

Working for the Benefit of All Californians

2020 UC ANR Annual Report



Delivering the UC ANR Mission



Amidst a year of remarkable challenges in 2020, the University of California Agriculture and Natural Resources (UC ANR) workforce continued critical efforts in agriculture, natural resources, nutrition, economics, and youth development to improve the lives of all 40 million residents in California. More than ever, the overlapping public health crisis

of COVID-19, the unprecedented California wildfires, and the social unrest that overwhelmed our nation has strengthened our commitment to UC ANR's core public values:

- Promoting economic prosperity
- Developing a qualified workforce
- Safeguarding abundant and healthy food for all
- Protecting California's natural resources
- Building climate-resilient communities and ecosystems
- Promoting healthy people and communities
- Developing an inclusive and equitable society

When UC ANR offices across the state closed due to COVID-19 shelter-in-place orders, our organization quickly pivoted to a remote platform where staff could continue to work with partners and communities safely. As a trusted resource across the state, many of UC ANR's frontline staff were called upon to distribute science-based information to support growers and to help mitigate disruptions to California's food system. With the pandemic disproportionately affecting California's most vulnerable communities, our nutrition education programs focused on supporting families' food security and physical health. All of UC ANR's statewide programs demonstrated resilience and ingenuity by transitioning

their expertise and educational resources into engaging virtual programming. UC ANR also hosted its first [virtual tour](#) for 40 legislators, UC Regents, UC President Drake, and new members of the UC President's Advisory Commission on Agriculture and Natural Resources.

California's catastrophic wildfires have burned over 6 million acres since 2016, harming forested landscapes, wildlands, and urban areas. UCCE advisors are trusted experts who provide resources for community wildfire planning, fire adaptation, and resiliency throughout California. This work is amplified through the UC ANR network of community educators and thousands of volunteers who are empowered to take the latest information about fire preparedness, fire safe landscaping, and home hardening, and deliver it directly to those who need it most.

Guided by our [UC ANR Principles of Community](#), our staff, academics and leadership worked to expand efforts on diversity, equity, and inclusion (DEI), which helped inform UC ANR's new 2020-2025 strategic plan. Through an informal DEI Alliance, employee affinity groups, and staff and academic assemblies, the UC ANR system strove to recognize and address conscious and unconscious bias in our programs and workplace. Although much work remains on the path to racial justice, we will continue to improve upon the organizational reflection, relationships, and responsibilities required to meaningfully address these issues in communities across California and beyond.

Despite tumultuous events, an \$11.3 million loss of funding for FY 20-21, and systemwide hiring freezes, UC ANR continued to deliver on its mission and conduct research and programming to provide science-based solutions to local and statewide problems. New partnerships were formed, such as the one with Clif Bar that launched the UC Organic Agriculture

2019-2020 Highlighted Outputs & Activity



20

novel ideas led to patents

1,150

policy engagement activities



2,240

credible, audience-driven educational materials

>30,440

meetings, workshops, field days and courses held



708,400

direct contacts/ educational exchanges with adults and youth

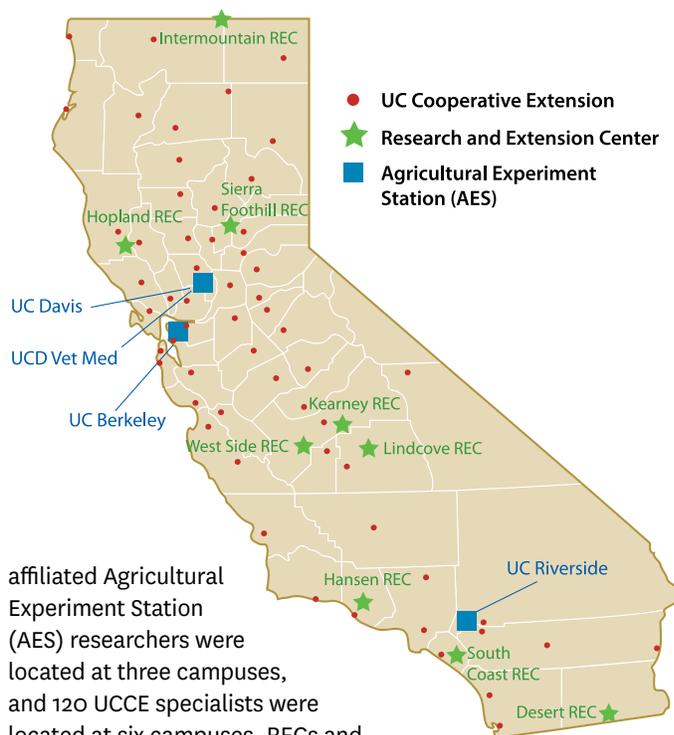
Institute, which builds upon the existing strength of UC ANR's Cooperative Extension and accelerates the adoption of tools and practices for organic farmers or those adopting organic farming methods.

As we look towards the future and the health and well-being of people and the planet, we are certain we will continue to face situations we have never seen before. We will all need to share information, look for synergies, and collaborate in new ways to meet the demands of these times. We welcome your partnership toward these efforts and look forward to joining forces with you in the years to come.

*Glenda Humiston,
Vice President, UC ANR*

UC ANR operates a statewide network of researchers and educators dedicated to the development and application of knowledge to address local agricultural, environmental and health issues. The network of local Cooperative Extension sites and research and extension centers is often the face of the University to residents who may never set foot on a UC campus. By working and living among those we serve, UC ANR expands UC's reach to engage all people and communities in California, ensuring equal access to the UC system.

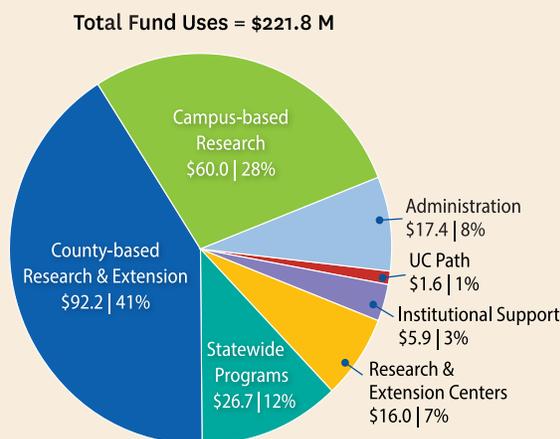
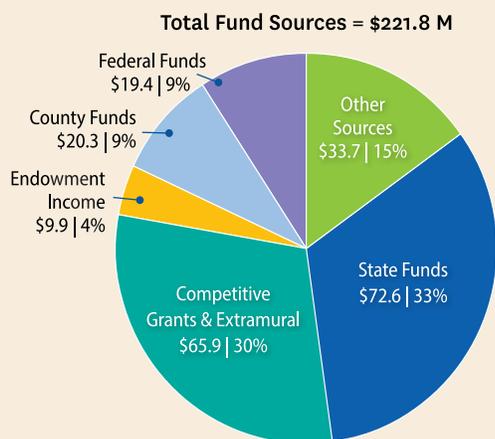
In 2020, 150 University of California Cooperative Extension (UCCE) advisors conducted research, outreach and education from locally based CE offices serving all 58 counties from 70+ locations throughout the state, and over 260 Community Educator Specialists delivered evidence-based programming to the public. Nine research and extension centers (RECs), located in a variety of ecosystems across the state, provide places for researchers to conduct field experiments and educational opportunities for the public. Approximately 560



affiliated Agricultural Experiment Station (AES) researchers were located at three campuses, and 120 UCCE specialists were located at six campuses, RECs and county offices.

UC ANR includes statewide programs and institutes, which work through and with our county offices and community partners. The statewide programs include UC California Naturalist, UC Master Gardener, 4-H Youth Development, Expanded Food and Nutrition Education, UC Master Food Preserver, Informatics and Geographic Information Systems, UC Integrated Pest Management, UC Sustainable Agriculture Research and Education, Agricultural Issues Center and CalFresh Healthy Living, UC. The institutes are the Nutrition Policy Institute, California Institute for Water Resources, and UC Organic Agriculture Institute.

UC ANR Division Budget FY 2019-2020



Promoting Economic Prosperity in California



Enhanced community economic development

New citrus introduction encourages job growth

A UCCE specialist at UC Riverside directed the California Citrus Clonal Protection Program (CCPP), the first program of its kind in the world, which provides a safe mechanism for statewide introduction of new citrus varieties through methods such as in vitro variety therapy and disease diagnostics for propagating healthy citrus trees. From the 14 new citrus varieties that completed therapy and testing by the CCPP in 2020, four varieties were introduced by large California citrus producers. Citrus growers estimate that every commercially viable CCPP variety introduction creates one to two jobs per acre out of 1,000 to 1,500 acres typically planted for new varieties. (Georgios Vidalakis)

Protecting family farmers during COVID-19

UCCE in Santa Clara County provided technical assistance to 185 farmers from socially disadvantaged communities to apply for COVID-19 emergency relief grants. These programs were designed to help farms

better absorb sales declines and increased marketing costs associated with the pandemic. Of the farmers who worked with UCCE Santa Clara, 155 received a total of over \$3 million in relief funds, helping to sustain local farms at a critical time and protect California's food system.

(Qi Zhou)

Watershed project generates jobs to expand forest restoration

UCCE partners with the Nature Conservancy, Sierra Nevada Conservancy, American River Conservancy, Placer County Water Agency, Placer County, and the U.S. Forest Service on the award-winning French Meadows Project, which measures and models water, carbon, and forest health benefits of watershed restoration. The project has resulted in 3,100 acres of forest restoration across 28,000 acres of federal and private land. In the year 2020 alone, the project generated jobs for more than 100 contractors. It also moved 1.4 million board feet of timber to a local mill and more than 1,200 tons of biomass to local renewable energy facilities to help offset restoration costs and contribute to the local economy.

(Safeeq Khan)

Improved individual household and financial stability

Los Angeles families save money on food

UCCE academics provided oversight, leadership and guidance for the statewide implementation of the Expanded Food and Nutrition Education Program (EFNEP), which serves adults with income less than 185% of the federal poverty level. Surveys of EFNEP participants in Los Angeles County who participated in Eating Smart Being Active workshops showed that 82% of 210 participants improved in one or more food resource management practices. Forty-five participants indicated that they saved an average of \$80 a month on groceries. ([Natalie Price](#))

Improved animal management, productivity and efficiency

Cattle grazing as a tool for preventing fires

UCCE livestock and natural resources advisors and UC postdocs and graduate students worked on a collaborative research project to analyze how cattle's consumption of fine fuels, such as grasses and other herbaceous plants, can affect fire behavior and safety. The project, funded by the California Cattle Council, will help inform new statewide recommendations. It caught the attention of the National Cattlemen's Beef Association that is exploring including this new research as part of their national sustainability science communication efforts and life cycle analyses. ([Devii Rao](#), [Sheila Barry](#), [Luke Macaulay](#), [Royce Larsen](#), [Matthew Shapero](#), [Max Moritz](#), [Larry Forero](#))

Teaching safe and sustainable management for urban backyard flocks

UCCE provided workshops on backyard and pastured poultry for 29 participants in the Southern San Francisco Bay Area. All workshop participants increased their knowledge of pastured poultry, 91% increased their knowledge of egg handling and food safety, and 82% increased their knowledge of bird health and diseases, bird behavior and welfare, and managing poultry during disasters. ([Lucy Diekmann](#), [Aparna Gazula](#))

Increased agricultural efficiency and profitability

Turning food waste into crop fertilizer

AES researchers at UC Riverside are investigating the benefits of sustainable crop production and water use efficiency from recycling food waste as biofertilizers in horticultural crop production. Microbiologists have found that

including fermented food waste in the water supply for pot-grown citrus trees promoted the growth of beneficial bacteria around the plant roots, with potential benefits for plant growth, plant health, and the production efficiency of the plants. By recycling food waste, the experimental system can help close a major gap in the sustainable recycling of resources in modern societies. With more than half of the world's population living in urban settings, recycling resources from cities back to agriculture is a major opportunity. ([Samantha Ying](#))

Research on vineyard mechanization increases profitability

In response to increases in manual labor costs and severe labor shortages, UCCE Fresno and UC Davis have been researching strategies for mechanical pruning, leafing and shoot thinning to support California's \$6.25 billion wine industry. Their research also confirmed that mechanization has no negative effects on grape and wine quality, rather, that it carries potential to improve them. As a result, over 30,000 acres of wine grape in San Joaquin Valley converted to a type of mechanization based on UCCE's findings, potentially saving up to \$15 million per year based on [UC's cost studies](#). ([George Zhuang](#))

Business management skills increase farmers' cash flow during COVID-19

UCCE Placer and Nevada counties delivered workshops on building producers' business management skills, risk management and planning, and economic and market analysis. During the COVID-19 pandemic, the program shifted workshops to a virtual platform and expanded public reach through the UCCE Foothill Farming website. Nineteen Farm Business Planning graduates shared their successes and challenges, with 58% reporting the



34%

sales increase for farmers who participated in UC SAREP trainings on regional collaborative models

\$58.10

monthly food cost savings reported by 497 EFNEP families statewide



ability to adjust their operations and increase cash flow during the first six months of the pandemic. Additionally, the program's public-facing "Farm Business pages" were accessed 20,110 times and a Farm and Ranch Standard and Emergency Operations Procedures template was downloaded 2,584 times. (Cindy Fake, Dan Macon)

New IPM model shows potential to increase farms' sustainability and income

A UCCE advisor has redefined the integrated pest management (IPM) paradigm toward a new model that revisits ecological aspects of pest management and emphasizes economic viability, social acceptance, and environmental sustainability. Surveys have shown that these new recommendations were helpful for 115 local and international clientele, with 96% responding that they found the information useful and that they intended to apply the new knowledge with their farmers. Collectively, these clients account for 955,000 acres with a potential \$33.5 million improvement in farm income or savings. (Surendra Dara)

UC's biological control program protects California's citrus industry

At UC Riverside, a UCCE specialist conducted several years of research on a natural enemy for the Asian citrus psyllid, which spreads the bacterium that causes the citrus-killing disease huanglongbing and threatens the industry. This included importing, safety testing, mass rearing, and releasing *Tamarixia radiata* to establish, spread and suppress the target pest populations. In partnership with the California Department of Food and Agriculture (CDFA), UCCE's research found that Asian citrus psyllid incidence was reduced by 70%, and even more in some areas, after implementing the biological control program. Multiple studies now confirm that biological control may have helped to protect the citrus industry from huanglongbing across different years and geographic locations through the state because Asian citrus psyllid populations have been significantly and permanently reduced by natural enemies. (Mark Hoddle)

Increased emerging food economies and markets

Advancing research and policy on hemp production

Due to its network of academics throughout the state, UCCE is a leader within the UC on hemp production research. UC ANR conducted the first UC field trials at two UC facilities after the crop was legalized in the 2018 Farm Bill. UCCE academics engaged extensively on hemp policy with local county boards of supervisors, CDFA, and

agricultural commissioners throughout the state. Their expertise enabled the Sutter County Board of Supervisors to make evidence-based decisions with regard to hemp production in their region. Additionally, UCCE academics quickly responded to grower needs by producing extension materials about protecting bees while producing hemp, and to address herbicide drift concerns with this new commodity. A UCCE agronomy advisor led a training for employees from Agricultural Commissioners' offices in hemp-producing regions throughout the state on identifying herbicide drift symptoms in hemp. (Sarah Light, Dan Putnam, Bob Hutmacher, Brad Hanson, Charles Brummer, Ian Grettenberger, Cassandra Swett)

New market opportunities for food hubs and farmers

For the past five years, UC SAREP has organized, convened and provided technical assistance to the California Food Hub Network, consisting of 21 food hubs that each purchase from approximately 40 different farms. After UC SAREP's training on food hub financing, 85% of the 13 food hub participants reported knowledge gain on their financial infrastructure, 69% on completing an action plan for their businesses, and 69% on using financial, sales and other projections to build a financial plan for their business. (Gail Feenstra)



Protecting California's Natural Resources



Improved water quality

Fertilizer management research helps protect groundwater

In response to groundwater nitrogen regulations, a collaborative project between statewide UCCE agronomy advisors and researchers at UC Davis was designed to help growers maximize their crop yields return per unit of fertilizer used. Research and demonstration was conducted in fields in Siskiyou, Colusa, Yolo, Solano, Sacramento and Kings counties during the bulk of the growing season, and used several in-field tools such as reference areas, soil sampling kits, hand-held chlorophyll meters, and refined methods that help growers react to crop conditions in-season. These tools helped reduce nitrogen applications to the field by 30% and increased capacity to respond to seasonal conditions at the Yolo County site, for example. These practices carry potential to prevent nitrogen leaching into groundwater and reduce the production of nitrous oxide greenhouse gas and ammonia gas, an significant air pollution constituent, while helping growers maintain productivity and economic sustainability. (Nick Clark, Giulano Galdi, Thomas Getts, Sarah Light, Mark Lundy, Konrad Mathesius, Michelle Leinfelder-Miles)

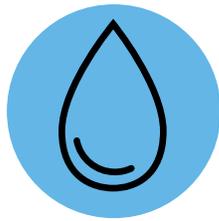
New technologies inform water quality decision-making

The Range Health Conditions Assessment and Monitoring Program is a 7-year project with the East Bay Municipal Utility District (EBMUD) that seeks to address several land management issues, including livestock grazing and its potential impact on drinking water. UCCE built a web-based platform for field staff and local ranchers to collect and use geographic information system (GIS) data, which improves how data is collected and used to inform management decisions. EBMUD, which oversees water quality for 1.3 million Bay Area residents, adopted these new technologies and is exploring applications to other divisions, such as integrated pest management and recreation. (Scott Oneto, Theresa Becchetti)

Improved water use efficiency

Analyzing global irrigation practices

A UC Agricultural Experiment Station scientist at UC Berkeley improved a previous assessment of unsustainable irrigation water consumption which found that about 40% of global irrigation by volume is unsustainable based on 16 major crops that account for 70% of global crop production. This newer, more comprehensive study considered



1,200

growers and land managers adopted practices to meet groundwater management regulations



4 million

square feet of pollinator habitat improved as a result of UC Master Gardener events



7.5

pounds of food waste diverted from landfills per week by composting program attendees

130 primary crops, or nearly 100% of global crop production, and found that 51% of global irrigation volumes are unsustainable. Moreover, the findings included crop-specific and country-specific analyses of unsustainable irrigation. This research meets gaps in knowledge around the environmental impacts of unsustainable irrigation and their displacement through trade. ([Paolo D'Odorico](#))

Research on drought-tolerant tree species can preserve key California crops

An Agriculture Experiment Station researcher at UC Riverside is investigating tree varieties and species that will best tolerate drier weather patterns in California due to climate change. Under drier conditions, perennial, woody plant species such as avocado, citrus, grapes and other significant economically viable crops may face increased threats. Variation in drought tolerance exists in these tree species, indicating that the selection of well-adapted varieties might be possible. This type of future-proofing research is a major reason why UC has contributed to the long-term success of California's food system. ([Louis Santiago](#))

Increased water supply security

Moderate deficit irrigation practices conserve water

A UCCE advisor conducted research with four commercial growers in the Palo Verde Valley to identify and optimize moderate water deficits in alfalfa. To enhance water-use efficiency, they explored shifting from the regular irrigation model to moderate summer deficit irrigation strategies. Positive findings resulting from new practices are causing the Natural Resource Conservation Service and other agencies to consider the alfalfa deficit irrigation practices as a formal on-farm water conservation innovation program. Accordingly, they will provide incentives to growers who adopt the alfalfa deficit irrigation practices to contribute to water supply security in the Colorado River Basin. Low desert growers may conserve one acre-foot per acre following this study's proposed practices, which would equate to 200,000 acre-feet of water conserved for the region. ([Ali Montazar](#))

Improved management and use of land

Casper Wilderness Park adopts techniques that improve public safety

A UCCE advisor, a UC Riverside professor, and Orange County Parks worked to identify a new research site to test the efficacy of new control methods on yellow jacket wasps. Monitoring traps and experimental baiting stations were set up throughout Caspers Wilderness Park, where wasp infestations prevented the public from safely using the campgrounds and other outdoor facilities. One week after the yellow jacket wasp baits were placed, Caspers Wilderness Park had a 95% reduction in the number of wasps captured. This project allowed UCCE to test the efficacy of new control methods while also providing a solution to local partners and improving the safe use of natural areas by the general public. ([Beatriz Nobua-Behrmann](#))

Communities use UCCE project to fight Sudden Oak tree death

A UCCE specialist leads a lab at UC Berkeley to develop community-based projects related to Sudden Oak Death called SOD-BLITZ (www.sodblitz.org). For the 14th year, this project engaged residents to collect data that helped detect disease and produced detailed local maps of disease distribution that identified areas for proactive management. One hundred SOD-BLITZ participants from 2019 and 2020 were surveyed on the program's effectiveness

and reported a total of 18,000 oak trees were treated to protect from sudden oak death, with an 80% average success rate of treatment. These are primarily high-value trees in properties with an average value of \$14,000 per tree in the Bay Area. ([Matteo Garbelotto](#))

Improved air quality

Almond and walnut growers adopt IPM strategies that preserve air and water quality

One UCCE advisor worked on several studies in collaboration with insecticide and pest management companies that tested new and improved insecticide products against insect pests in tree crops. These study findings encouraged growers in the northern San Joaquin Valley to adopt minimal-risk insecticides including insect growth regulators and 'green' methods such as mating disruption techniques as a part of the IPM Program. These practices help farmers use less broad-spectrum insecticides and ultimately minimize potential air and water contamination. ([Jhalendra Rijal](#))

Protected and conserved soil quality

Strawberry growers adopt sustainable soil management practices

One UCCE specialist and his colleagues at UC Santa Cruz conducted four on-farm research trials on organic strawberries. This included an economic analysis that examined soil health management practices, particularly the practice of anaerobic soil disinfestation using cover crop or crop residue. The trials resulted in approximately 1,800 acres of primarily organic strawberry fields in California being treated by anaerobic soil disinfestation in the 2020 growing season, according to data from Farm Fuel, Inc. This is a slight increase from the previous year, and represents nearly 40% of total organic strawberry acreages and about 5% of total strawberry acreages in the state. ([Joji Muramoto](#))

Increased ecological sustainability of agriculture, landscapes and forestry

Conservation research culminates in adoption of new agricultural practices

In 1999, UC ANR established the long-term, collaborative University of California Conservation Agriculture Systems Project at the UC ANR West Side Research and Extension Center (REC) to measure soil and crop productivity changes resulting from sustainable soil health management practices. Building on over 20 years of research, UC ANR organized a group of 20 California farmers and



private sector supporters to work on a USDA National Resources Conservation Service Conservation Innovation Grant Program project, which led all participating farmers to implement sustainable practices such as reducing disturbance, increasing residue cover, cover cropping, and reducing tillage intensity. ([Jeff Mitchell](#))

UCCE research increases non-chemical termite control practices

Termites cause significant and costly structural damage in California, and are typically targeted with pest control programs that rely on whole-structure treatments, fumigants or potentially hazardous liquid insecticides. A UCCE urban IPM advisor's research investigates the utility and efficacy of alternative strategies that may reduce risk to the environment and communities. Pest management professionals that participated in UCCE's educational programs about termite control have increased their monitoring, detection and delimitation services. They have also increased offerings of non-chemical control services, such as the use of lower levels of heat coupled with wintergreen oil, which poses no harm to humans or their pets. ([Andrew Sutherland](#))

Developing an Inclusive and Equitable Society



Improved living and working conditions for California's food system and farm workers

Creating safe conditions at farm stands during COVID-19

During the COVID-19 pandemic, many farmers were concerned both that they might lose customers under the shelter-in-place orders or that customers might not follow COVID-19 safety procedures, therefore increasing the risk of COVID-19 spread to other customers or to the farmers and their family members. In response, the UCCE Fresno County small farms team distributed face masks, hand sanitizing wipes, and COVID-19 safety signage in multiple languages to roadside strawberry stands. Sixteen small-scale strawberry farmers implemented the use of personal protective equipment and displayed the safety signage at their farm stands, reporting that they encouraged compliance from customers who were more careful handling produce, social distancing, and wearing masks while visiting farm stands. ([Ruth Dahlquist-Willard](#))

Farmworkers learn strategies to reduce pesticide drift at work

Pesticide drift is a health concern for farmworkers, as well as the surrounding farm and school communities and the environment. With funding from the California Department of Pesticide Regulation, UCCE provided two hands-on trainings in English and Spanish that helped pesticide applicators with air blast sprayer calibration



and drift reduction. This encouraged 62% of vineyard training participants to reveal they might or probably would try low drift nozzles, and 65% of orchard training participants indicated they might or probably would use tape or ribbon to check airflow in trees. These practices can improve farmworker working conditions and health by reducing pesticide drift. (Lynn Wunderlich)



Increased diversity, inclusiveness and cultural competency in California's workplaces

The UC Master Gardener Program takes measures to increase volunteer diversity

UC ANR recognizes that the UC Master Gardener volunteer population does not reflect the diversity of California residents and gardeners. To address this issue, the program is taking a two-pronged approach, which includes outreach to communities historically underrepresented in the program, and strategies to increase cultural competence among UC Master Gardener Program personnel and volunteers. Volunteer selection and inclusivity training was offered to a total of 150 people, resulting in the three counties with the largest volunteer enrollment adopting implicit bias training for their volunteers. While implicit bias training alone is not sufficient to address inequality in hiring and, by extension, volunteer selection, implicit bias awareness can be an important step in equitable volunteer selection. (Marisa Coyne)

Addressing LGBTQ+ healthcare inequities during COVID-19

With the support of an emergency grant from the UC Office of the President, UCCE designed an educational campaign to inform healthcare providers, community-based organizations, policymakers, and the public about the impact of COVID-19 on the LGBTQ+ population. Their research and campaign materials created awareness around the increased risks for LGBTQ+ individuals related to COVID-19 and identified gaps in affirming care that lead individuals to delay or avoid interacting with the healthcare system during a critical time. The [Unmasking the Truth](#) campaign is being shared through social media to address these discrepancies in providers' perceptions on access to care, and to influence public health research and policy that holds the potential to improve LGBTQ+ health outcomes over time. (Katherine Soule)

Efforts to improve representation in the California Naturalist Program

UC ANR's California Naturalist Program promotes stewardship of the state's natural resources through education and service, and partners with close to 50 well-established institutions to offer the California Naturalist certification course. Since its inception in 2012, the program has certified over 3,770 graduates as California Naturalists, who volunteer to support conservation and restoration efforts in 51 counties. In response to the 2020 national push for racial justice, the program re-examined its approach and placed a greater emphasis on building meaningful connections with organizations serving underrepresented groups, focusing on more workforce development organizations, and ensuring the relevance of program content, language and delivery to diverse groups. To reduce barriers to participation, the program introduced new scholarships and initiated partnerships with organizations serving underrepresented groups such as Community Nature Connection, Nature for All, Outward Bound Adventures, and Southern California Mountains Foundation's Urban Conservation Corps. (Greg Ira)

Safeguarding Abundant and Healthy Food for All Californians



Improved food security

Identifying successful strategies for grocery store interventions

Agricultural Experiment Station (AES) researchers at UC Davis developed and maintained the first publicly available database of grocery stores interventions aimed at increasing access to nutritious food in food desert areas. Studies resulting from the database assessed the interplay between regional geography, management models, policy drivers, financing, and timing for 71 interventions and identified factors to consider for successful implementation of interventions. Their research found that community engagement was a critical component in siting, opening and keeping a new grocery store operational. (Catherine Brinkley)

Local farmer training fosters fresh produce distribution during the pandemic

Through the UC Gill Tract Community Farm, a UCCE specialist at UC Berkeley provided online training sessions and technical assistance to local farmers on safe production and distribution during the COVID-19 pandemic.

As a result, UC Gill Tract Community Farm volunteers, including partners from Black Earth Farms, Sogorea Te Land Trust, and local herbal medicine makers, organized a mutual aid food distribution program. This included their participation in a Farms to Families Food box program, which produced and distributed more than 10,000 pounds of produce to over 30 local organizations and individuals, including the UC Berkeley Student Pantry, Black Earth Farms, Women's Daytime Drop-In Center, Daily Bread, and Berkeley Food Pantry. (Jennifer Sowerwine)

Extending fresh produce for food bank clients during COVID-19

The UC Master Food Preserver in San Luis Obispo County provided low-cost, safe food preservation lessons to 363 residents who received food assistance at food bank distribution sites during the COVID-19 pandemic. This included providing brushes for cleaning produce and bilingual handouts on practical hand and produce washing techniques that promote safety and prevent the virus. Eighty-five percent of participants reported that the lessons provided would help them extend fresh food received at food bank sites. (Katherine Soule, Dayna Ravalin)

Increasing use of federal food support at local farmers markets

Researchers with the UC SAREP conducted focus groups and environmental scans to assess the inclusivity of farmers markets in Marin and Sonoma County, leading to farmers market improvement projects that reached 4,775 beneficiaries and stakeholders. Supplemental Nutrition Assistance Program (SNAP) benefits distributed in Sonoma County in 2020 increased 64% and dollar-for-dollar Market Match incentives distributed increased 52% from the prior year. Customer transactions also increased at the markets by 55%. ([Gail Feenstra](#), [Julia Van Soelen Kim](#))

Farmers markets reach more CalFresh customers during COVID-19

UCCE in San Luis Obispo worked with the San Luis Obispo County Food System Coalition to ensure that markets serving SNAP-eligible families remained open during the COVID-19 pandemic. Efforts included grassroots outreach, earned media, awareness events, and providing county disaster service workers during the initial phases of stay-at-home orders. Participating farmers markets

saw a 35% increase in new EBT/CalFresh customers from 2019 to 2020, a significant increase over the prior year's growth of 4%. ([Katherine Soule](#))

Improved food safety

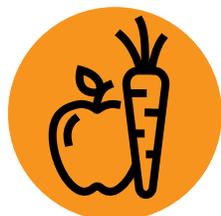
Ensuring food safety compliance for small-scale farmers

UCCE Fresno County organized and conducted a Produce Safety Alliance (PSA) grower training workshop. PSA training is required for at least one representative of every farming operation fully covered by the Food Safety Modernization Act (FSMA). Forty-three small-scale farmers from socially disadvantaged communities attended UCCE's PSA training and received certificates of completion, which helped farmers stay in compliance with important FSMA food safety regulations during CDFA audits. ([Ruth Dahlquist-Willard](#))



Informing schools' drinking water safety and access during COVID-19 and beyond

The UC ANR Nutrition Policy Institute provided leadership through the National Drinking Water Alliance to ensure that the nation's children have access to safe drinking water during the COVID-19 pandemic and beyond. The Centers for Disease Control incorporated NPI's recommended water safety practice language in a recent update of their COVID-19 water guidance for schools. They developed an infographic to illustrate alternate means of providing safe water during COVID and a suite of checklists for drinking water safety, access and promotion in school settings. ([Christina Hecht](#))



99

UC Master Gardener participants donated produce to community programs



85%

of 2,200 adult EFNEP participants showed improvement in one or more food safety practices



79%

of 310 4-H youth know how to keep a cooking area safe from germs

Developing a Qualified Workforce



Increased workforce retention and competency

Alfalfa and Forage Field Day supports licensure

The annual Alfalfa and Forage Field Day held at the UC ANR Kearney Research and Extension Center (KARE) is part of the California Department of Pesticide Regulation accreditation process. In 2020, the field day was adapted to a virtual platform in response to COVID-19 shelter-in-place orders, and three agronomy public meetings were organized with 106 total attendees who received a free opportunity to earn credits to maintain Pesticide Control Adviser (PCA) and Certified Crop Adviser (CCA) licenses. (Nick Clark)

Virtual professional development and networking for arborists

The UCCE environmental horticulture and urban forestry advisor continued the Landscape Supervisors Forum, a local professional association established 54 years ago by UCCE as a crucial local resource for staff-level municipal employees. This forum provides the opportunity to learn about new issues from academic experts, as well as for UCCE to hear about new needs and developments

from the field. In 2020, arborists received 92 webcasted person-hours of continuing education units to retain and renew their certification granted by the International Society of Arboriculture. Not all municipal employees, especially the junior ones, have funds available to attend conferences; thus, this forum has played a critical role in reaching these employees for many years. (Igor Laca)

Teachers gain skills to conduct virtual physical activity lessons during COVID-19

UCCE in Riverside County leveraged strong partnerships with local school districts to increase nutrition and physical activity best practices for youth. Six hundred teachers who serve 18,000 students in Alvord Unified School District discovered ways to increase physical activity during COVID-19 virtual learning through “Brain Breaks in the Virtual World.” A survey three months after the training showed that teachers implemented virtual physical activity breaks with over 3,100 students. (Chutima Ganthavorn)

Early childhood training increases nutrition education and physical activity

UCCE provided training to Desert Sands Unified School District early childhood educators on delivering the Go,

Glow, Grow (GGG) curriculum to their 469 preschool students. Eighty-four percent of Desert Sands Unified early childhood teachers who participated in the training strongly agreed that more students can now identify healthy food choices. All early childhood educators said they now encourage students to eat breakfast and to be physically active. ([Chutima Ganthavorn](#))

Increased effective public leaders

Sacramento teens teach environmental education to younger peers

4-H On The Wild Side (OTWS) brings environmental education to fourth, fifth and sixth grade youth while empowering teenagers as program leaders and stewards of the environment. All teenagers in Sacramento who delivered 4-H OTWS lessons to younger grade levels described the project as an avenue for meaningful work, and an important point for connection with others when schools shifted to virtual learning in Spring of 2020. ([Marianne Bird](#))

Improved college readiness and access

UC 4-H prepares youth for careers in science

To address gaps in career readiness, the UC 4-H Youth Development Program provides youth statewide with opportunities to develop skills necessary to thrive in life and prepare for a career after high school. In total, 331 4-H youth in California responded to a science common measures survey and reported science skills and abilities such as asking questions about how things work (85%), trying new things to see how they will work (85%), looking at how things are the same or different (82%), and comparing how different things work (73%). ([UC 4-H](#))

Increased civic engagement

UC 4-H youth contribute to their communities

Over 100,000 youth in UC 4-H Youth Development Program clubs, afterschool programs and camps participated in civic engagement, healthy lifestyles, and science, engineering and technology projects. Civic engagement projects focused on community engagement, service, civic education, and personal development. Of 197 4-H youth who responded to a statewide civic engagement survey, 86% reported they had done a community service project, and 75% said they look for ways to help when they learn about a problem in the community. ([UC 4-H](#))



91%

of 4-H youth respect the differences and strengths of individuals on the team

2 million

hours of public service delivered by 19,000 UC-trained volunteers



Santa Clara youth help communities during the COVID-19 pandemic

Once COVID-19 shelter-in-place took effect, a 4-H ambassador in Santa Clara County organized a team of more than 15 youth and 12 adults in a service learning project to make, gather and distribute over 2,000 masks and face shields to health care workers at community health centers and families who participate in UCCE Santa Clara's nutrition education programs. ([Fe Moncloa](#))



Building Climate-Resilient Communities and Ecosystems



Increased preparedness and resilience to extreme weather and climate change

Mitigating wildfire with prescribed burns

Nearly 400 landowners and staff from organizations in the Sierra Nevada region have attended a UCCE two-part workshop series on prescribed fire in the last two years. Part one focused on options for private lands burning, use of prescribed fire to manage forests and rangelands, air quality and smoke management, permitting and legal considerations, fire weather, terms and behavior, burn planning, technical assistance and cost-share programs. Part two included field-based instruction on burn unit preparation, equipment and tools, firing techniques, and personal protective equipment. The tactics taught in the workshops were used by local landowners, firewise communities, and partner organizations to reduce fuels with prescribed fire. ([Susie Kocher](#), [Ryan Tompkins](#), [Fadzi Mashiri](#), [Rebecca Ozeran](#), [Rob York](#))

New app-based technologies identify hazardous trees

At UC Berkeley, a UCCE researcher and his lab helped redesign vegetation surveys along power lines for energy companies such as Pacific Gas and Electric (PG&E). The project trains work crews to correctly identify possible hazard trees along electrical lines, accurately sampling the wood, and collect other critical details through an application called *EvaluTree*, developed as a proof-of-concept. The data would be collected and stored online, and the lab would assess the samples for wood decay. The lab is one of only two in the entire world to diagnose important wood decay pathogens directly from wood with confidence. A database of all trees sampled would be generated and made available to PG&E to help improve management of trees along power lines. The wood decay data has been used as forensic evidence in litigation that has resulted in awards exceeding \$200 million in cases associated with tree failures leading to death, injury or wildfire, thus providing a value for PG&E's 16 million clients facing property losses from mismanagement. ([Matteo Garbelotto](#))

Preventing post-fire debris flows into communities

Destructive debris flows, commonly known as mudslides, can damage homes and infrastructure and threaten public safety. A UC Riverside Agricultural Experiment Station scientist is conducting field research to better understand how storm events following wildfires affect destructive debris flows in Southern California. Their research group travels to various catchments after fire and storm events to investigate the water and sediment transport processes that produce debris flows. These findings will help scientists and stakeholders better assess debris flow risk during post-fire storms. ([Andrew Gray](#))

Understanding the effects of wildfires on California's wildlife

A scientist in the UC Davis Agriculture Experiment Station is studying the effect of large, high-severity wildfires on wildlife and ecological networks in the Sierra Nevada. She conducted an intensive study of the plants, invertebrates, mammals, birds, bats, pollinators and flowering plants within the burn perimeter of California's 2014 King Fire. The goal of the project was to map and better understand the food web and plant-pollinator networks to assess post-fire ecological communities. With the increasing size and intensity of wildfires in California, having baseline data to evaluate recovery and species declines provides critical information for forest managers. ([Rahel Sollmann](#))

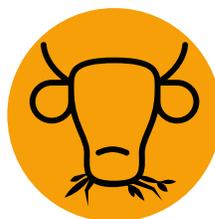
Climate adaptation agricultural practices conserve resources and protect sensitive crops

The gradual shift in California's climate demands that farmers adapt to evolving conditions in order to protect their crops. UCCE's North Coast temperature inversion studies provide real-time temperature data to grower clientele and National Oceanic and Atmospheric Association (NOAA) scientists. Seventeen weather stations and 35-foot towers were installed for measuring inversion conditions using a practical method developed by UCCE, and UC ANR's IGIS program created a website displaying real-time data. As a result of the study, one early adopter purchased 10 permanent wind machines for their 100-acre vineyard and saved considerable water. Additionally, a land manager at an 800-acre site leased additional wind machines, strategically placing them in more beneficial areas as identified by UCCE's measurements. The study has generated a shift from water-intensive sprinklers towards water-conserving

wind machines, while still achieving frost protection for sensitive crops during significant weather events associated with climate change. ([Mark Battany](#))

Research informs climate-resilient agricultural practices

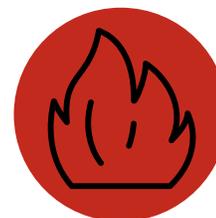
A UC Agricultural Experiment Station scientist at UC Davis researches soil carbon's role in the overall mitigation of greenhouse gases and climate change. One project at Russell Ranch aims to understand how soil biodiversity and biological activities can inform sustainable agricultural management practices and use of nutrients recycled from commonly occurring organic waste. Research looking at various inputs under different management conditions, such as tillage versus cover crop, has helped the field identify pros and cons in these different management and input scenarios. Understanding how such practices shift microbial abundance, diversity and life strategies can help design farming systems that support high yields while enhancing carbon sequestration and increasing resilience to climate change. ([Kate Scow](#))



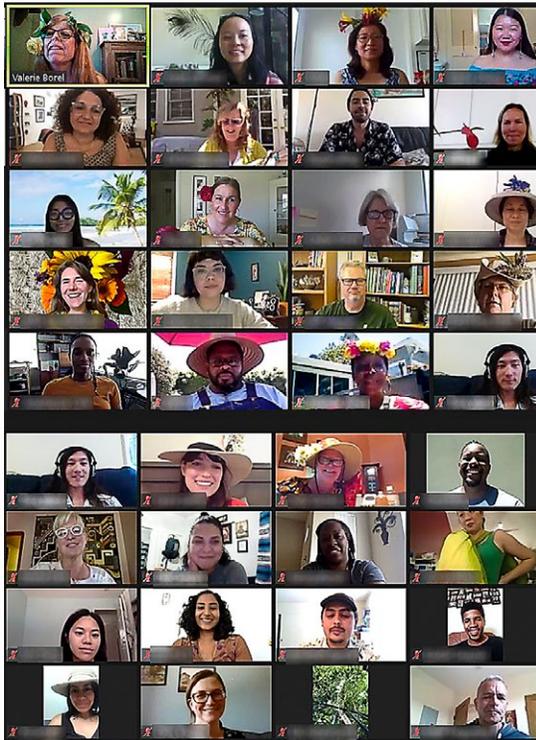
2,220
acres in the wildland-urban interface are now using grazing for drought and wildfire mitigation

80%

of 400 workshop participants reported improved knowledge on conducting prescribed burns



Promoting Healthy People and Communities



Improved health for all

Virtual classes increase edible gardening in Los Angeles during COVID-19

Research has shown that gardens increase produce consumption and improve food security. The UC Master Gardener Program in Los Angeles County hosts the Grow LA Victory Garden Initiative, which helps new gardeners start their own gardens quickly and easily in a container, in the backyard or at a community garden. Courses were offered virtually throughout 2020, with 71% of participants from the series saying they had started a vegetable garden since taking the class. Ninety-eight percent of participants indicated that their gardening knowledge had improved by taking the course. ([Rachel Surls](#))

UC 4-H youth statewide adopt COVID-19 preventive practices

The UC 4-H Healthy Living Team adapted a Center for Disease Control and Prevention epidemiology curriculum for remote instruction during COVID-19. UC's 4-H Disease Detectives project included eight interactive virtual sessions on public health professions, disease investigation, virus transmission, disease outbreaks, vaccines, immunity, preventive measures and education.

After completing the project, youth statewide reported that they were more likely to wash their hands before food preparation (78.1%), after sneezing or coughing (56.2%), and after shopping in a public space (87.5%). The majority (84.4%) of youth also reported that they were more likely to wear a face mask when out in public than before the project. ([Marcel Horowitz](#), [Anne Iaccopucci](#), [Dorina Espinoza](#))



86%

of 2,220 adult EFNEP participants improved practices in physical activity

2,500

healthy food tastings with youth in CFHL, UC programs



Improved community health and wellness

Statewide programs increase physical activity

UCCE academics provided oversight, leadership and guidance for CalFresh Healthy Living, UC (CFHL, UC) in 32 counties. The program offers educational resources for California residents who are eligible for the federal Supplemental Nutrition Assistance Program-Education (SNAP-Ed). In 2019-2020, 135 CalFresh Healthy Living, UC program partnering sites in 27 counties made at least one physical activity-related change, such as incorporating more physical activity into the instructional day or improving facilities to increase physical activity. More than half of these sites improved the quality of structured physical activity offered to youth. ([CalFresh Healthy Living, UC](#))

UC IPM strategies support students' well-being at school

A UCCE advisor worked with the California School for the Deaf in Riverside to control an infestation of the Red Imported Fire Ant (RIFA) population across its 70-acre campus. He provided environmentally friendly pest monitoring and control methods that cut back on insecticide use and reduced ant mounds in problematic areas by up to 96% after one year. Implementing these new methods helped protect 500 school students from stings at their school site. ([Siavash Taravati](#))



182,000

square feet of school and community gardens were improved with the support of UC Master Gardeners

172,000

individuals benefited from policy, systems, and environmental changes at 320 CFHL, UC sites



Improved access to positive built and natural environment

Research informs design-based approaches to adolescent health

An Agricultural Experiment Station researcher at UC Davis undertook a project entitled “Designing Healthy Youth Environments” to identify how physical environments facilitate adolescents’ positive development and how youth engagement might help understand, conceive, and create supportive physical environments. This work, which appears in a recently published book, is a crosswalk between positive youth development and community development, and has policy and planning implications relative to urban spaces, park planning, and park design. ([Patsy Eubanks Owens](#))

Cultivating appreciation for the natural world during shelter-in-place

The statewide UC 4-H Youth Development Program designed innovative educational solutions during COVID-19 that helped youth stay engaged with active living, natural environments, and environmental education. UC 4-H advisors led a collaboration among academics, staff, volunteers and youth representing 20 counties, and four UC ANR Research and Extension Centers to design a 4-H Virtual Camp. Our Wild California was the first-ever virtual 4-H camp in the state. The week-long program provided 108 youth campers from 18 counties the opportunity to learn about the outdoors. Youth who participated rated learning about wildlife and making new friends as the top two reasons to participate in the camp. One of their top-rated activities was classifying objects as part of the “Coding a Clean Ocean” exercise. ([Fe Moncloa](#), [Russell Hill](#))



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