HEALTHY FOOD SYSTEMS • HEALTHY ENVIRONMENTS • HEALTHY COMMUNITIES • HEALTHY CALIFORNIANS

University of California
Agriculture and Natural Resources
Making a Difference for California

University of California Cooperative Extension Monterey County Biennial Report 2019-2021

UC CE

University of California
Agriculture and Natural Resources

Cooperative Extension – Monterey County

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October 13, 2021

Dear Honorable Supervisors of Monterey County,
Department Heads, and members of the community;

The COVID-19 pandemic had a strong impact on the work of all of us, as working from home or other places virtually for a longer period was a new experience for many. It required finding out together how to best organize our teamwork and how to communicate with each other and our stakeholders.

Now is a good time to look back at what unfolded during these two last years. I think of what we did and how we did it as well as perhaps what we could have done better. My reflection involves compressing our achievements in this report, but we know they go further, and so now I want to share them as they resonated with our resilience. Resilience is that feature of character that demonstrates an ability to bend but not break, struggle but not forsake. Leaders need resilience because they are often faced by obstacles that can overwhelm them.

But, as it has with almost everyone, the pandemic has also affected researchers' work and personal lives. Many of us have had our projects delayed, careers put on hold and research funding disrupted. In spite of the pandemical event and the county's relentless fires, we had a bigger operational budget due to the securing of grants done by all academics in our office, which counted for 25% of our total budget. There are other newsworthy research and extension accomplishments to applaud, but I want to bring focus to the achievements realized by UCCE Monterey County during this hard time.

The findings of Farm Advisor Bettiga regarding the use of planting stock with pre-developed trunks has increased higher initial yield for wine grape growers; the versatility of our advisors is clearly reflected in the work that Farm Advisor Smith is conducting in the absence of a Plant Pathologist and the incidence of *Phytium* and Necrotic Spot Virus diseases in our lettuce fields. This also shows the great support and collaborative effort we had with partner organizations such as USDA-ARS and CSUMB. Farm Advisor Michael Cahn and his online decision support tool, CropManage, is steadily growing since its inception and provides great recommendations to our growers in their water and nutrient usage; my own abilities to secure grant money for minor specialty crops, goes hand-in-hand with the promotion of soil health and sustainability issues in our industry.

We have two very engaged and prolific volunteer programs, 4-H Youth Development and Master Gardeners. The 4-H program suffered an average of 15% attrition in enrollment, due to the pandemic issues and the inability and unwillingness of families to meet exclusively via zoom. Master Gardeners *au contraire*, didn't have any issue adapting and adopting their outreach and public education to the virtual stage. Both programs, thanks to their ingenuity and resourcefulness, thrive.

What could have been ignominious defeat was transformed by our staff and advisors into months of resolve and resolution, showing our undeniable resilience.

Sincerely,

Maria de la Fuente, PhD

Sixteen Ways UC Cooperative Extension is Working for You

Supporting Agriculture. This $4+ billion industry relies on UC research and extension to remain strong and globally competitive. Cooperative Extension has been behind the growth of the local agribusiness industry since 1918.

Spurring Economic Development. UC research helps Monterey County's #1 economic driver—agriculture—be competitive and productive.

Promoting Food Safety. In-Field experiments show the best ways to prevent harmful microbes from contaminating field produce, protecting consumers and the viability of local agriculture. Local advisors team with campus-based food safety researchers to bring expertise to the county.

Brokering Solutions. Cooperative Extension is the neutral party bringing together entities who need to work together to find workable solutions to vexing issues.

Teaching Sustainability. We develop and share various approaches to achieve a healthier environment, a thriving agricultural business cluster, and a community driven by engaged youth and adults.

Reducing Pesticide Use. Farm advisors inform growers about the most effective ways to treat pests including biological control and computer guided technologies. Using scientifically tested treatments can save thousands of dollars.

Saving Soil. Techniques developed by the farm advisors keep tons of soil in place, preventing erosion, saving valuable topsoil, and pollution of water bodies.

Saving Water. Farm advisors teach farm owners and their irrigators ways to improve irrigation efficiency and to use less water.

Channeling UC Expertise. Cooperative Extension collaborates with many UC researchers to help solve the current environmental, agricultural or quality of life issues affecting Monterey County residents.

Beginner & Minority Famers. Enhancing the competitiveness and sustainability of beginning and minority, farmers and ranchers in California.

Creating Tomorrow's leaders. We certify over 300 adults to work with youth, using the latest research on youth development practices to instill qualities our young people need to succeed.

Minority Youth Development. Monterey County 4-H Diversity Program promotes youth development for less advantaged minority youth in the community.

Providing Community Service. Youth in 4-H, along with their parents, donate hundreds of hours to creative local community service, and educating community members at county fairs or other events.

Beautifying Public Places. UC Master Gardeners, now numbering in the hundreds in Monterey County, devote time and energy to restoring historical gardens and preserving sensitive plant habitat and beneficial organisms, and to educate our residents about gardening and food production.

Bilingual Bicultural Outreach. UCCE provides bilingual and bicultural educational instruction, training, and outreach to Spanish-speaking landscapers and commercial gardeners in "Jardinero Verde" (Green Gardener Program).

Next Generation in Agriculture. UCCE hires student assistants to allow hands on learning experiences for youth interested in exploring careers in agriculture.

County Funded Administrative Positions

Kelley Sivertson

Administrative Services Assistant

7 years with UCCE

Administrative Services Assistant

This position is our Office Manager for University of California Cooperative Extension and County of Monterey business operations. Responsibilities for both agencies include Finance Management (budget development and monitoring, grant fund management, Purchasing, Accounts Payable) Human Resources, Supervisor for Administrative Staff including the Accounting Technician, Secretary, and part-time assistants. This position is knowledgeable of policies and procedures for both agencies and the many web-based programs associated with them. The ASA is the assistant to the Department Head.

Harriet Stevens

Accounting Technician

9 months with UCCE

Accounting Technician

This position keeps track of University of California grant funds. This involves maintaining spreadsheets, preparing purchase orders and being the receiver for purchasing card purchases. The position is knowledgeable of U.C. policies and procedures and the web-based programs. Works closely with the ASA and U.C. advisors regarding the management and consolidation of grants.

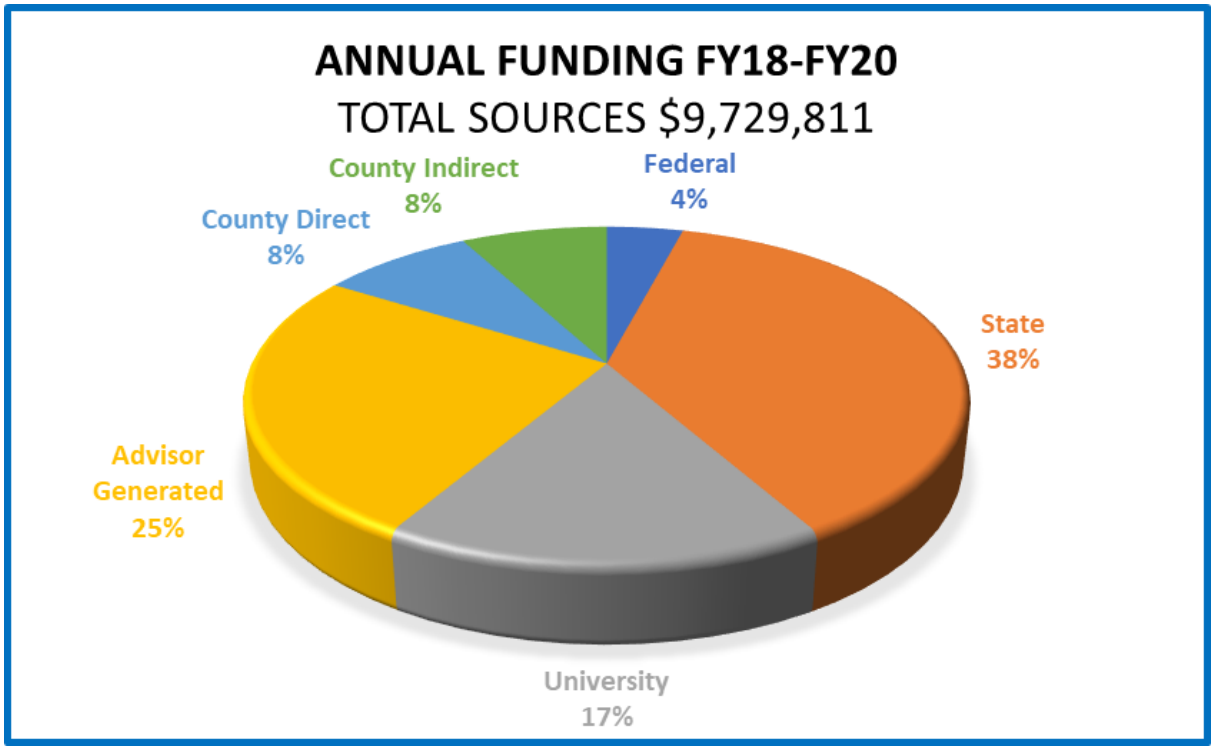
Jennifer Magana

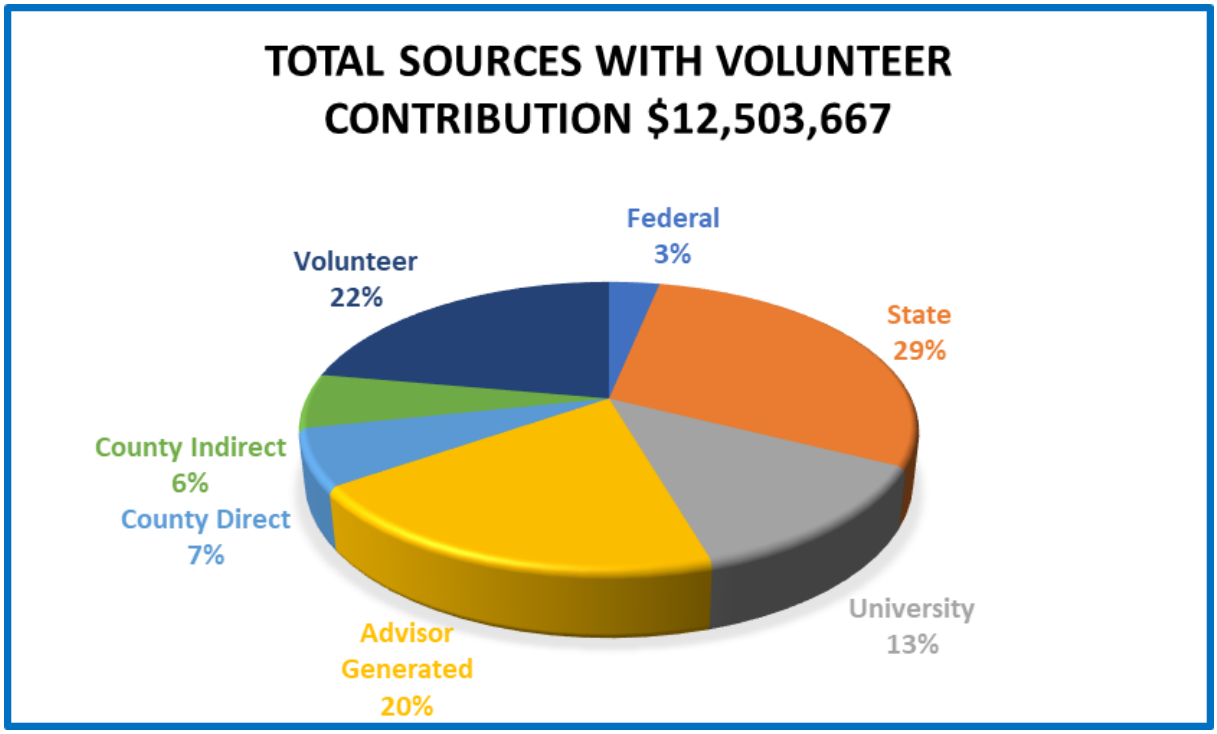
Department Secretary

1 year with UCCE

Department Secretary

This position provides secretarial support for the 4-H Youth Program which involves serving the clientele, enrollment, training, assisting the Youth Advisor and Program Representative with projects and events. The position is knowledgeable of the web-based 4-H Enrollment Program. The position also provides support to the Master Gardeners volunteer program, U.C. advisors, and other staff members. The position serves as our web master and handles our desktop publishing.


ANNUAL FUNDING FY18-FY20
TOTAL SOURCES $9,729,811
County Indirect 8%
Federal 4%
County Direct 8%
State 38%
Advisor Generated 25%
University 17%


TOTAL SOURCES WITH VOLUNTEER CONTRIBUTION $12,503,667
Federal 3%
Volunteer 22%
State 29%
County Indirect 6%
County Direct 7%
University 13%
Advisor Generated 20%

Larry Bettiga

Viticulture Farm Advisor

M.S., CSU Fresno

43 years with UCCE

The viticulture program focuses on extension education, applied research and problem diagnosis for wine grape growers in Monterey County.

Local research has been instrumental in helping the Monterey County wine grape industry achieve and maintain a reputation of being early adaptors of new technologies. This work has been done both independently by wine grape growers and in cooperation with county and campus based staff from the University of California Division of Agriculture and Natural Resources. The following examples will demonstrate how UCCE viticulture research conducted in the county has helped to provide answers to major production issues in vineyards.

Evaluation of vineyard practices to improve the sustainability and viability of wine grape production.

Research has been conducted to evaluate established and alternative vineyard cultural practices for the potential to improve plant growth and yield to achieve fruit quality expectations for coastal wine grapes using research based knowledge to promote economic and environmental sustainability. Nurseries are selling potted dormant benchgrafts with trunks pre-developed as a method to accelerate the vine establishment process. We have continued to evaluate this type of material compared to the standard type of benchgraft that is trained in either the first or second year and established six trials to determine the growth response of potted dormant versus green-growing plants and to further evaluate training strategies and the use of vine shelters to enhance earlier vine development.

Trials evaluating planting stock and training methods have yielded information to demonstrate to growers the potential for reducing the time to achieve full production of vineyards with a reduction in training labor costs. These studies described have produced new information that was used by grape growers to improve economic sustainability. The extension of vineyard development practices has improved management decisions, and growers that have adopted earlier vine training have achieved full production potential earlier in the life of their vineyards. The use of planting stock with pre-developed trunks has increased locally based on the trials conducted, that justified the use of this more expensive planting stock based on earlier plant

Plant stock material being evaluated to improve early vine development and productivity

development and higher initial yields. This work has also demonstrated the labor savings by planting vines with preformed trunks. The impact of this work becomes more obvious as the results serve as a basis for more informed planting decisions to improve yields and quality.

The wine grape annual industry gross value is 106+million in Monterey County

Pest Management in Viticulture

The goal is to identify and document pest issues of wine grape vineyards on the central coast; develop information on the biology of new and established pest issues; and devise management strategies to reduce impact from these pests. Fungicide evaluations have been conducted to measure efficacy of both registered and experimental materials for both powdery mildew and *Botrytis* bunch rot. In addition to evaluating low risk and biological fungicides, the demonstration of resistance management strategies is a key component of this fieldwork. For powdery mildew UCCE has developed data that will contribute to future grape fungicide registrations and benefit growers. The powdery mildew projects have changed grower practice in vineyards with extension efforts making growers more aware of the importance of application timing, material selection, and the use of resistance management strategies to improve disease control. UCCE has worked with local growers in the Salinas Valley to share mealybug trap catches and coordinate control practices between all growers in the county to reduce the impact of mealybug spread of leafroll virus. Currently, they are forming neighborhood groups to coordinate control practices to reduce mealybug spread of leafroll disease between adjacent vineyard properties and we are working closely with the local grower association to provide technical support to this areawide effort.

Grape powdery mildew (left) is the major disease problem of vineyards in Monterey County

Richard Smith

Vegetable & Weed Sciences Farm Advisor

M.S., UC Davis

35 years with UCCE

This program addresses vegetable production issues such as cultural practices to improve nitrogen fertilizer use efficiency. Nitrate is a form of nitrogen fertilizer used by crops, but if leached with irrigation water or rain, can get beyond the reach of the crop's root zone and can contaminate drinking water wells that are used by municipalities. Nitrate leaching occurs when excess quantities of nitrogen fertilizer are applied to vegetable production fields and/or when excess irrigation water is applied or during heavy rain fall events. In April of 2021 Ag Order 4.0 was approved by the Central Coast Regional Water Quality Control Board (CCRWQCB). Growers are now under targets and limits for the amount of fertilizer nitrogen that they can apply to the fields. Initial targets and limits will be easier for growers to comply with. In the near future targets and limits on the amount of nitrogen that can be applied begins to ratchet down and will be more difficult for growers to meet the standards. This program is assisting growers with complying with the new regulations by developing practices that they can employ to meet water quality standards.

In addition, this program addresses weed control research and education. Weed control in vegetable production fields is a critical cultural practice carried out by growers to assure successful and profitable crop production. It is critical to continue to evaluate new techniques and equipment to help maintain the competitive ability of Monterey County growers. An increasing issue for growers is the availability of workers to weed vegetable production fields.

Nitrogen Management

Nitrogen fertilizer research is conducted with cooperating growers. Nitrogen research projects include evaluation of nitrogen uptake dynamics of vegetables, impact of residual soil nitrate on crop growth, and use of fertilizer technologies to improve nitrogen use efficiency. The fall is a key time of year that nitrate leaching occurs and we are conducting a project examining the use of high carbon containing composts to help tie-up residual nitrate in the soil and keep it from leaching. In addition, fall-grown cover crops absorb residual soil nitrate in the soil and can play a role in helping growers comply with water quality regulations. We are evaluating varieties of cover crops that can grow quickly and absorb residual soil nitrate and keep it from leaching.

Nitrogen management in organic production is also important because it comprises over 10% of the total value of agriculture in Monterey County and is an important part of the business of every vegetable production company. In order to help the organic industry address water quality regulations and help growers more effectively manage nitrogen fertilization issues, we conducted a multi-year evaluation of the fertility dynamics in organic vegetable production.

High carbon compost applied to a field to tie up residual soil nitrate and prevent it from leaching over the winter

Weed Management

Automated machines are now routinely utilized by growers in the Salinas Valley to both thin as well as weed lettuce. These machines are being utilized by growers to address labor shortages and improve crop production practices in the valley. We are conducting research to evaluate the efficacy of automated weeders to better understand when these machines can provide the greatest economic benefit to growers' weed management programs.

Automated weeder with a split blade that opens around lettuce plants and closes between lettuce plants to remove weeds from in the seedline

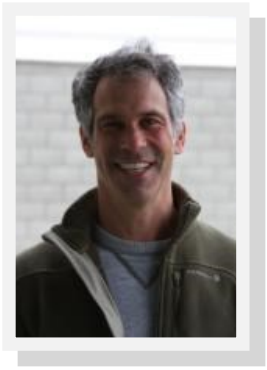
Collaboration to address critical industry issues of Pythium and Impatiens Necrotic Spot Virus (INSV)

Other Duties

Given the absence of a Plant Pathology Farm Advisor in our office, we have responded to the continuing need for research and development of solutions to serious diseases that threaten lettuce and other crops. We have conducted fungicide trials to find solutions to Pythium wilt of lettuce. We coordinated with researchers at CSUMB and the USDA to conduct research projects addressing Pythium wilt of lettuce as well as Impatiens Necrotic Spot Virus (INSV) and provide solutions to growers for addressing these diseases.

A lettuce field affected by Pythium wilt of lettuce and Impatiens Necrotic Spot Virus

Michael Cahn



Irrigation and Water Resource Management Farm Advisor

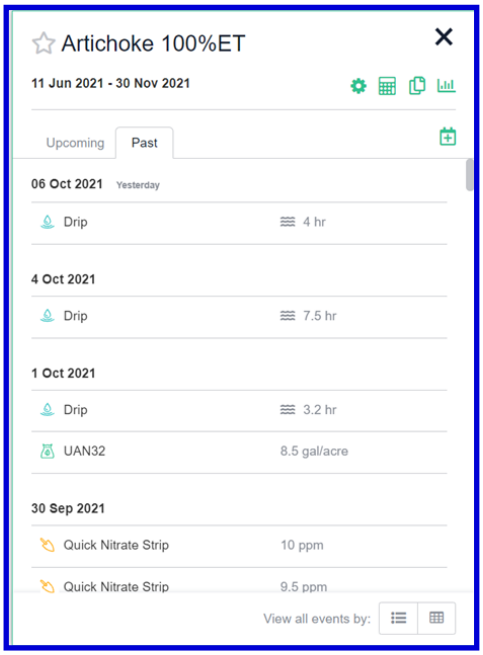
PhD, Cornell University

26 years with UCCE

The UCCE Irrigation and water resource program conducts research and education programs to promote agricultural stewardship of ground and surface water supplies in Monterey County. Agriculture is the main user of ground water in Monterey County. Identifying practices that can assist growers in using water more efficiently can have a large impact on the sustainability of water resources in the Monterey Bay region. In addition, run-off from farmland during storm and irrigation events can degrade the quality of surface and ground water supplies. Through grant funding support of more than $1 million during the last 2 years we have been able to greatly increase research and outreach activities to improve the efficient use of water by agriculture and to protect water quality. The following highlights a few of these projects.

Assisting growers with improving water and nitrogen management of coastal crops

Efficiently using water and nitrogen fertilizer to grow crops is critical to conserving ground water and protecting water quality. Growers are facing ever stricter regulations for water and nitrogen fertilizer use. Our team assisted growers in improving water and nitrogen management through intensive field research, on-farm field demonstrations, educational trainings, and hands-on workshops. Additionally, we continue to improve and expand the UCCE online decision support tool (CropManage) that can accurately determine the appropriate amount of water and nitrogen fertilizer to apply to Salinas valley crops. Grower use of CropManage has steadily grown since it went online in 2011, providing as much as 1500 recommendations per month to vegetable and berry producers during the growing season.



Example from CropManage online tool helps growers make better decisions on irrigation and nutrient management

Developing new technologies to minimize sediment in farm run off

Irrigation run-off from agricultural fields transports sediments, and sediment bound pesticides, and nutrients that degrade the quality of water in creeks, rivers and estuaries. Even small quantities of pyrethroid and neonicotinoid pesticides lost in runoff from agricultural fields can harm the native aquatic organisms downstream. We developed and tested equipment to apply low concentrations of polymers that remove as much as 98% of the suspended sediments in irrigation runoff. The reduction in sediment from farms is not only good for water quality, but also improves soil quality, helps growers comply with water quality regulations, and also will save the county money in cleaning out culverts and road-side drainage ditches that clog with sediment by the end of the growing season.

The UCCE irrigation program developed a prototype polyacrylamide (PAM) applicator that can remove 98% of suspended sediments in farm run off

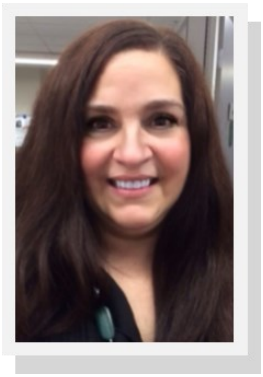
Irrigation runoff sampled upstream (left) of the PAM applicator and downstream (right) of the applicator

UCCE uses research based results to help shape new regulations impacting local growers

Making research the basis of water quality regulations

Growers are facing very strict regulations on the use of nitrogen fertilizer and pesticides under the new Agricultural Discharge Order 4.0 that will go into effect in 2022. UCCE advisors worked closely with the Central Coast Regional Water Quality Control Board throughout the 2-year process of updating water quality regulations on the central coast. By presenting results of local science-based research conducted over two decades, we were able to persuade regulators to adjust many of the requirements so that the vegetable industry will be able to continue to thrive in the upcoming years while implementing a much more sustainable production system that is less impactful on the natural environment and will improve the quality of drinking water.

Maria de la Fuente



County Director, Farm and Master Gardener Advisor

PhD, Plant Pathology Iowa State University

25 years with UCCE

Hispanic growers attending an educational training in Spanish

Dr. de la Fuente's programmatic efforts are intimately related on increasing science literacy in agriculture to improve the competitiveness and productivity of the industry while supporting the sustainability of small farms and minority growers. Some of the particular projects of focus for the past two years are;

Highlighting California's Agriculture

UCCE cultivates and strengthens relationships and networking with Monterey County Ag Commissioner, Farm Bureau, California Leafy Greens Research Board, CSUMB, RCD, and other agencies to foster partnerships and increase its visibility, to conduct research, secure grants, contracts and donations, maintain county budget, keep office space, and provide support for all the programs offered to constituents.

Using her expertise in working with Hispanic communities she contributes to the UC ANR Diversity and Inclusion Alliance and collaborates in projects building & sustaining engagement with diverse audiences and has been invited to conduct trainings in Spanish with growers in Mexico producing for American companies, as well as to Mexican Agricultural Universities to present about how research and extension is conducted in California.

Invited by the Ag Commissioner to the 22nd Annual Monterey Bay Region Agricultural Expo and Seminar held at the Salinas Sport Complex, she delivered a seminar in Spanish on the role of UCCE on California's agriculture, with a detail explanation of the services provided and the programs available for the more than 300 Hispanic attendees as well as to their families.

From 2019 to 2021 she provided 5 agricultural presentations and tours to national and international visitors from Universidad Autónoma de Chapingo MX, Universidad Popular Autónoma de Puebla MX, Asociación de Ingenieros Agrónomos de Monterrey, MX, UC Davis Student Organic Seed Symposium, and Food & Machine Corporation (FMC). All these aiming at others to know about our agricultural systems and our research, extension and outreach methods.

Research and Extension on minor Specialty Crops

In collaboration with UC Nursery and Floriculture Alliance and securing a grant from CDFA Dr. de la Fuente provided technical help and education to owners and operators of nurseries in California. Nursery growers produce commodities such as cut flowers, coniferous and broad-leaf evergreens, deciduous shrubs, roses, herbaceous ornamentals, bulbs, corms, rhizomes, pips, decorative plants, cacti, succulents, deciduous fruit and nut trees, grape and kiwi vines, citrus, tropical/subtropical fruit trees, berries, palms, vegetables, groundcover and sod/turfgrass. She conducted a series of in-person hands-on trainings for nursery growers in English and Spanish. Nutrient and Fertilizers workshops were attended by 127 nursery owners and operators. Due to the pandemic COVID-19 restrictions she had to continue with the project via Webinars, for the rest of the curriculum, reaching 292 growers and operators with topics such as Horticulture,

The ABCs' series of workshops has been a proven success

General Botany & Physiology, Soilless Production & Substrates, Insect Pests & Beneficials, Diseases, all in English and Spanish.

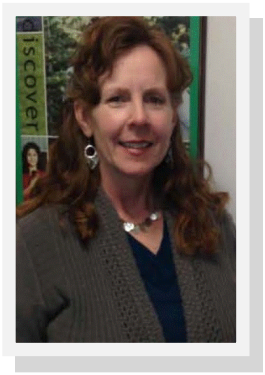
California state agencies are advocating for the use of soil amendments derived from organic materials to increase soil health and improve climate resilience. The application of these materials has shown to increase soil organic carbon content, reduce fertilizer loss, and improve nutrient use efficiency. The use of these amendments, such as compost, is a common practice within the Central Coast specialty crop industry. Yet, fundamental questions remain concerning soil carbon sequestration limits, nutrient availability, crop yield stability, and greenhouse gas emissions. Previous work has shown that the influence of a single compost application on soil nitrogen dynamics, such as nitrous oxide emissions under nitrogen fertilization, depends on soil texture. Dr. de la Fuente secured two other grants from CDFA to conduct research projects on specialty crops and soil health, conducting research on the impact of compost as organic amendments in the soil and their effects on the greenhouse gases via lab, field, and greenhouse experiments to improve understanding of these materials and inform the nutrient management component of the Natural Resources Conservation Service COMET-Farm Tool, aiming to make it more relevant for Central Coast specialty crop producers. One research project focused on a rotation of jalapeño pepper and broccoli crops, a rotation not very much used in Monterey county, but due to the high Hispanic percentage of the population, a crop that will have easy and fast marketability in fresh or processed.

Jalapeño chile pepper harvest

The Healthy Soils Demonstration Project aims to improve soil health, sequester carbon and reduce atmospheric greenhouse gases (GHGs). This is an on-farm demonstration project that collects data and showcases conservation management practices that mitigate GHG emissions and increase soil health, creating a platform promoting widespread adoption of conservation management practices throughout the state. The project in cooperation with grower & CSUMB, is demonstrating implementation of conservation management practices, by a 15% N application reduction, replacement of synthetic N fertilizer with compost as soil amendment, and measure field GHGs emissions. With this project we have produced two videos, one in English and one in Spanish, available at our website (cemonterey.ucanr.edu) or in the following link: https://youtu.be/uCxP9lkccm0 and https://youtu.be/TiiMegLc-eI

Jalapeño chile pepper plants growing in Castroville

Lorin Hofmann-Lurz



Youth Development Community Educator Specialist

9 years with UCCE

The mission of the 4-H Youth Development Program is to instill leadership, citizenship, and life skills in our youth through hands-on learning and community service. In Monterey County there are 15 community clubs serving young people ages 5 through 19. The content of the 4-H program focuses on science, engineering and technology; healthy living; and citizenship. Volunteers keep the tradition of animal husbandry, mechanics and home arts alive.

4-H adapts program in a pandemic with determination

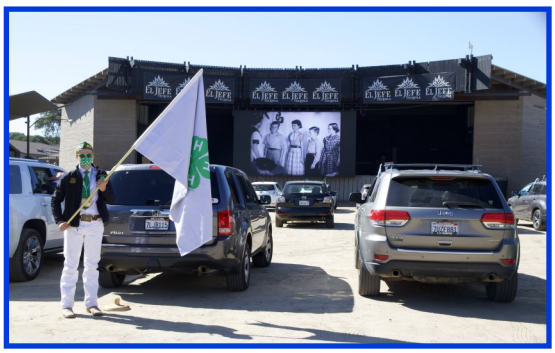
During the 2020-2021 year, the local 4-H Program was able to hold every traditional event and activity through the determination of adult volunteers and youth leaders. The challenges that the COVID-19 virus delivered were no match for the resiliency the 4-H Youth Development Program supporters.

All 15 Community Clubs held their monthly youth-driven meetings - virtually. All were able to elect, install and train their officers using technology that many learned as they progressed. The required Business, Program and Recreation in each club meeting agenda was conducted – even if the internet in many homes proved to be challenging.

New members and their families were invited to join the 4-H New Member Party online. Hosted by the Greenfield club and the 4-H Program Staff, the virtual event included playful and useful information for a family's first year in the program. New members were showered with 4-H themed door prizes which helped to bring out active participation with 23 new members and their parents.

With less travel time and no need to book a central facility, offering training and support through the ZOOM allowed Council committees to focus on their educational work. This year, the Lockwood club provided three separate online trainings on how to prepare a 4-H Record Book. Attendance was excellent and their colorful slides with ice breaker games proved to be popular among members.

To keep the annual 4-H Awards and Recognition event alive during in-person restrictions, the Leader's Council jumped into the concept of a Drive In event. This provided social distancing, contact tracing and still gave the members the much needed recognition for their efforts in earning awards such as the 4-H Star Rank. This event was held at the Monterey Fairgrounds and featured the Youth Council as the emcees. Using a slide show photo presentation, every car was able to clearly see the youth and club receiving the award. As a bonus, members were treated to a free screening of a drive in movie and snacks afterwards, while sitting in their own car.



4-H Awards and Recognition drive-in

Makenzie Keslin won the senior Consumer Science contest at the State Fashion Revue

The long-standing Fashion Revue contest was held virtually with the applicants using technology to submit their photos, entry forms, and receipts to complete. This is a qualifier contest for the State Fashion Revue where one of Monterey County senior won the senior category with her Consumer Science outfit.

Innovating in 4-H

The Leader's Council was able to introduce a new 4-H contest to the membership – the Interview Contest is designed to build skills in youth on how to apply and interview for a job. Contestants filled out online job applications and took part in a virtual interview panel. All were "judged" using a rubric. Members received awards and feedback on their efforts.

From the pandemic, a 4-H Emerald Star idea was born. 13-year-old Tommy Storelli of King City found the forced closure of the local library could have an effect on local youth. He developed a 4-H Book Barn model and encouraged other clubs to place these little free libraries in their community. The little stands are shaped like a barn are to be filled with free children's books and monitored all year by a 4-H club as part of their annual community service. The book barns can be found around the county an in the UCCE lobby.

Emerald Star Award Winner Tommy Storelli and one of his Book Barns

COVID-19 prevented fundraising opportunities and revenue loss

Program Future

The Monterey County Leaders Council took a financial blow with the loss of the fundraising booth and events at the cancelled Monterey County Fair 2020. The Council is non-profit partner to the UC Youth Program and provides the all financial support for the youth.

The Leader's Council recognizes the need to invite new volunteers and members from within the community from a variety of backgrounds to keep the program moving forward. Long standing supporters and stakeholders from the community show their support in a variety of ways. Future funding by University of Agricultural and Natural Resources for Program staff has become uncertain for the years moving forward. The community may need to find alternate funding sources to continue the high level of educational commitment.

Royce Larsen

Area Natural Resource Watershed Advisor

PhD, Oregon State University

27 years with UCCE

There are over one million acres of native pastures in Monterey County. These lands provide opportunity for multiple purposes. Rangelands serve as watersheds to capture, store and release water for downstream uses; they provide forage for grazing by livestock; and their diverse plant communities provide habitat for many species of wildlife and recreational uses. UCCE advisors and specialists apply research to develop new knowledge to effectively and efficiently manage rangelands and livestock in today's competitive environment and regulatory environment.

Challenges to the livestock industry

There were many challenges during this review period due to the Covid-19 pandemic. In addition to the pandemic, the livestock industry also faced challenges including climate change, increased number and severity of fires and droughts. Many producers have found it difficult to maintain cattle herds because the lack of forage caused by drought, and some had fires ravage their ranches. Climate change and droughts has not only lead to less forage, but there has also been an increase of unpalatable weedy species invading rangelands in California Coast.

Cow grazing on thistle

Continued outreach and education during pandemic

Calf nursing in the spring

The ranching industry in the Central Coast is a very important part of the economy and wellbeing of the citizens that live and work here. Providing information of improved forage species for production, improved nutrient quality, and plant species that can compete with weedy invasive species is important to the ranchers and land managers of rangelands. With difficulty attending meetings, Dr. Larsen was still able to publish two articles to help livestock producers. One article was "Seasonal Changes in Forage Nutrient and Toxicity Levels on California Central Coast Rangelands-A Preliminary Study (Grasslands Journal – Winter 2021. 31(1):15-24). This article covers the nutrient and toxin levels for many of the plants on the Central Coast. He also published an article on Forage Quantity and Quality Dynamics Due to Weathering over the Dry Season on California Annual Rangelands (Range Ecology and Management 76 (2021):150-156). This paper describes the amount of forage that is lost through the summer dry period from photo degradation, which helps a rancher better understand the amount of forage they have available to feed their cattle.

UCCE addresses forage loss during drought which assists in rancher loss payments

Continuing Peak Forage Production Project

This program has four forage monitoring locations in Monterey County, in addition to the sites in San Luis Obispo and Santa Barbara Counties. These sites are used to determine forage production, especially forage loss during droughts. This information is given to the USDA FSA and Agricultural Commissioners to help ranchers get the needed payments for forage losses during droughts. In 2021 there was a huge storm in January, but then very little rain for the remainder of the growing season. In some cases this lead to high forage production, but was mostly weedy species like ripgut brome and foxtail, that were not good livestock feed. Other sites had very low production. Overall, this was a difficult year for livestock producers, with many having to sale many of their cattle.

Forage Production near King City, spring 2021. This site had high production, but it consisted of ripgut brome, and foxtail, which is poor feed for livestock

Forage Production near Bradley, spring 2021. This site had good feed for livestock, but it was about 50% below the average because of the drought this year

Mark Bolda

Strawberries & Caneberries Farm Advisor

M.S. Plant Protection and Pest Management, UC Davis

18 years with UCCE

The strawberry and caneberry (raspberries and blackberries) program serves the berry grower community in Santa Cruz, Monterey and San Benito counties. This program consists of traditional agricultural extension like personal contacts and extension meetings, and more contemporary educational material shared through the use of blogs in both Spanish and English, which actually became quite popular as the stay at home orders came into effect in 2020.

Invasive Pest Management

The strawberry and caneberry program works continually to reduce the economic losses brought about by the invasive light brown apple moth (LBAM) and the spotted wing Drosophila (SWD). In the 2019-2021 period, Bolda did five educational programs for berry growers on how to manage LBAM to correspond with the regulatory program currently in place for the Central Coast. Also, Bolda did several trials testing new materials which offered control of SWD in raspberry and blackberry, including an organically registered calcium suspension to strengthen fruit against damage by this pernicious pest.

Strawberry soil pathogen management

Advisor Bolda worked with a USDA scientist, industry pest management companies, and growers to investigate better control for the rapidly advancing epidemic of the soil pathogen *Fusarium oxysporum* forma speciales (f.sp.) *fragariae.* This work successfully identified the use of post season crop termination as a positive addition to the development of an integrated system of management for this pathogen, which also includes crop rotation, plant resistant varieties, and good cropping practices.

Damage from Fusarium to a strawberry field can cause high losses

Mitigaton of fruit reversion in blackberry

While the introduction of new, highly productive, late producing blackberry varieties has been a boon for Central Coast blackberry growers, several of these varieties are susceptible to fruit reversion, which is a reddish discoloration of the fruit that is suppose to be black. Over the 2019-2021 period, Advisor Bolda, worked with support from the North American Raspberry and Blackberry Association, in collaboration with a local grower looking at tunnel temperature, UV radiation and nitrogen fertilizer quantity as possible causes of this reversion. The result was that temperature was the main factor in causing this reversion, and the information has been shared with growers nationwide through presentations, published material on blogs and newsletters.

Reversion in blackberries

UCCE addresses new pest problems in both conventional and organic crops

Addressing New Pests

The Lewis mite, *Eotetranychus lewisi,* a long time pest of strawberry in Southern California, in recent years has become a problem for local strawberry growers. In both 2020 and 2021, Advisor Bolda worked to find solutions, and indeed by May, 2021, had successfully done so, in both conventional and organic systems. Information has been shared with growers in remote meetings, as well as material published on the blog maintained for this purpose.

Devii Rao

Area Livestock and Natural Resources Advisor

M.S. UC Berkeley

7 years with UCCE

The Livestock and Natural Resources program focuses on science and education related to economic and ecological sustainability of ranching in Monterey County. At over one million acres in Monterey County, rangeland is valued at $20.1 million dollars and livestock $100.9 million. The program aims to help ranchers maintain economic viability through challenges such as drought and increased regulation, as well as balance business operations with preservation of water quality, local ecosystems, and food safety.

Collaborating on disease management in Cattle

The UC Davis School of Veterinary Medicine, in collaboration with UCCE advisors across the state is conducting a rancher survey to find out about local prevalence and problems with Anaplasma, a tick borne disease in cattle. With this information, we can better understand how widespread the disease is and what herds with the disease have in common, which may help find ways to better protect cattle from anaplasmosis.

Economic Impacts of Ground Squirrels on Ranching

In collaboration with other UCCE advisors and UC Davis, Advisor Rao has been conducting research to better understand the economic impacts of squirrels on ranching operations. She has been monitoring three ranch study sites. At each site there are test plots with different densities of ground squirrels.

Squirrel hole damage in rangeland

Squirrel count observations

Managing Wildfires in Rangeland

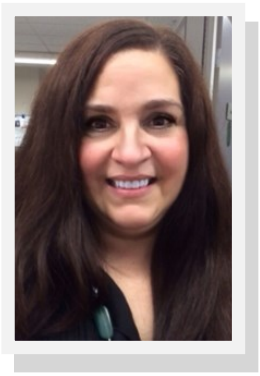
UCCE engaging in wildfire management to protect rangelands

Increasing ecological sustainability is an important goal of UCCE. The Livestock and Range program is working with local landowners and agencies to bring prescribed fire back to the community. Prescribed fire can be used to reduce fire fuels and control invasive weeds. After 2020's devastating fires in Monterey County; River, Dolan, Carmel and Coleman wildfires, this research is becoming increasingly important for preservation of natural resources and the economic viability of ranching. Advisor Rao is working in partnership with CAL FIRE to develop a prescribed burn association (PBA) in Monterey, San Benito and Santa Cruz counties. PBA members pool their knowledge people power, and equipment to help each other conduct prescribed burns. Burn goals vary from increasing livestock forage and controlling weeds, to fire safety, to improving habitat. An indirect benefit from prescribed burns is prevention of smoke damage to fruit and vegetable crop from wildfires. Recently the first prescribed burn was conducted in Santa Cruz County. The next burn will be fall of 2021 in Monterey County.

Through funding from the California Cattle Council, and in collaboration with several UCCE academics a project is being conducted to analyze how much forage/fine fuels cattle consume and how that affects fire behavior and fire safety.

Advisor Devii Rao (center) working with a Cal Fire crew on a prescribed burn. Photo credit Matthew Shapero

Maria de la Fuente



County Director, Farm & Master Gardener Advisor

PhD, Plant Pathology, Iowa State University

25 years with UCCE

The mission of the UC Master Gardener program is "To extend research-based knowledge and information on home horticulture, pest management and sustainable practices to the residents of California."

UC Master Gardeners Monterey & Santa Cruz Counties

During the 2019 – 2021 timeframe, 133 UC Master Gardeners of Monterey and Santa Cruz Counties donated a total of 14,313 volunteer hours of their time serving the community and gained 1,677 hours of Continuing Education for their benefit.

UC Master Gardeners Initial Training 2020

During this period, the UC Master Gardeners managed to hold and complete a UC Master Gardener Initial Training class for the Class of 2020 Master Gardeners, where we graduated 34 individuals. Due to the COVID-19 restrictions this course transformed into a virtual classroom setting after March 2020. The Class of 2020 Master Gardeners are among the most productive MG volunteer class ever!

UCCE Master Gardeners of Monterey and Santa Cruz County Class of 2020

COVID-19 Pandemic Adjustments

Master Gardeners continued education and outreach through COVID-19

Due to the pandemic, the UC Master Gardeners adapted and established a new system of on-line free Zoom Public Education Classes, to continue the mission of spreading U C scientific-based knowledge to the home gardeners residing in our counties. Socially distanced and limited safe in person classes have resumed outdoors at the UC Master Gardeners Teaching & Demonstration Garden located at the UCCE Santa Cruz County facility at 1430 Freedom Boulevard, Watsonville, CA.

During COVID 19, the UC Master Gardeners of Monterey and Santa Cruz Counties established the "Jardinero Verde" (Green Gardener Program). This new educational program is dedicated to having bilingual and bicultural Master Gardeners provide educational instruction, training and outreach to the Spanish-speaking landscapers and commercial gardeners in California. The program consisted of 14 modules with more than 30 hours of instruction, with a final exam. The topics included are: Introduction to Sustainability, Soils, Mulching, Compost, Integrated Pest Management, Site Evaluation, Irrigation, Turf, Fertilizers, Trees & Shrubs, and Correct Plant & Correct site. A very comprehensive training! This first time was a success, where 25 participants from all throughout the state participated in the virtual training and graduated at the end of June 2021. For the local participants, we hosted a graduation and delivery of certificates meeting in our UCCE Monterey County facility at 1432 Abbott Street, Salinas, CA

First group of local graduates for the UCCE Monterey & Santa Cruz Counties "Jardinero Verde" Program

The UC Master Gardeners held three online and safe contact Plant Sales, based out of the UCCE Monterey County greenhouse and shade house located at the UCCE Monterey County site at 1432 Abbott Street, Salinas, CA. These plant sales have been focused on promoting the use of drought tolerant and native plants for our area, and are our main fundraising for the delivery of our educational programs.

The UC Master Gardeners Hotline has continued to be in full operation, and UC Master Gardeners answer questions from the public on gardening issues, as well as research topics and provide the callers with research based answers and guidance.

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We're on the web!

Visit us at cemonterey.ucanr.edu & ucanr.org

We wish to thank our 4-H volunteers, Master Gardeners, and student interns for their dedicated service. They help Cooperative Extension enrich the lives of many residents in Monterey County.

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