

V(A). Planned Program (Summary)

Program # 7

1. Name of the Planned Program

Climate Change

Reporting on this Program

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
102	Soil, Plant, Water, Nutrient Relationships	25%		30%	
111	Conservation and Efficient Use of Water	35%		40%	
112	Watershed Protection and Management	25%		0%	
405	Drainage and Irrigation Systems and Facilities	15%		30%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2014	Extension		Research	
	1862	1890	1862	1890
Plan	1.0	0.0	1.0	0.0
Actual Paid	0.0	0.0	0.0	0.0
Actual Volunteer	0.0	0.0	0.0	0.0

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

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
1055	0	1487	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
54880	0	0	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Global climate change will continue to affect Hawaii's tropical, island environment as well as other Pacific Islands. 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 where long-term volcanic eruptions continue. Increased urbanization also contributes to global warming, and researchers and extension personnel are pursuing mitigation efforts via urban horticulture and forestry. Continuing activities in this area 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.

The CTAHR Range Management Specialist has continued to collect and analyze data from 15 Weather station/forage production exclosures located throughout the state, and to distribute the results to ranchers on each island. The Drought Management and Forage Production Decision Support Tool (<http://globalrangelands.org/hawaii>) developed from this work has been released to the public. Increasing temperatures were also reported to be affecting lettuce producers in FY2014, while increasing salinity is anticipated by taro growers. CTAHR extension personnel joined in the national Climate Hub initiative in FY2014, an effort to coordinate technology transfer and extension efforts to mitigate the impacts of climate change across landgrants and federal agencies. To further this effort, college staff met with our western region counterparts, and formed a Hawaii alliance with federal partners.

Climate change research addressed the seasonal phenology, and its inter-annual variability, of native forests in Hawaii; and also continued to examine the impact of temperature increase on carbon pools in live and dead biomass in tropical forests. A 1.5 year continuous time series of top-of-the-canopy photos was acquired by mounting a digital fisheye imaging system at two native forest sites on the island of Hawaii. In comparison to a MODIS vegetation index time series, and in situ meteorological data, the fisheye camera time series illustrated moderate fluctuations in canopy greenness not otherwise observable, demonstrating the value of in situ near-surface remote sensing in monitoring native Ohia forest dynamics.

The recently established Pacific Fire Exchange (PFX), one of 14 consortia arising from a national effort of the Joint Fire Sciences Program, was active in fire prevention extension programming with wildfire professionals in Hawaii, Guam and Palau; and in research to better model wildfire behavior in the tropics, particularly in the common invasive guinea grass.

2. Brief description of the target audience

The rainwater catchment program and irrigation support research 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, particularly those involved in wildfire management, as well as being actively incorporated into instructional activities.

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2014	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	0	0	0	0

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

Patent Applications Submitted

Year: 2014

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2014	Extension	Research	Total
Actual	0	0	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of workshops, field days, or demonstrations conducted

Year	Actual
2014	0

Output #2

Output Measure

- Presentations at national and international meetings.

Year	Actual
2014	2

Output #3

Output Measure

- Grant proposals submitted.

Year	Actual
2014	17

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

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

Outcome #1

1. Outcome Measures

Number of people that adopt one or more recommended practice.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Rain catchment systems for domestic water use are impacted by low or variable rainfall distribution and by poor water quality. Drought and rainfall variation also can cause problems with watershed management, ecosystem restoration and wild fires.

What has been done

A domestic rainwater catchment program provides educational information to Hawaii residents statewide as well as internationally. Programs are being initiated to improve watershed and fire management.

Results

Rainwater catchment users have improved their domestic water quality. Fire-fighting professionals are better prepared and more effective.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
111	Conservation and Efficient Use of Water
112	Watershed Protection and Management

Outcome #2

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Hawaii residents need to anticipate and plan for possible effects of climate change, including weather variability and drought.

What has been done

Workshops, demonstrations and nonformal education activities have been carried out.

Results

Hawaii residents are better informed about possible impacts of climate change, and better able to mitigate impacts.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
111	Conservation and Efficient Use of Water
112	Watershed Protection and Management
405	Drainage and Irrigation Systems and Facilities

Outcome #3

1. Outcome Measures

Dollar value of grants and contracts obtained.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	597933

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

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

What has been done

Funds were solicited from extramural agencies.

Results

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

4. Associated Knowledge Areas

KA Code	Knowledge Area
111	Conservation and Efficient Use of Water
112	Watershed Protection and Management
405	Drainage and Irrigation Systems and Facilities

V(H). Planned Program (External Factors)

External factors which affected outcomes

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

Brief Explanation

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

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.