

UC | **University of California**
CE | **Agriculture and Natural Resources** | **Cooperative Extension**

1
9
1
4



**Centennial
Report**



2
0
1
4



Farm and Home Advisors

From the County Director

For the past 100 years University of California Cooperative Extension has responded to societal, farm and community needs and led the way with innovative researched-based answers. The Extension caravans and demonstration trains connecting communities with their University were important methods of conveying up-to-date information on food production and preservation and improving the quality of life for rural Californians. Our methods have changed with the times and our scope of work has expanded, but our mission remains the same. Advisors and their staff, housed in the County of Kern Farm and Home Department, are a Practical, Connected and Trusted resource for science-based information in agriculture, natural resources, community resource management, nutrition, family and consumer science, and 4-H youth development.



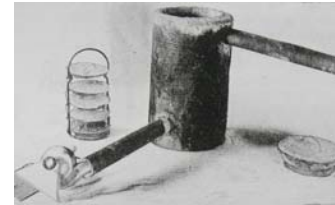
It is impossible to fully convey the hard work of our highly dedicated and talented current and former advisors and staff and their impact on individuals and communities. This is but a snapshot of the extensive work performed by UCCE—Kern County. The next 100 years will bring new challenges and opportunities. UC Cooperative Extension is well prepared and positioned to address those needs; researching, developing and promoting **Healthy Food Systems**, **Healthy Environments**, **Healthy Communities** and **Healthy Californians**.



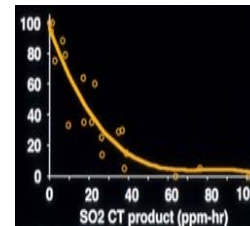
Dr. Brian Marsh

Post harvest fruit quality is critical to profitable production and marketing.

SO₂ use for table grapes started between 1915-1917



Stove for rapid burning of sulfur



1980-1990

SO₂ loses “generally recognized as safe” status. UC Advisors develop “Total Utilization Program” to meet residues standards and Air Pollution district regulations.



UC Advisors continue to conduct research on growth regulators and girdling, canopy and cluster management, pest and disease resistant rootstocks, irrigation management and plant nutrition.

#1 Commodity since 1993[†]

Year	Acres	\$ Value
1930	20,100	2.99 million
1950	29,500	19.9 million
1970	39,500	41.3 million
1990	81,400	286.7 million
2013	107,500	1.82 billion

[†] #2 from 2005 to 2008, #3 in 2011



Sulfur injection research



Amonds

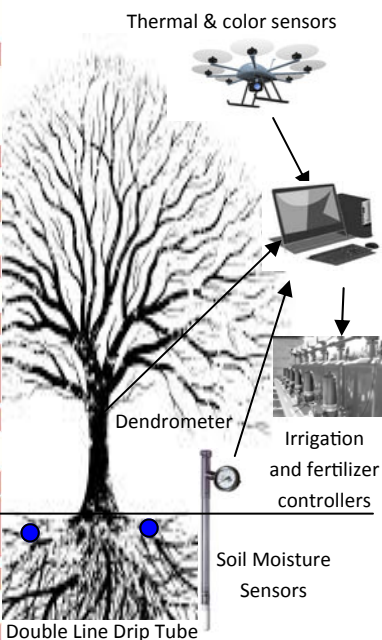
The Art and Science Pruning

The art of pruning is the ability to create an eye-pleasing tree canopy utilizing the tree’s natural growth habit. The science of pruning is the ability to utilize research-based information to create a long lived productive canopy. Stiffening cuts, heading cuts, thinning cuts, topping and hedging are important components of light management throughout the canopy. This creates the healthiest and most productive tree architecture. UCCE Advisors have a long history of conducting pruning research projects and education programs.



Year	Acres	\$ Value
1930	50	10,000
1970	22,470	2.1 million
1990	81,350	107 million
2013	148,600	971 million

Water and Fertility



An orchard that irrigates and fertilizes itself when needed. It’s not futuristic, it’s now. Canopy temperature, aerial imagery, soil moisture, dendrometer and flow meters combine for precision application of water and fertilizer, when the trees need it. Water use efficiency of 95% and nitrogen use efficiency of 85% have been documented using this state-of-the-art technology. UCCE Advisors in close collaboration with equipment manufacturers and growers are testing the dependability and value of this high tech system.

Pistachios

Kern County Farm Advisors have been breeding pistachio trees for many years and maintain a germplasm collection. 2,000 crosses are being evaluated for potential release.



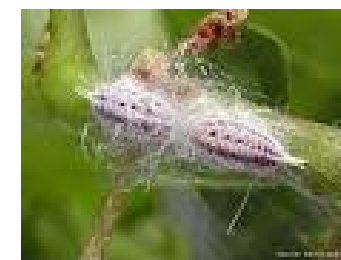
Golden Hills and Lost Hills varieties were recently released.

Year	Acres	\$ Value
1970	556	N/A
1980	12,000	28 million
1990	22,760	77.5 million
2000	29,000	124 million
2013	78,500	388 million



Research conducted by UCCE—Kern County Farm Advisors established the level of salt tolerance for Pistachio trees. Thousand of acres have been planted since the release of that report.

Gilli mealybug is an invasive pest spreading quickly throughout the state. It thrives on pistachio trees and feeds on the cluster, thus reducing both the size and the quality of pistachio nuts. A UCCE Kern County Advisor conducted research to determine its life cycle, number of generations per year, its distribution in a tree, the effect on nut quality, as well as control methods through monitoring programs coupled with biological and chemical control.



Cotton

1916 — USDA sends Bill Camp to California to investigate potential for cotton production.



1918 — UC Farm Advisor Myron Rice organizes grower group. First cotton gin installed in Kern County.

1922 — US Cotton Research Station is established.

1926 — One Variety law enacted. UC researchers conduct irrigation and other experiments. By 1960 eight UC researchers are located at Shafter.



1930 — Cotton #1 crop in Kern County grown on 51,000 acres and valued at \$3,000,000. Cotton remains #1 crop until 1993.



1960s— Pink Bollworm explodes in Southern California. UC and other researchers develop biological control practices of host-free period and sterile moth release.

1980s— Pima cotton reintroduced. This premium fiber cotton now dominates California cotton acreage.



2010s— UCCE Farm Advisors and Specialists conduct research on nutrient management, soil fertility, weed control, growth regulators, drip irrigation, defoliation, area-wide insect management and fusarium wilt.

Vegetables Plant Pathology

UCCE Advisors conduct research on all aspects of vegetable production.



Varieties developed by universities, USDA, or private breeders from all over the US are planted in replicated trials in a grower's field as the Kern County Potato Evaluation Trial.



Potato, Tomato & Carrot		
Year	Acres	\$ Value
1930	2,830	935,000
1950	46,800	25 million
1990	58,640	258 million
2013	51,100	499 million

The trial is harvested, graded, and evaluated to determine best adaptable varieties for Kern County.

Variety trials for many crops are conducted annually by UCCE advisors.



Mycorrhiza hyphae (dark blue) colonizing root epidermal cells (light blue)

Arbuscular mycorrhizal fungi (AMF) are obligate symbiotic fungi that colonize the roots of vascular plants. AMF symbiosis is typically mutualistic, meaning both the plant and the AMF provide benefit to each other. Extra-radical hyphae of AMF can effectively act as extensions of the plant root as they extend up to four inches beyond the root to acquire soil nutrients. Most importantly, AMF increases P uptake and yields in many crops such as garlic, onion, celery and potato. Species diversity of arbuscular mycorrhizal fungi in agricultural systems and undisturbed sites in Kern County was studied. The composition of AMF was limited at all sites to two species, *Glomus mosseae* and *G. intraradices*. There were no differences in species diversity between conventional and organic farming systems. Carrots are highly dependent on mycorrhizae for optimum phosphorus uptake and growth.

F amily, Home and Consumer Science



1923
21 Home Demonstration Agents in county offices, emphasis on food preservation and household management.

1940
Home Demonstration Agents and Farm Advisors lead wartime committees, organize child care, conduct war bond campaigns and organize state militia.

1960
Program emphasis changes to science-based nutrition, consumer economics and healthy family relationships.



1990
A team of UCCE home economists develops the Money Sense program to help low-income families improve their financial situation.

2002
California Children's 5-a-day—Power Play Campaign is tested.

2012
14,000 Kern County participants attend financial or nutritional education.

2013
Program expands to Eastern Kern County

Financial Curriculum

Making Every Dollar Count

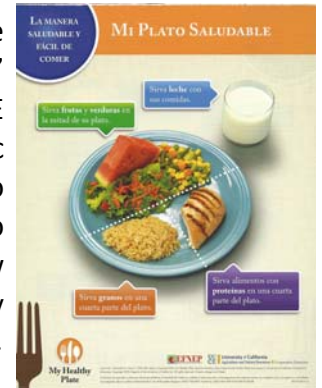
5 lessons include:

- ◆ Goal setting
- ◆ Making good choices
- ◆ Saving money on food
- ◆ Effects of food advertising on your purchases
- ◆ Stretching your dollars with community resources



UC Advisors have led the way nationally in the development and testing of the “plate” approach to nutrition education. UCCE Advisors and Specialists tested a graphic almost identical to MyPlate several years ago and the work was shared with USDA prior to the adoption of MyPlate by USDA as the new graphic to remind Americans about healthy eating at mealtime.

MyPlate



“Creating and Sustaining Your School Garden”

UCCE-Kern County Advisors and staff assisted schools, youth organizations and clubs in obtaining grants for gardens and nutritional programs that targeted at-risk children.



HEALTHY CALIFORNIANS 4-H Youth Development

Leadership, Citizenship, Life Skills



Boy's and girl's agricultural clubs in rural areas of California were organized as early as 1912. In 1928, the title "4-H" was used in reports on youth activities. The goal was to train youth in agricultural skills and

to influence adults through the youth projects. In the 1950s, 4-H began to extend into urban areas as well. The focus of 4-H became centered around the personal growth of the



member. Life skills development was built into 4-H projects, events and activities to help youth become contributing, productive and self-directed members of society. The organization changed in the 1960s, combining 4-H groups once divided by gender or race into an integrated program.

4-H activities have expanded to include:

Science, Engineering and Technology
An after-school, inquiry driven, experientially based activity directed at urban youth.



Outreach Programs

Several hundred youth have participated with the vast majority coming from lower income families. The highlights for the participants were a summer camp, a winter camp, and a soap box derby. Summer camp included a traditional resident camp setting with all the amenities, such as horse back riding, archery, and crafts. At winter camp, youth participated in activities such as sledding, skits, and science projects. The soap box derby was the climax of the program. Youth who had helped construct soap box derby cars raced them in a contest at a youth festival set up especially for them.



Today, 820 youth and 235 adult volunteers participate in a variety of 4-H clubs in Kern County that help foster leadership skills.

4-H continues to grow and develop with head, heart, hands and health for our youth.

Military Programs

A collaborative effort with America's communities to support children and youth impacted by deployment.



Natural Resources

Water quality and waterborne pathogens in streams is a concern, especially in relation to animal agriculture. The perception is that cattle are the major source of water borne pathogens. Studies looked at livestock and wildlife generation of the waterborne pathogen *Cryptosporidium* spp. The data show wildlife are a much bigger source of environmental loading of *Cryptosporidium* than livestock.



Pathogen Generation Equivalence

1 coyote	6-8 cows
1 ground squirrel	6-8 cows
1 skunk	17 cows
1 marmot	95 cows

Managing Rangelands



UCCE advisors have a long history of rangeland management research. Fire, herbicides, predatory insects, mowing, tillage and grazing have been used to control unwanted plant species and optimize forage production.



Vegetation assessment is critical to determine forage production and loss due to drought. It is important data that can be correlated with other commonly collected vegetation measurements.



UC researchers have worked with ranchers to determine the cause of Foothill Abortion. The Pajaruello tick was identified as the carrier. Development of a vaccine to control the causative bacteria continues, which could save up to 90,000 calves each year.

Air Quality

1944—Extension Service researchers study air pollution damage to various crops to establish causality and identify research-based solutions.



Air pollution injury on spinach leaves. Severe leaf scorching made crops “unmarketable.”

1990s—UCCE conducts research on the effect of elevated CO₂ and ozone levels on plants. Research shows purple nutsedge is more competitive than Pima cotton under high ozone concentrations.

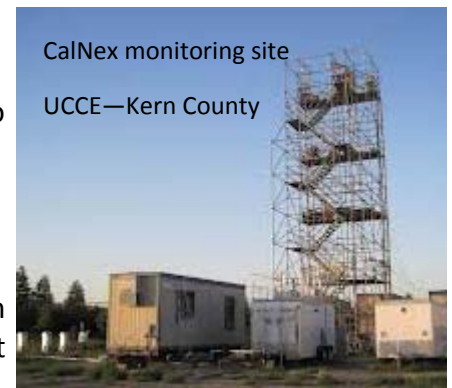


Ozone structures at KREC

2006—CalNex

Tall scaffold towers with multiple collection and sensing instruments, aircraft with odd protuberances, and the research vessel Atlantis cruised the coastline laden with its own array of analytical devices.

This was a coordinated set of activities to analyze physical and chemical processes in the atmosphere. Knowing what chemicals are put into the atmosphere, whether from nature or human activity, and how those chemicals react with each other, are essential to predict their effect on air quality and climate. A UCCE—Kern County Advisor and UC campus based researchers were key participants in designing and conducting this multi-university, multi-agency project.



CalNex monitoring site

UCCE—Kern County

UC Cooperative Extension Centennial Time Line

1862 President Abraham Lincoln signs the Morrill Act, authorizing federal funds for the development of agricultural "land-grant" colleges in each state.

1868 University of California opens to teach "agriculture, mining and the mechanical arts."

1887 Hatch Act passed establishing Agricultural Experiment Stations

1906 Research farm at Davisville established. UC Davis becomes 7th campus in 1959.

1907 Citrus Experiment Station established in Riverside. The College of Letters and Science opens for classes in February 1954 to become UC Riverside.

1914 Smith-Lever Act establishes Cooperative Extension nationwide.
R.R. Mack begins service as first farm advisor in Kern County in August.

1920s Agriculture Clubs officially become 4-H Clubs. "4-H" appears for the first time in California reports on youth work.

1930s Researchers make significant progress in soil fertility studies. New chemical dusts and sprays are introduced for control of smut and fungus on crops.
Congress approves the Soil Conservation and Domestic Allotment Act to conserve soil and prevent erosion. Agricultural Extension Service agents are assigned the responsibility to carrying out the organizational work.

1940s Farm advisors and home demonstration agents provide leadership on wartime committees, conduct war bond campaigns, organize child care, provide information on blackouts and organize a state militia that recruits more than 23,000 volunteers.
With establishment of the US Forest Service and national forests, ranchers encounter severe limitations on grazing range for their livestock. Agricultural Extension Service advisors step in to help determine the most efficient locations and methods for feeding cattle.

1950s UC Ag Extension specialists coordinate with USDA researchers to develop new shade structures that will help keep livestock comfortable and healthy in hot weather.
UC Davis scientists working with farm advisors develop and test tomato varieties around the state, identify three new hybrids with superior yields.

Farm advisors work with farmers to improve irrigation efficiency, applying water based on soil and crop needs thus reducing runoff and overwatering.

Concerns rise over urban sprawl and the resulting loss of productive farmland. Extension efforts in production agriculture contribute to rapid advances in farm productivity and mechanization.

1960s 4-H institutes new programs suited to urban, low-income areas.

UC Extension scientists continue their biocontrol efforts, releasing imported parasitic wasps for control of specific citrus pests, such as California red scale. Their pioneering biocontrol efforts begin to take hold around the state.

1970s UC officially recognizes the broadening social and economic purview and gives the Agricultural Extension Service its new name, UC Cooperative Extension (UCCE).
Statewide Integrated Pest Management Project accelerates education and research into alternatives that require less use of pest-control chemicals.

1980s Integrated Hardwood Management program is established, and charged with investigating the problems that face oak trees and other California hardwoods.
4-H Club members, aged 9 to 19, number about 76,000 in California. More than 40% of members live in large cities or suburbs, and 55% of them are girls.

1990s UCCE researchers investigate use of sprinklers, microsprinklers and drip systems, and document agriculture's shift from furrow and flood irrigation.
Windblown dust in Southern California's Antelope Valley becomes an increasing pollution concern. UCCE scientists respond, finding new ways to stabilize the soil and reduce airborne dust.

2000s UCCE study finds that school gardening projects go beyond just teaching how to till, plant, and weed—they also teach kids healthier eating habits.
A team of UCCE scientists develops an IPM method to deal with sudden oak death, a disease that has killed tens of thousands of oak trees in the state.

2010s UCCE advises agriculture on nutrient and irrigation management strategies to control nitrate pollution. A fifth strategic initiative addressing Water Quantity, Quality and Security is launched.

2014 UC Cooperative Extension celebrates 100 years of putting science and service to work for Californians in local communities.



UCCE Kern County Advisors

John Borba; 4-H Youth Development

Ashraf El-Kereamy, Ph.D.; Viticulture

Julie Finzel; Livestock & Natural Resources

David Haviland; Entomology

Margaret Johns; Family, Home & Consumer Science

Craig Kallsen; Citrus & Pistachio

John Karlik, Ph.D.; Environmental Horticulture & Science

Brian Marsh, Ph.D.; County Director & Field Crops

Joe Nunez; Vegetable Crops & Plant Pathology

Blake Sanden; Irrigation & Soils

Alex Souza, DVM, Ph.D.; Dairy

Emeritus Advisors

Darlene Liesch; County Director & Youth Development

Don Luvisi; Viticulture

Ralph Phillips, Ph.D.; Livestock & Natural Resources

Mario Viveros; Nut Crops



University of California
Agriculture and Natural Resources

Cooperative Extension

ucanr.edu

cekern.ucanr.edu