

# 2007 University of Hawaii Combined Research and Extension Annual Report

Status: Accepted  
Date Accepted: 05/06/08

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## I. Report Overview

### 1. Executive Summary

CTAHR celebrated our Centennial this year. CTAHR researchers, specialists, and county agents continue to work in tandem and with federal, state and other non-profit sister agencies to help Hawai'i farmers to be more competitive in the global economy. Unfortunately, 2007 was not a good year for the state of Hawai'i or CTAHR. A depressed housing market has put a dent in the local economy, and the tourist industry is experiencing a slow down in number of visitors from overseas, an indication of a general declining world economy. The escalating oil price and consequent high fuel cost has forced both airlines and maritime companies to increase their fueling surcharges. The net effect is increased cost for imported foods and feeds, as well as fertilizers, chemicals, and other materials associated with agriculture production. While increased shipping charges have eroded net income of those producers relying on exporting their products. Weyerhaeuser has announced it will close down this year. It is the only wood product company that produces all the paper shipping boxes for our floriculture, fruits, and vegetable industries. The last dairy farm on Oahu closed in 2007, which left only two dairy farms on the Big Island remaining in the state. Increased feed costs and stringent environmental regulations were two major reasons behind the overall decline in animal industry. CTAHR is a victim of the loss of USDA/CSREES special grants due to partisan bickering during 2007 budget process. Although we received additional Hatch and Smith-Lever funding, and state support, we still had a net loss of more than \$2.9 million in research and extension budget. This has negatively impacted our programming. We were forced to terminate some existing projects, and not funding any new projects. The loss of experienced research supporting staff will be felt beyond this fiscal year. On the positive side, we were successful in obtaining four faculty positions to support the Center on the Family during 2007 legislature session. We also received a capital improvement appropriation of \$764,000 for a second phase of renovations at the Komohana Agricultural Complex in Hilo. Eight new faculty members reported to duty in 2007. These positions are a combination of new positions provided by previous legislative session and vacancy created through attrition. Our faculty is due to receive an 11% raise on July 1, 2008, the last year of a six-year 30% pay increase package. Currently, the faculty union is negotiating with the Board of Regents on a new contract. We anticipate an increased pace in faculty retirement in the next five years. This will present an opportunity for programming adjustments for our research, teaching and extension programs. With a declining economy, it is unlikely we will be able to obtain any additional positions or capital improvement funds this year. Our programs will be further impacted if we do not have a farm bill in place soon. We have made changes in funding our projects supported by the formula and special grant funds. A new competitive process will be implemented for our formula fund distribution this year. We anticipate an increased effectiveness in our programming by this change. Although we faced tremendous challenges in 2007, our faculty and staff have performed admirably in generating new knowledge and providing valuable service to our stakeholders. From a portfolio of more than 300 projects, we have the following 17 projects to showcase what we have accomplished last year.

Hawai'i AgriTourism. In 2006, Hawai'i's 7.4 million visitors spent a record \$12 billion. The state's agricultural sales total about \$2 billion. Ag-tourism, the intersection of these two industries, benefits both sectors. Farm tours and on-farm sales, roadside stands, farmers' markets, farmer/chef collaborations, living-history farms, and agricultural events help Hawai'i's farmers and ranchers create economically sustainable operations that sell high-value products and offer unique experiences directly to customers. The tourism industry gains new attractions for visitors seeking an authentic slice of rural Hawai'i life. Between 2000 and 2003, the value of Hawai'i's ag-tourism increased by 30 percent to almost \$34 million, and the number of farms with ag-tourism income rose by nearly 50 percent. This rapid growth is expected to continue. CTAHR has nurtured ag-tourism for more than a decade. Beginning in 1999, spearheaded by a CTAHR Specialist the state's first ag-tourism conference, now a biennial event, began. In a free DVD available through CTAHR's ag-tourism website, [www.ctahr.hawaii.edu/agtourism](http://www.ctahr.hawaii.edu/agtourism), the owners of successful ag-tourism ventures describe how they've incorporated visitor sales and services. In 2007, CTAHR Specialists have assisted the newly formed statewide Hawaii AgriTourism Association with leadership training and strategic planning. The growing popularity of ag-tourism was evident at the 12th annual "Taste of the Hawaiian Range". This premier agricultural and educational event, which brings food consumers, producers, and preparers together to enjoy and learn more about Hawai'i's forage-fed meats, drew 1,900 participants to the Hilton Waikoloa Village. While dozens of chefs wooed the crowd with mouthwatering samples, producers of coffee, chocolate, honey, taro, sheep, cattle, abalone, fruits, vegetables, and handcrafted saddles promoted their own operations' ag-tourism activities to visitors from 27 states and five countries. By linking agriculture to the state's top industry, ag-tourism helps farmers chart a profitable future.

Area-Wide Fruit Fly IPM. Fruit fly pests have plagued Hawai'i farmers since 1895. Today the state is home to four invasive fruit fly species, each of which attacks a different set of fruits and fleshy vegetables. Together, they cost the state many tens of millions of

dollars per year in direct losses, quarantine costs, and the inability to establish commercial production of vulnerable host crops. In 2000, the U.S. Department of Agriculture's Agricultural Research Service, the Hawai'i Department of Agriculture, and CTAHR launched a collaboration with Hawai'i farmers and backyard growers to limit fruit fly damage. Through the Hawai'i Area-Wide Fruit Fly Pest Management program (HAW-FLYPM), more than 2,500 cooperators on more than 15,000 acres have put into practice a straightforward, environmentally sensitive approach to fruit fly control: (1) sanitizing fields by removing infested fruit, (2) monitoring traps that contain species-specific male lures or attractants to assess the size and composition of the fruit fly population, (3) targeting females with food lures such as protein bait plus a low-toxicity insecticide approved for conventional and organic crops, and (4) annihilating males through the use of abundant lure traps. HAW-FLYPM has changed Hawai'i's diversified agriculture. Squashes and melons that incurred heavy losses despite weekly cover sprays of pesticides are now grown with minimal losses and little or no cover sprays. Tomatoes once harvested green can be vine-ripened for the gourmet market. Improved persimmon yields have given rise to popular value-added products. New crops can be grown profitably, including Halloween pumpkin and dragonfruit (pitaya). Uninfested fruits command better prices and are cheaper to harvest and grade. Declining fruit fly populations offer hope of less expensive quarantine regimes. Benefits to industry, currently estimated at \$2.6 million per year, are projected to increase to \$6 million by 2011. In the words of a Moloka'i farmer who previously lost 30–40 percent of his mangos and 50–60 percent of his watermelons and now loses less than 1 percent: "This is government at its best."

Center on the Family. More than 60 percent of Hawai'i's children under age six live with working parents. For most of these youngsters, child care providers play a vital role in sparking their curiosity and preparing them for school. Recognizing the importance of the early years, CTAHR in partnership with the State of Hawai'i's Department of Human Services is working to enhance the care that Hawai'i's children receive through the Quality Care Program. The program provides technical support and training to care providers working in child care centers and licensed family daycare homes, as well as to informal caregivers such as grandparents, neighbors, and friends. CTAHR's Center on the Family administers the Quality Care Program, collaborating with other community partners including Honolulu Community College, the Hawai'i Association for the Education of Young Children, and PATCH, a statewide child care resource and referral agency. Center-based child care programs receive assistance in working toward meeting the Hawai'i Preschool Content Standards for Four-Year-Olds. For many programs, this can be their first step toward accreditation. Training classes are offered for preschool teachers, and program directors receive one-on-one support. For home-based child care providers, Quality Care brings instruction directly into the home with an orientation visit and monthly mailings of educational materials that offer insight into children's development and ideas for learning activities. Providers who actively demonstrate their commitment to offer high quality care can receive incentive payments based on the number of low income children they serve. Child care providers can participate in the educational aspects of the program regardless of whether they are eligible for payments. All the children in a provider's care benefit from the program's training in early childhood development, curriculum guidance, and—for those providers who serve children receiving DHS child care subsidies—an influx of financial resources. The Quality Care Program gives child care providers new ways to foster our youngest children's growth, health, and exploration, sowing the seeds of lifetime learning. By supporting caregivers, Quality Care helps keiki thrive.

Invasive Species. In April 2005 a UH student in Mānoa spotted strange swellings on the leaves of a coral tree (*Erythrina* sp.) caused by a newly invasive wasp. Within months, the *Erythrina* gall wasp (*Quadrastichus erythrinae*) had spread statewide. From attractive ornamentals, to the tall wiliwili ('Tropic Coral') used in windbreaks, to the native wiliwili of Hawai'i's dry forests, trees in the genus *Erythrina* were under attack. The female gall wasp lays her eggs in young leaves. As the wasp larvae mature, the leaves become too deformed to sustain the plant through photosynthesis. Severely infested trees lose their leaves and die. CTAHR is battling the wasp on several fronts. Researchers are collaborating with the Hawai'i Department of Agriculture and researchers in Africa, the gall wasp's continent of origin, to collect and identify *erythrina* gall wasps and their predators. Comparing the DNA of Hawai'i's invasive gall wasp to the DNA of gall wasps collected from locations throughout Africa helps researchers pinpoint where the Hawai'i pest originated and thus where to look for its natural enemies. CTAHR collaborators in Kenya and HDOA entomologist, working in Tanzania, have collected several such enemies, wasps that lay eggs in *Erythrina* galls so that their offspring can eat the gall wasp's larvae. HDOA is seeking state and federal approval to release one of these parasitoid wasps as a biocontrol agent. CTAHR researchers have found a way to save individual trees by injecting the pesticide imidacloprid into their trunks. CTAHR is propagating *Erythrina* varieties already in Hawai'i that appear to resist the gall wasp for future plantings. Despite these successes, an effective program of biocontrol remains the best hope for native wiliwili.

4-H: Serving Those Who Serve. Hawai'i is home to more than 44,000 military personnel, and active-duty service persons and their dependents together make up about ten percent of our population. Through 4-H programs for children, teens, parents, and staff, CTAHR reaches out to families with members serving in the U.S. Army, Air Force, Army Reserves, and Hawai'i Army and Air Force National Guards. The project started in 2000 with the formation of 15 4-H clubs involving 160 young people at Army installations on O'ahu. In 2007, it included more than 50 military 4-H clubs and helped 850 youths in Hawai'i, Japan, and Kwajalein build their skills and leadership ability. Military staff members and parents who work with young people receive training from CTAHR faculty.

Following the January 2005 deployment of Hawai'i Army National Guard troops to Iraq, CTAHR participated for two years in Operation Military Kids. Working with military partners and the Boys and Girls Club of Honolulu, Hawai'i 4-H helped youth service providers understand the impact of deployment, assisted the children of deployed soldiers in learning digital communication skills to stay in touch with their parents overseas, and offered support and special events for National Guard families. A much loved part of this program, Hero Packs for the children of deployed citizen soldiers, has extended past its funding. The packs, which include donated goods and a letter from another young person, are now assembled by 4-H youth as a service-learning project that teaches about the sacrifices made by our volunteer forces and their families.

Agriculture Awareness Day Grows. Good ideas are infectious. One good idea, a Kaua'i tradition for more than a decade, has spread south to O'ahu and the Big Island. This year marked Kaua'i's 11th annual Agricultural and Environmental Awareness Day, an education fair for fifth graders hosted by CTAHR's Kaua'i Agricultural Research Center and supported by the Kaua'i County Farm Bureau, the county's Office of Economic Development, the Hawaii Crop Improvement Association, and Monsanto. About 500 students, educators, and community members delved into agriculture and natural resource management, examining current issues and future career options. This educational event was started when it was recognized that with fewer families working in agriculture, more children believed that food comes from the supermarket rather than the farm. An event was developed to plant seeds of curiosity that might motivate a new generation of agriculturists. Noting the success of this program, it was brought to the other three counties so nearly 2000 students keiki's in all four counties now learn each year more about what they eat, where they live, and who they can become through hands on experiences.

Water for Farming's Future. Much of Hawai'i's surface water infrastructure was developed by sugar plantations during the late 1800s and early 1900s. With the collapse of the sugar industry, many aging irrigation systems have fallen into disrepair. CTAHR's researchers have led the latest phase of an agricultural water plan for the Hawai'i Department of Agriculture. The water plan addresses 10 previously studied irrigation systems located on five islands. For each system, prime agricultural lands, soil types, and current land uses and crops were mapped, as were potential sources of reclaimed water for irrigation. Preliminary maps were developed for an additional 11 irrigation systems. For the 10 systems studied, the irrigation needs for 27 crops were estimated based on historical climate data, soil properties, crop-specific water use traits, and growing seasons. The software employed to calculate these crop water duties is a flexible tool through which irrigation managers, farmers, and regulators can predict specific crop water requirements depending on when and where the crop is grown. Previous records, maps, site visits, and the input of an expert panel were used to evaluate the 10 systems, including the impact of proposed rehabilitation works. To project water demands to the year 2030, macroeconomists were surveyed to develop three scenarios—most likely, optimistic, and pessimistic—for Hawai'i agriculture. A panel of agriculturalists was asked to project crop acreages, from which irrigation demands were estimated. The potential for bioenergy crops was assessed using a separate survey and geographical analysis of available lands. The results will help Hawai'i's counties develop water plans for their jurisdictions. The Agricultural Water Use and Development Plan is still in draft form; official release of the water plan is anticipated in spring 2008. On the Runway, Ready to Launch. In April 22, 2007, an annual event now in its fifth decade drew a lunchtime crowd of more than 750 to the Sheraton Waikiki. The 2007 spring fashion show presented by students in CTAHR's Apparel Product Design and Merchandising program introduced fashion fans to the work of 15 young designers. The show's title, Centennial Seven, highlighted the years' seven graduating design seniors—Brandie Cazimero, Leah Evans, Keri Haraga, Jamie Higa, Kelly Mammel, Liezel Grace Pagala, and Andrea Wu—whose clothing lines were the culminating projects for their degrees. Mentored by instructor Cynthia Tsark, they developed collections that included hand-sewn couture, wearable art, and modern twists on styles from 1907, the college's first year. Among the richly varied outfits were items suitable for a day at the office, an afternoon tea, a romantic dinner, or a late night of club-hopping fun. Most of these new graduates plan to enter Hawai'i's \$600-million textiles and apparel industry; others hope to carry the islands with them to centers of fashion on the mainland and beyond. The clothes may have held the spotlight, but they were only the most visible part of what makes the fashion show a singular educational experience. Apparel Product Design and Merchandising students also comprised the show's production team. The production team was responsible for myriad details, including promotion, registration, sound and lighting, and ensuring that the right model in the right dress hit the catwalk at the proper cue. The fashion production studio class operated as a business that met expenses and turned a net profit of more than \$5,000. Through CTAHR's annual spring fashion show, students learn the entrepreneurial skills and hard work needed to make others look effortlessly fabulous.

Soil, the Groundwork for Success. For farmers, soil fertility is a high-stakes balancing act. Providing too little of a needed nutrient can lead to low yields or even crop failure. Adding too much increases your costs without improving your harvest. The stakes are also high for the environment. Runoff can carry excess fertilizer into streams, rivers, and coastal waters, where it feeds microbial activity that can suffocate fish, coral, and other animals. CTAHR is helping farmers decide what inputs work best with their soils, crops, and budgets. For example, repeated applications of fertilizer containing both nitrogen and phosphorous can cause phosphorus to build up in the soil. Experiments to find the range of soil phosphorus concentrations required for optimal crop growth enable farmers to test their soil and, if their land is already phosphorus-sufficient, use a nitrogen-only fertilizer that saves hundreds of dollars per acre. On farm trials allow growers to see for themselves the costs and benefits of different practices. Research on

organic soil amendments to calculate the soil-specific rates at which animal manures release nitrogen to plants and to assess the ability of composts and cover crops to boost soil organic matter, improve soil fertility, and increase crop quality are being conducted. Flash carbonizing of agricultural wastes has shown to prevent them from releasing greenhouse gases. Charcoal was also shown to improve a soil's ability to retain water and minerals. Researchers have found that the degree of carbonization is critical: adding highly carbonized macadamia nutshell charcoal to soil can benefit plants, but poorly carbonized charcoal contains volatile compounds that inhibit plant growth. CTAHR researchers are finding new ways to make farmers' fields and pocketbooks greener.

An Edible Rainbow, Fresh from the Farm. CTAHR faculty in the Cooperative Extension Service are the driving force behind Fruits and Veggies—More Matters, which has been integrated into the diverse consumer education efforts of the college's Nutrition Education for Wellness program. Through outreach to promote wholesome snacks for children in daycare, nourishing meals for seniors, smart shopping choices for households receiving food assistance, and healthy refreshments for workplace meetings, CTAHR is raising awareness of how tasty, nutritious, and affordable vegetables and fruits can be. Here in the islands, the "all meals and all forms" message comes with a third recommendation: if you're in the market for fresh fruits and veggies, locally grown produce is your best choice. Fruits and Veggies—More Matters is partnering with Buy Fresh, Buy Local, a campaign through which CTAHR, the Hawai'i Department of Agriculture, media outlets, nonprofit organizations, and businesses are working to support local agriculture, conserve green farmland, and invest in our community. Fresh, ripe, local produce can offer superior nutrition and taste, and buying close to home protects the environment by limiting the fossil fuels burned to bring food to the table. From growers marketing their crops more effectively to shoppers putting more vegetables and fruits—including delicious, Island Fresh produce—in their carts, Buy Fresh, Buy Local and Fruits and Veggies—More Matters are helping our people stay healthy and our farmers stay in business.

New Tools for Disease Detection. Found throughout the tropics and subtropics, *Ralstonia solanacearum* causes bacterial wilt in more than 200 plant species. Annual damages to potato total \$950 million worldwide. In Hawai'i this bacterium attacks tomato, pepper, eggplant, and ginger, with culinary ginger crop losses as high as 45 percent. Because cold-tolerant strains can devastate temperate-zone crops, materials potentially infected with them are subject to quarantine by the United States, Canada, and Europe. DNA-based assays are used to distinguish among *R. solanacearum* strains. Faster, more efficient identification of individual strains in contaminated water, soil, and plant tissue will help prevent their transport and contain outbreaks. Toward that goal, several CTAHR researchers are developing different rapid detection methods that employ DNA biosensors. These methods include: 1) using a combination of molecular and magnetic interactions to quickly isolate *R. solanacearum* cells from dilute samples to facilitate subsequent detection, 2) analyzing DNA sequences of several hundred *R. solanacearum* strains collected to identify regions that can be used to construct probes to selectively detect DNA from specific strains, 3) developing biosensors that amplify DNA more rapidly, simply, and efficiently at temperatures much lower than normal. Temperature-control elements on the electrode help sustain optimal conditions for DNA extraction, amplification, and detection. Several of these tools have been successfully demonstrated for the detection of a strain of *R. solanacearum* that infects ginger, and the technologies can be readily adapted to detect other plant or human pathogens, offering prospects of broad future benefit.

Growing Green Energy. With mainland gasoline prices hitting record highs and Hawai'i prices surging higher still, the year 2006 brought home our dependence on oil. More than 90 percent of the energy consumed in Hawai'i comes from imported fossil fuels, mostly petroleum. The percentage of our energy derived from petroleum is the highest in the nation, and our gasoline and electricity routinely top U.S. price charts. Our reliance on oil makes us vulnerable to sudden disruptions in supply. And each tanker that arrives at our shores has the potential to spill its cargo and damage our fragile coasts. Developing Hawai'i's renewable energy resources will improve our energy security and protect our environment. 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 countryside. Moreover, biofuels do not promote global warming as fossil fuels do. Biofuels are carbon neutral: carbon dioxide is removed from the atmosphere by the growing fuel crops and added back again once the fuel is used. CTAHR and University of Guam researchers are examining crop options for biodiesel production in Hawai'i and other Pacific islands. One promising candidate flagged for further study is *Jatropha curcas*, a productive, drought-tolerant tree that can grow on marginal lands. Researchers hope to identify high-yielding *Jatropha* varieties that don't need irrigation as well as varieties with edible seeds from which animal feed could be a byproduct. CTAHR is also working with Hawai'i landowners to assess what fuel crops are suited to their lands and aiding Hawaiian Electric Company's efforts to meet nationwide targets for the use of non-fossil fuels by electric utilities. Through bioenergy research, CTAHR is helping chart Hawai'i's sustainable future.

Protecting the Sea from the Land. Hawai'i's coral reefs are among the state's most treasured assets. These rich, living communities are home to more than 5,000 species, about one-quarter of which are found nowhere else on earth. Reefs add nearly

\$1,000,000 per day in value to the state economy through recreational activities, scientific research, near-shore fisheries, and increased property values. More than half of Hawai'i visitors snorkel or dive during their stay, and net revenues from those recreational activities alone exceed \$300,000,000 each year. Land-based pollutants such as sediment from eroded soil and nutrients from fertilizers and animal and human wastes threaten more than 20 percent of the world's coral reefs and have been identified as a reef protection priority by the United States. In Hawai'i, the local action strategy to remedy threats posed by land-based pollution is administered by the Department of Land and Natural Resources' Division of Aquatic Resources and coordinated by CTAHR. The strategy focuses on three watersheds: Honolulu (Maui), Kawela (Moloka'i), and Hanalei (Kaua'i). Partners include state and federal agencies, environmental organizations, and landholders. CTAHR plays several roles in implementing the strategy. CTAHR, as a liaison linking participating agencies with community members and as convener of the strategy's steering committee, builds consensus on reef protection actions. Grant writing and fundraising bring in federal and private dollars for pollution control and watershed restoration projects. Outreach efforts educate key constituencies. For example, the Maui County Council strengthened storm water ordinances in response to recommendations from the Center for Watershed Protection. The college is also contributing to the strategy's research efforts. CTAHR researchers are evaluating a computer simulation of non-pointsource pollution. Adapting this model to local conditions, including steep slopes, eroded stream banks, landslides, and feral pig damage, will enable its use in establishing best management practices for the Hanalei watershed. Managing our uplands wisely is essential to protecting our irreplaceable reefs downstream.

From Fallow to Forage. Like Hawai'i's sugarcane and pineapple industries, the state's long history of cattle ranching dates back to the nineteenth century. Today, acreage that once produced sugarcane and pineapple represents an opportunity for Hawai'i ranchers. A lack of suitable grazing lands has long limited the growth of the Hawaiian livestock industry, and many ranchers are now leasing or purchasing former sugarcane and pineapple fields on the islands of Kaua'i, Maui, and Hawai'i. To support grazing cattle, soil must contain adequate levels of mineral nutrients for plant growth. Soil pH is also an important factor because it can strongly influence the availability of soil nutrients. Years of high-intensity agriculture have left much of the sugarcane and pineapple lands now available to ranchers acidic and depleted, unable to produce sufficient forage for cattle, and vulnerable to invasive weeds that can out-compete forage plants on poor soils. Current recommendations for restoring the fertility of these lands are suited for returning them to crop-based agriculture but are too input-intensive and expensive for sustainable forage production. To help ranchers use their new lands to best advantage, CTAHR extension faculty are developing best management practices for converting sugarcane and pineapple lands to pasture. With the help of cooperating ranchers on the Big Island, Kaua'i, and Maui, CTAHR Specialists are assessing the effectiveness, efficiency, and sustainability of various soil treatments, including application of fertilizer and lime, sowing of legumes that add nitrogen to the soil, and rotation of grazing animals. The ongoing study will determine how the treatments interact to influence soil fertility, forage growth, animal production, and changes in the pasture ecosystem over time. Early results suggest that forage production on former sugarcane land can be doubled by adding nitrogen, indicating that the cost of applying fertilizer could be offset by increases in pasture productivity. The research will aid future efforts to help bring fallow fields back to productive agricultural use.

Sowing the Seeds of Success. About one in five Hawai'i farmers was born outside the United States. Many have limited English skills that make their challenging occupation even harder, with potential harmful consequences. The Hawai'i Department of Health determined in 1997 that produce grown by Hawai'i's immigrant farmers was 12 times more likely than the national average to contain unapproved or excessive pesticide residues. Dr. Sabina Swift, an extension specialist who has taught plant protection in Vietnam, Laos, and her native Philippines, started working with non-English-proficient farmers on O'ahu in 2001. The pesticide safety training program she developed emphasized face-to-face interaction and provided training materials in the farmers' native languages. More than 200 farmers and farm workers learned about pest identification, personal protective equipment, and the proper mixing, application, and disposal of pesticides, while program staff established relationships with respected immigrant community members and gained the trust of clients from the Philippines, Laos, Cambodia, Thailand, Korea, and Tonga, many of whom were wary of government employees. The program grew to encompass risk management training in 2004. More than 120 underserved immigrant farmers on O'ahu and the Big Island were offered information on integrated pest management, soil fertility, pesticide safety, recordkeeping, crop and business plans, marketing, loans, and taxes by members of the CTAHR faculty, consultants, community leaders, and representatives from government agencies, sometimes aided by translators. The farmers gave the outreach efforts high marks, and many adopted new practices. Use of fertilizers to correct soil deficiencies greatly improved some of the growers' papaya yields. One farmer changed his planting regimen to allow year-round kabocha pumpkin production. Another grew basil for export to the mainland. During the next three years the outreach program will primarily target Filipino growers, who make up 20 percent of Hawai'i's farmers. A century after the first Filipino plantation laborers, or sakadas, arrived in the islands, the college is helping their fellow immigrants and descendants develop their own safe, successful farming operations.

Extending a Helping Hand. CTAHR agents are running a half-dozen field projects at the Moloka'i Research and Demonstration Farm. Later today, they'll be introducing gradeschoolers to production costs and recordkeeping as part of their agricultural

entrepreneurship project, the Moloka'i Radish Patch Kids. After that, there's a Moloka'i Community Service Council board of directors' meeting. And given what remains on today's "to do" list, tomorrow's schedule will be just as full. There's a good reason why these County Agents and their colleagues are in such high demand. Hawai'i has 5,500 farms and ranches, but only 21 agricultural extension agents working from nine offices on five islands. These men and women assist Hawai'i producers through individual consultations and site visits, workshops and training seminars, field trials, collaboration with extension specialists and researchers, and participation in community organizations. Their brochures, posters, videos, Web sites, newspaper articles, television appearances, and events make relevant, useful knowledge available to members of the community. In addition to working with agricultural operations of all sizes on issues that encompass crop and livestock production, food safety, conservation, and marketing, they also help gardeners asking questions about plant health, students working on classroom projects, and teachers seeking judges for the science fair. Like the students they mentor, county agents find lessons and homework at every turn. As Hawai'i's agriculture diversifies, the array of crops that the agents must understand increases. Each year brings new pests and diseases that can have dire economic and environmental consequences. Rapid assessment and diagnosis can mean the difference between an isolated outbreak and an industry-wide threat. CTAHR's agricultural extension agents are few in number, but the impact of their service is profound.

For Landscapes, CLT Means TLC Not all cultivated land produces crops. Public and private parks and golf courses, botanical gardens, and the green grounds and lush lobbies of resorts and residences all shape the experience of living in or visiting Hawai'i. By conservative estimates, our state's landscape services industry has an annual worth of nearly \$500 million and employs more than 10,000 people, adding about 130 jobs per year. To meet this demand for skilled workers, CTAHR collaborates with the Landscape Industry Council of Hawai'i to train and certify landscape professionals. Established in 2000 through a Hawai'i Department of Labor and Industrial Relations grant to the Hawai'i Island Landscape Association, the Certified Landscape Technician (CLT) program currently operates on O'ahu, the Big Island, and Kaua'i. CTAHR extension staff administers the program statewide and coordinates training on O'ahu, while extension agents help conduct the certification exam on the Big Island. The training includes evening classes on landscape maintenance and a two-day intensive course on irrigation. About half of the students opt to take the certification exam, a challenging, day-long, nationally standardized test offered in more than 30 states. The written and hands-on exam components cover varied topics: how to read plans, identify plants, conduct first aid, plant trees, lay sod, prune, program and repair irrigation systems, apply fertilizers and pesticides, and use plant and lawn care machinery. About 10 percent of test-takers, both locally and nationwide, pass on their first attempt. In seven years, Hawai'i's CLT program has educated about 1,000 trainees and certified 135 landscape technicians. Beyond its aesthetic and economic benefits, CLT training has implications for human and environmental health. Proper management can limit the spread of pests and plant diseases, overuse of water taxes a limited resource, excess fertilizer in runoff can suffocate aquatic ecosystems, and unlike most farmers, landscapers use pesticides in residential and heavily trafficked locations. By partnering with industry, CTAHR is helping keep our neighborhoods and our natural landscapes green.

#### Total Actual Amount of professional FTEs/SYs for this State

Year:2007	Extension		Research	
	1862	1890	1862	1890
<b>Plan</b>	65.3	0.0	57.8	0.0
<b>Actual</b>	38.9	0.0	42.2	0.0

## II. Merit Review Process

### 1. The Merit Review Process that was Employed for this year

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

### 2. Brief Explanation

CTAHR's peer review process that has been in use for some time. The 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 three departmental members who are familiar with the issue 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. CTAHR administrators, program leaders and faculty may serve as resources to clarify plans of work for reviewers. External reviewers were used to evaluate all formula funded and most special grants funded projects. Final review for plans of work occurs in the offices of the Associate Dean/Associate Director for Research and Associate Dean/Associate Director for Extension.

### III. Stakeholder Input

#### 1. Actions taken to seek stakeholder input that encouraged 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

#### Brief Explanation

CTAHR employed a variety of input methods including soliciting input from the CTAHR Board of Advisors, face-to-face discussions with industry representatives, the Hawai'i Farm Bureau Federation, and a long-standing "Industry Analysis Process" and "Strategic Planning Process" that were used for the Cattle Industry, Organic Farming, Tropical Fruit Crops, and Bioenergy crops.

For example, a series of statewide meetings and surveys were conducted in June and July of 2007 to assess the needs of organic growers and others in this important sector of agriculture. Over 75 participants provided their thoughts through thousands of comments, which were organized and reviewed over several months. The results have clearly identified the need for increased educational activities and institutional support in several priority areas, including: farm labor, soil biology, plant nutrition, pest control, biotechnology, water/irrigation, food safety, cost of production, and marketing.

Other techniques used for gather stakeholder inputs were surveys, commodity organization meetings, through feedback and input from the Farm Bureau, direct input from stakeholders, and working with the many industry associations such as the Hawaii Banana Industry Association, Hawaii Tropical Flowers and Shippers Association, Hawaii Tropical Fruit Growers Association, and Hawaii Food Industry Associations. Email listserve groups of CTAHR and external individuals are also used for areas such as organic farming, banana and others. Information, questions, and other exchanges take place on a regular basis.

We require all our faculty members who are preparing their project proposal to include a section detailing their efforts in soliciting stakeholder inputs. New faculty members are instructed to identify their stakeholders first, and document their engagement with their stakeholders before initiating their projects.

#### 2(A). A brief statement of the process that was 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 general, stakeholders are considered to be anyone with an interest in, will be impacted by, or participate in the activity or issue. These typically include producers, processors, consumers, decision makers, students, alumni, and members of the business community. As an example, CTAHR personnel recently participated in farm visits organized by the Hawaii Farm Bureau, State Legislators, to identify the needs of taro growers in Hawaii. The farm visits took place in all four counties. This information and discussions during a statewide meeting of taro farmers, Hawaii Department of Agriculture, native Hawaiian groups, CTAHR, and other individuals interested in taro farming were combined to develop priorities for the taro industry for legislative action and provides priorities for CTAHR research and extension activities.

**2(B). A brief statement of the process that was 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

**Brief Explanation**

CTAHR employed a variety of input methods including soliciting input from the CTAHR Board of Advisors, face-to-face discussions with industry representatives, the Hawai'i Farm Bureau Federation, and a long-standing "Industry Analysis Process" and "Strategic Planning Process" that were used for the Cattle Industry, Organic Farming, Tropical Fruit Crops, and Bioenergy crops. For example, a series of statewide meetings and surveys were conducted in June and July of 2007 to assess the needs of organic growers and others in this important sector of agriculture. Over 75 participants provided their thoughts through thousands of comments, which were organized and reviewed over several months. The results have clearly identified the need for increased educational activities and institutional support in several priority areas, including: farm labor, soil biology, plant nutrition, pest control, biotechnology, water/irrigation, food safety, cost of production, and marketing.

Other techniques used to gather stakeholder inputs were surveys, commodity organization meetings, through feedback and input from the Farm Bureau, direct input from stakeholders, and working with the many industry associations such as the Hawaii Banana Industry Association, Hawaii Tropical Flowers and Shippers Association, Hawaii Tropical Fruit Growers Association, and Hawaii Food Industry Associations. Email listserve groups of CTAHR and external individuals are also used for areas such as organic farming, banana and others. Information, questions, and other exchanges take place on a regular basis

**3. A statement of how the input was 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**

These documents were and are being used for research and extension program planning. Stakeholder input is important for the review process for extension and research project proposals. If a project demonstrates that it is a stakeholder priority and has their support, chances of funding is significantly greater. Through our Industry Analysis Process, stakeholders assisted CTAHR in maintaining relevance of overall programs and help to assure program coordination among teaching, research and extension/outreach programs.

For example, with the organic farming groups, we initiated efforts to address some of the issues identified, and look forward to working with Hawaii Organic Farmers Association, other groups, and organic growers to implement strategies to improve the capacity of Hawaii's organic sector to address its needs.

**Brief Explanation of what you learned from your Stakeholders**

We have very diverse stakeholder groups. For example, Native Hawaiians and organic farmers do not want us to use transgenic technology in our research. The Native Hawaiians include cultural and religious reasons in their argument for keeping taro "pure". They demand an absolute guarantee that there will be no "contamination", whatsoever, from transgenic crops. However, we have other farmers who understand the devastation and potential threats of taro pests, who want us to use all technologies available to find solutions for them. We are caught in the middle of the culture vs science debate, and this has made our life very difficult.

We continue to lose programs due to budget cut and the loss of special grants in 2007. This has created a shortage of personnel and projects to continue what we used to provide the service to our stakeholders.

The people of Hawaii have come to the realization that we are very vulnerable to external factors. Although we accept the global economy, knowing that there is only a 4 to 7 day supply of food and other necessities on the supermarket shelves in Hawaii if shipping lines are disrupted is quite disconcerting. Among the 50 states, we depend on imported oil the most (over 90%) for our energy sources. Invasive species continue to arrive through imported produce and other commodities, which threaten our environment and way of life. Hawaii has finally realize how serious these issues are and that we need to turn that around and become for sustainable in everything we do. Sustainability is a key issue for stakeholders.

**IV. Expenditure Summary**

<b>1. Total Actual Formula dollars Allocated (prepopulated from C-REEMS)</b>			
<b>Extension</b>		<b>Research</b>	
<b>Smith-Lever 3b &amp; 3c</b>	<b>1890 Extension</b>	<b>Hatch</b>	<b>Evans-Allen</b>
1241880	0	2202234	0

<b>2. Totaled Actual dollars from Planned Programs Inputs</b>				
	<b>Extension</b>		<b>Research</b>	
	<b>Smith-Lever 3b &amp; 3c</b>	<b>1890 Extension</b>	<b>Hatch</b>	<b>Evans-Allen</b>
<b>Actual Formula</b>	860374	0	1498829	0
<b>Actual Matching</b>	3024299	0	9085490	0
<b>Actual All Other</b>	1346883	0	1336098	0
<b>Total Actual Expended</b>	5231556	0	11920417	0

<b>3. Amount of Above Actual Formula Dollars Expended which comes from Carryover funds from previous years</b>				
<b>Carryover</b>	478329	0	414080	0

**V. Planned Program Table of Content**

<b>S. NO.</b>	<b>PROGRAM NAME</b>
1	3. Hawaii's Livestock and Aquaculture Systems For Sustainability and Competitiveness
2	1. Sustain, Protect, and Manage Hawaii's Natural Resources and Environment
3	2. Hawaii's Diversified Tropical Crop Systems for Sustainability and Competitiveness
4	4. Invasive Species Education and Management
5	5. Youth, Family and Community Development
6	6. Health and Wellness of Hawaii's Families and Communities
7	7. Generate and Improve Hawaii's Products, Processes and Market

**Program #1****V(A). Planned Program (Summary)****1. Name of the Planned Program**

3. Hawaii's Livestock and Aquaculture Systems For Sustainability and Competitiveness

**V(B). Program Knowledge Area(s)****1. Program Knowledge Areas and Percentage**

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
301	Reproductive Performance of Animals	30%		17%	
303	Genetic Improvement of Animals	20%		21%	
304	Animal Genome	10%		9%	
305	Animal Physiological Processes	10%		7%	
306	Environmental Stress in Animals	5%		13%	
307	Animal Management Systems	15%		20%	
308	Improved Animal Products (Before Harvest)	10%		2%	
314	Toxic Chemicals, Poisonous Plants, Naturally Occuring Toxir	0%		11%	
	<b>Total</b>	100%		100%	

**V(C). Planned Program (Inputs)****1. Actual amount of professional FTE/SYs expended this Program**

Year: 2007	Extension		Research	
	1862	1890	1862	1890
<b>Plan</b>	5.0	0.0	3.0	0.0
<b>Actual</b>	3.6	0.0	4.2	0.0

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

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
82457	0	136653	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
231406	0	948119	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
59900	0	29286	0

**V(D). Planned Program (Activity)****1. Brief description of the Activity**

Although Hawaii's animal industry continues to decline, research and extension efforts to support Hawaii's Livestock and Aquaculture Systems for Sustainability and Competitiveness remains a priority for CTAHR. Beef cattle is still one of top agriculture industries in Hawaii, while aquaculture continues to grow. Major research and extension emphases are in genetic improvement of animals and animal management systems.

- Developed marketing models and economic analyses of the key segments of the beef industry.

- Evaluated best management practices and technologies for conversions of intensive mono cropping systems to sustainable tropical grazing production.

- Initiated program for genetic identification for the university's beef research herd and seed stock producers and analyze for economically important markers under tropical ecosystems.

- Conducted research station field days, demonstration sites conferences, and other outreach and educational activities for stakeholders.

- Developed a gender-specific molecular sex marker in shrimp and prawns.

- Identified the period when shrimps are receptive to the sex reversing effects of exogenous androgenic hormone.

## 2. Brief description of the target 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 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, 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, extension staff in other CTAHR units and at sister institutions, and other members of the professional community who deal with livestock and aquaculture industries.

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

### 1. Standard output measures

#### Target for the number of persons (contacts) reached through direct and indirect contact methods

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
Plan	200	300	75	100
2007	725	1850	44	0

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

#### Patent Applications Submitted

Year	Target
Plan:	0
2007 :	0

#### Patents listed

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

#### Number of Peer Reviewed Publications

	Extension	Research	Total
Plan			
2007	20	6	26

**V(F). State Defined Outputs****Output Target****Output #1****Output Measure**

- Number of workshops, conferences and other outreach events

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2007	3	10

**Output #2****Output Measure**

- Publish scholarly work

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2007	10	26

**Output #3****Output Measure**

- Conduct Mealani Forage Field Day for stakeholders

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2007	1	1

**Output #4****Output Measure**

- Write grant proposal to secure additional funds

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2007	5	11

**V(G). State Defined Outcomes****V. State Defined Outcomes Table of Content**

O No.	Outcome Name
1	Increase sales from shellfish aquaculture industry in Hawai'i
2	Total dollar value of grants and contracts obtained.
3	Number of ranchers who have adopted a recommended practice
4	Increased numbers of beef cattle kept in Hawai'i for local consumption

**Outcome #1****1. Outcome Measures**

Increase sales from shellfish aquaculture industry in Hawai'i

**2. Associated Institution Types**

- 1862 Extension
- 1862 Research

**3a. Outcome Type:**

Change in Condition Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	100000	1400000

**3c. Qualitative Outcome or Impact Statement****Issue (Who cares and Why)**

Hawaii has been transitioning from plantation agriculture (sugar and pineapple) to diversified agriculture over the last 20 years. Hawaii imports nearly 90% of the food it consumes despite year round growing conditions. Aquaculture is an important component of diversified agriculture.

**What has been done**

CTAHR is involved in research, outreach and educational efforts to help develop new aquaculture industries. Research develops new technology, new species, improved species, new markets, and new production techniques.

**Results**

One stakeholder who came to the aquaculture production workshops a few years ago not knowing very much about the industry, started an aquaculture business, and is now a reviewer of projects and industry liaison for the USDA Center for Tropical and Subtropical Aquaculture. The value of aquaculture increased in 10 years from \$16.6M to \$26M, an increase of over 60%.

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
307	Animal Management Systems
308	Improved Animal Products (Before Harvest)

**Outcome #2****1. Outcome Measures**

Total dollar value of grants and contracts obtained.

**2. Associated Institution Types**

- 1862 Extension
- 1862 Research

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	100000	409570

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

**Issue (Who cares and Why)**

Grants and contracts numbers should be an output measure, not an outcome measure. We will correct this next year.

**What has been done****Results****4. Associated Knowledge Areas**

KA Code	Knowledge Area
308	Improved Animal Products (Before Harvest)
303	Genetic Improvement of Animals
306	Environmental Stress in Animals
307	Animal Management Systems

**Outcome #3****1. Outcome Measures**

Number of ranchers who have adopted a recommended practice

**2. Associated Institution Types**

- 1862 Extension
- 1862 Research

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	7	39

**3c. Qualitative Outcome or Impact Statement****Issue (Who cares and Why)**

High feed costs, transportation costs (increase by 29% in 2007), waste management issues, and other factors are forcing the closure of many livestock operations. The last dairy on Oahu closed in 2007, and the last egg farm on the island of Hawaii closed in 2007. Hawaii has finally realized that too much of our food and energy have to be shipped into Hawaii and makes us vulnerable to any disasters or other events that affect shipping into Hawaii; this started a major coordinated effort towards sustainability

**What has been done**

CTAHR formed the Beef Initiative which includes all faculty involved in cattle research and extension. They collaboratively plan, organize and execute research and extension activities to satisfy the needs of the cattle industry. Priority areas include substitutes for high cost imported grain, waste management, invasive species, value added products. Demonstrations, workshops, publications, websites, consultations, conferences and other methods help to educate stakeholders.

**Results**

Over 645 cattle producers have attended one or more of the workshops, demonstrations, or conferences. The Beef Cattle industry conducted a 2-day strategic planning session facilitated by CTAHR with over 69 participants contributing to the plan. Results demonstrate that an application of 150# of urea produced over 10 tons of biomass more than untreated plots in 3 to 4 months which would allow an additional 25 animal unit months of grazing. Twenty-two cattle producers have adopted one or more of the best management practices to restore non-productive former sugar or pineapple lands to highly productive pastures. Because of the high cost of livestock feed and as a survival measure, two dairies have begun installing irrigation systems to utilize waste lagoon water for forage production.

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
307	Animal Management Systems
303	Genetic Improvement of Animals

**Outcome #4****1. Outcome Measures**

Increased numbers of beef cattle kept in Hawai'i for local consumption

**2. Associated Institution Types**

- 1862 Extension
- 1862 Research

**3a. Outcome Type:**

Change in Condition Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	200	6361

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

**Issue (Who cares and Why)**

**What has been done**

**Results**

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
307	Animal Management Systems

**V(H). Planned Program (External Factors)****External factors which affected outcomes**

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

**Brief Explanation**

Loss of USDA/CSREES special grants during FY 2007 has a negative impacts on our overall program effectiveness. Net loss of more than \$2.9 million forced us to lay off personnel, and this will have a long term effect beyond this fiscal year. High fuel and feed costs (shipping) have hurt the livestock industry especially hard. The island of Oahu, where nearly 1 million people live saw its last dairy close. Only 30% of the milk sold is local (from the Big Island of Hawaii) and the remainder is shipped from California. The last egg producer on the island of Hawaii is shutting down and will be closed by the end of 2008 because of the high cost of feed and fuel.

## **V(I). Planned Program (Evaluation Studies and Data Collection)**

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

- After Only (post program)
- During (during program)

### **Evaluation Results**

Most of our programs are providing valuable information that is critical to the needs of our stakeholders. Many stakeholders expect CTAHR to provide more programs and contents to support their enterprises. Unfortunately, we have not been able to meet their demands. We need to continue to improve the effectiveness of our efforts.

### **Key Items of Evaluation**

**Program #2****V(A). Planned Program (Summary)****1. Name of the Planned Program**

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

**V(B). Program Knowledge Area(s)****1. Program Knowledge Areas and Percentage**

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
102	Soil, Plant, Water, Nutrient Relationships	25%		31%	
111	Conservation and Efficient Use of Water	10%		27%	
112	Watershed Protection and Management	10%		2%	
121	Management of Range Resources	5%		3%	
123	Management and Sustainability of Forest Resources	5%		0%	
124	Urban Forestry	5%		4%	
125	Agroforestry	10%		0%	
133	Pollution Prevention and Mitigation	20%		2%	
401	Structures, Facilities, and General Purpose Farm Supplies	0%		11%	
402	Engineering Systems and Equipment	0%		5%	
403	Waste Disposal, Recycling, and Reuse	10%		15%	
	<b>Total</b>	<b>100%</b>		<b>100%</b>	

**V(C). Planned Program (Inputs)****1. Actual amount of professional FTE/SYs expended this Program**

Year: 2007	Extension		Research	
	1862	1890	1862	1890
<b>Plan</b>	5.0	0.0	5.0	0.0
<b>Actual</b>	0.4	0.0	5.9	0.0

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

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
35267	0	375090	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
36049	0	1062795	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
17287	0	189038	0

**V(D). Planned Program (Activity)****1. Brief description of the Activity**

Research and extension efforts to promote harmony between agriculture and environment continue to be a priority for CTAHR. Four major areas addressed by research and extension projects include: soil plant water, nutrient relationships; conservation and efficient use of water; waste disposal, recycling, and reuse; and structure, facilities, and general purpose farm supplies. Research and extension efforts into preserving, protecting, and renewing Hawai'i's natural resources continue to be an area of focus.

- Developed improved policies and plans for the best management of forest, watershed (including coastal zone management), and agroforestry ecosystems.
- Conducted research that assist the state to formulate visionary land and water use policies.
- Provided professional development opportunities for CTAHR faculty to improve capacity in natural resource management.
- Conducted needs assessment to establish current and future potential of bioremediation for Hawai'i in both urban and rural environments.
- Conducted an "industry analysis" for environment resource management with goal of identifying needs to help Hawai'i its ahupua'a systems.
- Developed and delivered programs to provide pollution control information and environmental education to the public, with emphasis on schools, youth groups, home gardeners and urban/residential communities.
- Enhanced CTAHR's international partnerships and collaboration on management of agricultural and natural resources.
- Developed a statewide emergency response team with internal and external partners (HDOA Plant Industry, Quarantine, State wide invasive species committees; etc) to quickly identify, mitigate, and transfer information about new pest invaders.
- Provided knowledge and technologies to improve the management of Hawai'i's resources to support agricultural production and enhance the environment.

**2. Brief description of the target 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 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(E). Planned Program (Outputs)**

**1. Standard output measures**

**Target for the number of persons (contacts) reached through direct and indirect contact methods**

	<b>Direct Contacts Adults</b>	<b>Indirect Contacts Adults</b>	<b>Direct Contacts Youth</b>	<b>Indirect Contacts Youth</b>
<b>Year</b>	<b>Target</b>	<b>Target</b>	<b>Target</b>	<b>Target</b>
<b>Plan</b>	100	1000	100	500
2007	1165	77197	97	55

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

**Patent Applications Submitted**

**Year**    **Target**  
**Plan:**    0

2007 : 2

**Patents listed**

Dr. Pingyi Yang. Patent No. US 7,226,539; Date Issued - June 5, 2007

Rapid Generation of Pulse Flash Free Radicals to Kill Human Cancer Cells, Recycle Human Urine, and Mineralize Organic Chemicals in Wastewater by Using Metallic Cations and Hydrides. Provisional patent application filed on 9/14/07.

Dr. Qing Li.

**3. Publications (Standard General Output Measure)****Number of Peer Reviewed Publications**

	<b>Extension</b>	<b>Research</b>	<b>Total</b>
<b>Plan</b>			
2007	7	49	56

**V(F). State Defined Outputs****Output Target****Output #1****Output Measure**

- Number of publications.

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2007	6	57

**Output #2****Output Measure**

- Grant proposal submitted.

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2007	5	14

**Output #3****Output Measure**

- Presentations at international and national meetings.

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2007	6	6

**Output #4****Output Measure**

- Number of workshops and other educational activities held

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2007	2	25

**Output #5****Output Measure**

- Number of websites

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2007	{No Data Entered}	3

**V(G). State Defined Outcomes****V. State Defined Outcomes Table of Content**

O No.	Outcome Name
1	Increased awareness and understanding of the issues
2	Number of people completing non-formal education programs
3	Number of agency professionals, including extension agents who actually implement or install demonstration or similar programs for clientele education
4	Number of people who actually adopt one or more recommended practices
5	Total dollar value of grants and contracts obtained.

**Outcome #1****1. Outcome Measures**

Increased awareness and understanding of the issues

**2. Associated Institution Types**

- 1862 Extension
- 1862 Research

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	200	196

**3c. Qualitative Outcome or Impact Statement****Issue (Who cares and Why)**

Land owners interested in: productive efficiency and sustainability of forest and range production systems; reforestation with native hardwoods; reduce or minimize the impact of invasive species on forest and rangelands; interplant crops with native hardwoods to provide a source of income; landowners with exotic hardwoods looking for economically viable options. Food waste generators with disposal problems and pig farmers faced with high cost of feed.

**What has been done**

Demonstrations of proper thinning operations on collaborators property, presentations, workshops, week-long field based course on forest restoration, field days, publications, posters, websites, research, one on one consultations. A project was initiated to collect and compost food wastes with a composting machine to produce feed for pigs. A bioreactor to treat waste water generated by a dairy was put on demonstration.

**Results**

The jointly produced book "Traditional Trees of Pacific Islands" had an initial printing of 2000 copies are close to being sold out in less than a year. Websites had over 77,000 persons visiting during the reporting period and over 2500 downloads of web pages. Many forestry professionals from Hawaii and the Pacific Islands learned about reforestation techniques for native tree species and especially Acacia koa, thinning techniques and principles, invasive species management, and other subjects. Small land owners were made aware of the potential value of native hardwoods when grown for 13 years and made into bowls and other products.

Pig farmers have been made aware of a local option for feed either as a supplement or for their total feed source using local food wastes composted by a composting machine. Dairies and other generators of waste water were made aware of the bioreactor as an environmentally friendly wastewater treatment system.

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
123	Management and Sustainability of Forest Resources
112	Watershed Protection and Management
133	Pollution Prevention and Mitigation
111	Conservation and Efficient Use of Water
125	Agroforestry
403	Waste Disposal, Recycling, and Reuse
121	Management of Range Resources

**Outcome #2****1. Outcome Measures**

Number of people completing non-formal education programs

**2. Associated Institution Types**

- 1862 Extension
- 1862 Research

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	25	120

**3c. Qualitative Outcome or Impact Statement****Issue (Who cares and Why)**

Land owners interested in: productive efficiency and sustainability of forest and range production systems; reforestation with native hardwoods; reduce or minimize the impact of invasive species on forest and rangelands; interplant crops with native hardwoods to provide a source of income; landowners with exotic hardwoods looking for economically viable options. Food waste generators with disposal problems and pig farmers faced with high cost of feed.

**What has been done**

Demonstrations of proper thinning operations on collaborators property, presentations, workshops, week-long field based course on forest restoration, field days, publications, posters, websites, research, one on one consultations. A project was initiated to collect and compost food wastes with a composting machine to produce feed for pigs. A bioreactor to treat waste water generated by a dairy was put on demonstration.

**Results**

Wood turners on the Big Island transformed raw native wood grown in a demonstration plot into beautiful bowls and other wooden art objects bring prices of over \$200 a piece. About 45,770 acres of native hardwood forests are now under management options that include thinning and fertilizing as a result of workshops held by CTAHR workers.

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
123	Management and Sustainability of Forest Resources
125	Agroforestry
121	Management of Range Resources
403	Waste Disposal, Recycling, and Reuse
111	Conservation and Efficient Use of Water
102	Soil, Plant, Water, Nutrient Relationships

**Outcome #3****1. Outcome Measures**

Number of agency professionals, including extension agents who actually implement or install demonstration or similar programs for clientele education

**2. Associated Institution Types**

- 1862 Extension
- 1862 Research

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	2	3

**3c. Qualitative Outcome or Impact Statement****Issue (Who cares and Why)**

Land owners interested in: productive efficiency and sustainability of forest and range production systems; reforestation with native hardwoods; reduce or minimize the impact of invasive species on forest and rangelands; interplant crops with native hardwoods to provide a source of income; landowners with exotic hardwoods looking for economically viable options. Food waste generators with disposal problems and pig farmers faced with high cost of feed.

**What has been done**

Demonstrations of proper thinning operations on collaborators property, presentations, workshops, week-long field based course on forest restoration, field days, publications, posters, websites, research, one on one consultations. A project was initiated to collect and compost food wastes with a composting machine to produce feed for pigs. A bioreactor to treat waste water generated by a dairy was put on demonstration.

**Results**

Three extension workers have installed one or more demonstration plots involving forestry or agro-forestry projects.

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
111	Conservation and Efficient Use of Water
123	Management and Sustainability of Forest Resources
125	Agroforestry

**Outcome #4****1. Outcome Measures**

Number of people who actually adopt one or more recommended practices

**2. Associated Institution Types**

- 1862 Extension
- 1862 Research

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	12	85

**3c. Qualitative Outcome or Impact Statement****Issue (Who cares and Why)**

Land owners interested in: productive efficiency and sustainability of forest and range production systems; reforestation with native hardwoods; reduce or minimize the impact of invasive species on forest and rangelands; interplant crops with native hardwoods to provide a source of income; landowners with exotic hardwoods looking for economically viable options. Food waste generators with disposal problems and pig farmers faced with high cost of feed.

**What has been done**

Demonstrations of proper thinning operations on collaborators property, presentations, workshops, week-long field based course on forest restoration, field days, publications, posters, websites, research, one on one consultations. A project was initiated to collect and compost food wastes with a composting machine to produce feed for pigs. A bioreactor to treat waste water generated by a dairy was put on demonstration.

**Results**

Eighty five landowners have adopted one or more practices, involving 45,772 acres now being managed using techniques and information provided through the educational offerings.

**4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
112	Watershed Protection and Management
125	Agroforestry
111	Conservation and Efficient Use of Water
123	Management and Sustainability of Forest Resources
102	Soil, Plant, Water, Nutrient Relationships

**Outcome #5****1. Outcome Measures**

Total dollar value of grants and contracts obtained.

**2. Associated Institution Types**

- 1862 Extension
- 1862 Research

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

<b>Year</b>	<b>Quantitative Target</b>	<b>Actual</b>
2007	250000	264270

**3c. Qualitative Outcome or Impact Statement****Issue (Who cares and Why)**

Land owners interested in: productive efficiency and sustainability of forest and range production systems; reforestation with native hardwoods; reduce or minimize the impact of invasive species on forest and rangelands; interplant crops with native hardwoods to provide a source of income; landowners with exotic hardwoods looking for economically viable options. Food waste generators with disposal problems and pig farmers faced with high cost of feed.

**What has been done**

Demonstrations of proper thinning operations on collaborators property, presentations, workshops, week-long field based course on forest restoration, field days, publications, posters, websites, research, one on one consultations. A project was initiated to collect and compost food wastes with a composting machine to produce feed for pigs. A bioreactor to treat waste water generated by a dairy was put on demonstration.

**Results**

The jointly produced book, "Traditional Trees of Pacific Islands," initial printing of 2000 copies are close to being sold out in less than a year. Websites had over 77,000 persons visiting during the reporting period and over 2500 downloads of web pages.

Many forestry professionals from Hawaii and the Pacific Islands learned about reforestation techniques for native tree species and especially Acacia koa, thinning techniques and principles, invasive species management, and other subjects.

Small land owners were made aware of the potential value of native hardwoods when grown for 13 years and made into bowls and other products.

Pig farmers have been made aware of a local option for feed either as a supplement or for their total feed source using local food wastes composted by a composting machine. Dairies and other generators of waste water were made aware of the bioreactor as an environmentally friendly wastewater treatment system.

#### 4. Associated Knowledge Areas

KA Code	Knowledge Area
123	Management and Sustainability of Forest Resources
111	Conservation and Efficient Use of Water
102	Soil, Plant, Water, Nutrient Relationships
125	Agroforestry
112	Watershed Protection and Management

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

##### External factors which affected outcomes

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

##### Brief Explanation

Hawaii Department of Agriculture regulatory changes affected research on anthurium blight to some degree. Loss of USDA/CSREES special grants has reduced our effectiveness in delivering our programs.

#### V(I). Planned Program (Evaluation Studies and Data Collection)

##### 1. Evaluation Studies Planned

- After Only (post program)
- During (during program)

##### Evaluation Results

Although post program evaluation indicated general satisfactory about the contents of our programs, it is clear our stakeholders want to see more programs to meet their needs. Personnel turnover will have long lasting impact on our effectiveness in delivering our programs.

##### Key Items of Evaluation

**Program #3****V(A). Planned Program (Summary)****1. Name of the Planned Program**

2. Hawaii's Diversified Tropical Crop Systems for Sustainability and Competitiveness

**V(B). Program Knowledge Area(s)****1. Program Knowledge Areas and Percentage**

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
201	Plant Genome, Genetics, and Genetic Mechanisms	0%		4%	
202	Plant Genetic Resources	10%		3%	
203	Plant Biological Efficiency and Abiotic Stresses Affecting Pla	5%		11%	
204	Plant Product Quality and Utility (Preharvest)	10%		14%	
205	Plant Management Systems	20%		42%	
206	Basic Plant Biology	0%		11%	
211	Insects, Mites, and Other Arthropods Affecting Plants	15%		1%	
212	Pathogens and Nematodes Affecting Plants	10%		4%	
213	Weeds Affecting Plants	10%		0%	
214	Vertebrates, Mollusks, and Other Pests Affecting Plants	5%		0%	
216	Integrated Pest Management Systems	15%		10%	
	<b>Total</b>	<b>100%</b>		<b>100%</b>	

**V(C). Planned Program (Inputs)****1. Actual amount of professional FTE/SYs expended this Program**

Year: 2007	Extension		Research	
	1862	1890	1862	1890
<b>Plan</b>	29.3	0.0	36.0	0.0
<b>Actual</b>	15.0	0.0	12.4	0.0

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

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
331697	0	293240	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
1200262	0	3240683	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
467246	0	193485	0

**V(D). Planned Program (Activity)****1. Brief description of the Activity**

Research and extension efforts to support Hawai'i's Diversified Tropical Crop Systems for Sustainability and Competitiveness continue to be a top priority for CTAHR. Although nine knowledge areas were covered by our projects, more than 80% of the resources were used for the following five areas: plant management systems; plant product quality and utility; plant biological efficiency and abiotic stresses affecting plant; basic plant biology; and integrated pest management systems. Import replacement and producing high value specialty crops for niche markets continue to be our focus areas.

- Conducted basic and applied research to increase production, efficiency and profitability of diversified agricultural industries while protecting the environment.

- Provided diagnostic and analytical services for soil testing, water analysis, plant tissue analyses, plant disease identification, insect pest identification, and feed and forage analyses.

- Conducted outreach programs to provide best management practices needed to grow and market existing and new crops.

- Increased the competitiveness of local agricultural production systems by reducing costs and increasing efficiency.

- Provided training in identification and management of costs of production, identification of niche market opportunities.

- Incorporated research-based technology that reduces losses due to pests, disease, and inefficient use of resources into production systems.

- Performed a sector-wide analysis by industries or clusters of industries for existing industries. Used this information to set priorities.

- Conducted analysis of sustainable agriculture programs and needs for research and extension. Reviewed and evaluated academic programs as they relate to sustainable agriculture.

## 2. Brief description of the target 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 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 – there are a whole bunch of human service groups here too). Clients for extension agents are potential and existing farmers/producers and their organizations (such as the Hawai'i Association of Soil and Water Conservation Districts, Hawai'i Macadamia Nut Association, Hawai'i Papaya Industry Association, and the Hawai'i Farm Bureau Federation), packing houses and shippers, extension colleagues, and other members of the community who are involved in the agriculture sector.

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

### 1. Standard output measures

#### Target for the number of persons (contacts) reached through direct and indirect contact methods

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
Plan	580	800	500	150
2007	13120	152212	359	34

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

#### Patent Applications Submitted

Year	Target
Plan:	0
2007 :	6

#### Patents listed

Six plant patent applications were filed. Dr. John Cho. Ornamental Colocasias hybrids: Diamond Head (2005-17), Blue Hawaii (2005-24), Pineapple Princess (2004-39), Maui Magic (2005-32), Hilo Bay (2005-05), Hawaiian Eye (2005-23).

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

#### Number of Peer Reviewed Publications

	Extension	Research	Total
<b>Plan</b>			
2007	66	31	97

### V(F). State Defined Outputs

#### Output Target

##### Output #1

###### Output Measure

- Number of workshops, research/field day demonstrations conducted

Year	Target	Actual
2007	30	278

##### Output #2

###### Output Measure

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

Year	Target	Actual
2007	20	35

##### Output #3

###### Output Measure

- Stakeholder participation in on-farm cooperative trials

Year	Target	Actual
2007	10	98

##### Output #4

###### Output Measure

- Number of publications

Year	Target	Actual
2007	30	66

##### Output #5

###### Output Measure

- Presentations at international and national meetings

Year	Target	Actual
2007	20	18

##### Output #6

###### Output Measure

- Number of diagnostic samples analyzed

Year	Target	Actual
2007	1000	16487

##### Output #7

###### Output Measure

- Number of grant proposals submitted.

Year	Target	Actual
2007	25	45

**V(G). State Defined Outcomes****V. State Defined Outcomes Table of Content**

O No.	Outcome Name
1	Increased awareness of best management practices to promote environmentally responsible agricultural and landscape management
2	Adoption of best management practices to promote environmentally responsible agricultural and landscape management
3	Number of people completing non-formal education programs
4	Number of agency professionals, including extension agents who actually implement or install demonstration or similar programs for clientele education
5	Number of people who adopt one or more recommended practices
6	Number of commodities with increased exports
7	Number of commodities where reliance on imports is reduced
8	Total dollar value of grants and contracts obtained.

**Outcome #1****1. Outcome Measures**

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

**2. Associated Institution Types**

- 1862 Extension
- 1862 Research

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	300	0

**3c. Qualitative Outcome or Impact Statement****Issue (Who cares and Why)**

Farming in Hawaii continues to be difficult because of high land costs and competition with housing needs, high transportation and fuel costs, high cost of feed, water, waste management, labor and the lack of labor, and threat by invasive species, cheap imports. Despite these challenges, the industry continues to diversify and expand into specialty niche markets and, in a few crops, import replacements. Because of the high cost of fuel, an initiative to investigate biofuels was begun.

**What has been done**

CTAHR conducted research and extension activities in nutrient management, cultural and production methods, pest management, new cultivar development and evaluations, provided diagnostic and analytical services, assisted industries with industry analyses and/or strategic planning, risk management, pesticide registration, and marketing and promotion.

**Results**

Over 2000 trained cooperators have learned to implement and manage the fruit fly management program for their specific local management area of interest. Macnut growers learned that different cultivars have different fertilizer requirements. In support of the increased plantings and production of specialty tropical fruit crops such as litchi and rambutan, researchers and extension workers are cataloging the insect and disease problems that are being found on the crop and educating growers. Work is progressing on nutrient requirements of these crops and relating to flowering and production. Rambutan is native to S.E. Asia, where it fruits only once a year. Research has shown that alternating wet/dry conditions trigger flowering. Rambutan in Hawaii, therefore, fruits two and even three times a year depending on rainfall. This knowledge helps growers plan for their field and marketing operations.

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
212	Pathogens and Nematodes Affecting Plants
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plant
205	Plant Management Systems
211	Insects, Mites, and Other Arthropods Affecting Plants
216	Integrated Pest Management Systems

**Outcome #2****1. Outcome Measures**

Adoption of best management practices to promote environmentally responsible agricultural and landscape management

**2. Associated Institution Types**

- 1862 Extension
- 1862 Research

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	20	19

**3c. Qualitative Outcome or Impact Statement****Issue (Who cares and Why)**

Farming in Hawaii continues to be difficult because of high land costs and competition with housing needs, high transportation and fuel costs, high cost of feed, water, waste management, labor and the lack of labor, and threat by invasive species, cheap imports. Despite these challenges, the industry continues to diversify and expand into specialty niche markets and, in a few crops, import replacements. Because of the high cost of fuel, an initiative to investigate biofuels was begun

**What has been done**

CTAHR conducted research and extension activities in nutrient management, cultural and production methods, pest management, new cultivar development and evaluations, provided diagnostic and analytical services, assisted industries with industry analysis and/or strategic planning, risk management, pesticide registration, and marketing and promotion.

**Results**

Semi-annual bioassays of diamond back moth for insecticide resistance in different locales alert farmers on which insecticides are being compromised by resistance development. Thirty-two growers in three growing areas participate and benefit from this activity thus saving time, money and crop by avoiding ineffective insecticides.

Growers have adopted recommended fertilization recommendations of a ratio of 2N-1P-3K as being ideal for litchi (cv. Kaimana) grown in Hawaii. Phosphorous calibration studies provided data which led to the revision of P fertilizer recommendations which have resulted in reduced P applications by at least 30 vegetable farmers.

Virtually all Oahu flower growers (105) have adopted pesticide rotation procedures to minimize the development of resistance, IPM methods to reduce pesticide usage, and are more aware of cost of different operations to reduce their production costs.

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plant
212	Pathogens and Nematodes Affecting Plants
211	Insects, Mites, and Other Arthropods Affecting Plants
205	Plant Management Systems
216	Integrated Pest Management Systems

**Outcome #3****1. Outcome Measures**

Number of people completing non-formal education programs

**2. Associated Institution Types**

- 1862 Extension
- 1862 Research

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	50	2706

**3c. Qualitative Outcome or Impact Statement****Issue (Who cares and Why)**

Farming in Hawaii continues to be difficult because of high land costs and competition with housing needs, high transportation and fuel costs, high cost of feed, water, waste management, labor and the lack of labor, and threat by invasive species, cheap imports. Despite these challenges, the industry continues to diversify and expand into specialty niche markets and, in a few crops, import replacements. Because of the high cost of fuel, an initiative to investigate biofuels was begun

**What has been done**

CTAHR conducted research and extension activities in nutrient management, cultural and production methods, pest management, new cultivar development and evaluations, provided diagnostic and analytical services, assisted industries with industry analyses and/or strategic planning, risk management, pesticide registration, and marketing and promotion.

**Results****4. Associated Knowledge Areas**

KA Code	Knowledge Area
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plant
216	Integrated Pest Management Systems
211	Insects, Mites, and Other Arthropods Affecting Plants
212	Pathogens and Nematodes Affecting Plants
205	Plant Management Systems

**Outcome #4****1. Outcome Measures**

Number of agency professionals, including extension agents who actually implement or install demonstration or similar programs for clientele education

**2. Associated Institution Types**

- 1862 Extension
- 1862 Research

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	15	0

**3c. Qualitative Outcome or Impact Statement****Issue (Who cares and Why)**

Farming in Hawaii continues to be difficult because of high land costs and competition with housing needs, high transportation and fuel costs, high cost of feed, water, waste management, labor and the lack of labor, and threat by invasive species, cheap imports. Despite these challenges, the industry continues to diversify and expand into specialty niche markets and, in a few crops, import replacements. Because of the high cost of fuel, an initiative to investigate biofuels was begun.

#### What has been done

CTAHR conducted research and extension activities in nutrient management, cultural and production methods, pest management, new cultivar development and evaluations, provided diagnostic and analytical services, assisted industries with industry analyses and/or strategic planning, risk management, pesticide registration, and marketing and promotion.

#### Results

#### 4. Associated Knowledge Areas

KA Code	Knowledge Area
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plant
212	Pathogens and Nematodes Affecting Plants
216	Integrated Pest Management Systems
211	Insects, Mites, and Other Arthropods Affecting Plants
205	Plant Management Systems

#### Outcome #5

##### 1. Outcome Measures

Number of people who adopt one or more recommended practices

##### 2. Associated Institution Types

- 1862 Extension
- 1862 Research

##### 3a. Outcome Type:

Change in Action Outcome Measure

##### 3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	20	1986

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

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

Farming in Hawaii continues to be difficult because of high land costs and competition with housing needs, high transportation and fuel costs, high cost of feed, water, waste management, labor and the lack of labor, and threat by invasive species, cheap imports. Despite these challenges, the industry continues to diversify and expand into specialty niche markets and, in a few crops, import replacements. Because of the high cost of fuel, an initiative to investigate biofuels was begun.

###### What has been done

CTAHR conducted research and extension activities in nutrient management, cultural and production methods, pest management, new cultivar development and evaluations, provided diagnostic and analytical services, assisted industries with industry analyses and/or strategic planning, risk management, pesticide registration, and marketing and promotion.

###### Results

Semi-annual bioassays of diamond back moth for insecticide resistance in different locales alert farmers on which insecticides are being compromised by resistance development. Thirty-two growers in three growing areas participate and benefit from this activity thus saving time, money and crop by avoiding ineffective insecticides. Growers have adopted recommended fertilization recommendations of a ratio of 2N-1P-3K as being ideal for litchi (cv. Kaimana) grown in Hawaii. Phosphorous calibration studies provided data which led to the revision of P fertilizer recommendations which have resulted in reduced P applications by at least 30 vegetable farmers. Virtually all Oahu flower growers (105) have adopted pesticide rotation procedures to minimize the development of resistance, IPM methods to reduce pesticide usage, and are more aware of cost of different operations to reduce their production costs.

#### 4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plant
212	Pathogens and Nematodes Affecting Plants
216	Integrated Pest Management Systems
211	Insects, Mites, and Other Arthropods Affecting Plants

#### Outcome #6

##### 1. Outcome Measures

Number of commodities with increased exports

##### 2. Associated Institution Types

- 1862 Extension
- 1862 Research

##### 3a. Outcome Type:

Change in Condition Outcome Measure

##### 3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	1	0

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

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

Farming in Hawaii continues to be difficult because of high land costs and competition with housing needs, high transportation and fuel costs, high cost of feed, water, waste management, labor and the lack of labor, and threat by invasive species, cheap imports. Despite these challenges, the industry continues to diversify and expand into specialty niche markets and, in a few crops, import replacements. Because of the high cost of fuel, an initiative to investigate biofuels was begun

###### What has been done

CTAHR conducted research and extension activities in nutrient management, cultural and production methods, pest management, new cultivar development and evaluations, provided diagnostic and analytical services, assisted industries with industry analyses and/or strategic planning, risk management, pesticide registration, and marketing and promotion.

###### Results

Over 320 commercial growers and 561 community cooperators have adopted and taken over full responsibility in the area-wide program impacting over 15,000 acres for the management of fruit flies statewide. Examples of crop loss reduction: zucchini from 60% to 2% (one grower resulted in 130,000 pounds of additional production per crop); melons from 30 to 40% to 2% and reduced OP insecticides by 75 to 100%; persimmons from 40% to less than 1%. Benefits to industry, currently estimated at \$2.6 million per year, are projected to increase to \$6 million by 2011. Coffee grown in Kau placed 6th and 9th best in a 2007 Specialty Coffee Association of America competition against other world-class coffee. This previously unknown coffee production area has brought attention to coffee grown in areas of Hawaii other than Kona and greatly increasing prices to as high as \$30.50 a pound and being sold in retail shops such as Neiman Marcus.

#### 4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems
211	Insects, Mites, and Other Arthropods Affecting Plants
213	Weeds Affecting Plants
216	Integrated Pest Management Systems
204	Plant Product Quality and Utility (Preharvest)
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plant

### Outcome #7

#### 1. Outcome Measures

Number of commodities where reliance on imports is reduced

#### 2. Associated Institution Types

- 1862 Extension
- 1862 Research

#### 3a. Outcome Type:

Change in Condition Outcome Measure

#### 3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	1	1

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

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

Farming in Hawaii continues to be difficult because of high land costs and competition with housing needs, high transportation and fuel costs, high cost of feed, water, waste management, labor and the lack of labor, and threat by invasive species, cheap imports. Despite these challenges, the industry continues to diversify and expand into specialty niche markets and, in a few crops, import replacements. Because of the high cost of fuel, an initiative to investigate biofuels was begun.

##### What has been done

CTAHR conducted research and extension activities in nutrient management, cultural and production methods, pest management, new cultivar development and evaluations, provided diagnostic and analytical services, assisted industries with industry analyses and/or strategic planning, risk management, pesticide registration, and marketing and promotion.

##### Results

The HawFly IPM program has been so successful that the fall pumpkin production almost tripled (from 80,000 pounds to 290,000) reducing imports significantly for Halloween and Thanksgiving.

#### 4. Associated Knowledge Areas

KA Code	Knowledge Area
216	Integrated Pest Management Systems
211	Insects, Mites, and Other Arthropods Affecting Plants

**Outcome #8****1. Outcome Measures**

Total dollar value of grants and contracts obtained.

**2. Associated Institution Types**

- 1862 Extension
- 1862 Research

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	4000000	1319598

**3c. Qualitative Outcome or Impact Statement****Issue (Who cares and Why)**

Farming in Hawaii continues to be difficult because of high land costs and competition with housing needs, high transportation and fuel costs, high cost of feed, water, waste management, labor and the lack of labor, and threat by invasive species, cheap imports. Despite these challenges, the industry continues to diversify and expand into specialty niche markets and, in a few crops, import replacements. Because of the high cost of fuel, an initiative to investigate biofuels was begun

**What has been done**

CTAHR conducted research and extension activities in nutrient management, cultural and production methods, pest management, new cultivar development and evaluations, provided diagnostic and analytical services, assisted industries with industry analyses and/or strategic planning, risk management, pesticide registration, and marketing and promotion.

**Results**

Grants and contracts most probably should have been listed as an output, not an outcome measure. We will need to make adjustment in next year's plan of work.

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
202	Plant Genetic Resources
204	Plant Product Quality and Utility (Preharvest)
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plant
212	Pathogens and Nematodes Affecting Plants
213	Weeds Affecting Plants
216	Integrated Pest Management Systems
211	Insects, Mites, and Other Arthropods Affecting Plants
205	Plant Management Systems
206	Basic Plant Biology

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

External factors which affected outcomes

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

#### **Brief Explanation**

Agricultural statistics data are typically published 2 years after the calendar year is completed so current year and just completed year's data often are not available. The cost of energy continues to skyrocket thus the cost of gasoline, diesel, electricity, fees, fertilizer, shipping, supplies and everything else are much more than it was only 6 months ago. Loss of USDA/CSREES special grants during FY2007 has severely reduced our ability to conduct research. The full impact will be reflected in next year's report. Some commodities, such as macadamia nuts, are facing stiff foreign competition who often undercut prices to get rid of products.

Loss of USDA/CSREES special grants during FY 2007 has negatively impacted our overall program effectiveness. The loss was more than \$2.9 millions.

#### **V(I). Planned Program (Evaluation Studies and Data Collection)**

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

- After Only (post program)

#### **Evaluation Results**

Participants in our programs were generally satisfied with the program contents we have offered. Not all of our programs are effective. Continuing monitoring will be essential for future success.

#### **Key Items of Evaluation**

**Program #4****V(A). Planned Program (Summary)****1. Name of the Planned Program**

4. Invasive Species Education and Management

**V(B). Program Knowledge Area(s)****1. Program Knowledge Areas and Percentage**

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
121	Management of Range Resources	5%		0%	
123	Management and Sustainability of Forest Resources	5%		0%	
136	Conservation of Biological Diversity	10%		0%	
211	Insects, Mites, and Other Arthropods Affecting Plants	20%		27%	
212	Pathogens and Nematodes Affecting Plants	20%		0%	
213	Weeds Affecting Plants	20%		53%	
214	Vertebrates, Mollusks, and Other Pests Affecting Plants	15%		0%	
215	Biological Control of Pests Affecting Plants	0%		20%	
311	Animal Diseases	5%		0%	
	<b>Total</b>	<b>100%</b>		<b>100%</b>	

**V(C). Planned Program (Inputs)****1. Actual amount of professional FTE/SYs expended this Program**

Year: 2007	Extension		Research	
	1862	1890	1862	1890
<b>Plan</b>	2.0	0.0	5.0	0.0
<b>Actual</b>	1.6	0.0	8.3	0.0

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

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
78231	0	437446	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
103583	0	1801323	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
6941	0	150883	0

**V(D). Planned Program (Activity)****1. Brief description of the Activity**

Research and extension efforts to support Invasive Species Education and Management continue to be a top priority for CTAHR. With increased airline and shipping traffic, more invasive species are arriving, and threaten the native plants and animals, as well as economically important plants, forests, and watersheds. A great majority of the resource for invasive species were invested in the following knowledge areas: pathogens and nematodes affecting plants; insects, mites, and other arthropods affecting plants; and weeds affecting plants.

CTAHR has conducted research and outreach activities on invasive species that became established within the last 10 years include: coqui frog, nettle caterpillar, Erythrina gall wasp, fireweed, pickle worm, and papaya mealybug.

The brown tree snake (Guam and other Pacific islands) and the Red Imported Fire Ant (Southeast USA, California, Australia, and Taiwan) are two species that have drawn particular attention and for which action plans have been developed in the event that they are accidentally introduced into Hawaii.

•Provided outreach activities to educate stakeholders on biology, management techniques, and other information on targeted invasive species.

•Coordinated activities with partner agencies, community groups, and other interested stakeholders.

•Conducted pertinent research on the biology, and control of the invasive species.

•Improved the detection methods for an invasive bacterial species, *Ralstonia solanacearum*.

•Generated multiple lines of transgenic Mexican lime plants that may be resistant to citrus tristeza virus.

## 2. Brief description of the target 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 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 potential and existing farmers/producers and their organizations, (such as the Hawai'i Association of Soil and Water Conservation Districts, individual commodity associations, and the Hawai'i Farm Bureau), packing houses and shippers, extension staff, and other members of the community who are involved in the agriculture industry, and environmental groups.

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

### 1. Standard output measures

#### Target for the number of persons (contacts) reached through direct and indirect contact methods

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
Plan	70	500	200	100
2007	123	25	0	0

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

#### Patent Applications Submitted

Year    Target

Plan:    0

2007 :    1

#### Patents listed

Dr. Qing Li. Human Consumable Essential Oil Highly Toxic to Pest Tephritid Fruit Flies. Provisional patent application filed on 11/9/07

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

#### Number of Peer Reviewed Publications

	Extension	Research	Total
Plan			
2007	1	25	26

**V(F). State Defined Outputs****Output Target****Output #1****Output Measure**

- Number of workshops, field days, demonstrations held

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2007	1	4

**Output #2****Output Measure**

- Number of publications

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2007	10	26

**Output #3****Output Measure**

- Number of grant proposals submitted

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2007	10	14

**V(G). State Defined Outcomes****V. State Defined Outcomes Table of Content**

O No.	Outcome Name
1	Number of people completing non-formal education programs
2	Number of agency professionals, including extension agents who implement or install demonstration or similar programs for clientele education
3	Total dollar value of grants and contracts obtained.

**Outcome #1****1. Outcome Measures**

Number of people completing non-formal education programs

**2. Associated Institution Types**

- 1862 Extension
- 1862 Research

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	20	71

**3c. Qualitative Outcome or Impact Statement****Issue (Who cares and Why)**

Invasive species is one of Hawaii's most critical problems. In the last 10 years alone, a number of serious pests have become established causing major impact in Hawaii's landscape, agriculture and way of living. Recent introductions include the nettle caterpillar, Erythrina gall wasp, ohia rust, varroa mite, exotic seaweeds and the onslaught continues.

**What has been done**

Because of the immensity of the problem, CTAHR collaborates with other governmental and NGO agencies to fight the invasive species battle. Most of CTAHR's efforts have been through research on the biology of the species to better develop management methods. CTAHR also conducted outreach programs to educate industry and the general public on ways to minimize introduction of invasive species and manage invasive species.

**Results**

Through various outreach methods, banana growers are more aware of the early symptoms of BBTV, and a better understanding of how it spreads, and the importance of eradicating infected mats. They also understand that the best option for replacement planting is with clean, tissue cultured plants. Many in the plant industry (nurseries, gardeners, ranchers, etc.) have attended one or more outreach workshops on invasive species and have greater awareness in the immensity of the problem and willing to do their part.

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
212	Pathogens and Nematodes Affecting Plants

**Outcome #2****1. Outcome Measures**

Number of agency professionals, including extension agents who implement or install demonstration or similar programs for clientele education

**2. Associated Institution Types**

- 1862 Extension
- 1862 Research

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	4	4

**3c. Qualitative Outcome or Impact Statement****Issue (Who cares and Why)**

Invasive species is one of Hawaii's most critical problems. In the last 10 years alone, a number of serious pests have become established causing major impact in Hawaii's landscape, agriculture and way of living. Recent introductions include the nettle caterpillar, Erythrina gall wasp, ohia rust, varroa mite, exotic seaweeds and the onslaught continues.

**What has been done**

Because of the immensity of the problem, CTAHR collaborates with other governmental and NGO agencies to fight the invasive species battle. Most of CTAHR's efforts have been through research on the biology of the species to better develop management methods. CTAHR also conducted outreach programs to educate industry and the general public on ways to minimize introduction of invasive species and manage invasive species.

**Results**

CTAHR initiated a tissue culture effort to produce clean, tissue cultured banana plants to sell to growers as replacement plants. This insures that those plants are BBTV free unlike getting replanting material from their own fields. Studies show that a minimum of 20% of symptomless plants in areas with BBTV are already infected with the virus. The response by banana growers exceeded expectations. Requests for more than 15,000 plants have been received from growers.

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
212	Pathogens and Nematodes Affecting Plants

**Outcome #3****1. Outcome Measures**

Total dollar value of grants and contracts obtained.

**2. Associated Institution Types**

- 1862 Extension
- 1862 Research

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	250000	468760

**3c. Qualitative Outcome or Impact Statement****Issue (Who cares and Why)**

Invasive species is one of Hawaii's most critical problems. In the last 10 years alone, a number of serious pests have become established causing major impact in Hawaii's landscape, agriculture and way of living. Recent introductions include the nettle caterpillar, Erythrina gall wasp, ohia rust, varroa mite, exotic seaweeds and the onslaught continues.

**What has been done**

Because of the immensity of the problem, CTAHR collaborates with other governmental and NGO agencies to fight the invasive species battle. Most of CTAHR's efforts have been through research on the biology of the species to better develop management methods. CTAHR also conducted outreach programs to educate industry and the general public on ways to minimize introduction of invasive species and manage invasive species.

**Results**

A CTAHR researcher is multiplying a variety of Erythrina that is resistant to the effects of the Erythrina gall wasp that has decimated plants in this genus statewide. Erythrina trees can now be an option again as a landscape plant. CTAHR is also collaborating with Agriculture Department scientists who have identified and getting ready for release several parasites of the gall wasp.

Hot water treatment chambers developed by CTAHR researchers are being used to eradicate coqui frogs from ornamental plants shipped intrastate. This treatment provides an acceptable control measure to prevent the spread of the pest. Although coqui frogs are not a quarantine pest for out-of-state shipments, this technology is available for immediate implementation should it become a requirement.

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
212	Pathogens and Nematodes Affecting Plants
215	Biological Control of Pests Affecting Plants
214	Vertebrates, Mollusks, and Other Pests Affecting Plants

**V(H). Planned Program (External Factors)****External factors which affected outcomes**

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

**Brief Explanation**

Invasive species programs are integral in most of the other planned programs (natural resources, agriculture, livestock,) and closely linked to those areas and many are thus reported in those areas. Only one project is listed in this program on the extension side.

Current Homeland Security policies and regulations preempt and thus affect the ability of state quarantine procedures and activities to effectively prevent import of invasive species. For example, taro root is allowed to be imported from countries and regions of the Pacific with minimal inspection, despite the presence of industry threatening pests that are present in the country of origin but do not occur here.

Loss of USDA/CSREES special grants during FY 2007 has caused disruption in our research program. Loss of personnel in various programs will have a longer impact beyond next fiscal year.

**V(I). Planned Program (Evaluation Studies and Data Collection)****1. Evaluation Studies Planned**

- After Only (post program)
- During (during program)

**Evaluation Results**

All CTAHR research programs are required to conduct evaluations. Annual program evaluation is conducted by the department chair and the associate dean for research. Most faculty members were able to leverage their formula funds to obtain additional grants and contracts to support their programs. However, small number of faculty members were not successful in getting extramural funding; thus, limited their effectiveness in delivering expected outcomes.

**Key Items of Evaluation**

**Program #5****V(A). Planned Program (Summary)****1. Name of the Planned Program**

5. Youth, Family and Community Development

**V(B). Program Knowledge Area(s)****1. Program Knowledge Areas and Percentage**

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
801	Individual and Family Resource Management	10%		13%	
802	Human Development and Family Well-Being	15%		73%	
803	Sociological and Technological Change Affecting Individuals,	10%		2%	
804	Human Environmental Issues Concerning Apparel, Textiles, ;	30%		0%	
805	Community Institutions, Health, and Social Services	20%		10%	
806	Youth Development	15%		2%	
	<b>Total</b>	<b>100%</b>		<b>100%</b>	

**V(C). Planned Program (Inputs)****1. Actual amount of professional FTE/SYs expended this Program**

Year: 2007	Extension		Research	
	1862	1890	1862	1890
<b>Plan</b>	14.0	0.0	3.0	0.0
<b>Actual</b>	13.1	0.0	3.1	0.0

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

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
223233	0	79541	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
982269	0	286671	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
416328	0	402337	0

**V(D). Planned Program (Activity)****1. Brief description of the Activity**

Human development and family well-being knowledge area was the major focus of CTAHR research and extension projects in the Youth, Family and Community Development program area during 2007. Individual and family resource management as well as community institutions, health, and social services are the other two knowledge areas that were covered by some of our projects.

Because of the limited resources to carry out many of these programs, CTAHR faculty seeks out extramural funding and partner and collaborate with other governmental and non-governmental agencies such as the Hawaii Department of Health, Department of Education, Department of Human Services, USDA, Elderly Services programs, various county agencies, military services, and many more.

**2. Brief description of the target audience**

As intended by the Land Grant perspective, CTAHR's "targeted" clients for this program in teaching 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). 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(E). Planned Program (Outputs)****1. Standard output measures****Target for the number of persons (contacts) reached through direct and indirect contact methods**

	<b>Direct Contacts Adults</b>	<b>Indirect Contacts Adults</b>	<b>Direct Contacts Youth</b>	<b>Indirect Contacts Youth</b>
<b>Year</b>	<b>Target</b>	<b>Target</b>	<b>Target</b>	<b>Target</b>
<b>Plan</b>	1000	2000	1500	250
2007	9380	137746	9998	136954

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

<b>Year</b>	<b>Target</b>
<b>Plan:</b>	0
2007 :	0

**Patents listed****3. Publications (Standard General Output Measure)****Number of Peer Reviewed Publications**

	<b>Extension</b>	<b>Research</b>	<b>Total</b>
<b>Plan</b>			
2007	38	70	108

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

**Output #1**

**Output Measure**

- Number of people completing non-formal education programs on parenting, youth development, and leadership development

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2007	100	5719

**Output #2**

**Output Measure**

- Number of volunteer hours

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2007	5000	58619

**Output #3**

**Output Measure**

- Number of publications

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2007	5	108

**Output #4**

**Output Measure**

- Presentations at international and national meetings.

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2007	5	20

**Output #5**

**Output Measure**

- Grant proposals submitted.

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2007	10	21

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

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

O No.	Outcome Name
1	Number of youth development professionals enrolled in "Moving Ahead Together";
2	Number of post-training focus group on practices adopted or working positively with youth at their schools or centers or clubs
3	Number of educators, youth program staff and others that adopt 4-H Juried Curriculum in their youth programs
4	Number of people completing non-formal education programs on parenting, youth development, and leadership development, who adopt one or more parenting principles, behaviors, or practices
5	Total dollar value of grants and contracts obtained.

**Outcome #1**

**1. Outcome Measures**

Number of youth development professionals enrolled in "Moving Ahead Together";

**2. Associated Institution Types**

- 1862 Extension
- 1862 Research

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	10	300

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

**Issue (Who cares and Why)**

More than any other institution, the family has profound influence on the health and well being of its members, particularly its youth and elderly. The college has both an opportunity and a responsibility to strengthen families in rural and urban environments by providing educational programs in areas such as family health and life span development, personal and family financial and time management, youth development, parenting, and caring for the elderly.

**What has been done**

CTAHR conducted integrated research, extension and education projects to promote resiliency and well being in Hawaii's individuals, families, and communities. CTAHR's efforts focused on: children and youth to develop individual, social, and leadership skills and habits; the ability of Hawaii's families and communities to meet the needs of a growing elderly population; and, providing data, information, and technical assistance to enhance policies and programs for individuals and families.

**Results**

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
802	Human Development and Family Well-Being
806	Youth Development

**Outcome #2**

**1. Outcome Measures**

Number of post-training focus group on practices adopted or working positively with youth at their schools or centers or clubs

**2. Associated Institution Types**

- 1862 Extension
- 1862 Research

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	5	78

**3c. Qualitative Outcome or Impact Statement****Issue (Who cares and Why)**

More than any other institution, the family has profound influence on the health and well being of its members, particularly its youth and elderly. The college has both an opportunity and a responsibility to strengthen families in rural and urban environments by providing educational programs in areas such as family health and life span development, personal and family financial and time management, youth development, parenting, and caring for the elderly.

**What has been done**

CTAHR conducted integrated research, extension and education projects to promote resiliency and well being in Hawaii's individuals, families, and communities. CTAHR's efforts focused on: children and youth to develop individual, social, and leadership skills and habits; the ability of Hawaii's families and communities to meet the needs of a growing elderly population; and, providing data, information, and technical assistance to enhance policies and programs for individuals and families.

**Results**

Four "street safe" videos were produced and shown on public access TV multiple times. A large, but unknown number of viewers were made aware of these safe practices. A poster was produced for the NEAFCS National Conference with 300 extension educators visiting. The KAMP transition program reached 1500 new kindergartners and 2500 adults participated and learned techniques to make the start of school as a positive event. Parents learned how to become more involved in their children's learning.

The "Na Tutu" coalition is a statewide Family Community Education (FCE) program that is striving for legislative changes that impact elderly caregivers of minor children to improve the quality of their lives. Over 520 adults learned the specifics of this issue.

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
806	Youth Development
805	Community Institutions, Health, and Social Services

**Outcome #3****1. Outcome Measures**

Number of educators, youth program staff and others that adopt 4-H Juried Curriculum in their youth programs

**2. Associated Institution Types**

- 1862 Extension
- 1862 Research

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	5	8

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

**Issue (Who cares and Why)****What has been done****Results****4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
806	Youth Development

**Outcome #4****1. Outcome Measures**

Number of people completing non-formal education programs on parenting, youth development, and leadership development, who adopt one or more parenting principles, behaviors, or practices

**2. Associated Institution Types**

- 1862 Extension
- 1862 Research

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

<b>Year</b>	<b>Quantitative Target</b>	<b>Actual</b>
2007	40	4187

**3c. Qualitative Outcome or Impact Statement****Issue (Who cares and Why)**

More than any other institution, the family has profound influence on the health and well being of its members, particularly its youth and elderly. The college has both an opportunity and a responsibility to strengthen families in rural and urban environments by providing educational programs in areas such as family health and life span development, personal and family financial and time management, youth development, parenting, and caring for the elderly.

**What has been done**

CTAHR conducted integrated research, extension and education projects to promote resiliency and well being in Hawai'i's individuals, families, and communities. CTAHR's efforts focused on: children and youth to develop individual, social, and leadership skills and habits; the ability of Hawai'i's families and communities to meet the needs of a growing elderly population; and, providing data, information, and technical assistance to enhance policies and programs for individuals and families.

**Results**

Over 4000 youth and adults implemented newly learned skills, or changed their behavior as a result of the various outreach programs. About 2000 parents and teachers who participated in previous KAMP programs have implemented their own KAMP program and carrying on the activities that they learned. This allows the KAMP organizers to expand to other schools. Although the Na Tutu coalition, involving 210 FCE members was not successful in getting legislation passed, they participate in caucuses at the legislature and plan on continuing their pursuit during the 2008 legislative session. About 75 youth are able to complete 4-H livestock record books to the established standard. Many of the older youth assist younger 4-H'ers with their projects and record books. Another 150 youth and adults in the 4-H program have collaborated and formed teams that developed and implemented a variety of community action projects in their own communities. Formal financial literacy outreach programs sponsored by CTAHR were completed by 886 adults and another 144 participants completed the poverty simulation workshop thus obtaining a better appreciation for what poverty is like.

#### 4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development
801	Individual and Family Resource Management
803	Sociological and Technological Change Affecting Individuals, Fam
805	Community Institutions, Health, and Social Services

#### Outcome #5

##### 1. Outcome Measures

Total dollar value of grants and contracts obtained.

##### 2. Associated Institution Types

- 1862 Extension
- 1862 Research

##### 3a. Outcome Type:

Change in Condition Outcome Measure

##### 3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	1000000	706500

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

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

More than any other institution, the family has profound influence on the health and well being of its members, particularly its youth and elderly. The college has both an opportunity and a responsibility to strengthen families in rural and urban environments by providing educational programs in areas such as family health and life span development, personal and family financial and time management, youth development, parenting, and caring for the elderly.

###### What has been done

CTAHR conducted integrated research, extension and education projects to promote resiliency and well being in Hawai'i's individuals, families, and communities. CTAHR's efforts focused on: children and youth to develop individual, social, and leadership skills and habits; the ability of Hawai'i's families and communities to meet the needs of a growing elderly population; and, providing data, information, and technical assistance to enhance policies and programs for individuals and families.

###### Results

Over a period of 5 years, the "Na Tutu" coalition has learned to lobby and provide testimony to get legislation involving providing rights to grandparents who care for minor children passed in 2003 and 2007. The provisions of these legislations are being taken to grandparents in educational outreach efforts by the FCE clubs. Their legislative efforts continue to provide more rights to grandparents. The 180 students in a MoneyEd class had a financial impact of \$45,870.70 in savings and credit management. Partly as a result of CTAHR's programs, most of Hawaii's community service agencies are now integrating financial education into their programs many using the curriculum developed by CTAHR and modified to suit particular needs. One trainer has taken this program to the State correctional institution where inmates are being taught financial literacy.

#### 4. Associated Knowledge Areas

KA Code	Knowledge Area
805	Community Institutions, Health, and Social Services
803	Sociological and Technological Change Affecting Individuals, Fam
801	Individual and Family Resource Management
806	Youth Development

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

##### External factors which affected outcomes

- Economy
- Appropriations changes
- Public Policy changes
- Competing Public priorities
- Competing Programatic Challenges
- Populations changes (immigration,new cultural groupings,etc.)
- Other (Loss of Special Grants)

##### Brief Explanation

Loss of USDA/CSREES special grants during FY 2007 has negatively impacted the effectiveness of delivering our programs.

#### V(I). Planned Program (Evaluation Studies and Data Collection)

##### 1. Evaluation Studies Planned

- After Only (post program)

##### Evaluation Results

Lack of personnel has limited our ability to provide adequate support in thsi program area. Stakeholders are happy with what we have provided, but would like to see more programs to help their needs.

##### Key Items of Evaluation

**Program #6**

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

**1. Name of the Planned Program**

6. Health and Wellness of Hawaii's Families and Communities

**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	30%		26%	
704	Nutrition and Hunger in the Population	10%		0%	
711	Ensure Food Products Free of Harmful Chemicals, Including	20%		37%	
712	Protect Food from Contamination by Pathogenic Microorgani	20%		31%	
722	Zoonotic Diseases and Parasites Affecting Humans	5%		0%	
723	Hazards to Human Health and Safety	5%		6%	
724	Healthy Lifestyle	10%		0%	
<b>Total</b>		100%		100%	

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

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

Year: 2007	Extension		Research	
	1862	1890	1862	1890
<b>Plan</b>	7.0	0.0	2.8	0.0
<b>Actual</b>	2.7	0.0	2.6	0.0

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

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
61388	0	15569	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
285051	0	744376	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
375200	0	317220	0

**V(D). Planned Program (Activity)**

**1. Brief description of the Activity**

Health and Wellness of Hawai'i's Families and Communities program is the smallest of the seven program areas in CTAHR. A majority of research and extension projects were focused on three knowledge areas: Ensure food products free of harmful chemicals, including residues; Protect food from contamination by pathogenic microorganisms, pathogens; and Nutrition education and behavior.

- Developed research, extension, and education initiatives to protect the state from bioterrorism.
- Maintained and upgraded research and extension laboratory resources needed to rapidly detect, analyze and identify chemical and biological samples.
- Established effective working relations with state and federal laboratories and programs focused on agroterrorism.
- Established formal and information education and training programs for students, first responders/detectors and agriculture producers.
- Developed and maintained an effective pesticide education and management program.
- Developed a CTAHR response plan in conjunction with Hawai'i Department of Health in preparation for an emergency or unexpected outbreak.
- Provided training to extension faculty to educate Hawai'i farmers and ranchers to help mitigate effects of a zoonotic or foreign animal disease outbreak.
- Promoted locally grown commodities to minimize unnecessary imports from mainland and international destinations.
- Established a Pacific Agrosecurity system to provide training for partners in the American Pacific to ensure that first responders are prepared.
- Conducted outreach programs for stakeholders to strengthen their capacity to make educated decisions to improve their health, wellness and overall quality of life.
  - Established a statewide coordinated nutrition outreach program.

**2. Brief description of the target audience**

As intended by the Land Grant perspective, CTAHR's "targeted" clients for this program in teaching 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 Service). Clients for extension agents are youth, families, and extended families, especially those on limited budgets, youth and adults at risk for obesity and diabetes and related diseases, farmers and farm workers, especially those that are immigrants, the general public and consumers of local produce, 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(E). Planned Program (Outputs)**

**1. Standard output measures**

**Target for the number of persons (contacts) reached through direct and indirect contact methods**

	<b>Direct Contacts Adults</b>	<b>Indirect Contacts Adults</b>	<b>Direct Contacts Youth</b>	<b>Indirect Contacts Youth</b>
<b>Year</b>	<b>Target</b>	<b>Target</b>	<b>Target</b>	<b>Target</b>
<b>Plan</b>	300	500	150	150
2007	5397	6299	2373	1739

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

**Patent Applications Submitted**

Year	Target
Plan:	0
2007 :	0

**Patents listed**

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

**Number of Peer Reviewed Publications**

	Extension	Research	Total
Plan			
2007	10	31	41

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

**Output Target**

**Output #1**

**Output Measure**

- Number of molecular diagnostic methods, tools and techniques developed for ABTA's

Year	Target	Actual
2007	0	0

**Output #2**

**Output Measure**

- Number of outreach activities and events conducted

Year	Target	Actual
2007	6	329

**Output #3**

**Output Measure**

- Number of mitigation and remediation techniques or tools developed

Year	Target	Actual
2007	0	0

**Output #4**

**Output Measure**

- Number of students, scientists, technicians, first responders, and government officials completing training to evaluate effective

Year	Target	Actual
2007	15	0

**Output #5**

**Output Measure**

- Number of publications

Year	Target	Actual
2007	5	41

**Output #6**

**Output Measure**

- Presentations at international and national meetings.

Year	Target	Actual
2007	5	8

**Output #7**

**Output Measure**

- Grant proposals submitted.

Year	Target	Actual
2007	5	8

**V(G). State Defined Outcomes****V. State Defined Outcomes Table of Content**

O No.	Outcome Name
1	Number of people trained and who receive their pesticide applicators license
2	Number of people who changed their behavior to better their health
3	New methods are developed for rapid extraction and measurement of toxic chemicals
4	Number of people who increased their knowledge in health and wellness through outreach activities
5	Total dollar value of grants and contracts obtained.

**Outcome #1****1. Outcome Measures**

Number of people trained and who receive their pesticide applicators license

**2. Associated Institution Types**

- 1862 Extension
- 1862 Research

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	50	172

**3c. Qualitative Outcome or Impact Statement****Issue (Who cares and Why)**

The 2003 Hawai'i health survey reveals that more than half of Hawaii's adults are overweight or obese. In some Hawai'i communities, the rate of obesity in children ages 6 to 11 is twice the national average. About 75% of Hawai'i residents don't eat enough fruits and vegetables, and many suffer from diabetes, heart disease, or high blood pressure. Hawai'i,s people, food and water supply pose serious challenges to Hawaii,s health, economy, and ecosystem.

**What has been done**

CTAHR conducted integrated research, extension and education projects to improve the health and wellness of Hawai'i's families and communities. Outreach programs focused on efforts to educate the people of Hawaii on the role of nutrition and lifestyles in health and disease, food safety concerns, recommendations for health, and effective prevention of contaminant release and management of contaminants and chemicals found in communities and households.

**Results**

Over 300 adults and 1200 youth in one extension program increased their knowledge of the benefits of physical activities and healthy eating habits. Members of the FCE acknowledge the aging population and have agreed to look out for one another and assist one another at all opportunities.

Of the over 5000 people seeking information on catchment water systems 718 requested additional information. The Urban Garden Center continued to be a popular place to learn about urban gardening with over 4400 completing non-formal educational programs held on a variety of topics. Plant sales, gardening displays, open houses, and other outreach activities also attracted an additional 4,000 persons.

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
723	Hazards to Human Health and Safety
724	Healthy Lifestyle

**Outcome #2****1. Outcome Measures**

Number of people who changed their behavior to better their health

**2. Associated Institution Types**

- 1862 Extension
- 1862 Research

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	50	172

**3c. Qualitative Outcome or Impact Statement****Issue (Who cares and Why)**

The 2003 Hawai'i health survey reveals that more than half of Hawai'i's adults are overweight or obese. In some Hawai'i communities, the rate of obesity in children ages 6 to 11 is twice the national average. About 75% of Hawai'i residents don't eat enough fruits and vegetables, and many suffer from diabetes, heart disease, or high blood pressure. Hawai'i's people, food and water supply pose serious challenges to Hawai'i's health, economy, and ecosystem.

**What has been done**

CTAHR conducted integrated research, extension and education projects to improve the health and wellness of Hawai'i's families and communities. Outreach programs focused on efforts to educate the people of Hawaii on the role of nutrition and lifestyles in health and disease, food safety concerns, recommendations for health, and effective prevention of contaminant release and management of contaminants and chemicals found in communities and households.

**Results**

Over 50% (675) of those participating in a healthy living program adopted better eating habits, increased their physical activity, and practiced proper hand washing techniques. Over 60 persons joined the Hawai'i Rainwater Catchment Systems Association (RCSA), 318 purchased water test kits (92% indicated they will purchase kits again), over 100 national and international representatives attended the 2007 American RCSA held in Volcano, HI. Its success motivated them to hold the conference annually instead of biannually. Of 789 adults screened for hemoglobin A1c resulted in 40% with levels indicating a diabetic condition and encouraged to seek further tests and treatment as necessary. The Pearl City UGC has a core of over 80 volunteers that donate over 9000 hours of their time to maintain, improve, and sponsor educational events at the facility. The PCUGC has evolved into a valuable resource for over 800,000 living on the highly urbanized island of Oahu.

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
723	Hazards to Human Health and Safety
724	Healthy Lifestyle
703	Nutrition Education and Behavior

**Outcome #3****1. Outcome Measures**

New methods are developed for rapid extraction and measurement of toxic chemicals

**2. Associated Institution Types**

- 1862 Extension
- 1862 Research

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	0	0

**3c. Qualitative Outcome or Impact Statement****Issue (Who cares and Why)****What has been done****Results****4. Associated Knowledge Areas**

KA Code	Knowledge Area
723	Hazards to Human Health and Safety

**Outcome #4****1. Outcome Measures**

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

**2. Associated Institution Types**

- 1862 Extension
- 1862 Research

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	100	6991

**3c. Qualitative Outcome or Impact Statement****Issue (Who cares and Why)**

The 2003 Hawai'i health survey reveals that more than half of Hawaii's adults are overweight or obese. In some Hawai'i communities, the rate of obesity in children ages 6 to 11 is twice the national average. About 75% of Hawai'i residents don't eat enough fruits and vegetables, and many suffer from diabetes, heart disease, or high blood pressure. Hawaiis people, food and water supply pose serious challenges to Hawai'i's health, economy, and ecosystem.

**What has been done**

CTAHR conducted integrated research, extension and education projects to improve the health and wellness of Hawai'i's families and communities. Outreach programs focused on efforts to educate the people of Hawaii on the role of nutrition and lifestyles in health and disease, food safety concerns, recommendations for health, and effective prevention of contaminant release and management of contaminants and chemicals found in communities and households.

**Results**

Over 300 adults and 1200 youth in one extension program increased their knowledge of the benefits of physical activities and healthy eating habits. Members of the FCE acknowledge the aging population and have agreed to look out for one another and assist one another at all opportunities.

Of the over 5000 people seeking information on catchment water systems 718 requested additional information . The Urban Garden Center continued to be a popular place to learn about urban gardening with over 4400 completing non-formal educational programs held on a variety of topics. Plant sales, gardening displays, open houses, and other outreach activities also attracted an additional 4,000 persons.

#### 4. Associated Knowledge Areas

KA Code	Knowledge Area
711	Ensure Food Products Free of Harmful Chemicals, Including Residu
723	Hazards to Human Health and Safety
704	Nutrition and Hunger in the Population
703	Nutrition Education and Behavior
712	Protect Food from Contamination by Pathogenic Microorganisms, Pa
724	Healthy Lifestyle

#### Outcome #5

##### 1. Outcome Measures

Total dollar value of grants and contracts obtained.

##### 2. Associated Institution Types

- 1862 Extension
- 1862 Research

##### 3a. Outcome Type:

Change in Action Outcome Measure

##### 3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	200000	254134

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

**Issue (Who cares and Why)**

**What has been done**

**Results**

#### 4. Associated Knowledge Areas

KA Code	Knowledge Area
711	Ensure Food Products Free of Harmful Chemicals, Including Residu
723	Hazards to Human Health and Safety
722	Zoonotic Diseases and Parasites Affecting Humans
703	Nutrition Education and Behavior
724	Healthy Lifestyle
704	Nutrition and Hunger in the Population
712	Protect Food from Contamination by Pathogenic Microorganisms, Pa

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

External factors which affected outcomes

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

**Brief Explanation**

**V(I). Planned Program (Evaluation Studies and Data Collection)**

**1. Evaluation Studies Planned**

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

**Evaluation Results**

**Key Items of Evaluation**

**Program #7**

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

**1. Name of the Planned Program**

7. Generate and Improve Hawaii's Products, Processes and Market

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

**1. Program Knowledge Areas and Percentage**

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
501	New and Improved Food Processing Technologies	10%		14%	
502	New and Improved Food Products	10%		15%	
503	Quality Maintenance in Storing and Marketing Food Products	5%		2%	
511	New and Improved Non-Food Products and Processes	0%		28%	
601	Economics of Agricultural Production and Farm Management	25%		14%	
602	Business Management, Finance, and Taxation	5%		0%	
603	Market Economics	15%		3%	
604	Marketing and Distribution Practices	10%		5%	
605	Natural Resource and Environmental Economics	0%		10%	
607	Consumer Economics	15%		4%	
608	Community Resource Planning and Development	5%		5%	
<b>Total</b>		<b>100%</b>		<b>100%</b>	

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

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

Year: 2007	Extension		Research	
	1862	1890	1862	1890
<b>Plan</b>	3.0	0.0	3.0	0.0
<b>Actual</b>	2.5	0.0	5.7	0.0

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

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
48101	0	161290	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
185679	0	1001523	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
3981	0	53849	0

**V(D). Planned Program (Activity)**

**1. Brief description of the Activity**

CTAHR has more than 30 projects under the Generate and Improve Hawai'i's Products, Processes and Market program area dealing with 10 knowledge areas. Half of the projects were in the new and improved food and non-food products, processing technologies, and the other half in the agricultural production and natural resource and environmental economics.

- Identified and developed new value-added products from locally grown crops and livestock.

- Assisted and provided the latest technology to local entrepreneurs in the development of new value added products.

- Provided consulting service to individual farmers, processors, packers, and industry groups with developing new markets, developing new marketing strategies, writing successful business/marketing plans to expand their business.

- Assisted data collection and provided scientific data to satisfy regulatory requirements to facilitate the introduction of transgenic papaya into Japanese market.

- Conducted portfolio and industry analyses to identify bottlenecks for industry expansion.

## 2. Brief description of the target 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 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, Business, Economic Development and Tourism, and Land and Natural Resources). Clients for extension agents are farmers, small business owners, food manufacturers, commodity producers and their organizations (such as individual grower associations, 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 product development and marketing.

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

### 1. Standard output measures

#### Target for the number of persons (contacts) reached through direct and indirect contact methods

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
Plan	60	200	0	0
2007	501	20070	163	5

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

#### Patent Applications Submitted

Year	Target
Plan:	0
2007 :	1

#### Patents listed

Patent No. US 7,247,443 B2; Date Issued - July 24, 2007. Dr. Wei Wen (Winston) Su.

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

#### Number of Peer Reviewed Publications

	Extension	Research	Total
Plan			
2007	4	36	40

## V(F). State Defined Outputs

### Output Target

**Output #1****Output Measure**

- Develop new food and other products of added value.

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2007	0	0

**Output #2****Output Measure**

- Number of publications.

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2007	5	40

**Output #3****Output Measure**

- Presentations at international and national meetings.

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2007	5	13

**Output #4****Output Measure**

- Grant proposals submitted.

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2007	10	6

**V(G). State Defined Outcomes****V. State Defined Outcomes Table of Content**

O No.	Outcome Name
1	Number of people completing non-formal education programs on economic or enterprise development
2	Number of new businesses started and number of existing businesses maintaining or expanding operations resulting from economic development programs
3	Total dollar value of grants and contracts obtained

**Outcome #1****1. Outcome Measures**

Number of people completing non-formal education programs on economic or enterprise development

**2. Associated Institution Types**

- 1862 Extension
- 1862 Research

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	20	438

**3c. Qualitative Outcome or Impact Statement****Issue (Who cares and Why)**

Hawaii is moving towards small, entrepreneurial operations that produce a diversity of crops and agri products. Many startups experience difficulty with financing, adopting sound business practices, marketing products and services, coping with regulations, and optimizing growth opportunities. Value added products can increase profitability of a crop significantly. CTAHR needs to continue to provide assistance and expertise in developing new products, processes, and new markets.

**What has been done****Results****4. Associated Knowledge Areas**

KA Code	Knowledge Area
604	Marketing and Distribution Practices
608	Community Resource Planning and Development
607	Consumer Economics
501	New and Improved Food Processing Technologies

**Outcome #2****1. Outcome Measures**

Number of new businesses started and number of existing businesses maintaining or expanding operations resulting from economic development programs

**2. Associated Institution Types**

- 1862 Extension
- 1862 Research

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	2	0

**3c. Qualitative Outcome or Impact Statement****Issue (Who cares and Why)**

Hawai'i is moving towards small, entrepreneurial operations that produce a diversity of crops and agri products. Many startups experience difficulty with financing, adopting sound business practices, marketing products and services, coping with regulations, and optimizing growth opportunities. Value added products can increase profitability of a crop significantly. CTAHR needs to continue to provide assistance and expertise in developing new products, processes, and new markets.

**What has been done**

CTAHR has an Agribusiness Incubator program funded by non-formula funds and where most of the activity in this area is being conducted and reported directly to the granting agency.

**Results**

With CTAHR's lead and assistance, the Hawaii AgriTourism Association was formed in 2007 with 48 members representing the six major islands. The association can now represent the industry in all matters and speak as a consolidated voice. On Molokai, three new products (kulolo, sweet potato chips, basil pesto) were developed and being marketed.

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
602	Business Management, Finance, and Taxation

**Outcome #3****1. Outcome Measures**

Total dollar value of grants and contracts obtained

**2. Associated Institution Types**

- 1862 Extension
- 1862 Research

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	50000	196000

**3c. Qualitative Outcome or Impact Statement****Issue (Who cares and Why)**

Warmer temperature in Hawaii provides ample opportunity for bacteria growth in fruit juices, and thus, increased incidence of food borne diseases.

**What has been done**

A two-color fluorescence assay based on integrity of the cell membrane has been established to determine the viability of bacterial cells.

**Results**

This assay has been successfully applied to both gram-positive and gram-negative bacteria isolated from juice samples. This method is critical for investigating the survivability of Escherichia coli O157:H7, Salmonella, and Listeria monocytogenes in pineapple and guava juices.

**4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
502	New and Improved Food Products
604	Marketing and Distribution Practices
501	New and Improved Food Processing Technologies
608	Community Resource Planning and Development

**V(H). Planned Program (External Factors)****External factors which affected outcomes**

- Economy
- Appropriations changes
- Public Policy changes
- Competing Public priorities
- Competing Programatic Challenges
- Other (Loss of USDA/CSREES special grants)

**Brief Explanation**

Loss of special grants during FY 2007 has created hardship for our research programs. Loss of personnel will have long term negative impacts on our programs.

**V(I). Planned Program (Evaluation Studies and Data Collection)****1. Evaluation Studies Planned**

- After Only (post program)

**Evaluation Results**

All CTAHR programs are required to conduct evaluation to assess its effectiveness. Evaluation forms are distributed after all workshops and seminars to collect inputs. Research program are evaluated each year by department chair and the associate dean for research. The productivity of each program is used for the fund distribution for the following year.

**Key Items of Evaluation**