

CA&ES Outlook

Cooperative Extension weed specialists Brad Hanson (left) and emeritus Clyde Elmore at a UC Davis field day.

DIANE NELSON / UC DAVIS

Making the CONNECTION

A century of solutions from Cooperative Extension

A photograph of a young orchard with rows of bare trees in a field. The trees are arranged in neat rows, and the ground is covered with fallen leaves. The sky is clear and blue.

For 100 years, Californians have turned to the University of California Cooperative Extension for scientifically sound information to improve their lives. The application of research-based information to agricultural practices, environmental resource management, and human health and well-being has helped the state and its citizens cope with challenges and find new opportunities.

A CENTURY OF COOPERA



Cooperative Extension weed specialist Brad Hanson (left) consults with John Roncoroni, Cooperative Extension weed science advisor for Napa County, in a research orchard at UC Davis.

JOHN STUMBOS/UC DAVIS

TION

Story by
JOHN STUMBOS, ROBIN DERIEUX, and DIANE NELSON

In May 1914, the Smith-Lever Act was signed into law to establish a nationwide system to diffuse “useful and practical information on subjects relating to agriculture and home economics.” This legislation mandated that the new service be located at the country’s land-grant colleges such as the University of California to extend scientific knowledge. Initially known as Agricultural Extension, it became the University of California Cooperative Extension in 1974. Cooperative Extension (CE) today is overseen by UC systemwide Agriculture and Natural Resources (ANR), and its research and outreach address contemporary needs, including food and agriculture, environmental stewardship, healthy families, and thriving communities.

At the heart of Cooperative Extension is a time-tested partnership between its county-based advisors, the people of California, and the CE specialists and fellow scientists based predominantly on UC campuses in Davis, Berkeley, and Riverside. A crucial link in this continuum is the corps of Cooperative Extension specialists who conduct educational activities on and off campus and mission-oriented research in their areas of expertise. Specialists work closely with county advisors on a broad range of activities—helping diagnose agricultural production problems, participating in “field days” to share information about research and new technologies, and coordinating with stakeholder groups on diverse issues such as pest management, nutrition education, youth development, water and air quality, or range management.

In the pages that follow we highlight four UC Davis-based Cooperative Extension specialists working in different disciplines. Samuel Sandoval works with agencies and individuals to develop strategies for water management. Kali Trzesniewski conducts research to help the statewide 4-H program stay on the cutting edge of positive youth development. Brad Hanson helps farmers, ranchers, and others learn effective strategies for dealing with weed management. And Deborah Golino heads a program that provides clean planting stock for agricultural producers.

Cooperative Extension is an integral part of the University of California and has played a vital role in helping the state adapt and thrive for the last century. Read on to see how this innovative program stays on top of important issues to make a real difference in the lives of Californians.

A farmer and extension advisor work together on the running board of a historic Agricultural Extension vehicle.



UNIVERSITY OF CALIFORNIA HISTORIC PHOTO



ROBIN DEREUX/UC DAVIS

Science-based solutions that hold water

California depends on water.

And Californians can depend on water management expert Samuel Sandoval Solis to help conserve this vital natural resource. Sandoval, a Cooperative Extension specialist and UC Davis professor in the Department of Land, Air and Water Resources, provides technical advice on water conservation to farmers and to water management agencies, big and small.

“I help design strategies for water resource challenges, trying to balance the needs of agriculture, industry, the environment, and cities,” said Sandoval, who joined the UC Davis faculty in 2011. “Back in the 1950s or ‘60s, if you had a water supply problem, you just built a reservoir or dug a well. That was the silver



Sam Sandoval provides technical support to water engineers at the State Water Resources Control Board. From left, Scott Ligare, Sandoval, Will Anderson, and Eleanor Bartolomeo.

bullet. Now there are no silver bullets. We have to create integrated strategies to stretch a water system that was originally built to meet a completely different set of objectives.”

As part of his Cooperative Extension duties, Sandoval teaches a seminar called “Climate Change and Hydrology 101” that helps farmers and ranchers in various regions of the state understand how changing water resources in their area will affect local crops. A native of Mexico, Sandoval is able to deliver talks in English or Spanish, depending on the audience.

Sandoval also provides technical advice to water management agencies. He recently helped a small agricultural region in Monterey County—the Pajaro Valley—determine how to conserve water in an area where groundwater overdrafts are causing sea-

water to intrude into freshwater aquifers. Sandoval relishes the complexity of solving water problems. “It’s like putting a puzzle together,” he said. “There are the people using the water, the water agencies, regulations, the politics, the water supply—everything is related. What you do in one area has an impact elsewhere.”

One challenge in making water management recommendations to stakeholders is gaining access to reliable data sets on land and water use. Sandoval and others have begun developing a documented database accessible to anyone doing water planning analysis. Funded by the UC Davis Center for Watershed Sciences, the database will contain information from the California Department of Water Resources, the Federal Bureau of Reclamation, and other sources. This project, which Sandoval considers to be at least a

decade ahead of current practices, should be completed within two years.

“When you think about how California has developed, it’s always been through science, through innovation,” said Sandoval. “Having the correct technical advice at hand really helps the state move forward.” — R.D.

A 4-H program on the cutting edge

Kali Trzesniewski wants to see young people thrive and reach their full potential.

The Cooperative Extension specialist in the Department of Human Ecology is trained in developmental psychology and serves as the associate director of research for the ANR statewide 4-H Youth Development Program. One of her projects is examining a new curriculum delivered to youth in 4-H clubs and after-school programs. It’s called “4-H Thrive!”

“My task is to help evaluate this program to make sure 4-H stays on the cutting edge of positive youth development,” she says. “We’re testing whether the 4-H Thrive! curriculum is better than what we have been using.”

The 4-H program has been helping youth become caring, contributing members of their communities for more than 100 years. When young people join 4-H, they choose from a list of projects that will teach them life skills and expose them to new knowledge. Livestock projects are a good example—and a familiar one to anybody who has been to



Kali Trzesniewski (standing, right), CE specialist and associate director of research for the 4-H Youth Development Program, tests out a new curriculum with the help of staff, volunteers, and youth at an afterschool program in Lathrop (San Joaquin County).

the fairgrounds to see youth compete and show their animals.

One version of the 4-H Thrive! program is currently being delivered to youth between the ages of 13 and 18 who are engaged in leadership projects. What's different about this curriculum is its emphasis on positive youth development concepts. It helps youth identify a "spark," something they are passionate about; learn how to develop a "growth" mindset that focuses on learning rather than outcomes; and cultivates goal-management skills.

"Our hypothesis is that you can take the standard curriculum for a leadership project and you'll get good results," Trzesniewski says. "But you'll get even better results if you combine the core leadership messages with positive youth development concepts."

The 4-H Thrive! project involves Trzesniewski's research, 4-H state office staff who create the curriculum materials, county Cooperative Extension advisors and program representatives who manage activities locally, and trained 4-H volunteer leaders and afterschool staff who are the

curriculum teachers. The project is supported by a gift from the Thrive Foundation, while Trzesniewski's evaluation of the program is funded by a grant from UC Agriculture and Natural Resources.

One of the principal ideas the curriculum teaches is that the brain is like a muscle. The more you work it, the stronger it gets. The important thing is to challenge the mind, not whether you succeed or fail. "Failure is really scary if you think you can't change," Trzesniewski said. "But if you feel that you can change, you can get smarter and gain new abilities, then a challenge can be fun." —J.S.

Working to battle agricultural bullies

Don't let their names fool you. Weeds like "hairy fleabane," "junglerice," and "three-spike goose grass" might not sound like tough guys. But left unchecked, they cripple crop production in California, consuming the water, light, and nutrients other plants need to grow.

"Weeds are bullies," said Brad

Hanson, UC Cooperative Extension (CE) weed specialist with ANR and the UC Davis Department of Plant Sciences. "You don't have agriculture if you can't find safe, effective ways to fight weeds."

Hanson is a pivotal player on a UC weed-fighting team that helps keep California agriculture strong. As a Cooperative Extension specialist, he conducts cutting-edge research and disseminates information pest control advisers, UC farm advisors, and growers need to fight agricultural bullies.

"Brad is our point man, our last line of defense," said David Doll, CE pomology farm advisor in Merced County. "What treatment should growers use on certain weeds in specific situations? Brad Hanson helps answer those questions and more."

Hanson specializes in weeds that affect woody perennials—virtually any crop that grows in an orchard or vineyard. He and his team test herbicides and other treatments in controlled settings, providing unbiased information on their strengths and weaknesses.

"That's invaluable," said John Roncoroni, CE weed science advisor in Napa County.

Even when growers find products that work, Hanson helps design alternative treatments to keep weeds from developing resistance. He also helps producers deal with herbicide drift, which can happen when sprays drift and damage nearby crops.

"We make field calls, sometimes with a pathologist and entomologist, trying to determine the source of crop injury," Hanson said. "Symptoms can be confusing. Are they caused by disease? Insects? Herbicide drift? Frost? Drought?"

Some members of the weed-fighting team spend most of their

time in the lab, conducting basic science needed to solve applied problems in the field. Specialists like Hanson help disseminate the findings and let them know what issues to address.

“We’re translators,” Hanson said. “We’re the folks in the system who can translate what the molecular geneticists and physiologists discover to the folks who drive the tractors, and vice versa. We span the boundary, from field to lab.”

And specialists couldn’t bridge that gap without Cooperative Extension farm advisors, Hanson said. “They’re our eyes and ears in the field,” he said. “They tell me what’s going on out there, which helps us design our research.”

Roncoroni said bullies like hairy fleabane face a worthy foe in Hanson.

“He’s knowledgeable and fantastic to work with,” Roncoroni said. “Growers love him. Brad collaborates well, which is what Cooperative Extension is all about—working together to meet society’s needs.” — D.N.

One specialist, one crucial industry aid

About a year ago, UC Davis’ Foundation Plant Services (FPS) announced to the winegrape industry that a virus called “red blotch” had been discovered in the Napa Valley. UC Davis scientists immediately went to work on it, cloning the virus with the latest technology and developing diagnostics to distinguish the pathogen from other plant viruses.

“It’s been a frantic year of people looking everywhere for the virus and worrying about vineyards that have been infected and whether their grapes were going to be okay,” said Deborah Golino, a Cooperative Extension plant pathologist and FPS director. “Anything that affects the sugar, aromatics, and pigmentation of the winegrapes is going to worry winemakers.”

Foundation Plant Services, which is the source of all California’s certified grape nursery stock, has taken steps to ensure its vines remain free of red blotch. “New technology will allow us to do an even better job of

providing healthy material to our nurseries and growers,” she said.

When Golino was hired to run Foundation Plant Services in 1994, the program had a staff of eight. The self-supporting center in the College of Agricultural and Environmental Sciences now has 35 employees and grosses about \$3.5 million annually, mostly from the sale of plant materials, user fees, and industry contributions.

While grapes are the largest commodity handled by Foundation Plant Services, the program also distributes other disease- and identity-tested planting stock. FPS has the largest public clean-stock rose collection in the world. California’s sweet potato growers rely on FPS to produce thousands of disease-free rooted cuttings each year. The university’s strawberry breeding program depends on FPS to virus test stock before distribution to UC licensees. And the foundation orchard includes clean varieties of almond, apricot, cherry, nectarine, peach, and plum.

Foundation Plant Services houses the only dedicated grape importation facility in the U.S. Grape varieties from foreign sources must pass through quarantine, which involves a lengthy process of inspection, propagation, lab testing, tissue culture, varietal identification, and regulatory approval—typically more than five years before registered material becomes available.

Research demonstrates the value of disease-free grapevines. UC Davis economists determined that if all winegrape growers in the North Coast region used certified planting stock it would translate to a benefit of more than \$60 million annually.

“By investing in us, the nurseries are helping growers who may not even be aware of virus issues because they’ve been protected from virus issues by the program for so long,” Golino says. —J.S.

JOHN STUMBOS/UC DAVIS



Every commercial California sweet potato is derived from planting stock grown in this Foundation Plant Services greenhouse. CE specialist Deborah Golino (right), who leads the program, talks with production manager Michael Cunningham.