

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

**Program # 2**

**1. Name of the Planned Program**

Hawaii's Diversified Tropical Crop Systems for Sustainability and Competitiveness

Reporting on this Program

**V(B). Program Knowledge Area(s)**

**1. Program Knowledge Areas and Percentage**

<b>KA Code</b>	<b>Knowledge Area</b>	<b>%1862 Extension</b>	<b>%1890 Extension</b>	<b>%1862 Research</b>	<b>%1890 Research</b>
102	Soil, Plant, Water, Nutrient Relationships	9%		5%	
124	Urban Forestry	2%		2%	
201	Plant Genome, Genetics, and Genetic Mechanisms	0%		4%	
202	Plant Genetic Resources	5%		5%	
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants	0%		1%	
204	Plant Product Quality and Utility (Preharvest)	0%		6%	
205	Plant Management Systems	40%		17%	
206	Basic Plant Biology	0%		1%	
211	Insects, Mites, and Other Arthropods Affecting Plants	4%		2%	
212	Diseases and Nematodes Affecting Plants	6%		15%	
213	Weeds Affecting Plants	2%		0%	
215	Biological Control of Pests Affecting Plants	0%		5%	
216	Integrated Pest Management Systems	22%		12%	
502	New and Improved Food Products	0%		6%	
511	New and Improved Non-Food Products and Processes	0%		5%	
601	Economics of Agricultural Production and Farm Management	5%		4%	
604	Marketing and Distribution Practices	0%		5%	
903	Communication, Education, and Information Delivery	5%		5%	
	<b>Total</b>	100%		100%	

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

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

Year: 2014	Extension		Research	
	1862	1890	1862	1890
<b>Plan</b>	12.0	0.0	8.0	0.0
<b>Actual Paid</b>	12.0	0.0	10.8	0.0
<b>Actual Volunteer</b>	117.0	0.0	0.0	0.0

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

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
652474	0	476686	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
1372369	0	3808418	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
369250	0	936633	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, both for local use and for export. Since 88% of the food consumed in Hawaii is imported, an important goal for local food security 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. Research and extension efforts in F2014 included all areas of tropical agriculture: breeding of new ornamental varieties, variety selection for pest and disease resistance, pest and disease management in both conventional and organic farming, identification and evaluation of potential new specialty crops and value-added processed foods, genetic modification and marker assisted selection, improved field and greenhouse cultivation methods, promotion of import replacement with locally grown produce, and aquaponics for sustainable no-soil agricultural production.

Successful farming requires economic stability as well a success in crop cultivation. This can be challenging in Hawaii, where all crops are considered Specialty Crops, and 63% of the state's 7,000 farms are less than 10 acres in size. The Risk Management Hawaii (RMH) program addresses the challenge by providing education and training in management of production issues such as nutrition and pest control, crop diversification opportunities, food safety, marketing, farm business practices, Federal crop insurance and disaster assistance programs. In FY2014, attendees at the 75 RMH workshops rated the workshops as excellent (3.7 on a scale of 1-4), and 92% agreed that these educational sessions had increased their ability to manage agricultural risks. Diversified income sources are also of great value to Hawaii's farmers, and a draft set of best-management practices for farms engaged in "agri-tainment" (agritourism) was prepared.

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. Master Gardeners have become the "volunteer" public face of the Cooperative Extension Service at numerous events statewide, including county fairs and Plant Doctor booths at Farmers Markets.

Important limiting factors in crop production in Hawaii are pests and diseases. Taro is a culturally-important primary food source in Hawaii (most often boiled and mashed as poi) and throughout the Pacific; and Taro Leaf Blight, a fungal disease, is one of the greatest threats to taro production. Using both conventionally bred taro hybrids, and field-resistant cultivars from Palau and Micronesia, progeny were produced with high resistance to the pathogen. Genotyping by sequencing (GBS) indicates that the resistant phenotype is not inherited in a dominant manner and is likely a complex, multi-locus, trait.

Efforts to increase the availability of crop extension services and more rapidly transfer research results focused on the release of two new mobile phone applications. "The Plant Doctor" app offers plant disease identification tools and rapid consultation by professionals; while "Pic-a-Papaya" encourages citizen scientists to submit photos and descriptions of possibly diseased papaya. This app combines Papaya Ring Spot Virus diagnosis, GMO testing of papaya, and plant replacement services for diseased or GMO papaya (if the latter is a concern to the client).

## 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.

## 3. How was eXtension used?

Aquaculture faculty were active in use of eXtension and service on national committees.

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

#### 1. Standard output measures

2014	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
<b>Actual</b>	17821	164029	1378	5160

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

Year: 2014  
 Actual: 0

**Patents listed**

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

**Number of Peer Reviewed Publications**

2014	Extension	Research	Total
Actual	46	14	60

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

**Output Target**

**Output #1**

**Output Measure**

- Number of workshops, research/field day demonstrations conducted

Year	Actual
2014	281

**Output #2**

**Output Measure**

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

Year	Actual
2014	47

**Output #3**

**Output Measure**

- Presentations at international and national meetings

Year	Actual
2014	14

**Output #4**

**Output Measure**

- Number of grant proposals submitted.

Year	Actual
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2014

64

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

**V. State Defined Outcomes Table of Content**

O. No.	OUTCOME NAME
1	Number of individuals completing non-formal education programs.
2	Number of people who adopt one or more recommended practices.
3	Total dollar value of grants and contracts obtained.

## **Outcome #1**

### **1. Outcome Measures**

Number of individuals completing non-formal education programs.

### **2. Associated Institution Types**

- 1862 Extension

### **3a. Outcome Type:**

Change in Knowledge Outcome Measure

### **3b. Quantitative Outcome**

<b>Year</b>	<b>Actual</b>
2014	17821

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

#### **Issue (Who cares and Why)**

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

#### **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**

<b>KA Code</b>	<b>Knowledge Area</b>
102	Soil, Plant, Water, Nutrient Relationships
201	Plant Genome, Genetics, and Genetic Mechanisms
202	Plant Genetic Resources
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants
204	Plant Product Quality and Utility (Preharvest)
205	Plant Management Systems
206	Basic Plant Biology

211	Insects, Mites, and Other Arthropods Affecting Plants
212	Diseases and Nematodes Affecting Plants
213	Weeds Affecting Plants
215	Biological Control of Pests Affecting Plants
216	Integrated Pest Management Systems
502	New and Improved Food Products
601	Economics of Agricultural Production and Farm Management
604	Marketing and Distribution Practices
903	Communication, Education, and Information Delivery

## **Outcome #2**

### **1. Outcome Measures**

Number of people who adopt one or more recommended practices.

### **2. Associated Institution Types**

- 1862 Extension

### **3a. Outcome Type:**

Change in Action Outcome Measure

### **3b. Quantitative Outcome**

<b>Year</b>	<b>Actual</b>
2014	1563

### **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. Adoptions usually require 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

<b>KA Code</b>	<b>Knowledge Area</b>
102	Soil, Plant, Water, Nutrient Relationships
124	Urban Forestry
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants
204	Plant Product Quality and Utility (Preharvest)
205	Plant Management Systems
211	Insects, Mites, and Other Arthropods Affecting Plants
212	Diseases and Nematodes Affecting Plants
213	Weeds 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**

Total dollar value of grants and contracts obtained.

##### **2. Associated Institution Types**

- 1862 Extension
- 1862 Research

##### **3a. Outcome Type:**

Change in Action Outcome Measure

##### **3b. Quantitative Outcome**

<b>Year</b>	<b>Actual</b>
2014	4449802

##### **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**

<b>KA Code</b>	<b>Knowledge Area</b>
102	Soil, Plant, Water, Nutrient Relationships
201	Plant Genome, Genetics, and Genetic Mechanisms
202	Plant Genetic Resources
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants
204	Plant Product Quality and Utility (Preharvest)
205	Plant Management Systems
206	Basic Plant Biology
211	Insects, Mites, and Other Arthropods Affecting Plants
212	Diseases and Nematodes Affecting Plants
213	Weeds 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

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

**External factors which affected outcomes**

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

**Brief Explanation**

Natural disasters such as hurricanes, typhoons, floods, fires, often are destructive to

crops. 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)**

### **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.