

**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%	
	<b>Total</b>	100%		100%	

**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 Hawaii'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
<b>Plan</b>	80	7000	50	30
<b>Actual</b>	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
<b>Plan</b>	2	10	
<b>Actual</b>	1	1	2

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

**Output Target**

**Output #1**

**Output Measure**

- Presentations at international and national meetings.

Year	Target	Actual
2010	15	8

**Output #2**

**Output Measure**

- Grant proposals submitted.

Year	Target	Actual
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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

**Outcome #1**

**1. Outcome Measures**

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

Not Reporting on this Outcome Measure

**Outcome #2**

**1. Outcome Measures**

Total dollar value of grants and contracts obtained

**2. Associated Institution Types**

- 1862 Extension
- 1862 Research

**3a. Outcome Type:**

Change in Knowledge 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**

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
136	Conservation of Biological Diversity

**Outcome #3**

**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 Action 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**

KA Code	Knowledge Area
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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

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

##### **External factors which affected outcomes**

- Economy
- Appropriations changes
- Public Policy changes
- Competing Public priorities
- Competing Programmatic Challenges

##### **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)**

##### **1. Evaluation Studies Planned**

- Before-After (before and after program)
- During (during program)

#### **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.