University of California Cooperative Extension Santa Barbara

Quarterly Report January—March 2019

4-H Members from Santa Barbara County attended the 2019 Youth Leadership Summit

Submitted by: Katherine E. Soule, PhD
Director of UC Cooperative Extension
Santa Barbara County
April 30, 2019

UC Cooperative Extension Programs in Santa Barbara County

PLANT SCIENCES AND HORTICULTURE led by Mr. Mark Battany, Dr. Surendra Dara, Dr. Ben Faber, and Dr. Chris Greer specializes in the science and art of growing fruits, vegetables, flowers, and ornamental plants. Advisors conduct local field research to test new crops and varieties that are best adapted to local soil and water conditions and markets, implement improvements in cultural practices and pest control methods, and offer information that optimizes production, conserves natural resources, and protects the environment. Advisors are called upon regularly by growers and the general public to assist in enterprise planning and problem solving. Programs include the UC Integrated Pest Management and UC Master Gardener programs.

YOUTH, FAMILIES, AND COMMUNITIES PROGRAMS led by Dr. Katherine Soule and Ms. Liliana Vega. The mission of the UC Youth, Families, and Communities Program in Santa Barbara County is to cultivate environments where local youth, families, and community members have access to science-based resources and knowledge in order to be the creators of a healthy, inspired, active, & connected Central Coast. Programs include: the UC CalFresh Nutrition Education, UC Master Food Preservers, and 4-H Youth Development programs.

NATURAL RESOUCES, RANGE MANGEMENT, WATERSHED, AND LIVESTOCK led by Dr. Royce Larsen and Mr. Matthew Shapero, provides range and pasture livestock ranchers and producers with research-based information on ecosystem services, irrigated pastures, resource economies, livestock health, production and management, improvements, and watershed management and water quality issues on rangelands.

FIRE ECOLOGY AND MANAGEMENT led by Dr. Max Moritz, focuses broadly on scientific questions in fire ecology and management. Research includes analysis of where various fuel management techniques are likely to succeed and be sustainable, mapping of fire weather patterns, and quantifying linkages between fire and climate change. Outreach efforts emphasize fire-related policy decisions and education of the general public to live more safely on fire-prone landscapes.

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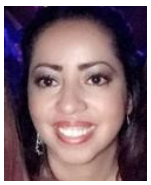

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The Challenge

Communities beyond the reach of the land grant campuses of the University of California present special challenges for outreach and extension. Cooperative Extension is the public education arm of the University of California's Division of Agriculture and Natural Resources. Cooperative Extension provides a direct link between all citizens of Santa Barbara County and the research, teaching and public service activities of the University.

Our mission is to extend research knowledge and information to empower people to improve and enhance their lives. We represent a unique partnership between the University of California, the County of Santa Barbara, and the United States Department of Agriculture.

Upcoming: UC Master Gardener Pollinators Workshop on May 5

Addressing the Challenge

As Director of Cooperative Extension in Santa Barbara County, Dr. Katherine E Soule maintained contact with the Agricultural Commissioner throughout the quarter. UC Cooperative Extension Advisors and staff were active in all program areas in the county during the quarter. Advisors were involved in extensive outreach and education efforts providing workshops and field meetings as well as reaching clients through social media. During the quarter, I met individually with the 4th and 5th District Supervisors to provide updates on UCCE activities in the County. UC personnel collaborated with the Santa Barbara County Cattleman's Association, Santa Barbara County Fire, Vandenberg Air Force Base, Santa Maria Bonita School District, THRIVE Santa Maria's Healthy School Pantry, Santa Barbara County Public Health Department, United Way, local libraries, Carpinteria Garden Park, the Santa Barbara Botanic Garden, Santa Barbara County Fire Safe Council, California Avocado Commission, US Forest Service, UC Santa Barbara, UC Riverside, and the USDA to support programs.

Area Natural Resource Advisor, Dr. Larsen, and Livestock and Range Advisor Shapero served on the Santa Barbara Agricultural Preserve Advisory Committee. Santa Barbara County Agriculture Advisory Committee meetings in January and March were attended by Dr. Dara and Advisor Shapero. Updates were provided on UCCE Activities and upcoming events.

Public Value

The University of California Cooperative Extension programs in Santa Barbara County:

- Ensure that science-based information developed by the University of California is available to all the people of Santa Barbara County through outreach and education provided by UCCE programs.
- Narrow the gaps in information needed by county agencies and constituents to inform policy and decision-making through local research into questions and issues unique to Santa Barbara County.
- Bring together the resources and expertise of the University of California and local partners to develop solutions to local problems.
- Provide research and information to local partners on practices or programs that reduce costs or increase benefits for the people and environment of Santa Barbara County.

Integrated Pest Management — Advisor Dr. Christopher Greer

The Challenge

Growers of agricultural crops throughout California face ever increasing challenges related to pest management through the introduction of invasive pest species, increased production costs, changing federal and state laws and regulations, and consumer preferences. Ecosystem-based strategies for agricultural pest management that are developed and validated through local field research and evaluation, disseminated through effective educational opportunities, and adopted on a regional or areawide scale are essential to maintaining economic viability of agricultural crops. Integrated pest management is a decision-making strategy that focuses on long-term prevention of pests or their damage through a combination of techniques such as biological control, habitat manipulation, modification of cultural practices, and use of resistant varieties. Pesticides are used only after monitoring indicates they are needed according to established guidelines, and treatments are made with the goal of removing only the target organism. Pest control materials are selected and applied in a manner that minimizes risks to human health, beneficial and nontarget organisms, and the environment.

Typical symptoms of avocado branch canker demonstrating dieback of the shoot and leaves, progressing from the tip of the shoot toward the main branch or trunk.

Addressing the Challenge

During the quarter, Advisor Dr. Chris Greer continued establishing priorities to support his integrated pest management program with an emphasis on plant pathology. Activities included:

- Presented a session on “University of California IPM Tools/Resources” at the Central Coast Chapter of California Association of Pest Control Advisors continuing education meeting in Atascadero.
- Presented a three hour training on Integrated Pest Management for UC Master Gardener trainees and current volunteers in Goleta.
- Acquired a multispectral camera, attended a short course at UC Davis on utilizing drone data in agricultural research and extension, and completed drone training flights in preparation for aerial imaging in support of pest and disease monitoring research.
- Increased competency with local crops and pest management by participating in the 2019 Annual UCCE Strawberry Production Research Meeting in Watsonville, UC ANR Pesticide Policy and Safety Training, UCCE Vineyard IPM Seminar in San Luis Obispo, UCCE Irrigation and Nutrient Management Meeting in Salinas, 3rd Ag Innovations Conference: Biologicals in Santa Maria, and the California Leafy Greens Research Program Annual Research Conference Pismo Beach.
- Participated in the Department of Pesticide Regulation – 2nd Integrated Pest Management Symposium in Sacramento.
- Began collaboration with UC researchers to investigate avocado branch canker in order to determine the role of various fungi associated with this disease, identify conditions that favor development of the disease, and develop effective integrated pest management strategies for the disease.

Public Value

In Santa Barbara County, the University of California Integrated Pest Management Program helps residents, growers, land managers, community leaders, and professional pest managers prevent and solve pest problems with the least unintended impacts on people and their surroundings, which can lead to:

- Increased ecological sustainability of agriculture, contributing to improving air, soil, and water quality while ensuring the viability of the agricultural industry.
- Improved food security, leading to increased access to abundant, affordable, safe, and healthy food.
- Increased agricultural efficiency and profitability, improving yield, as well as reducing inputs, thus increasing economic return.

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Watershed, Natural Resources, and Rangeland Management—Advisor Dr. Royce Larsen

The Challenge

There are close to one million acres of native pasture and forestlands in Santa Barbara County, which are collectively referred to as rangelands. Comprising approximately half of the acreage of the 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. The UC Cooperative Extension Watershed and Natural Resource Program provide educational programs to inform people who own and/or manage the land and the animals grazing these lands. This work also includes applied research to develop new knowledge to effectively and efficiently manage rangelands and livestock in today's competitive and regulatory environment.

The FOSS NIRS scanning machine at the Forage and Range Research Lab, USDA ARS in Logan Utah, that predicts forage quality components.

Addressing the Challenge

At the beginning of this year I started working with Santa Barbara County Cattlemen's Association and with Advisor Matthew Shapero to provide information to the cattlemen. I held a workshop in San Luis Obispo on ground squirrel control, of which several attendees were from Santa Barbara County. I also help organize and present at the San Luis Obispo County Range Improvement Association annual meeting in Arroyo Grande, of which some from Santa Barbara County attended. I will attend the Santa Barbara County Range Improvement Association meeting in April 2019. The purpose of these organizations/meetings is to find effective ways of conducting controlled burns to decrease the risk of wild fires.

Advisor Larsen continued working with the USDA ARS lab in Utah scanning forage samples from 2018. The scanning of samples provides nutrient data that will help producers understand supplementation needs better.

I attended the annual cattlemen's meeting, and other board meetings, giving short presentations/updates on the ongoing forage production project and about new species of forage plants that are ready for testing on the Central Coast.

Public Value

The University of California Watershed/Natural Resource program in Santa Barbara County focuses on developing and extending research based information to help ranchers, managers and owners of rangeland manage their land in a sustainable and productive manner. The livestock industry is an important economic part of agriculture in the County. Research and education helps sustain the livestock industry in Santa Barbara County through:

- Improving rancher sustainability by improving their practices which sustain their production, lands, and families.
- Promoting best management practices for helping ranchers survive through the drought.
- Providing research data demonstrating severity of the drought on forage losses, in order to help ranchers obtain financial help through USDA programs designed for drought relief.

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Livestock & Range—Advisor Matthew Shapero

The Challenge

Rangelands in Santa Barbara County support a host of ecosystem services (water storage and filtration, wildlife habitat, carbon storage, scenic viewsheds), as well as provide the primary forage base for the county's thirty-million-dollar livestock industry. For generations, ranchers have worked to sustainably manage these rangeland ecosystems while providing a quality, safe agricultural product. Increasingly, however, the county's livestock industry faces new sets of ecological, economic, and regulatory challenges that complicate this work. The ultimate goal of the UC Cooperative Extension Livestock & Range program is to assist producers and rangeland managers alike to successfully navigate these challenges. The Livestock & Range program will provide relevant, science-based information and will develop an applicable and progressive research program to respond to the questions and needs of local clientele.

Advisor Shapero leads discussion at the Prescribed Fire Field Day, January 2019. Here, long-time members of the Santa Barbara Range Improvement Association describe the workings of their organization to state and local officials, local agencies, and local NGOs.

Addressing the Challenge

During the first quarter of 2019, Advisor Shapero was again active with extension presentations and workshops. In early January, he organized the Prescribed Fire Field Day, on the ranch where the Santa Barbara County Range Improvement Association conducted a controlled burn in November 2018. The field day brought together elected officials, agencies, and decision makers to discuss the viability and benefits of using prescribed fire in the county as a fuels management strategy and for range improvement. Later that month, Advisor Shapero co-organized a workshop, "Fire-informed Land Use Planning." Members of the SB County Planning Department participated in the workshop in Ventura, which addressed how changes or adjustments to land use planning can incorporate the ongoing threat of wildfire. In early February, Advisor Shapero hosted another successful workshop entitled "Weather, Grass, and Drought: Planning for Uncertainty." Experts from around the county came to address local ranchers and agencies regarding planning and weather forecasting tools that are available to improve on-ranch decision making. Advisor Shapero has continued to forward his research program in Santa Barbara County. This quarter, he partnered with Cal Poly San Luis Obispo to pilot the use of drones to monitor post-prescribed-fire vegetation recovery. And the end of March saw the beginning of the busy field season in the county to monitor forage production on rangelands. The data he and Advisor Royce Larsen collect each Spring are added to a robust and growing dataset that is beginning to provide important insights into how rangelands may respond to a changing climate. Advisor Shapero attended the January and March meetings of the Santa Barbara County Cattleman's Association and is an ex-officio member of their Land-Use Subcommittee. Additionally, Advisor Shapero serves on the county's Agricultural Preserve Advisory Commission and attended the February meeting. Finally, Advisor Shapero continues to respond to clientele inquiries and to meet with county residents to determine best directions for his extension programming.

Public Value

The University of California Livestock & Range program in Santa Barbara County will provide science-based information to help ranchers, managers, and owners of rangeland manage their land in a sustainable and productive manner. Future research and education will benefit livestock operators and rangeland managers through:

- Addressing animal health issues that will increase the welfare and productivity of livestock.
- Promoting rangeland management practices that benefit both the land and the ranching operation.
- Facilitating conversation between community stakeholders in order to achieve lasting, responsible management.
- Improving animal genetics and performance, ranch profitability, and ecological sustainability.

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4-H Youth Development—Advisor Liliana Vega with Janelle Hansen

The Challenge

Communities of scientifically literate, well-informed, and actively engaged citizens are essential to create positive changes needed to solve important issues facing our nation and help us to prosper in a global economy.

The University of California 4-H Youth Development Program provides training and resources to local volunteers who partner with youth to bring about positive change in our communities. The 4-H program equips youth with hands-on science activities, healthy living knowledge, leadership experiences, and service-learning opportunities. Participation in 4-H prepares youth to understand and acquire the skills that will allow them to become problem-solvers and astute leaders.

Sixteen youth from five 4-H Clubs attended the 2019 Central 4-H Youth Summit

Addressing the Challenge

4-H staff supported adult volunteers and youth members in delivering positive youth development programming to members and their families in 23 clubs throughout the county. Participants engaged in hands-on experiential learning projects in the focus areas of Science, Leadership, Healthy Living, and Citizenship. Countywide 4-H activities, training meetings, and educational outreach events were delivered to 4-H youth, families, as well as the community at large, including:

- Hands-on science learning activities presented by 4-H staff, volunteers and youth members to over 400 visitors at the THRIVE Santa Maria's Healthy School Pantry (HSP) program.
- County 4-H Presentation Day which gave 31 youth the opportunity to practice their public speaking skills and qualify for State 4-H Presentation Day. Youth attending also participated in an engineering rocket challenge, impromptu speeches and judging boards.
- Science nights at Brandon and El Camino Schools in Goleta allowed 250 youth to experiment with balloon rockets.
- The California Central 4-H Youth Summit where 16 youth and 2 chaperones attended a three-day weekend leadership conference at Wonder Valley Ranch in Sanger. The focus of the "Bee the Change" Summit was social awareness and youth engaged in workshops on empathy, job interviews and bullying. They also learned a variety of leadership and communication skills.

Public Value

In Santa Barbara County, the University of California 4-H Youth Development Program is focused on providing youth with opportunities to develop strong, positive youth-adult partnerships while engaging in meaningful activities, which lead to:

- Reduced participation in risky behaviors (e.g. underage drinking, sexual activity, gang activity), which can decrease related public costs.
- Increased academic success and/or science literacy, which contributes to a highly qualified and productive workforce.
- Increased civic engagement, which can strengthen communities through youth training in leadership skills, innovation, critical thinking, and healthy living.
- Increased youth literacy in science, engineering, and technology through special programming, projects, and access to University curricula.
- Increased environmental stewardship and agricultural knowledge, which ensures a safe, sustainable, and secure food supply.

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Master Food Preserver Program—Advisor Dr. Katherine E. Soule with Dayna Ravalin

The Challenge

A resurging interest in food preservation in Santa Barbara County in recent years highlighted the lack of local information and resources on up-to-date and safe food preservation practices, critical in reducing serious illness. Responding to the community's interest and concerns regarding home food preservation, the UCCE in San Barbara County launched the Master Food Preserver program.

Addressing the Challenge

During the first quarter of 2019, the UC Master Food Preserver Program offered 3 public classes with an attendance of 121 individuals. Several of the attendees were residents of Santa Barbara County. Two of the three classes were new topics which included making and preserving bone broth and safely making yogurt and soft cheeses at home. Our program continues to look for new and exciting topics to share with the community to increase awareness of the importance of using researched based food preservation methods and recipes.

Improving our program's visibility in Santa Barbara County is a high priority for our volunteers. Unfortunately, our plan to offer a volunteer training in the area did not happen due to lack of applications. We continue to work on developing multiple strategies for program outreach in the upcoming year. Our volunteer training interest list is growing, and we are hopeful to provide a training in 2020. A significant barrier to offering a training in the Santa Barbara County region is the availability of low-cost rental space with adjacent kitchen facilities in the southern section of the County. While searching for a facility which will meet our needs and budget, we continue to reach out to the community to intensify interest in volunteering. Through expansion of our group of volunteers in Santa Barbara County, we will be able to increase programming in the region as well.

UCCE Master Food Preserver Fermentation Class
UCCE Master Food Preserver Dawn Peters
Photo credit: Tami Reece

Public Value

The UC ANR Master Food Preserver program is a public service for residents who want to learn safe methods of preserving produce sources from farmers' markets, local grocery stores, or gardens. These efforts benefit Santa Barbara County through:

- Decreasing health care costs by reducing instances of food borne illness through safe home food preservation practices.
- Increasing community wellness by creating co-capacity building with volunteers who are trained to provide services at lower costs to community residents.
- Increasing environmental sustainability through decreased food waste by teaching residents how to preserve food that might otherwise spoil before consumption.
- Increasing economic stability by growing the purchasing power of residents who can use home food preservation techniques to maximize their food resources.
- Increasing the economic vitality of resident food producers by empowering consumers to choose locally grown commodities.

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Master Gardeners—Linda Baity with Dr. Christopher Greer

The Challenge

Communities beyond the reach of the land grant campuses of the University of California present special challenges for outreach and extension of research in new horticulture practices to home gardeners. Research based information about home horticulture, pest management; sustainable landscape practices and other environmental and natural resource issues support informed decisions by home gardeners promoting healthy, safe and prosperous communities in Santa Barbara County. Local certified Master Gardener volunteers, trained by the University of California provide information and problem solving opportunities.

Master Gardeners Lynn Kirby, Jo Bardsley, Donna Grubisic, Janet Rogers, Lana McIntyre and Celina Andrade prepare to welcome butterfly lovers to Alice Keck Memorial Garden on March 30, 2019.

Addressing the Challenge

On January 9, 2019, Master Gardeners began training classes for a class of 20 potential new volunteers. 20 weeks of instruction are scheduled through mid-May, with sessions to be taught by experts in all areas related to urban horticulture selected from UC ANR specialists as well as UC faculty members.

Master Gardeners participated in a Winter Tree Pruning Clinic at La Huerta Historic Orchard at the Old Mission Santa Barbara, whereas a second pruning workshop scheduled to be held on February 2nd at Mesa Harmony Garden in conjunction with the California Rare Fruit Growers was cancelled due to inclement weather. During the Community Seed Swap event on January 27th at Trinity Gardens, Master Gardeners staffed a Help Table and gave away seeds and planting advice to hundreds of local residents who attended.

Public education workshops presented as part of our ongoing series of free classes at the Central Library in downtown Santa Barbara included "Worm Composting Made Easy" on February 3rd and "Straw Bale Gardening" on February 23rd. Master Gardener Len Grabowski presented "Growing Orchids in Santa Barbara" as part of the 74th Santa Barbara International Orchid Show. Master Gardener volunteers also staffed Help Table during all three days of the show March 15-17t, and also participated in the "Mulch Madness & Beekeepers" event on March 17th held at the Santa Ynez Valley Botanic Garden.

A free public event on Saturday, March 30th, entitled "Create a Butterfly Garden" attracted dozens of residents to the Master Gardener Butterfly Garden at Alice Keck Park Memorial Garden. Activities for all ages were provided, including free milkweed seedlings and a children's planting area. Master Gardener contacted more than 1,000 Santa Barbara County residents at public sites throughout the community during this quarter, including on-going projects at La Huerta Historic Garden at the Old Mission, Alice Keck Park Memorial Garden, Mesa Harmony Community Garden, and the bi-monthly Help Tables at the downtown Santa Barbara Farmers Market and Santa Barbara Botanic Garden.

Master Gardeners devoted a total of 895 volunteer service hours to educational outreach during this quarter, representing a contributed value of $26, 805.25 to the County of Santa Barbara.

Public Value

The University of California Master Gardener Program is focused on extending research based information on sustainable landscape practices. This effort benefits Santa Barbara County through:

- Safe gardening practices that help to protect water and water quality, support healthy ecosystems and enhance wildlife and biodiversity.
- Sustainable local food systems that enhance food security for families, neighborhoods, and communities.
- Sustainable landscape practices that create efficient communities by conserving water and energy, and reducing and reusing green waste.
- Effective prevention, detection and management of invasive and endemic species through public outreach and education that helps to preserve a prosperous agricultural economy.
- Increasing science literacy of Master Gardeners and their clientele through quality education and outreach.

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UC CalFresh Nutrition Education—Advisor Dr. Katherine E. Soule with Shannon Klisch

The Challenge

In 2009, the Santa Barbara County Department of Public Health reported that approximately 1/2 of adults and 1/3 of teens in the county are overweight or obese. Obesity is a contributing factor of disease and death. Rates of obesity are generally higher among low-income populations.

To improve the health of the public, the University of California CalFresh Nutrition Education Program (UC CalFresh NEP) provides high-quality, nutrition and physical activity education programs for youth and adults in Santa Barbara County, focusing on low-income populations.

Addressing the Challenge

From January through March 2019, UC CalFresh collaborated with the Santa Barbara County Public Health Nutrition Education and Obesity Prevention program to develop a three-year SNAP-Ed Integrated Work Plan. Using community assessment data from the County Department of Public Health, Santa Barbara County Food Bank and City of Santa Maria, the work plan outlines activities related to obesity prevention that the two programs will implement starting in Federal Fiscal Year 2020.

In addition, student leaders in the 4-H Student Nutrition Advisory Council clubs (SNAC) have been busy leading educational sessions with their peers, with parents and with other community members. In March, SNAC youth worked at their schools to promote National School Breakfast Week and the importance of eating a healthy breakfast every morning. Their promotional efforts led to the increased uptake of school breakfast in at least one school site. One Food Service Manager commented, “Wow, we sold over 300 breakfasts today, we never break 300." In addition, SNAC youth led a physical activity booth at the March 31 Santa Maria Open Streets event reaching hundreds of families and community members.

Lastly, UC CalFresh continued to support 80 teachers and 3800 students with comprehensive nutrition education service at five school sites in the Santa Maria-Bonita School District and one school site in Lompoc. The teachers received No-Prep Nutrition Education curriculum kits. Students in grades Kindergarten through 6th participated in cooking demonstrations led by UC Community Education Specialist and SNAC youth leaders during this quarter.

4-H SNAC Students teaching a 2nd grade class how to make a healthy oatmeal breakfast.

Public Value

The UC CalFresh NEP is focused on improving the health of the public, which in turn reduces public costs by providing research-based quality nutrition education. These efforts include:

- Serving as a vital bridge between the learning and knowledge of the UC system and our community.
- Promoting healthy living, food safety, food budget maximization, and physical activity to CalFresh recipients and other low-income individuals, families, and youth.
- Tailoring the latest science, curriculum and information to the needs, culture and language of low-income communities to provide culturally sensitive programming that meets nutrition education and resource needs in Santa Barbara County.
- Enhancing individual efforts to make healthier lifestyle choices by utilizing the Socio-Ecological Model (SEM) to encourage social and environmental (e.g. home, school) changes.

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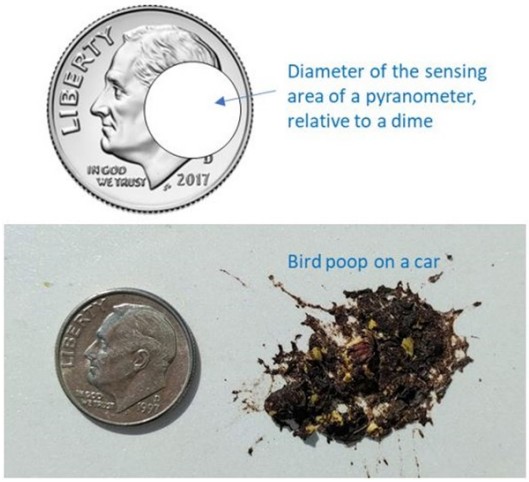
Water Management and Biometeorology — Advisor Mark Battany

The Challenge

Growers of wine grape vineyards throughout California face challenges with increased competition for limited water supplies and potential changing climate conditions.

Improved information on climate conditions resulting from local field research can provide growers with the knowledge to make the most informed decisions possible to ensure that their vineyards remain productive and economically viable under these changing conditions.

The efficient management of irrigation water will become increasingly more critical in the future. Limitations of water supplies will force all farmers and other water users to generate the maximum possible returns from their available water.



An example of how small the light-sensing area of a pyranometer can be, relative to a dime.

Addressing the Challenge

Data risks in agriculture

The recent problems of the Boeing 737 MAX aircraft have been associated with erroneous values from a single sensor leading to failure of the system (i.e. airplane crash). This unfortunate outcome serves as a reminder that very smart and capable teams of people can inadvertently design systems that may be prone to unexpected failure when provided with erroneous data. It would be helpful to look at the systems that we use in agriculture with a critical eye to understand if any of them may also be prone to unexpected failures if key components fail. One example of such a weakness can be in the weather station data that is used to calculate evapotranspiration values for irrigation management. This calculation requires measurements of air temperature, humidity, wind speed, and solar radiation. The latter measurement has the largest influence in the final value, and hence errors in the solar radiation measurement can lead to very inaccurate evapotranspiration values. The sensor used to measure the solar radiation is called a pyranometer; the part of the sensor that actually measures incoming solar radiation is quite small, about the diameter of a small chocolate chip. How might this small sensor be vulnerable? One potential source of error is from a bird dropping that falls on the sensor and partially reduces the reading, resulting in lower evapotranspiration values than truly exist in the field. This example was recently addressed at a Vineyard Irrigation conference at UC Davis.

Public Value

The University of California Viticulture/ Soils program in Santa Barbara County is focused on developing and extending critical research- based information to help wine grape growers maintain sustainable production.

This effort benefits Santa Barbara County through:

- Achieving sustainable wine grape vineyards that enhance productivity, crop quality and economic returns to growers with benefits to the entire local economy.
- Vineyard irrigation and soil management practices that help reduce water use and maintain soil productivity, thus relieving the strain on impacted water resources and ensuring more reliable supplies for all water users.
- Improved understanding of frost conditions and protective measures to help achieve effective practices that minimize impact on water resources.

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Strawberries and Vegetables—Advisor Dr. Surendra Dara

The Challenge

Public health and environmental resources are protected through efficient use of agricultural inputs and safe agricultural practices. Strawberry and vegetable growers and pest control advisors are continually in need of information on improved production technologies and strategies for managing endemic and invasive pests, diseases, and weeds. Optimizing inputs and maximizing returns with food safety in mind are key strategies for healthy, safe, and prosperous agricultural operations.

The Strawberry and Vegetable program identifies growers' needs, develops solutions based on sound scientific research, and extends information in a timely and proactive manner.

Addressing the Challenge

Currently conducting two strawberry studies evaluating biostimulant and nutrient materials on crop health and yield; and preparing to start a biofungicide study in strawberry and insecticide studies in cabbage and lettuce. Published a trade journal article on the new IPM model and an extension journal article on non-chemical control of the western grapeleaf skeletonizer.

Organized the 3rd Ag Innovations Conference: Biologicals and tradeshow in Santa Maria to improve the knowledge of using biocontrol agents, biostimulants, and beneficial microbes for pest and disease management in various crops. Also co-organized a meeting in San Luis Obispo on nutrient management.

Reached out to 76 people through individual consultations various agronomic and pest management issues, and 240 people through extension meetings.

UCCE continues to provide timely information on production practices, pest, disease, and weed management to the clients.

Santa Maria strawberry grower, Dave Peck (Manzanita Berry Farms) speaking at the Ag Innovations Conference that had nearly 180 attendants

Public Value

The UCCE Strawberry and Vegetable program promotes a prosperous local economy, as well as a safe and healthy food system through:

- Improved production practices by optimizing input costs and increasing yields.
- Innovative research on alternatives to chemical fumigants, insecticides, miticides, fungicides, and improved Integrated Pest Management practices.
- Efficient use of fertilizers and irrigation water which contribute to reduced leaching of nitrates, reduced ground water contamination, and water conservation.
- Education on invasive pests and diseases that impact both the farming community and home gardeners which better equips them to take appropriate preventive and/or control measures.

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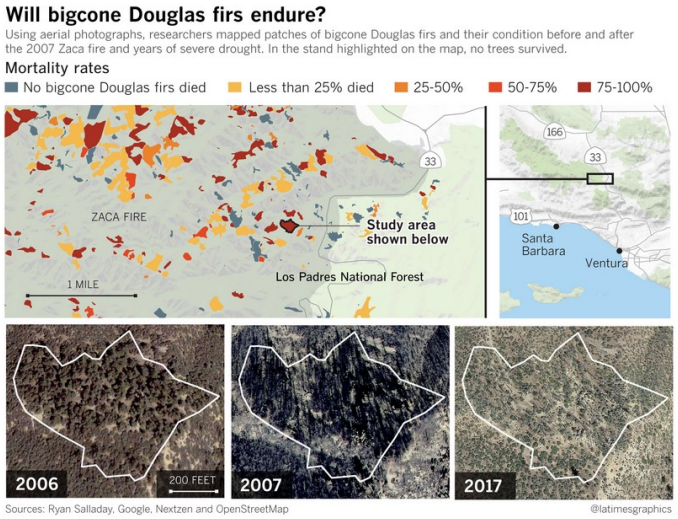
Fire Ecology & Management—Specialist Dr. Max Moritz

The Challenge

Understanding the nature of fire in California can help to save lives, minimize property damage, and protect the environment. Focusing broadly on fire ecology and management, this program brings UC research expertise to Santa Barbara County on the following topics:

- Quantifying the natural ranges of variation in fire regimes including frequency, size, seasonality and intensity within fire-adapted vegetation.
- Understanding where and when various fuel management techniques are likely to succeed and be sustainable.
- Mapping fire weather patterns, which historically have been associated with the greatest losses.
- Modeling linkages between fire activity and climate change.



This image is from a weekend feature story on wildfire in the Los Angeles Times (Sunday edition, published January 12, 2019), which showcased one of Moritz' UCSB-based research projects.

https://www.latimes.com/local/lanow/la-me-fire-los-padres-20190111-htmlstory.html

Addressing the Challenge

During this quarter Specialist Max Moritz continued working with local citizen science volunteers to maintain local Live Fuel Moisture (LFM) data sampling and processing, which feed into regular updates and distribution though the Santa Barbara Botanic Garden website. As a board member of the Santa Barbara County Fire Safe Council, Moritz continued to work with local constituents on fire-related issues; this includes a recent FEMA Notice of Intent submission for work on community-based resilience. The UCSB project on restoration of big cone Douglas fir in the Zaca Fire area of Santa Barbara County continues, and it was featured in a front-page cover piece in the Los Angeles Times (see below). The sundowner wind mapping project with other UCSB collaborators is also ongoing. Notably, during this period Moritz gave California Senate testimony at an Informational Hearing called "Living resiliently in the new abnormal: the future of development in California's most fire prone regions" in Sacramento.

Public Value

Fire is an important and natural process in almost every terrestrial ecosystem of California, yet it is one of the most persistent threats facing communities that live on fire-prone landscapes.

Communicating and implementing the latest scientific information about fire research is crucial for making communities safer, reducing property damage, saving lives, and protecting the environment.

UC Cooperative Extension helps Santa Barbara County create safer, healthier and more prosperous communities through efforts that emphasize the following:

- Education of homeowners about fire danger and preparedness steps.
- Communication with fire manager, policy makers, and planners about long-term fire-related decision making.

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Soils, Water, Subtropicals—Advisor Dr. Ben Faber

The Challenge

Santa Barbara County's agricultural competitiveness depends on adopting new scientific and technological innovations derived from new knowledge in agriculture. Research and educational efforts must enhance the opportunities for markets and new products. Creating a sustainable local agricultural economy also depends upon improving water quality, quantity, and security; managing pests and diseases; and improving cultural management practices for subtropical producers.

The Soils/Water/Subtropical Program has a 60 year history of local research and extension that optimizes crop production, maximizes net farm income, conserves natural resources and protects the environment.

Young Coffee Plants Under Wraps Protected from Frost in an Avocado Orchard

Addressing the Challenge

We have our monthly IPM webinar https://ucanr.edu/sites/ucexpertstalk/ which has covered a variety of citrus and avocado pests and diseases with different experts in the field. It's open to all interested, but confers Continuing Education Units for Pest Control Advisers/ Operators/ Applicators.

Our bimonthly avocado meeting was recently held at Cal Poly SLO with 48 grower in attendance. Topics were pruning, disease and pest management

Our *Topics in Subtropics* quarterly newsletter was published and is online and hard copy at: http://ceventura.ucanr.edu/newsletters/Topics_in_Subtropics79277.pdf

Our Blog covering a variety of Tree/Soil/Irrigation topics is produced 2-3 times per week https://ucanr.edu/blogs/Topics/

Current Research Efforts cover

- Lemon Rootstock and Scion Performance
- Mandarin rootstock performance
- Frost Alert Instrumentation using Dept Water Resources CIMIS station network
- Avocado Pollinator Study using supplemental Pollination Gardens
- New coffee and tea plantings are being installed for evaluation

Public Value

Healthy people and communities, healthy food systems, and healthy environments are strengthened by a close partnership between the University of California and its research and extension programs and the people of Santa Barbara County.

The Soils/Water/Subtropical Program provides innovation in applied research and education that supports:

- Sustainable, safe, nutritious food production through the delivery of information on soil and water management.
- Economic success in a global economy through production of high quality fruit.
- A sustainable, healthy, productive environment through improved water and nutrient management.
- Science literacy within the agricultural community promoted by rapid access to evidence based information.

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