

2010 University of Hawaii Combined Research and Extension Annual Report of Accomplishments and Results

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I. Report Overview

1. Executive Summary

This was a year of transition for the College of Tropical Agriculture and Human Resources (CTAHR), at the University of Hawaii at Manoa (UHM). Programmatically, CTAHR reshaped its research and extension activities from seven identified program areas into the ten program areas described in this Annual Report and in the FY2011 Plan of Work. This realignment includes both the five national areas of activity prioritized by USDA NIFA, and programs to meet the unique needs of Hawaii as a tropical, Pacific basin, island state.

Within these ten program areas, CTAHR faculty continued their history of strong research and extension efforts to increase local agricultural productivity; further the cultivation and processing of specialty crops and products; manage Hawaii's land and water resources for a sustainable future; battle invasive pests; and promote physical, mental and economic health in Hawaii's citizens and their communities. For example, development of novel agricultural products, such as the award-winning new line of ornamental *Colocasia* patented by CTAHR plant geneticists during this reporting period, has a positive impact on the entire state economy; while distribution of information on the relative dietary availability of iron in local foods by CTAHR dieticians addresses the serious problem of iron deficiency.

Invasive pests (insects, weeds, pathogens) are particularly significant constraints on agricultural systems, natural resources, and the urban environment in Hawaii. The Hawaii Department of Agriculture has estimated that 17 new insect species, many vectoring plant pathogens, are introduced each year. For example, a new species of leafhopper vectoring a phytoplasma causing aster yellows disease attacked watercress across the island of Oahu in the past several years. Invasive plants such as fire weed are increasing problems in range land on the island of Hawaii, while others such as strawberry guava threaten to overrun areas of native forest. CTAHR faculty cooperate with state and federal agencies in Hawaii to rapidly detect and manage new threats, often through the introduction or enhancement of biological control agents in order to minimize the impact of control measures on natural resources and the human population.

In response to the natural limitations on land and water in an island state, CTAHR faculty have initiated efforts to monitor and model the impacts of climate change and human actions on carbon cycling and Hawaii's watersheds. A similar concern with ensuring a sustainable future for Hawaii drives CTAHR bioenergy research to identify optimal plants for ethanol production, such as Napier grass and high-yielding *Jatropha* genotypes. New programs on childhood obesity and food safety address public health concerns. Obesity is a major problem in Pacific island populations; while bacterial contamination of fresh produce has not occurred in Hawaii, but is a significant concern that CTAHR is addressing through bioengineering of new assays for rapid bacterial detection; development of novel food preservation methods; and best agricultural practices and food safety certification programs for small farmers.

CTAHR's research and extension efforts are tempered by the fact that Hawaii's financial downturn has resulted in a significant reduction of 26% (\$66M) in state support to the university (UHM). Labor agreements with public unions, although softened in the short-term by furloughs and temporary salary reductions, will increase UHM operating costs over the next three years. Coupled with the loss of federal

stimulus funds after fiscal year 2011, this translates into a substantial budget gap that must be filled by cost savings and other revenue sources.

Although budgetary restrictions affect all CTAHR units, the college has managed to function effectively through flexible and creative management of resources. These measures to improve efficiency, and decrease and redistribute expenses over a longer time period, include:

- 10% reduction in electricity allocation for off-campus units;
- Reduction in upkeep funds to departments (60%) and county offices (40%);
- Use of networked scanners to reduce paper usage;
- Reduction of neighbor island travel by utilizing video conferencing;
- Elimination of underutilized phone and fax lines;
- Reduction in the number of hours air conditioning is provided to offices and laboratories;
- Extended distribution of start-up funds to new faculty over three years rather than two.

The 16 retirements within the college during 2010, were offset by approval to recruit 14 faculty, 3 professional staff, and 3 temporary staff positions; funded both by retirement cost savings and new university initiatives for more equitable distribution of tuition revenue. This major investment by the college in faculty and staff positions strengthens CTAHR's ability to meet current obligations and address future challenges.

FY2010 has also been a year of major leadership changes in CTAHR. Dr. Andrew Hashimoto stepped down on June 30, 2010, after ten years as Dean, and Dr. Sylvia Yuen was appointed Interim Dean. Dr. Linda Cox served as the Interim Associate Dean for Extension from December 2009 to August 2010. At present, the college has a new administrative team with Interim Dean Yuen, Interim Associate Dean for Research J. Kenneth Grace, Interim Associate Dean for Extension Carl Evensen, and continuing Dean for Academic Affairs, Charles Kinoshita.

This new leadership team has sought to build on the successes of the previous administration and has also implemented new initiatives to strengthen college organization and funding capacity, enhance communication and college culture, increase the numbers of students served, foster collaboration within and beyond the college, and emphasize transparency and accountability. These efforts have promoted increased integration of research and extension programming through internal competitive funding opportunities that prioritize such integration, encourage multistate cooperation, and emphasize the five program areas prioritized by NIFA.

Total Actual Amount of professional FTEs/SYs for this State

Year: 2010	Extension		Research	
	1862	1890	1862	1890
Plan	42.0	0.0	46.5	0.0
Actual	61.2	0.0	54.4	0.0

II. Merit Review Process

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

- Internal University Panel

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

2. Brief Explanation

CTAHR continues to use expert peer review panels to review individual Plans of Work, projects, publications, promotion and tenure applications, and post tenure reviews. All reviewers are asked to determine if the program or project address 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 draft proposal that is ready for review is transmitted to the department's ad hoc Peer Review Committee. This committee is comprised of three departmental members who are familiar with the issue 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. CTAHR administrators, program leaders and faculty may serve as resources to clarify plans of work for reviewers. Final review for 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
- Targeted invitation to selected individuals from general public
- Survey of traditional stakeholder groups
- Survey of traditional stakeholder individuals
- Survey of the general public
- Survey specifically with non-traditional groups
- Survey specifically with non-traditional individuals
- Survey of selected individuals from the general public
- Other

Brief explanation.

As a standard practice CTAHR includes stakeholders in search committees for all faculty positions, including researcher, extension specialist and agent positions, county administrators, department chairs, and college administrators. CTAHR faculty work closely with industry groups who work with and often advise these groups. This close working relationships provides a means for encouraging stakeholder participation and input on all matters of mutual concern. If CTAHR faculty is not available in a particular locale, stakeholders often call upon college administrators or the county administrators with their input and concerns.

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
- Other

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 community. Most of the commodities and program areas have one or more organizations representing their commodity 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 with the general public (open meeting advertised to all)
- Survey of the general public
- Meeting specifically with non-traditional groups
- Survey specifically with non-traditional groups
- Meeting specifically with non-traditional individuals
- Survey specifically with non-traditional individuals
- Meeting with invited selected individuals from the general public

- Survey of selected individuals from the general public
- Other

Brief explanation.

CTAHR employed a variety of methods including soliciting input from the CTAHR Board of Advisors (semi- annual meetings), face to face discussions with industry representatives, the Hawai'i Farm Bureau Federation, and a long standing "Industry Analysis Process" and "Strategic Planning Process" that will be used in the next several years for key industries.

Other techniques used to gather stakeholder inputs were surveys, commodity organization meetings, through feedback and input from the Farm Bureau, 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 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.

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
- Other

Brief explanation.

Input is 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 a project demonstrates that it is a stakeholder priority and has their support, chances of funding is significantly greater. Through the Industry Analysis Process, stakeholders assisted CTAHR in maintaining relevance of overall programs and help to assure program coordination among teaching, research and extension/outreach programs.

Brief Explanation of what you learned from your Stakeholders

Stakeholders from all industry groups demand more research and extension program support from CTAHR. Given the budget cuts that CTAHR has received and the hiring freeze that the State has implemented, these demands will be difficult to satisfy in the next few years. At the same time, communities across the State are facing major challenges as the unemployment rate increases and State spending is cut for nearly every program. Every group feels that their interests should be our top priority, and they demand our attention and service.

IV. Expenditure Summary

1. Total Actual Formula dollars Allocated (prepopulated from C-REEMS)			
Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
1327169	0	1459186	0

2. Totaled Actual dollars from Planned Programs Inputs				
Extension			Research	
	Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
Actual Formula	965535	0	1731163	0
Actual Matching	5092928	0	11037990	0
Actual All Other	1139149	0	3531131	0
Total Actual Expended	7197612	0	16300284	0

3. Amount of Above Actual Formula Dollars Expended which comes from Carryover funds from previous				
Carryover	0	0	271977	0

V. Planned Program Table of Content

S. No.	PROGRAM NAME
1	1. Sustain, Protect, and Manage Hawaii's Natural Resources and Environment
2	2. Hawaii's Diversified Tropical Crop Systems for Sustainability and Competitiveness
3	3. Invasive Species Education and Management
4	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

Add previously unplanned program

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

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

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	25%		14%	
111	Conservation and Efficient Use of Water	10%		6%	
112	Watershed Protection and Management	10%		5%	
121	Management of Range Resources	5%		0%	
123	Management and Sustainability of Forest Resources	10%		7%	
124	Urban Forestry	0%		2%	
125	Agroforestry	10%		4%	
132	Weather and Climate	0%		6%	
133	Pollution Prevention and Mitigation	20%		4%	
135	Aquatic and Terrestrial Wildlife	0%		5%	
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants	0%		4%	
205	Plant Management Systems	0%		7%	
211	Insects, Mites, and Other Arthropods Affecting Plants	0%		5%	
212	Pathogens and Nematodes Affecting Plants	0%		4%	
402	Engineering Systems and Equipment	0%		5%	
403	Waste Disposal, Recycling, and Reuse	10%		2%	
404	Instrumentation and Control Systems	0%		6%	
512	Quality Maintenance in Storing and Marketing Non-Food Products	0%		4%	
605	Natural Resource and Environmental Economics	0%		5%	
803	Sociological and Technological Change Affecting Individuals, Families, and Communities	0%		5%	
	Total	100%		100%	

Add knowledge area

V(C). Planned Program (Inputs)

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

Year: 2010	Extension		Research	
	1862	1890	1862	1890
Plan	1.0	0.0	6.0	0.0
Actual	3.8	0.0	5.8	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
34387	0	157983	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
322332	0	1129415	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
3826	0	243679	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Research and extension efforts to promote harmony between agriculture and environment continue to be a priority for CTAHR. Areas addressed by research and extension projects include agricultural waste management, forest resource management, agroforestry, range management, nutrient management, soil erosion, soil quality, biological diversity, rehabilitation of degraded and idle lands, handling of hazardous materials, and water quality. Research and extension efforts at preserving, protecting, and renewing Hawai'i's natural resources continue to be an area of focus.

The forestry extension program made direct contacts with 344 forest landowners, managers, and professionals through email and telephone. In addition, the forestry extension website (www.ctahr.hawaii.edu/forestry) received 39,000 visits over the year representing 33,000 unique visitors from 189 different countries. The most popular pages by far were the ones with photographs and information on Hawaiian trees.

Hawai'i has the most critically endangered species within the United States, due primarily to competition from introduced species and habitat fragmentation/degradation. One habitat that has been substantially degraded through anthropogenic activities for the last century is the endemic, montane koa (*Acacia koa* A. Gray) forest. With its demise, many species, especially birds, have become threatened, endangered, or extinct. In response the forestry extension program established small demonstration koa plantations at 3 private ranches on Hawaii Island to demonstrate to landowners that they can manage lands for conservation and yet still realize income. These plantations will provide valuable "bird corridor" habitat islands between larger blocks of forest. The project will demonstrate to local ranches viable ways of integrating forestry into ranching for both economic and ecological benefits.

In invasive plant control programs, research was initiated to characterize spatial and temporal soil

moisture regimes under two, single chemical herbicide treatments (glyphosate and imazapyr) and one untreated control. Initial data analysis points to successful suppression of competitive grasses with added benefit of increased soil moisture in the upper soil profile. Treatment effects are expected to further differentiate over time because of the differences in suppressive longevity between the herbicides. This difference may be vital in characterizing soil moisture retention intervals and the ability of a seedling to exploit these intervals while establishing and growing.

In extension programs for soil fertility management, farmers have begun to use locally available compost and manure materials as a partial replacement for plant nutrient requirements thus decreasing dependence on imported synthetic fertilizers. The adoption of compost use has increased soil quality and changed farmer perception of compost as a viable option to improve soil fertility. The important improvements in soil physical properties reduce soil erosion protecting valuable land, freshwater and coastal resources.

Modified dry litter waste management and the portable pen system, for piggery waste management, have been extended to and adopted in American Samoa, Commonwealth of the Northern Marianas Islands, Guam and Palau. In an U.S. Environment Protection Agency report out of American Samoa, link their success in dramatic improvement to water quality to a multitude of factors, including the technology developed out of CTAHR.

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 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 Hawai'i State Departments of Agriculture, Health, and 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 Hawai'i Association of Soil and Water Conservation Districts, Hawai'i Forestry Industry Association, and the Hawai'i 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.

V(E). Planned Program (Outputs)

1. Standard output measures

2010	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Plan	1000	50000	50	350
Actual	8688	86228	1315	0

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

Patent Applications Submitted

Year: 2010

Plan: 1
 Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2010	Extension	Research	Total
Plan	7	30	
Actual	2	56	58

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Grant proposals submitted.

Not reporting on this Output for this Annual Report

Year	Target	Actual
2010	20	30

Output #2

Output Measure

- Presentations at international and national meetings.

Not reporting on this Output for this Annual Report

Year	Target	Actual
2010	15	32

Output #3

Output Measure

- Number of workshops and other educational activities held

Not reporting on this Output for this Annual Report

Year	Target	Actual
2010	8	25

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.

Add Cross-cutting Outcome/Impact Statement or Unintended or Previously Unknown Outcome Measure

Outcome #1

1. Outcome Measures

Not Reporting on this Outcome Measure

Number of people who actually adopt one or more recommended practices

2. Associated Institution Types

1862 Extension

1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

Change in Action Outcome Measure

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	20	412

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

All residents and visitors in the State of Hawaii enjoy the State natural environment and will suffer should it not be sustained. Many residents also rely on the environment to support the tourism industry and provide employment for residents.

What has been done

Various stakeholders were educated about how to better manage Hawaii's open ranges, forest and urban landscapes using workshops, demonstrations, field days websites, publications and other outreach activities.

Results

Hawaii's watersheds and all the resources contained in these watersheds are more sustainable.

4. Associated Knowledge Areas

- 102 - Soil, Plant, Water, Nutrient Relationships
- 111 - Conservation and Efficient Use of Water
- 112 - Watershed Protection and Management
- 121 - Management of Range Resources
- 123 - Management and Sustainability of Forest Resources
- 124 - Urban Forestry

- 125 - Agroforestry
- 132 - Weather and Climate
- 133 - Pollution Prevention and Mitigation
- 135 - Aquatic and Terrestrial Wildlife
- 203 - Plant Biological Efficiency and Abiotic Stresses Affecting Plants
- 205 - Plant Management Systems
- 211 - Insects, Mites, and Other Arthropods Affecting Plants
- 212 - Pathogens and Nematodes Affecting Plants
- 402 - Engineering Systems and Equipment
- 403 - Waste Disposal, Recycling, and Reuse
- 404 - Instrumentation and Control Systems
- 512 - Quality Maintenance in Storing and Marketing Non-Food Products
- 605 - Natural Resource and Environmental Economics
- 803 - Sociological and Technological Change Affecting Individuals, Families, and

Outcome #2

1. Outcome Measures

- Not Reporting on this Outcome Measure
Total dollar value of grants and contracts obtained.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

- Change in Knowledge Outcome Measure
- Change in Action Outcome Measure
- Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	200000	1219477

3c. Qualitative Outcome or Impact Statement

Issue (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, which is tourism.

What has been done

Forest conservation and restoration activities have taken place throughout the state, but particularly on the Big Island of Hawaii, where 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

Through a variety of research and extension programs, Hawaii residents and visitors are more aware of the environmental impacts of their activities. Many are increasingly adopting more sustainable and environmentally responsible practices.

4. Associated Knowledge Areas

- 102 - Soil, Plant, Water, Nutrient Relationships
- 111 - Conservation and Efficient Use of Water
- 112 - Watershed Protection and Management
- 121 - Management of Range Resources
- 123 - Management and Sustainability of Forest Resources
- 124 - Urban Forestry
- 125 - Agroforestry
- 132 - Weather and Climate
- 133 - Pollution Prevention and Mitigation
- 135 - Aquatic and Terrestrial Wildlife
- 203 - Plant Biological Efficiency and Abiotic Stresses Affecting Plants
- 205 - Plant Management Systems
- 211 - Insects, Mites, and Other Arthropods Affecting Plants
- 212 - Pathogens and Nematodes Affecting Plants
- 402 - Engineering Systems and Equipment
- 403 - Waste Disposal, Recycling, and Reuse
- 404 - Instrumentation and Control Systems
- 512 - Quality Maintenance in Storing and Marketing Non-Food Products
- 605 - Natural Resource and Environmental Economics
- 803 - Sociological and Technological Change Affecting Individuals, Families, and

V(H). Planned Program (External Factors)

External factors which affected outcomes

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

Brief Explanation

- Natural disasters such as hurricanes, typhoons, floods, fires, often are destructive to natural resources such as reefs, water quality, forests, indigenous species, research plots and equipment.
- When the economy is poor, public and private funding decreases and is more difficult to obtain.
- 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 and Data Collection)

(OPTIONAL SECTION)

1. Evaluation Studies Planned

- After Only (post program)
- Retrospective (post program)
- Before-After (before and after program)
- During (during program)
- Time series (multiple points before and after program)
- Case Study
- Comparisons between program participants (individuals, group, organizations) and non-participants
- Comparisons between different groups of individuals or program participants experiencing different levels of program intensity.
- Comparison between locales where the program operates and sites without program intervention
- Other

Evaluation Results

All projects conducted under this program were peer-reviewed before initiation. Annual progress reports were collected and evaluated by the associate deans for research and extension. Funds are not released for those projects which did not show tangible progress.

Key Items of Evaluation

None

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

2. Hawaii's Diversified Tropical Crop Systems for Sustainability and Competitiveness

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
102	Soil, Plant, Water, Nutrient Relationships	10%		5%	
124	Urban Forestry	0%		2%	
125	Agroforestry	0%		2%	
201	Plant Genome, Genetics, and Genetic Mechanisms	0%		6%	
202	Plant Genetic Resources	5%		7%	
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants	2%		7%	
204	Plant Product Quality and Utility (Preharvest)	6%		7%	
205	Plant Management Systems	20%		18%	
206	Basic Plant Biology	0%		10%	
211	Insects, Mites, and Other Arthropods Affecting Plants	15%		5%	
212	Pathogens and Nematodes Affecting Plants	15%		7%	
213	Weeds Affecting Plants	8%		3%	
214	Vertebrates, Mollusks, and Other Pests Affecting Plants	2%		0%	
215	Biological Control of Pests Affecting Plants	2%		1%	
216	Integrated Pest Management Systems	10%		6%	
502	New and Improved Food Products	0%		4%	
511	New and Improved Non-Food Products and Processes	0%		4%	
601	Economics of Agricultural Production and Farm Management	3%		1%	
604	Marketing and Distribution Practices	2%		5%	
	Total	100%		100%	

Add knowledge area

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

Year: 2010	Extension		Research	
	1862	1890	1862	1890
Plan	20.0	0.0	13.0	0.0
Actual	16.0	0.0	8.7	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
221500	0	228316	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
1399112	0	1968137	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
190166	0	88282	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

A fundamental responsibility of the College of Tropical Agriculture and Human Resources is promotion of crop production in the State. Since most food consumed in Hawaii is imported, an important goal is to encourage import replacement through increased commercial as well as backyard and urban agricultural production. Likewise, promotion of diversified cropping helps to diversify the state's economy in the wake of sugarcane and pineapple plantation closures over the past several decades. Linkages with programs in other states and island territories assist CTAHR in these efforts.

On the island of Molokai, a major initiative this year was to provide opportunity for mono-crop farmers to diversify the crops they produce and for new and for beginning farmers to increase their knowledge and skills in crop production and farm business management. Mono crop farmers in the project are successfully producing alternative crops along with their primary crop; and new and beginning farmers are developing their production and business plans. For example, Whole Foods Markets and other mainland distributors have increased their demand for organic papaya and Moloka'i papaya farmers have the opportunity to increase the value of their fruits by changing from conventional to organic farming methods. More than .6 million pounds of certified organic papayas were exported to mainland markets last year.

Another major focus of activities was in the continued development of an umbrella organization to unite the flower and nursery industries under one statewide organization. This new organization, named the Hawaii Floriculture and Nursery Association (HFNA), was being formed in order to: 1) enhance its members' business success through enactment of laws to advance the common business interests of its members, 2) to encourage and promote the betterment of conditions that will create and sustain an economically viable flower and plant industry, and 3) to promote the export of Hawaii flowers and plants. This organization would help to ensure the growth of the floriculture and nursery industries in Hawaii by increasing professionalism and by competing more effectively in the world market. The statewide umbrella organization will represent more than a dozen ornamental associations. The present structure of multiple organizations duplicates efforts in marketing, educational programs, and minimizes the effectiveness of

establishing strong governmental relations.

Urban horticulture clientele and Master Gardener volunteers statewide increased awareness of resources available to home gardeners through CTAHR, including fruit fly suppression, general plant pest and disease control, plant propagation, nutrient management and environmentally sound gardening. Statewide Master Gardener programs expanded with over 100 new volunteers trained and assisting CTAHR in disseminating research-based information to the public through help-lines in all four counties, information booths at public events and peer-to-peer education within the community.

2. Brief description of the target audience

The target audience for this program area is mainly the diversified farming community, especially those growing commercial or home garden crops. Main commercial crop industries served by CTAHR include floriculture and nursery, tropical fruit trees and nuts, vegetables, melons, herbs, and root or tuber crops. Many of these crops are tropical not commonly grown in the mainland US, so that research and extension outreach is very important to Hawaii producers. There is also a resurgence of interest in home and school gardening which is supported by CTAHR programs.

V(E). Planned Program (Outputs)

1. Standard output measures

2010	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Plan	14500	10000	1000	100
Actual	15362	135293	1003	160

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

Patent Applications Submitted

Year: 2010
 Plan: 4
 Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2010	Extension	Research	Total
Plan	15	32	
Actual	8	21	29

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of workshops, research/field day demonstrations conducted

Not reporting on this Output for this Annual Report

Year	Target	Actual
2010	70	267

Output #2

Output Measure

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

Not reporting on this Output for this Annual Report

Year	Target	Actual
2010	80	46

Output #3

Output Measure

- Presentations at international and national meetings

Not reporting on this Output for this Annual Report

Year	Target	Actual
2010	20	20

Output #4

Output Measure

- Number of diagnostic samples analyzed

Not reporting on this Output for this Annual Report

Year	Target	Actual
2010	15000	0

Output #5

Output Measure

- Number of grant proposals submitted.

Not reporting on this Output for this Annual Report

Year	Target	Actual
2010	45	56

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Increased awareness of best management practices to promote environmentally responsible agricultural and landscape management
2	Number of people who adopt one or more recommended practices
3	Total dollar value of grants and contracts obtained.

Add Cross-cutting Outcome/Impact Statement or Unintended or Previously Unknown Outcome Measure

Outcome #1

1. Outcome Measures

- Not Reporting on this Outcome Measure

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

2. Associated Institution Types

- 1862 Extension
 1862 Research

3a. Outcome Type:

- Change in Knowledge Outcome Measure
 Change in Action Outcome Measure
 Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	400	21548

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Increased awareness of environmentally responsible agricultural and landscape management is the first step toward better decision making and improved practices.

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

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

4. Associated Knowledge Areas

- 102 - Soil, Plant, Water, Nutrient Relationships
 124 - Urban Forestry
 125 - Agroforestry
 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
- 215 - Biological Control of Pests Affecting Plants
- 216 - Integrated Pest Management Systems
- 502 - New and Improved Food Products
- 511 - New and Improved Non-Food Products and Processes
- 601 - Economics of Agricultural Production and Farm Management
- 604 - Marketing and Distribution Practices

Outcome #2

1. Outcome Measures

- Not Reporting on this Outcome Measure

Number of people who adopt one or more recommended practices

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

- Change in Knowledge Outcome Measure
- Change in Action Outcome Measure
- Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	250	2691

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Moving from understanding of improved practice to actual adoption is obviously important to realizing the environmental, social and economic benefits associated with the improved practices.

What has been done

Developing improved practices (such as pest control, improved crop varieties, soil management, etc.) is done by research faculty, either in on-station or on-farm experiments. Adoption usually

requires repeated instruction and follow up by extension educators, which is often done in conjunction with commodity associations. Also CTAHRS's Master Gardener programs involves repeated and in depth outreach to the general gardening public. This is done through fairs, phone hotlines and direct instruction of the public by the Master Gardener volunteers.

Results

Commercial crop and home garden production will be more productive and sustainable.

4. Associated Knowledge Areas

- 102 - Soil, Plant, Water, Nutrient Relationships
- 124 - Urban Forestry
- 125 - Agroforestry
- 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
- 215 - Biological Control of Pests Affecting Plants
- 216 - Integrated Pest Management Systems
- 502 - New and Improved Food Products
- 511 - New and Improved Non-Food Products and Processes
- 601 - Economics of Agricultural Production and Farm Management
- 604 - Marketing and Distribution Practices

Outcome #3

1. Outcome Measures

- Not Reporting on this Outcome Measure
Total dollar value of grants and contracts obtained.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

- Change in Knowledge Outcome Measure
- Change in Action Outcome Measure
- Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	4600000	4356091

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

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

What has been done

Grant funds have been received.

Results

Increased extramural funding has allowed CTAHR faculty and staff to conduct needed research and associated extension outreach activities.

4. Associated Knowledge Areas

- 102 - Soil, Plant, Water, Nutrient Relationships
- 124 - Urban Forestry
- 125 - Agroforestry
- 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
- 215 - Biological Control of Pests Affecting Plants
- 216 - Integrated Pest Management Systems

- 502 - New and Improved Food Products
- 511 - New and Improved Non-Food Products and Processes
- 601 - Economics of Agricultural Production and Farm Management
- 604 - Marketing and Distribution Practices

V(H). Planned Program (External Factors)

External factors which affected outcomes

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

Brief Explanation

Natural disasters such as hurricanes, typhoons, floods, fires, often are destructive to crops. Annual crops suffer immediate, although not permanent damage, while orchard crops may sustain long term damage. Damage to research plots, and equipment can also occur. When the economy is poor, public and private funding decreases and is more difficult to obtain. 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 have increased production costs.

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

(OPTIONAL SECTION)

1. Evaluation Studies Planned

- After Only (post program)
- Retrospective (post program)
- Before-After (before and after program)
- During (during program)
- Time series (multiple points before and after program)
- Case Study
- Comparisons between program participants (individuals, group, organizations) and non-participants
- Comparisons between different groups of individuals or program participants experiencing different levels of program intensity.

- Comparison between locales where the program operates and sites without program intervention
- Other

Evaluation Results

All projects conducted under this program were peer-reviewed before initiation. Annual progress reports were collected and evaluated by the Associate Deans for research and extension. Funds are not released for those projects which did not show tangible progress.

Key Items of Evaluation

None

V(A). Planned Program (Summary)

Program # 3

1. Name of the Planned Program

3. Invasive Species Education and Management

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
136	Conservation of Biological Diversity	0%		7%	
204	Plant Product Quality and Utility (Preharvest)	0%		7%	
205	Plant Management Systems	15%		6%	
211	Insects, Mites, and Other Arthropods Affecting Plants	20%		18%	
212	Pathogens and Nematodes Affecting Plants	15%		36%	
213	Weeds Affecting Plants	15%		0%	
215	Biological Control of Pests Affecting Plants	5%		17%	
216	Integrated Pest Management Systems	30%		7%	
601	Economics of Agricultural Production and Farm Management	0%		2%	
	Total	100%		100%	

Add knowledge area

V(C). Planned Program (Inputs)

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

Year: 2010	Extension		Research	
	1862	1890	1862	1890
Plan	2.0	0.0	6.0	0.0
Actual	5.0	0.0	4.8	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
113081	0	169014	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
413273	0	792317	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	270586	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Pests threaten the quality of agricultural products, the health of farming businesses and the surrounding natural and urban ecosystems. Sound management of agroecosystems in Hawai'i depends on mitigating the effects of alien invasive species. Invasive species threaten our native plant heritage and economically important plants, pastures, rangelands, forests, and critical watersheds. CTAHR plays a significant role in developing and delivering information and technologies that minimize the negative impacts of invasive species.

Fruit flies are among the most serious pests of fruits and vegetables in the tropics and subtropics. In Hawaii, four fruit flies of major economic importance are: Melon Fly, Mediterranean Fruit Fly, Oriental Fruit Fly, and Solanaceous Fruit Fly. The host range of fruit flies are in excess of 400 plant species and includes important agricultural commodities. These pests have caused serious economic impact to the industry by causing severe crop losses and imposed USDA plant quarantine regulations to restrict the shipment movement of host plant fruits to the continental USA and other international markets. CTAHR, USDA ARS and Hawaii Department of Agriculture have formed a coordinated partnership to implement an area-wide fruit fly suppression program. The program provides continual education for commercial growers and home gardeners about fruit flies and demonstrating sustainable technologies that are to be used in the management of fruit flies. Growers decreased in fruit fly infestation levels and crop damage, thus increasing farm revenue. Home gardeners have decreased fruit fly infestation levels and crop damage, thereby making Hawaii have a more sustainability food source of our island communities

In 2009 Hawaii's export agriculture industry experienced high rates of rejection due to pest interceptions in California. Working in collaboration with Hawaii Department of Agriculture and private industries, a team of CTAHR faculty conducted a series of workshops and demonstrations on "Good Agricultural Practices" to provide growers with the knowledge and resources to improve pest control measures and food safety issues. Mist and air blowers were demonstrated for improved spray coverage and pest control. Growers were also informed about proper worker protection equipment and calibration of spray equipment. Most of the 20 growers trained have adopted the use of the new nozzle technology and mist blowers, reducing the volume of pesticide sprays to improve the efficacy of pesticide sprays and/or also reducing spray drift onto non-target areas.

Fireweed (*Senecio madagascariensis*) is the biggest weed problem facing ranchers in Hawaii today. Maui County has sponsored an herbicide prescription program conducted by CTAHR Extension to suppress infestations in priority pastures. Cost effectiveness of herbicide application was improved by improved herbicide formulations and training participants on proper equipment calibration. Thirty

participants have treated over 1400 acres, with a goal of treating 4000 acres.

2. Brief description of the target audience

Target audiences include farmers, consumers, and rural citizens who can appreciate reduced pesticide inputs as we come to rely more on biological means of pest control. Scientists who study invasive species, and in particular fruit flies 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) depend on CTAHR researchers and extension to develop and deliver technologies for improved control and management of invasive plants in Hawaii's landscapes.

V(E). Planned Program (Outputs)

1. Standard output measures

2010	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Plan	600	3000	50	350
Actual	1877	3660	1845	0

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

Patent Applications Submitted

Year: 2010
 Plan: 1
 Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2010	Extension	Research	Total
Plan	5	20	
Actual	1	29	30

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of workshops, field days, demonstrations held

Not reporting on this Output for this Annual Report

Year	Target	Actual
2010	20	73

Output #2

Output Measure

- Number of grant proposals submitted

Not reporting on this Output for this Annual Report

Year	Target	Actual
2010	15	11

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Awareness created
2	Number of agency professionals, including extension agents who implement or install demonstration or similar programs for clientele education
3	Total dollar value of grants and contracts obtained.

Add Cross-cutting Outcome/Impact Statement or Unintended or Previously Unknown Outcome Measure

Outcome #1

1. Outcome Measures

Not Reporting on this Outcome Measure

Awareness created

2. Associated Institution Types

1862 Extension

1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

Change in Action Outcome Measure

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	350	5381

3c. Qualitative Outcome or Impact Statement

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

Workshops, demonstrations, field days, presentations and publications make residents aware of the problems associated with invasive species and control practices which are most successful.

Results

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

4. Associated Knowledge Areas

136 - Conservation of Biological Diversity

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
- 601 - Economics of Agricultural Production and Farm Management

Outcome #2

1. Outcome Measures

- Not Reporting on this Outcome Measure

Number of agency professionals, including extension agents who implement or install demonstration or similar programs for clientele education

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

- Change in Knowledge Outcome Measure
- Change in Action Outcome Measure
- Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	8	28

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Residents are unaware of how to control invasive species.

What has been done

Demonstration project have been installed.

Results

Farmers and residents better understand how to control invasive species and Hawaii is better protected from crop destruction and ecosystem damage caused by invasive plants and animals.

4. Associated Knowledge Areas

- 136 - Conservation of Biological Diversity
- 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
- 601 - Economics of Agricultural Production and Farm Management

Outcome #3

1. Outcome Measures

- Not Reporting on this Outcome Measure
Total dollar value of grants and contracts obtained.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

- Change in Knowledge Outcome Measure
- Change in Action Outcome Measure
- Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	100000	895379

3c. Qualitative Outcome or Impact Statement

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

Extramural grants have been received and funding utilized.

Results

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

4. Associated Knowledge Areas

- 136 - Conservation of Biological Diversity
- 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
- 601 - Economics of Agricultural Production and Farm Management

V(H). Planned Program (External Factors)

External factors which affected outcomes

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

Brief Explanation

- Intentional introductions of invasive species
- Lack of funding/grant proposals don't come through.
- Other agencies and partners are not willing to partner and coordinate efforts

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

(OPTIONAL SECTION)

1. Evaluation Studies Planned

- After Only (post program)
- Retrospective (post program)
- Before-After (before and after program)
- During (during program)
- Time series (multiple points before and after program)
- Case Study
- Comparisons between program participants (individuals, group, organizations) and non-participants

- Comparisons between different groups of individuals or program participants experiencing different levels of program intensity.
- Comparison between locales where the program operates and sites without program intervention
- Other

Evaluation Results

All projects conducted under this program were peer-reviewed before initiation. Annual progress reports were collected and evaluated by the associate deans for research and extension. Funds are not released for those projects which did not show tangible progress.

Key Items of Evaluation

None

V(A). Planned Program (Summary)

Program # 4

1. Name of the Planned Program

4. Youth, Family and Community Development

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%		3%	
102	Soil, Plant, Water, Nutrient Relationships	0%		3%	
124	Urban Forestry	2%		5%	
133	Pollution Prevention and Mitigation	0%		3%	
703	Nutrition Education and Behavior	2%		3%	
724	Healthy Lifestyle	5%		3%	
801	Individual and Family Resource Management	8%		0%	
802	Human Development and Family Well-Being	30%		32%	
803	Sociological and Technological Change Affecting Individuals, Families, and Communities	10%		14%	
804	Human Environmental Issues Concerning Apparel, Textiles, and Residential and Commercial Structures	3%		10%	
805	Community Institutions, Health, and Social Services	5%		0%	
806	Youth Development	35%		9%	
903	Communication, Education, and Information Delivery	0%		15%	
	Total	100%		100%	

Add knowledge area

V(C). Planned Program (Inputs)

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

Year: 2010	Extension		Research	
	1862	1890	1862	1890
Plan	17.0	0.0	3.6	0.0
Actual	22.1	0.0	3.6	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
309323	0	127986	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
1692290	0	407360	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
522580	0	1093215	0

V(D). Planned Program (Activity)**1. Brief description of the Activity**

More than any other social institution, the family has 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, personal and family financial and time management, youth development, parenting, and caring for the elderly. Colleagues from UH community colleges, nonprofit organizations, and government agencies are partners on several CTAHR projects.

Hawaii's Urban Horticulture and Master Gardener programs develop and deliver integrated horticultural educational programs that meet the needs of urban clientele, enhancing their quality of life while maintaining environmental stewardship and sustainability. The main goal for the Master Gardener program is to facilitate the establishment of a volunteer group that is well trained and supported, and which will become more self-reliant, self-aware and ecologically literate to actively support urban horticultural and environmental programs. Five Master Gardener coordinators coordinated their efforts in 2010 to establish a Statewide Master Gardener program, which led to the hosting of the first Statewide Master Gardener conference on Oahu (October 14-17, 2010) with over 100 attendees, developed a program website (50% completed) and working towards the establishment of a statewide Master Gardener policies and procedures manual.

There is a growing interest in youth gardening as well as school gardening programs by many organizations, groups and individuals in Hawaii. Programmatic efforts in youth gardening specifically centers on creating opportunities for the youth to develop gardening skills, learn about healthy foods, gain an appreciation for nature and the environment and to participate in physical activities. In 2009-2010, more than 830 youth were reached with gardening information. For example 10 schools on Maui have initiated gardening projects supported by Maui Master Gardeners. A survey of the youth gardening program in Maui County indicates, increased adoption of youth gardening projects by volunteers, schools and the community.

Statewide trainings for Youth-Adult Partnership teams were conducted to strengthen their working relationship as partners in community building and to enhance their ability to implement community service learning projects. As a result of integrating learned skills (i.e. team building, public speaking, etc.) and subject matter (i.e. healthy living), six Youth-Adult Partnership teams from Kauai, Oahu, East Hawaii and West Hawaii are functioning at a higher level of youth engagement. More than 200 youth and adult leaders

have become partners in planning and implementing community service projects, such as collecting food for food banks, preparing food baskets and gifts for people in need, promoting literacy and the importance of reading aloud, entertaining patients at convalescent homes, cleaning beaches, and picking up trash along the highways.

2. Brief description of the target audience

- Academic researchers in the fields of family science, human development, sociology, economics, public policy, education, and social services.;
- Administrators of state and local nonprofit agencies relating to health, human services, education, and economic development.;
- Service providers and advocates who work with children, families, or the aging, especially those who work with at-risk groups; State legislators and policy makers;
- The general public

V(E). Planned Program (Outputs)

1. Standard output measures

2010	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Plan	9000	100000	5000	5000
Actual	19338	198357	14459	3921

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

Patent Applications Submitted

Year: 2010
 Plan: 0
 Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2010	Extension	Research	Total
Plan	4	10	
Actual	27	14	41

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

Year	Target	Actual
2010	150	10594

Output #2

Output Measure

- Number of volunteer hours

Not reporting on this Output for this Annual Report

Year	Target	Actual
2010	60000	68601

Output #3

Output Measure

- Presentations at international and national meetings.

Not reporting on this Output for this Annual Report

Year	Target	Actual
2010	5	20

Output #4

Output Measure

- Grant proposals submitted.

Not reporting on this Output for this Annual Report

Year	Target	Actual
2010	10	22

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	Number of stakeholders completing non-formal education programs on parenting, youth development, and leadership development, who adopt one or more parenting principles, behaviors, or practices
3	Total dollar value of grants and contracts obtained.

Add Cross-cutting Outcome/Impact Statement or Unintended or Previously Unknown Outcome Measure

Outcome #1

1. Outcome Measures

Not Reporting on this Outcome Measure

Number of stakeholders who increased knowledge in at least one issue

2. Associated Institution Types

1862 Extension

1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

Change in Action Outcome Measure

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	3000	22192

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Residents want a better quality of life.

What has been done

Workshops, demonstrations, presentations, website and publications gave residents the knowledge to have a better quality of life.

Results

Hawaii families in both rural and urban environments are assisted in areas such as family health and lifespan development, personal and family financial and time management, youth development, parenting, and caring for the elderly. This improves quality of life and productivity of Hawaii's residents and builds stronger communities.

4. Associated Knowledge Areas

- 101 - Appraisal of Soil Resources
- 102 - Soil, Plant, Water, Nutrient Relationships
- 124 - Urban Forestry
- 133 - Pollution Prevention and Mitigation
- 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
- 804 - Human Environmental Issues Concerning Apparel, Textiles, and Residential and
- 805 - Community Institutions, Health, and Social Services
- 806 - Youth Development
- 903 - Communication, Education, and Information Delivery

Outcome #2

1. Outcome Measures

- Not Reporting on this Outcome Measure

Number of stakeholders completing non-formal education programs on parenting, youth development, and leadership development, who adopt one or more parenting principles, behaviors, or practices

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

- Change in Knowledge Outcome Measure
- Change in Action Outcome Measure
- Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	400	3358

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Residents want a better quality of life.

What has been done

Workshops, demonstrations, presentations, website and publications gave residents the knowledge to have better skills on parenting, youth development and leadership.

Results

Residents have changed their behavior so they have a better quality of life

4. Associated Knowledge Areas

- 101 - Appraisal of Soil Resources
- 102 - Soil, Plant, Water, Nutrient Relationships
- 124 - Urban Forestry
- 133 - Pollution Prevention and Mitigation
- 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
- 804 - Human Environmental Issues Concerning Apparel, Textiles, and Residential and
- 805 - Community Institutions, Health, and Social Services
- 806 - Youth Development
- 903 - Communication, Education, and Information Delivery

Outcome #3

1. Outcome Measures

- Not Reporting on this Outcome Measure
Total dollar value of grants and contracts obtained.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

- Change in Knowledge Outcome Measure
- Change in Action Outcome Measure
- Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	1200000	1669912

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

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

What has been done

Funds were obtained.

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

- 101 - Appraisal of Soil Resources
- 102 - Soil, Plant, Water, Nutrient Relationships
- 124 - Urban Forestry
- 133 - Pollution Prevention and Mitigation
- 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
- 804 - Human Environmental Issues Concerning Apparel, Textiles, and Residential and
- 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

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

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 intergenerational 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 and Data Collection)

(OPTIONAL SECTION)

1. Evaluation Studies Planned

- After Only (post program)
- Retrospective (post program)
- Before-After (before and after program)
- During (during program)
- Time series (multiple points before and after program)
- Case Study
- Comparisons between program participants (individuals, group, organizations) and non-participants
- Comparisons between different groups of individuals or program participants experiencing different levels of program intensity.
- Comparison between locales where the program operates and sites without program intervention
- Other

Evaluation Results

All projects conducted under this program were peer-reviewed before initiation. Annual progress reports were collected and evaluated by the associate deans for research and extension. Funds are not released for those projects which did not show tangible progress.

Key Items of Evaluation

None

V(A). Planned Program (Summary)

Program # 5

1. Name of the Planned Program

Health and Wellness of Hawaii's Families and Communities

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
131	Alternative Uses of Land	0%		7%	
607	Consumer Economics	5%		6%	
608	Community Resource Planning and Development	10%		3%	
701	Nutrient Composition of Food	8%		8%	
702	Requirements and Function of Nutrients and Other Food Components	5%		18%	
703	Nutrition Education and Behavior	13%		11%	
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources	5%		5%	
723	Hazards to Human Health and Safety	10%		5%	
724	Healthy Lifestyle	17%		3%	
802	Human Development and Family Well-Being	10%		15%	
803	Sociological and Technological Change Affecting Individuals, Families, and Communities	12%		13%	
804	Human Environmental Issues Concerning Apparel, Textiles, and Residential and Commercial Structures	5%		6%	
	Total	100%		100%	

Add knowledge area

V(C). Planned Program (Inputs)

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

Year: 2010	Extension		Research	
	1862	1890	1862	1890
Plan	6.0	0.0	3.0	0.0
Actual	4.3	0.0	5.1	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
36338	0	232415	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
340786	0	617863	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
294887	0	232207	0

V(D). Planned Program (Activity)**1. Brief description of the Activity**

The 2003 Hawai'i health survey reveals that more than half of Hawai'i's adults are overweight or obese. The rate of obesity in children ages 6 to 11 is twice the national average. About three-quarters of Hawai'i residents don't eat enough fruits and vegetables, and many suffer from diabetes, heart disease, high blood pressure, or diet-related cancers. To combine their strengths and enhance their effectiveness, CTAHR extension faculty in all four counties and two college departments (Human Nutrition, Food, and Animal Sciences and Family and Consumer Sciences) have joined together to coordinate their outreach in the areas of food, nutrition, and health. Under an umbrella program called Nutrition Education for Wellness, or NEW, this team of extension agents brings its varied expertise to a wide range of projects that promote healthy eating and exercise habits, encourage safe food handling practices, and improve the access of limited-income households to good nutrition. Research and instructional components exist as well, such as materials developed for young athletes by food science and human nutrition students. CTAHR faculty will continue to develop an interactive behavioral intervention program to improve the effectiveness in increasing calcium intake and bone density among Asian, Hispanic, and Caucasian girls.

In nutrition education programs the focus in 2010 has been on reestablishing quality food and nutrition education, staff performance appraisals to support quality functioning, maintenance of minimum expectations, and continuing to build community connections and relationships. Program outputs for the NEW program included a participation total of 759 program families (adult direct contacts) and 53 youth (youth direct contacts). There were 1701 adults and 1467 youth in the families. 536 program families (71%) completed the 4-6 sessions series that included 6 lessons with accompanying food skills demonstrations. Reported impact outcomes include 70% of participants reporting improvement in one or more food resource management practices, 82% reporting improvement in one or more nutrition practices, 82% reporting improvement in one or more nutrition practices, 54% reporting improvement in one or more of the food safety practices, 90% reporting positive change in any food group at exit, and 28% reporting positive change in physical activity.

In February 2010 CTAHR researchers presented information on Omegaven (omega-3 IV fish oil) and TPN induced cholestasis to 40 neonatologists, pediatricians, and allied health professionals at the Kapiolani Medical Center for Women and Children. In response, the neonatologists had an open-label protocol approved by the FDA and registered a clinical trial on Clinicaltrials.gov.

2. Brief description of the target audience

The target clients is 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.

V(E). Planned Program (Outputs)

1. Standard output measures

2010	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Plan	10000	50000	4000	5000
Actual	7900	58708	1091	12970

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

Patent Applications Submitted

Year: 2010
 Plan: 0
 Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2010	Extension	Research	Total
Plan	1	10	
Actual	0	10	10

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of outreach activities and events conducted
- Not reporting on this Output for this Annual Report

Year	Target	Actual
2010	420	499

Output #2

Output Measure

- Presentations at international and national meetings.

Not reporting on this Output for this Annual Report

Year	Target	Actual
2010	5	35

Output #3

Output Measure

- Grant proposals submitted.

Not reporting on this Output for this Annual Report

Year	Target	Actual
2010	10	52

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Number of people trained and who receive their pesticide applicators license
2	Number of people who changed their behavior to better their health
3	Number of people who increased their knowledge in health and wellness through outreach activities
4	Total dollar value of grants and contracts obtained.

Add Cross-cutting Outcome/Impact Statement or Unintended or Previously Unknown Outcome Measure

Outcome #1

1. Outcome Measures

Not Reporting on this Outcome Measure

Number of people trained and who receive their pesticide applicators license

2. Associated Institution Types

1862 Extension

1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

Change in Action Outcome Measure

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	85	207

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Resident who want or are required to know how to apply pesticides properly.

What has been done

Short courses, newsletters, and study guides educated people about proper pesticide use

Results

Residents use pesticide correctly and 207 people received training and new licenses or recertification.

4. Associated Knowledge Areas

131 - Alternative Uses of Land

607 - Consumer Economics

608 - Community Resource Planning and Development

701 - Nutrient Composition of Food

702 - Requirements and Function of Nutrients and Other Food Components

703 - Nutrition Education and Behavior

711 - Ensure Food Products Free of Harmful Chemicals, Including Residues from

- 723 - Hazards to Human Health and Safety
- 724 - Healthy Lifestyle
- 802 - Human Development and Family Well-Being
- 803 - Sociological and Technological Change Affecting Individuals, Families, and
- 804 - Human Environmental Issues Concerning Apparel, Textiles, and Residential and

Outcome #2

1. Outcome Measures

- Not Reporting on this Outcome Measure
Number of people who changed their behavior to better their health

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

- Change in Knowledge Outcome Measure
- Change in Action Outcome Measure
- Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	400	3173

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Residents who want healthier lifestyles.

What has been done

Workshops, demonstrations, and presentations educate people about how to have a healthy lifestyle.

Results

Residents improve their health through adoption of improved health practices.

4. Associated Knowledge Areas

- 131 - Alternative Uses of Land
- 607 - Consumer Economics

- 608 - Community Resource Planning and Development
- 701 - Nutrient Composition of Food
- 702 - Requirements and Function of Nutrients and Other Food Components
- 703 - Nutrition Education and Behavior
- 711 - Ensure Food Products Free of Harmful Chemicals, Including Residues from
- 723 - Hazards to Human Health and Safety
- 724 - Healthy Lifestyle
- 802 - Human Development and Family Well-Being
- 803 - Sociological and Technological Change Affecting Individuals, Families, and
- 804 - Human Environmental Issues Concerning Apparel, Textiles, and Residential and

Outcome #3

1. Outcome Measures

- Not Reporting on this Outcome Measure

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
- Change in Action Outcome Measure
- Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	1200	6362

3c. Qualitative Outcome or Impact Statement

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

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

Results

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

4. Associated Knowledge Areas

- 131 - Alternative Uses of Land
- 607 - Consumer Economics
- 608 - Community Resource Planning and Development
- 701 - Nutrient Composition of Food
- 702 - Requirements and Function of Nutrients and Other Food Components
- 703 - Nutrition Education and Behavior
- 711 - Ensure Food Products Free of Harmful Chemicals, Including Residues from
- 723 - Hazards to Human Health and Safety
- 724 - Healthy Lifestyle
- 802 - Human Development and Family Well-Being
- 803 - Sociological and Technological Change Affecting Individuals, Families, and
- 804 - Human Environmental Issues Concerning Apparel, Textiles, and Residential and

Outcome #4

1. Outcome Measures

- Not Reporting on this Outcome Measure
Total dollar value of grants and contracts obtained.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

- Change in Knowledge Outcome Measure
- Change in Action Outcome Measure
- Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	275000	1171246

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

Grant funds were applied for and received.

Results

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

4. Associated Knowledge Areas

- 131 - Alternative Uses of Land
- 607 - Consumer Economics
- 608 - Community Resource Planning and Development
- 701 - Nutrient Composition of Food
- 702 - Requirements and Function of Nutrients and Other Food Components
- 703 - Nutrition Education and Behavior
- 711 - Ensure Food Products Free of Harmful Chemicals, Including Residues from
- 723 - Hazards to Human Health and Safety
- 724 - Healthy Lifestyle
- 802 - Human Development and Family Well-Being
- 803 - Sociological and Technological Change Affecting Individuals, Families, and
- 804 - Human Environmental Issues Concerning Apparel, Textiles, and Residential and

V(H). Planned Program (External Factors)

External factors which affected outcomes

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

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 concerned priorities and compete for available funds.

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

(OPTIONAL SECTION)

1. Evaluation Studies Planned

- After Only (post program)
- Retrospective (post program)
- Before-After (before and after program)
- During (during program)
- Time series (multiple points before and after program)
- Case Study
- Comparisons between program participants (individuals, group, organizations) and non-participants
- Comparisons between different groups of individuals or program participants experiencing different levels of program intensity.
- Comparison between locales where the program operates and sites without program intervention
- Other

Evaluation Results

All projects conducted under this program were peer-reviewed before initiation. Annual progress reports were collected and evaluated by Associate Deans for research and extension. Funds were not released for those projects which did not show tangible progress

Key Items of Evaluation

None

V(A). Planned Program (Summary)

Program # 6

1. Name of the Planned Program

Global Food Security and Hunger

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
102	Soil, Plant, Water, Nutrient Relationships	5%		10%	
205	Plant Management Systems	10%		7%	
301	Reproductive Performance of Animals	20%		12%	
303	Genetic Improvement of Animals	12%		10%	
305	Animal Physiological Processes	10%		15%	
306	Environmental Stress in Animals	8%		10%	
307	Animal Management Systems	10%		3%	
403	Waste Disposal, Recycling, and Reuse	10%		2%	
503	Quality Maintenance in Storing and Marketing Food Products	5%		11%	
511	New and Improved Non-Food Products and Processes	5%		12%	
601	Economics of Agricultural Production and Farm Management	3%		5%	
607	Consumer Economics	2%		3%	
	Total	100%		100%	

Add knowledge area

V(C). Planned Program (Inputs)

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

Year: 2010	Extension		Research	
	1862	1890	1862	1890
Plan	4.0	0.0	4.2	0.0
Actual	8.0	0.0	22.3	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
240320	0	675484	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
658534	0	5521841	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
114650	0	603560	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

CTAHR can play a pivotal role in supporting the national priorities in global food security and hunger because Hawai'i has an environment that is similar to that of other developing countries in the tropical and subtropical regions. This planned program will utilize integrated research, extension, and education projects to provide knowledge and technologies to generate and improve products and processes for existing and expanded markets.

Hawaii aquaculture extension specialists have developed educational opportunities in the area of aquaponics, the production of hydroponic crops using fish effluent. Through this partnership, growers obtain access to starter fish and educational resources to produce fish and edible crops successfully in a safe and cost effective manner. Educational workshops were held to educate growers about aquaponics and the benefits of creating a sustainable system. Incorporation of an aquaponic operation has enabled growers to cultivate edible crops such as lettuce, Asian leafy greens, while producing and marketing aquaculture commodities such as tilapia and cat fish. Aquaponics have been incorporated into instructional programs (elementary through college) and are effective in raising awareness of environmental stewardship, Hawaiian culture and science education. These systems have also been demonstrated in Waimanalo with 4 Hawaiian Homestead farms and are generating great interest among homesteaders statewide as a means of becoming more self-reliant in food production.

In Hawaii there are approximately 800 beef cattle ranchers ranging in size from 20,000 cows to a single back cow. On a commercial basis the Hawaii has 2 small dairies, 105 swine facilities, 5 average sized egg producing farms, 1100 game bird facilities, 65 sheep flocks and numerous sustainable livestock farmers. Cooperative Extension plays a coordinating role in the State with county and state staff, University of Hawaii personnel, industry associations and community groups in the areas of pasture management, livestock production and marketing.

A significant focus of Hawaii's Rangeland management program in 2010 has been to share the technology and knowledge base of sustainable pasture management and livestock production with other Pacific Islands. Eight workshops and field day events were held between November 2009 and October 2010 in Guam, Tinian, Saipan, and Rota. These workshops were well attended and many of the participants have adopted many of the management practices discussed or demonstrated. In addition a 6 demonstration sites have been established allowing for the evaluation of different forages and legumes for use in the tropics. The success of this ongoing project prompted the submission of a second grant that was awarded (\$400,000) to provide similar extension outreach to Hawaii, Guam, Northern Marianas Islands, Palau and Federated States of Micronesia. A new website was developed in conjunction with this project and efforts to extend outreach efforts to other Pacific Islands; Marianas Grazing and Livestock

Management Academy (marianasgrazingacademy.org.)

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, aquaculturists, 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.

V(E). Planned Program (Outputs)

1. Standard output measures

2010	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Plan	650	2500	40	100
Actual	4589	29318	645	631

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

Patent Applications Submitted

Year: 2010
 Plan: 0
 Actual: 6

Patents listed

- US Patent No PP20,982 Colocasia plant named ?Pineapple Princess?
- US Patent No PP20,003 Colocasia plant named ?Blue Hawaii?
- US Patent No PP19,939 Colocasia plant named ?Diamond Head?
- US Patent No PP19,884 Colocasia plant named ?Hawaiian Eye?
- US Patent No PP20,108 Colocasia plant named ?Hilo Bay?
- US Patent No PP19,625 Colocasia plant named ?Maui Magic?

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2010	Extension	Research	Total
Plan	3	12	
Actual	6	56	62

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of workshops, conferences and other outreach events

Not reporting on this Output for this Annual Report

Year	Target	Actual
2010	11	181

Output #2

Output Measure

- Write grant proposal to secure additional funds

Not reporting on this Output for this Annual Report

Year	Target	Actual
2010	6	128

Output #3

Output Measure

- Presentations at international and national meetings

Not reporting on this Output for this Annual Report

Year	Target	Actual
2010	{No Data Entered}	22

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Total dollar value of grants and contracts obtained.
2	Number of ranchers who adopt a recommended practice
3	Number of people who adopt one or more recommended practice

Add Cross-cutting Outcome/Impact Statement or Unintended or Previously Unknown Outcome Measure

Outcome #1

1. Outcome Measures

Not Reporting on this Outcome Measure

Total dollar value of grants and contracts obtained.

2. Associated Institution Types

1862 Extension

1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

Change in Action Outcome Measure

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	135000	7357720

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

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

What has been done

Grant funds have been received.

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

102 - Soil, Plant, Water, Nutrient Relationships

205 - Plant Management Systems

301 - Reproductive Performance of Animals

303 - Genetic Improvement of Animals

305 - Animal Physiological Processes

306 - Environmental Stress in Animals

307 - Animal Management Systems

- 403 - Waste Disposal, Recycling, and Reuse
- 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

Outcome #2

1. Outcome Measures

- Not Reporting on this Outcome Measure
Number of ranchers who adopt a recommended practice

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

- Change in Knowledge Outcome Measure
- Change in Action Outcome Measure
- Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	9	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

- 102 - Soil, Plant, Water, Nutrient Relationships
- 205 - Plant Management Systems
- 301 - Reproductive Performance of Animals
- 303 - Genetic Improvement of Animals
- 305 - Animal Physiological Processes
- 306 - Environmental Stress in Animals
- 307 - Animal Management Systems

- 403 - Waste Disposal, Recycling, and Reuse
- 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

Outcome #3

1. Outcome Measures

- Not Reporting on this Outcome Measure

Number of people who adopt one or more recommended practice

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

- Change in Knowledge Outcome Measure
- Change in Action Outcome Measure
- Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	{No Data Entered}	2638

3c. Qualitative Outcome or Impact Statement

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

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

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

- 102 - Soil, Plant, Water, Nutrient Relationships
- 205 - Plant Management Systems
- 301 - Reproductive Performance of Animals
- 303 - Genetic Improvement of Animals
- 305 - Animal Physiological Processes
- 306 - Environmental Stress in Animals
- 307 - Animal Management Systems
- 403 - Waste Disposal, Recycling, and Reuse
- 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

V(H). Planned Program (External Factors)

External factors which affected outcomes

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

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 and Data Collection)

(OPTIONAL SECTION)

1. Evaluation Studies Planned

- After Only (post program)
- Retrospective (post program)
- Before-After (before and after program)
- During (during program)
- Time series (multiple points before and after program)
- Case Study
- Comparisons between program participants (individuals, group, organizations) and non-participants
- Comparisons between different groups of individuals or program participants experiencing different levels of program intensity.
- Comparison between locales where the program operates and sites without program intervention
- Other

Evaluation Results

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.

Key Items of Evaluation

All projects conducted under this program were peer-reviewed before initiation. Annual progress reports were collected and evaluated by the associate deans for research and extension. Funds are not released for those projects which did not show tangible progress.

V(A). Planned Program (Summary)

Program # 7

1. Name of the Planned Program

Climate Change

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
104	Protect Soil from Harmful Effects of Natural Elements	0%		10%	
111	Conservation and Efficient Use of Water	50%		0%	
112	Watershed Protection and Management	20%		20%	
122	Management and Control of Forest and Range Fires	0%		20%	
123	Management and Sustainability of Forest Resources	0%		15%	
132	Weather and Climate	10%		10%	
133	Pollution Prevention and Mitigation	20%		15%	
136	Conservation of Biological Diversity	0%		10%	
	Total	100%		100%	

Add knowledge area

V(C). Planned Program (Inputs)

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

Year: 2010	Extension		Research	
	1862	1890	1862	1890
Plan	1.5	0.0	5.7	0.0
Actual	0.7	0.0	0.7	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
2710	0	48436	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
122307	0	90513	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	163425	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Global climate change has affected Hawai'i's tropical environment. The availability of water is of great concern, particularly in rural areas where water-delivery systems that used to be maintained by the large plantations have fallen into disrepair. Water catchment systems are a common solution; however, water quality is affected by many variables. For example, acid rain caused by volcanic gas (VOG) is a major concern in the state, particularly on Hawai'i Island. Increased urbanization also contributes to global warming, and researchers and extension personnel are pursuing mitigation efforts via urban horticulture and forestry. Activities are to (1) conduct a needs assessment for stakeholders in urban and rural areas; (2) develop and deliver educational programs directed at catchment systems and urban horticulture in order to mitigate or prevent the negative effects of global warming; (3) develop remote sensing methods to monitor land-based pollution influences on the coastal environment; and (4) gain a better understanding of the fuel, climatic, and fire behavior components of the grass/wildfire cycle in Hawaii.

Hawaii's multistate programs on global climate change are fairly modest at this time. The availability of water is of great concern, particularly in rural areas. Water catchment systems are a common solution. This program provides testing supplies and kits for monitoring water supplies, has developed national and international collaborations, and emphasizes importance of water disinfection/purification techniques for Hawaii and Pacific Island residents.

In evaluating remote sensing methods, it was found that readily available MODIS data were effective for sediment plume detection but too coarse in resolution to track evolution of sediment plumes. Cross-calibration of higher resolution multi-sensor sources is necessary to track temporal changes in coastal sediment plumes.

Another area of emphasis is the sustainable productivity of Hawaii's range and pasture lands and forests where drought management spread of invasive weeds and pests are emphasized, particularly with respect to the impact of invasives on wildfire fuel load and fuel moisture content. In restoration studies, increased native species functional diversity enhanced restoration potential by negatively impacting invasive guinea grass growth and reproduction.

2. Brief description of the target audience

The rainwater catchment program and the urban forestry program are aimed at the general public. Remote sensing activities target government agencies and NGOs concerned with coastal pollution monitoring and management; and pasture and forest ecosystem studies are addressed to government, NGOs and private land managers, as well as being actively incorporated into instructional activities.

V(E). Planned Program (Outputs)

1. Standard output measures

2010	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Plan	80	7000	50	30
Actual	2899	37708	0	0

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

Patent Applications Submitted

Year: 2010
 Plan: 1
 Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2010	Extension	Research	Total
Plan	2	10	
Actual	1	1	2

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Presentations at international and national meetings.
- Not reporting on this Output for this Annual Report

Year	Target	Actual
2010	15	8

Output #2

Output Measure

- Grant proposals submitted.
- Not reporting on this Output for this Annual Report

Year	Target	Actual
2010	6	16

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 programs on economic or enterprise development
2	Total dollar value of grants and contracts obtained
3	Number of people who increase their knowledge or complete non-formal education on climate change related issues

Add Cross-cutting Outcome/Impact Statement or Unintended or Previously Unknown Outcome Measure

Outcome #1

1. Outcome Measures

- Not Reporting on this Outcome Measure

Number of people who increase their knowledge or complete non-formal education programs on economic or enterprise development

2. Associated Institution Types

- 1862 Extension
 1862 Research

3a. Outcome Type:

- Change in Knowledge Outcome Measure
 Change in Action Outcome Measure
 Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	200	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

Outcome #2

1. Outcome Measures

- Not Reporting on this Outcome Measure

Total dollar value of grants and contracts obtained

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

- Change in Knowledge Outcome Measure
- Change in Action Outcome Measure
- Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	400000	323719

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Resources are needed to conduct research and extension programs to assist stakeholders.

What has been done

Resources were obtained and programs were conducted.

Results

Hawaii's economy benefited from external funds and programming to assist stakeholders was conducted.

4. Associated Knowledge Areas

- 104 - Protect Soil from Harmful Effects of Natural Elements
- 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
- 136 - Conservation of Biological Diversity

Outcome #3

1. Outcome Measures

- Not Reporting on this Outcome Measure

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

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

- Change in Knowledge Outcome Measure
- Change in Action Outcome Measure
- Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	{No Data Entered}	8135

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Residents, businesses and government must anticipate and adapt to conditions associated with current and anticipated changes in conditions (like water availability, extreme weather events, fires, etc.) associated with climate change.

What has been done

Research has been conducted and the information shared with both granting agencies and extension educators on forest and fire management. Workshops and demonstrations have been conducted on catchment water safety, pollution prevention, and mitigating reduced or variable water supplies.

Results

Hawaii's residents are better prepared to deal with the consequences of some climate change issues.

4. Associated Knowledge Areas

- 104 - Protect Soil from Harmful Effects of Natural Elements
- 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
- 136 - Conservation of Biological Diversity

V(H). Planned Program (External Factors)

External factors which affected outcomes

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

Brief Explanation

This is a relatively new program for the college, and a difficult economic climate for obtaining extramural funding. Higher resolution data needs to be obtained to track coastal sediment plumes over time; and models of fire behavior developed in temperate regions are not necessarily transportable to the tropics.

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

(OPTIONAL SECTION)

1. Evaluation Studies Planned

- After Only (post program)
- Retrospective (post program)
- Before-After (before and after program)
- During (during program)
- Time series (multiple points before and after program)
- Case Study
- Comparisons between program participants (individuals, group, organizations) and non-participants
- Comparisons between different groups of individuals or program participants experiencing different levels of program intensity.
- Comparison between locales where the program operates and sites without program intervention
- Other

Evaluation Results

All projects conducted under this program were peer-reviewed before initiation. Annual progress reports were collected and evaluated by the associate deans for research and extension. Funds are not released for those projects which did not show tangible progress.

Key Items of Evaluation

None.

V(A). Planned Program (Summary)

Program # 8

1. Name of the Planned Program

Sustainable Energy

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
511	New and Improved Non-Food Products and Processes	0%		100%	
	Total	0%		100%	

Add knowledge area

V(C). Planned Program (Inputs)

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

Year: 2010	Extension		Research	
	1862	1890	1862	1890
Actual	0.0	0.0	0.8	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	717	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	190551	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	768846	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

The state of Hawai'i depends heavily upon imported fossil fuels for power and transportation. The ultimate goals of this program are to efficiently grow perennial crops on marginal lands as feedstock for

biofuels and to develop and promote the use of these locally produced biofuels as alternatives to imported fossil fuels. The objectives of this program are to (1) demonstrate the technical and economic feasibility of producing ethanol from lignocellulosic biomass, (2) demonstrate the technical and economic feasibility of producing vegetable oil for biodiesel production, and (3) demonstrate the technical and economic feasibility of producing charcoal from bioresidue generated in the course of producing ethanol and biodiesel. Planned activities are to (1) determine the optimal yield and quality of guinea grass for conversion as a function of harvesting frequency, irrigation, and fertilizer treatments; (2) conduct field experiments with *Jatropha curcas*, a tree that produces a nut with great potential as a source of oil for conversion into biodiesel; and (3) develop and demonstrate the use of dried guinea grass and the shell and husk of *Jatropha* nuts as feedstock for conversion into charcoal using flash carbonization.

On the continental US, dry matter yield ranging from 15 - 30 Mg/ha/yr is considered high. In Hawaii, our long growing season enable us to produce dry matter yield as high as 100 Mg/ha/yr. High yields in Hawaii, however, have been obtained on prime agricultural lands, and our goal is to retain these lands for food production and learn to produce biomass for biofuels on the state's marginal, underutilized lands. In Hawaii, these underutilized lands occur at high elevations where air temperature is too low for most crops, and in the rain shadow of our high mountains where rainfall too low. Guinea grass is drought tolerant, but is not suitable for the high elevation zones. Our work shows that napier grass can perform well at 1000m elevation. We now need to learn whether napier grass can perform well in the dry, high elevations zones of the state. The napier grass-millet hybrid, developed by Dr. Joy is a promising candidate for the cool, dry zones of the state. High oil yields claimed by *Jatropha* promoters have not been achieved in practice. However, high yielding trees have been identified, but seeds from these trees produce progeny that vary greatly in size, shape and oil yield. We are pursuing tissue culture as a route to consistently high-yielding trees. Our research so far indicates that charcoal is a high specific surface, variable charge material with physical and chemical properties very similar to our high specific surface, variable charge clay soils. However, the charcoal used to purify sewage water has its pores filled with nutrients removed from the sewage water, and this nutrient-rich biochar may have the carbon sequestering and agronomic value we have been looking for.

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) and Hawaii Pure Plant Oil (HPPO) (*Jatropha*) are partners and target audiences for these efforts. Lastly, the Hawaii Agricultural Research Center (HARC) and Hawaii Natural Resources Institute are both collaborators and audiences for improved biofuel production.

V(E). Planned Program (Outputs)

1. Standard output measures

2010	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Plan	{NO DATA}	{NO DATA}	{NO DATA}	{NO DATA}
Actual	0	0	0	0

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

Year: 2010
 Plan:
 Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2010	Extension	Research	Total
Actual	0	0	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Grant proposals submitted.

Not reporting on this Output for this Annual Report

Year	Target	Actual
2010	{No Data Entered}	8

Output #2

Output Measure

- Presentations at national and international meetings.

Not reporting on this Output for this Annual Report

Year	Target	Actual
2010	{No Data Entered}	0

Output #3

Output Measure

- Number of workshops and other educational activities held.

Not reporting on this Output for this Annual Report

Year	Target	Actual
2010	{No Data Entered}	1

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Dollar value of grants and contracts obtained.

Add Cross-cutting Outcome/Impact Statement or Unintended or Previously Unknown Outcome Measure

Outcome #1

1. Outcome Measures

- Not Reporting on this Outcome Measure
Dollar value of grants and contracts obtained.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

- Change in Knowledge Outcome Measure
- Change in Action Outcome Measure
- Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	{No Data Entered}	1677728

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Resources are needed to conduct research and extension programs to assist stakeholders.

What has been done

Resources were obtained and programs were conducted.

Results

Hawaii's economy benefited from external funds and programming to assist stakeholders was conducted.

4. Associated Knowledge Areas

- 511 - New and Improved Non-Food Products and Processes

V(H). Planned Program (External Factors)

External factors which affected outcomes

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

Brief Explanation

This is a relatively new program area for the college, and faculty numbers are limited due to both retirements and competing program needs.

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

(OPTIONAL SECTION)

1. Evaluation Studies Planned

- After Only (post program)
- Retrospective (post program)
- Before-After (before and after program)
- During (during program)
- Time series (multiple points before and after program)
- Case Study
- Comparisons between program participants (individuals, group, organizations) and non-participants
- Comparisons between different groups of individuals or program participants experiencing different levels of program intensity.
- Comparison between locales where the program operates and sites without program intervention
- Other

Evaluation Results

All projects conducted under this program were peer-reviewed before initiation. Annual progress reports were collected and evaluated

by the associate deans for research and extension. Funds are not released for those projects which did not show tangible progress.

Key Items of Evaluation

None.

V(A). Planned Program (Summary)

Program # 9

1. Name of the Planned Program

Childhood Obesity

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
703	Nutrition Education and Behavior	50%		50%	
704	Nutrition and Hunger in the Population	10%		50%	
724	Healthy Lifestyle	40%		0%	
	Total	100%		100%	

Add knowledge area

V(C). Planned Program (Inputs)

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

Year: 2010	Extension		Research	
	1862	1890	1862	1890
Actual	0.3	0.0	1.1	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
3514	0	20180	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
28318	0	179452	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
12450	0	67331	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Health and wellness have long been issues for Hawai'i's communities. The high cost of living in Hawai'i and the resulting need for multiple incomes in the household reduce time and energy available for food preparation, leading to greater consumption of fast food. In addition, cultural practices in Hawai'i place great 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). Although traditional health and wellness programming in CTAHR has focused on adults, growing concern over childhood obesity has shifted the focus to youth in the past few years. For example, the rate of obesity in children in Hawai'i ages 6 to 11 is twice the national average.

Extension activities in CTAHR focus on nutrition education in order to help parents and children improve their diets, and on integrating increased physical activity into youth development programs. Research efforts to support these outreach activities and to identify physical, cultural, or social factors impeding their adoption are new in the college, but will be increasingly important over the next several years. Activities focused on (1) providing adult development programs for volunteers that include content encouraging better nutrition and increased physical activity for the youth for whom these adults are responsible; (2) expanding 4-H or other youth curricula to encourage better nutrition and increased physical activity in youths; (3) and conducting research to identify and mitigate the physical, social, and/or cultural barriers to improved nutrition and physical well-being of youth in Hawai'i. A food store intervention trial targeting caregivers was found to improve children's dietary intake; and local data was contributed to a national review on obesity measures.

Get Moving For Health is a 4-H Healthy Living project to motivate youth throughout the state of Hawaii to be more physically active. The training involves youth and adults working in partnership to implement projects in their communities which encourage youth and adults to make healthy lifestyle choices and changes through daily physical activities. The program engaged six teams from four of the islands in teaching exercise to intergenerational groups on their home island. The teams each had two teenage 4-H members and an adult advisor. The teams were prepared to teach at a training session on the island of Kauai where they learned the benefits of physical activity. More than one thousand Hawaiian young people and more than 200 Hawaiian adults increased their level of physical activity over a period of six weeks as a result of this program. Seventy seven percent of the participants said they would maintain the same or greater level of physical activity after the program ended. 89% of the participants said they had found ways to make exercise less work like and more enjoyable. Youth participants in the program report feeling healthier, discovering they enjoy exercise and had fun being physically active.

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) participating in community wellness programs and community development programs such as 4H.

V(E). Planned Program (Outputs)

1. Standard output measures

2010	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Plan	{NO DATA}	{NO DATA}	{NO DATA}	{NO DATA}
Actual	329	4127	302	608

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

Patent Applications Submitted

Year: 2010
 Plan:
 Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2010	Extension	Research	Total
Actual	0	1	1

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Grant proposals submitted.

Not reporting on this Output for this Annual Report

Year	Target	Actual
2010	{No Data Entered}	4

Output #2

Output Measure

- Presentations at national and international meetings.

Not reporting on this Output for this Annual Report

Year	Target	Actual
2010	{No Data Entered}	1

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Dollar value of grants and contracts obtained.
2	Number of stakeholders completing non-formal education programs on childhood obesity issues.

Add Cross-cutting Outcome/Impact Statement or Unintended or Previously Unknown Outcome Measure

Outcome #1

1. Outcome Measures

- Not Reporting on this Outcome Measure
Dollar value of grants and contracts obtained.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

- Change in Knowledge Outcome Measure
- Change in Action Outcome Measure
- Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	{No Data Entered}	67389

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Resources are needed to conduct research and extension programs to assist stakeholders.

What has been done

Resources were obtained and programs were conducted.

Results

Hawaii's economy benefited from external funds and programming to assist stakeholders was conducted.

4. Associated Knowledge Areas

- 703 - Nutrition Education and Behavior
- 704 - Nutrition and Hunger in the Population
- 724 - Healthy Lifestyle

Outcome #2

1. Outcome Measures

- Not Reporting on this Outcome Measure

Number of stakeholders completing non-formal education programs on childhood obesity issues.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

- Change in Knowledge Outcome Measure
- Change in Action Outcome Measure
- Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	{No Data Entered}	297

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Information is needed by children, parents and health professionals on best means of reducing childhood obesity in Hawaii.

What has been done

Stakeholders have received appropriate information on reducing childhood obesity through improved diet and increased exercise through workshops, demonstrations, extension publications and nutrition website.

Results

Children in Hawaii have begun to change their behavior and are losing weight in a healthy manner.

4. Associated Knowledge Areas

- 703 - Nutrition Education and Behavior
- 704 - Nutrition and Hunger in the Population
- 724 - Healthy Lifestyle

V(H). Planned Program (External Factors)

External factors which affected outcomes

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

Brief Explanation

This is new program area for the college. State and federal regulations governing the inclusion of children in research can cause delays in program initiation and implementation.

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

(OPTIONAL SECTION)

1. Evaluation Studies Planned

- After Only (post program)
- Retrospective (post program)
- Before-After (before and after program)
- During (during program)
- Time series (multiple points before and after program)
- Case Study
- Comparisons between program participants (individuals, group, organizations) and non-participants
- Comparisons between different groups of individuals or program participants experiencing different levels of program intensity.
- Comparison between locales where the program operates and sites without program intervention
- Other

Evaluation Results

All projects conducted under this program were peer-reviewed before initiation. Annual progress reports were collected and evaluated

by the associate deans for research and extension. Funds are not released for those projects which did not show tangible progress.

Key Items of Evaluation

None.

V(A). Planned Program (Summary)

Program # 10

1. Name of the Planned Program

Food Safety

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
402	Engineering Systems and Equipment	0%		8%	
501	New and Improved Food Processing Technologies	25%		24%	
502	New and Improved Food Products	10%		0%	
503	Quality Maintenance in Storing and Marketing Food Products	30%		0%	
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources	15%		4%	
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins	20%		47%	
722	Zoonotic Diseases and Parasites Affecting Humans	0%		17%	
	Total	100%		100%	

Add knowledge area

V(C). Planned Program (Inputs)

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

Year: 2010	Extension		Research	
	1862	1890	1862	1890
Actual	1.0	0.0	1.5	0.0

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

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
4362	0	70632	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
115976	0	140541	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
590	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Stakeholders have a variety of concerns relative to bioterrorism (of increasing importance); good agricultural practices (in order to avoid bacterial or other contamination of produce); food allergen control; and general food safety (e.g., food additives). In response to these needs, CTAHR has developed and maintained a strong food safety program targeted at food processors for over 20 years. Certification of agricultural producers in their use of good agricultural practices is a clear trend and is challenging for many of Hawaii's small farms, many of which are operated by recent immigrants with limited English language skills.

In research on the three pathogenic bacteria (*E. coli* O157:H7, *Salmonella*, and *L. monocytogenes*) known to be present on fresh produce and able to develop in acidic fruit juices, we developed a novel method of bacterial detection in refrigerated juice using plate count agar containing 0.2% sodium pyruvate (PCA-SP) in combination with selective agar media. A novel method of detecting *Salmonella* in lettuce by propidium monoazide real-time PCR was also developed, and it was found that DNA from dead *Salmonella* remains stable in lettuce for at least 8 days. For single-step detection of food pathogens in processing facilities, we focused on development of microbial sensor technology exploiting novel nanoneedle probes, using the lethal bacterial strain *E. coli* O157:H7 as a model organism. A microwire sensor device was designed and fabricated successfully, and demonstrated to provide high sensing efficiency that allows the entire procedure to be completed within 15 minutes. Current research focuses on scaling this device down to nanowire, and potential use as a tool for detection of extracellular DNA markers in food samples. Finally, we optimized a targeted gene knockout method to generate over 200 mutants as the first step in better understanding of mycotoxin production.

CTAHR has continued efforts in educating growers about food safety practices on farm and in the packing areas. Through one on one visitation and consultations, growers indicated an increase in knowledge and heightened level of competencies in identifying high-risk areas. Modified operations have minimized the risk associated with food safety issues and secured their marketplace. In 2008, there were approximately 10 growers on Oahu who have successfully obtained Food Safety certification. In 2010, the number of food safety certified operation increased through our collaborative efforts. We are continuing to work to safeguard Hawaii's agricultural food supply through minimizing risk associated with food borne illnesses. In 2009-2010 we provided food safety opportunities in: 1) on farm audits, 2) farm manual and document development and 3) on farm education of managers and employees. We stress the importance of education in conjunction with certification to help socially disadvantaged growers transition toward food safety certified operation while maintaining their market share and position at the Hawaii Farm Bureau Federation Farmers Markets, in which farm food safety certification is increasingly being required.

2. Brief description of the target audience

This program reaches from farms to food processing facilities; to consumers, hospitals and research facilities. Detection and mitigation of food-borne pathogens is a critical concern for local farms and processing facilities, home gardeners, medical laboratories, and the many importers and retailers of food products imported from outside of the State of Hawaii.

V(E). Planned Program (Outputs)

1. Standard output measures

2010	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Plan	{NO DATA}	{NO DATA}	{NO DATA}	{NO DATA}
Actual	1073	10350	200	1060

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

Patent Applications Submitted

Year: 2010
 Plan:
 Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2010	Extension	Research	Total
Actual	0	1	1

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Grant proposals submitted.

Not reporting on this Output for this Annual Report

Year	Target	Actual
2010	{No Data Entered}	8

Output #2

Output Measure

- Presentations at national and international meetings.

Not reporting on this Output for this Annual Report

Year	Target	Actual
2010	{No Data Entered}	2

Output #3

Output Measure

- Number of workshops or demonstration activities held on food safety

Not reporting on this Output for this Annual Report

Year	Target	Actual
2010	{No Data Entered}	35

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

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

Add Cross-cutting Outcome/Impact Statement or Unintended or Previously Unknown Outcome Measure

Outcome #1

1. Outcome Measures

- Not Reporting on this Outcome Measure
Dollar value of grants and contracts obtained.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

- Change in Knowledge Outcome Measure
- Change in Action Outcome Measure
- Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	{No Data Entered}	86282

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Resources are needed to conduct research and extension programs to assist stakeholders.

What has been done

Resources were obtained and programs were conducted.

Results

Hawaii's economy benefited from external funds and programming to assist stakeholders was conducted.

4. Associated Knowledge Areas

- 402 - Engineering Systems and Equipment
- 501 - New and Improved Food Processing Technologies
- 502 - New and Improved Food Products
- 503 - Quality Maintenance in Storing and Marketing Food Products
- 711 - Ensure Food Products Free of Harmful Chemicals, Including Residues from
- 712 - Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and
- 722 - Zoonotic Diseases and Parasites Affecting Humans

Outcome #2

1. Outcome Measures

Not Reporting on this Outcome Measure

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

2. Associated Institution Types

1862 Extension

1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

Change in Action Outcome Measure

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	{No Data Entered}	390

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Protection of food safety is both an individual and well as a societal responsibility. Farms, food processors, markets, restaurants as well as the individual consumer all have their respective responsibilities in maintaining a safe food supply. CTAHR has the responsibility to provide science-based information on food safety to all these groups.

What has been done

Various stakeholders were educated about improving food safety through workshops, extension publications, websites and non-formal educational activities.

Results

The safety of Hawaii's fresh and processed foods has been improved through these activities.

4. Associated Knowledge Areas

402 - Engineering Systems and Equipment

501 - New and Improved Food Processing Technologies

502 - New and Improved Food Products

503 - Quality Maintenance in Storing and Marketing Food Products

711 - Ensure Food Products Free of Harmful Chemicals, Including Residues from

- 712 - Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and
- 722 - Zoonotic Diseases and Parasites 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
- Populations changes (immigration, new cultural groupings, etc.)
- Other

Brief Explanation

Retailers and consumers have a strong interest in food safety, but processors and farmers face difficulties from the costs associated with food safety certification, particularly in a weak economy. Thus, funding for this program, and public/client and political interest is inconsistent.

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

(OPTIONAL SECTION)

1. Evaluation Studies Planned

- After Only (post program)
- Retrospective (post program)
- Before-After (before and after program)
- During (during program)
- Time series (multiple points before and after program)
- Case Study
- Comparisons between program participants (individuals, group, organizations) and non-participants
- Comparisons between different groups of individuals or program participants experiencing different levels of program intensity.
- Comparison between locales where the program operates and sites without program intervention
- Other

Evaluation Results

All projects conducted under this program were peer-reviewed before initiation. Annual progress reports were collected and evaluated by the associate deans for research and extension. Funds are not released for those projects which did not show tangible progress.

Key Items of Evaluation

None.