

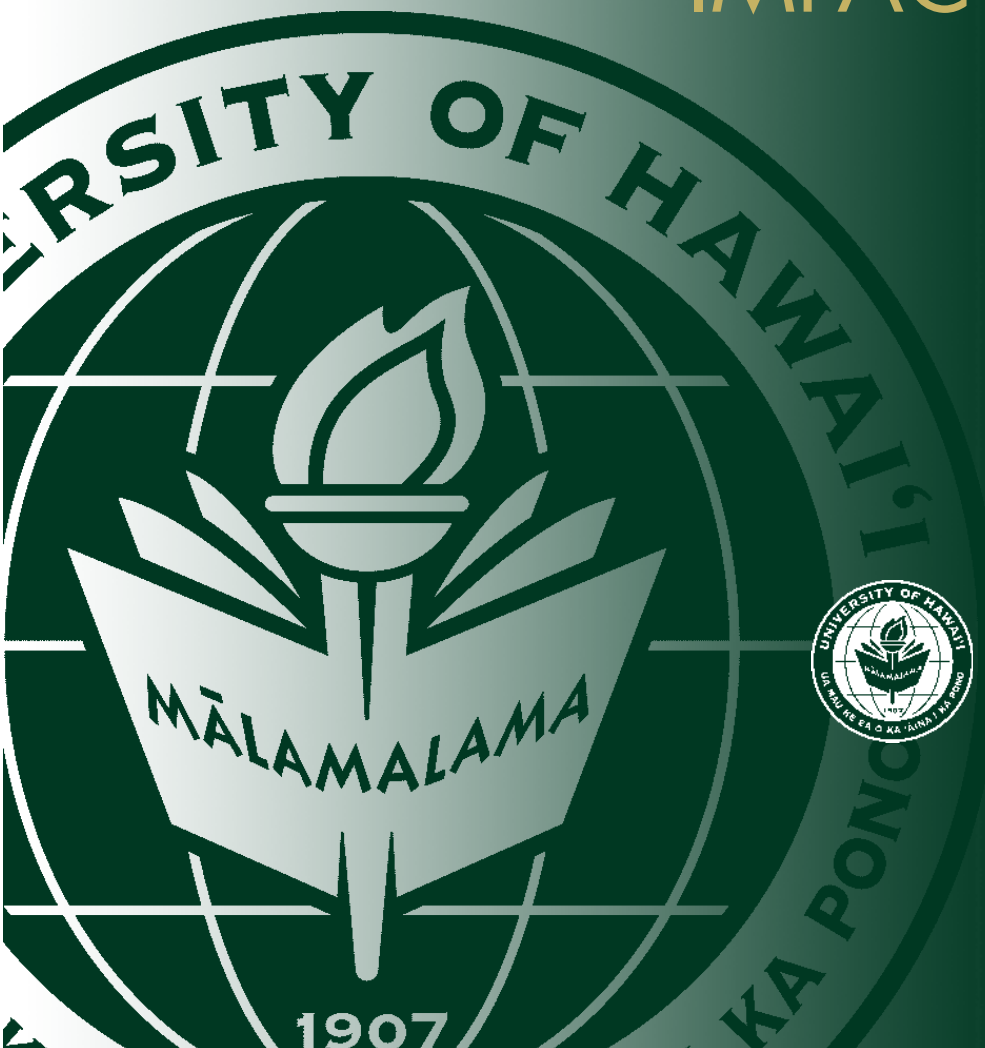
# *Diversifying, Sustaining, Strengthening*



# 2007

## IMPACT REPORT

*A Century of Service*

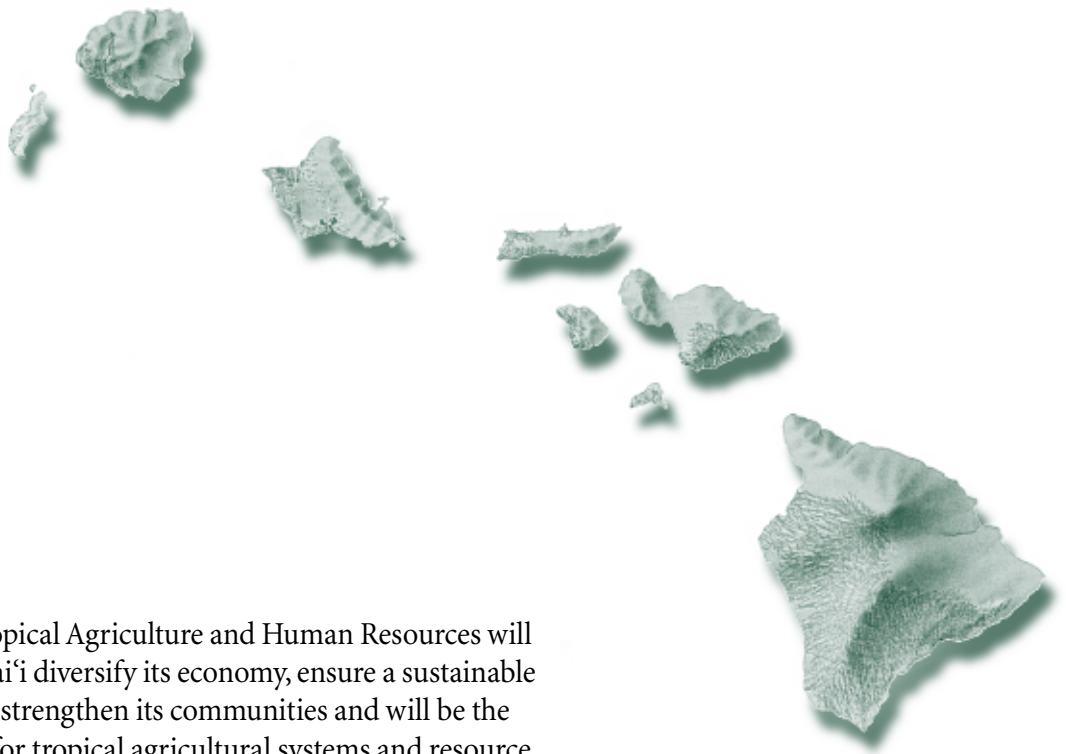


College of Tropical Agriculture  
and Human Resources

UNIVERSITY OF HAWAII AT MĀNOA

*The founding college of the University of Hawai'i, established 1907*



**VISION**

The College of Tropical Agriculture and Human Resources will actively help Hawai'i diversify its economy, ensure a sustainable environment, and strengthen its communities and will be the premier resource for tropical agricultural systems and resource management in the Asia-Pacific region.

**MISSION**

The College of Tropical Agriculture and Human Resources is committed to the preparation of students and all citizens of Hawai'i for life in the global community through research and educational programs supporting tropical agricultural systems that foster viable communities, a diversified economy, and a healthy environment.



College of Tropical Agriculture  
and Human Resources

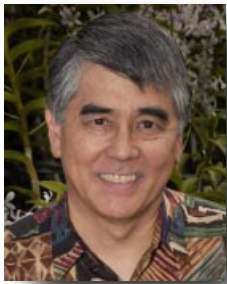
---

UNIVERSITY OF HAWAII AT MĀNOA

*The founding college of the University of Hawai'i, established 1907*

## College of Tropical Agriculture and Human Resources— A Century of Service

Our centennial year, 2007, has been a very special one for the University of Hawai'i and its founding college, the College of Tropical Agriculture and Human Resources (CTAHR). We have celebrated the accomplishments of our first one hundred years as Hawai'i's land-grant institution while preparing for exciting challenges ahead. The year has also brought new leadership to UH Mānoa, and we welcome our new chancellor, Dr. Virginia Hinshaw.



*"I am privileged to work with our students, staff, faculty, allies, and stakeholders as we seek a sustainable future for Hawai'i."*

– Andrew Hashimoto,  
Dean, CTAHR

Much has changed since our college's first days. The College of Agriculture and Mechanic Arts was established in 1907 so that the people of the Territory of Hawai'i could pursue higher education close to home. Today, CTAHR attracts outstanding students and faculty members from across our state and nation and from every corner of the globe. When classes began in 1908, the college had five students pursuing bachelors' degrees. By contrast, more than 800 students are currently enrolled in CTAHR's undergraduate and graduate degree programs, our highest enrollment in more than two decades.

Though our college has grown, CTAHR's current programs remain true to our heritage. Our first students received instruction in agriculture, household economics, science, and engineering, all of which are part of our curriculum a century later. The Hawai'i Agricultural Experiment Station—created by the U.S. Department of Agriculture in 1901 and later integrated into CTAHR during the 1920s and 1930s—dedicated itself at its inception to promoting diversified agriculture for improved food security and a resilient economy. We take pride in our essential contributions to the state's agricultural and value-added products industries and our ongoing research to breed, establish, and protect a wide array of Hawai'i crops. 4-H, which early in the college's history established clubs in all four counties, each year offers leadership, citizenship, and life skills training to more than 15,000 children, not just in rural communities but also in housing projects and suburbs and on military bases. For decades, Hawai'i's home gardeners have turned to CTAHR for advice ranging from how to supplement wartime diets with fresh produce to which potted plants are best for a small, sunny lanai.

As we enter CTAHR's second century, we recommit ourselves to providing an excellent education for our students and fostering a diverse and vibrant economy, a healthy environment, and thriving families and communities for Hawai'i. These goals are central not only to our work as a college but also to the state's 2050 Sustainability Plan, a draft of which was released for public comment at the 2050 Sustainability Summit held September 22, 2007 in Waikiki. The task force of community leaders that developed the draft 2050 Sustainability Plan at the request of the Hawai'i State Legislature drew on research data and broad community input to arrive at three balanced, interdependent goals: a sustainable economy, a sustainable society, and a sustainable environment. These goals mirror CTAHR's mission, vision, and strategic plan, and we are pleased to support this vital effort to shape innovative state policies for the next forty years and beyond.

This Centennial report illustrates the breadth and depth of CTAHR's instruction, outreach, and research. From identifying agricultural resource needs and

optimizing resource use to forging alliances between farmers and the hospitality industry, from pest management strategies that protect crops and native plants to outreach that enriches the lives of babies, youngsters, and adolescents, from biomolecular technology to fashion design, our college is dedicated to serving Hawai'i's people, expanding our economy, and conserving our environment. I am privileged to work with our students, staff, faculty, allies, and stakeholders as we seek a sustainable future for Hawai'i, and I honor their creativity and commitment.

Aloha,

A handwritten signature in dark ink, reading "A. G. Hashimoto". The signature is fluid and cursive, with the first name "A." and last name "Hashimoto" clearly legible.

Andrew G. Hashimoto  
Dean/Director



Photo: Tessie Amore

Anthurium cultivar 'Centennial', UH1272, is a dual-purpose cut flower and potted plant selection named in celebration of 100 years of higher education in the Hawaiian Islands. In 2007, the University of Hawai'i, its flagship campus, the University of Hawai'i at Mānoa, and its founding college, the College of Tropical Agriculture and Human Resources, commemorate a century of accomplishments.

'Centennial' reflects the contributions that research in tropical flower breeding has made to the rich agricultural heritage of Hawai'i. During the past five decades, release of about forty cultivars by UH has helped make anthurium the top-selling cut flower in Hawai'i. The 'Centennial' hybrid draws on the unique and invaluable genetic resources of the UH anthurium research and breeding program. The team that developed 'Centennial' includes emeritus professor Haruyuki Kamemoto, who established the UH anthurium program in 1950, current program leader Heidi Kuehnle, Tessie Amore, John Kunisaki, Joanne Lichty, and Janice Uchida.

# TABLE OF CONTENTS

A Party 100 Years in the Making .....	<b>2</b>
Welcoming Guests to Hawai'i's Table .....	<b>3</b>
HAW-FLYPM: "Government at Its Best" .....	<b>4</b>
Quality Care for Hawai'i's Keiki .....	<b>5</b>
Fighting Wasps with Wasps .....	<b>6</b>
4-H: Serving Those Who Serve .....	<b>7</b>
Awareness Day Tradition Grows .....	<b>8</b>
Water for Farming's Future .....	<b>9</b>
On the Runway, Ready to Launch .....	<b>10</b>
Soil: The Groundwork for Ag Success .....	<b>11</b>
An Edible Rainbow, Fresh from the Farm .....	<b>12</b>
New Tools for Disease Detection .....	<b>13</b>
Meeting Local Needs Statewide .....	<b>14</b>



# A Party 100 Years in the Making

**C**TAHR capped its first century by honoring our exceptional students, staff, faculty, and friends at the Centennial Homecoming and Awards Celebration, held April 12, 2007 at Hilton Hawaiian Village in Waikiki.

UH President David McClain, U.S. Representative Mazie Hirono, and Hawai'i Board of Agriculture Chairwoman Sandra Kunimoto addressed the gathering, paying tribute to the important roles that agriculture, the university, and its founding college, CTAHR, have played in nurturing our state. Honolulu Mayor Mufi Hannemann gently roasted and shared a karaoke duet with Nalo Farms' owner/operator Dean Okimoto, who received the 2007 *Ka Lei Hano* Heritage Award for his contributions as president of the Hawaii Farm Bureau Federation and a longtime CTAHR advisor. The year's Outstanding Alumnus was Dr. Nan-Yao Su, the inventor of DowAgrosciences' Sentricon® system for elimination of subterranean termite colonies.

Hawai'i's diversified crops took a prominent place at the table as guests enjoyed a banquet featuring delicious, locally grown foods. The Island Fresh menu included Big Island beef, Hāmākua mushrooms, Nalo Farms micro greens, and fruits and vegetables from Aloun Farms. Another banquet headliner was 'Centennial', a green-and-white anthurium created through a research and breeding program that was established in 1950 by CTAHR alumnus and emeritus professor Haruyuki Kamemoto and continues today under professor Heidi Kuehnle. This school-colors anthurium is one of about 40 produced at CTAHR during the past six decades.

With more than \$200,000 in donations linked to the event, the banquet combined fun with fundraising. The Hawaii Florists and Shippers Association expanded to \$100,000 their scholarship endowment for agriculture students throughout the UH system, and the Hawai'i Association of Family and Consumer Sciences established two endowments of \$50,000 each to support students in the college's Apparel Product Design and Merchandising and Family Resources programs, respectively. Mahalo to everyone who made the Centennial celebration so special. Your help and generosity made the party a great finish to CTAHR's first century.

*With more than \$200,000 in donations linked to the event, the Centennial banquet combined fun with fundraising.*



Photos: Dave Au

*Ka Lei Hano Heritage Award recipient Dean Okimoto and Outstanding Alumnus Nan-Yao Su took top honors at CTAHR's Centennial Homecoming and Awards Celebration.*

*The tourism industry gains new attractions for visitors seeking an authentic slice of rural Hawai'i life.*

# Welcoming Guests to Hawai'i's Table

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. The college's Mealani "A Taste of the Hawaiian Range" Food and Agriculture Festival—the brainchild of Glen Fukumoto, Milton Yamasaki, and retiree Burt Smith—and extension specialist Kent Fleming's work with Chef Peter Merriman helped create a restaurant market for fresh, locally grown foods. In 1999, Fleming organized the state's first ag-tourism conference, now a biennial event. 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. Extension specialist Donna Ching is lending her leadership-training expertise to the newly formed statewide Hawaii AgriTourism Association.

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.



Photo provided by Glen Fukumoto

*Chefs create delicious dishes from Hawai'i's forage-fed meats and the freshest Big Island produce at the 2007 Taste of the Hawaiian Range food show.*



Photo: Bill Harby

*At the 2007 Taste, visitors experienced paniolo skills firsthand. Here, Bronson Fuertes (foreground) and a student from Kohala High School demonstrate the art of saddle making.*



# HAW-FLYPM: “Government at Its Best”

**F**ruit 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 malathion are now grown with minimal losses and 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.”

*Benefits to industry, currently estimated at \$2.6 million per year, are projected to increase to \$6 million by 2011.*



*Mike Klungness, with the USDA's Agricultural Research Service, checks tomatoes for fruit fly infestation. The yellow hanging trap, baited with BioLure®, is used to monitor and kill female Mediterranean fruit flies.*



*Grant McQuate (USDA-ARS) applies GF-120 protein bait to castor bean, a host plant used to attract melon flies. The low-toxicity bait targets female flies and is used in both conventional and organic agriculture.*

Photos: USDA Agricultural Research Service



*Support and training help child care providers prepare children for a lifetime of learning.*

# Quality Care for Hawai'i's Keiki

**M**ore 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, the State of Hawai'i's Department of Human Services is funding the Quality Care Program to enhance the care that Hawai'i's children receive. 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.



Photo provided by Ann Tom

*A young girl shares a moment of discovery with her caregiver as they investigate a caterpillar.*



Photo: Bob Chinn

*Playing with colorful, baby-safe blocks builds cognitive and motor skills.*

# Fighting Wasps with Wasps

In April 2005 a UH student in Mānoa spotted strange swellings on the leaves of a coral tree (wiliwili haole), damage 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* are 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. Mark Wright, Daniel Rubinoff, Russell Messing, and former post-doctoral scholar Aime Bokonon-Ganta have collaborated 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 Mohsen Ramadan, 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. Arnold Hara developed and refined this injection treatment, while Qing Li established a new method to quantify how much of the pesticide reaches the leaves and how long it persists. For future ornamental plantings, Kenneth Leonhardt is propagating *Erythrina* varieties already in Hawai'i that appear to resist the gall wasp. Despite these successes, an effective program of biocontrol remains the best hope for native wiliwili.

*The erythrina gall wasp is attacking wiliwili trees statewide.*



Photo: Michelle Tremblay



Photo: Walter Nagamine

*An erythrina gall wasp (top) and its potential nemesis, a eurytomid wasp from Tanzania that HDOA hopes to release as a biocontrol agent. Larvae of the eurytomid wasp can protect wiliwili by eating gall wasp larvae.*

*Tracing the origins of Hawai'i's invasive gall wasp, Mark Wright and Daniel Rubinoff collect specimens in South Africa.*

Photo: Russell Messing



*Through 4-H programs for children, teens, parents, and staff, CTAHR reaches out to families with members serving in the U.S. Armed Forces.*

## 4-H: Serving Those Who Serve

**T**he years since September 11, 2001 have challenged America's military families. More than 1.5 million soldiers have been deployed to Afghanistan and Iraq, including more than 420,000 reservists and members of the National Guard. These deployments have affected many island households. Our state is home to more than 44,000 military personnel, and active-duty servicepersons 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 built their skills and leadership ability. In addition, military staff members and parents who work with young people receive training from CTAHR faculty. CTAHR's 4-H military liaison Claire Nakatsuka received the second annual U.S.

Department of Agriculture/Army Youth Development Project Salute Award in 2004 for fostering these partnerships.

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.



Photos: Claire Nakatsuka

*A youngster from Schofield Barracks' Bennett Youth Center runs an obstacle course at the 2007 4-H Spring Fling.*



*4-H Garden Club members plant vegetables at the Fort Shafter Youth Center.*

# Awareness Day Tradition Grows

**G**ood 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.

Kaua'i's Awareness Day originated with retired county administrator Terry Sekioka and former research associate Susan Keller. They recognized that with fewer families working in agriculture, more children would think 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.

Attending the 2005 event, associate dean Charly Kinoshita saw an opportunity to expand this outreach. Aided by Keller's and Sekioka's expert advice, Kinoshita, assistant researcher Traci Sylva, and county administrator Kelvin Sewake brought Agricultural and Environmental Awareness Day to Hilo's Komohana Research and Extension Center in 2006. Faculty and community presenters, volunteer master gardeners, and KTA Super Stores' Derek Kurisu helped 350 students investigate tea, taro, tropical fruit, hydroponics, floriculture, forestry, invasive insects, and plant diseases. Future events are planned once renovations at the Komohana facilities are complete.

Sylva, extension agent Steve Nagano, and county administrator Ray Uchida debuted O'ahu's Awareness Day at the Pearl City Urban Garden Center in 2007. More than 500 students, teachers, and community members explored crop production, invasive species, biotechnology, bioremediation, resource management, and healthy eating habits. With Maui Community College hosting its own Agriculture and Natural Resources Awareness Day, keiki in all four counties can now learn more about what they eat, where they live, and who they can become.

*Youngsters across the state are learning more about what they eat, where they live, and who they can become.*



*At the Pearl City Urban Garden Center, docent Aubin Stremler guides children through the Boardwalk Garden during O'ahu's first Agricultural and Environmental Awareness Day.*



*As part of an Awareness Day display, doctoral student Adam Vorsino introduces O'ahu fifth graders to some six-legged friends.*

Photos: Miles Hakoda



*The Agricultural Water Use and Development Plan addresses 10 previously studied irrigation systems located on five islands.*



Photo: Dan Paquin

*Gate 31 of the Waiāhole Ditch, one of the irrigation systems studied in the water use plan. The ditch carries water from the lush Koʻolau Mountains to the dry plain of Central Oʻahu, shown in the map below.*

# Water for Farming's Future

**M**uch 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. Through the efforts of Hawai'i's congressional delegation, federal funding has been made available to examine these agricultural water systems, estimate the cost of restoring them, evaluate their future prospects, and identify opportunities for water reclamation. CTAHR's Ali Fares, Carol Ferguson, and Tomoaki Miura have led the latest phase of this 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

**O**n 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. Led by Centennial Seven's director, Keith Nishida, and co-director, Sasha Dominy, 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. With guidance from instructor Ray Sasaki, 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.

*Centennial Seven featured fashions by 15 young designers, including seven graduating seniors.*

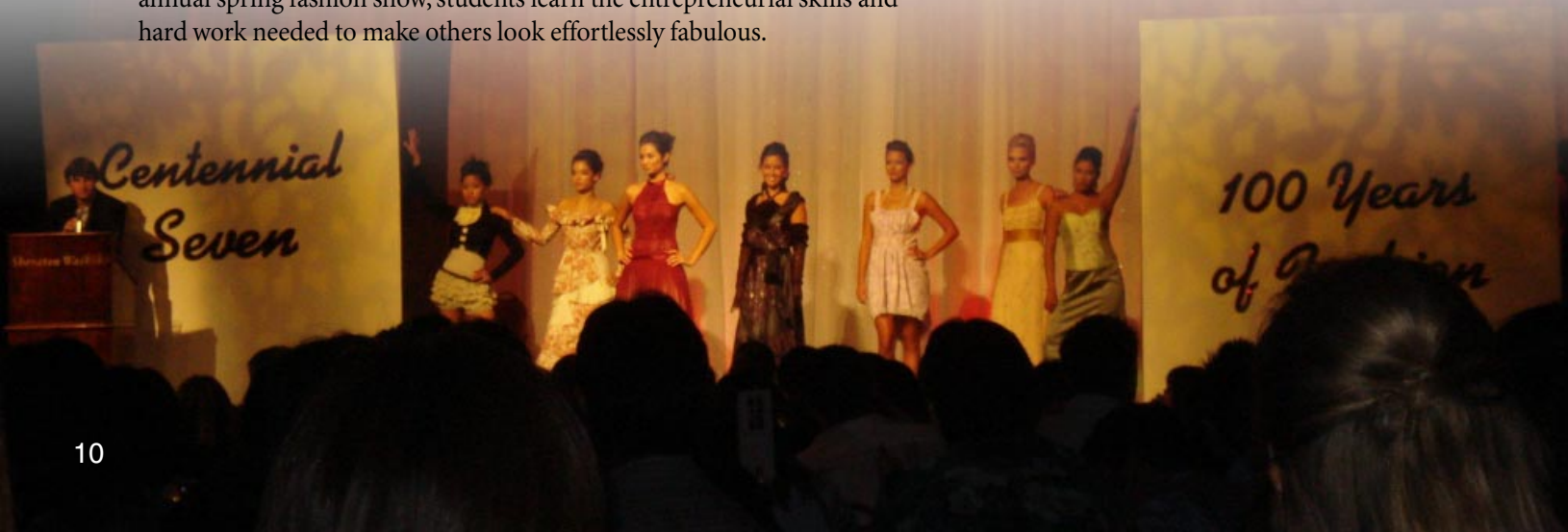


Photo: Liezel Grace Pagala

*Instructor Cynthia Tsark helps design senior Andrea Wu make adjustments to a dress pattern.*

*The clothes take center stage at the Apparel Product Design and Merchandising program's 2007 spring fashion show.*

Photo: Sasha Dominy





*On-farm trials allow growers to see for themselves the costs and benefits of different practices.*



Photo provided by Jonathan Deenik

*Robin Shimabuku and Jonathan Deenik sample soil in a Maui onion field.*

*In Kamuela, Randy Hamasaki and Ray Uchida harvest head cabbages to be analyzed for yield and phosphorous content.*

# Soil: The Groundwork for Ag Success

**F**or 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.

Extension specialist Jonathan Deenik 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, and Deenik spreads the new knowledge further through collaborations with and workshops for agricultural extension agents, who named him their Outstanding Specialist for 2007.

Several of Deenik's projects evaluate organic soil amendments. These include research 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. Another amendment, flash-carbonized charcoal, was developed by UH Mānoa professor Michael Antal. Flash carbonization locks carbon into a stable, biologically unavailable form, so flash carbonizing agricultural wastes prevents them from releasing greenhouse gasses. Charcoal can also improve a soil's ability to retain water and minerals. However, student-turned-research assistant Tai McClellan has 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. Through wide-ranging research, Deenik and colleagues are finding new ways to make farmers' fields and pocketbooks greener.



Photo: Jonathan Deenik



# An Edible Rainbow, Fresh from the Farm

**H**ow many servings of fruits and vegetables should we eat each day? Five? Nine? The nationwide, private-public partnership that introduced U.S. consumers to the concept of five-a-day has new, easy-to-remember advice: however many veggie and fruit portions you currently eat, more would be better. Fruits and Veggies—More Matters encourages us to make fruits and vegetables part of every eating occasion. Fresh, frozen, canned, dried, and pure-juice products all count toward this goal, and eating a variety of colors provides the broadest range of nutrients.

In Hawai'i, 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.

*Three out of every four Hawai'i residents don't eat enough fruits and vegetables.*



Photo: Carissa Poon

*At the HMSA Island Fresh Festival, CTAHR extension personnel survey attendees about their vegetable and fruit consumption and tout the nutritional benefits of eating more servings daily.*



Photo: Dale Uno



Using DNA biosensors, CTAHR researchers are developing fast, efficient methods to identify damaging pathogens.

# New Tools for Disease Detection

**F**ound 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, CTAHR researchers are developing rapid detection methods that employ DNA biosensors.

Winston Su is using a combination of molecular and magnetic interactions to quickly isolate *R. solanacearum* cells from dilute samples to facilitate subsequent detection. A team lead by Gernot Presting and Anne Alvarez is analyzing the DNA sequences of several hundred *R. solanacearum* strains collected during the past 30 years by Alvarez to identify regions that can be used to construct probes, DNA molecules

that bind selectively to DNA from specific strains.

Construction of the biosensor is taking place in the lab of Daniel Jenkins. Phages—viruses that attack bacteria—release the DNA from *R. solanacearum* cells. In the future, purified phage enzymes may be used to extract the DNA directly. Next, the DNA is amplified (copied multiple times). This typically requires cycles of near-boiling temperature, but for greater speed, simplicity, and efficiency, amplification processes at lower, constant temperatures are being developed. Detection occurs when a DNA sequence amplified from the bacterium binds specifically to a DNA probe that is linked to a small, disposable electrode. 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.



Daniel Jenkins describes the operation of a handheld electrode reader to Ryo Kubota and Gabriel Peckham.



Asoka De Silva and Mathews Paret compare a protein-based assay currently available to detect *Ralstonia solanacearum* with the new DNA biosensor under development. The biosensor offers hope for improved detection specificity.

Photos: UH Creative Services

# Meeting Local Needs Statewide

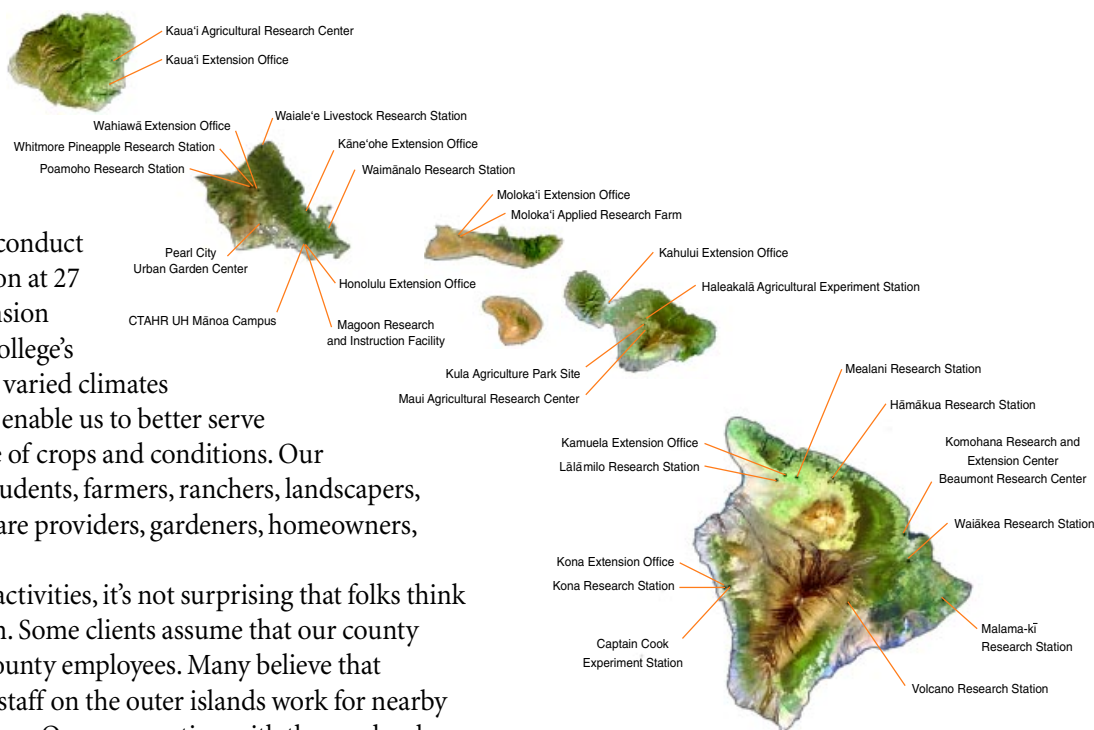
*Given the scope of CTAHR's activities, it's not surprising that folks think we're more than one organization.*

**W**hen the College of Agriculture and Mechanic Arts welcomed its first students in 1908, the entire school fit in a house on Young Street. But Hawai'i's land-grant college didn't stay in one place for long. Through 4-H clubs on O'ahu, Maui, Hawai'i, and Kaua'i, the college that is now CTAHR served communities throughout the territory well before the federal government began supporting this work through the Cooperative Extension Service in 1928. In the decade that followed, the federally funded Hawai'i Agricultural Experiment Station merged with CTAHR, and the college's research and extension expanded further.

Today we offer services on all the major Hawaiian Islands and conduct research, outreach, and instruction at 27 locations statewide. Our 10 extension offices on five islands make the college's assistance easy to access, and the varied climates and soils at our research stations enable us to better serve clients by studying a broad range of crops and conditions. Our programs address the needs of students, farmers, ranchers, landscapers, businesses, resource managers, care providers, gardeners, homeowners, children, elders, and families.

Given the scope of CTAHR's activities, it's not surprising that folks think we're more than one organization. Some clients assume that our county extension offices are staffed by county employees. Many believe that CTAHR's nearly 100 faculty and staff on the outer islands work for nearby UH schools rather than UH Mānoa. Our cooperation with those schools can make matters more confusing. For example, the annual garden fair presented by CTAHR and the Kaua'i County Farm Bureau has been held at Kaua'i Community College, and CTAHR's Kahului and Moloka'i extension offices are located on Maui Community College land.

Whether we're helping Big Island residents maintain safe water catchment systems, working with growers to foster brand identity for Maui onions, or sharing the whimsical Children's Garden with young visitors at the Pearl City Urban Garden Center, CTAHR is committed to serving all of Hawai'i's communities.



*From Kapa'a in the north to Malama-kī in the south, CTAHR conducts field and laboratory research, community outreach, and classroom instruction at 27 locations statewide.*

**COLLEGE OF TROPICAL AGRICULTURE AND HUMAN RESOURCES**

University of Hawai'i at Mānoa

3050 Maile Way, Gilmore Hall 202

Honolulu, HI 96822

[www.ctahr.hawaii.edu](http://www.ctahr.hawaii.edu)

**ADMINISTRATION**

Andrew G. Hashimoto, Dean and Director, 808-956-8234

C.Y. Hu, Associate Dean and Associate Director for Research, 808-956-8131

Wayne Nishijima, Associate Dean and Associate Director for Cooperative Extension, 808-956-8397

Charles Kinoshita, Associate Dean for Academic and Student Affairs, 808-956-6997

Susan Miyasaka, Acting Hawai'i County Administrator, 808-981-2823

Roy Yamakawa, Interim Kaua'i County Administrator, 808-274-3471

Harold Keyser, Maui County Administrator, 808-244-3242

Ray Uchida, O'ahu County Administrator, 808-956-7138

**DEPARTMENTS**

**Family and Consumer Sciences**

Barbara Yee, Chair, 808-956-8105

**Human Nutrition, Food and Animal Sciences**

James Carpenter, Chair, 808-956-8236

**Molecular Biosciences and Bioengineering**

Harry Ako, Chair, 808-956-8384

**Natural Resources and Environmental Management**

Carl Evensen, Chair, 808-956-8708

**Plant and Environmental Protection Sciences**

J. Kenneth Grace, Chair, 808-956-7076

**Tropical Plant and Soil Sciences**

Robert E. Paull, Chair, 808-956-8351

**Impact Report Staff**

Dale Uno, Director, Office of Communication Services

Kathleen Vickers, Writer

Dale Evans, Editor

Miles Hakoda, Graphic Designer

Sharon Tasato, Circulation Services

# *Diversifying, Sustaining, Strengthening*

## **2007** IMPACT REPORT

*A Century of Service*

