

V(A). Planned Program (Summary)

Program # 7

1. Name of the Planned Program

Climate Change

Reporting on this Program

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
102	Soil, Plant, Water, Nutrient Relationships	0%		15%	
111	Conservation and Efficient Use of Water	50%		20%	
112	Watershed Protection and Management	17%		0%	
122	Management and Control of Forest and Range Fires	25%		0%	
123	Management and Sustainability of Forest Resources	0%		30%	
132	Weather and Climate	0%		10%	
133	Pollution Prevention and Mitigation	8%		0%	
136	Conservation of Biological Diversity	0%		10%	
405	Drainage and Irrigation Systems and Facilities	0%		15%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2013	Extension		Research	
	1862	1890	1862	1890
Plan	1.0	0.0	2.0	0.0
Actual Paid Professional	0.8	0.0	0.6	0.0
Actual Volunteer	0.0	0.0	0.0	0.0

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

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
52536	0	26813	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
69436	0	82158	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	222917	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Global climate change will continue to affect Hawai'i'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. The data collected to date (2008-2013) have been used to develop a Drought Management and Forage Production Decision Support Tool that has been released to the public and can be found at: <http://globalrangelands.org/hawaii>. The project was originally funded through the NRCS-Conservation Initiative Grant Program. Subsequent funding was provided through CTAHR. In addition, through this project Hawaii Livestock producers received drought management and mitigation support through direct outreach and assessment of drought impacts for the USDA-FSA NAP-Forage program.

The Rainwater Catchment Education and Research program in Hawaii focuses on both improving water quality for domestic use catchment systems and mitigating the effects of variable rainfall through conservation activities. The program maintains a website (<http://www.ctahr.hawaii.edu/hawaiirain/>) providing information on system design, maintenance and safety. Testing supplies and kits are also distributed. Since 2011, the program has developed significant national and international collaborations with other rainwater catchment associations in Taiwan, China, Europe, Australia and the continental USA. Collaboration with these international groups will facilitate sharing of information on safe and efficient rainwater harvesting methods. In 2013 the Rainwater Catchment program became a collaborative effort of CTAHR with Hawaii Seagrant.

Climate change research examined the impact of temperature increase on carbon pools in live and dead biomass in tropical forests, both above and below ground, and suggested that the size and distribution of these carbon pools will be less sensitive to rising temperatures than has been predicted by

ecosystem models. The recently established Pacific Fire Exchange (PFX), one of 14 consortia arising from a national effort of the Joint Fire Sciences Program, was also both in fire prevention programming with wildfire professionals in Hawaii, Guam and Palau; and in research to model wildfire behavior in the tropics, particularly in the common invasive guinea grass. Field data were used to parameterize a custom fuels model, which better predicted fire behavior than either the national standard or previous custom fuel models. Accurate prediction of wildfire behavior is essential for effective wildfire management.

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

2013	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	3951	2527	0	0

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

Patent Applications Submitted

Year: 2013
 Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2013	Extension	Research	Total
Actual	0	4	4

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of workshops, field days, or demonstrations conducted

Year	Actual
2013	4

Output #2

Output Measure

- Presentations at national and international meetings.

Year	Actual
2013	4

Output #3

Output Measure

- Grant proposals submitted.

Year	Actual
2013	7

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 Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	62

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.

4. Associated Knowledge Areas

KA Code	Knowledge Area
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
133	Pollution Prevention and Mitigation

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
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	30

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.

4. Associated Knowledge Areas

KA Code	Knowledge Area
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

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
2013	691638

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
102	Soil, Plant, Water, Nutrient Relationships
111	Conservation and Efficient Use of Water
112	Watershed Protection and Management
122	Management and Control of Forest and Range Fires
123	Management and Sustainability of Forest Resources
132	Weather and Climate
133	Pollution Prevention and Mitigation
136	Conservation of Biological Diversity

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 relatively new program for the college. 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)

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.