

2017 University of Hawaii Combined Research and Extension Plan of Work

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I. Plan Overview

1. Brief Summary about Plan Of Work

The College of Tropical Agriculture and Human Resources (CTAHR) has had major impact on the socio-economic well-being of the people of Hawai'i since its founding in 1907. CTAHR has educated thousands of students, helped hundreds of businesses, facilitated informed decision-making by government and community leaders, and enhanced the lives of Hawai'i's people and communities. CTAHR faculty and staff have effectively served a broad range of stakeholders through its academic, research and extension programs.

In keeping with its tradition of providing excellent educational opportunities, relevant and timely research results, and superior service to stakeholders, CTAHR based its current strategic action plan on this POW to ensure that the priorities and functions of CTAHR are aligned with the needs and aspirations of those that CTAHR is committed to serve. Extensive input was solicited from faculty, students, staff, and stakeholders, which identified and prioritized CTAHR's programmatic strategies, along with management and administrative strategies to increase resources and improve efficiency. CTAHR's strategic action plan is a living document, and is well aligned with the strategic plans of UH and other related institutions to ensure that CTAHR continues close working relationships with USDA/ARS Daniel K. Inouye Pacific Basin Agriculture Research Center, Hawaii Agricultural Research Center, the Hawaii Department of Agriculture, Hawaii Department of Land and Natural Resources, and UH Hilo.

Tourism continues to be the State's number one economic sector, making the quality of the environment crucial to the Hawai'i's continued prosperity. The military is the State's second largest sector in terms of value, with the agricultural sector occupying third place in the Hawai'i's economy. The most recent estimates of the impact of agriculture on the economy of Hawai'i indicate that 62,000 people are employed in agriculture and related industries, and \$4.5 billion is contributed to the economy. Diversified agriculture is replacing a portion of the revenues generated by sugar in the State's economy. Since 1989, the value of diversified agriculture, which generally involves operations with an average size of less than five acres, has increased by 50%. However, many recent immigrants lack the critical skills required for success in diversified agriculture.

Urbanization and tourism compete with agriculture for land and water, causing land prices to rise and water availability to become an issue. To assist in the development of diversified agriculture, research and extension programs focus on enhancing profitability by reducing costs and expanding markets. The programs aimed at reducing costs determine the most efficient means of yield increase and cost reduction (through research) and assist operators in understanding how to incorporate this information into their existing management strategies (extension). In order to increase market prices, the research programs look for ways to increase the value of existing products, reduce costs and/or increase consumer demand for new or existing products, while extension programs disseminate this information to the relevant target audiences. Hawai'i's agricultural strategy includes the need to replace imports, since over 88 percent of the State's food is imported, and to develop high value, niche crops for local use and export.

At the same time, increasing urbanization has increased the interest in urban horticultural programs.

CTAHR's efforts to support subsistence and backyard agriculture have increased, as communities across the State have become more interested in increasing household food production. CTAHR is developing a variety of statewide programs aimed at supporting these efforts, including expanded and modified Master Gardener efforts.

More than 90 percent of the energy consumed in Hawai'i is from imported fossil fuels, primarily petroleum. The percentage of energy derived from petroleum in the State is the highest in the nation, and the price of gasoline and electricity routinely top U.S. charts. Hawai'i's heavy reliance on oil makes the State vulnerable to sudden disruptions in supply, while each tanker that arrives has the potential to spill its cargo and damage the fragile coasts that are so important to tourism and aquatic resources. Developing Hawai'i's renewable energy resources will improve energy security and protect the environment; and help to alleviate a significant mitigating factor for agricultural producers. Among the most promising alternative energy sources are biofuels, including ethanol from biomass and biodiesel from plant oils. A biofuel industry can expand the state's agricultural and technology sectors, keeping cash in the local economy while conserving green space. Moreover, biofuels do not promote global warming as fossil fuels do, since biofuels are carbon neutral.

CTAHR continues to conduct research in biofuel crops appropriate for Hawaii. Hawaii's desire to be less dependent on costly imported oil, coupled with the year-round growing season; experience with sugar cane; and desire to keep Hawaii green are driving this effort. CTAHR works with Hawai'i landowners to assess what fuel crops are best suited for their lands and aids Hawaiian Electric Company's efforts to meet nationwide targets for increasing the use of non-fossil fuels by electric utilities. Through bioenergy research, CTAHR is helping chart Hawai'i's sustainable future.

Unlike the situation in many states, the State of Hawaii's contribution to agricultural research and extension is provided solely through the University of Hawaii budget allocation to CTAHR. No funds are legislatively appropriated specifically for agricultural research and extension activities. University unit budgets have declined over the past several years, resulting in a decrease in formal FTE assigned to research and extension, and an increase in instructional FTE for newly recruited faculty. However, internal college resources are leveraged to promote integration of research and extension activities, emphasize NIFA priority areas, and strengthen applications for extramural funding. CTAHR intends to continue these initiatives to address our mandate as a land-grant institution.

Estimated Number of Professional FTEs/SYs total in the State.

Year	Extension		Research	
	1862	1890	1862	1890
2017	48.0	0.0	37.0	0.0
2018	50.0	0.0	39.0	0.0
2019	50.0	0.0	43.0	0.0
2020	52.0	0.0	46.0	0.0
2021	53.0	0.0	47.0	0.0

II. Merit Review Process

1. The Merit Review Process that will be Employed during the 5-Year POW Cycle

- Internal University Panel
- External Non-University Panel
- Expert Peer Review

2. Brief Explanation

CTAHR encourages all faculty and staff to participate in the development and implementation of CTAHR's Strategic Plan and Plan of Work. CTAHR also uses expert peer review panels to review individual Plans of Work and projects. All reviewers are asked to assess whether the planned programs address critical, strategic issues, including those identified by the stakeholders; utilize multi-disciplinary approaches; integrate research, extension and instruction; address the needs of under-served populations of the State; describe expected outcomes and impacts; and improve effectiveness and/or efficiency. Each degree program undergoes a comprehensive review by the University of Hawai'i at Manoa every five years. Individual CTAHR departments also undergo University reviews periodically.

CTAHR's long standing peer 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 a minimum of three departmental members, supplemented by external reviewers as necessary, who are familiar with the issues 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, and anonymous reviews transmitted to the investigator. The revised project proposal is reviewed by the unit administrator, and passed, along with all reviews, to the appropriate Associate Dean/Director. CTAHR administrators, program leaders and faculty may serve as resources to clarify proposed projects and plans of work for reviewers. Final review for projects and plans of work occurs in the offices of the Associate Dean/Associate Director for Research and Associate Dean/Associate Director for Extension.

III. Evaluation of Multis & Joint Activities

1. How will the planned programs address the critical issues of strategic importance, including those identified by the stakeholders?

The critical issues are being addressed by CTAHR's planned programs which fall within the strategic goals of providing an excellent and relevant student-centered learning environment; diversifying and strengthening the State's economy; protecting and enhancing the environment and Hawaii's resources; and strengthening families and communities.

Several projects are aimed at increasing the value of the State's diversified agriculture. The biomass energy program intends to use under-utilized farmland to address some local energy needs. A new initiative formed at the request of stakeholders who feel that they are

under served in past years is aimed at increasing the value of sustainable and organic agriculture involves a large team of researchers, specialists and county agents. CTAHR continues to respond to various production issues brought about by disease and pest concerns. CTAHR remains active in developing and providing knowledge and technologies to generate and improve products, and processes for existing and new markets for local producers and commodity groups.

Hawaii has an ensemble of unique plants and fauna and physical features that have evolved into fragile ecosystems which are vulnerable to invading exotic species and the activities of man. As a result, Hawaii has the largest numbers of endangered species anywhere in the world. Hawaii depends on the environment to support tourism, the State's largest economic sector. CTAHR will continue to focus on issues that ensure the understanding, protection, and sustained management of precious natural resources. Research and outreach activities target waste management, water quality, invasive species, enhancing and protecting forest and range resources, species diversity, detection, analysis and remediation of toxic compounds, and many others to insure the health and well-being of our natural resources.

Hawaii is socially and ethnically diverse. The high cost of living, particularly the cost of housing, results in most families having two or more income, multi-generational households, a significant homeless population, and a high percentage of working mothers. At the same time, obesity, diabetes, and heart disease present significant health challenges for many populations, particularly Pacific islanders. CTAHR has active research and outreach programs, including the Nutritional Education for Wellness programs; the Youth Development program; the Center of the Family programs that address many of these issues.

CTAHR works very closely with colleagues from USDA/ARS/PBARC, Hawaii Agriculture Research Center, UH Hilo, UH West Oahu, Hawaii and Kapiolani Community Colleges, and other community colleges in collaborative projects in many program areas. Many of our researchers especially have joint and/or collaborative projects in crop production, marketing, livestock and pasture management, and pest control.

2. How will the planned programs address the needs of under-served and under-represented populations of the State(s)?

CTAHR conducts integrated projects that serve ethnic groups and cultures that may be underserved by traditional federal programs. A farm risk management program and a pesticide safety and agricultural skills program specifically targeting under-served farmers, including women, Native Hawaiians, and recent immigrants from countries such as the Philippines, Laos, Cambodia, Korea, and Tonga is being conducted statewide. Many immigrant farmers speak varying amounts of English as their second language and are at risk, especially in the area of pesticide safety. Outreach is conducted using a variety of methods such as small group meetings, individual on-farm consultations and assistance, bilingual training materials in their native language, and workshops on IPM, pesticide use, handling and storage, and how to recognize common pests of the crops they grow.

CTAHR's youth development programs target at-risk youth and get them involved in activities and programs in leadership, personal values, and other life skills to make them better citizens.

3. How will the planned programs describe the expected outcomes and impacts?

Annual reports are required for all projects. Among the data required to be reported are outputs and outcomes. The latter can be described as short, medium and long term outcomes following the Logic Model format and concept.

Overall, CTAHR programs are producing valuable outcomes and impacts for our stakeholders and represent a sound investment of CTAHR's federal appropriation. Additional funding was also obtained from non-federal sources for program support, which reflects their credibility and productivity. Specific progress toward the outcomes and impacts will be documented under each planned program.

4. How will the planned programs result in improved program effectiveness and/or

University of Hawai'i at Mānoa has a unique organizational approach that integrates research, extension and instructional programs. All faculty in the statewide branch stations and extension offices have an academic, departmental home. Extension faculty who are stationed in a county fully participate in promotion and tenure activities of the department. Faculty are encouraged to establish integrated project incorporating extension education activities with research efforts. Integrated Research/Extension projects are the norm at the present time. Specific examples of the effectiveness of integrated programs are described in the planned programs sections.

IV. Stakeholder Input

1. Actions taken to seek stakeholder input that encourages 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
- Survey of traditional stakeholder groups
- Survey of traditional stakeholder individuals
- Other (Social Media)

Brief explanation.

CTAHR employs a variety of stakeholder input methods including face-to-face discussions with industry representatives, the Hawai'i Farm Bureau Federation, Hawai'i Farmers' Union United, Hawai'i Organic Farmer's Association, and appropriate industry associations. When deemed necessary, an "Industry Analysis Process" is also implemented. Typically, the Associate Director for Research and the Associate Director for Extension designate a convener who will be responsible for the development of a draft analysis of a particular commodity group. The convener then assembles a committee of appropriate faculty to develop the analysis.

In general, the draft analysis will assess the important issues, problems, concerns and pathways to overcome bottlenecks that face an agricultural industry. The draft analysis will consider the present status of the commodity including current production, value and recent trends. Of

particular importance is an understanding of the industry's potential and the challenges that must be overcome to reach this potential. The analysis identifies the major issues related to the factors such as: land; water; capital; labor; cultivars; pest and disease control; culture and management practices; harvest management and post-harvest handling; processing including food safety and quality; waste management; transportation; marketing; cost of production; and government policies; rules and regulations. Input is then sought via mechanisms such as: web-based presentation for electronic review and comment by stakeholders, faculty, and government agencies; distribution through industry associations; and personal contacts with key stakeholders. Based on these methods, a final industry analysis is developed that will serve to guide for POW refinement. This process helps stakeholders assist CTAHR to ensure that programs are relevant.

Social media is also increasingly used to solicit and obtain stakeholder input, particularly Twitter and Facebook. Stakeholder blogs are also useful as a means to determine current stakeholder needs and priorities. Several faculty have released mobile phone applications as well, which strengthen stakeholder communication links.

CTAHR has also strengthened our stakeholder input process for individual projects and plans of work. New projects and plans of work must identify the stakeholders, methods used to determine the needs of these stakeholders and how the project will address the needs of these stakeholders.

2(A). A brief statement of the process that will be 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

Brief explanation.

In addition to state and county divisions of the major national farming associations, Hawai'i has over 100 commodity and grower organizations, many of which have research committees. Hawai'i also has a wide assortment of active environmental, consumer, and community organizations. These organizations provide a broad perspective for input to the management of the college's research programs. Research, extension and instruction faculty within CTAHR reach stakeholders at the local, state and national levels. The college also has an advisory board consisting of a representative from over 20 relevant stakeholder groups. Counties also have advisory board to address local issues. To establish Hatch, integrated, and/or extension projects, faculty members must identify the stakeholders their projects serve, and describe how input is solicited from these stakeholders.

2(B). A brief statement of the process that will be 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 specifically with non-traditional groups
- Meeting specifically with non-traditional individuals
- Meeting with invited selected individuals from the general public
- Other (Social Media)

Brief explanation.

Most CTAHR faculty, especially the extension faculty, work closely with stakeholders. These include farming associations (Hawaii Farm Bureau Federation, Hawaii Farmers' Union United), individual farmers and food processors, commodity associations, homeowners, 4-H and other youth organizations, government agencies, Hawaiian cultural organizations, senior groups, state legislators, county councils, school teachers, non-profit organizations and many more. The Dean or Associate Deans of CTAHR also represent the University of Hawaii on the State of Hawaii Board of Agriculture, and the multi-agency Hawaii Invasive Species Committee. Informal and formal input that includes letters, minutes of meetings, resolutions, industry analyses, and strategic plans is provided to CTAHR on a regular basis. CTAHR faculty also request these types of documents and other input as needed.

Input and feedback is also obtained during workshops, open houses, and telephone calls from both traditional and non-traditional stakeholders. Inputs are also solicited from specific under represented stakeholders. CTAHR faculty and administrators serve on legislative task forces, state agency boards, and board of nonprofit foundations, and receive input and feedback from them. CTAHR also has close working relationships with scientists from the USDA/ARS Daniel K. Inouye Pacific Basin Agriculture Research Center, Hawaii Agricultural Research Center, UH Hilo, Oceanic Institute, the state departments concerned with agriculture and natural resources, and the UH Community colleges. Input from these sister institutions is routinely collected, evaluated, and incorporated into CTAHR programs.

Social media is also increasingly used to solicit and obtain stakeholder input, particularly Twitter and Facebook. Stakeholder blogs are also useful as a means to determine current stakeholder needs and priorities. Several faculty are releasing iPhone and Android Apps, as well, which strengthen stakeholder communication links. Additionally, all integrated and extension projects include formally defined evaluation processes.

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

Brief explanation.

Stakeholder input has been used extensively in developing the current CTAHR Strategic Action Plan. Pertinent stakeholder input and feedback is received from various stakeholders on a wide range of research and extension program initiatives. As a result of the input received, CTAHR faculty modify work plans to improve the design of research projects and provide specific opportunities for continued feedback. Information is disseminated to communities through newsletters, local newspaper coverage, commodity association meetings, workshops, and radio and television programs. Administrators and faculty use input to prioritize resource allocations, and inform other researchers and policymakers of trends and concerns. Recommendations from various advisory boards, including the Dean's Advisory Board, represent key constituent views, and are useful in developing research and extension programs. Staffing plans within the college also reflect stakeholder input, and the selection committees for extension and administrative positions generally include stakeholder members.

V. Planned Program Table of Content

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

V(A). Planned Program (Summary)

Program # 1

1. Name of the Planned Program

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

2. Brief summary about Planned Program

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, fire science, 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.

This planned program will utilize integrated research, extension and instructional projects to provide knowledge and technologies to improve the management of Hawaii's resources to support agricultural production and enhance the environment. This program will strengthen CTAHR's capabilities in management of agricultural and natural resources, and to manage the impacts of human activities in ecosystems and mitigate environmental and waste management problems.

3. Program existence : Mature (More than five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

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	18%		6%	
111	Conservation and Efficient Use of Water	6%		9%	
112	Watershed Protection and Management	10%		3%	
121	Management of Range Resources	13%		4%	
123	Management and Sustainability of Forest Resources	10%		4%	
124	Urban Forestry	0%		2%	
125	Agroforestry	5%		5%	
131	Alternative Uses of Land	0%		7%	
133	Pollution Prevention and Mitigation	11%		7%	
135	Aquatic and Terrestrial Wildlife	0%		1%	
136	Conservation of Biological Diversity	0%		4%	
205	Plant Management Systems	17%		10%	
211	Insects, Mites, and Other Arthropods Affecting Plants	0%		8%	
212	Diseases and Nematodes Affecting Plants	0%		9%	
213	Weeds Affecting Plants	0%		4%	
402	Engineering Systems and Equipment	0%		2%	
403	Waste Disposal, Recycling, and Reuse	5%		2%	
404	Instrumentation and Control Systems	0%		1%	
605	Natural Resource and Environmental Economics	5%		9%	
803	Sociological and Technological Change Affecting Individuals, Families, and Communities	0%		3%	
	Total	100%		100%	

V(C). Planned Program (Situation and Scope)

1. Situation and priorities

Hawaii's unique tropical island environment and its broad biological, physical, and social diversity enrich the lives of local residents and provide a setting that attracts visitors from all corners of the world.

The sustainability of natural resources, stability of agroecosystems, and quality of life for Hawaii's people are intrinsically dependent on the judicious use and management of our resources.

Effective management of the environment and natural resources requires balancing competing interests. While these interests often appear to be in direct conflict with each other, the development of sound management strategies, combined with a thorough understanding of the complex interdependencies of natural systems, can yield sustainable benefits and satisfy most diverse and competing interests over the long term. In partnership with communities and government agencies, CTAHR will develop the knowledge base and education and extension strategies that achieve maximum sustainable benefits from Hawaii's resources.

Areas addressed by research and extension projects include agricultural waste management, forest resource management, agroforestry, range management, fire science, nutrient management, soil erosion, soil quality and bioremediation, biological diversity, rehabilitation of degraded and idle lands, handling of hazardous materials, and water quality. Research and extension efforts at preserving, protecting, and renewing Hawaii's natural resources continue to be an area of focus.

Sustainable production of food, fiber, and other bio-based products will be realized only if undertaken in harmony with Hawaii's environment and natural resources. Through advances in scientific knowledge and effective application of that knowledge, CTAHR can help ensure an adequate food supply while protecting the state's precious natural resources. The strategies developed by the college strive to deliver food and fiber sustainably and to develop ecosystem management approaches that mitigate environmental problems.

2. Scope of the Program

- In-State Extension
- In-State Research
- Multistate Research
- Multistate Extension
- Integrated Research and Extension
- Multistate Integrated Research and Extension

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

- A core of qualified extension and research staff is available.
- Additional external funds and other resources are available.
- Partnerships will continue and expand to coordinate efforts and share resources.
- Information on best management practices exists for the management of natural resources.
- Stakeholders are willing to implement best management practices.
- People are motivated to learn/change.

1.

2. Ultimate goal(s) of this Program

Watersheds and forest reserves are protected and managed effectively, and Hawaii achieves a sustainable balance of agricultural activities, suburban and urban development, and a healthy environment

with biodiversity.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2017	4.0	0.0	6.0	0.0
2018	4.0	0.0	6.0	0.0
2019	4.0	0.0	6.0	0.0
2020	4.0	0.0	6.0	0.0
2021	4.0	0.0	4.0	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

Develop best management practices and plans for forests, watersheds from the mountains to the coastal zones, and agroforestry ecosystems.

- Provide knowledge and technologies to improve the management of natural resources.
- Conduct research that will assist the state to formulate visionary land- and water-use policies.
- Provide professional development opportunities for CTAHR faculty to improve capacity in natural resource management.
 - Conduct needs assessments and necessary research promote both bioremediation and effective waste management in Hawai'i.
 - Conduct analyses of environmental resource management to identify needs of Hawai'i ahupua'a (watershed) systems.
 - Develop and deliver programs to provide pollution control information and environmental education to the public, with emphasis on schools, youth groups, home gardeners and urban/residential communities.
 - Enhance CTAHR's international partnerships and collaboration on management of agricultural and natural resources.
 - Coordinate a statewide emergency response team as necessary, with internal and external partners, including HDOA Plant Industry, Quarantine, and statewide invasive species committees to quickly identify, mitigate, and transfer information about new pest invaders.

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension	
Direct Methods	Indirect Methods

<ul style="list-style-type: none">● Education Class● Workshop● Group Discussion● One-on-One Intervention● Demonstrations	<ul style="list-style-type: none">● Newsletters● eXtension web sites● Web sites other than eXtension
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3. Description of targeted 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, natural resource management, 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(G). Planned Program (Outputs)

NIFA no longer requires you to report target numbers for standard output measures in the Plan of Work. However, all institutions will report actual numbers for standard output measures in the Annual Report of Accomplishments and Results. The standard outputs for which you must continue to collect data are:

- Number of contacts
 - Direct Adult Contacts
 - Indirect Adult Contacts
 - Direct Youth Contacts
 - Indirect Youth Contact
- Number of patents submitted
- Number of peer reviewed publications

Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(H). State Defined Outputs

1. Output Measure

- Grant proposals submitted.
- Presentations at international and national meetings.
- Number of workshops and other educational activities held
- Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(I). State Defined Outcome

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.

Outcome # 1

1. Outcome Target

Number of people who actually adopt one or more recommended practices

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 211 - Insects, Mites, and Other Arthropods Affecting Plants
- 133 - Pollution Prevention and Mitigation
- 136 - Conservation of Biological Diversity
- 124 - Urban Forestry
- 111 - Conservation and Efficient Use of Water
- 125 - Agroforestry
- 212 - Diseases and Nematodes Affecting Plants
- 112 - Watershed Protection and Management
- 402 - Engineering Systems and Equipment
- 403 - Waste Disposal, Recycling, and Reuse
- 123 - Management and Sustainability of Forest Resources
- 102 - Soil, Plant, Water, Nutrient Relationships
- 205 - Plant Management Systems
- 135 - Aquatic and Terrestrial Wildlife
- 121 - Management of Range Resources

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 2

1. Outcome Target

Total dollar value of grants and contracts obtained.

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 131 - Alternative Uses of Land
- 124 - Urban Forestry
- 125 - Agroforestry

- 803 - Sociological and Technological Change Affecting Individuals, Families, and Communities
- 112 - Watershed Protection and Management
- 404 - Instrumentation and Control Systems
- 605 - Natural Resource and Environmental Economics
- 205 - Plant Management Systems
- 212 - Diseases and Nematodes Affecting Plants
- 133 - Pollution Prevention and Mitigation
- 121 - Management of Range Resources
- 402 - Engineering Systems and Equipment
- 111 - Conservation and Efficient Use of Water
- 102 - Soil, Plant, Water, Nutrient Relationships
- 123 - Management and Sustainability of Forest Resources
- 211 - Insects, Mites, and Other Arthropods Affecting Plants
- 403 - Waste Disposal, Recycling, and Reuse
- 135 - Aquatic and Terrestrial Wildlife

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

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

Description

- Natural disasters such as hurricanes, typhoons, floods and fires are often destructive to natural resources such as reefs, water sheds, forests, indigenous species habitats, research plots or 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(K). Planned Program - Planned Evaluation Studies

Description of Planned Evaluation Studies

All projects conducted under this program will be peer-reviewed before installation. Annual progress reports will be collected and evaluated by the Associate Deans for Research and Extension. Funds will be not released for those projects which do not show tangible progress.

V(A). Planned Program (Summary)

Program # 2

1. Name of the Planned Program

Hawaii's Diversified Tropical Crop Systems for Sustainability and Competitiveness

2. Brief summary about Planned Program

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. Research and extension efforts include 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.

Hawaii's agricultural expansion is focused on two strategies. The first is to encourage import replacement because Hawaii currently imports about 90 percent of its food annually. Many of the fruits and vegetables that are now imported could be grown locally. At the same time, backyard and urban agricultural programs also can contribute significantly to food production.

The second strategy is to produce high-value specialty products for niche markets. For example, Kona coffee sells for over five times the commodity price of coffee and cannot be grown anywhere other than Hawaii Island. Various cut flowers, potted ornamental plants, and exotic tropical fruits from Hawaii also command high prices. Identifying other high-value products, both fresh and processed, for local consumption or export is a high priority for CTAHR. Banana, coffee, papaya, specialty seed crops, tropical tree fruits, organics, and aquaculture are among those being investigated. At the same time, CTAHR provides specialized assistance to entrepreneurs who want to start or expand their agricultural business.

Hawaii relies heavily on its environment as a major attractant for the visitor industry. The design, installation and maintenance of landscapes plays an essential role in the tourism sector. Landscape services add value to locally produced nursery plants that have become part of a landscape. These landscapes must be produced domestically, which ensure that landscape services represent domestic employment.

The planned program will utilize integrated research, extension and education projects to support diversified agricultural industries in Hawaii, to increase profitability for our farmers and producers, and to increase food security by reducing our reliance on imported agriculture products.

3. Program existence : Mature (More than five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

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	12%		5%	
124	Urban Forestry	0%		2%	
201	Plant Genome, Genetics, and Genetic Mechanisms	0%		4%	
202	Plant Genetic Resources	2%		5%	
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants	3%		1%	
204	Plant Product Quality and Utility (Preharvest)	4%		6%	
205	Plant Management Systems	22%		17%	
206	Basic Plant Biology	0%		1%	
211	Insects, Mites, and Other Arthropods Affecting Plants	14%		2%	
212	Diseases and Nematodes Affecting Plants	13%		15%	
213	Weeds Affecting Plants	6%		0%	
214	Vertebrates, Mollusks, and Other Pests Affecting Plants	4%		0%	
215	Biological Control of Pests Affecting Plants	0%		5%	
216	Integrated Pest Management Systems	13%		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	0%		4%	
604	Marketing and Distribution Practices	7%		5%	
903	Communication, Education, and Information Delivery	0%		5%	
	Total	100%		100%	

V(C). Planned Program (Situation and Scope)

1. Situation and priorities

The agricultural sector continues to diversify. The sugar industry has drastically downsized with one remaining operation on Maui that produced 34,500 acres of sugarcane valued at about \$70 million in 2010. Small farms have replaced pineapple plantations. 63% of the state's 7,000 farms are less than 10 acres in size, and another 25% fall between 10-49 acres. Hawaii imports 89% of its food, and our agricultural landscape consists of specialty crops, many grown nowhere else in the USA. Seed crops is the State's number one commodity, which was valued at \$247 million in 2010, followed by sugarcane, coffee, cattle, and macadamia nuts, at \$70, \$33.4, \$33, and \$30 million, respectively in 2010.

Important limiting factors in crop production in Hawaii are pests and diseases. Area-wide fruit fly management is now an option for growers of fruit fly susceptible fruits and vegetables. Vegetables, melons and fruits, excluding pineapple, were valued at \$47.5 million in 2010, making the detection and/or eradication of pests a high priority so that products suitable for export can be shipped.

Production and manufacturing are costly in Hawai'i because equipment, and raw materials must be shipped in. Local businesses can provide products that add value or serve niche markets. Import substitution expands the local market for products, increases employment, and retains dollars within the state. Examples of high-value or value-added agri-products for Hawai'i producers include flowers, landscape and nursery crops, seeds, tropical fruits, vegetables, beverages, and medicinal and cosmetic plant derivatives. Access to superior varieties, best production or cultivation management practices, processing and handling technologies, and market information is key to long-term success. Through research, instruction, and extension, CTAHR can provide new knowledge and a better-prepared workforce to generate new products and expand markets. Although headquartered on Oahu, CTAHR has 12 branch stations and 10 extension office on all major islands in Hawaii.

2. Scope of the Program

- In-State Extension
- In-State Research
- Multistate Research
- Multistate Extension
- Integrated Research and Extension
- Multistate Integrated Research and Extension

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

- Buyers require a consistent quantity and quality of supply.
- Agricultural pests will continue to be a significant production problem for most crops.
- Export quarantine requirements can be met for selected fruit fly susceptible crops.
- External funds and resources are available and can serve as a catalyst for change.
- Staff with appropriate expertise is available or can be recruited.
- A knowledge base exists to execute extension plans.
- People will be motivated to learn/change.

2. Ultimate goal(s) of this Program

Hawai'i will be able to increase exports and decrease imports of agricultural commodities and value added products.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2017	11.0	0.0	10.0	0.0
2018	11.0	0.0	10.0	0.0
2019	11.0	0.0	10.0	0.0
2020	11.0	0.0	10.0	0.0
2021	11.0	0.0	10.0	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

- Conduct basic and applied research to increase production, efficiency, and profitability of diversified agricultural industries while protecting the environment.
 - Provide diagnostic and analytical services for soil testing, water analyses, plant tissue analyses, plant disease identification, insect pest identification, and feed and forage analyses.
 - Conduct outreach programs to provide best management practices to grow and market existing and new crops.
 - Increase the competitiveness of local agricultural production systems by reducing costs and increasing efficiency.
 - Provide training in identification and management of production costs and niche markets;
 - Incorporate research-based technology that reduces losses due to pests, disease, and inefficient use of resources in production systems.
 - Identify the challenges for various agricultural industries or industry clusters and use this information to set priorities.
 - Continue to develop sustainable agriculture programs.

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension

Direct Methods	Indirect Methods
<ul style="list-style-type: none"> ● Education Class ● Workshop ● Group Discussion ● One-on-One Intervention ● Demonstrations 	<ul style="list-style-type: none"> ● Newsletters ● TV Media Programs ● eXtension web sites ● Web sites other than eXtension

3. Description of targeted audience

The target audience for this program area is primarily 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 and not commonly grown in the continental USA, and CTAHR research and extension efforts are very important to Hawaii producers. There is also a resurgence of interest in home and school gardening which is supported by CTAHR programs.

V(G). Planned Program (Outputs)

NIFA no longer requires you to report target numbers for standard output measures in the Plan of Work. However, all institutions will report actual numbers for standard output measures in the Annual Report of Accomplishments and Results. The standard outputs for which you must continue to collect data are:

- Number of contacts
 - Direct Adult Contacts
 - Indirect Adult Contacts
 - Direct Youth Contacts
 - Indirect Youth Contact
- Number of patents submitted
- Number of peer reviewed publications

Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(H). State Defined Outputs

1. Output Measure

- Number of workshops, research/field day demonstrations conducted
 - Published information such as extension newsletters, fact sheets, videos, and other publications
 - Presentations at international and national meetings
 - Number of grant proposals submitted.
- Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(I). State Defined Outcome

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 Target

Number of individuals completing non-formal education programs.

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 205 - Plant Management Systems
- 204 - Plant Product Quality and Utility (Preharvest)
- 213 - Weeds Affecting Plants
- 102 - Soil, Plant, Water, Nutrient Relationships
- 604 - Marketing and Distribution Practices
- 214 - Vertebrates, Mollusks, and Other Pests Affecting Plants
- 212 - Diseases and Nematodes Affecting Plants
- 211 - Insects, Mites, and Other Arthropods Affecting Plants
- 502 - New and Improved Food Products
- 903 - Communication, Education, and Information Delivery
- 601 - Economics of Agricultural Production and Farm Management
- 206 - Basic Plant Biology
- 203 - Plant Biological Efficiency and Abiotic Stresses Affecting Plants
- 202 - Plant Genetic Resources
- 215 - Biological Control of Pests Affecting Plants
- 216 - Integrated Pest Management Systems
- 201 - Plant Genome, Genetics, and Genetic Mechanisms

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 2

1. Outcome Target

Number of people who adopt one or more recommended practices.

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 213 - Weeds Affecting Plants
- 205 - Plant Management Systems

- 203 - Plant Biological Efficiency and Abiotic Stresses Affecting Plants
- 204 - Plant Product Quality and Utility (Preharvest)
- 601 - Economics of Agricultural Production and Farm Management
- 214 - Vertebrates, Mollusks, and Other Pests Affecting Plants
- 124 - Urban Forestry
- 102 - Soil, Plant, Water, Nutrient Relationships
- 211 - Insects, Mites, and Other Arthropods Affecting Plants
- 502 - New and Improved Food Products
- 216 - Integrated Pest Management Systems
- 604 - Marketing and Distribution Practices
- 212 - Diseases and Nematodes Affecting Plants
- 511 - New and Improved Non-Food Products and Processes
- 215 - Biological Control of Pests Affecting Plants

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 3

1. Outcome Target

Total dollar value of grants and contracts obtained.

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 102 - Soil, Plant, Water, Nutrient Relationships
- 214 - Vertebrates, Mollusks, and Other Pests Affecting Plants
- 213 - Weeds Affecting Plants
- 215 - Biological Control of Pests Affecting Plants
- 201 - Plant Genome, Genetics, and Genetic Mechanisms
- 212 - Diseases and Nematodes Affecting Plants
- 502 - New and Improved Food Products
- 205 - Plant Management Systems
- 206 - Basic Plant Biology
- 211 - Insects, Mites, and Other Arthropods Affecting Plants
- 204 - Plant Product Quality and Utility (Preharvest)
- 216 - Integrated Pest Management Systems
- 202 - Plant Genetic Resources
- 511 - New and Improved Non-Food Products and Processes

- 203 - Plant Biological Efficiency and Abiotic Stresses Affecting Plants

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

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

Description

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 increases in petroleum prices have increased production costs.

V(K). Planned Program - Planned Evaluation Studies

Description of Planned Evaluation Studies

All projects conducted under this program will be peer-reviewed before installation. Annual progress reports will be collected and evaluated by the Associate Deans for Research and Extension. Funds will be not released for those projects which do not show tangible progress.

V(A). Planned Program (Summary)

Program # 3

1. Name of the Planned Program

Invasive Species Education and Management

2. Brief summary about Planned Program

Invasive species 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. In addition to their economic damages, invasives also threaten conservation efforts for native endangered plants and insects. Invasive biology and conservation biology are opposite sides of the same coin. CTAHR plays a significant role in developing and delivering information and technologies that minimize the negative impacts of invasive species. Increasingly, CTAHR staff are also involved in efforts to conserve threatened native biota.

The invasion of new pests and pathogens, including rapidly reproducing plants, insects, and disease-causing organisms, can devastate Hawai'i's valuable niche crops. Plant pathologists and entomologists identify new pests that continually invade the state. New technologies are being developed at CTAHR to control insects through biological control; and novel, novel insecticides and herbicides and targeted application methods for these materials to reduce environmental hazard are under investigation. Similarly, plant selection and breeding for pest and disease control are important CTAHR contributions, which also provide environmental protection.

This planned program will utilize integrated research, extension and education projects to develop and deliver information and technologies to mitigate pests and invasive species that threaten agricultural, natural, and urban ecosystems and the economy.

3. Program existence : Mature (More than five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
112	Watershed Protection and Management	0%		4%	
136	Conservation of Biological Diversity	0%		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	15%		2%	
211	Insects, Mites, and Other Arthropods Affecting Plants	20%		8%	
212	Diseases and Nematodes Affecting Plants	15%		13%	
213	Weeds Affecting Plants	12%		21%	
215	Biological Control of Pests Affecting Plants	8%		18%	
216	Integrated Pest Management Systems	30%		11%	
312	External Parasites and Pests of Animals	0%		9%	
721	Insects and Other Pests Affecting Humans	0%		2%	
	Total	100%		100%	

V(C). Planned Program (Situation and Scope)**1. Situation and priorities**

Hawaii's physical isolation and year round growing conditions create unique ecosystems across the islands that comprise the state. At the same time, invasive species have been described as "the single greatest threat to Hawaii's economy and natural environment and to the health and lifestyle of Hawaii's people". Invasive species cause millions of dollars in crop losses, the extinction of native species, and the destruction of native forests. Pests not yet occurring in Hawaii such as the red imported fire ant, sand and biting flies, the brown tree snake, and many more could seriously damage Hawaii's natural resources, agriculture, tourism, and quality of life.

Despite federal and state quarantine regulations, about 24 new insect species become established in Hawaii every year and many more intercepted in various imported products. Some of the recent invaders that have made an obvious impact on Hawaii's environment and/or economy are the coqui frog, erythrina gall wasp, Asperisporium black spot of papaya, nettle caterpillar, coffee berry borer, and basil downy mildew. Priorities will be aimed at effective detection and control of invasive species newly introduced, with the possibility of eliminating populations in localized outbreaks. In situations where eradication may not be possible, control measures to minimize pest spread, and develop and extend effective biological control and integrated pest management techniques to reduce the pest population below action threshold levels will be emphasized.

2. Scope of the Program

- In-State Extension
- In-State Research
- Multistate Research
- Multistate Extension
- Integrated Research and Extension
- Multistate Integrated Research and Extension

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

- Other federal and state agencies are willing and effective collaborators and cooperators.
- External funds and resources are available and can serve as a catalyst for change.
- Staff with appropriate research and/or expertise are available or can be recruited.
- A knowledge base exists to execute extension plans.

2. Ultimate goal(s) of this Program

- Detect and eliminate specific invasive species before establishment.
- Improved management of targeted invasive species in Hawai'i to protect crops and natural resources with a subsequent reduction in production and management costs.
 - Spread of invasive species is reduced.
 - Damage caused to agricultural and natural ecosystems by invasive insects, plant diseases, and weeds is mitigated.
 - Working relationships with the state and county Invasive Species Committees, Department of Land and Natural Resources, USDA National Resource Conservation Service and other county, state and federal agencies become more effective.
 - Stakeholders will receive timely information regarding new pest invaders.
 - Pesticide applicators and ultimately farmers will have greater access to products and other tools needed for crop production and applicators will be less likely to endanger themselves or the environment.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2017	3.0	0.0	4.0	0.0

2018	4.0	0.0	5.0	0.0
2019	4.0	0.0	5.0	0.0
2020	4.0	0.0	5.0	0.0
2021	4.0	0.0	5.0	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

- Provide outreach activities to educate stakeholders on biology, management techniques, and other information on targeted invasive species.
- Coordinate activities with partner agencies, community groups, and other interested stakeholders.
- Conduct pertinent research on the biology and control of the invasive insect, plant disease and plant species, including impacts on native biota and ecosystems
- Continue to engage in a "SWAT Team" approach to control and grower education about newly introduced pests and diseases. This entails rapid deployment of a team of professionals to identify, contain and control the pest/disease, including developing appropriate management tools and strategies, and education of growers about control practices.

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension

Direct Methods	Indirect Methods
<ul style="list-style-type: none"> • Education Class • Workshop • Group Discussion • One-on-One Intervention • Demonstrations 	<ul style="list-style-type: none"> • Newsletters • TV Media Programs • Web sites other than eXtension

3. Description of targeted 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 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(G). Planned Program (Outputs)

NIFA no longer requires you to report target numbers for standard output measures in the Plan of Work. However, all institutions will report actual numbers for standard output measures in the Annual Report of Accomplishments and Results. The standard outputs for which you must continue to collect data are:

- Number of contacts
 - Direct Adult Contacts
 - Indirect Adult Contacts
 - Direct Youth Contacts
 - Indirect Youth Contact
- Number of patents submitted
- Number of peer reviewed publications

Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(H). State Defined Outputs

1. Output Measure

- Number of workshops, field days, demonstrations held
- Number of grant proposals submitted
- Presentations at international and national meetings

Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(I). State Defined Outcome

O. No	Outcome Name
1	Awareness created
2	Number of workshops implemented and demonstration installed for clientele education
3	Total dollar value of grants and contracts obtained.

Outcome # 1

1. Outcome Target

Awareness created

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 213 - Weeds Affecting Plants
- 112 - Watershed Protection and Management
- 216 - Integrated Pest Management Systems
- 136 - Conservation of Biological Diversity
- 204 - Plant Product Quality and Utility (Preharvest)
- 212 - Diseases and Nematodes Affecting Plants
- 211 - Insects, Mites, and Other Arthropods Affecting Plants
- 312 - External Parasites and Pests of Animals
- 215 - Biological Control of Pests Affecting Plants
- 205 - Plant Management Systems

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 2

1. Outcome Target

Number of workshops implemented and demonstration installed for clientele education

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 205 - Plant Management Systems
- 216 - Integrated Pest Management Systems
- 215 - Biological Control of Pests Affecting Plants
- 211 - Insects, Mites, and Other Arthropods Affecting Plants
- 213 - Weeds Affecting Plants
- 212 - Diseases and Nematodes Affecting Plants
- 136 - Conservation of Biological Diversity
- 112 - Watershed Protection and Management

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 3

1. Outcome Target

Total dollar value of grants and contracts obtained.

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 215 - Biological Control of Pests Affecting Plants
- 212 - Diseases and Nematodes Affecting Plants
- 211 - Insects, Mites, and Other Arthropods Affecting Plants
- 205 - Plant Management Systems
- 721 - Insects and Other Pests Affecting Humans
- 213 - Weeds Affecting Plants
- 136 - Conservation of Biological Diversity
- 216 - Integrated Pest Management Systems
- 112 - Watershed Protection and Management

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

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

Description

- Intentional introductions of invasive species.
- Lack of funding, different priorities in extramural grant programs.
- Difficulty in coordination with external agencies and partners.

V(K). Planned Program - Planned Evaluation Studies

Description of Planned Evaluation Studies

All projects conducted under this program will be peer-reviewed before installation. Annual progress reports will be collected and evaluated by the Associate Deans for Research and Extension. Funds will be not released for those projects which do not show tangible progress.

V(A). Planned Program (Summary)

Program # 4

1. Name of the Planned Program

Youth, Family and Community Development

2. Brief summary about Planned Program

More than any other social institution, the family has profound influences on the health and well-being of its members, particularly its youth and elderly. CTAHR strengthens families in Hawai'i's rural and urban environments by providing assistance in areas such as family health and lifespan development, financial and time management, youth development, parenting, and caring for the elderly. Each of these areas of emphasis impact community conditions and societal well-being, and CTAHR takes responsibility for collecting and compiling current social indicator data on Hawaii communities, and making the results accessible to government agencies, nonprofits, and policy makers through the Data Center maintained by the Center on the Family. Colleagues from UH community colleges, nonprofit organizations, and government agencies are partners on a number of CTAHR projects.

This planned program will utilize integrated research, extension, and instructional projects to promote resiliency and well-being in Hawai'i's individuals, families, and communities, and to strengthen their resource management, leadership, and community action. This planned program will provide integrated research, extension, and education focused on children and youth; enhance the ability of Hawai'i's families and communities to meet the needs of a growing elderly population; provide data, information, and technical assistance to enhance policies and programs for individuals and families; develop leadership and volunteer capacities of individuals and communities to take action for public well-being; facilitate partnerships and networks for effective action within and across communities; and enhance financial literacy and resource management.

3. Program existence : Mature (More than five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
124	Urban Forestry	0%		3%	
131	Alternative Uses of Land	0%		6%	
134	Outdoor Recreation	0%		1%	
602	Business Management, Finance, and Taxation	0%		3%	
604	Marketing and Distribution Practices	0%		5%	
606	International Trade and Development Economics	0%		2%	
608	Community Resource Planning and Development	0%		6%	
724	Healthy Lifestyle	8%		5%	
801	Individual and Family Resource Management	6%		1%	
802	Human Development and Family Well-Being	35%		20%	
803	Sociological and Technological Change Affecting Individuals, Families, and Communities	10%		14%	
804	Human Environmental Issues Concerning Apparel, Textiles, and Residential and Commercial Structures	2%		13%	
805	Community Institutions and Social Services	9%		3%	
806	Youth Development	30%		14%	
903	Communication, Education, and Information Delivery	0%		4%	
	Total	100%		100%	

V(C). Planned Program (Situation and Scope)**1. Situation and priorities**

Families and communities throughout Hawai'i and the Pacific region face daunting challenges. CTAHR's existing and new instructional, research, and outreach programs, which often involve partnering with other successful community programs in our communities, will have positive and lasting impacts on Hawai'i families and communities.

National statistics on the status of Hawaii's youth indicate that many young people are at risk. A high percentage of Hawai'i's students are performing below average in national aptitude testing. Hawai'i ranks below the national average for households headed by single parents and has a high percentage of low-income households. Programs such as 4-H provide healthy, experiential learning opportunities for youth in Hawai'i. Such programs complement and reinforce formal classroom education and provide opportunities

for young people to learn and excel in non-threatening, extracurricular activities. CTAHR needs to continue to take an active role in coordinating and supporting these types of programs.

Strengthening individuals and families and fostering community collaborations are complementary approaches in coping with change and transition. Extension programs start within a community and are administered by organization members sensitive to the needs, issues, concerns, and interests of individuals, families, and communities. Extension programs in leadership and volunteer development, such as Family and Community Education, Family Community Leadership, and other extension projects, focus on providing community members with opportunities to learn life skills, develop leadership skills, conduct educational programs, and build partnerships within their communities. CTAHR supports such programs that produce positive impacts on, and build upon, the strengths of individuals, families, and communities.

2. Scope of the Program

- In-State Extension
- In-State Research
- Multistate Extension
- Integrated Research and Extension
- Multistate Integrated Research and Extension

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

- External partners and state and federal agencies are willing to collaborate and cooperate.
- External funds and resources are available and can serve as a catalyst for change.
- Staff with appropriate expertise is available or can be recruited.
- A knowledge base exists to execute extension plans.

2. Ultimate goal(s) of this Program

Hawaii's youth, families and communities will make choices that result in community residents living longer, healthier and more productive lives.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2017	15.0	0.0	4.0	0.0

2018	15.0	0.0	4.0	0.0
2019	15.0	0.0	5.0	0.0
2020	15.0	0.0	5.0	0.0
2021	15.0	0.0	5.0	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

- Provide adult development programs to volunteers for youth programs.
- Conduct research on social needs and utilization of social services in Hawaii’s communities to guide both practice and policy decisions.
 - Provide opportunities for youth to become responsible, productive adults across the state.
 - Develop outreach programs to train and support caregivers for youth and the elderly.
 - Share 4-H Juried Curriculum with educators, youth program staff, and volunteers through workshops.
 - Develop and/or adapt curriculum and conduct training in building effective collaborations and create opportunities to build new collaborations within the college and/or amongst the community at large.
 - Develop and maintain outreach programs in family and community development, including financial skills and science literacy, and leadership development.

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension	
Direct Methods	Indirect Methods
<ul style="list-style-type: none"> • Education Class • Workshop • Group Discussion • One-on-One Intervention • Demonstrations 	<ul style="list-style-type: none"> • Newsletters • TV Media Programs • Web sites other than eXtension

3. Description of targeted audience

As intended by the Land Grant perspective, CTAHR's "targeted" clients for this program in **instruction** are the undergraduate and graduate students in family and consumer sciences 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 Health and Social Services; adults (4-H leaders) and youth (ages 5-19) through the 4-H Youth Development program; young children and parents through the literacy programs; adults through the Family Education and Family Community Leadership Programs; home gardeners; and the elderly, extension staff in other CTAHR units and at sister institutions; and other members of the professional community who deal with family, youth and health issues. Clients for **extension agents** are children, youth and families "at risk" in targeted communities through the "New Community Projects" program, kindergartners and parents through the "KAMP" programs, adults (4-H

leaders) and youth (ages 5-19) through the 4-H Youth Development program, young children and parents through the literacy programs, adults through the Family Education and Family Community Leadership Programs, home gardeners, and the elderly, extension staff in other CTAHR units and at sister institutions, and other members of the professional community who deal with family, youth and health issues.

V(G). Planned Program (Outputs)

NIFA no longer requires you to report target numbers for standard output measures in the Plan of Work. However, all institutions will report actual numbers for standard output measures in the Annual Report of Accomplishments and Results. The standard outputs for which you must continue to collect data are:

- Number of contacts
 - Direct Adult Contacts
 - Indirect Adult Contacts
 - Direct Youth Contacts
 - Indirect Youth Contact
- Number of patents submitted
- Number of peer reviewed publications

Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(H). State Defined Outputs

1. Output Measure

- Number of people completing non-formal education programs on parenting, youth development, and leadership development
- Number of volunteer hours
- Presentations at international and national meetings.
- Grant proposals submitted.

Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(I). State Defined Outcome

O. No	Outcome Name
1	Number of individuals who adopt at least one new practice learned.
2	Total dollar value of grants and contracts obtained.

Outcome # 1

1. Outcome Target

Number of individuals who adopt at least one new practice learned.

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 806 - Youth Development
- 724 - Healthy Lifestyle
- 804 - Human Environmental Issues Concerning Apparel, Textiles, and Residential and Commercial Structures
- 802 - Human Development and Family Well-Being
- 903 - Communication, Education, and Information Delivery
- 801 - Individual and Family Resource Management
- 803 - Sociological and Technological Change Affecting Individuals, Families, and Communities
- 124 - Urban Forestry
- 608 - Community Resource Planning and Development

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 2

1. Outcome Target

Total dollar value of grants and contracts obtained.

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 804 - Human Environmental Issues Concerning Apparel, Textiles, and Residential and Commercial Structures
- 803 - Sociological and Technological Change Affecting Individuals, Families, and Communities
- 806 - Youth Development
- 604 - Marketing and Distribution Practices
- 805 - Community Institutions and Social Services
- 903 - Communication, Education, and Information Delivery
- 724 - Healthy Lifestyle
- 802 - Human Development and Family Well-Being
- 801 - Individual and Family Resource Management

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

- Economy
- Appropriations changes
- Public Policy changes
- Competing Public priorities
- Competing Programmatic Challenges
- Populations changes (immigration, new cultural groupings, etc.)

Description

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(K). Planned Program - Planned Evaluation Studies

Description of Planned Evaluation Studies

All projects conducted under this program will be peer-reviewed before installation. Annual progress reports will be collected and evaluated by the Associate Deans for Research and Extension. Funds will be not released for those projects which did not show tangible progress.

V(A). Planned Program (Summary)

Program # 5

1. Name of the Planned Program

Health and Wellness of Hawaii's Families and Communities

2. Brief summary about Planned Program

An aging population, economic duress, and social and cultural factors affecting food choice all contribute to social, environmental, and health stress in Hawaii. Iron deficiency, obesity, and diabetes are common conditions in Pacific populations; and appropriate choice, handling and preparation of locally available foods are topics requiring integrated research and extension efforts. 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. Identification and education on good iron sources is another area of emphasis to reduce both anemia and non-anemic iron deficiencies in the population.

This planned program will utilize integrated research, extension, and instructional projects to improve the health and wellness of Hawaii's families and communities. This program will improve the understanding of and better communicate the role of nutrition and lifestyles in health and disease, including recommendations for health such as locally grown and ethnic crops with beneficial nutrient content.

3. Program existence : Mature (More than five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

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%	
404	Instrumentation and Control Systems	0%		3%	
511	New and Improved Non-Food Products and Processes	0%		3%	
607	Consumer Economics	5%		1%	
608	Community Resource Planning and Development	10%		1%	
701	Nutrient Composition of Food	9%		5%	
702	Requirements and Function of Nutrients and Other Food Components	5%		10%	
703	Nutrition Education and Behavior	14%		5%	
704	Nutrition and Hunger in the Population	2%		1%	
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources	5%		1%	
723	Hazards to Human Health and Safety	6%		1%	
724	Healthy Lifestyle	22%		19%	
802	Human Development and Family Well-Being	10%		13%	
803	Sociological and Technological Change Affecting Individuals, Families, and Communities	12%		9%	
804	Human Environmental Issues Concerning Apparel, Textiles, and Residential and Commercial Structures	0%		17%	
806	Youth Development	0%		4%	
	Total	100%		100%	

V(C). Planned Program (Situation and Scope)**1. Situation and priorities**

Iron deficiency, obesity, and diabetes are common conditions in Pacific populations; and appropriate choice, handling and preparation of locally available foods are topics requiring integrated research and extension efforts. CTAHR plays an important role in promoting healthy lifestyle habits and behaviors, such as identifying more appropriate local foods with nutritive value, and educating Hawai'i residents to make better food choices to improve their quality of life.

One out of five farms in Hawai'i are owned by immigrant farmers, who have limited knowledge of the

English language and have been receiving assistance in many subjects including proper pesticide usage to minimize impact on themselves as well as those that consume their produce. CTAHR has been involved with immigrant farmers for many years helping them with basic knowledge about marketing, pesticide safety, and other opportunities.

CTAHR also needs to provide leadership in family and community safety, disease-exposure prevention, and food security and safety. The college will help protect Hawai'i's general population and its agricultural industry by providing comprehensive research and training in the detection, analysis, diagnosis, management, and assessments of the risk and economic impact of threats to Hawai'i's food supply and biological and chemical threats against the state.

Through outreach, the college can also help protect our communities and families from contaminants and harmful household chemicals. To that end, we are partnering with colleagues from UH community colleges in several projects.

2. Scope of the Program

- In-State Extension
- In-State Research
- Multistate Research
- Multistate Extension
- Integrated Research and Extension
- Multistate Integrated Research and Extension

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

- External partners and state and federal agencies are willing to collaborate and cooperate.
- External funds and resources are available and can serve as a catalyst for change.
- Staff with appropriate expertise is available or can be recruited.
- A knowledge base exists to execute extension plans.

2. Ultimate goal(s) of this Program

The citizens of Hawai'i will consume a healthier diet, and live a longer and healthier life. Families and communities will be protected from environmental contaminants.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
		1862	1890	1862

2017	5.0	0.0	3.0	0.0
2018	5.0	0.0	3.0	0.0
2019	5.0	0.0	4.0	0.0
2020	5.0	0.0	4.0	0.0
2021	0.0	0.0	0.0	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

- Develop research, extension, and instructional initiatives to improve diet and nutrition in Hawaii's multiethnic population, addressing such issues as diabetes, iron deficiency, and weight management.
- Maintain and laboratory resources needed to detect and analyze biological and chemical environmental contaminants.
- Establish education and training programs for students, community members, first responders/detectors, and agriculture producers.
- Promote locally grown commodities to minimize unnecessary imports from mainland and international destinations, including research and extension efforts with underutilized local produce of high nutritional value.
- Conduct outreach programs for stakeholders to strengthen their capacity to make educated decisions to improve their health, wellness, and overall quality of life.

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension

Direct Methods	Indirect Methods
<ul style="list-style-type: none"> • Education Class • Workshop • Group Discussion • One-on-One Intervention 	<ul style="list-style-type: none"> • Newsletters • TV Media Programs • Web sites other than eXtension

3. Description of targeted audience

The target clients are 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(G). Planned Program (Outputs)

NIFA no longer requires you to report target numbers for standard output measures in the Plan of Work. However, all institutions will report actual numbers for standard output measures in the Annual Report of Accomplishments and Results. The standard outputs for which you must continue to collect data are:

- Number of contacts
 - Direct Adult Contacts
 - Indirect Adult Contacts
 - Direct Youth Contacts
 - Indirect Youth Contact
 - Number of patents submitted
 - Number of peer reviewed publications
- Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(H). State Defined Outputs

1. Output Measure

- Number of outreach activities and events conducted
 - Presentations at international and national meetings.
 - Grant proposals submitted.
- Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(I). State Defined Outcome

O. No	Outcome Name
1	Number of people who increased their knowledge in health and wellness through outreach activities
2	Total dollar value of grants and contracts obtained.

Outcome # 1

1. Outcome Target

Number of people who increased their knowledge in health and wellness through outreach activities

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 803 - Sociological and Technological Change Affecting Individuals, Families, and Communities
- 723 - Hazards to Human Health and Safety
- 703 - Nutrition Education and Behavior
- 724 - Healthy Lifestyle
- 711 - Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources
- 701 - Nutrient Composition of Food
- 608 - Community Resource Planning and Development
- 607 - Consumer Economics

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 2

1. Outcome Target

Total dollar value of grants and contracts obtained.

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 724 - Healthy Lifestyle
- 711 - Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources
- 608 - Community Resource Planning and Development
- 131 - Alternative Uses of Land
- 607 - Consumer Economics
- 704 - Nutrition and Hunger in the Population
- 804 - Human Environmental Issues Concerning Apparel, Textiles, and Residential and Commercial Structures
- 723 - Hazards to Human Health and Safety
- 802 - Human Development and Family Well-Being
- 702 - Requirements and Function of Nutrients and Other Food Components

- 703 - Nutrition Education and Behavior
- 803 - Sociological and Technological Change Affecting Individuals, Families, and Communities

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

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

Description

- 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.
 - High cost of petroleum and increased worked demand are directly or indirectly increasing the cost of all goods and services.

V(K). Planned Program - Planned Evaluation Studies

Description of Planned Evaluation Studies

All projects conducted under this program will be peer-reviewed before installation. Annual progress reports will be collected and evaluated by the Associate Deans for Research and Extension. Funds will be not released for those projects which do not show tangible progress.

V(A). Planned Program (Summary)

Program # 6

1. Name of the Planned Program

Global Food Security and Hunger

2. Brief summary about Planned Program

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.

The call for increased production of local food has brought increased attention to expanding commercial agricultural production. CTAHR has an extension program specifically designed to assist producers interested in starting or expanding operations. At the same time, the traditional extension programming is continuing to focus on assisting new and existing producers. Small-scale agriculture, which can easily be used for backyard or subsistence, is a high-priority activity for CTAHR extension programming, and work has just begun to integrate a portion of this effort into a statewide Master Gardener program. Hawai'i livestock and aquaculture industries also contribute to the value of Hawai'i's agriculture sector.

CTAHR engages in research, extension, and instruction in support of crop and livestock industries. Specific research efforts include plant pest and disease mitigation, traditional breeding and genetic improvement of crop varieties, genetic improvement of cattle, increasing in muscle mass in cattle, the development of cooling systems for cows in hot-humid climates, pasture and drought management, and new marketing opportunities for value-added beef products. Development of nutritive drought-resistant forage, and of local animal feed sources are also priorities. Work aimed at increasing backyard and subsistence efforts that move towards altering a household's production function and decrease reliance on purchased, imported food is also underway.

3. Program existence : Mature (More than five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

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%		1%	
104	Protect Soil from Harmful Effects of Natural Elements	0%		6%	
131	Alternative Uses of Land	4%		5%	
201	Plant Genome, Genetics, and Genetic Mechanisms	0%		1%	
204	Plant Product Quality and Utility (Preharvest)	5%		3%	
205	Plant Management Systems	16%		2%	
211	Insects, Mites, and Other Arthropods Affecting Plants	5%		5%	
212	Diseases and Nematodes Affecting Plants	6%		6%	
216	Integrated Pest Management Systems	5%		3%	
301	Reproductive Performance of Animals	18%		2%	
302	Nutrient Utilization in Animals	0%		13%	
305	Animal Physiological Processes	10%		16%	
306	Environmental Stress in Animals	8%		2%	
307	Animal Management Systems	12%		8%	
502	New and Improved Food Products	2%		0%	
503	Quality Maintenance in Storing and Marketing Food Products	0%		7%	
511	New and Improved Non-Food Products and Processes	0%		13%	
601	Economics of Agricultural Production and Farm Management	3%		7%	
607	Consumer Economics	3%		0%	
608	Community Resource Planning and Development	3%		0%	
	Total	100%		100%	

V(C). Planned Program (Situation and Scope)

1. Situation and priorities

With the closing or downsizing of the large sugar and pineapple operations in Hawai'i, the number of small, entrepreneurial operations that produce a diversity of crops and agricultural products has increased. Opportunities exist for replacing imports to local supermarket chains, hotels, and restaurants.

However, because of the small size of most local farms, many are not able to meet the continuous supply requirements. 63% of the state's 7,000 farms are less than 10 acres in size, and another 25% fall between 10-49 acres. Collaboration among farmers to synchronize production and/or coordinate marketing to meet the needs of buyers would significantly help towards filling the needs of buyers with local produce.

Value added products can increase profitability of a crop significantly. Many of Hawaii's products can be made into ready-to-eat products. Success stories abound of local value added products, such as the "Mountain Apple Brand" developed by a local supermarket chain that features local produce. CTAHR will continue to provide assistance and expertise in developing new products, processes, and new markets.

Hawaii is particularly vulnerable should in-shipments to the State be stopped for any reason because more than 88% of the State's food supply is imported. Estimates indicate that only a two week supply of food exist within the State at any one time and policy makers are increasingly interested in efforts to increase Hawaii's food self-sufficiency. The call for increased production of local food has brought increased attention to expanding commercial agricultural production.

CTAHR has research programs in vegetable production, taro, and tropical fruits production which are relevant to our state, and also to food security in other tropical and subtropical regions of the world. Diseases and pests continue to be major constraints in growing food crops on the islands, and our research programs are designed to resolve these challenges.

CTAHR has an extension program specifically designed to assist producers interested in expanding operations. At the same time, the traditional extension programming is continuing to focus on assisting new and existing producers. While Hawaii has been relatively successful in increasing the production of fruits and vegetables, the production of starch and protein is more challenging.

Increasing urbanization has also increased the interest in urban horticultural programs, since many of Hawaii's urban areas can be classified as food deserts. Small scale agriculture, which can easily be used for backyard or subsistence is a high priority activity for CTAHR extension programming. Work has just begun to integrate a portion of this effort into establishing a Statewide Master Gardener program.

CTAHR is involved in research and extension efforts to improve the genetics of cattle in the characteristics of tenderness, rib eye area, and marbling with the focus on forage finishing. Although Hawaii does not expect to be self-sufficient in beef, the overall goal is to retain a greater portion of locally produced beef. Interest in forage finished natural beef has increased, with work on value added products continuing.

Drought and the high cost of animal feed challenge Hawaii's livestock and aquaculture producers. Research is pursuing drought tolerant forage with high nutritive value, and local sources of animal feed. CTAHR is also moving forward with a certificate program in aquaculture to train students and the aquaculture workforce.

2. Scope of the Program

- In-State Extension
- In-State Research
- Multistate Research
- Multistate Extension

- Integrated Research and Extension
- Multistate Integrated Research and Extension

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

- External funds and resources are available.
- Staff with the appropriate expertise is available or can be recruited.
- People will be motivate to learn/change.
- Opportunities for value added products exist.
- Cost efficient production and processing systems can be developed.

2. Ultimate goal(s) of this Program

- Hawaii will become more self-sufficient in food production and reduce the reliance on imported food.
- New value added products will be developed using locally produced crops and livestock.
- Current products and processes are improved using knowledge and expertise in CTAHR.
- Local producers and manufacturers become more efficient, more profitable, and more competitive with the technical and business management assistance and training received from CTAHR.
- Develop profitable and sustainable livestock and aquaculture industries in Hawaii.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2017	6.0	0.0	6.0	0.0
2018	6.0	0.0	6.0	0.0
2019	6.0	0.0	6.0	0.0
2020	7.0	0.0	7.0	0.0
2021	8.0	0.0	8.0	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

- Conduct needs assessments as needed for stakeholders in urban and rural areas.
- Develop and deliver educational programs aimed at increasing local food production by households and commercial producers.

- Conduct varietal-testing trials to identify disease-resistant varieties for Hawai'i planting.
- Develop sustainable farming techniques for local farmers.
- Conduct research and extension efforts to improve soil fertility and lessen water usage.
- Explore the potential of new and underutilized foods crops.
- Develop value-added products from locally grown crops and livestock.
- Conduct research station field days, demonstration sites conferences, and other outreach and educational activities for stakeholders.
 - Extend information on aquaculture and aquaponic cultivation methods.
 - Develop marketing models and economic analyses for local crop and livestock products.
 - Provide educational and training services to individual farmers, processors, packers, and industry groups with a view toward developing new markets, developing new marketing strategies, and writing successful business/marketing plans to expand their business.

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension	
Direct Methods	Indirect Methods
<ul style="list-style-type: none"> • Education Class • Workshop • Group Discussion • One-on-One Intervention • Demonstrations 	<ul style="list-style-type: none"> • Newsletters • eXtension web sites • Web sites other than eXtension

3. Description of targeted audience

This program audience is quite diverse, encompassing ranchers and commercial and hobbyist livestock producers in Hawaii and the American-affiliated Pacific Islands, 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(G). Planned Program (Outputs)

NIFA no longer requires you to report target numbers for standard output measures in the Plan of Work. However, all institutions will report actual numbers for standard output measures in the Annual Report of Accomplishments and Results. The standard outputs for which you must continue to collect data are:

- Number of contacts
 - Direct Adult Contacts
 - Indirect Adult Contacts
 - Direct Youth Contacts
 - Indirect Youth Contact
- Number of patents submitted
- Number of peer reviewed publications

Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(H). State Defined Outputs

1. Output Measure

- Number of workshops, field days and demonstrations.
- Presentations at international and national meetings
- Grant proposals submitted

Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(I). State Defined Outcome

O. No	Outcome Name
1	Number of people that adopt one or more recommended practices.
2	Total dollar value of grants and contracts obtained

Outcome # 1

1. Outcome Target

Number of people that adopt one or more recommended practices.

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 502 - New and Improved Food Products
- 301 - Reproductive Performance of Animals
- 205 - Plant Management Systems
- 306 - Environmental Stress in Animals
- 503 - Quality Maintenance in Storing and Marketing Food Products
- 101 - Appraisal of Soil Resources
- 608 - Community Resource Planning and Development
- 511 - New and Improved Non-Food Products and Processes
- 305 - Animal Physiological Processes
- 307 - Animal Management Systems
- 212 - Diseases and Nematodes Affecting Plants
- 607 - Consumer Economics
- 601 - Economics of Agricultural Production and Farm Management

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 2

1. Outcome Target

Total dollar value of grants and contracts obtained

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 601 - Economics of Agricultural Production and Farm Management
- 511 - New and Improved Non-Food Products and Processes
- 305 - Animal Physiological Processes
- 307 - Animal Management Systems
- 205 - Plant Management Systems
- 101 - Appraisal of Soil Resources

- 503 - Quality Maintenance in Storing and Marketing Food Products
- 502 - New and Improved Food Products
- 301 - Reproductive Performance of Animals
- 306 - Environmental Stress in Animals
- 608 - Community Resource Planning and Development
- 607 - Consumer Economics

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

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

Description

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(K). Planned Program - Planned Evaluation Studies

Description of Planned Evaluation Studies

All projects conducted under this program will be peer-reviewed before installation. Annual progress reports will be collected and evaluated by the Associate Deans for Research and Extension. Funds will be not released for those projects which do not show tangible progress.

V(A). Planned Program (Summary)

Program # 7

1. Name of the Planned Program

Climate Change

2. Brief summary about Planned Program

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.

3. Program existence : Intermediate (One to five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

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%		30%	
111	Conservation and Efficient Use of Water	50%		40%	
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%		5%	
132	Weather and Climate	0%		5%	
133	Pollution Prevention and Mitigation	8%		0%	
405	Drainage and Irrigation Systems and Facilities	0%		20%	
	Total	100%		100%	

V(C). Planned Program (Situation and Scope)

1. Situation and priorities

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, the water quality in catchment system is affected by many variables, which must be managed by the owner. Acid rain caused by volcanic gas or VOG is a concern in the State, particularly on Hawaii Island, both for crops and for catchment systems.

Increased urbanization also contributes to global warming. Urban forestry provides one approach to mitigating global warming, to some degree. Efforts to increase the size of the urban forests in Hawaii via CTAHR outreach programs are underway.

Research is underway to predict the impacts of temperature changes on terrestrial ecosystems using Hawaii's existing temperature variations with elevations gradients. Also the effects of climate variation on the incidence and severity of forest and rangeland fires is being studied in Hawaii. With respect to agricultural production, drought management of pasture forage is an area of concern, as is increasing soil salinity for water-intensive crops such as taro, a culturally important staple starch crop in Hawaii and throughout the Pacific.

2. Scope of the Program

- In-State Extension
- In-State Research
- Multistate Research

- Multistate Extension
- Integrated Research and Extension

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

- A core of qualified extension and research staff is available.
- Additional external funds and other resources are available.
- Partnerships can continue and expand to coordinate efforts and share resources.
- Stakeholders are willing to implement best management practices.
- People are motivated to learn/change.

2. Ultimate goal(s) of this Program

Hawaii will develop long term strategies to mitigate the negative impacts of climate change on the State's residents, visitors, the economy and the environment.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2017	1.0	0.0	1.0	0.0
2018	1.0	0.0	1.0	0.0
2019	1.0	0.0	1.0	0.0
2020	1.0	0.0	2.0	0.0
2021	0.0	0.0	2.0	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

- Conduct a needs assessments as needed for stakeholders in urban and rural areas.
- Develop and deliver educational programs directed at agricultural producers and urban horticulture in order to mitigate the impacts of climate change.
 - Develop and improve remote sensing methods and use of satellite imagery to model impacts of climate change and pollution on Pacific island land and coastal resources.
 - Develop and extend mitigation measures for drought conditions (and other impacts of climate change) affecting livestock and agriculture in the Pacific, including identifying appropriate forage and soil amendments.

- Develop appropriate fuel load and wild fire management models for tropical conditions.

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension

Direct Methods	Indirect Methods
<ul style="list-style-type: none"> • Education Class • Workshop • Group Discussion • One-on-One Intervention • Demonstrations 	<ul style="list-style-type: none"> • Newsletters • Web sites other than eXtension

3. Description of targeted 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.

V(G). Planned Program (Outputs)

NIFA no longer requires you to report target numbers for standard output measures in the Plan of Work. However, all institutions will report actual numbers for standard output measures in the Annual Report of Accomplishments and Results. The standard outputs for which you must continue to collect data are:

- Number of contacts
 - Direct Adult Contacts
 - Indirect Adult Contacts
 - Direct Youth Contacts
 - Indirect Youth Contact
 - Number of patents submitted
 - Number of peer reviewed publications
- Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(H). State Defined Outputs

1. Output Measure

- Number of workshops, field days, or demonstrations conducted
- Presentations at national and international meetings.
- Grant proposals submitted.
- Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(I). State Defined Outcome

O. No	Outcome Name
1	Number of people who increase their knowledge or complete non-formal education on climate change related issues.
2	Dollar value of grants and contracts obtained.

Outcome # 1

1. Outcome Target

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

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 405 - Drainage and Irrigation Systems and Facilities
- 133 - Pollution Prevention and Mitigation
- 111 - Conservation and Efficient Use of Water
- 123 - Management and Sustainability of Forest Resources
- 122 - Management and Control of Forest and Range Fires
- 132 - Weather and Climate
- 102 - Soil, Plant, Water, Nutrient Relationships
- 112 - Watershed Protection and Management

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 2

1. Outcome Target

Dollar value of grants and contracts obtained.

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 111 - Conservation and Efficient Use of Water
- 132 - Weather and Climate
- 405 - Drainage and Irrigation Systems and Facilities
- 112 - Watershed Protection and Management
- 123 - Management and Sustainability of Forest Resources
- 133 - Pollution Prevention and Mitigation
- 122 - Management and Control of Forest and Range Fires

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

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

Description

- Any natural disaster may alter the effect of climate change on Hawaii.
- The economic situation will determine what resources are available via appropriations and other funding mechanisms.
- Climate change models developed elsewhere are not necessarily applicable to Pacific islands.

V(K). Planned Program - Planned Evaluation Studies

Description of Planned Evaluation Studies

All projects conducted under this program will be peer-reviewed before installation. Annual progress reports will be collected and evaluated by the Associate Deans for Research and Extension. Funds will be not released for those projects which do not show tangible progress.

V(A). Planned Program (Summary)

Program # 8

1. Name of the Planned Program

Sustainable Energy

2. Brief summary about Planned Program

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; and to reduce energy costs for agricultural producers in Hawaii.

The objectives of this program are to 1) efficiently grow perennial crops on marginal lands as feedstock for biofuels; (2) develop and promote the use of these locally produced biofuels as alternatives to imported fossil fuels; (3) identify useful and commercially-viable co-products of biofuel cultivation and processing; and (4) develop energy efficient methods for production and processing of agricultural produce.

3. Program existence : Intermediate (One to five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

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%		16%	
201	Plant Genome, Genetics, and Genetic Mechanisms	0%		6%	
205	Plant Management Systems	0%		8%	
402	Engineering Systems and Equipment	0%		10%	
404	Instrumentation and Control Systems	0%		10%	
501	New and Improved Food Processing Technologies	50%		12%	
502	New and Improved Food Products	30%		8%	
511	New and Improved Non-Food Products and Processes	20%		30%	
	Total	100%		100%	

V(C). Planned Program (Situation and Scope)

1. Situation and priorities

Hawaii has the highest energy costs in the nation, due to dependence upon imported fossil fuels for power and transportation. Energy costs are a ,major constraint to agricultural production, as well as to the economic well-being of the entire state. There is a need to identify and develop locally-grown biofuel feedstocks appropriate for Hawaii's environmental conditions, and efficient and economically viable local means of biofuel production, including development of co-products. Development and extension of cost-reducing energy production methods for agricultural industries in Hawaii is a complementary need.

2. Scope of the Program

- In-State Extension
- In-State Research
- Multistate Research
- Integrated Research and Extension

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

1. Price for fossil fuels continue to rise.
2. Political will to use alternative energy to replace fossil fuels continues.
3. Adequate funding support is available.
4. CTAHR faculty and collaborators have an appropriate combination of expertise.

2. Ultimate goal(s) of this Program

The goal of this program is to reduce reliance on imported fossil fuels in Hawaii, and lower energy costs for agricultural producers and the public at large without harming Hawaii's tropical island environment. This will include locally grown and processed biofuel feedstock and alternative energy production strategies.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2017	1.0	0.0	1.0	0.0
2018	1.0	0.0	1.0	0.0
2019	1.0	0.0	2.0	0.0
2020	1.0	0.0	2.0	0.0
2021	0.0	0.0	0.0	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

- Determine optimal lignocellulosic substrate (grass type) for ethanol production in Hawaii, as a function of site location, elevation, harvesting frequency, irrigation, and fertilizer treatments.
- Conduct field experiments with *Jatropha curcas*, a tree that produces a nut with great potential as a source of oil for conversion into biodiesel.
- Develop useful co-products of biofuel cultivation and processing, such as animal feed and/or soil amendments for agricultural production.
- Develop energy efficient methods for production and processing of agricultural produce in Hawaii and the American Pacific.

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension

Direct Methods	Indirect Methods
<ul style="list-style-type: none"> • Group Discussion • One-on-One Intervention • Demonstrations 	<ul style="list-style-type: none"> • TV Media Programs • Web sites other than eXtension

3. Description of targeted 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), Pacific Biodiesel Inc., Zechem Inc., and Hawaii Pure Plant Oil (HPPO) (*Jatropha*) are partners and target audiences for these efforts. Lastly, the Hawaii Agricultural Research Center (HARC), Hawaii Natural Resources Institute, College of Micronesia, University of Guam, Oregon State University, and Washington State University are both collaborators in current efforts and audiences for improved biofuel production technologies. With respect to development of alternative energy production methods, such as photovoltaic solar dryers, for agricultural producers, all producers in Hawaii and the American Pacific are part of the audience.

V(G). Planned Program (Outputs)

NIFA no longer requires you to report target numbers for standard output measures in the Plan of Work. However, all institutions will report actual numbers for standard output measures in the Annual Report of Accomplishments and Results. The standard outputs for which you must continue to collect data are:

- Number of contacts
 - Direct Adult Contacts
 - Indirect Adult Contacts
 - Direct Youth Contacts
 - Indirect Youth Contact
- Number of patents submitted
- Number of peer reviewed publications

Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(H). State Defined Outputs

1. Output Measure

- Grant proposals submitted
- Presentations at national and international meetings.
- Number of workshops and other educational/outreach activities held.

Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(I). State Defined Outcome

O. No	Outcome Name
1	Identified types of bioenergy crops suitable for Hawaii environment.
2	Dollar value of grants and contracts received

Outcome # 1

1. Outcome Target

Identified types of bioenergy crops suitable for Hawaii environment.

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 502 - New and Improved Food Products
- 501 - New and Improved Food Processing Technologies
- 511 - New and Improved Non-Food Products and Processes
- 404 - Instrumentation and Control Systems

4. Associated Institute Type(s)

- 1862 Research

Outcome # 2

1. Outcome Target

Dollar value of grants and contracts received

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 404 - Instrumentation and Control Systems
- 501 - New and Improved Food Processing Technologies
- 511 - New and Improved Non-Food Products and Processes

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Appropriations changes

- Public Policy changes
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges

Description

Cost is a decisive factor in developing an alternative fuels industry. Without government support, market forces may abandon alternative energy research. Like any other programs, sustainable energy research programs will have to compete for limited funding.

V(K). Planned Program - Planned Evaluation Studies

Description of Planned Evaluation Studies

All projects conducted under this program will be peer-reviewed before installation. Annual progress reports will be collected and evaluated by the Associate Deans for Research and Extension. Funds will be not released for those projects which do not show tangible progress.

V(A). Planned Program (Summary)

Program # 9

1. Name of the Planned Program

Childhood Obesity

2. Brief summary about Planned Program

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. CTAHR faculty participate in regional and national efforts to identify the factors contributing to weight gain in young children, particularly in low-income households in order to develop obesity prevention programs.

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 are moving forward to develop locally-appropriate healthy diets; support and evaluate the impact of outreach activities; and identify physical, cultural, or social factors impeding the adoption of recommended dietary and behavioral interventions.

3. Program existence : Intermediate (One to five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

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%		0%	
724	Healthy Lifestyle	40%		0%	
803	Sociological and Technological Change Affecting Individuals, Families, and Communities	0%		50%	
	Total	100%		100%	

V(C). Planned Program (Situation and Scope)**1. Situation and priorities**

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 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 is shifting the focus to youth. For example, the rate of obesity in children in Hawai'i ages 6 to 11 is twice the national average. CTAHR faculty participate in regional and national efforts to identify the factors contributing to weight gain in young children, particularly in low-income households in order to develop obesity prevention programs.

The youth of Hawaii also increasingly engage in sedentary activities such as playing video games, watching television and surfing the internet just as children in other parts of the world do. In conjunction with the consumption of excess calories, this encourages obesity. CTAHR's programming in childhood obesity focuses on identification and promotion of locally-appropriate improvements in diet, and on increasing physical activity. Research and extension efforts target families and communities in Hawaii and throughout the American Pacific.

2. Scope of the Program

- In-State Extension
- In-State Research
- Multistate Research
- Multistate Extension
- Integrated Research and Extension
- Multistate Integrated Research and Extension

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

- External partners are willing to collaborate and cooperate.
- External funds and resources are available.
- Staff with the appropriate expertise is available or can be recruited.
- People will be motivate to learn/change.

2. Ultimate goal(s) of this Program

The children of Hawaii will be healthy and of normal weight, and will be free of the health complications of obesity as they age.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2017	1.0	0.0	1.0	0.0
2018	1.0	0.0	1.0	0.0
2019	1.0	0.0	1.0	0.0
2020	2.0	0.0	2.0	0.0
2021	2.0	0.0	2.0	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

- Provide adult development programs for volunteers that include content encouraging better nutrition and increased physical activity for the youth for whom these adults are responsible.
 - Develop, adapt (localize), and/or expand 4-H or other youth curricula to encourage better nutrition and increased physical activity in youths.
 - Conduct research to identify and mitigate the physical, social, and/or cultural barriers to improved nutrition and physical well-being of youth in Hawai'i.
 - Develop and promote socially and culturally appropriate activity and diet-based interventions to reduce obesity rates in Pacific island populations.

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension	
Direct Methods	Indirect Methods

<ul style="list-style-type: none">● Education Class● Workshop● Group Discussion● One-on-One Intervention● Demonstrations	<ul style="list-style-type: none">● Newsletters● Web sites other than eXtension
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3. Description of targeted audience

Target audiences are food producers and retailers, caregivers, and members of the public (particularly those from Pacific lineages at risk from diabetes), both in the community at large (as in schools and after-school programs) or participating in community wellness programs and community development programs such as 4H. Current programs focus on children and families from at-risk native populations in communities in Hawaii, and across the Pacific region.

V(G). Planned Program (Outputs)

NIFA no longer requires you to report target numbers for standard output measures in the Plan of Work. However, all institutions will report actual numbers for standard output measures in the Annual Report of Accomplishments and Results. The standard outputs for which you must continue to collect data are:

- Number of contacts
 - Direct Adult Contacts
 - Indirect Adult Contacts
 - Direct Youth Contacts
 - Indirect Youth Contact
- Number of patents submitted
- Number of peer reviewed publications

Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(H). State Defined Outputs

1. Output Measure

- Number of workshops, filed days, or demonstrations conducted.
- Presentations at national and international meetings.
- Grant proposals submitted.

Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(I). State Defined Outcome

O. No	Outcome Name
1	Number of stakeholders who increased knowledge in at least one issue.
2	Dollar value of grants and contracts obtained.

Outcome # 1

1. Outcome Target

Number of stakeholders who increased knowledge in at least one issue.

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

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

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 2

1. Outcome Target

Dollar value of grants and contracts obtained.

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

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

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations

- Competing Public priorities
- Competing Programmatic Challenges
- Populations changes (immigration, new cultural groupings, etc.)

Description

- Economic concerns may redirect funding to other programmatic areas and other public priorities.
- Population trends may cause a change programming effectiveness. For example, some Pacific Islander populations traditionally value obesity and favor consumption of various unhealthy foods, which will increase programmatic challenges.

V(K). Planned Program - Planned Evaluation Studies

Description of Planned Evaluation Studies

All projects conducted under this program will be peer-reviewed before installation. Annual progress reports will be collected and evaluated by the Associate Deans for Research and Extension. Funds will be not released for those projects which do not show tangible progress.

V(A). Planned Program (Summary)

Program # 10

1. Name of the Planned Program

Food Safety

2. Brief summary about Planned Program

Good Agricultural Practices (GAP) and certification of agricultural producers for food safety in order to avoid bacterial or other contamination of produce have become increasingly important to processors, retailers, and the public. This concern continues up the processing chain through processing plants and into restaurant operations. Compliance is challenging for Hawaii's small farms, many of which are operated by recent immigrants with limited English language skills. In FY2012, approval of the Food Safety and Modernization Act (FSMA) accelerated concerns over food safety and compliance. To address these needs, CTAHR conducts educational programming in GAPs and food safety compliance for agricultural producers and processors. In addition, CTAHR's extension staff offer workshops for socially disadvantaged producers on correct handling and application of pesticides, fertilizer/pesticide monitoring and record keeping, and sanitation requirements to reduce risk of food borne illness.

In addition to addressing their increasing concern about the safety of the food they purchase, consumers also need information on safe food storage, handling, and preparation. Local customs dictate that food consumption be included in virtually all social events. In addition, Hawaii's tropical climate may compromise food safety more quickly than stakeholders realize.

Research emphasizes both field detection of contaminants and pathogens, and improved/alternative methods of sterilization and decontamination of tropical fresh and processed foods.

3. Program existence : Intermediate (One to five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
404	Instrumentation and Control Systems	0%		8%	
501	New and Improved Food Processing Technologies	25%		25%	
502	New and Improved Food Products	11%		0%	
503	Quality Maintenance in Storing and Marketing Food Products	28%		0%	
511	New and Improved Non-Food Products and Processes	0%		8%	
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources	14%		8%	
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins	22%		43%	
723	Hazards to Human Health and Safety	0%		8%	
	Total	100%		100%	

V(C). Planned Program (Situation and Scope)**1. Situation and priorities**

Government agencies, retailers and the public at large are concerned about the safety of our food supply. Implementation of the Food Safety and Modernization Act (FSMA) in the near future will greatly accelerate concerns over food safety and compliance. If something were to occur that destroyed the public's confidence in a fresh or processed food product in Hawaii, as has occurred with some agricultural products in the continental USA, the brand and profitability of Hawaii agriculture would be affected dramatically. CTAHR established a food safety program aimed at food processor more than 20 years ago and the program has proven very effective at meeting the needs of food processors. More recently, CTAHR established a Good Agricultural Practices and food safety certification educational program to meet the needs of Hawaii farmers.

Food handling safety by consumers is also a concern. The importance of food in all social activities, coupled with the preparation and storage methods used for many local, ethnic foods created the need for the educational programs conducted by CTAHR as part of nutrition education. Cooking and storage guidelines, food preparation tips, and resource information are included in this programming.

Research priorities are to develop effective methods of both field detection of contaminants and pathogens, and improved/alternative methods of sterilization and decontamination of tropical fresh and processed foods.

2. Scope of the Program

- In-State Extension
- In-State Research
- Multistate Research
- Multistate Extension
- Integrated Research and Extension

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

- A core of qualified extension and research faculty is available.
- Funds and other resources are available.
- Partnerships can continue and expand to coordinate efforts and share resources.
- Information on best management practices exists for food safety.
- People are motivated to learn/change and willing to implement best management practices.

2. Ultimate goal(s) of this Program

Hawaii has a safe food supply from the farmers' fields to final consumption.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2017	1.0	0.0	1.0	0.0
2018	2.0	0.0	2.0	0.0
2019	2.0	0.0	2.0	0.0
2020	2.0	0.0	2.0	0.0
2021	2.0	0.0	2.0	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

- Conduct needs assessments for various stakeholders groups: farmers and ranchers, processors, and consumers.
- Conduct research that will identify the best technologies and management practices for food

production and processing that meet applicable laws and regulations.

- Research, develop, and deliver timely and relevant outreach programming in good agricultural practices, and prevention of food biological and chemical contamination to stakeholders, in collaboration with partners across the state.
- Conduct research to develop methods for field detection of contaminants and pathogens, and improved/alternative methods of sterilization and decontamination of tropical fresh and processed foods.

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension

Direct Methods	Indirect Methods
<ul style="list-style-type: none"> • Education Class • Workshop • Group Discussion • One-on-One Intervention 	<ul style="list-style-type: none"> • Newsletters • Web sites other than eXtension

3. Description of targeted audience

This program reaches from farms to food processing facilities; to consumers, hospitals and research facilities. Prevention, detection and mitigation of food-borne pathogens is a critical concern for local farms and processing facilities, home gardeners, medical facilities, and retailers of food products.

V(G). Planned Program (Outputs)

NIFA no longer requires you to report target numbers for standard output measures in the Plan of Work. However, all institutions will report actual numbers for standard output measures in the Annual Report of Accomplishments and Results. The standard outputs for which you must continue to collect data are:

- Number of contacts
 - Direct Adult Contacts
 - Indirect Adult Contacts
 - Direct Youth Contacts
 - Indirect Youth Contact
- Number of patents submitted
- Number of peer reviewed publications

Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(H). State Defined Outputs

1. Output Measure

- Number of workshops, field days and demonstrations
- Presentations at national and international meetings.
- Grant proposals submitted.
- Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(I). State Defined Outcome

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

Outcome # 1

1. Outcome Target

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

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 503 - Quality Maintenance in Storing and Marketing Food Products
- 711 - Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources
- 511 - New and Improved Non-Food Products and Processes
- 502 - New and Improved Food Products
- 712 - Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins
- 501 - New and Improved Food Processing Technologies

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 2

1. Outcome Target

Dollar value of grants and contracts obtained.

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 511 - New and Improved Non-Food Products and Processes
- 503 - Quality Maintenance in Storing and Marketing Food Products
- 502 - New and Improved Food Products
- 404 - Instrumentation and Control Systems
- 711 - Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources
- 712 - Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins
- 501 - New and Improved Food Processing Technologies

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

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

Description

- State and federal laws and regulations could change, which would affect the behavior of businesses relative to food safety.
- Natural disasters could interrupt control systems and prevent them from coming back on-line
- Public policy change could impact the expectations of consumers and others in the marketing channel, relative to food safety.
- A shortage of resources due to the economic situation, or a change in competing public or programmatic interests could draw attention away from food safety.
- An increase in immigrants involved in agriculture or food processing could increase the need for food safety educational programs.

V(K). Planned Program - Planned Evaluation Studies

Description of Planned Evaluation Studies

All projects conducted under this program will be peer-reviewed before installation. Annual progress reports will be collected and evaluated by the Associate Deans for Research and Extension. Funds will be not released for those projects which do not show tangible progress.