

2017 University of Hawaii Combined Research and Extension Annual Report of Accomplishments and Results

Status: Accepted

Date Accepted: 06/11/2018

I. Report Overview

1. Executive Summary

The College of Tropical Agriculture and Human Resources (CTAHR) at the University of Hawaii at Manoa (UHM) is composed of six academic departments, the Center on the Family, and the Western Insular Pacific Sun Grant Subcenter. Some noteworthy administration changes occurred in CTAHR in FY2017 and FY2018, Interim Dean Rachel Novotny served for most of FY2017. Dr. Nicholas Comerford became the Dean and Director for Research and Cooperative Extension effective September 1, 2017. Dr. Comerford was previously the director of North Florida Research and Education Center in the University of Florida, where he was a professor in the soil and water science department. Dr. Charles Kinoshita, Associate Dean for Academic and Student Affairs, returned to his home department as a faculty member, and Dr. Ania Wieczorek was appointed as Interim Associate Dean for Academic and Student Affairs since January 1, 2017. Dr. J. Kenneth Grace, Associate Dean and Associate Director for Research, retired from the college at the end of 2017 and was replaced by Dr. Jinzeng Yang, a professor of animal science, as the Interim Associate Dean and Associate Director for Research effective January 1, 2018. Kelvin Sewake continued as the Interim Associate Dean and Associate Director for Cooperative Extension.

CTAHR administration and faculty continued to work within the framework provided by the ten program areas described in this Annual Report. As the only tropical, island state in the USA and located in the middle of Pacific Ocean, CTAHR's programs have been focused on Hawaii's unique natural resources, specialty crops, livestock, invasive species, leadership development in both youth and adults, health, and community needs. The first five of our ten program areas address local issues and priorities, while program areas 6-10 are those areas identified as national priorities by USDA-NIFA. In FY2017, we reassessed our program areas for possible consolidation to further emphasize USDA priorities in the future.

Although we continue to focus significant effort on the national priority areas, our five local program areas remain equally important due to the unique Pacific Ocean location, environment, and economics of an island state 2,500 miles from the continental United States and representing the most isolated island chain in the world. Hawaii has virtually every recognized soil type, rapid increases in elevation, annual rainfall variation from less than ten to over 400 inches, and the unique agricultural challenge of vog (volcanic fog). We have 7000 farms, 63% of the farms are less than 10 acres in size, and another 25% of farms fall between 10-49 acres in land size. Although the cost of ocean transportation is not cheap, Hawaii imports nearly 90% of its food due to the lower and more competitive prices of food coming from the Mainland US and Asian countries. Nevertheless, Hawaii's agricultural sector includes specialty crops grown nowhere else in the USA. Furthermore, Hawaii's Governor has proposed an ambitious goal of doubling local food production by 2020, presenting CTAHR with a huge challenge in trying to meet that goal.

Hawaii's challenges are many. Hawaii is unique in its social and cultural mix, with many first-generation immigrants entering agricultural production with a wide range of cultural practices and dietary preferences in the population. The costs of land, labor, and energy exceed those found in most other states. Higher fuel costs add significantly to the costs of production, importing agrochemicals and animal feed, and exporting products to distant markets. The high costs of energy and lack of skilled labor and interest in farming are major challenges. Although livestock producers in Hawaii are making progress towards the goal of grass-finished healthy beef, virtually all calves are still shipped to the mainland feedlots due to lack of economical local feed supplements. Lack of affordable slaughterhouses for livestock is another

challenge for small livestock producers and promoting local meat production. Invasive species and the attendant costs of insect, disease, and weed management, and export limitations imposed by plant quarantine regulations also place additional burden on Hawaii's farmers.

CTAHR faculty engage in a broad spectrum of research and extension activities, including management of invasive species that constantly threaten the "gateway" state of Hawaii, improved cultivation and processing of specialty crops, development of value-added products, increasing forest productivity, protection of forests, watersheds and coastal resources, plant and animal breeding and genetic improvement, biofuel development to address soaring energy costs and fossil fuel depletion, plant stresses related to drought and climate change, food safety and security, the health (mental, physical, and financial) of Hawaii's citizens and communities, human nutrition programs, and fundamental agricultural sciences such as plant and animal genetics, physiology and pathology. As in past years, our FY2017 report documents program challenges and program successes, often incremental but sometimes transformational.

Research and extension faculty continued to show progress in all ten program areas. Initiatives described in earlier years continued to progress in FY2017. Efforts continued to battle childhood obesity in the region, building upon the success of a NIFA-funded Children's Healthy Living Program (CHL) for Remote Underserved Minority Populations of the Pacific. Conservation of Hawaii's natural resources and native biota continued to be priorities, and included mitigation of climate effects. Food safety projects addressed the FDA's Food Safety Modernization Act enhancing Good Agricultural Practices and Good Handling Practices training for farmers and processors, and developing processing and novel preservation methods for Hawaii's fresh produce, fish and meat. Research continued on lignocellulosic and oil biofuel crops, recognizing Hawaii's energy needs, including the use insects (soldier blackflies) as a means of processing food waste for biodiesel production that was initiated in FY2015. Efforts also continued to combat the continual influx of invasive insect pests and associated plant diseases entering Hawaii. Reflecting on our location in a Pacific island state, CTAHR continued to address issues associated with specialty regional and ethnic crops, including related work on pest management, crop improvement, and documentation of dietary and health impacts.

In FY2017, CTAHR's large backlog of cumulative deferred repair and maintenance (CDRM) issues of its buildings and research facilities remained unaddressed. Although these issues had been discussed with the State of Hawaii and the University of Hawaii, there was no significant progress in funding the CDRM projects and planning for such activities. However, progress was made with the state Legislature in providing four new extension agent positions for food crops in 2016 and the college was able to fill these position in 2017. Despite challenges, research continued to advance in FY2017, and extension engagement with the public and farming communities remained strong, with continuing strong interest in the Master Gardener program, the 4-H Youth Leadership Development program, and beginning farming GoFarm programs statewide. CTAHR is focused on assisting our stakeholders and providing the leadership required to move agriculture, resource management, and sustainable communities forward in the State of Hawaii.

Total Actual Amount of professional FTEs/SYs for this State

Year: 2017	Extension		Research	
	1862	1890	1862	1890
Plan	48.0	0.0	37.0	0.0
Actual	49.5	0.0	30.7	0.0

II. Merit Review Process

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

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

2. Brief Explanation

CTAHR continues to use expert peer review panels to review individual plan of work, projects, publications, promotion and tenure applications, and post-tenure reviews. All reviewers are asked to determine if the program or project addresses the critical issues of strategic importance, including those identified by the stakeholders; utilize multi-disciplinary approaches and provide evidence of integration of research and extension; address the needs of underserved populations of the State; describe the expected outcomes and impacts; and result in improved effectiveness and/or efficiency.

CTAHR's peer project review process begins when a project proposal is submitted to a unit administrator. The unit administrator checks the proposal for completeness and format. A proposal that is ready for review is transmitted to the department's ad hoc Peer Review Committee. This committee is comprised of a minimum of three members, supplemented by external reviewers as necessary, who are familiar with the issues addressed by the plan or project. The Peer Review Committee reviews the proposal for (1) significance, (2) need, (3) approach, (4) new knowledge of programs to be generated, (5) potential for impact, (6) collaborative arrangements, (7) track record of the project leader(s), and (8) potential for success of the proposed project. After the committee completes its evaluation, the proposal and the peer evaluation forms are returned to the unit administrator, and anonymous reviews transmitted to the investigator. The revised project proposal is reviewed by the unit administrator, and passed, along with all reviews, to the appropriate Associate Dean/Director. CTAHR administrators, program leaders and faculty may serve as resources to clarify proposed projects and plans of work for reviewers. Final review for projects and plans of work occurs in the offices of the Associate Dean/Associate Director for Research and Associate Dean/Associate Director for Extension.

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
- Survey of traditional stakeholder groups
- Survey of traditional stakeholder individuals
- Other (Social Media)

Brief explanation.

As a standard practice, CTAHR includes stakeholders or local external professionals in position search committees for faculty positions, including professor, researcher, extension specialist and agent positions, county administrators, department chairs, and college administrators. CTAHR faculty work closely with industry groups and associations. This close working relationship provides a means for stakeholder participation and input on all matters of mutual concerns and interests. If CTAHR faculty is not available in a particular local issue, stakeholders often call upon college administrators or the county administrators with their input and concerns. College administrators also confer often with officers and executive staff of relevant stakeholder associations, such as the

Hawaii Farm Bureau Federation, and the Hawaii Farmers Union United. In recent years, there have been an increasing numbers of legislative bills related to agriculture, food production, and marketing in Hawaii. CTAHR's Dean and Associate Deans for Research and Extension have been a resource for information for different agriculture groups on related issues. Additionally, the college is increasingly soliciting and receiving stakeholder input through social media, including Facebook, Twitter, stakeholder blogs, and release of both iPhone and Android Apps. The Communications Services office and other college offices are active on Twitter.

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 are considered by CTAHR to be anyone with an interest in, can be impacted by, or participates in the activity or issue. These typically include producers, processors, consumers, decision makers, students, alumni, community organizations, representatives of various State and federal agencies and members of the business communities or associations. Most of the commodities and program areas have one or more organizations representing their commodities or interests. Although input can be made by anyone and everyone, CTAHR prefers to listen to a spokesperson or organization that represents the majority of those affected by an issue.

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 specifically with non-traditional groups
- Meeting specifically with non-traditional individuals
- Meeting with invited selected individuals from the general public
- Other (Social Media)

Brief explanation.

CTAHR employs a variety of methods including face to face discussions with industry representatives, participation in trade and community association meetings, participation on the State of Hawaii Board of Agriculture, Hawaii Invasive Species Council and other state boards and committees; participation in ad hoc state task forces such as the Coffee Berry Borer Taskforce, Governor's Taskforce on Vog, Governor's Task Force on Rat Lungworm Disease; consultation with the Hawaii Farm Bureau Federation, and long standing "Industry Analysis" and "Strategic Planning"

processes that are applied to for key industries.

Other techniques used to gather stakeholder inputs are surveys, commodity organization meetings, facilitated meetings, through feedback and input from the Farm Bureau or Farmers Union, and direct input from stakeholders. CTAHR faculty and administrators regularly assist, facilitate and participate in strategic planning sessions for industry associations and organizations such as the Hawaii Association of Family and Consumer Education, Hawaii 4-H Foundation, Hawaii 4-H Livestock Association, Hawaii Coffee Growers Association, Hawaii Tropical Flowers and Shippers Association, Hawaii Orchid Growers Association, Hawaii Tropical Fruit Growers Association, Hawaii Macadamia Nut Association, Hawaii Food Industry Associations, Hawaii Tea Society, and many others. CTAHR also receives many requests for research, outreach and other resources through emails, letters, meetings, and phone calls. Email list serve groups of CTAHR and external individuals are also used. Information, questions, and other exchanges take place on a regular basis.

Stakeholder input is increasingly solicited and received through social media via Facebook, Twitter, and an increasing number of Apps released by CTAHR faculty for iPhone or Android use.

Stakeholder blogs have been found to also be a useful means of obtaining timely information on needs and opportunities.

3. A statement of how the input will be considered

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

Brief explanation.

CTAHR is stakeholder-need driven. Stakeholder input collected as described in the previous section is used in research, extension and instructional program planning. Stakeholder input is important for the review process for extension and research project proposals. If an investigator demonstrates that a project is a stakeholder priority, chances of funding are significantly greater. Through the Dean's Advisory Committee, stakeholders assisted CTAHR in maintaining relevance of overall programs and helped to assure program coordination among teaching, research and extension/outreach programs.

Brief Explanation of what you learned from your Stakeholders

College priorities and research and extension programs are in line with expressed stakeholder needs, although stakeholders from all industry groups would like to have increased support from CTAHR for their particular sector. Given that upcoming retirements, past budget and staffing cuts, and some restrictions on hiring, these requests will be difficult to satisfy. However, in the next several years, as the State economy is now slightly better than in past years and coupled with faculty retirement salary savings, CTAHR is poised to begin hiring once again in high priority positions following years of little to no faculty hiring. Furthermore, CTAHR has an excellent relationship with the vast majority of its stakeholder groups, and these groups are working proactively through their elected state and federal officials to make their needs and the needs of the State of Hawaii known to NIFA.

Hawaii receives an average of 24 new insect introductions to the Islands each year, and is the first port of call for pests that may well move on to attack agriculture in the continental USA. At this time, invasive agricultural pests such as the coffee berry borer, macadamia felted coccid, and the little fire

ant, rat lungworm disease for food safety are of great concerns to our stakeholders and food producers. They wish to see not only greater NIFA funding and program resources applied to these key pests and diseases of tropical agriculture and the American Pacific, but development of efficient and rapid means of bringing NIFA resources to bear through CTAHR on newly discovered invasive plant pests and diseases in Hawaii.

CTAHR stakeholders continue to join with those in Florida and the Caribbean in requesting that NIFA resurrect and fund the Tropical and Subtropical Agricultural Research program (TSTAR), or an equivalent program to address the unique needs of these regions. The small \$6.2 million annual investment, defunded in FY2010, was of enormous benefit to Pacific and Caribbean stakeholders, and provided funds essential to address constant threats from invasive pests and diseases, and protect and develop the crops that are uniquely important in the US Affiliated Tropics.

IV. Expenditure Summary

1. Total Actual Formula dollars Allocated (prepopulated from C-REEMS)			
Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
{No Data Entered}	{No Data Entered}	{No Data Entered}	{No Data Entered}

2. Totalled Actual dollars from Planned Programs Inputs				
	Extension		Research	
	Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
Actual Formula	1489609	0	1550976	0
Actual Matching	1489609	0	1550976	0
Actual All Other	740626	0	5702256	0
Total Actual Expended	3719844	0	8804208	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

S. No.	PROGRAM NAME
1	Sustain, Protect, and Manage Hawaii's Natural Resources and Environment
2	Hawaii's Diversified Tropical Crop Systems for Sustainability and Competitiveness
3	Invasive Species Education and Management
4	Youth, Family and Community Development
5	Health and Wellness of Hawaii's Families and Communities
6	Global Food Security and Hunger
7	Climate Change
8	Sustainable Energy
9	Childhood Obesity
10	Food Safety

V(A). Planned Program (Summary)

Program # 1

1. Name of the Planned Program

Sustain, Protect, and Manage Hawaii's Natural Resources and Environment

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%		11%	
112	Watershed Protection and Management	0%		3%	
121	Management of Range Resources	15%		3%	
123	Management and Sustainability of Forest Resources	22%		7%	
124	Urban Forestry	0%		4%	
125	Agroforestry	0%		11%	
131	Alternative Uses of Land	0%		2%	
133	Pollution Prevention and Mitigation	0%		7%	
136	Conservation of Biological Diversity	0%		6%	
205	Plant Management Systems	29%		1%	
211	Insects, Mites, and Other Arthropods Affecting Plants	0%		5%	
212	Pathogens and Nematodes Affecting Plants	0%		12%	
213	Weeds Affecting Plants	0%		4%	
216	Integrated Pest Management Systems	17%		0%	
307	Animal Management Systems	9%		0%	
403	Waste Disposal, Recycling, and Reuse	0%		6%	
605	Natural Resource and Environmental Economics	0%		14%	
803	Sociological and Technological Change Affecting Individuals, Families, and Communities	0%		4%	
903	Communication, Education, and Information Delivery	8%		0%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2017	Extension		Research	
	1862	1890	1862	1890
Plan	4.0	0.0	6.0	0.0
Actual Paid	5.7	0.0	2.7	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
241931	0	161178	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
241931	0	161178	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
1816	0	707116	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Research and extension efforts on effective natural resources management continue to be a priority of CTAHR. Active projects include efficient agricultural chemical use, waste management, forest resource management, agroforestry, range management, wildland fire science, nutrient management, soil erosion, soil quality and bioremediation, biological diversity, rehabilitation of degraded and idle lands, handling of hazardous materials, and water quality. To preserve, protect, and renew Hawaii's natural resources, we have also developed programs to provide farming and environmental education to the public with emphasis on schools, youth groups, home gardeners, urban/residential communities, land managers, and local government and private partners. We are also highly involved in international partnerships and collaborations on management of agricultural and natural resources.

Rapid Ohia Death (ROD) continued to be a major focus of forestry research and extension efforts in FY2017. Research efforts focused on PCR identification of the pathogens for detection and quarantine enforcement purposes, and preventing disease spread. The extension forestry program on ROD reached 838 stakeholders via direct contacts and 275,000 via indirect contacts. Invasive species continue to become established in Hawaii and pose a huge threat to Hawaii and mainland U.S. agriculture. The University of Hawaii Insect Museum stores data essential to understanding the spread and impact of invasive species, the application of biological control, and the conservation of native insects and their ecosystems. The museum has grown by over 50,000 specimens, of these the most significant growth was seen among Tephritidae fruit flies (over 25,000 specimens). A new insect pest, the Two-lined Spittlebug (TLSB) was identified for the first time this fiscal year in Hawai'i. The damage was extensive and threatened the beef cattle industry since this insect feeds on kikuyu and pangola grass that 70% of the state's beef cattle graze on. CTAHR educational resources were provided for ranchers with pasture management protocol information as well as for initiating biocontrol research and TLSB resistant forage trials.

The Master Gardner Program continued to provide outreach to thousands of people in the general public and to school children by providing information on small-scale food production, gardening, pest control, environmental sustainability, bee keeping, and more. Inquiries from the public are changing to more

questions about environmentally sound gardening practices. Data from two counties indicated that this program had 437 volunteers that served a total of 16,326 volunteer hours in answering helplines, participating in educational exhibits, maintaining their website, creating school gardens, and maintaining demonstration gardens. The value of these volunteer-hours based on Hawaii's volunteer rate at \$23.80 per volunteer hour equals \$388,558 that was contributed back into the program. Volunteer leaders are working hard to bring in more volunteers annually to be trained and certified Master Gardeners that would ensure a long-term and sustainable MG program.

2. Brief description of the target audience

- As intended by the Land Grant perspective, CTAHR's "targeted" clients for this program in teaching are the undergraduate and graduate students in agriculture, natural resource management, and allied fields.
- Targeted clients for research are peers and extension specialists. Clients for extension specialists are CTAHR's county extension agents and the counterpart professional personnel of sister state and federal agencies (such as the Hawaii's State Departments of Agriculture, Department of Health, and Department of Land and Natural Resources, and the USDA Natural Resources Conservation Service, NRCS).
- Clients for extension agents are land users and commodity producers and their organizations (such as the Hawaii's Association of Soil and Water Conservation Districts, Hawaii's Forestry Industry Association, and the Hawaii's Farm Bureau), extension staff in other CTAHR units and at sister institutions, and other members of the professional community who deal with managing land, soil and water resources especially in tropical agro-ecosystems. Interfacing with other professional and community groups who can provide new and useful knowledge to facilitate making decisions is an important expectation for effectively meeting its commitments.

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2017	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	27057	1305342	1129	350

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

Patent Applications Submitted

Year: 2017
 Actual: 4

Patents listed

- 1) Monoterpenoids are insecticidal to agricultural storage and household insect pests (#62/416,121)
- 2) Recombinant and engineering windmill palm tree (62/503,896)
- 3) Discovery of potent selective substrate competitive and bioavailable glycogen synthase kinase-3 (62/519,825)
- 4) Novel GSK3 inhibitors for prevention and treatment of neurodegenerative diseases (62/536,962).

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2017	Extension	Research	Total
Actual	13	31	44

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Grant proposals submitted.

Year	Actual
2017	70

Output #2

Output Measure

- Presentations at international and national meetings.

Year	Actual
2017	33

Output #3

Output Measure

- Number of workshops and other educational activities held

Year	Actual
2017	250

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Number of people who actually adopt one or more recommended practices
2	Total dollar value of grants and contracts obtained.

Outcome #1

1. Outcome Measures

Number of people who actually adopt one or more recommended practices

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2017	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
102	Soil, Plant, Water, Nutrient Relationships
112	Watershed Protection and Management
121	Management of Range Resources
123	Management and Sustainability of Forest Resources
124	Urban Forestry
125	Agroforestry
133	Pollution Prevention and Mitigation
136	Conservation of Biological Diversity
205	Plant Management Systems
211	Insects, Mites, and Other Arthropods Affecting Plants
212	Pathogens and Nematodes Affecting Plants
403	Waste Disposal, Recycling, and Reuse
605	Natural Resource and Environmental Economics

803 Sociological and Technological Change Affecting Individuals, Families, and Communities

Outcome #2

1. Outcome Measures

Total dollar value of grants and contracts obtained.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2017	1462432

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Who cares and Why

Protecting Hawaii's natural resources preserves the islands unique environments and native species, enhances the well-being of Hawaii residents, and promotes the main economic engine of the state, the tourism industry. The beauty of nature, ocean and beaches, and mountain are important attractions for visitors to see Hawaii.

What has been done

What has been done

Forest conservation and restoration activities have taken place throughout the state, but particularly on the Big Island of Hawaii, where Rapid Ohia Death has been detected and its statewide spread prevented, and preservation and restoration of endangered native bird habitat has been enhanced by koa forest restoration. Invasive species control is being promoted by CTAHR faculty, particularly through collaboration with other agencies and private organizations. Soil and water conservation remain important activities statewide, along with animal waste management.

Results

Results

Results

Through a variety of research and extension programs, Hawaii residents and visitors are more aware of the environmental impacts of their activities, especially in the movement of unwanted diseases, insects, and weeds that impact Hawaii's native forests. Many are increasingly adopting more sustainable and environmentally responsible practices. The education and outreach programs from CTAHR have positive impacts on the communities.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
112	Watershed Protection and Management
121	Management of Range Resources
123	Management and Sustainability of Forest Resources
124	Urban Forestry
125	Agroforestry
131	Alternative Uses of Land
133	Pollution Prevention and Mitigation
136	Conservation of Biological Diversity
205	Plant Management Systems
211	Insects, Mites, and Other Arthropods Affecting Plants
212	Pathogens and Nematodes Affecting Plants
213	Weeds Affecting Plants
216	Integrated Pest Management Systems
307	Animal Management Systems
403	Waste Disposal, Recycling, and Reuse
605	Natural Resource and Environmental Economics
803	Sociological and Technological Change Affecting Individuals, Families, and Communities
903	Communication, Education, and Information Delivery

V(H). Planned Program (External Factors)

External factors which affected outcomes

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

Brief Explanation

- Natural disasters such as hurricanes, typhoons, floods and fires are often destructive to natural resources such as reefs, water sheds, forests, indigenous species habitats, research plots or equipment.
- Government regulations on environment impacts and pesticide uses for agricultural use may prevent farms to control plant diseases.
- When the economy is poor and tourism industry is not doing well, public and private funding decreases and it is more difficult to obtain funding for research and educational programs.
- Current and new quarantine and inspection procedures for imported materials affect the rate of new introductions of invasive species into the State.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

n/a

Key Items of Evaluation

n/a

V(A). Planned Program (Summary)**Program # 2****1. Name of the Planned Program**

Hawaii's Diversified Tropical Crop Systems for Sustainability and Competitiveness

 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	7%		4%	
201	Plant Genome, Genetics, and Genetic Mechanisms	0%		8%	
202	Plant Genetic Resources	0%		10%	
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants	0%		4%	
204	Plant Product Quality and Utility (Preharvest)	6%		12%	
205	Plant Management Systems	21%		11%	
206	Basic Plant Biology	1%		2%	
211	Insects, Mites, and Other Arthropods Affecting Plants	6%		0%	
212	Pathogens and Nematodes Affecting Plants	12%		12%	
213	Weeds Affecting Plants	4%		4%	
214	Vertebrates, Mollusks, and Other Pests Affecting Plants	0%		4%	
216	Integrated Pest Management Systems	24%		12%	
307	Animal Management Systems	5%		0%	
311	Animal Diseases	4%		0%	
511	New and Improved Non-Food Products and Processes	0%		4%	
601	Economics of Agricultural Production and Farm Management	0%		6%	
604	Marketing and Distribution Practices	0%		3%	
903	Communication, Education, and Information Delivery	10%		4%	
	Total	100%		100%	

V(C). Planned Program (Inputs)**1. Actual amount of FTE/SYs expended this Program**

Year: 2017	Extension		Research	
	1862	1890	1862	1890
Plan	11.0	0.0	10.0	0.0
Actual Paid	17.7	0.0	8.6	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
597532	0	352874	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
597532	0	352874	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
324411	0	185357	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Due to the high cost of farming in Hawaii and competition with imported produce and meat, approximately 90% of the food consumed in Hawaii is imported. The goal of Hawaii's Governor is to double local production of food by 2020. Research and education on diversified crops through CTAHR programs helped to diversify the state's agriculture economy, necessitated even more by the demise of sugarcane and pineapple plantations over the past several decades, the last sugar plantation in Hawai'i closing its doors in FY 2017 ending a 150-year long plantation industry. CTAHR has conducted basic and applied research to increase production, efficiency, and profitability of diversified agricultural industries while protecting the environment. Research and extension efforts in FY2017 continued to include all areas of tropical agriculture: breeding of new ornamental varieties, variety selection for pest and disease resistance, pest and disease management in both conventional and organic farming, pesticide education, pesticide residue and registration, identification and evaluation of potential new specialty crops, value-added processed foods, marker-assisted selection and crop genetic improvement, development of greenhouse cultivation, promotion of import replacement with locally grown produce, beef and livestock production, and aquaponics for sustainable no-soil agricultural production. CTAHR conducted outreach programs to provide best management practices to grow and market existing and new crops and to provide excellent training opportunities for new farmers. Working as a team, agents and specialists identified swine problems and educated producers such that Hawai'i's swine numbers have increased by 1,000 animals after several years of declining production. CTAHR's pesticide program has responded to governmental requests for information by working with industry for input, ultimately impacting government decisions on removing or maintaining pesticide uses. Without government notification or response, important pesticide uses may have been prematurely cancelled. In addition, the IR4 Pesticides Program has provided research data on efficacy and residue of various pesticides for Special Local Needs registration for several of Hawai'i's crops that would otherwise, not have pesticide alternatives against some major invasive and destructive species.

CTAHR extension specialists continued to explore apps and develop electronic technology to assist growers and the public. CTAHR's digital outreach capabilities using social media, websites, and distance

education provided much timely assistance to farmers. In FY2017, a myriad of workshops continued to be offered throughout the state to assist growers with crop diversification, management of pests and diseases, and navigation of financial, legal and labor issues. In disease detection, new fungal and viroid organisms were discovered negatively impacting local crops. Field variety trials conducted sought disease tolerance and resistance in local crops, and organized field demonstrations taught growers to recognize the disease symptoms while providing alternatives in disease management.

2. Brief description of the target audience

- The target audience for this program area is primarily the diversified farming community, especially those growing commercial or home garden crops, and beginning farmers, and urban residents and investors who are interested in farming and healthy food production.
- Main commercial crop industries served by CTAHR include floriculture and nursery, tropical fruit trees and nuts, vegetables, melons, herbs, and root or tuber crops, livestock animal producers, and 4H program teachers. Many of these crops are tropical and not commonly grown in the continental USA, and CTAHR research and extension efforts are very important to Hawaii producers. There is also a resurgence of interest in home and school gardening which is supported by CTAHR programs.

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2017	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	26194	1842769	1161	26714

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

Patent Applications Submitted

Year: 2017
 Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2017	Extension	Research	Total

Actual	43	17	60
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V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of workshops, research/field day demonstrations conducted

Year	Actual
2017	315

Output #2

Output Measure

- Published information such as extension newsletters, fact sheets, videos, and other publications

Year	Actual
2017	37

Output #3

Output Measure

- Presentations at international and national meetings

Year	Actual
2017	41

Output #4

Output Measure

- Number of grant proposals submitted.

Year	Actual
2017	56

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Number of individuals completing non-formal education programs.
2	Number of people who adopt one or more recommended practices.
3	Total dollar value of grants and contracts obtained.
4	Individuals completing non-formal education programs Individual and groups who are farming for their own food and food supplies to the market.

Outcome #1

1. Outcome Measures

Number of individuals completing non-formal education programs.

Not Reporting on this Outcome Measure

Outcome #2

1. Outcome Measures

Number of people who adopt one or more recommended practices.

Not Reporting on this Outcome Measure

Outcome #3

1. Outcome Measures

Total dollar value of grants and contracts obtained.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2017	1251644

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Issue (Who cares and Why)

Increased awareness of best management practices to promote environmentally responsible agricultural and landscape management.

What has been done

What has been done

Workshops, field days, demonstrations, presentations, websites and publications have been completed on a variety of topics that will help agricultural and home garden producers understand how to make the State more sustainable.

Results

Results

Hawaii will be more sustainable and the agricultural producers will be more competitive.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
201	Plant Genome, Genetics, and Genetic Mechanisms
202	Plant Genetic Resources
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants
204	Plant Product Quality and Utility (Preharvest)
205	Plant Management Systems
206	Basic Plant Biology
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
307	Animal Management Systems
311	Animal Diseases
511	New and Improved Non-Food Products and Processes
601	Economics of Agricultural Production and Farm Management
604	Marketing and Distribution Practices
903	Communication, Education, and Information Delivery

Outcome #4

1. Outcome Measures

Individuals completing non-formal education programs Individual and groups who are farming for their own food and food supplies to the market.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2017	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Who cares and Why

Increased awareness of best management practices to promote environmentally responsible agricultural and landscape management.

Farming skills and better harvest for beginning farmers.

What has been done

What has been done

Workshops, field days, demonstrations, presentations, websites and publications have been completed on a variety of topics of farming and food safety that will help agricultural and home garden producers understand how to make the State more sustainable and healthy food production.

Results

Results

More sustainable agriculture operations and local food producers will be more competitive in production and food prices.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
201	Plant Genome, Genetics, and Genetic Mechanisms
202	Plant Genetic Resources
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants
204	Plant Product Quality and Utility (Preharvest)

205	Plant Management Systems
206	Basic Plant Biology
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
307	Animal Management Systems
311	Animal Diseases
511	New and Improved Non-Food Products and Processes
601	Economics of Agricultural Production and Farm Management
604	Marketing and Distribution Practices
903	Communication, Education, and Information Delivery

V(H). Planned Program (External Factors)

External factors which affected outcomes

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

Brief Explanation

- Natural disasters such as hurricanes, drought, typhoons, floods, and fires often are destructive to crops production and native plants. Annual crops suffer immediate, although not permanent damage, while orchard crops may sustain long-term damage. Damage to research plots, set-ups and equipment can also occur.
- When the economy is poor, public and private funding decreases and is more difficult to obtain funding for R& D programs. When monies are short, public priorities that relate to health and safety are more visible and will compete for available funds. The increase in petroleum prices has increased production costs.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

N/A

Key Items of Evaluation

N/A

V(A). Planned Program (Summary)

Program # 3

1. Name of the Planned Program

Invasive Species Education and 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
112	Watershed Protection and Management	0%		10%	
123	Management and Sustainability of Forest Resources	25%		0%	
136	Conservation of Biological Diversity	0%		3%	
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants	0%		1%	
204	Plant Product Quality and Utility (Preharvest)	0%		5%	
205	Plant Management Systems	0%		2%	
211	Insects, Mites, and Other Arthropods Affecting Plants	25%		18%	
212	Pathogens and Nematodes Affecting Plants	0%		11%	
213	Weeds Affecting Plants	25%		24%	
215	Biological Control of Pests Affecting Plants	25%		16%	
216	Integrated Pest Management Systems	0%		5%	
312	External Parasites and Pests of Animals	0%		1%	
721	Insects and Other Pests Affecting Humans	0%		4%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2017	Extension		Research	
	1862	1890	1862	1890
Plan	3.0	0.0	4.0	0.0
Actual Paid	1.9	0.0	2.0	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
132535	0	138046	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
132535	0	138046	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
13196	0	1969410	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Invasive species constantly threaten agricultural production, farm profitability, and Hawaii's surrounding natural and urban ecosystems. Sound management of agroecosystems and nature conservation depends on effective mitigation of alien invasive species. The Hawaii Department of Agriculture has reported the introduction of 28 new insect invaders each year. This large number of newly introduced alien invasive species has prompted a Hawaii Interagency Biosecurity Plan for the State of Hawaii, in which CTAHR plays a significant role in developing detection and mitigation technologies and education to minimize the impacts of invasive species. CTAHR coordinates activities with partner agencies, community groups, and other interested stakeholders, and conducts research on the biology and control of the invasive insect, plant diseases and weedy plant species, including studying their impacts on farms, native biota, and local ecosystems. CTAHR engaged a "SWAT Team" approach to grower education about newly introduced pests and diseases. This entailed rapid deployment of a team of professionals to identify, contain, and control the pest or disease.

Evaluation of effective trunk injection methods for high value trees to control Chinese banyan stem and leaf gall wasps and lobate lac scale were conducted and shared with the landscape industry. The landscape industry also benefited from research on light exclusion as a non-chemical means of weed control in turf renovation.

The research and extension program on Herbicide Ballistic Technology (HBT) and other alien species management strategies adopted concepts and philosophies from Participatory Action Research models where the researcher participated with the stakeholder in management and the stakeholder participated in research and development. In FY2017, over 220 professionals and local weed management practitioners attended several workshops and conferences to learn about HBT. HBT is a paintball gun-like technology that applies small, precise doses of herbicides to invasive plants in remote areas. In FY2017, over 49,421 acres of forested watershed were effectively protected by eliminating over 19,000 invasive plant targets. By mitigating these plants from becoming mature, the estimated cost savings is over \$380 million that would have been needed in extra management over the next four decades. A new telemetry system was developed and deployed to record projectiles discharged and precise plant target coordinates.

2. Brief description of the target audience

- Target audiences include farmers, consumers, and rural citizens who appreciate reduced pesticide inputs as we come to rely more on biological means of pest control.
- Scientists who study invasive species work with extension educators to delivery best management

practices to agricultural and residential clientele.

- Natural resource managers (including those responsible for forestry, rangeland and conservation lands) and asset managers who depend on CTAHR researchers and extension to develop and deliver technologies for improved control and management of invasive plants in Hawaii's landscapes.

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2017	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	2974	56	0	0

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

Patent Applications Submitted

Year: 2017

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2017	Extension	Research	Total
Actual	4	22	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of workshops, field days, demonstrations held

Year	Actual
2017	25

Output #2

Output Measure

- Number of grant proposals submitted

Year	Actual
2017	61

Output #3

Output Measure

- Presentations at international and national meetings

Year	Actual
2017	22

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Awareness created
2	Number of workshops implemented and demonstration installed for clientele education
3	Total dollar value of grants and contracts obtained.

Outcome #1

1. Outcome Measures

Awareness created

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2017	61

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Who cares and Why

Residents are not aware of the problems associated with invasive species. Increased awareness of best management practices is the first step in implementing improvements in invasive species control and management.

What has been done

What has been done

Workshops, demonstrations, field days, presentations and publications make residents aware of the problems associated with invasive species and control practices which are most successful. As a result, these people have then adopted one or more control practices.

Results

Farmers, residents, land owners and government conservation management will be more likely to assist in controlling invasive species.

4. Associated Knowledge Areas

KA Code	Knowledge Area
112	Watershed Protection and Management
123	Management and Sustainability of Forest Resources
136	Conservation of Biological Diversity
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants

204	Plant Product Quality and Utility (Preharvest)
205	Plant Management Systems
211	Insects, Mites, and Other Arthropods Affecting Plants
212	Pathogens and Nematodes Affecting Plants
213	Weeds Affecting Plants
215	Biological Control of Pests Affecting Plants
216	Integrated Pest Management Systems
312	External Parasites and Pests of Animals
721	Insects and Other Pests Affecting Humans

Outcome #2

1. Outcome Measures

Number of workshops implemented and demonstration installed for clientele education

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2017	61

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Issue (Who cares and Why)

Residents are not aware of the problems associated with invasive species. Increased awareness of best management practices is the first step in implementing improvements in invasive species control and management.

What has been done

What has been done

Workshops, demonstrations, field days, presentations and publications make residents aware of the problems associated with invasive species and control practices which are most successful. As a result, these people have then adopted one or more control practices.

Results

Results

Farmers and residents will be more likely to assist in controlling invasive species.

4. Associated Knowledge Areas

KA Code	Knowledge Area
112	Watershed Protection and Management
123	Management and Sustainability of Forest Resources
136	Conservation of Biological Diversity
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants
204	Plant Product Quality and Utility (Preharvest)
205	Plant Management Systems
211	Insects, Mites, and Other Arthropods Affecting Plants
212	Pathogens and Nematodes Affecting Plants
213	Weeds Affecting Plants
215	Biological Control of Pests Affecting Plants
216	Integrated Pest Management Systems
312	External Parasites and Pests of Animals
721	Insects and Other Pests Affecting Humans

Outcome #3

1. Outcome Measures

Total dollar value of grants and contracts obtained.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2017	4901730

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Issue (Who cares and Why)

Funding is needed to conduct research and extension activities to augment that accomplished with formula funds.

What has been done

What has been done

Extramural grants have been received and funding utilized.

Results

Results

Hawaii has been able to better accomplish meaningful and comprehensive invasive species control.

4. Associated Knowledge Areas

KA Code	Knowledge Area
112	Watershed Protection and Management
123	Management and Sustainability of Forest Resources
136	Conservation of Biological Diversity
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants
204	Plant Product Quality and Utility (Preharvest)
205	Plant Management Systems
211	Insects, Mites, and Other Arthropods Affecting Plants
212	Pathogens and Nematodes Affecting Plants
213	Weeds Affecting Plants
215	Biological Control of Pests Affecting Plants
216	Integrated Pest Management Systems
312	External Parasites and Pests of Animals
721	Insects and Other Pests Affecting Humans

V(H). Planned Program (External Factors)

External factors which affected outcomes

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

Brief Explanation

- Intentional introductions of invasive species by tourists and returning residents.
- Lack of funding, different priorities in extramural grant programs
- Difficulty in coordination with external agencies and partners
- Natural disasters such as flood and weather extremes.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

n/a

Key Items of Evaluation

n/a

V(A). Planned Program (Summary)

Program # 4

1. Name of the Planned Program

Youth, Family and Community Development

Reporting on this Program

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
124	Urban Forestry	0%		3%	
131	Alternative Uses of Land	6%		0%	
134	Outdoor Recreation	0%		1%	
205	Plant Management Systems	7%		0%	
307	Animal Management Systems	4%		0%	
602	Business Management, Finance, and Taxation	0%		3%	
604	Marketing and Distribution Practices	0%		3%	
608	Community Resource Planning and Development	0%		7%	
724	Healthy Lifestyle	0%		7%	
802	Human Development and Family Well-Being	28%		23%	
803	Sociological and Technological Change Affecting Individuals, Families, and Communities	0%		14%	
804	Human Environmental Issues Concerning Apparel, Textiles, and Residential and Commercial Structures	0%		11%	
805	Community Institutions, Health, and Social Services	0%		4%	
806	Youth Development	55%		13%	
903	Communication, Education, and Information Delivery	0%		11%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2017	Extension		Research	
	1862	1890	1862	1890
Plan	15.0	0.0	4.0	0.0

Actual Paid	12.4	0.0	3.8	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
237225	0	58871	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
237225	0	58871	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
173513	0	157226	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

The family, more than any other social institution, has a profound influence on the health and well-being of its members, particularly its youth and elderly. CTAHR strengthens families in Hawaii's rural and urban environments by providing assistance in areas such as family health and lifespan development, financial and time management, youth development, parenting, and caring for the elderly. CTAHR collects and compiles current social indicator data on Hawaii communities, and develops initiatives to improve diet and nutrition in Hawaii's multi-ethnic population, addressing such issues as diabetes, obesity and weight management. CTAHR programs evaluate locally-grown commodities that are underutilized, yet are of high nutritional value. CTAHR's outreach programs strengthen its stakeholders' capacity to make educated decisions to improve their health, wellness, and overall quality of life.

Work by Center on the Family (COF) researchers and CTAHR extension faculty continued to focus on developing indicator briefs on topics relevant to the well-being of children and families in Hawaii, disseminating data and raising public awareness on the conditions and challenges of children and families in Hawaii for policy and program decision making affecting this population. Hawaii Kids Count child and family indicators have moved from the COF to the national Kids Count Data Center, providing 1,000 subscribers, including service providers, government agencies, and university faculty and students with useful data on youth. Training and technical assistance was provided to over 275 stakeholders, addressing evaluation frameworks, accurate data collection, and the use of evaluation data to improve program services in the areas of foster care, substance abuse prevention and treatment, homelessness, and behavioral health. The Hawaii pages of the Kids Count data center received an average of 624 visits per month. Monthly issues of Kids Count e-bulletins were produced and disseminated presenting data and research contextualized within relevant and current local programming and policy discussions, along with a call to action to use this data in decision making that affect the well-being of children in Hawaii.

The 4-H Youth Leadership program focused on healthy living, science, citizenship, volunteer development, and marketing and public relations for youth ages 5-19. Popular 4-H projects and their student enrollment (number) included technology and engineering (3,610), foods and nutrition (733), plant science (696), community/volunteer service (528), communication and expressive arts (465), health (451), livestock (320), and leadership and personal development (279). Hawaii's 4-H Program reached 4,797 young people in FY2017. These programs and clubs were supported by 270 adult volunteers serving an average of 128 hours per volunteer. Based on Hawaii's value of \$23.80 per hour for volunteers, the value of the 4-H volunteers is \$822,252 per year. Thus, Hawaii continues to strengthen its volunteer base to ensure a

strong 4-H program.

2. Brief description of the target audience

CTAHR's "targeted" clients for this program in instruction are the undergraduate and graduate students in family and consumer sciences and allied fields. The state and federal agencies such as the Hawaii State Departments of Health and Social Services; adults (4-H leaders) and youth (ages 5-19) through the 4-H Youth Development program; young children and parents through the literacy programs; adults through the Family Education and Family Community Leadership Programs; home gardeners; the elderly; extension staff in other CTAHR units and at sister institutions; and other members of the professional community who deal with family, youth and health issues. Clients for extension agents are children, youth and families "at risk" in targeted communities through the "New Community Projects" program, and kindergartners and parents through the "KAMP" programs.

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2017	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	51249	2613290	27854	34254

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

Patent Applications Submitted

Year: 2017

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2017	Extension	Research	Total
Actual	11	8	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of people completing non-formal education programs on parenting, youth development, and leadership development
Not reporting on this Output for this Annual Report

Output #2

Output Measure

- Number of volunteer hours

Year	Actual
2017	174281

Output #3

Output Measure

- Presentations at international and national meetings.

Year	Actual
2017	23

Output #4

Output Measure

- Grant proposals submitted.

Year	Actual
2017	25

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Number of individuals who adopt at least one new practice learned.
2	Total dollar value of grants and contracts obtained.

Outcome #1

1. Outcome Measures

Number of individuals who adopt at least one new practice learned.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2017	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
124	Urban Forestry
131	Alternative Uses of Land
134	Outdoor Recreation
205	Plant Management Systems
307	Animal Management Systems
602	Business Management, Finance, and Taxation
604	Marketing and Distribution Practices
608	Community Resource Planning and Development
724	Healthy Lifestyle
802	Human Development and Family Well-Being
803	Sociological and Technological Change Affecting Individuals, Families, and Communities
804	Human Environmental Issues Concerning Apparel, Textiles, and Residential and Commercial Structures

- 805 Community Institutions, Health, and Social Services
- 806 Youth Development
- 903 Communication, Education, and Information Delivery

Outcome #2

1. Outcome Measures

Total dollar value of grants and contracts obtained.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2017	2940407

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Issue (Who cares and Why)

Resources are needed for research and extension programs to assist Hawaii's families and communities.

What has been done

What has been done

Extramural grants were received and funding utilized in support of the program.

Results

Results

Hawaii economy was improved as external funds were received and Hawaii's communities are better off as a result of the research and extension programming.

4. Associated Knowledge Areas

KA Code	Knowledge Area
124	Urban Forestry
131	Alternative Uses of Land
134	Outdoor Recreation
205	Plant Management Systems
307	Animal Management Systems
602	Business Management, Finance, and Taxation
604	Marketing and Distribution Practices
608	Community Resource Planning and Development
724	Healthy Lifestyle
802	Human Development and Family Well-Being
803	Sociological and Technological Change Affecting Individuals, Families, and Communities
804	Human Environmental Issues Concerning Apparel, Textiles, and Residential and Commercial Structures
805	Community Institutions, Health, and Social Services
806	Youth Development
903	Communication, Education, and Information Delivery

V(H). Planned Program (External Factors)

External factors which affected outcomes

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

Brief Explanation

The economic downturn and cuts in social services over the past several years have place great strains on many social institutions and social safety nets (eg. counseling, social services, food banks, charitable organizations) with serious implications especially for disadvantaged populations. It is under these circumstances that community based volunteer organizations such as 4H Youth Development, Master Gardeners and inter-generational programs (eg Grandparents Raising Grandchildren) become especially important and valuable. CTAHR is one of the main supporters and proponents of these programs in Hawaii.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

n/a

Key Items of Evaluation

n/a

V(A). Planned Program (Summary)

Program # 5

1. Name of the Planned Program

Health and Wellness of Hawaii's Families and Communities

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
607	Consumer Economics	0%		3%	
608	Community Resource Planning and Development	0%		7%	
701	Nutrient Composition of Food	0%		5%	
703	Nutrition Education and Behavior	31%		5%	
724	Healthy Lifestyle	9%		7%	
801	Individual and Family Resource Management	20%		0%	
802	Human Development and Family Well-Being	40%		23%	
803	Sociological and Technological Change Affecting Individuals, Families, and Communities	0%		14%	
804	Human Environmental Issues Concerning Apparel, Textiles, and Residential and Commercial Structures	0%		11%	
806	Youth Development	0%		14%	
903	Communication, Education, and Information Delivery	0%		11%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2017	Extension		Research	
	1862	1890	1862	1890
Plan	5.0	0.0	3.0	0.0
Actual Paid	4.5	0.0	1.9	0.0
Actual Volunteer	0.0	0.0	6.1	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
61740	0	107622	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
61740	0	107622	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
1194	0	278532	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Economic constraints, Hawaii's aging population, and social and cultural factors affecting food choice all contribute to health and wellness in Hawaii. Obesity and diabetes are common medical problems in Pacific populations. Healthy nutrition and consumption using locally available foods required integrated research and extension efforts.

Research indicates that adequate protein intake is beneficial for weight loss, especially when protein sources provide significant amounts of the amino acid leucine. The optimal protein intake level may be 50 to 100% greater than the current Recommended Dietary Allowance (RDA) for protein. CTAHR's research providing additional information to previous data analysis from the National Health and Nutrition Examination Survey (NHANES), has improved current knowledge of the role of dietary protein in the maintenance of healthy body weight, obesity and associated disease factors.

In Hawaii, 90% of taro is processed into a paste form called poi which contains lactic acid bacteria (LAB) and yeast. CTAHR's research showed that LAB isolated and identified from poi were found to exhibit high tolerance to low pH and bile. Preliminary results suggest that bacteriocins produced by the isolates could offer a promising tool for the inhibition of pathogenic bacteria in food.

Extension activities have focused on translating current science-based nutrition information and disseminating it to the public. A weekly "Health Options" column in the major local newspaper has a readership of over 350,000 adults on the island of Oahu alone, not including the other islands or youth. A "Got Nutrients" website with "Daily Tips" provided information on nutrition, exercise or health-related topics to over 2,200 subscribers.

For our small island state where people live in close proximity, overall health management of psychological stress and substance abuse are critical for individuals, families, and communities. This is particularly important in Hawaii's multicultural society, where individuals and families from diverse cultures, often with very different traditions and daily routines, must work harmoniously to form functional communities.

Research and extension efforts in FY2017 addressed aging, documenting the life-lessons in multiple domains of older adults as guides for life-planning in children and young adults. CTAHR also identified a statewide shortage of childcare, a critical shortage of infant care, and childcare deserts in regions around the state via data analysis and GIS mapping in a Hawaii Early Learning Needs Assessment program. Results of this work reached over 1,700 people and are being used for recommendations for advocacy and policy development. An Early Childhood Social Emotional Training and Consultation project was started providing training to 12 preschool classrooms to train teachers about dealing with challenging behavior in early childhood settings. Results of this work included increased knowledge of early childhood professionals, advocates, and state agency staff concerning availability, cost, and quality of childcare and early learning programs, along with action steps to improve these conditions.

2. Brief description of the target audience

The target clients are the general public. However, some programs, such as the expanded Food and Nutrition Program and the Supplemental Nutrition Assistance program were geared toward specific groups such as low income families and families on food stamps. Specialized programs are also targeting seniors and youth. High risk groups include minority populations, Pacific Islanders, obese and diabetic individuals.

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2017	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	4312	1463631	620	22

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

Patent Applications Submitted

Year: 2017
 Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2017	Extension	Research	Total
Actual	0	4	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of outreach activities and events conducted

Year	Actual
2017	89

Output #2

Output Measure

- Presentations at international and national meetings.

Year	Actual
2017	18

Output #3

Output Measure

- Grant proposals submitted.

Year	Actual
2017	23

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Number of people who increased their knowledge in health and wellness through outreach activities
2	Total dollar value of grants and contracts obtained.

Outcome #1

1. Outcome Measures

Number of people who increased their knowledge in health and wellness through outreach activities

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2017	5765

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Issue (Who cares and Why)

Health and wellness of families and communities requires that scientific information be presented to the public in ways that they can grasp and use to modify their behavior.

What has been done

What has been done

Workshops, extension publications, informal training and we-based information has been developed and implemented.

Results

Results

Hawaii's families and communities have the opportunity to achieve healthier lifestyle and improve wellness.

4. Associated Knowledge Areas

KA Code	Knowledge Area
607	Consumer Economics

608	Community Resource Planning and Development
701	Nutrient Composition of Food
703	Nutrition Education and Behavior
724	Healthy Lifestyle
801	Individual and Family Resource Management
802	Human Development and Family Well-Being
803	Sociological and Technological Change Affecting Individuals, Families, and Communities
804	Human Environmental Issues Concerning Apparel, Textiles, and Residential and Commercial Structures
806	Youth Development
903	Communication, Education, and Information Delivery

Outcome #2

1. Outcome Measures

Total dollar value of grants and contracts obtained.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2017	666124

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Extramural funding is needed to augment program funds for health and wellness.

What has been done

Extramural grants were received and funding utilized in support of the program.

Results

Health and wellness programs and extension outreach were expanded with the additional grant funds.

4. Associated Knowledge Areas

KA Code	Knowledge Area
607	Consumer Economics
608	Community Resource Planning and Development
701	Nutrient Composition of Food
703	Nutrition Education and Behavior
724	Healthy Lifestyle
801	Individual and Family Resource Management
802	Human Development and Family Well-Being
803	Sociological and Technological Change Affecting Individuals, Families, and Communities
804	Human Environmental Issues Concerning Apparel, Textiles, and Residential and Commercial Structures
806	Youth Development
903	Communication, Education, and Information Delivery

V(H). Planned Program (External Factors)

External factors which affected outcomes

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

Brief Explanation

When the economy is weak, public and private funding decreases and is more difficult to obtain. When funding has decreased, other issues may be considered priorities and compete for available funds.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

n/a

Key Items of Evaluation

n/a

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
101	Appraisal of Soil Resources	0%		7%	
102	Soil, Plant, Water, Nutrient Relationships	37%		0%	
104	Protect Soil from Harmful Effects of Natural Elements	0%		6%	
131	Alternative Uses of Land	0%		2%	
201	Plant Genome, Genetics, and Genetic Mechanisms	0%		17%	
204	Plant Product Quality and Utility (Preharvest)	0%		2%	
205	Plant Management Systems	36%		2%	
211	Insects, Mites, and Other Arthropods Affecting Plants	0%		4%	
212	Pathogens and Nematodes Affecting Plants	0%		15%	
216	Integrated Pest Management Systems	0%		5%	
301	Reproductive Performance of Animals	0%		3%	
302	Nutrient Utilization in Animals	27%		5%	
305	Animal Physiological Processes	0%		6%	
306	Environmental Stress in Animals	0%		3%	
307	Animal Management Systems	0%		4%	
503	Quality Maintenance in Storing and Marketing Food Products	0%		2%	
511	New and Improved Non-Food Products and Processes	0%		3%	
601	Economics of Agricultural Production and Farm Management	0%		6%	
607	Consumer Economics	0%		1%	
608	Community Resource Planning and Development	0%		7%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2017	Extension		Research	
	1862	1890	1862	1890
Plan	6.0	0.0	6.0	0.0
Actual Paid	5.4	0.0	10.1	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
116409	0	458188	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
116409	0	458188	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
138588	0	1901825	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

CTAHR strongly supports this national priority. This program area utilized integrated research and extension projects to provide knowledge and technologies to generate and improve food products and processing for existing local and export markets.

With virtually no local sources of animal feed, livestock and feed efforts continued on cattle genetics and muscle development, biological indicators of stress, development of local animal feed sources, best-management practices for drought-stricken pastures, and relationship between cattle stocking density and grazing strategies to animal performance.

CTAHR continued its work on insect pests such as the imported cabbage webworm and diamond back moth; invasive weeds affecting livestock such as fireweed; and disease control such as basil downy mildew. IPM work using greenhouses for pest exclusion and using biologically-based fungicides such *Beauveria bassiana* have been continued.

Go Farms Hawaii, a New Beginning Farmer Education Program, provided hands-on training to encourage new farmers and to assist existing farmers. Hawaii's Sustainable and Organic Agricultural Program (SOAP) provided extensive in-service training for government agencies and farmers, while exploring and adopting economically viable production methodologies.

Hawaii's coffee industry valued at over \$62.2 million produces some of the world's finest coffee. A major pest, the coffee berry borer (*Hypothenemus hampei*) has threatened this industry in recent years. Extension's efforts combined with a research team of scientists from USDA-ARS and CTAHR has resulted in increased adoption of IPM strategies for CBB management, leading to decreased bean damage. Survey responses indicate a 37.5% increase from FY2013 to FY2017 in the adoption and implementation of field sanitation, the most important CBB control activity. About 95% of growers spray recommended commercial products containing *Beauveria bassiana* at least every 4 weeks to kill CBB in the field versus 74% of grower in 2013.

The Hawaii Expanded Food and Nutrition Education Program (EFNEP) and Hawaii's Nutrition Education

for Wellness (NEW) programs have brought about significant improvements in food resource management, nutrition practices, and food safety practices as reported by stakeholders in FY2017 as compared to FY 2016. There was a total of 4,185 direct and indirect contacts among adults and youth. Data was collected based on pre- and post family records of 334 adults and 511 youths. Adults reported improvements as follows: in one or more food resource management practices (86%, up from 78%); in one or more nutrition practices (90%, up from 83%); in one or more food safety practices (71%, up from 68%); in being physically active (29%, same as last year at 29%); and positive change (any food group) (91%, same as last year at 91%). Youth that reported improvements that were similar as last year. Youth improvements were as follows: in one or more diet quality practices (88%); in one or more food safety practices (58%); in one or more physical activity practices (62%); in one or more food security practices (33%); and in one or more food resource management practices (58%).

2. Brief description of the target audience

This program audience is quite diverse, encompassing ranchers and commercial and hobbyist livestock producers in Hawaii and the American-affiliated Pacific Islands, food industries and marketers, as well as scientists, students, and educators involved in knowledge generation and dissemination. Since the general public in the Pacific Islands is increasingly interested in food sustainability issues, the audience can include large segments of the population.

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2017	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	2905	8523	2913	951

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

Patent Applications Submitted

Year: 2017
 Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2017	Extension	Research	Total
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Actual	9	46	0
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V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of workshops, field days and demonstrations.

Year	Actual
2017	68

Output #2

Output Measure

- Presentations at international and national meetings

Year	Actual
2017	49

Output #3

Output Measure

- Grant proposals submitted

Year	Actual
2017	46

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Number of people that adopt one or more recommended practices.
2	Total dollar value of grants and contracts obtained

Outcome #1

1. Outcome Measures

Number of people that adopt one or more recommended practices.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2017	3460

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Issue (Who cares and Why)

People need to be more competitive in reducing costs and/or increasing revenues. Currently many farmers and ranchers are struggling to stay in business and produce food for global consumers. At the same time increased food production in home gardens and backyards can be an important supplement to incomes and local food sufficiency. Better food processing and marketing practices will leader to greater profitability, food availability and food safety.

What has been done

What has been done

Workshops demonstrations, field days, presentations, websites, and publications have changed many people's knowledge and behavior so they can better achieve their sustainable food production goals.

Results

Results

Hawaii and Pacific Island farmers, ranchers and residents are more competitive and the local supplies of food will be more abundant and secure.

4. Associated Knowledge Areas

KA Code	Knowledge Area
101	Appraisal of Soil Resources
102	Soil, Plant, Water, Nutrient Relationships
104	Protect Soil from Harmful Effects of Natural Elements
131	Alternative Uses of Land
201	Plant Genome, Genetics, and Genetic Mechanisms
204	Plant Product Quality and Utility (Preharvest)
205	Plant Management Systems
211	Insects, Mites, and Other Arthropods Affecting Plants
212	Pathogens and Nematodes Affecting Plants
216	Integrated Pest Management Systems
301	Reproductive Performance of Animals
302	Nutrient Utilization in Animals
305	Animal Physiological Processes
306	Environmental Stress in Animals
307	Animal Management Systems
503	Quality Maintenance in Storing and Marketing Food Products
511	New and Improved Non-Food Products and Processes
601	Economics of Agricultural Production and Farm Management
607	Consumer Economics
608	Community Resource Planning and Development

Outcome #2

1. Outcome Measures

Total dollar value of grants and contracts obtained

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2017	1654556

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Issue (Who cares and Why)

Funds are needed to undertake research and extension activities to assist agricultural producers and home gardeners.

What has been done

What has been done

Extramural grants have been received and funding utilized in support of the program.

Results

The information needed by the public will be provided and the size of Hawaii's economy will increase if more external funds are received and more assistance can be provided to producers and the public.

4. Associated Knowledge Areas

KA Code	Knowledge Area
101	Appraisal of Soil Resources
205	Plant Management Systems
301	Reproductive Performance of Animals
305	Animal Physiological Processes
306	Environmental Stress in Animals
307	Animal Management Systems
503	Quality Maintenance in Storing and Marketing Food Products
511	New and Improved Non-Food Products and Processes
601	Economics of Agricultural Production and Farm Management
607	Consumer Economics
608	Community Resource Planning and Development

V(H). Planned Program (External Factors)

External factors which affected outcomes

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

Brief Explanation

Natural disasters such as hurricanes, typhoons, floods, fires, often are destructive to crops, livestock operations, and home garden production. When these events occur, local food production can be temporarily disrupted and island residents become increasingly dependent on imported foods. If transportation facilities are also impaired, local food shortages occur. Under normal conditions, island food production and processing is greatly impacted by mainland and foreign producers with greater economies of scale. This leads local producers and processors to specialize in niche markets, which leads to a high percentage of imported foods, particularly for many staple food materials. Also fragile island environments have led to many government regulations on land use, food production and pollution control, which are perceived by producers as stifling their productivity and profitability. When local economies experience downturns, public priorities that relate to health and safety can be stressed, causing less funding to be available to on-going research, education and public outreach.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

n/a

Key Items of Evaluation

n/a

V(A). Planned Program (Summary)

Program # 7

1. Name of the Planned Program

Climate Change

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%		13%	
111	Conservation and Efficient Use of Water	0%		21%	
112	Watershed Protection and Management	0%		11%	
122	Management and Control of Forest and Range Fires	33%		10%	
123	Management and Sustainability of Forest Resources	0%		5%	
132	Weather and Climate	33%		23%	
133	Pollution Prevention and Mitigation	0%		12%	
213	Weeds Affecting Plants	34%		0%	
405	Drainage and Irrigation Systems and Facilities	0%		5%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2017	Extension		Research	
	1862	1890	1862	1890
Plan	1.0	0.0	1.0	0.0
Actual Paid	0.3	0.0	0.4	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
6995	0	81900	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
6995	0	81900	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	279210	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Research efforts in FY2017 continued to focus on measurement and management of changes in carbon cycling and storage in Hawaiian terrestrial systems as a result of regional and global climate change. The research and extension work proposed here were designed to inform management of Hawaiian terrestrial ecosystems regarding carbon cycling. Specifically, this work was designed to assess current and future carbon flux and storage in Hawaiian terrestrial ecosystems, including the impacts of: (i) climate change; (ii) non-native invasions; and (iii) wildfire.

The Cooperative Extension Service, CTAHR, and the University of Hawaii has become recognized as a valued resource among the fire and land management community in Hawaii and the Pacific through the outputs and relationships developed by the Wildland Fire Program. The program regularly fields requests for technical assessments and advice on mitigation and post-fire response projects, participation in and facilitation of multi-agency wildfire meetings and coordinating groups, and providing syntheses of existing data and expertise on novel analyses. Through development and management of the Pacific Fire Exchange (PFX; with partners at the US Forest Service and Hawaii Wildfire Management Organization) the Wildland Fire Program has created a platform for delivering science-based best practices, creating opportunities for new collaborations and partnerships through field tours, workshops and workshops, and established an infrastructure for tracking stakeholder needs and program success.

A Hawaii Extension Climate Forum was conducted with over 40 extension faculty and presenters from the US Forest Service, the Pacific Islands Climate Change Cooperative, Pacific-RISA, Sea Grant, and the Pacific Islands Climate Science Center. This forum helped to share and develop fundamental knowledge of Pacific climate systems and long-term climate projections. It also helped to identify relevant climate-related tools, and to outline approaches to integrate climate science and climate-change communication into existing extension programs.

2. Brief description of the target audience

Efforts to measure and mitigate the impact of climate variability on forests and soils target both government agencies and NGOs concerned with resource management and private landowners. Agricultural producers are addressed in work with extension agents to develop tools to explain climate impacts and recommendations for mitigation. Private and public landowners, and all parties involved in wildfire management in the Pacific are addressed through the Wildland Fire Program and the Pacific Fire Exchange.

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2017	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	10	0	0	275

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

Patent Applications Submitted

Year: 2017
 Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2017	Extension	Research	Total
Actual	0	13	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of workshops, field days, or demonstrations conducted

Year	Actual
2017	4

Output #2

Output Measure

- Presentations at national and international meetings.

Year	Actual
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2017 10

Output #3

Output Measure

- Grant proposals submitted.

Year	Actual
2017	34

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Number of people who increase their knowledge or complete non-formal education on climate change related issues.
2	Dollar value of grants and contracts obtained.

Outcome #1

1. Outcome Measures

Number of people who increase their knowledge or complete non-formal education on climate change related issues.

Not Reporting on this Outcome Measure

Outcome #2

1. Outcome Measures

Dollar value of grants and contracts obtained.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2017	908286

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Issue (Who cares and Why)

Extramural funding is necessary to determine the impacts of climate change on Hawaii and other Pacific Island natural resources, and the agricultural sectors and communities supported by those resources.

What has been done

What has been done

Funds were solicited from extramural agencies

Results

Results

Funding obtained enables further research on the issues associated with climate change in the Pacific Basin.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
111	Conservation and Efficient Use of Water
112	Watershed Protection and Management
122	Management and Control of Forest and Range Fires
123	Management and Sustainability of Forest Resources
132	Weather and Climate
133	Pollution Prevention and Mitigation
213	Weeds Affecting Plants
405	Drainage and Irrigation Systems and Facilities

V(H). Planned Program (External Factors)

External factors which affected outcomes

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

Brief Explanation

This is a developing program for the college. Higher resolution data needs to be obtained to track coastal sediment plumes over time. Models of fire behavior developed in temperate regions are not necessarily transferable to the tropics, and there is a need for improved tropical models.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

n/a

Key Items of Evaluation

n/a

V(A). Planned Program (Summary)

Program # 8

1. Name of the Planned Program

Sustainable Energy

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%		50%	
402	Engineering Systems and Equipment	0%		50%	
	Total	0%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2017	Extension		Research	
	1862	1890	1862	1890
Plan	1.0	0.0	1.0	0.0
Actual Paid	0.0	0.0	0.4	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	85849	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	85849	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	45250	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Hawaii has the highest energy costs in the nation, due to dependence on imported fossil fuels for power and transportation. There is an urgent need to develop local energy/feed and biobased products

production capacity to improve Hawaii energy security and to reduce our dependency on imports. Any proposed biorefinery would require reliable energy crop performance information, including crop yields and input requirements, conversion technology, economics and sustainability assessments. Our plan of work is to demonstrate that an economically viable biorefinery is feasible in Hawaii, not only for the State of Hawaii but whole continental U.S. Research was continued with field trials in FY2017 to evaluate perennial grasses grown on marginal lands as feedstock for ethanol production. The feasibility of combining biofuel and animal forage production via napier grass / pearl millet crosses with drought resistance and high biomass yield continued to be explored.

2. Brief description of the target audience

Hawaiian Electric Company is a target for improved energy production, and partially supports this research. The DOD Office of Naval Research is also interested in providing the military with clean, renewable transportation fuel. Private firms such as Hawaiian Commercial and Sugar Company (HC&S) (grasses), Pacific Biodiesel Inc., Zechem Inc., and Hawaii Pure Plant Oil (HPPO) (Jatropha) are partners and target audiences for these efforts. Lastly, the Hawaii Agricultural Research Center (HARC), Hawaii Natural Resources Institute, College of Micronesia, University of Guam, Oregon State University, and Washington State University are collaborators in current efforts and audiences for improved biofuel production technologies. With respect to development of alternative energy production methods, such as photovoltaic solar dryers, for agricultural producers, all producers in Hawaii and the American Pacific are part of the audience.

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2017	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: 2017
 Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2017	Extension	Research	Total
Actual	0	0	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Grant proposals submitted

Year	Actual
2017	8

Output #2

Output Measure

- Presentations at national and international meetings.

Year	Actual
2017	2

Output #3

Output Measure

- Number of workshops and other educational/outreach activities held.
Not reporting on this Output for this Annual Report

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Identified types of bioenergy crops suitable for Hawaii environment.
2	Dollar value of grants and contracts received

Outcome #1

1. Outcome Measures

Identified types of bioenergy crops suitable for Hawaii environment.

Not Reporting on this Outcome Measure

Outcome #2

1. Outcome Measures

Dollar value of grants and contracts received

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2017	138992

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Utility companies, landowners and farmers who could grow biofuel crops, municipalities, and homeowners have a strong sense of the need for sustainable energy. The State of Hawaii has as its goal to convert to 100% renewable energy by 2045.

What has been done

Research has continued on biofuel crops and bioenergy conversion technologies.

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
402	Engineering Systems and Equipment

V(H). Planned Program (External Factors)

External factors which affected outcomes

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

Brief Explanation

When the economy slows down, government appropriations decrease accordingly, placing a burden on existing programs that carry out sustainable energy research. Natural disasters and especially drought can have a significant effect on negatively impacting biofuel crops, thereby decreasing capacity for energy conversion.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

n/a

Key Items of Evaluation

n/a

V(A). Planned Program (Summary)

Program # 9

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
703	Nutrition Education and Behavior	75%		50%	
724	Healthy Lifestyle	25%		33%	
803	Sociological and Technological Change Affecting Individuals, Families, and Communities	0%		17%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2017	Extension		Research	
	1862	1890	1862	1890
Plan	1.0	0.0	1.0	0.0
Actual Paid	0.2	0.0	0.1	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
4810	0	30222	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
4810	0	30222	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

Health and wellness have long been issues for Hawaii's communities. The Center for Disease Control and Prevention stated that native Hawaiians are in worse health than many other Americans, and that they were more likely to suffer from asthma, diabetes, and obesity. The study indicated that nearly 40% of native Hawaiians are obese. The high cost of living in Hawaii and the resulting need for multiple incomes in the household reduce time and energy available for food preparation, leading to greater consumption of fast foods. In addition, cultural practices in Hawaii place emphasis on food consumption as a part of virtually all social activities, and the local diet is high in starch (e.g., white rice, macaroni salad) and fat (e.g., processed meat products, fried items). Health and wellness programming in CTAHR focused on both adults and children, particularly in response to the prevalence of childhood obesity. For example, the rate of obesity in children in Hawai'i ages 6 to 11 is twice the national average, and recent research identified 35% of eight-year olds as obese. CTAHR faculty participate in regional and national efforts to identify the factors contributing to weight gain in young children, particularly in low-income households in order to develop obesity prevention programs.

The Children's Healthy Living Program for Remote Underserved Minority Populations of the Pacific (CHL) was a major effort to integrate research on diet and obesity factors in native Pacific populations with culturally appropriate community-scale interventions in Hawaii, American Samoa, Northern Marianas, Guam, Palau, Micronesia and Alaska. CHL initiated a CHL Summer Institute program in FY 2016 integrating Extension and Instructional programs by transforming specialized curriculum in child obesity prevention, health and measurement. The CHL Summer Institute 2017 has grown educating 126 students (24 more students than the previous year) and bringing in over \$70,000 (\$20,000 more than the previous year) in tuition via the UH Outreach College.

A GET (Grow, Eat and Think) Local program was initiated by extension agents across the state to strengthen connections within the food system and to support local agriculture, including healthful uses of local products. An extension initiative was also being developed around the theme of Healthy Communities via a More Sustainable Food System. This initiative will better integrate extension's health and nutrition programs with extension's farm production and food systems programs. Work was also initiated to examine the impact of parental / caregiver attitudes and actions on adolescent eating and exercise behaviors, and identification of culturally appropriate parental best practices. Cohabiting extended families are also common in Hawaii and Pacific populations, and older adults were selected for interviews, recording of reminiscence films, and subsequent construction of "life advice" films to promote healthy adolescent behaviors.

2. Brief description of the target audience

Target audiences are food producers and retailers, caregivers, and members of the public (particularly those from Pacific lineages at risk from diabetes), both in the community at large (as in schools and after-school programs) or participating in community wellness programs and community development programs such as 4H. Current programs focus on children and families from at-risk native populations in communities in Hawaii, and across the Pacific region.

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2017	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	239	416	50	2

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

Year: 2017
 Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2017	Extension	Research	Total
Actual	0	8	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of workshops, filed days, or demonstrations conducted.

Year	Actual
2017	3

Output #2

Output Measure

- Presentations at national and international meetings.

Year	Actual
2017	1

Output #3

Output Measure

- Grant proposals submitted.

Year	Actual
------	--------

2017

16

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Number of stakeholders who increased knowledge in at least one issue.
2	Dollar value of grants and contracts obtained.

Outcome #1

1. Outcome Measures

Number of stakeholders who increased knowledge in at least one issue.

Not Reporting on this Outcome Measure

Outcome #2

1. Outcome Measures

Dollar value of grants and contracts obtained.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2017	576581

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Resources are needed to organize and implement healthy living and obesity prevention programs for children in Hawaii and the Pacific Basin.

What has been done

Extramural resources were solicited to promote healthy living and develop and implement methods and tools to combat childhood obesity.

Results

Resources were obtained to promote healthy living and develop and implement methods and tools to combat childhood obesity.

4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior
724	Healthy Lifestyle
803	Sociological and Technological Change Affecting Individuals, Families, and Communities

V(H). Planned Program (External Factors)

External factors which affected outcomes

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

Brief Explanation

Brief Explanation

This is a program area with limited faculty, and requires developing relationships with community-based organizations. State and federal regulations governing the inclusion of children in research can cause delays in program initiation and implementation. Therefore, CTAHR is reviewing using faculty across departments and using faculty from its Center on the Family to possibly assist in research, population data collection, and web mapping needy communities.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

n/a

Key Items of Evaluation

n/a

V(A). Planned Program (Summary)

Program # 10

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	0%		30%	
503	Quality Maintenance in Storing and Marketing Food Products	0%		14%	
607	Consumer Economics	10%		0%	
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources	0%		10%	
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins	20%		36%	
723	Hazards to Human Health and Safety	15%		10%	
724	Healthy Lifestyle	20%		0%	
903	Communication, Education, and Information Delivery	35%		0%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2017	Extension		Research	
	1862	1890	1862	1890
Plan	1.0	0.0	1.0	0.0
Actual Paid	1.7	0.0	0.9	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
90432	0	76226	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
90432	0	76226	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
87908	0	178330	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Policies on Good Agricultural Practices and Good Handling Practices have been developed to minimize the risk of food borne illnesses and insure a safe food supply. Implementation of the Food Safety Modernization Act (FSMA) is putting edible crop producers' agricultural practices under close scrutiny and raising anxiety among producers over the costs associated with implementation. Increased food safety measures may minimize hazards related to microbial food borne illnesses and increase consumer confidence in the safety of locally produced fruits and vegetables.

Hawaii is facing a serious problem of Rat Lung Worm Disease (RLWD) due to produce contaminated with slugs carrying the RLWD nematode that causes severe neurological problems for the victim when ingested accidentally. A Governor's Multi-Agency Task Force on RLWD was formed that included CTAHR, to address this serious problem. With increased public concerns, CTAHR intensified its outreach efforts by forming a Food Safety team including eight extension agents and a food safety specialist to educate growers and the public about food safety, FSMA regulations, and RLWD at home settings, on the farm, and in produce packing areas. The team conducted 59 FSMA and RLWD related educational workshops reaching over 4,500 adults and youth. Hand hygiene education at schools and community events utilizing 35 volunteers reached 2,250 youth and school staff. Resource materials were continually developed and improved. In addition, CTAHR extension faculty offered workshops for socially disadvantaged producers on risk management, correct handling and application of pesticides, fertilizer/pesticide monitoring and record keeping, and sanitation requirements to reduce the risk of food-borne illness. CTAHR faculty also conducted food handling workshops on preventive controls for employees in food processing facilities throughout Hawaii. Multistate activities included developing Extension food policy and food safety courses for food inspectors for Temporary Food Establishment Food Safety.

A method for post-harvest microbial decontamination of fresh produce surfaces was developed using a pulsed carbon dioxide laser in combination with conjugated gold nanoparticles applied to the fruit surface. This was found to be effective in achieving a 90% microbial reduction from the surface of mango and other heat-sensitive foods. Work also continued to refine the use of lime and orange juices as safe antimicrobial preservatives for fresh produce, and java plum juice was found to have strong antimicrobial activity.

2. Brief description of the target audience

This program reaches from farms to food processing facilities to food establishments; and to consumers, hospitals and research facilities. Prevention, detection and mitigation of food-borne pathogens is a critical

concern for local farms and processing facilities, home gardeners, medical facilities, and retailers of food products.

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2017	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	4479	3300	130	2650

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

Patent Applications Submitted

Year: 2017
 Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2017	Extension	Research	Total
Actual	0	26	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of workshops, field days and demonstrations

Year	Actual
2017	80

Output #2

Output Measure

- Presentations at national and international meetings.

Year	Actual
2017	14

Output #3

Output Measure

- Grant proposals submitted.

Year	Actual
2017	4

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Number of people adopting one or more practices which result in improved food safety.
2	Dollar value of grants and contracts obtained.

Outcome #1

1. Outcome Measures

Number of people adopting one or more practices which result in improved food safety.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2017	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

The consumer is genuinely concerned about the ability to obtain foods that will be safe to eat, without the fear of produce, meats, and edible agricultural products being contaminated with harmful biological organisms. The food producers, that is, the farmers, as well as food processors are concerned about the additional costs that they must bear in order to meet the FDA's Food Safety Modernization Act's requirements.

What has been done

A CTAHR food safety team has been established statewide and workshops have been on-going regarding on-farm and processing facility food safety information. These have been in conjunction with the Hawaii Departments of Agriculture and Health.

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
501	New and Improved Food Processing Technologies
503	Quality Maintenance in Storing and Marketing Food Products
607	Consumer Economics
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins
723	Hazards to Human Health and Safety

724 Healthy Lifestyle
903 Communication, Education, and Information Delivery

Outcome #2

1. Outcome Measures

Dollar value of grants and contracts obtained.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2017	60578

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Issue (Who cares and Why)

Improved food safety practices by food producers, processors and consumers are needed to protect public health. Funding is needed to support these programs, as well as research on improving food safety.

What has been done

What has been done

Extramural funds have been obtained in support of research and educational programs in food safety.

Results

Results

Hawaii's food supply is safer, and Hawaii's agricultural industry is more competitive and better prepared for the Food Safety Modernization Act and compliance programs required by retailers.

4. Associated Knowledge Areas

KA Code	Knowledge Area
501	New and Improved Food Processing Technologies
503	Quality Maintenance in Storing and Marketing Food Products
607	Consumer Economics
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins
723	Hazards to Human Health and Safety
724	Healthy Lifestyle
903	Communication, Education, and Information Delivery

V(H). Planned Program (External Factors)

External factors which affected outcomes

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

Brief Explanation

Retailers and consumers have a strong interest in food safety, but processors and farmers face difficulties due to the costs associated with food safety certification compliance. Food safety regulations and buyer expectations are changing over time. Thus, extramural funding in support of this program, and public/client and political interest is often inconsistent and changes with this and other competing program needs.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

n/a

Key Items of Evaluation

n/a

VI. National Outcomes and Indicators

1. NIFA Selected Outcomes and Indicators

Childhood Obesity (Outcome 1, Indicator 1.c)	
0	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 with climate adaptive traits.
Global Food Security and Hunger (Outcome 1, Indicator 4.a)	
0	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.