total
Actual	0	0	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- no activity

Year	Actual
2012	0

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	no activity

Outcome #1

1. Outcome Measures

no activity

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	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
{No Data}	null

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Other ()

Brief Explanation

{No Data Entered}

V(I). Planned Program (Evaluation Studies)

Evaluation Results

{No Data Entered}

Key Items of Evaluation

{No Data Entered}

V(A). Planned Program (Summary)

Program # 5

1. Name of the Planned Program

Climate Change

☐ Reporting on this Program

Reason for not reporting

No research activity in this program.

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2012	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	0.0	0.0	0.0
Actual Paid Professional	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}
Actual Volunteer	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}

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

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}
1862 Matching	1890 Matching	1862 Matching	1890 Matching
{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}
1862 All Other	1890 All Other	1862 All Other	1890 All Other
{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}

V(D). Planned Program (Activity)

1. Brief description of the Activity

no activity

2. Brief description of the target audience

no activity

3. How was eXtension used?

{No Data Entered}

V(E). Planned Program (Outputs)

1. Standard output measures

2012	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	0	0	0	0

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

Patent Applications Submitted

Year: 2012

Actual: {No Data Entered}

Patents listed

{No Data Entered}

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2012	Extension	Research	Total
Actual	0	0	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- no activity

Year	Actual
2012	0

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	no activity

Outcome #1

1. Outcome Measures

no activity

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	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
{No Data}	null

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Other ()

Brief Explanation

{No Data Entered}

V(I). Planned Program (Evaluation Studies)

Evaluation Results

{No Data Entered}

Key Items of Evaluation

{No Data Entered}

V(A). Planned Program (Summary)

Program # 6

1. Name of the Planned Program

Sustainable Energy

☐ Reporting on this Program

Reason for not reporting

No research activity in this program.

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2012	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	0.0	0.0	0.0
Actual Paid Professional	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}
Actual Volunteer	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}

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

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}
1862 Matching	1890 Matching	1862 Matching	1890 Matching
{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}
1862 All Other	1890 All Other	1862 All Other	1890 All Other
{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}

V(D). Planned Program (Activity)

1. Brief description of the Activity

no activity

2. Brief description of the target audience

no activity

3. How was eXtension used?

{No Data Entered}

V(E). Planned Program (Outputs)

1. Standard output measures

2012	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	0	0	0	0

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

Patent Applications Submitted

Year: 2012

Actual: {No Data Entered}

Patents listed

{No Data Entered}

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2012	Extension	Research	Total
Actual	0	0	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- no activity

Year	Actual
2012	0

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	no activity

Outcome #1

1. Outcome Measures

no activity

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	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
{No Data}	null

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Other ()

Brief Explanation

{No Data Entered}

V(I). Planned Program (Evaluation Studies)

Evaluation Results

{No Data Entered}

Key Items of Evaluation

{No Data Entered}

V(A). Planned Program (Summary)

Program # 7

1. Name of the Planned Program

Childhood Obesity

☐ Reporting on this Program

Reason for not reporting

No research activity in this program.

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2012	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	0.0	0.0	0.0
Actual Paid Professional	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}
Actual Volunteer	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}

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

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}
1862 Matching	1890 Matching	1862 Matching	1890 Matching
{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}
1862 All Other	1890 All Other	1862 All Other	1890 All Other
{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}

V(D). Planned Program (Activity)

1. Brief description of the Activity

no activity

2. Brief description of the target audience

no activity

3. How was eXtension used?

{No Data Entered}

V(E). Planned Program (Outputs)

1. Standard output measures

2012	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	0	0	0	0

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

Patent Applications Submitted

Year: 2012

Actual: {No Data Entered}

Patents listed

{No Data Entered}

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2012	Extension	Research	Total
Actual	0	0	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- no activity

Year	Actual
2012	0

Output #2

Output Measure

- no activity

Year	Actual
2012	0

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	no activity

Outcome #1

1. Outcome Measures

no activity

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	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
{No Data}	null

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Other ()

Brief Explanation

{No Data Entered}

V(I). Planned Program (Evaluation Studies)

Evaluation Results

{No Data Entered}

Key Items of Evaluation

{No Data Entered}