

I am seeking a merit from Full-Title Advisor, step VII to Full Title Advisor, step VIII. This statement covers the period from October 1, 2017 to September 30, 2020. During this period, I have led an innovative research and educational program focused on increasing water conservation by agriculture and protecting the quality of ground and surface water supplies. In addition to leading a strong research program I have continued to excel in water management education, giving 112 presentations at workshops, seminars, conferences, and field meetings during the last 3 years. I co-authored 8 peer-reviewed publications, and I also demonstrated leadership through research, education, and university service activities.

Mission and objectives

My primary clientele includes landowners, grower operators and farm managers who are decision makers on water management for crop production. Secondary clientele includes industry representatives, professional consultants, technical service providers, and government personnel and policy makers involved with water management decisions and policy. I assess my program needs and demographics of potential clientele annually.

In accordance with my position description, I continued to identify issues that have significant impact on water resource management on the Central Coast. I either initiated or collaborated on research and educational projects that addressed these concerns, and then I extended the findings of these projects broadly to clientele. I accomplished this mission through an extensive network of UC collaborators composed of Advisors, Specialists, and Faculty, who contributed to my research and extension program. I also have a strong network of collaborators with other institutions such as California State University (CSU) Monterey Bay, CSU Fresno, NASA, USDA Agricultural Research Service, local Resource Conservation Districts (RCD), and the National Resources Conservation Service (NRCS). I have built cooperative relationships with growers and industry groups such as the California Leafy Green Research Board, Central Coast Grower Shipper Association, and Farm Bureau, who provided input to my program goals and have benefited from my research and extension activities.

Applied Research and Extending Knowledge and Information

During the past 3 years serving as Water Resources and Irrigation Advisor, I continued to focus my research and extension program on problems pertinent to clientele, to the interests of California, and of high and medium priority for UCANR. Projects that I developed or collaborated on support the ANR condition changes for improving water quality, water-use efficiency, and water-supply security.

Additionally themes 2 and 3 support condition changes for improved food security and food safety.

1. Agriculture water conservation.
2. Nutrient management for protecting water quality and improving food security.
3. Conservation practices for protecting water quality and food safety.

Since my last salary action in 2017, I authored or collaborated on 31 grants to support these projects, totaling more than \$4 million, of which approximately \$2 million directly supported my program. Results were reported to clientele through more than 112 presentations at conferences, educational seminars, field meetings and workshops, and through newsletters, blog entries, and trade journal articles (28) and technical reports (10). I also contributed to 21 abstracts and proceedings papers at professional society meetings and regional conferences, and co-authored 8 peer-reviewed publications.

I demonstrated leadership and a high degree of professional competency in all areas of my research and extension program as well as in university and public service. Highlights include expanding the CropManage online irrigation and nutrient management decision support tool to counties and commodities beyond the Central Coast, chairing an ad hoc program review committee, invitations to speak nationally and internationally, mentoring junior advisors, and taking leadership in assisting the Regional Water Quality Control Board to establish achievable water quality regulations for agriculture on the Central Coast.

1. Agricultural Water Conservation (summary of 12 projects)

Background and Rationale: The economy of the Central Coast relies on ground water to support agriculture, tourism and rural and urban populations. Agriculture contributes more than \$5 billion annually to the economy, but also accounts for more than 80% of groundwater use. The combination of periodic droughts, such as the one ending in 2017, and chronic over-pumping has resulted in a steady decline in ground water levels, causing seawater to intrude into the underground aquifers, and wells to become too salty to be used for irrigating crops. The Sustainable Ground Water Management Act requires that pumping in coastal valleys be reduced to bring recharge and groundwater use back into parity. Failure to achieve this goal could lead to future court adjudication which would further limit pumping and potentially following of farmland.

Clientele, Goals, Inputs: To support efforts to restore ground water supplies and halt seawater intrusion I collaborated with regional water agencies, farm operations, shippers, and public agencies on strategies to increase agricultural water conservation. I led or co-managed 12 grants to fund these projects.

Methods and Outputs

Improving irrigation efficiency: My program continues to assist farmers to increase irrigation efficiency by improving system design and operation, adopting new irrigation technology, and implementing better irrigation scheduling. We evaluated new ways to use drip irrigation including germinating lettuce to reduce water use during crop establishment, and for production of baby spinach in collaboration with Ali Montazar (Imperial County). My program assisted with grower applications for financial assistance from CDFR State Water and Energy Efficiency Program (SWEET) to implement water efficient technology and partnered with the Pajaro Valley Water Management Agency and the Resource Conservation District (RCD) of Santa Cruz County by providing growers with technical assistance in water conservation. Additionally, my program evaluates irrigation system efficiency and design upon grower requests.

Expansion of CropManage decision support tool: I continued leading and overseeing the operation and improvements of the online CropManage (CM) decision support tool which has become a centerpiece of my program. CM assists growers in implementing better irrigation scheduling and is a tool that I use to assess grower water use efficiency. Among many new features recently added are the capabilities to automatically import and display soil moisture data from sensors in the field. I demonstrated state-wide leadership by expanding CM to accommodate crops grown in the Central Valley including tree crops (almonds, walnuts, pistachio), warm season vegetables (tomato, pepper), and alfalfa through grants that I sought out. This goal required my leadership in organizing a team of advisors, faculty, and specialists with the appropriate knowledge and expertise to adapt CM to these additional commodities.

Weather-based irrigation scheduling: Assisting growers to better match irrigation schedules with crop water needs can conserve water. One of the best ways to accomplish better scheduling in vegetables is to use weather data to estimate crop water needs. Using CropManage growers can use weather data from the California Irrigation Management and Information System (CIMIS) to quickly determine how long to irrigate their crops. However, the algorithms in the decision support tool need to be tested and validated to assure that the recommendations are accurate. In partnership with CSU Monterey Bay, NASA, and the USDA-ARS I led projects to validate weather-based irrigation scheduling by conducting replicated field trials in cauliflower, celery, artichoke, and cabbage. Additionally, I collaborated with the small farm advisors in Santa Clara and Fresno Counties (Gazula, Dahlquist-Willard) to collect data to implement weather-based irrigation scheduling of Asian vegetables (bok choy, Napa cabbage) in CropManage.

Irrigation training: Another limitation to improving irrigation management on the Central Coast is adequate training for irrigators, farm managers, and growers. In response, I conducted trainings on critical topics that I identified from the irrigation efficiency evaluations and research projects. Trainings included formal workshops that I co-organized (13) as well as small group trainings held in the field or at grower offices (7), some of which I presented in Spanish. Additionally, I gave 28 presentations on irrigation management at educational meetings, wrote newsletter and trade journal articles (13), and extended information through interviews with news media (6).

Outcomes, Impacts, Condition Changes: A significant outcome of my efforts is that the water needs of vegetable and berry crops produced on the Central Coast are much better understood. Another important outcome is that field testing demonstrated that CropManage provides accurate water recommendations and that growers can reduce average water use in celery, cauliflower, red cabbage, and artichokes by as much as 40% without sacrificing yield and quality.

Policy Impacts: My research and extension efforts have been critical for water management agencies to comply with the Sustainable Ground Water Management Act. Through our technical services, the Pajaro valley water management agency made progress in achieving half of the water conservation goal outlined in their basin plan.

Affecting Change: Grower use of CropManage (CM) increased significantly during the past three years. More than 27,000 acres per year of lettuce were managed using the online decision support tool. Additionally, 7,700 acres per year of broccoli, cauliflower, celery, and strawberries were also managed using this CM. CM provided more than 2500 recommendations per month during the growing season in 2019. Grower adoption of CM demonstrated that the agriculture industry is making progress to improve farm water management.

2. Nutrient Management for Protecting Water Quality and Improving Food Security. (summary of 10 projects)

Background and Rationale: Approximately 1/3 of agricultural wells on the Central Coast are above the drinking water standard for nitrate due to intensive use of water and fertilizer to produce vegetable and berry crops. The latest proposed water quality regulations, enforced by the Central Coast Regional Water Quality Control Board, will phase in limits on the amount of nitrate that growers can discharge to ground and surface water thereby restricting the quantity of fertilizer that growers can apply to their crops.

Clientele, Goals, Inputs: I continued a broad research and extension program in collaboration with UC colleagues (Smith, Hartz, Gazula, Biscaro) to develop information on nitrogen requirements of the many vegetable commodities produced on the Central Coast, as well as identified, evaluated, and demonstrated strategies to better manage nitrogen so that agriculture industry can demonstrate progress on attaining proposed discharge targets. I collaborated on 10 grants to support these research and extension efforts.

Methods and Outputs

Evaluating nitrogen (N) needs and removal coefficients of vegetable crops: In collaboration with colleagues Smith, Gazula, and Biscaro we have continued efforts to define the nitrogen needs of vegetable commodities grown on the central coast. The most recent focus has been understanding the nitrogen needs of minor vegetable crops such as Napa cabbage, bok choy, artichokes, bell pepper, snap pea, and kale, as well as the amount of nitrogen removed in the harvested product of more than 50 commodities.

Knowledge and practices for improving N use efficiency: In collaboration with UC colleagues Smith, Hartz, Geisseler, and Muramoto, we obtained funding to conduct field demonstrations to determine the

fertilizer value of N in irrigation water for vegetable crops, as well as evaluate the use of high carbon compost to sequester soil nitrate during the winter months to prevent nitrate leaching losses and develop predictive models for N mineralization from soil and organic fertilizers.

Expand capabilities of CropManage for nitrogen management: Along with implemented better irrigation practices, careful management of nitrogen fertilizer is needed to minimize nitrate leaching from vegetable systems. CropManage (CM) decision support tool also assists growers in determining the right amount of fertilizer to apply to match crop needs by accounting for crop nitrogen demand and soil and water sources of nitrogen. I led projects to further refine CM to estimate nitrogen contribution from irrigation water and expand the nitrogen algorithms to additional commodities. I sought out grants that funded this project, developed the algorithms used in the software, and coordinated software development. Additionally, I led 14 workshops and gave more than 35 presentations to introduce and teach growers, industry consultants, college students, and UC colleagues on how to use the online tool for nitrogen management. I also demonstrated state-wide leadership by leading the expansion of CM nitrogen management capabilities to tree commodities and processing tomatoes principally grown in the central valley. This effort was a collaboration with Brown (UCD), Geissler (UCD), Aegerter (UCCE San Joaquin)

Outcomes, Impacts, Condition Changes: The assessment of nitrogen requirements of cool season vegetables resulted in better guidelines of how to manage fertilizer nitrogen to minimize nitrate losses. Results have been widely disseminated through educational meetings, extension bulletins and trade journal articles. This research was also disseminated through professional conferences and society meetings (10 abstracts during the review period).

Policy impacts: Results of our studies were cited by the Central Coast Regional Water Quality Control board and have been used to develop regulations in the current draft of the agricultural discharge order that will be implemented in 2021. Both myself and colleague Richard Smith devoted many hours with grower organizations and water quality control board staff and board members to craft fair and science-based regulations. Most of our suggestions were adopted into the current draft regulations.

Affecting change: The CropManage (CM) online decision support tool has helped growers customize water and nitrogen applications for individual fields and minimize leaching losses of nitrate. Several major vegetable growing operations in the Salinas Valley have adopted the CM approach to managing fertilizer and reported an average of a 30% reduction in nitrogen fertilizer use. Beyond providing an efficient means to deliver ANR research to clientele, CM increased the visibility of the ANR mission to government officials, including the California Agriculture Secretary, Karen Ross and NASA officials.

3. Management Practices for Protecting Water Quality and Food Safety (summary of 4 projects)

Background and Rationale: Intensive farming of vegetables and berries on the Central Coast has led to excessive irrigation run-off. Sediment, nutrients, pesticides, and bacteria in agricultural run-off can impair the quality of downstream rivers and estuaries on the Central Coast, potentially impacting the health of the Monterey Bay National Marine Sanctuary. Two important classes of pesticides, neonicotinoids and pyrethroids, account for much of the toxicity to aquatic organisms on the Central Coast. Additionally, recent changes to the food safety rules now require that farms treat runoff retained in reservoirs to assure that generic *E. coli* concentrations are minimized. To meet strict water quality and food safety regulations growers will need to implement mitigation practices to address toxicity and food safety concerns.

Clientele, Goals, Inputs: I sought out collaborators, secured funding, and either led or collaborated on research that evaluated a suite of mitigation practices that could potentially mitigate water quality impairments from agriculture and protect food safety. These projects were supported by 8 grants that I led or co-led.

Methods and Outputs

Integrated vegetated treatment systems: In collaboration with Phillips (UCD) we conducted field studies over 2 years evaluating an integrated system of using sediment traps, vegetated ditches, and compost and carbon filled geotextile sleeves to remove suspended sediments and soluble and insoluble pesticides from runoff. Neonicotinoid and pyrethroid concentration and aquatic toxicity were evaluated along the length of the treatment system.

Pesticide treatment of seed: In collaboration with the California Department of Pesticide Regulation, I led replicated field trials at the USDA-ARS station over two seasons to evaluate if seed coating with pesticide could reduce neonicotinoid concentrations in runoff during crop establishment compare to a spray application on the soil surface.

New approaches to using polyacrylamide (PAM) for sediment control: I led several projects investigating new ways that growers can use PAM, a large, chained polymer, for minimizing soil erosion and suspended sediments in runoff. This required designing several prototype applicators that can add dry PAM to pressurize sprinkler systems and field testing the units in grower fields. We also developed and tested an automated applicator for treating irrigation runoff with PAM to drop out suspended sediments from runoff before leaving the farm or entering a retention basin.

Assessing microbial food safety risks of agricultural tail water. Concerns about microbial food safety risks of agricultural runoff have limited the reuse of tailwater for pre-irrigation and germination of crops. In collaboration with Linda Harris (UC Davis Center for Produce Safety), and Steve Koike, I led and completed a 2-year study evaluating the microbial food safety risks of using tail water for irrigation of leafy green vegetables.

Outcomes, Impacts, Condition Changes: The projects that I have led or participated in have identified a suite of practices that can assist growers in improving water quality. Integrated vegetated systems were found to be effective in removing more than 95% of neonicotinoid and pyrethroid pesticides and in some cases to non-toxic concentrations. Field trials demonstrated that the PAM applicator reduced suspended sediment loss in sprinkler runoff by 92% compared to untreated plots. We have broadly extended results of our efforts to develop and evaluate water quality practices through presentations at seminars, workshops, and field days, and through newsletter and popular press articles.

Policy impacts: The PAM applicators that we developed could potentially help growers comply with these stricter food safety metrics while minimizing treatment costs. The results of the pesticide studies that we conducted will be used by the Department of Pesticide Regulation to evaluate the registration of neonicotinoid and pyrethroid pesticides in California and could potentially lead to changes of how grower apply these pesticides to prevent aquatic toxicity.

Affecting change: Based on the results of these projects one major grower in the Salinas Valley plans to use of the PAM applicators that we developed on a portion of his ranch during the 2021 season and expand the use of the equipment if he can demonstrate a consistent reduction in sediment loads and save on the cost of chlorinating his reservoir water to meet food safety metrics.

Professional competence and training

I continue to participate in 4 professional societies (Agronomy Society of America, Soil Science Society of America, American Society of Horticulture Science, California Chapter of Agronomy Society of America). I gave 2 presentations at professional society meetings since my last salary action, and I was a co-author of 21 abstracts at professional meetings during the period of review. I participated on the governing board of California Chapter of Agronomy Society of America and assisted in planning and moderating the 2020 California Plant and Soil Conference. Invitations to speak at state-level conferences in California, Oregon, and Arizona are also evidence of competence in my field, as well as invitations to

speak at *national* (Center for Produce Safety Symposium, Gro Innovations) and *international* (International Workshop of Precision Irrigation and Fertigation, Beijing China) conferences. I am well regarded for my expertise in irrigation and water management at the regional, state, and international levels, as evidenced by the numerous requests to participate in agency and industry meetings and provide expertise to various public and private groups (Table D1) and requests to peer-review manuscripts (Table B3). I continue to seek out training opportunities by attending professional meetings, professional society conferences, participating in ANR workgroups and meetings, as well as reading trade and scientific journal articles in my field (Table B1).

University and public service

I served the University at several levels during this period of review, including participating in the Vegetable Crop, Precision Agriculture, Strawberry, and Water *Program Teams*. I demonstrated leadership within UCANR by as a Water Program Team *co-leader* during the period of review. I also chaired an *Ad hoc review committee* in 2020. I contributed to the planning committee for the UC Davis conference on *Catalyzing Adaptive and Resilient Food Systems*. I presented at UC workgroup meetings, Program Council, and participated in UC tours for international visitors (Table C2). I have also demonstrated leadership by organizing CropManage trainings for Advisors, Specialists, and Faculty, as well as expanding the online tool to Central Valley commodities. Additionally, I dedicate significant time to *mentoring* new and mid-career Advisors, including Aparna Gazula (Santa Clara), Andre Biscaro (Ventura), Ali Montazar (Imperial), Zheng Wang (Stanislaus), and most recently, Geraldo Spinelli (San Diego). I try to assist them in making connections with colleagues and industry reps., provide advice on grant opportunities, and answer questions on establishing a successful research and extension program.

My expertise in water management and irrigation is in high demand by clientele, and I have used it in public service to contribute to multi-agency team approaches to solving difficult water quality issues on the Central Coast. I participated in 48 meetings for federal, state, and local agencies and agricultural groups involved with water resource management on the Central Coast during the period of review (Table D1).

Affirmative action

The clientele of my affirmative action efforts are ethnic and gender minority growers, industry representatives and decision makers of irrigation and water management. Specifically, Hispanic growers, foremen, and irrigators are an integral part of water resource management on the Central coast and have benefited from trainings on irrigation and fertilizer management that I led or collaborated on. Some of the methods that I used to outreach to this group were personal contacts, and educational presentations to Spanish speakers: I co-organized 2 workshops that were Spanish language and 5 that used simultaneous Spanish translation. I also presented in Spanish at 2 trainings and assisted in translating one of my ANR peer-reviewed publications into Spanish. I routinely have personal contacts with farm managers, foremen, and irrigators in Spanish, in which I answer questions on irrigation or provide consultation. Hispanic growers and farm managers have been one of the groups that has benefited from the irrigation system evaluation program that I have led during the last 3 years.

Summary. During this review period I led an innovative and comprehensive research and education program that addressed major water conservation and quality challenges facing the Central Coast. I demonstrated leadership by seeking out funding and collaborators and overcoming obstacles so that I could conduct projects that would benefit clientele. I have built a mature and balanced program that has state-wide recognition, as evidenced by the numerous requests that I received to present and report on my research activities.

Supporting Documentation

A.1. Project Summary: Theme 1 Agricultural Water Conservation (12 projects).

Project name	Role	Collaborators	Funding source	Amount ¹	duration	end date
Web-based Irrigation scheduling tool for California crops	PI	Fulton (UCCE), Bali (UCCE), Johnson, Melton	Department of Water Resources	\$161,823 (\$199,823)	3 yr	8/10/2018
Improving Salinity Management of Strawberry Cultivars in California	co-PI	Biscaro (UCCE), Bolda (UCCE)	CDFAs Specialty Crop Block Grant	\$15,456	3 yr	3/29/2019
Capacity Building for Agricultural Sustainability on the California Central Coast Through Research and Education	co-PI	Melton (CSUMB/NASA)	CSU Monterey Bay	\$38,400	2 yr	4/30/2019
Evaluation of Drip Irrigation in Organic Spinach Production and Downy Mildew Management	co-PI	Montazar	California Leafy Greens Research Board	\$0 (\$25,200)	1 yr	4/30/2019
Adapting CropManage Irrigation and Nitrogen Management Decision Support Tool for Central Valley Crops	PI	Fulton (UCCE), Bali (UCCE), Johnson, Melton	Department of Water Resources	\$201,300 (\$241,560)	3 yr	12/31/2019
Addressing improvements in water use efficiency of high-value Salinas Valley specialty crops	co-PI	Johnson (CSUMB/NASA), Melton (CSUMB/NASA)	CDFAs Specialty Crop Block Grant	\$75,000	2.5 yr	4/30/2020
Pajaro Valley Water Irrigation Efficiency Program Support	PI	McCarthy (PVWMA)	Pajaro Valley Water Management Agency	\$97,272	2 yr	12/31/2020

¹ Amounts that directly benefited program. Total grant amounts are shown in parentheses.

A.1. Project Summary: Theme 1 Agricultural Water Conservation (continued).

Project name	Role	Collaborators	Funding source	Amount	duration	end date
Evaluation of single-use buried drip as a best management practice for irrigation and nutrient management of lettuce	co-PI	Smith	California Leafy Greens Research Board	\$26,485	1 yr	3/31/2021
WWAO Formulation: SIMS-CropManage	co-PI	Johnson (CSUMB/NASA), Melton (CSUMB/NASA)	NASA/CSU Monterey Bay	\$180,000	3 yr	9/30/2021
Precision Irrigation Scheduling for Specialty Crops	co-PI	Orrey (GeoVisual)	FFAR	\$73,555	2 yr	1/31/2022
Improving Water Use Efficiency of Cool Season Vegetable Crops	co-PI	Johnson (CSUMB/NASA)	CDFFA Specialty Crop Block Grant	\$219,334 (\$333,345)	2.5 yr	4/30/2022
Artificial Intelligence to Increase Sustainability of Water, Nutrient, Salinity, and Pest Management in the Western US.	co-PI	Scudiero (UCR), Bali (UCD)	USDA AFRI	\$378,035 (\$865,000)	5 yr	12/31/2024

Acronyms: CSUMB= California State University Monterey Bay, CDFFA= California Department of Food and Agriculture, CDPR = California Department of Pesticide Regulation, FFAR = Foundation for Food and Agriculture Research, NASA = National Aeronautical and Space Administration, PVWMA = Pajaro Valley Water Management Agency, SCRCDD = Santa Cruz County Resource Conservation District, UCD = UC Davis, UCSC = UC Santa Cruz, UCR = UC Riverside, USDA-ARS = USDA Agricultural Research Service, USDA-AFRI = USDA Agriculture and Food Research Initiative

A.2. Project Summary: Theme 2 Nutrient management for protecting water quality and improving food security (10 projects).

Project name	Role	Collaborators	Funding source	Amount¹	duration	end date
On-Farm Evaluations of Fertilizer Value of Nitrate in Irrigation Water	co-PI	Smith	California Leafy Greens Research Board	\$13,000	1 yr	3/30/2018
Developing a decision support tool for processing tomato irrigation and fertigation in the central valley based on cropmanage	collaborator	Geisseler (UCD)	CDFA-Fertilizer Research and Education Program	\$2,100	2 yr	12/31/2018
Evaluation and demonstration of nitrogen and phosphorus management in organic leafy green vegetable production on the central coast	co-PI	Smith, Hartz, Geisseler	CDFA-Fertilizer Research and Education Program	0 (\$27000)	2 yr	12/31/2018
Innovative Best Management Practice Adoption Strategies to Increase Nitrogen Efficiency in Central Coast Specialty Crops	co-PI	Smith	CDFA-Fertilizer Research and Education Program	\$123,772	3 yr	3/31/2019
Intern to assist on water quality, irrigation, and nutrient management projects in leafy greens.	PI		California Leafy Green Research Board	\$9,000	1 yr	3/31/2019
Precision technology application to breeding and site-specific agriculture	co-PI	Mitchelmore (UCD), Hays (USDA-ARS), Smith	USDA-Specialty Crop Research Initiative	\$62,732	5 yr	9/30/2020

1. Amounts that directly benefited program. Total grant amounts are shown in parentheses.

Acronyms: CSUMB= California State University Monterey Bay, CDFA= California Department of Food and Agriculture, CDPR = California Department of Pesticide Regulation, FFAR = Foundation for Food and Agriculture Research, NASA = National Aeronautical and Space Administration, PVWMA = Pajaro Valley Water Management Agency, SCRCO = Santa Cruz County Resource Conservation District, UCD = UC Davis, UCSC = UC Santa Cruz, UCR = UC Riverside, USDA-ARS = USDA Agricultural Research Service, USDA-AFRI = USDA Agriculture and Food Research Initiative

A.2. Project Summary: Theme 2 Nutrient management for protecting water quality and improving food security (continued).

Project name	Role	Collaborators	Funding source	Amount	duration	end date
Assessment of N uptake and N removal of leafy greens under different production regimes	co-PI	Smith	California Leafy Green Research Board	\$0 (\$26,985)	1 yr	3/31/2021
Water and nitrogen management decision support tool for Asian vegetables (bok choy and Napa cabbage) and bell peppers.	co-PI	Gazula, Smith	CDFAs Specialty Crop Block Grant	\$35,000 (\$320,472)	2.5 yr	4/30/2022
Immobilization of nitrate in winter-fallow vegetable production beds to reduce nitrate leaching.	co-PI	Smith, Muramoto (UCSC)	CDFAs-Fertilizer Research and Education Program	\$10,000 (\$192,668)	2 yr	12/31/2022
Assessment of Nitrogen Content of the Harvested Portion of Specialty Crops to Estimate Crop Nitrogen Removal and Improve Nitrogen Management in Crops	co-PI	Smith	CDFAs-Fertilizer Research and Education Program	\$0 (\$315,420)	2.5 yr	12/31/2022
Developing a nitrogen mineralization model for organically managed vegetable farms on the Central Coast	co-PI	Smith, Muramoto (UCSC)	CDFAs-Fertilizer Research and Education Program	\$50,000 (\$224,899)	2 yr	12/31/2022

Acronyms: CSUMB= California State University Monterey Bay, CDFAs= California Department of Food and Agriculture, CDPR = California Department of Pesticide Regulation, FFAR = Foundation for Food and Agriculture Research, NASA = National Aeronautical and Space Administration, PVWMA = Pajaro Valley Water Management Agency, SCRCD = Santa Cruz County Resource Conservation District, UCD = UC Davis, UCSC = UC Santa Cruz, UCR = UC Riverside, USDA-ARS = USDA Agricultural Research Service, USDA-AFRI = USDA Agriculture and Food Research Initiative

A.3. Project Summary: Theme 3. Conservation Practices for protecting water quality (4 projects)

Project name	Role	Collaborators	Funding source	Amount	duration	end date
Microbial food safety risks of re-using tail water for irrigating leafy greens	PI	Harris (UCD), Koike	California Leafy Greens Research Board	\$71,160	2 yr	12/31/2017
Microbial food safety risks of re-using tail water for irrigating leafy greens	PI	Harris (UCD), Koike	Center for Produce Safety	\$40,000 (\$162,695)	2 yr	6/30/2018
An integrated vegetated treatment system for mitigating imidocloprid and permethrin in agricultural irrigation run-off	co-PI	Phillips (UCD)	California Leafy Greens Research Board	\$27,872 (\$55,200)	1 yr	3/31/2019
Water treatment technology using polyacrylamide (PAM) to control sediment in agricultural run-off	PI		California Leafy Greens Research Board	\$7,500	1 yr	3/31/2019
An integrated vegetated treatment system for mitigating imidocloprid and permethrin in agricultural irrigation run-off	co-PI	Phillips (UCD)	California Leafy Greens Research Board	\$27,872 (\$55,200)	1 yr	3/31/2020
Water treatment technology using polyacrylamide (PAM) to control sediment in agricultural run-off	PI		California Leafy Greens Research Board	\$11,700	1 yr	3/31/2020
Seed treatment effects on neonicotinoid concentration in irrigation run-off from lettuce fields	PI	Teerlick (CDPR)	California Department of Pesticide Regulation	\$93,250	2 yr	11/30/2020
Water treatment technology using polyacrylamide (PAM) to control sediment in agricultural run-off	PI		California Leafy Greens Research Board	\$28,990	1 yr	3/31/2021

B.1. Professional Development and Training

Date	Title: Topic	Location
10/10/2017	California Leafy Green Research Board Fall Meeting	Salinas CA
11/16/2017	Western Plant Health Association 2017 Nutrient Seminar	Paso Robles CA
2/6/18-2/7/18	California Chapter of ASA, California Plant and Soil Conference	Fresno CA
3/6/2018	UC Pesticide training	Salinas CA
3/28/2018	California Leafy Green Research Board Annual Meeting	Pismo Beach CA
4/9-4/11/18	ANR statewide conference	Ontario CA
4/23/2018	2018 Innovator summit	Davis CA
6/4/2018	UCCE Affirmative Action training, South America culture	Salinas CA
6/19/2018	The Center for Produce Safety 2018 Symposium	Charlotte NC
7/16/2018	The Binational Agriculture Research and Development (BARD) Workshop on Water Resources	UC Davis
10/24/2018	FREP conference	
11/1/2018	Western Plant Health Association 2018 Nutrient Seminar	Fresno CA
11/6/2018	Procurement card training	online course
11/7/2018	GRO Innovations Conference	Las Vegas NV
11/26/2018	UC Vegetable Continuing Conference	UC Davis
2/5/19-2/6/19	California Chapter of ASA, California Plant and Soil Conference	Fresno CA
3/5/19-3/6/19	Water Program Team Meeting	Davis CA
3/19/2019	California Leafy Green Research Board Annual Meeting	Pismo Beach CA
3/28/2019	Annual Surface Water Pesticide Collaborative Meeting	Davis CA
3/28/2019	2019 Pomology Program Team Meeting	Davis CA
4/10/2019	California Department of Pesticide Regulation's Mitigation of Pesticides in Surface Water in California Agriculture Symposium	Sacramento CA
5/2/2019	Encore Plastic Recycling Tour	Salinas CA
7/21/19 - 7/25/19	2019 American Society of Horticultural Science (ASHS) Annual Conference	Las Vegas NV
10/30/2019	Fertilizer Research and Education Program Annual Conference	Fresno CA
1/15/2020	Wildlife Webinar - The Risk of Wildlife to Produce Safety: What do we know?	Webinar

B.1. Professional Development and Training (continued)

Date	Title: Topic	Location
2/3/20-2/5/20	California Chapter of ASA, California Plant and Soil Conference	Fresno CA
3/11/20-3/12/20	Water Program Team Meeting	Davis CA
3/17/2020	California Leafy Green Research Board Annual Meeting	Pismo Beach CA
4/20/2020	Procurement card training	online course
7/30/2020	Coastal Vegetable Production Webinar	Webinar
9/23/2020	Alfalfa and Forage Virtual Field Meeting	Webinar

B.2. Disciplinary Society or Professional Association

Disciplinary Society/Professional Association Name	Member/Meetings Attended/Activities
Agronomy Society of America	Member
Soil Science Society of America	Member
California Chapter of Agronomy Society of America	Member/Serve on Governing Board/attended state conferences in 2018, 2019, 2020
American Society of Horticulture Science	Member: attended national conference in 2019

B.3. Peer-Review activities for ANR, trade, and scientific journals (13 activities)

date	Journal/Organization
10/23/2017	Agricultural Water Management
11/28/2017	UCANR 8000 (chapter on vegetable irrigation)
4/8/2018	HortTechnology
7/13/2018	HortTechnology
7/20/2018	CDFA-FREP lettuce nutrient management leaflet
8/12/2018	UCANR 8000 Irrigation and Nitrogen Management Chapter
9/16/2018	Agricultural Systems Journal
9/20/2018	American Vegetable Grower
1/18/2019	American Vegetable Grower
12/27/2018	Agricultural Systems
9/25/2019	Soil Science Society of America Journal
9/10/2019	Vadose Zone Journal
3/25/2020	Agriculture Water Management

B.3. Educational Presentations demonstrating Professional Competence (15 presentations)

Date	Meeting name	Presentation Topic	Sponsor/Co-Sponsors	Location	No. of Attend.	Org Level	Theme
3/20/2018	Oregon vegetable grower tour	CropManage: Bringing water and nitrogen management decision support to the field	UCCE Monterey	Salinas CA	15	National	2
4/23/2018	UC Davis Ag Innovators Summit	Panel discussion (technology challenges)	UCANR	Davis CA	50	State	1
6/19/2018	The Center for Produce Safety 2018 Symposium	Microbial food safety risks of reusing tailwater	Center for Produce Safety	Charlotte NC	125	National	3
7/16/2018	The Binational Agriculture Research and Development (BARD) Workshop	Irrigation technologies and their optimization, including water networks	UC ANR California Institute for Water Resources	UC Davis	55	International	1
11/7/2018	GRO innovations conference	New tools for western water management	Meister publishing	Las Vegas NV	150	National	1
1/31/2019	Oregon State University Dept Seminar	CropManage decision support tool for irrigation and nutrient management	Oregon State University	Corvallis OR	35	National	2
2/1/2019	Oregon Processed Vegetable Commission Grower Meeting	CropManage decision support tool for irrigation and nutrient management	Oregon Processed Vegetable Commission	Albany OR	75	National	2
2/4/2019	Irrigation industry visitors from Argentina	Water issues on the central coast of California	UCCE Monterey	Salinas CA	7	International	1
2/21/2019	2019 Southwest Ag Summit	Strategies for Growing Vegetables with Less Water	Arizona State University	Yuma AZ	35	National	1

B.3. Educational Presentations demonstrating Professional Competence (continued)

Date	Meeting name	Presentation Topic	Sponsor/Co-Sponsors	Location	No. of Attend.	Org Level	Theme
4/10/2019	California Department of Pesticide Regulation's Mitigation of Pesticides in Surface Water in California Agriculture Symposium	Integrated approaches for mitigating pesticides in runoff from vegetables on the Central Coast	California Department of Pesticide Regulation	Sacramento CA	60	State	3
6/28/2019	Irrigation training for teachers	Panel discussion on irrigation training needs	Irrigation Association	San Luis Obispo CA	35	State	1
7/22/2019	American Society for Horticultural Science Annual Conference	Optimizing Water Management in Celery using Weather Based Scheduling	ASHS	Las Vegas NV	30	National	1
9/2/2019	International Workshop of Precision Irrigation and Fertigation Strategies for Northern China: from greenhouse to large scale	Optimization of irrigation and nutrient management of vegetable crops in open field in California, USA	Beijing Academy of Agricultural and Forestry Sciences	Beijing China	50	International	2
10/23/2019	Chinese visitor tour of Salinas Valley	New Tools for Western Water Management	UCCE Monterey	Salinas CA	2	International	1
12/9/2019	Farm Bureau State-wide Conference	A minus R: Implications and Challenges for Central Coast Farming	California Farm Bureau	Monterey CA	40	State	2

C. 1. University Service activities.

Dates	Meeting/Event	Organizational level	Role	Location
11/2/2017	Vice Provost and Associate Vice President visit	Division-wide	Participant	Salinas CA
12/5/2017	Program Council Statewide Review (IGIS)	Division-wide	Presenter	Davis CA
12/20/2017	ANR Innovation and Entrepreneurship Advisory	Division-wide	Participant	Davis CA
3/7/2018	Farm Advisor letter of evaluation	Division-wide	Lead	
5/15/2018	UCANR Innovation & Entrepreneurship Advisory Meeting	Division-wide	Participant	Kearny CA
6/4/2018	UCCE all staff meeting Affirmative Action Training: Brazilian Culture	County	Organizer	Salinas CA
6/22/2018	Water Program Team (CE position priorities)	Division-wide	Co-chair	conference call
9/18/2018	UC Davis International Agriculture tour	University-wide	Presenter	Salinas CA
11/10/2018	UCD Vegetable production course (PLS110) tour	University-wide	Participant	Salinas CA
1/24/2019	Water Program Team planning meeting	Division-wide	Co-chair	conference call
27-Feb-19	Open Digital Food and Agriculture	Division-wide	Participant	Davis CA
3/22/2019	ANR/Agrologics/Breyta deep dive	Division-wide	Participant	Woodland CA
3/28/2019	2019 Pomology (PECC) Program Team Meeting	University-wide	Participant	Davis CA
5/30/2019	Vice Provost Mark Lagrimini visit to Monterey County	Division-wide	Participant	Salinas CA
7/17/2019	Affirmative Action Review	Division-wide	Participant	Salinas CA
7/25/2019	Vice Provost Mark Bell visit to Monterey County	Division-wide	Participant	Salinas CA
8/21/2019	CropManage commercialization by Agrologics	Division-wide	Participant	conference call
8/22/2019	USDA-NIFA SAS grant	University-wide	Participant	conference call
11/13/2019	Datalogger training for Santa Clara Co Advisor (Mentoring)	Regional	Organizer	Salinas CA
12/9/2019	Certified Crop Advisor Nitrogen Training Program	Division-wide	Participant	conference call

C.1. University Service activities (continued)

Dates	Meeting/Event	Organizational level	Role	Location
1/13/2020	Adhoc Peer Review Committee Training	Division-wide	Participant	conference call
2/21/2020	UCANR Ad hoc committee	Division-wide	Chair	conference call
3/2/2020	UCANR Ad hoc committee	Division-wide	Chair	conference call
2/11/2020	Water tour of Salinas Valley for UC Davis visiting scholar	University-wide	Organizer	Salinas CA
2/28/2020	Certified Crop Advisor Nitrogen Training Program	Division-wide	Participant	conference call
6/8/2020	Catalyzing Adaptive and Resilient Food Systems Workshop Planning Meeting	University-wide	Participant	conference call
6/15/2020	UC Irrigation Product Advisory Group	University-wide	Participant	conference call
6/17/2020	Catalyzing Adaptive and Resilient Food Systems Workshop Planning Meeting	University-wide	Participant	conference call
8/11/2020	CropManage-Qualitech: Development of a Cooperation Agreement	Division-wide	Participant	conference call
8/12/2020	Adapting CropManage for Watermelons and Fresh Market Tomato in Stanislaus County (Mentoring)	Regional	Participant	conference call
8/13/2020	Catalyzing Adaptive and Resilient Food Systems Workshop Planning Meeting	University-wide	Participant	conference call

C.2. Educational Presentations that supported University Service (15 presentations).

Date	Meeting name	Presentation Topic	Sponsor/Co-Sponsors	Location	No. of Attend.	Org Level	theme
10/20/2017	Implementing tools for improving nutrient and water use efficiency	Sustaining the supply of high quality lettuce in changing technological and climatic environments	UC Davis	Davis CA (via Zoom)	15	University	2
12/5/2017	UCANR program council meeting	Program review of IGIS	ANR	Davis CA	14	Division	
1/18/2018	CropManage Processing Tomato Training	Hands-on training with CropManage	UCCE	Stockton CA	7	Division	1
4/30/2018	UCANR/PowWow partnership	Commercializing CropManage	UCANR	Woodland CA	10	Division	2
9/18/2018	International Ag tour	Irrigation technologies and Salinas Agriculture	UC Davis	Salinas CA	25	University	1
10/12/2018	Annual Meeting for the Lettuce USDA National Institute of Food and Agriculture Specialty Crop Research Initiative project annual meeting	Validation and demonstration of decision support tools for improving water and nitrogen use efficiency in lettuce	Plant Science Dept, UCD	UC Davis	15	University	2
10/16/2018	UCD Vegetable production course (PLS110)	CropManage Training	UCD Plant Sciences Dept	Davis CA	40	University	2

C.2. Educational Presentations that supported University Service (continued).

Date	Meeting name	Presentation Topic	Sponsor/Co-Sponsors	Location	No. of Attend.	Org Level	theme
11/10/2018	UCD Vegetable production course (PLS110) tour	Irrigation of vegetable crops	UCD Plant Sciences Dept	Soledad CA	45	University	1
11/26/2018	Vegetable crop continuing conference	CropManage Update	UC ANR	Davis CA	40	Division	2
1/18/2019	CropManage Hands-on training workshop	Hands-on training with CropManage for farm advisors and specialists	UCCE Monterey and UC Davis	Davis CA	14	Division	2
3/6/2019	UCANR Water Program Team Meeting	CropManage training for ANR members	UCANR	Davis CA	25	Division	1
3/28/2019	Pomology Program Team meeting	Adapting CropManage for Irrigation and Nutrient Management for Trees	UCANR	Davis CA	40	Division	2
5/24/2019	Visitors from Tashkent Institute of Irrigation and Mechanization Engineers	Introduction to CropManage and irrigation challenges on the central coast	UC Davis	Davis CA	3	University	1
11/15/2019	Annual Meeting for the Lettuce USDA National Institute of Food and Agriculture Specialty Crop Research Initiative project annual meeting	Validation and demonstration of decision support tools for improving water and nitrogen use efficiency in lettuce	UC Davis	Davis CA	15	University	2
3/12/2020	UCANR Water Team Meeting	New Water Quality Regulations on the Central Coast: Implications and Challenges for Agriculture	UC ANR	Davis CA	40	Division	2

D.1. Public Service activities

Dates	Name/Description of Activity	Role	Org. Level	Location
10/3/2017	Strawberry Certification Program Stakeholder Advisory Committee Meeting, Irrigation and Nutrient Management Task Force	Participant	Region	Watsonville CA
12/1/2017	Strawberry Certification Program Stakeholder Advisory Committee Meeting	Participant	Region	Watsonville CA
4/12/2018	Pajaro Valley Water Management Agency Conservation Program	Participant	County	Watsonville CA
5/10/2018	Monterey County Farm Bureau meeting	Participant	County	Salinas CA
10/2/2018	Ground water recharge workgroup DWR	Participant	State	Davis CA
2/4/2019	Salinas Valley Tour for Argentine visitors	Organizer	International	Salinas CA
3/27/2019	Pajaro Toxicity Reduction: Technical Advisory Committee	Participant	Regional	Capitola CA
3/29/2019	Sam Houston State University (Sustainability Index for Specialty Crops)	Participant	National	Watsonville CA
4/3/2019	California crop coefficient (3C) science collaborative meeting	Participant	State	Davis CA
4/24/2019	Calibration of the Salinas Valley Hydraulic USGS Model	Participant	County	Salinas CA
5/24/2019	CropManage training for processing tomato	Organizer	Regional	Dixon CA
6/3/2019	Church brothers farm/Sustainable Conservation - Panera bread field trials	Participant	Regional	Salinas CA
6/7/2019	Sustainable Conservation: sustainability metrics discussion	participant	Regional	conference call
7/8/2019	Taylor Farms: review trials on improving water and nitrogen use efficiency	participant	Regional	Salinas CA
7/12/2019	Sustainable Conservation: water quality regulations	participant	Regional	conference call
7/16/2019	Santa Cruz County Land Trust: Irrigation consulting	Participant	County	Watsonville CA
7/17/2019	California Department of Pesticide Regulation: Seed treatment trials	Participant	State	conference call
7/19/2019	Resource Conservation District of Monterey County: Datalogger training	Organizer	County	Salinas CA
8/1/2019	Parry Klassen CURES: water quality mitigation practices	Organizer	Regional	Salinas CA

D.1. Public service activities (continued)

Dates	Name/Description of Activity	Role	Org. Level	Location
8/6/2019	Central Coast Grower-Shipper Association: Water quality regulations	Participant	Regional	Salinas CA
8/19/2019	California Department of Pesticide Regulation: Seed treatment trials	Participant	State	conference call
9/25/2019	Sustainability in Action workshop planning	Participant	Regional	Salinas CA
10/3/2019	Resource Conservation District of Monterey County: Datalogger training	Organizer	County	Salinas CA
10/23/2019	Church brothers farm/Sustainable Conservation - Panera bread field trials	Participant	County	Salinas CA
11/13/2019	California Farm Bureau Federation: Irrigated Lands Water Quality Program	Participant	State	conference call
11/14/2019	Dole Vegetable: CIMIS station maintenance	Lead	County	Soledad CA
11/18/2019	Taylor Farms Sustainability Metrics	Participant	Regional	Salinas CA
11/21/2019	California Leafy Greens Research Board: Irrigated Lands Projects	Participant	Regional	Salinas CA
12/13/2019	Central Coast Grower-Shipper Association: Water quality regulations-Ken Cassman	Participant	Regional	Salinas CA
12/16/2019	FarmWise collaboration meeting	participant	Regional	San Francisco CA
1/17/2020	Almond Board of California: Future of CropManage	Participant	State	Salinas CA
2/6/2020	CDFR Office of Pesticide Consultation & Analysis	Participant	State	Salinas CA
2/13/2020	Sustainable Conservation: Agriculture Discharge Order 4.0 Nitrogen reporting	Participant	Regional	conference call
2/13/2020	Monterey County Farm Bureau meeting	Participant	County	Salinas CA
2/19/2020	Grower Shipper Association of Central California: Ag Order Discharge Regulations	Participant	Regional	Salinas CA
2/20/2020	California Department of Pesticide Regulation: Seed treatment trials	Participant	State	conference call
2/25/2020	Grower Shipper Association of Central California: Ag Order Discharge Regulations	Participant	Regional	conference call

D.1. Public service activities (continued)

Dates	Name/Description of Activity	Role	Org. Level	Location
4/24/2020	SARE Vegetated Ditch Study Design	Participant	Regional	conference call
4/28/2020	Vegetated Ditch/ Food Safety Planning Group	Participant	Regional	conference call
5/12/2020	Sustainable Conservation: Agriculture Discharge Order 4.0 Nitrogen reporting	Participant	Regional	conference call
5/28/2020	Pajaro Valley Water Management Agency Water Conservation	Participant	County	conference call
5/29/2020	Grower Shipper Association of Central California: Ag Order Discharge Regulations	Participant	Regional	conference call
6/12/2020	Sustainable Conservation: Agriculture Discharge Order 4.0 Nitrogen reporting	Participant	Regional	conference call
7/20/2020	Church Brothers Farms-Mexico Operations: salinity management	Participant	International	conference call
7/23/2020	Delmonte Fresh-Costa Rica: Use of Polyacrylamide for preventing soil erosion	Participant	International	conference call
8/6/2020	Pajaro Valley Water Management Agency Water Conservation Planning	Participant	County	conference call
8/13/2020	California Department of Pesticide Regulation: Seed treatment trials	Participant	State	conference call
8/14/2020	Yale University: Optimizing recharge basins in Kern County	Participant	National	conference call
8/20/2020	Pajaro Valley Water Management Agency Water Conservation Planning	Participant	County	conference call
9/2/2020	Sustainable Conservation: Agriculture Discharge Order 4.0 Public Comment coordination	Participant	Regional	conference call
9/9/2020	Consultation with Central Coast Regional Water Quality Control Board Member: Jane Gray	Participant	Regional	conference call
9/14/2020	Consultation with Central Coast Regional Water Quality Control Board Member: Chairman Wolff	Participant	Regional	conference call
9/14/2020	Consultation with Central Coast Regional Water Quality Control Board Member: Hunter	Participant	Regional	conference call
9/21/2020	Consultation with Central Coast Regional Water Quality Control Board Member: Mike Johnston	Participant	Regional	conference call
9/21/2020	Consultation with Central Coast Regional Water Quality Control Board Member: Jeff Young	Participant	Regional	conference call
9/30/2020	Bonipak consultation: fertilizer value of nitrate in irrigation water	Participant	Regional	conference call

D.2. Educational Meetings that support public service (13 presentations)

Date	Meeting name	Presentation Topic	Sponsor/Co-Sponsors	Location	No. of Attend.	Org Level	theme
2/14/2018	CDFA-program audit	Grower assistance on improving N use efficiency in vegetables	UCCE Monterey	Salinas CA	6	State	2
3/6/2018	Fresno State Vegetable Production Lab	CropManage Hands-on Training	CSU Fresno	Zoom Presentation	25	Regional	2
3/14/2018	Hartnell College vegetable production seminar series	CropManage Hands-on Training	Hartnell College	Salinas CA	25	Regional	2
4/27/2018	CropManage Lab training	Hands on training on CropManage	Cabrillo College	Aptos CA	20	Regional	2
10/16/2018	DWR Seminar	CropManage: bringing irrigation and N management decision support to the field	Cal DWR	Sacramento CA	18	State	1
3/12/2019	Fresno State Vegetable Production Lab	CropManage lab training	Fresno State	Zoom Presentation	40	Regional	2

D.2. Educational Meetings that support public service (Continued)

Date	Meeting name	Presentation Topic	Sponsor/Co-Sponsors	Location	No. of Attend.	Org Level	theme
4/3/2019	California Crop Coefficient Committee: Launching Meeting	Using CropManage for ET based irrigation scheduling	UCANR/DWR	Sacramento CA	60	State	1
5/3/2019	CropManage Workshop	Introduction to using CropManage	Cabrillo College	Aptos CA	35	Regional	2
10/16/2019	Hartnell College	CropManage Hands-on Training	Computers in AG course	Salinas CA	32	Regional	2
11/19/2019	Hartnell College soil fertility class	CropManage training	Hartnell College	Salinas CA	30	Regional	2
1/27/2020	Soil Fertility graduate course	Introduction to CropManage	Cal Poly San Luis Obispo	San Luis Obispo	10	Regional	3
3/10/2020	Fresno State Vegetable Production Lab PL101	CropManage decision support training	Fresno State University	Zoom workshop	40	Regional	2
9/23/2020	Ag Order Workshop	Public comments on Agricultural Discharge Order 4.0	Central coast regional water quality control board	Zoom meeting	50	Regional	2

Extension Activities

E.1. Educational Meetings Organized (18 meetings)

Date	Meeting name	Topic	Role	Sponsor/Co-Sponsors	Location	No. of Attend.	Lang.
10/24/2017	Review of 2015-2016 Raspberry Research Trials	Adapting CropManage for Raspberry	co-organizer	Driscolls	Watsonville CA	8	
12/14/2017	Huntington Farms Training	Heramientos para manejar agua y nitrogeno	co-organizer	Huntington Farms/UCCE Monterey	Soledad CA	12	S
2/13/2018	2018 UCCE Irrigation and Nutrient Meeting	Irrigation and nutrient management of central coast crops	co-organizer	UCCE Monterey	Salinas CA	90	
3/22/2018	CropManage Workshop	CropManage Hands-on Training	co-organizer	PVWMA/UCCE Santa Cruz	Watsonville CA	25	ST
4/24/2018	CropManage Workshop	Hands-on training on using the CropManage Irrigation and nutrient management decision support tool	lead organizer	UCCE Monterey	Salinas CA	21	
6/6/2018	CropManage Workshop	Hands-on training on using the CropManage Irrigation and nutrient management decision support tool	co-organizer	UCCE Ventura	Ventura CA	24	ST
10/18/2018	Celery Irrigation Field Day	Irrigation management of celery	lead organizer	USDA-ARS, NASA	Salinas CA	24	
2/26/2019	2019 UCCE Irrigation and Nutrient Meeting	Irrigation and nutrient management of central coast crops	co-organizer	UCCE Monterey	Salinas CA	70	ST
2/13/2019	SWEEP/healthy soils meeting	Requirements for the CDFA SWEEP/healthy soil cost share program	co-organizer	UCANR	Salinas CA	15	

E.1. Educational Meetings Organized (continued).

Date	Meeting name	Topic	Role	Sponsor/Co-Sponsors	Location	No. of Attend.	Lang.
2/28/2019	SWEEP/healthy soils meeting	Requirements for the CDFA SWEEP/healthy soil cost share program	co-organizer	UCANR	Watsonville CA	10	
5/22/2019	CropManage Workshop	Hands-on training on using the CropManage Irrigation and nutrient management decision support tool	co-organizer	UCCE Ventura	Ventura CA	30	ST
6/7/2019	CropManage tutorial	Introduction to using CropManage online irrigation and nutrient management decision support tool	lead organizer	Scheid Vineyards	Greenfield CA	5	
7/10/2019	Cauliflower irrigation trial meeting	Using weather-based approaches to scheduling irrigation in cauliflower	co-organizer	UCCE Monterey, USDA-ARS, NASA	Salinas	34	
11/20/2019	CropManage Hands-on training workshop	Hands-on training on using the CropManage Irrigation and nutrient management decision support tool	co-organizer	SCCRCD	Watsonville CA	23	ST
2/18/2020	2020 UCCE Monterey Irrigation and Nutrient Meeting	Irrigation and nutrient management of central coast crops	co-organizer	UCCE Monterey County	Salinas CA	85	S
3/9/2020	Irrigator training	Irrigation scheduling	co-organizer	Huntington Farms/UCCE Monterey	Soledad CA	14	

E.1. Educational Meetings Organized (continued).

Date	Meeting name	Topic	Role	Sponsor/Co-Sponsors	Location	No. of Attend.	Lang.
7/15/2020	CropManage Workshop	Hands-on training on using the CropManage Irrigation and nutrient management decision support tool	co-organizer	UCCE Monterey and Ventura	Webinar	35	ST
7/30/2020	Coastal Vegetable Production Webinar	Cool season vegetable production	co-organizer	UCCE Monterey and Ventura	Webinar	80	

Acronyms: PVWMA = Pajaro Valley Water Management Agency, CDFG = California Department of Food and Agriculture, FREP = Fertilizer Research and Education Program, NASA = National Aeronautical and Space Administration, PVWMA = Pajaro Valley Water Management Agency, SCCRCD = Santa Cruz County Resource Conservation District, USDA-ARS = USDA Agricultural Research Service; Languages: S = presented in Spanish, ST = Spanish simultaneous translation.

E.2.1. Educational Presentations: Theme 1. Agricultural Water Conservation (28 presentations)

Date	Meeting name	Presentation Topic	Sponsor/Co-Sponsors	Location	No. of Attend.	Lang.
10/6/2017	New Frontiers Water Forum: Visions, Visionaries, and Innovators	Next Practice Crop Management and Water Use	CSU Monterey Bay	Seaside CA	75	
12/7/2017	28th Annual fall desert workshop	Water and nutrient management of vegetable crops using the CropManage web application	UCCE Imperial	Imperial CA	46	
1/18/2018	Salinas Valley Sustainable Groundwater Association	CIMIS weather stations for irrigation in the Salinas Valley	Salinas Valley Groundwater sustainability association	Salinas CA	25	
2/28/2018	AgTech Meetup	CropManage: Bringing water and nitrogen management decision support to the field	Santa Cruz County AgTech Meetup	Watsonville CA	25	
3/29/2018	D'Arrigo Project Review	CropManage trials in broccoli	CSUMB/D'Arrigo	Salinas CA	10	
4/4/2018	UCCE Pepper Meeting	Using CropManage for water and nutrient management of peppers	UCCE Santa Clara	Gilroy CA	40	
5/16/2018	Pajaro Valley Water Management Agency Presentation	Agricultural Water Conservation	PVWMA	Watsonville CA	14	
10/18/2018	Celery Irrigation Field Day	Irrigation management of celery	USDA-ARS, NASA	Salinas CA	24	
10/22/2018	FREP preconference tour	Irrigation and water management on the central coast	CDFA-FREP	Seaside CA	55	
10/23/2018	FREP conference panel discussion	Innovations in Irrigation Management and Efficiency	CDFA-FREP	Seaside CA	130	

E.2.1. Educational Presentations: Theme 1. Agricultural Water Conservation (continued)

Date	Meeting name	Presentation Topic	Sponsor/Co-Sponsors	Location	No. of Attend.	Lang.
2/6/2019	Plant and Soil Conference	Using CropManage Decision Support Tool for Improving Irrigation Efficiency of Coastal Vegetables	CA chapter of Agronomy Society of America	Fresno CA	45	
2/13/2019	SWEEP healthy soils	Capital investments for improving irrigation efficiency.	UCANR	Salinas CA	15	
2/26/2019	2019 UCCE Irrigation and Nutrient Meeting	Optimizing Water Management in Celery using Weather Based Scheduling	UCCE Monterey	Salinas CA	70	
2/28/2019	SWEEP/healthy soils meeting	Capital investments for improving irrigation efficiency	UCANR	Watsonville CA	10	
5/22/2019	CropManage Workshop	Introduction to using CropManage	UCCE Ventura	Ventura CA	30	ST
6/7/2019	CropManage tutorial	Introduction to using CropManage	Scheid Vineyards	Greenfield CA	5	
7/10/2019	Cauliflower irrigation trial meeting	Using weather-based approaches to scheduling irrigation in cauliflower	UCCE Monterey, USDA-ARS, NASA	Salinas	34	
10/21/2019	UC Weed meeting	Season-long Use of Buried Drip Irrigation: Implications for Weed Control in Lettuce	UCCE Monterey	Salinas CA	75	

E.2.1. Educational Presentations: Theme 1. Agricultural Water Conservation (continued)

Date	Meeting name	Presentation Topic	Sponsor/Co-Sponsors	Location	No. of Attend.	Lang.
10/30/2019	Fertilizer Research and Education Program Annual Conference	Do-it-yourself tensiometer	CDFA Fertilizer Research and Education Program	Fresno CA	40	
12/12/2019	Fall Desert Seminar	Assessing and managing salinity	UCCE Imperial	Imperial CA	117	
1/14/2020	CropManage zoom training for Arizona State Univ	Introduction to CropManage	UCCE Monterey	Webinar	2	
2/18/2020	2020 UCCE Monterey Irrigation and Nutrient Meeting	Using Weather-Based Irrigation Scheduling for Optimizing Cauliflower Production	UCCE Monterey	Salinas CA	85	ST
2/18/2020	2020 UCCE Monterey Irrigation and Nutrient Meeting	Season-long Use of Buried Drip Irrigation: Implications for Surface Applied Fertilizer	UCCE Monterey	Salinas CA	85	ST
2/18/2020	2020 UCCE Monterey Irrigation and Nutrient Meeting	Does Irrigation Scheduling based on Evapotranspiration (ET) Work?	UCCE Monterey	Salinas CA	85	ST
3/9/2020	Irrigator training	Water management of vegetables: review of 2019	Huntington Farms/UCCE Monterey	Soledad CA	14	S
8/20/2020	Pajaro Valley Water Management Agency Operations Committee	Pajaro Valley water conservation program update	SCCRCD/PVWMA	Webinar	10	
9/2/2020	Santa Cruz County Farm Bureau meeting	Pajaro Valley water conservation program update	SCCRCD/PVWMA	Webinar	10	
9/23/2020	Alfalfa and Forage Virtual Field Meeting	Using CropManage online tool for irrigation decision support of alfalfa	UC Alfalfa and forage workgroup	Webinar	70	

E.2.2. Educational Presentations: Theme 2. Nutrient management for protecting water quality (29 presentations)

Date	Meeting name	Presentation Topic	Sponsor/Co-Sponsors	Location	No. of Attend.	Lang.
10/24/2017	2015-2016 Raspberry Research Trial Data Review	Adapting CropManage for Raspberry	Driscolls Berry	Watsonville CA	8	
10/26/2017	D'Arrigo Bro. Project Review	Fertilizer value of nitrate in irrigation water trials	CSU Monterey Bay	Salinas CA	12	
11/16/2017	Western Plant Health Association 2017 Nutrient Seminar	Fertilizer value of nitrogen in irrigation water for coastal vegetable production	Western Plant Health Association	Atascadero, CA	35	
11/27/2017	Santa Maria Vegetable and Strawberry Meeting	CropManage 3.0: bringing water and nitrogen management decision support to the field	UCCE San Luis Obispo	Santa Maria CA	60	ST
11/30/2017	California Association of Pest Control Advisers Education Meeting	Optimizing fertigation in drip irrigation	California Association of Pest Control Advisers	Gilroy CA	46	
12/8/2017	Central Coast Regional Water Quality Control Board Meeting	Fertilizer value of nitrogen in irrigation water for coastal vegetable production	Central Coast Regional Water Quality Control Board	San Luis Obispo CA	30	
12/14/2017	Huntington Farms Training	Heramientos para manejar agua y nitrogeno	Huntington Farms/UCCE Monterey	Soledad CA	12	S
2/1/2018	2018 Annual Strawberry Production Research Meeting	Strategies for Determining Nitrogen Needs in Strawberry	UCCE Santa Cruz	Watsonville CA	200	ST
2/13/2018	2018 UCCE Irrigation and Nutrient Meeting	On-Farm Trials Evaluating the Fertilizer Value of Nitrogen in Irrigation Water	UCCE Monterey	Salinas CA	90	
3/22/2018	CropManage Workshop	CropManage Hands-on Training	PVWMA/UCCE Santa Cruz Co	Watsonville CA	25	ST

E.2.2 Educational Presentations: Theme 2. Nutrient management for protecting water quality (continued).

Date	Meeting name	Presentation Topic	Sponsor/Co-Sponsors	Location	No. of Attend.	Lang.
3/27/2018	California Leafy Green Research Board Annual Meeting	On-Farm Trials Evaluating the Fertilizer Value of Nitrogen in Irrigation Water	CLGRB	Pismo Beach CA	100	
3/28/2018	AgTech Summit	CropManage: Bringing water and nitrogen management decision support to the field	Hartnell College	Salinas CA	30	
4/24/2018	CropManage Workshop	CropManage Hands-on Training	UCCE Monterey	Salinas CA	21	
6/6/2018	CropManage Workshop	Hands on training on CropManage	UCCE Ventura	Ventura CA	24	ST
10/24/2018	FREP annual conference	Speed update on ongoing projects	CDFA-FREP	Seaside CA	130	
11/1/2018	Western Plant Health Association 2018 Nutrient Seminar	CropManage: bringing irrigation and N management decision support to the field	WPHA	Modesto CA	35	
2/12/2019	Organic vegetables short course	Water Management Strategies for Efficient Use of Nitrogen in Organic Systems	UCCE Monterey	Salinas CA	80	
10/1/2019	Multi-processor Grower Workshop for Water Stewardship	Technical Assistance for Improving Water and Nutrient Management	Taylor Farms/Fresh Express	Salinas CA	70	
10/11/2019	Resource Conservation District-Santa Cruz County Field Meeting	Strawberry Nitrogen Management	SCCRCD	Watsonville CA	8	

E.2.2. Educational Presentations: Theme 2. Nutrient management for protecting water quality (continued).

Date	Meeting name	Presentation Topic	Sponsor/Co-Sponsors	Location	No. of Attend.	Lang.
10/30/2019	Fertilizer Research and Education Program Annual Conference	CropManage Decision Support Tool: Inputs, Outputs, and Users	CDFA Fertilizer Research and Education Program	Fresno CA	125	
10/30/2019	Fertilizer Research and Education Program Annual Conference	CropManage demonstration for tree crops	CDFA Fertilizer Research and Education Program	Fresno CA	46	
11/20/2019	CropManage Hands-on workshop	CropManage training for growers and consultants	SCCRCD	Watsonville CA	23	ST
2/10/2020	Dixon/Solano RCD Water Quality Coalition	CropManage Irrigation and N scheduling	RCD Solano County	Dixon CA	40	
2/18/2020	2020 UCCE Monterey Irrigation and Nutrient Meeting	A-R: Implications and challenges for irrigation and nutrient management on the central coast	UCCE Monterey	Salinas CA	85	ST
3/2/2020	Nutrient Management	A-R: challenges and implications for farm on the central coast	Tanimura and Antle Farms	Salinas CA	8	
3/16/2020	Future of Lettuce Symposium	CropManage online irrigation and nutrient management decision support software	UC Davis	Webinar	80	
6/12/2020	Precision Irrigation Scheduling of Specialty Crops	Introduction to using CropManage Irrigation and Nutrient Management Decision Support Tool	Foundation for Food and Ag Research/GeoVisual	Webinar	12	
7/15/2020	CropManage Workshop	Hands-on training on using the CropManage Irrigation and nutrient management decision support tool	UCCE Monterey and Ventura	Webinar	35	
7/30/2020	Coastal Vegetable Production Webinar	CropManage Irrigation and Nitrogen Management Decision Support Tool	UCCE Monterey and Ventura	Webinar	80	ST

E.2.3. Educational Presentations: Theme 3. Conservation practices for protecting water quality (12 presentations)

Date	Meeting name	Presentation Topic	Sponsor/Co-Sponsors	Location	No. of Attend.
10/10/2017	California Leafy Green Research Board Annual Meeting	Microbial food safety of tail water used for leafy green production.	CLGRB	Salinas CA	35
2/23/2018	Grower Shipper Water Quality sub-committee	Using Polyacrylamide (PAM) for Reducing Nutrients Sediment, and Pesticide Losses in Run-off	Central Coast Grower Shipper	Salinas CA	20
4/17/2018	Food Safety Committee	Microbial food safety risks of reusing tailwater	Central Coast Grower Shipper Association	Salinas CA	30
10/9/2018	California Leafy Greens Research Board Fall Meeting	Pesticide mitigation strategies	CLGRB	Salinas CA	20
2/26/2019	2019 UCCE Irrigation and Nutrient Meeting	Mitigating Pesticides and Sediment in Irrigation Run-Off with Polyacrylamide (PAM)	UCCE Monterey	Salinas CA	70
3/19/2019	California Leafy Green Research Board Annual Meeting	Integrated approach to mitigating pesticides in agricultural run-off	CLGRB	Pismo Beach	120

E.2.3. Educational Presentations: Theme 3. Conservation practices for protecting water quality (continued)

Date	Meeting name	Presentation Topic	Sponsor/Co-Sponsors	Location	No. of Attend.	Lang.
3/28/2019	Annual Surface Water Pesticide Collaborative Meeting	Integrated vegetated treatment system for mitigating pesticides in agricultural runoff.	DPR/UC Davis	Davis CA	70	
8/14/2019	Vegetable irrigation meeting	Using Polyacrylamide (PAM) for Reducing Nutrients Sediment, and Pesticide Losses in Run-off	UCCE-Ventura	Ventura CA	40	ST
10/8/2019	California Leafy Greens Research Board Fall Meeting	Integrated best management practice for reducing pesticides in runoff	CLGRB	Salinas CA	30	
12/10/2019	Miller Chemical Meeting	Best management practices for mitigating pesticides in runoff	Miller Chemical	Salinas CA	30	
3/17/2020	California Leafy Green Research Board Annual Meeting	Vegetated treatment systems for mitigating pesticides in agricultural runoff	CLGRB	zoom conference	100	
6/9/2020	Delmonte Fresh Research Group	Strategies for reducing soil erosion during storm events	Delmonte Fresh Vegetables	zoom meeting	5	

E.3. Interviews for trade journals and radio.

Miller C. (2017) 5 Studies that help explain how organic production works.
GrowingProduce.com October 25, 2017

Johnson B. (2018) Growers cut water use in Salinas Valley significantly Ag Alert. Oct. 10, 2018. <https://www.agalert.com/story/?id=12204>

Johnson B. (2019) Single-use drip tape gains interest in Salinas fields Ag Alert. Jan. 9, 2019. <https://www.agalert.com/story/?id=12420>

Johnson B. (2019) Drip irrigation may work with spinach Ag Alert. Sept. 4, 2019. <https://www.agalert.com/story/?id=13259>

Johnson B. (2019) Making tensiometer from parts saves money Ag Alert. Sept. 4, 2019. <https://www.agalert.com/story/?id=13252>

Hammerich T. (2020) UCANR CropManage Program, California Ag Today
<https://www.aginfo.net/report/46410/California-Ag-Today/UCANR-CropManage-Program>

Johnson B. (2020) Making tensiometer from parts saves money Ag Alert. Jan. 1, 2020. <https://www.agalert.com/story/?id=13575>

Bibliography

Publication category	Since Last salary action	UC Career	Academic Career
Peer reviewed journal articles (J)	4	38	46
Peer reviewed other ² (K)	4	23	23
Total Peer reviewed (J+K)	8	61	69
Newsletter, electronic and trade journal articles ¹ (A)	28	173	173
Technical Reports (B)	10	210	210
Abstracts (C)	21	160	160
Total Non-Peer reviewed (A+B+C)	59	543	543
Total	67	604	612

¹. includes electronic extension materials such as software, narrated presentations, and blog entries

². includes ANR peer reviewed publications, peer reviewed book chapters

List of publications are ordered chronologically (oldest to newest) but grouped among categories. Note that *category codes* are different than stated in ANR guidelines because they are a legacy of my complete and ongoing bibliography that I began 1995. My roles for multi-authored publications are listed for the period since my last salary action.

Peer-reviewed publications

Scientific Journal Articles

1. Garza-Díaz L.E., DeVincentis A.J., Sandoval-Solis S., Azizipour M., Ortiz-Partida J.P., Mahlknecht J., Cahn M., Medellín-Azuara J., Zaccaria D., Kisekka I. (2019) Land-Use Optimization for Sustainable Agricultural Water Management in Pajaro Valley, California. *Journal of Water Resources Planning and Management* 145:05019018. DOI: doi:10.1061/(ASCE)WR.1943-5452.0001117
<https://ascelibrary.org/doi/abs/10.1061/%28ASCE%29WR.1943-5452.0001117> %X **J**

Role: Collaborated on project and contributed data to the analysis.

2. Montazar A., Cahn M., Putman A. (2019) Research Advances in Adopting Drip Irrigation for California Organic Spinach: Preliminary Findings. *Agriculture* 9:177
<https://www.mdpi.com/2077-0472/9/8/177> **J Role:** collaborated designing trials, interpretation of results, and editing.
3. Geisseler D., Aegerter B.J., Miyao E.M., Turini T., Cahn M.D. (2020) Nitrogen in soil and subsurface drip-irrigated processing tomato plants (*Solanum lycopersicum* L.) as affected by fertilization level. *Scientia Horticulturae* 261:108999. DOI:
<https://doi.org/10.1016/j.scienta.2019.108999>
<http://www.sciencedirect.com/science/article/pii/S0304423819308854> **J Role:** collaborated on data collection and design of field research.
4. Moyne A.-I., Blessington T., Williams T.R., Koike S.T., Cahn M.D., Marco M.L., Harris L.J. (2020) Conditions at the time of inoculation influence survival of attenuated *Escherichia coli* O157:H7 on field-inoculated lettuce. *Food Microbiology* 85:103274. DOI:
<https://doi.org/10.1016/j.fm.2019.103274>
<http://www.sciencedirect.com/science/article/pii/S0740002019302850> **J Role:** collaborated on field trials, data interpretation, writing materials and methods.

Other Peer-Reviewed Publications (ANR publications, Book Chapters, etc)

5. Cahn M., Bali K. (2018) Consejos de la sequia: El manejo de las sales por medio de la filtracion. *Consejos de la Sequia ANR Publication* 8594:1-9
<https://anrcatalog.ucanr.edu/pdf/8594.pdf> **K Role:** I was lead author and wrote a majority of the manuscript. I corresponded with the ANR Spanish Translation team in developing this publication.
6. Cahn M. (2019) Drought Tip: Drought planning for vegetable production. *Drought Tip ANR Publication* 8632:1-9 <https://anrcatalog.ucanr.edu/pdf/8632.pdf> **K**.
7. Cahn M. (2019) Drought Tip: Drought tips for vegetable production. *Drought Tip ANR Publication* 8635:1-9 <https://anrcatalog.ucanr.edu/pdf/8635.pdf> **K**
8. Cahn M.D., Phillips B. (2019) Best Management Practices for Mitigating Pesticides in Runoff from Vegetable Systems in California, *Pesticides in Surface Water: Monitoring, Modeling, Risk Assessment, and Management*, American Chemical Society. pp. 519-539 **K Role:** I was the lead writer on this manuscript. I corresponded with the editor and I was also responsible for responding to reviewers' comments and resubmitting the chapter for review and publication.

Non-peer reviewed publications

Newsletter, Electronic, Trade Journal Articles

9. Cahn M. (2018) Attention to water management can improve nutrient use in organic vegetables Progressive Crop Consultant July/Aug 2018 A
10. Cahn M. (2018) View from the West: How to get what you need from fertigation American Vegetable Grower April 2018 A
11. Cahn M. (2018) CropManage Tutorials: Adjusting irrigation settings. February 14, 2018 CropManage Knowledge Base <http://help.cropmanage.ucanr.edu/2018/02/14/irrigation-settings/> A
12. Cahn M. (2018) CropManage Tutorials: Irrigation Method Impacts on CropManage Recommendations. February 14, 2018 CropManage Knowledge Base <http://help.cropmanage.ucanr.edu/2018/02/14/irrigation-methods-and-its-impact-on-cropmanage-recommendations/> A
13. Cahn M., Smith R. (2018) Food for thought during the holidays. November 20, 2018 Salinas Valley Agriculture Blog <https://ucanr.edu/blogs/blogcore/postdetail.cfm?postnum=28731> **A Role** I was the lead writer of this article
14. Hartz T.K., Cahn M.D., Smith R.F. (2018) Efficient nitrogen fertility and irrigation management of cool-season vegetables in coastal California UCANR Publication. pp. 1-11 <http://ciwr.ucanr.edu/files/283981.pdf> **A Role** I contributed to the writing of the irrigation section of this extension bulletin.
15. Hartz T.K., Cahn M.D., Bolda M.P., Biscaro A.S. (2018) Efficient nitrogen fertility and irrigation management in California strawberry production, UCANR Publication. pp. 1-10 <http://ciwr.ucanr.edu/files/283985.pdf> **A Role** I contributed to the writing of the irrigation section of this extension bulletin.
16. Biscaro A., Cahn M. (2019) Assessing the impact of irrigation water quality on strawberry cultivars. Progressive Crop Consultant Sept./Oct. 2019 A **Role** I assisted with the design of the trials and interpretation of results.
17. Cahn M. (2019) View from the West: tips to reduce pesticides entering the environment

American Vegetable Grower May 2019 A

18. Cahn M. (2019) Using CropManage decision support tool: improving irrigation and nutrient efficiency of coastal vegetable and berries Vegetables West May 2019 A
19. Cahn M. (2019) Filter Irrigation Runoff to Protect Water Quality, GrowingProduce.com <https://www.growingproduce.com/vegetables/filter-irrigation-runoff-to-protect-water-quality/> A
20. Cahn M. (2019) CropManage Tutorials: Selecting Weather Stations. Nov. 4, 2019 CropManage Knowledge Base <http://help.cropmanage.ucanr.edu/2019/11/04/cimis-weather-stations/> A
21. Cahn M. (2019) CropManage Tutorials: Introduction to CropManage. April 26, 2019 CropManage Knowledge Base <http://help.cropmanage.ucanr.edu/2019/04/26/introduction-to-cropmanage/> A
22. Cahn M. (2019) Using weather data to optimize water management American Vegetable Grower September 2019 A
23. Cahn M., Chambers D. (2019) Do it yourself (DIY) tensiometer. April 23, 2019 Salinas Valley Agriculture Blog <https://ucanr.edu/blogs/blogcore/postdetail.cfm?postnum=30042> A
24. Cahn M., Johnson L. (2019) Using weather data to optimize water management American Vegetable Grower September 2019 A **Role** I was lead writer of the article and corresponded with the editors.
25. Cahn M., Bolda M. (2019) Nitrogen Management of Strawberry during Establishment and Early Season. November 12, 2019 Santa Cruz County Strawberries and Caneberries Blog. http://cesantacruz.ucanr.edu/Strawberry_Nursery_Plant_Production/Blog_In_Spanish/?blogpost=38754&blogasset=41579 A **Role** I co-wrote the blog article.
26. Cahn M., Qin Z., Chambers D. (2019) Mitigating pesticides and sediment in tail water using polyacrylamide (PAM) Progressive Crop Consultant July/August 2019 A **Role:** I was lead author of this article.
27. Smith R., Cahn M. (2019) Fate of surface applied nitrogen in season-long drip irrigated fields. August 5, 2019 Salinas Valley Agriculture Blog

- <https://ucanr.edu/blogs/blogcore/postdetail.cfm?postnum=30993> A **Role:** I co-wrote this blog article
28. Smith R., Cahn M. (2019) Details on the soil nitrate test. April 1, 2019 Salinas Valley Agriculture Blog <https://ucanr.edu/blogs/blogcore/postdetail.cfm?postnum=4406> A **Role:** I co-wrote this blog article.
 29. Cahn M. (2020) Irrigation strategies for avoiding heat damage to cool season vegetables. August 18, 2020 Salinas Valley Agriculture Blog <https://ucanr.edu/blogs/blogcore/postdetail.cfm?postnum=43401> A
 30. Cahn M. (2020) Does Evapotranspiration Work for Vegetable Crops? GrowingProduce.com September 16, 2020 A
 31. Cahn M. (2020) CropManage Tutorials: Adding soil sample test values. April 23, 2020 CropManage Knowledge Base <http://help.cropmanage.ucanr.edu/2020/04/23/adding-soil-sample-events-for-a-planting/> A
 32. Cahn M. (2020) CropManage Tutorials: Add a new planting. March 13, 2020 CropManage Knowledge Base <http://help.cropmanage.ucanr.edu/2020/03/13/adding-a-new-planting/> A
 33. Cahn M. (2020) CropManage Tutorials: Adding and Managing Planting Areas. February 25, 2020 CropManage Knowledge Base <http://help.cropmanage.ucanr.edu/2020/02/25/adding-and-managing-lots/> A
 34. Cahn M. (2020) CropManage Tutorials: Adding fertilizer events for vegetable commodities. April 24, 2020 CropManage Knowledge Base <http://help.cropmanage.ucanr.edu/2020/04/24/adding-fertilizer-events-for-vegetable-commodities/> A
 35. Cahn M. (2020) View from the West: Does Evapotranspiration Work for Vegetables? American Vegetable Grower September 2020 A
 36. Cahn M. (2020) View from the West: Creative ways to manage groundwater American Vegetable Grower May 2020 A

Technical Reports

37. Cahn M. (2018) Web-based irrigation scheduling tool for California crops. Water use efficiency grants program, under Prop 50 Grants. . Final Report. pp 4 **B**
38. Cahn M., Koike S., Harris L. (2018) Microbial food safety risks of reusing tail water for leafy green production Center for Produce Safety 2015 RFP final project report https://www.centerforproducesafety.org/amass/documents/researchproject/389/CPS%20Final%20Report_Cahn,%20February%202018.pdf **B Role** I was the lead PI and was the lead writer on the report.
39. Cahn M., Brown P., Fulton A. (2018) Adapting CropManage Irrigation and Nitrogen Management Decision Support Tool for Central Valley Crops. CDFA Fertilizer Research and Education Program, Annual Report. pp 11 **B Role** I was lead PI and wrote the report.
40. Smith R., Cahn M. (2018) On-farm evaluations of fertilizer value of nitrate in irrigation water. . Annual Report California Leafy Greens Research Board. pp 9 <http://calgreens.org/wp-content/uploads/2018/08/Smith-Cahn-2018CLGB-Ambient-N-Report-Final.pdf> **B Role:** I participated in the field research and co-wrote the report.
41. Cahn M. (2019) Water treatment technology using polyacrylamide (PAM) to control sediment in agricultural run-off. Annual Report California Leafy Greens Research Board. pp 7 <https://calgreens.org/wp-content/uploads/2019/08/CLGRB-Cahn-PAM-2018-final-report-070319.pdf> **B**
42. Cahn M., Phillips B. (2019) An integrated vegetated treatment system for mitigating imidacloprid and permethrin in agricultural irrigation runoff. Annual Report California Leafy Greens Research Board. pp 10 <https://calgreens.org/wp-content/uploads/2019/11/CLGRB-CahnPhillips-Final-report-2018.pdf> **B Role** I was the lead PI and wrote the report.
43. Smith R., Cahn M. (2019) On-farm evaluations of fertilizer value of nitrate in irrigation water. Annual Report California Leafy Greens Research Board. pp 8 <https://calgreens.org/wp-content/uploads/2019/08/2019CLGB-Ambient-N-Report-Final.pdf> **B Role** I collaborated on this project and co-wrote the report
44. Cahn M. (2020) Water treatment technology using polyacrylamide (PAM) to control sediment in agricultural run-off. Annual Report California Leafy Greens Research Board. pp 7 https://calgreens.org/wp-content/uploads/2020/11/CLGRB-Cahn-PAM-2019-final-report_JC_MC.pdf **B**

45. Cahn M., Phillips B. (2020) An integrated vegetated treatment system for mitigating imidacloprid and permethrin in agricultural irrigation runoff. Annual Report California Leafy Greens Research Board. pp 9 <https://calgreens.org/wp-content/uploads/2020/11/Final-Report-CahnPhillips-2019.pdf> **B Role:** I was lead PI on this project and wrote the report.
46. Montazar A., Cahn M., Putman A. (2020) Evaluation of Drip Irrigation in Organic Spinach Production and Downy Mildew Management. Annual Report California Leafy Greens Research Board. pp 8 <https://calgreens.org/wp-content/uploads/2020/11/Annual-Project-Report-for-CLGRP-Ali-Montazar-2020.pdf> **B Role:** I was a collaborator on this project.

Conference Proceedings, Abstracts

47. Cahn M., Smith R., Hartz T.K. (2017) Determining the fertilizer value of ambient nitrogen in irrigation water. 25th annual CDFA Fertilizer Research and Education Program Conference Conference Proceedings, CDFA FREP, November 1-2 Modesto CA 46-49 https://www.cdfa.ca.gov/is/fldr/frep/pdfs/2017_Proceedings_FREP.pdf **C Role** I was the PI of the project and wrote the abstract.
48. Geisseler D., Aegerter B., Cahn M., Hartz T., Miyao G., Turini T. (2017) Developing a decision support tool for processing tomato irrigation and fertigation in the central valley based on cropmanage. 25th annual CDFA Fertilizer Research and Education Program Conference Conference Proceedings, CDFA FREP, November 1-2 Modesto CA 52-54 https://www.cdfa.ca.gov/is/fldr/frep/pdfs/2017_Proceedings_FREP.pdf **C Role** I was a collaborator on this project and participated in training advisors and algorithm development for the decision support tool.
49. Haffa A., Horwath W., Melton F., Cahn M., Smith R. (2017) Quantifying N₂O emissions under different on-farm irrigation and nutrient management bmps that reduce groundwater nitrate loading and applied water. 25th annual CDFA Fertilizer Research and Education Program Conference Conference Proceedings, CDFA FREP, November 1-2 Modesto CA 39-41 https://www.cdfa.ca.gov/is/fldr/frep/pdfs/2017_Proceedings_FREP.pdf **C Role** I participated in the field trials of this project
50. Melton F., Huntington J.L., Johnson L., Guzman A., Morton C., Zaragoza I., Dexter J., Rosevelt C., Michaelis A., Nemani R.R., Cahn M., Temesgen B., Trezza R., Frame K., Eching S., Grimm R., Hall M. (2017) Applications of satellite data to support improvements in irrigation and groundwater management in California American Geophysical Union Fall Meeting, December 11-15, 2017 New Orleans LA (PA23B-0373) <https://agu.confex.com/agu/fm17/meetingapp.cgi/Paper/268211> **C Role** I was collaborator on a several projects presented at this meeting.

51. Smith R., Cahn M., Hartz T.K. (2017) Improving N use efficiency of cool season vegetable production systems with broccoli rotations. 25th annual CDFA Fertilizer Research and Education Program Conference Conference Proceedings, CDFA FREP, November 1-2 Modesto CA 60-63
https://www.cdfa.ca.gov/is/ffldrs/frep/pdfs/2017_Proceedings_FREP.pdf **C Role** I was a collaborator on this project and participated in field trials

52. Smith R., Cahn M., Hartz T.K., Geisseler D. (2017) Evaluation and demonstration of nitrogen and phosphorus management in organic leafy green vegetable production on the central coast. 25th annual CDFA Fertilizer Research and Education Program Conference Conference Proceedings, CDFA FREP, November 1-2 Modesto CA 43-44
https://www.cdfa.ca.gov/is/ffldrs/frep/pdfs/2017_Proceedings_FREP.pdf **C Role** I was a collaborator on this project

53. Zaragoza I., Melton F., Dexter J., Post K., Haffa A., Kortman S., Spellenberg R., Cahn M. (2017) Utilizing on-farm best management practices: Managing Nitrate Leaching Using Evapotranspiration Based Irrigation Methods. American Geophysical Union Fall Meeting, December 11-15, 2017 New Orleans LA (GC33A-1064)
<https://agu.confex.com/agu/fm17/meetingapp.cgi/Paper/242519> **C Role** I was a collaborator on this project and assisted with field trials.

54. Cahn M., Fulton A., Brown P. (2018) Adapting CropManage Irrigation and Nitrogen Management Decision Support Tool for Central Valley Crops 26th annual CDFA Fertilizer Research and Education Program Conference October 22-24, 2018 Seaside CA 24-27
https://www.cdfa.ca.gov/is/ffldrs/frep/pdfs/2018_Proceedings_FREP.pdf **C Role** I was the lead PI and wrote the abstract.

55. Dexter J., Zaragoza I., Wang C., Haffa A., Kortman S., Cahn M., Smith R., Melton F. (2018) Quantifying the Benefits of On-farm Best Management Practices: Managing nitrate leaching using evapotranspiration-based irrigation scheduling. California Plant and Soil Conference February 6-7, 2018 Fresno CA 140
<http://calasa.ucdavis.edu/files/278374.pdf> **C Role** I was a collaborator on this project and participated in the field trials.

56. Guzman A., Cahn M., Johnson L., Wang C., Hang M., Zaragoza I., Melton F. (2018) Supporting advances in agricultural sustainability through integration of NASA SIMS and CropManage for irrigation management support Amer. Geophys. Union Fall Meeting 10-14 Dec 2018 2018 Washington DC **C Role** I was co-PI on this project and helped with the integration of the decision support tools.

57. Johnson L., Cahn M., Benzen S. (2018) Evapotranspiration-based Irrigation Scheduling in Cool Season Vegetables, Abstract for Hydrology Section Amer. Geophys. Union Fall Meeting 10-14 Dec 2018 2018 Washington DC **C Role** I was co-PI on this project and lead on the field trials. I assisted with writing the abstract.
58. Melton F., Haffa A., Aqueche K., Cahn M., Cassel-Sharma F., Dexter J., Duque J., Goorahoo D., Hang M., Johnson L., Kortman S., Prescott K., Wang T., Zaragoza I. (2018) Quantifying the Benefits of On-farm Best Management Practices: Managing nitrate leaching using evapotranspiration-based irrigation scheduling. California State University, ARI conference. September, 2018 2018 **C Role** I was a collaborator on the project and assisted with field trials.
59. Melton F., Johnson L., Guzman A., Dexter J., Zaragoza I., Wang T., Patron E., Duque J., Roosevelt C., Cahn M., Smith R., Temesgen B., Trezza R., Eching S., Frame K. (2018) The Satellite Irrigation Management Support (SIMS) System: Applications of Satellite Data to Support Improvements in Irrigation Management in California. California Plant and Soil Conference February 6-7, 2018 2018 Fresno CA 49-51
<http://calasa.ucdavis.edu/files/278374.pdf> **C Role** I was a collaborator on the project described in the abstract and helped edit the abstract.
60. Moyne A., Murphy L.A., Cahn M.D., Koike S.T., Harris L.J. (2018) Impact of Irrigation Run-off Water on the Survival of Salmonella and Escherichia coli in Soil and on Lettuce Plants. International Association for Food Protection July 8-11 Salt Lake City Utah
<https://iafp.confex.com/iafp/2018/abstracts/papers/index.cgi?username=18449&password=405777> **C Role** I collaborated on this project by assisting with field trials.
61. Smith R., Cahn M., Hartz T., Geisseler D. (2018) Evaluation and demonstration of nitrogen and phosphorus management in organic leafy green vegetable production on the central coast 26th annual CDFA Fertilizer Research and Education Program Conference October 22-24 , 2018 2018 Seaside CA 32-35
https://www.cdfa.ca.gov/is/flldr/frep/pdfs/2018_Proceedings_FREP.pdf **C Role** I was a collaborator on this project
62. Smith R., Hartz T., Geisseler D., Cahn M., Love P. (2018) Evaluation of Residual Mineral Nitrogen for Managing Nitrogen Fertilizer Applications for Organic Cool Season Vegetable Production 2018 ASA CSSA meeting November 4-7, 2018 2018 Baltimore, MD
<https://scisoc.confex.com/scisoc/2018am/meetingapp.cgi/Person/517664> **C Role** I was a collaborator on the project

63. Bateni S., Deenik, Golabi M.H., Gurr I., Cahn M., Neale C. (2019) Conserving Water Resources in the US Pacific Islands Region by Optimal Irrigation of Farmlands 74th SWCS International Annual Conference July 28 - 31, 2019 2019 Pittsburgh, Pennsylvania **C Role I** collaborated on a project to adapt CropManage to Pacific Island vegetable crops.
64. Biscaro A., Cahn M., Hartz T., Grattan S. (2019) Evaluation of Salinity Effects of Irrigation Water on Strawberry Cultivars 2019 ASHS Annual Conference July 21-25, 2019 2019 Las Vegas, NV. <https://ashs.confex.com/ashs/2019/webprogramarchives/Paper31343.html> **C Role I** was a collaborator on this project and assisted with trial design and data interpretation.
65. Cahn M., Johnson L., Smith R. (2019) Using CropManage decision support tool for improving irrigation and nutrient efficiency of coastal vegetables and berries California Plant and Soil Conference February 5-6, 2019 2019 Fresno CA 55-59 <https://ucanr.edu/sites/calasa/files/301066.pdf> **C Role I** wrote the abstract for this conference.
66. Cahn M., Fulton A., Brown P. (2019) Adapting CropManage Irrigation and Nitrogen Management Decision Support Tool for Central Valley Crops 27th annual CDFFA Fertilizer Research and Education Program Conference October 28-30, 2019 2019 Fresno CA 20-23 https://www.cdfa.ca.gov/is/ffldrs/frep/pdfs/2019_Proceedings_FREP.pdf **C Role I** was the lead PI on the project and wrote the abstract.
67. Cahn M., Johnson L., Benzen S., Qin Z., Chambers D. (2019) Optimizing water management in celery using weather-based scheduling 2019 ASHS Annual Conference July 21-25, 2019 2019 Las Vegas, NV. <https://ashs.confex.com/ashs/2019/webprogramarchives/Paper30407.html> **C Role I** was a co-PI on the project, led field trials and data analysis, and wrote the abstract.

Bibliography

Publication category	Since Last salary action	UC Career	Academic Career
Peer reviewed journal articles (J)	4	38	46
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Newsletter, electronic and trade journal articles ¹ (A)	28	173	173
Technical Reports (B)	10	210	210
Abstracts (C)	21	160	160
Total Non-Peer reviewed (A+B+C)	59	543	543
Total	67	604	612

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² includes ANR peer reviewed publications, peer reviewed book chapters

List of publications are ordered chronologically (oldest to newest) but grouped among categories. Publications since the last salary action are highlighted in gray. My roles for multi-authored publications are listed for the period since my last salary action.

Peer-reviewed publications

Scientific Journal Articles

1. Cahn M., Zobel R., Bouldin D. (1989) Relationship between root elongation rate and diameter and duration of growth of lateral roots of maize. *Plant and Soil* 119:271-279 **J**
2. Sudduth K., Hummel J., Cahn M. (1991) Soil organic matter sensing: a developing science Symposium on Automated Agriculture for the 21st Century 1991 **J**
3. Cahn M., Bouldin D., Cravo M. (1992) Nitrate sorption in the profile of an acid soil. *Plant and Soil* 143:179-183 **J**
4. Cahn M., Bouldin D., Cravo M. (1993) Amelioration of subsoil acidity in an Oxisol of the humid tropics. *Biology and Fertility of Soils* 15:153-159 **J**
5. Cahn M., Bouldin D., Cravo M., Bowen W. (1993) Cation and nitrate leaching in an Oxisol

of the Brazilian Amazon. *Agronomy Journal* 85:334-340 **J**

6. Han S., Goering C., Cahn M., Hummel J. (1993) A robust method for estimating soil properties in unsampled cells. *Transcripts of the ASAE (American Society of Agricultural Engineers)* 36:1336-1368 **J**
7. Cahn M., Hummel J., Brouer B. (1994) Spatial analysis of soil fertility for site-specific crop management. *Soil Science Society of America Journal* 58:1240-1248 **J**
8. Han S., Goering C., Cahn M., Hummel J. (1994) Cell size selection for site-specific farming. *Transcripts of the ASAE (American Society of Agricultural Engineering)* 37:19-26 **J**
9. Cahn M., Snyder R., Hanson B. (1999) Estimating evapotranspiration in processing tomato. *Acta Horticulturae* 487:493-497 **J**
10. Hartz T., Miyao G., Mullen R., Cahn M., Valencia J., Brittan K. (1999) Potassium requirements for maximum yield and fruit quality of processing tomato. *Journal of the American Society for Horticultural Science* 124:199-204 **J**
11. Hartz T., Giannini C., Miyao G., Valencia J., Cahn M., Mullen R., Brittan K. (1999) Soil cation balance affects tomato fruit color disorders. *Acta Horticulturae* 487:49-55 **J**
12. Murray M., Cahn M., Caprile J., May D., Miyao G., Mullen R., Valencia J., Weir W. (1999) University of California Cooperative Extension processing tomato cultivar evaluation program. *HortTechnology* 9:36-39 **J**
13. Cahn M., Herrero E., Snyder R., Hanson B. (2001) Water management strategies for improving fruit quality of drip irrigated processing tomatoes. *Acta Horticulturae* 542:111-116 **J**
14. Hartz T., Miyao G., Mullen R., Cahn M. (2001) Potassium fertilization effects on processing tomato yield and fruit quality. *Acta Horticulturae* 542:127-133 **J**
15. Krusekopf H., Mitchell J., Hartz T., May D., Miyao G., Cahn M. (2001) Pre-sidedress soil nitrate testing to determine yield response to fertilizer applications in processing tomatoes. *Acta Horticulturae* 542:135-142 **J**
16. Murray M., Cahn M., Miyao G., Brittan K., Mullen R. (2001) The University of California processing tomato workgroup: an example of ongoing effective collaborations. *Acta Horticulturae* 542:253-260 **J**
17. Krusekopf H., Mitchell J., Hartz T., May D., Miyao G., Cahn M. (2002) Pre-sidedress soil nitrate testing identifies processing tomato fields not requiring sidedress N fertilizer. *HortScience* 37:520-524 **J**
18. Cahn M., Herrero E., Hanson B., Snyder R., Hartz T., Miyao G. (2003) Effects of irrigation

cut-off on processing tomato fruit quality. *Acta Horticulturae* 613:75-80 **J**

19. Cahn M., Herrero E., Hanson B., Hartz T., Miyao G. (2004) Late season water management effects on quality and yield of processing tomatoes. *Acta Horticulturae* 664:111-118 **J**
20. Madden N., Mitchell J., Lanini W., Cahn M., Herrero E., Park S., Temple S., Van Horn M. (2004) Evaluation of conservation tillage and cover crop systems for organic processing tomato production. *HortTechnology* 14:243-250 **J**
21. Platts B., Cahn M., Holden R., Malanka M. (2004) Effects of recycled water on soil salinity levels for cool season vegetables. *Acta Horticulturae* 664:561-566 **J**
22. Johnstone P., Hartz T., Cahn M., Johnstone M. (2005) Lettuce response to phosphorus fertilization in high phosphorus soils. *HortScience* 40:1499-1503 **J**
23. Hartz T., Johnstone P., Smith R., Cahn M. (2007) Soil calcium status unrelated to tipburn of romaine lettuce. *HortScience* 42:1681-1684 **J**
24. Smith R., Bettiga L., Cahn M., Baumgartner K., Jackson L., Bensen T. (2008) Vineyard floor management affects soil, plant nutrition, and grape yield and quality. *California Agriculture* 62:184-190 **J**
25. Weston D., Lentz R., Cahn M., Ogle R., Rothert A., Lydy M. (2009) Toxicity of anionic polyacrylamide formulations when used for erosion control in agriculture. *Journal of Environmental Quality* 38 **J**
26. Hoque M., Ajwa H., Othman M., Smith R., Cahn M. (2010) Yield and Postharvest Quality of Lettuce in Response to Nitrogen, Phosphorus, and Potassium Fertilizers. *HortScience* 45:1539-1544 **J**
27. Moyne A., Sudarshana M.R., Blessington T., Koike S.T., Cahn M.D., Harris L.J. (2011) Fate of *Escherichia coli* O157:H7 in field-inoculated lettuce. *Food Microbiology* 28:1417-1425 **J**
28. Bottoms T., Smith R., Cahn M., Hartz T. (2012) Nitrogen requirements and N status determination of lettuce. *HortScience* 47:1768-1774 **J**
29. Bottoms T., Hartz T., Cahn M., Farrara B. (2013) Crop and soil nitrogen dynamics in annual strawberry production in California. *HortScience* 48:1034-1039 **J**
30. Heinrich A., Smith R., Cahn M. (2013) Nutrient and water use of fresh market spinach. *HortTechnology* 23:325-333 **J**
31. Olivieri A., Seto E., Cooper C., Cahn M., Colford J., Crook J., Debroux J., Mandrell R., Suslow T., Tchobanoglous G., Hultquist R., Spath D., Mosher J. (2014) Risk-Based Review of California's Water-Recycling Criteria for Agricultural Irrigation. *Journal of Environmental Engineering*. DOI: 10.1061/(ASCE)EE.1943-7870.0000833 **J**

32. Heinrich A., Smith R., Cahn M. (2014) Winter-killed cereal rye cover crop influence on nitrate leaching in intensive vegetable production systems. *HortTechnology* 25:502-511 **J**
33. Atwill E.R., Chase J.A., Oryang D., Bond R.F., Koike S.T., Cahn M.D., Anderson M., Mokhtari A., Dennis S. (2015) Transfer of *E. coli* 0157:H7 from simulated wildlife scat onto Romaine lettuce during foliar irrigation. *Journal of Food Protection* 78:240-247. DOI: 10.4315/0362-028X.JFP-14-277 <http://www.jfoodprotection.org/doi/pdf/10.4315/0362-028X.JFP-14-277> **J** **Role:** collaborator on project and contributed to field work.
34. Daugovish O., Faber B., Cahn M., Dara S. (2016) Increasing Number of Drip Irrigation Lines for Water Conservation during Strawberry Establishment. *International Journal of Fruit Science* 16:108-117. DOI: 10.1080/15538362.2016.1199997 <https://doi.org/10.1080/15538362.2016.1199997> **J**
35. Eriksen R.L., Knepper C., Cahn M.D., Mou B. (2016) Screening of Lettuce Germplasm for Agronomic Traits under Low Water Conditions. *HortScience* 51:669-679 <http://hortsci.ashspublications.org/content/51/6/669.abstract> **J**
36. Johnson L.F., Cahn M., Martin F., Melton F., Benzen S., Farrara B., Post K. (2016) Evapotranspiration-based irrigation scheduling of head lettuce and broccoli. *HortScience* 51:935-940 **J**
37. Anderson B.S., Phillips B.M., Voorhees J.P., Cahn M. (2017) Vegetated Treatment Systems for Removing Contaminants Associated with Surface Water Toxicity in Agriculture and Urban Runoff. *JoVE*:e55391. DOI: 10.3791/55391 <https://www.jove.com/video/55391> **J**.
38. Cahn M.D., Johnson L.F. (2017) New approaches to irrigation scheduling of vegetables. *Horticulturae* 3:28. DOI: 10.3390/horticulturae3020028 <http://www.mdpi.com/2311-7524/3/2/28> **J**
39. Cahn M., Smith R., Murphy L., Hartz T. (2017) Field trials show the fertilizer value of nitrogen in irrigation water. *California Agriculture* 71:62-67. DOI: 10.3733/ca.2017a0010 <http://dx.doi.org/10.3733/ca.2017a0010> **J**
40. Hartz T., Smith R., Cahn M., Bottoms T., Bustamante S.C., Tourte L., Johnson K., Coletti L. (2017) Wood chip denitrification bioreactors can reduce nitrate in tile drainage. *California Agriculture* 71:41-47. DOI: 10.3733/ca.2017a0007 <http://dx.doi.org/10.3733/ca.2017a0007> **J**.
41. Koike S.T., Smith R.F., Cahn M.D., Pryor B.M. (2017) Association of the carrot pathogen *Alternaria dauci* with new diseases, *Alternaria* leaf speck, of lettuce and celery in California. *Plant Health Progress* 18:136-143. DOI: 10.1094/PHP-12-16-0074-RS

<http://dx.doi.org/10.1094/PHP-12-16-0074-RS> **J**.

42. Phillips B.M., Anderson B.S., Cahn M., Rego J.L., Voorhees J.P., Siegler K., Zhang X., Budd R., Goh K., Tjeerdema R.S. (2017) An integrated vegetated ditch system reduces chlorpyrifos loading in agricultural runoff. *Integrated Environmental Assessment and Management* 13:423-430. DOI: 10.1002/ieam.1820 <http://dx.doi.org/10.1002/ieam.1820> **J**
43. Garza-Díaz L.E., DeVincentis A.J., Sandoval-Solis S., Azizipour M., Ortiz-Partida J.P., Mahlknecht J., Cahn M., Medellín-Azuara J., Zaccaria D., Kisekka I. (2019) Land-Use Optimization for Sustainable Agricultural Water Management in Pajaro Valley, California. *Journal of Water Resources Planning and Management* 145:05019018. DOI: doi:10.1061/(ASCE)WR.1943-5452.0001117 <https://ascelibrary.org/doi/abs/10.1061/%28ASCE%29WR.1943-5452.0001117> %X **J**
Role: Collaborated on project and contributed data to the analysis.
44. Montazar A., Cahn M., Putman A. (2019) Research Advances in Adopting Drip Irrigation for California Organic Spinach: Preliminary Findings. *Agriculture* 9:177 <https://www.mdpi.com/2077-0472/9/8/177> **J Role:** collaborated designing trials, interpretation of results, and editing.
45. Geisseler D., Aegerter B.J., Miyao E.M., Turini T., Cahn M.D. (2020) Nitrogen in soil and subsurface drip-irrigated processing tomato plants (*Solanum lycopersicum* L.) as affected by fertilization level. *Scientia Horticulturae* 261:108999. DOI: <https://doi.org/10.1016/j.scienta.2019.108999>
<http://www.sciencedirect.com/science/article/pii/S0304423819308854> **J Role:** collaborated on data collection and design of field research.
46. Moyne A.-I., Blessington T., Williams T.R., Koike S.T., Cahn M.D., Marco M.L., Harris L.J. (2020) Conditions at the time of inoculation influence survival of attenuated *Escherichia coli* O157:H7 on field-inoculated lettuce. *Food Microbiology* 85:103274. DOI: <https://doi.org/10.1016/j.fm.2019.103274>
<http://www.sciencedirect.com/science/article/pii/S0740002019302850> **J Role:** collaborated on field trials, data interpretation, writing materials and methods.

Other Peer-Reviewed Publications (ANR publications, Book Chapters, etc)

47. Shock C., Pereira A., Hanson B., Cahn M. (2007) Vegetable irrigation, in: R. Lanscano and R. Sojka (Eds.), *Irrigation of agricultural crops*, ASA-CSSA-SSSA (American Society of Agronomy-Crop Science Society of America-Soil Science Society of America), Madison, WI. pp. 535-606 **K**
48. Daugovish C., Cahn M., Koike S., Natwick E., Cantwell M., Takele E. (2008) Cabbage production in California, *Vegetable Production Series*, Agriculture and Natural Resources Publication 7208 <http://anrcatalog.ucdavis.edu/pdf/7208.pdf>. **K**

49. Daugovish C., Smith R., Cahn M., Koike S., Smith H., Aguiar H., Quiros J., Cantwell M., Takele E. (2008) Celery production in California, Vegetable Production Series, Agriculture and Natural Resources Publication 7220 <http://anrcatalog.ucdavis.edu/pdf/7220.pdf> **K**
50. Cahn M. (2009) Irrigation of head and romaine lettuce, UC IPM Pest Management Guidelines: Lettuce, University of California, Agriculture and Natural Resources Publication 3450 <http://www.ipm.ucdavis.edu/PMG/r441311511.html#IRRIGATION> **K**
51. Cahn M. (2009) Measures to minimize water quality impairments to surface and ground water, UC IPM Pest Management Guidelines: Lettuce, University of California, Agriculture and Natural Resources Publication 3450 <http://www.ipm.ucdavis.edu/PMG/r441311611.html> **K**
52. Koike S., Cahn M., Cantwell M., Fennimore M., LeStrange S., Natwick E., Smith R., Takele E. (2009) Cauliflower production in California, Vegetable Production Series, Agriculture and Natural Resources Publication 7219 <http://anrcatalog.ucdavis.edu/pdf/7219.pdf> **K**
53. Cahn M., Miyao G. (2010) Water management and impacts on water quality, Cover Cropping for vegetable Production: A grower's handbook, University of California, Agriculture and Natural Resources. pp. 31-36 **K**
54. Aegerter B., Cahn M., Koike S., Smith R., Hartz T., Suslow T. (2011) Asparagus production in California ANR Publication 7234 <http://anrcatalog.ucdavis.edu/pdf/7234.pdf> **K**
55. Koike S., Cahn M.D., Cantwell M., Fennimore S., LeStrange M., Natwick E., Smith R., Takale E. (2011) Spinach production in California, Vegetable Production Series ANR Publication 7212 <http://anrcatalog.ucdavis.edu/pdf/7212.pdf> **K**
56. LeStrange M., Cahn M., Koike S., Smith R., Daugovish O., Fennimore S., Natwick E., Dara S., Takale E., Cantwell M. (2011) Broccoli production in California. Vegetable Production Series ANR Publication 7211 <http://anrcatalog.ucdavis.edu/pdf/7211.pdf> **K**
57. Smith R.F., Cahn M.D., Cantwell M., Koike S., Natwick E., Takale E. (2011) Green onion production in California. Vegetable Production Series ANR Publication 72423 <http://anrcatalog.ucdavis.edu/pdf/7243.pdf> **K**
58. Smith R., Bi J., Cahn M., Cantwell M., Daugovish O., Koike S., Natwick E., Takale E. (2011) Cilantro production in California. Vegetable Production Series ANR Publication 7236 <http://anrcatalog.ucdavis.edu/pdf/7236.pdf> **K**
59. Smith R., Biscaro A., Cahn M., Daugovish C., Natwick E., Nunez J., Takele E., Turini T. (2011) Fresh-market bulb onion production in California, Vegetable Production Series, Agriculture and Natural Resources Publication 7242 <http://anrcatalog.ucdavis.edu/pdf/7242.pdf> **K**

60. Smith R., Cahn M., Daugovish O., Koike S., Natwick E., Smith H., Subbarao K., Takale E., Turini T. (2011) Leaf lettuce production in California. Vegetable Production Series ANR Publication 7216 <http://anrcatalog.ucdavis.edu/pdf/7216.pdf> **K**
61. Smith R., Aguiar J., Baameur A., Cahn M., Cantwell M., De la Fuente M., Hartz T., Koike S., Molinar R., Natwick E., Suslow T., Takale E. (2011) Chili pepper production in California. Vegetable Production Series ANR Publication 7244 <http://anrcatalog.ucdavis.edu/pdf/7244.pdf> **K**
62. Turini T., Cahn M., Cantwell M., Jackson L., Koike S., Natwick E., Smith R., Subbarao K., Takale E. (2011) Iceberg lettuce production in California. Vegetable Production Series ANR Publication 7215 <http://anrcatalog.ucdavis.edu/pdf/7215.pdf> **K**
63. Bolda M., Gaskell M., Mitcham E., Cahn M. (2012) Fresh Market Caneberry Production Manual, Agriculture and Natural Resources. pp. 74 **K**
64. Cahn M., Bali K. (2015) Drought Tip: Managing salts by leaching. Leaching for salt management. Drought Tip ANR Publication 8550:1-8 <http://anrcatalog.ucanr.edu/pdf/8550.pdf> **K Role:** I was lead author and wrote a majority of the manuscript. I corresponded with the editor and I was also responsible for responding to reviewers' comments and resubmitting the article for review and publication.
65. Koike S.T., Cahn M.D. (2015) 4.3. Water management. In: M. R. Finchkh, et al. (Eds.), Plant diseases and their management in organic agriculture, APS press. The American Phytopathological Society. St Paul Minnesota USA. pp. 141-152 **K Role:** Wrote sections on irrigation and water quality, contributed to photos, editing, and responding to editor.
66. Cahn M., Bali K. (2018) Consejos de la sequia: El manejo de las sales por medio de la filtracion. Consejos de la Sequia ANR Publication 8594:1-9 <https://anrcatalog.ucanr.edu/pdf/8594.pdf> **K Role:** I was lead author and wrote a majority of the manuscript. I corresponded with the ANR Spanish Translation team in developing this publication.
67. Cahn M. (2019) Drought Tip: Drought planning for vegetable production. Drought Tip ANR Publication 8632:1-9 <https://anrcatalog.ucanr.edu/pdf/8632.pdf> **K**.
68. Cahn M. (2019) Drought Tip: Drought tips for vegetable production. Drought Tip ANR Publication 8635:1-9 <https://anrcatalog.ucanr.edu/pdf/8635.pdf> **K**
69. Cahn M.D., Phillips B. (2019) Best Management Practices for Mitigating Pesticides in Runoff from Vegetable Systems in California, Pesticides in Surface Water: Monitoring, Modeling, Risk Assessment, and Management, American Chemical Society. pp. 519-539 **K Role:** I was the lead writer on this manuscript. I corresponded with the editor and I was also responsible for responding to reviewers' comments and resubmitting the chapter for review and publication.

Non-peer reviewed publications

Newsletter, Electronic, Trade Journal Articles

70. Cahn M., Davis R., Miyao G. (1998) Tomato Fruit Molds. The California Tomato Grower February 1998 **A**
71. Cahn M. (1999) Measles in Honeydew Melon: Weather Conditions Increase Problems Vegetables West January 1999 **A**
72. Cahn M. (1999) Verticillium wilt in processing tomatoes, Sutter County Vegetable Notes **A**
73. Cahn M. (1999) Vine collapse in squash and pumpkins, Sutter County Vegetable Notes **A**
74. Cahn M. (1999) Minimizing seedling disease in dry beans, Sutter County Vegetable Notes **A**
75. Cahn M. (1999) Sutter County weather data available on the web, Sutter County Vegetable Notes **A**
76. Cahn M. (1999) Progress report on monitoring worm pests in row crops, Sutter County Vegetable Notes **A**
77. Cahn M. (1999) Measles in honeydew melon, San Joaquin Valley Vegetable Report 5 **A**
78. Cahn M. (1999) Blackmold check list for processing tomatoes, Sutter County Vegetable Notes **A**
79. Cahn M. (1999) End of the year report, Sutter County Vegetable Notes **A**
80. Miyao G., Mullen R., Murray M., Barrett D., Cahn M., Caprile J., Hartz T., May D., Valencia J., Weir B. (1999) Processing tomato statewide variety evaluation trials California Tomato Grower Magazine 2 **A**
81. Cahn M. (2000) Around the county, Sutter County Vegetable Notes **A**
82. Miyao G., Mullen R., Murray M., Barrett D., Cahn M., Caprile J., Hartz T., May D., Valencia J., Weir B. (2000) Processing tomato statewide variety evaluation trials California Tomato Grower Magazine 2 **A**
83. Cahn M. (2001) County observation, Sutter County Vegetable Notes **A**

84. Cahn M. (2001) Processing tomato variety trial results, 2001 season, Sutter County Vegetable Notes A
85. Cahn M. (2001) Monitoring worm pests in row crops, Sutter County Vegetable Notes A
86. Cahn M. (2001) Good bye Sutter and Yuba growers, Sutter County Vegetable Notes A
87. Miyao G., Mullen R., Murray M., Barrett D., Cahn M., Caprile J., Hartz T., May D., Nunez J., Valencia J., Weir B. (2001) UC Farm Advisors processing tomato statewide variety evaluation trials California Tomato Grower Magazine 2 A
88. Cahn M. (2002) Soil moisture monitoring for improving irrigation management, Monterey County Crop Notes March 2002 A
89. Cahn M. (2002) 2001 Nitrate management survey results, Monterey County Crop Notes July 2002 A
90. Cahn M., Hanson B., Hartz T., Herrero E. (2002) Optimizing fruit quality and yield of processing tomatoes grown under drip irrigation, Vegetable Notes, Tulare and Kings Counties A
91. Cahn M., Hartz T., Herrero E., Miyao G. (2002) Irrigation strategies to balance tomato yield and soluble solids content, Vegetable Notes, Tulare and Kings Counties A
92. Cahn M., Harlan B., Herrero E., Miyao G. (2002) Improving distribution uniformity of sprinklers under windy conditions., Monterey County Crop Notes November 2002 A
93. Cahn M., Herrero E., Snyder R., Hartz T., Hanson B. (2002) Optimizing fruit quality and yield grown under drip irrigation California Tomato Grower Magazine 2 February/March 2002 A
94. Krusekopf H., Mitchell J., Hartz T., May D., Miyao G., Cahn M. (2002) Cut tomato "N" inputs with PSNT-substantially cut sidedress "N" with no yield or quality loss Vegetable Magazine January/February 2002 A
95. Mitchell J., Madden N., Herrero E., Cahn M., May D. (2002) Reducing tillage in tomato rotation: A progress report California Tomato Grower Magazine 2 February/March 2002 A
96. Murray M., Cahn M., Barrett D., Caprile J., Hartz T., May D., Miyao G., Mullen R., Nunez J., Valencia J., Weir B. (2002) 2001 statewide DANR processing tomato variety evaluation trials California Tomato Grower Magazine 2 February/March 2002 A
97. Cahn M. (2003) Assessing salinity in irrigation water, Monterey County Crop Notes

November 2003 A

98. Cahn M., Tjosvold S. (2003) Water management in the Salinas and Pajaro valleys CORF (California Ornamental Research Federation) News. A
99. Hartz T., Cahn M., Swain-Johnstone M. (2003) Efficient phosphorus management in coastal vegetable production, Monterey County Crop Notes January 2003 A
100. Bettiga L., Smith R., Cahn M., Tourte L. (2004) Vineyard floor management practices Update for Winegrape Growers. Summer 2004 A
101. Cahn M. (2004) Water management challenges in the Salinas Valley Coastal Grower A
102. Cahn M. (2004) Assessing salinity in irrigation water, Vegetable Notes, Tulare and Kings Counties A
103. Cahn M. (2004) Protecting water quality through improvements in irrigation efficiency, Monterey County Crop Notes September 2004 A
104. Cahn M., Ajwa H. (2004) Salinity effects on quality and yield of drip-irrigated lettuce, Monterey County Crop Notes May/June 2004 A
105. Cahn M., Ajwa H., Smith R., Young A. (2004) Evaluation of polyacrylamide for reducing sediment and nutrient concentration in tail water from central coast vegetable fields, Monterey County Crop Notes December 2004 A
106. Hartz T., Johnstone P., Cahn M. (2004) Phosphorus management in vegetables: an opportunity and a challenge, Monterey County Crop Notes January 2004
107. A
108. Hartz T., Johnstone P., Cahn M. (2004) Phosphorus management in vegetable production Vegetables West January 2004 A
109. Hartz T., Cahn M., Lentz R., Nunez J. (2004) Managing soluble solids of processing tomatoes with drip irrigation, Vegetable Notes, Tulare and Kings Counties A
110. Hartz T., Cahn M., LeStrange S., Nunez J. (2004) Managing soluble solids with drip irrigation, The California Tomato Grower 47 pp. 17-18 A
111. Hibbits B., Cahn M. (2004) UCCE farm water quality planning short course update, Monterey County Crop Notes December 2004 A
112. Cahn M. (2005) Using polyacrylamide (PAM) for reducing sediment and nutrient losses Conservation Currents. March 2005 A

113. Cahn M. (2005) 2005: A successful year for AWQA, Agriculture Water Quality Alliance, AWQA Committee A
114. Cahn M., Ajwa H. (2005) Management of salinity for lettuce production, Monterey County Crop Notes May/June 2005 A
115. Cahn M., Hanson B., Baameur A. (2005) Drip fertigation: the challenge of achieving uniform applications, Monterey County Crop Notes November/December 2005 A
116. Cahn M. (2006) Using polymers to reduce sediment and nutrient losses from central coast vegetable fields, UC Delivers Success Story <http://ucanr.org/delivers/impactview.cfm?impactnum=580> A
117. Cahn M. (2006) Tips on injecting polyacrylamide (PAM) into sprinkler systems to reduce sediment and nutrient losses, Monterey County Crop Notes May/June 2006 A
118. Cahn M., Bolda M. (2006) Raspberry producers reduce water use on the central coast, UC Delivers Success Story <http://ucanr.org/delivers/impactview.cfm?impactnum=576> A
119. Cahn M., Bolda M., Carlson C. (2006) Irrigation management for optimizing raspberry production, Monterey County Crop Notes November/December 2006 A
120. Cahn M., Bolda M., Smith R. (2006) Winter cover crops for reducing storm run-off and protecting water quality in strawberries, Monterey County Crop Notes November/December 2006 A
121. Cahn M., Smith R., Young A. (2006) Evaluation of practices for controlling storm run-off from vegetable fields, Monterey County Crop Notes November/December 2006 A
122. Cahn M. (2007) 2006-2007 agriculture water quality alliance: protecting the waters and watersheds of the Monterey Bay national marine sanctuary brochure, AWQA Committee A
123. Cahn M., Young A., Ajwa H. (2007) Drip germination of lettuce: strategies for enhancing the lateral movement of moisture around buried tape, Monterey County Crop Notes A
124. Cahn M., Smith R., Fennimore M., Young A. (2007) Germinating lettuce using drip irrigation, Monterey County Crop Notes July/August 2007 A
125. Hartz T., Cahn M., Smith R. (2007) Detecting and correcting soil calcium limitations, Monterey County Crop Notes July/August 2007 A
126. Koike S., Suslow T., Cahn M. (2007) Food safety and Salinas Valley crops: 1. characterizing and naming E. coli O157:H7, Monterey County Crop Notes May/June 2007 A

127. Smith R., Cahn M. (2007) Winter cover crops: strategies for including them in Salinas Valley vegetable rotations., Monterey County Crop Notes September/October 2007 A
128. Cahn M. (2008) Improving uniformity drip systems on sloped fields, Monterey County Crop Notes A
129. Cahn M. (2008) Improving irrigation uniformity of drip systems on sloped fields, Western Farm Press A
130. Cahn M., Buchanan M. (2008) Comparison of drip and sprinklers in Brussel sprouts: water use, nitrogen, and yield, Monterey County Crop Notes July/August 2008 A
131. Cahn M., Young A., Kamal S. (2008) Optimizing sprinkler application rates: pressure, nozzle size, and lateral spacing, Monterey County Crop Notes March/April 2008 A
132. Cahn M., Kamal S., Bolda M. (2008) Rooting patterns of caneberries, Monterey County Crop Notes May/June 2008 A
133. Koike S., Cahn M., Smith R., Suslow T., Harris L. (2008) UCCE investigates how *E. coli* survives in vegetable fields, UC Delivers Success Story <http://ucanr.org/delivers/impactview.cfm?impactnum=715> A
134. Smith R., Cahn M., Silva M. (2008) An evaluation of low residue winter crops Western Farm Press. September 30, 2008 A
135. Smith R., Cahn M., Silva Ruiz M. (2008) Low residue winter cover crops: an evaluation of their management in winter fallow vegetable production beds in the Salinas Valley, Monterey County Crop Notes November/December 20011 A
136. Cahn M. (2009) UC Research: Irrigation management boosts yields Ag Alert. April 22, 2009. <http://www.agalert.com/story/?id=1299> A
137. Cahn M., Smith R. (2009) Large scale irrigation and nitrogen fertilizer management trials in lettuce, Monterey County Crop Notes May/June 2009 A
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562. Biscaro A.S., Cahn M., Smith R., Hartz T.K. (2014) Nitrogen, phosphorus and potassium uptake patterns of fresh-market onion production in southern California American Society of Agronomy, Crop Science Society of America, and Soil Science Society of America (ASA, CSSA, and SSSA) International Annual Meetings November 2-5 2014 Long Beach CA <https://scisoc.confex.com/scisoc/2014am/webprogram/Paper89719.html> C
Role: I was a collaborator and assisted with data analysis for this project.
563. Cahn M. (2014) Off the “water grid”: weathering the drought on the central coast American Society of Agronomy, Crop Science Society of America, and Soil Science Society of America (ASA, CSSA, and SSSA) International Annual Meetings November 2-5 2014 Long Beach CA <https://scisoc.confex.com/scisoc/2014am/webprogram/Paper90860.html> C
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567. Smith R., Cahn M., Hartz T.K. (2014) Improving N use efficiency of cool season vegetable production systems with broccoli rotations 22nd annual CDFA Fertilizer Research and Education Program Conference Proceedings, CDFA FREP, October 29-30 Modesto CA 59-60 C
568. Smith R., Cahn M., Hartz T.K. (2014) Evaluation of N uptake and water use of leafy greens grown in high-density 80-inch bed plantings and demonstration of best management practices. 22nd annual CDFA Fertilizer Research and Education Program Conference Proceedings, CDFA FREP, October 29-30 Modesto CA 16-19 C
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<https://scisoc.confex.com/scisoc/2014am/webprogram/Paper86811.html> C
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http://www.iufrophytophthora2014.org/downloads/program_web.pdf C
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<http://calasa.ucdavis.edu/files/208317.pdf> C
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[http://www.ipni.net/ipniweb/conference/wnmc.nsf/e0f085ed5f091b1b852579000057902e/4be3031d1d87927a85257e37004fa7a8/\\$FILE/WNMC2015%20Cahn%20pg9.pdf](http://www.ipni.net/ipniweb/conference/wnmc.nsf/e0f085ed5f091b1b852579000057902e/4be3031d1d87927a85257e37004fa7a8/$FILE/WNMC2015%20Cahn%20pg9.pdf) C
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https://www.cdfa.ca.gov/IS/fldrs/frep/pdfs/2015_Proceedings_FREP.pdf C
580. Smith R., Hartz T.K., Cahn M. (2015) Improving N use efficiency of cool season vegetable production systems with broccoli rotations. 23rd annual CDFA Fertilizer Research and Education Program Conference Proceedings, CDFA FREP, November 5-6 Seaside CA 79-80
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583. Geisseler D., Aegerter B., Cahn M., Hartz T., Miyao G., Turini T. (2016) Developing a decision support tool for processing tomato irrigation and fertigation in the central valley based on cropmanage. 24th annual CDFA Fertilizer Research and Education Program Conference Proceedings, CDFA FREP, October 26-27 Modesto CA 44-46
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585. Johnson L., Cahn M., Benzen S., Zaragoza I., Murphy L., Lockhart T., Melton F. (2016) ET-based irrigation management in leaf lettuce and cabbage: results from 2015 trials USCID Water Management Conference, U.S. Committee on Irrigation & Drainage 17-20 May 2016 San Diego, California 81-86 **C Role:** I assisted with field work and data analysis for this project.
586. Kortman S., Post K., Conlen A., Muratone D., Prescott K., Spellenberg R., Toyoshima J., Zaragoza I., Cahn M., Smith R., Melton F., Haffa A. (2016) Quantifying N₂O emissions from different on-farm irrigation and nutrient management schedules in strawberry. 24th

annual CDFA Fertilizer Research and Education Program Conference Proceedings, CDFA FREP, October 26-27 Modesto CA 74
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588. Smith R., Cahn M., Hartz T.K., Geisseler D. (2016) Evaluation and demonstration of nitrogen and phosphorus management in organic leafy green vegetable production on the central coast. 24th annual CDFA Fertilizer Research and Education Program Conference Conference Proceedings, CDFA FREP, October 26-27 Modesto CA 63-64
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592. Cahn M., Smith R., Biscaro A., Noel B., Youtsey G., Schelp K. (2017) Cropmanage online decision support tool for irrigation and nutrient management of vegetables and strawberries. HortScience 52:S317
http://c.ymcdn.com/sites/www.ashs.org/resource/resmgr/Conference/2017_Abstract_Supplement_HS.pdf C
593. Johnson L., Fulton A., Rosencrance R., Cahn M. (2017) Model comparison for walnut and almond evapotranspiration in California's Sacramento Valley World Environmental and Water Resources Congress May 21-25, 2017 2017 Sacramento CA C
594. Loo M.K., Uyeda J., Cahn M.D., Deenik J. (2017) A framework to improve nitrogen fertilizer use efficiency in intensive vegetable systems of Hawaii. HortScience 52:S373
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595. Melton F., Johnson L., Post K., Guzman A., Spellenberg R., Zaragoza I., Rosevelt C., Michaelis A., Nemani R., Cahn M., Frame K., Temesgen B., Eching S. (2017) Integrating satellite and surface sensor networks for irrigation management decision support in California World Environmental and Water Resources Congress May 21-25, 2017 2017 Sacramento CA C
596. Cahn M., Smith R., Hartz T.K. (2017) Determining the fertilizer value of ambient nitrogen in irrigation water. 25th annual CDFA Fertilizer Research and Education Program Conference Conference Proceedings, CDFA FREP, November 1-2 Modesto CA 46-49 https://www.cdfa.ca.gov/is/fldrs/frep/pdfs/2017_Proceedings_FREP.pdf C **Role** I was the PI of the project and wrote the abstract.
597. Geisseler D., Aegerter B., Cahn M., Hartz T., Miyao G., Turini T. (2017) Developing a decision support tool for processing tomato irrigation and fertigation in the central valley based on cropmanage. 25th annual CDFA Fertilizer Research and Education Program Conference Conference Proceedings, CDFA FREP, November 1-2 Modesto CA 52-54 https://www.cdfa.ca.gov/is/fldrs/frep/pdfs/2017_Proceedings_FREP.pdf C **Role** I was a collaborator on this project and participated in training advisors and algorithm development for the decision support tool.
598. Haffa A., Horwath W., Melton F., Cahn M., Smith R. (2017) Quantifying N₂O emissions under different on-farm irrigation and nutrient management bmps that reduce groundwater nitrate loading and applied water. 25th annual CDFA Fertilizer Research and Education Program Conference Conference Proceedings, CDFA FREP, November 1-2 Modesto CA 39-41 https://www.cdfa.ca.gov/is/fldrs/frep/pdfs/2017_Proceedings_FREP.pdf C **Role** I participated in the field trials of this project
599. Melton F., Huntington J.L., Johnson L., Guzman A., Morton C., Zaragoza I., Dexter J., Rosevelt C., Michaelis A., Nemani R.R., Cahn M., Temesgen B., Trezza R., Frame K., Eching S., Grimm R., Hall M. (2017) Applications of satellite data to support improvements in irrigation and groundwater management in California American Geophysical Union Fall Meeting, December 11-15, 2017 New Orleans LA (PA23B-0373) <https://agu.confex.com/agu/fm17/meetingapp.cgi/Paper/268211> C **Role** I was collaborator on a several projects presented at this meeting.
600. Smith R., Cahn M., Hartz T.K. (2017) Improving N use efficiency of cool season vegetable production systems with broccoli rotations. 25th annual CDFA Fertilizer Research and Education Program Conference Conference Proceedings, CDFA FREP, November 1-2 Modesto CA 60-63 https://www.cdfa.ca.gov/is/fldrs/frep/pdfs/2017_Proceedings_FREP.pdf C **Role** I was a collaborator on this project and participated in field trials
601. Smith R., Cahn M., Hartz T.K., Geisseler D. (2017) Evaluation and demonstration of

nitrogen and phosphorus management in organic leafy green vegetable production on the central coast. 25th annual CDFA Fertilizer Research and Education Program Conference Conference Proceedings, CDFA FREP, November 1-2 Modesto CA 43-44
https://www.cdfa.ca.gov/is/flldrs/frep/pdfs/2017_Proceedings_FREP.pdf **C Role** I was a collaborator on this project

602. Zaragoza I., Melton F., Dexter J., Post K., Haffa A., Kortman S., Spellenberg R., Cahn M. (2017) Utilizing on-farm best management practices: Managing Nitrate Leaching Using Evapotranspiration Based Irrigation Methods. American Geophysical Union Fall Meeting, December 11-15, 2017 New Orleans LA (GC33A-1064)
<https://agu.confex.com/agu/fm17/meetingapp.cgi/Paper/242519> **C Role** I was a collaborator on this project and assisted with field trials.
603. Cahn M., Fulton A., Brown P. (2018) Adapting CropManage Irrigation and Nitrogen Management Decision Support Tool for Central Valley Crops 26th annual CDFA Fertilizer Research and Education Program Conference October 22-24, 2018 Seaside CA 24-27
https://www.cdfa.ca.gov/is/flldrs/frep/pdfs/2018_Proceedings_FREP.pdf **C Role** I was the lead PI and wrote the abstract.
604. Dexter J., Zaragoza I., Wang C., Haffa A., Kortman S., Cahn M., Smith R., Melton F. (2018) Quantifying the Benefits of On-farm Best Management Practices: Managing nitrate leaching using evapotranspiration-based irrigation scheduling. California Plant and Soil Conference February 6-7, 2018 Fresno CA 140
<http://calasa.ucdavis.edu/files/278374.pdf> **C Role** I was a collaborator on this project and participated in the field trials.
605. Guzman A., Cahn M., Johnson L., Wang C., Hang M., Zaragoza I., Melton F. (2018) Supporting advances in agricultural sustainability through integration of NASA SIMS and CropManage for irrigation management support Amer. Geophys. Union Fall Meeting 10-14 Dec 2018 2018 Washington DC **C Role** I was co-PI on this project and helped with the integration of the decision support tools.
606. Johnson L., Cahn M., Benzen S. (2018) Evapotranspiration-based Irrigation Scheduling in Cool Season Vegetables, Abstract for Hydrology Section Amer. Geophys. Union Fall Meeting 10-14 Dec 2018 2018 Washington DC **C Role** I was co-PI on this project and lead on the field trials. I assisted with writing the abstract.
607. Melton F., Haffa A., Aqueche K., Cahn M., Cassel-Sharma F., Dexter J., Duque J., Goorahoo D., Hang M., Johnson L., Kortman S., Prescott K., Wang T., Zaragoza I. (2018) Quantifying the Benefits of On-farm Best Management Practices: Managing nitrate leaching using evapotranspiration-based irrigation scheduling. California State University, ARI conference. September, 2018 2018 **C Role** I was a collaborator on the project and assisted with field trials.
608. Melton F., Johnson L., Guzman A., Dexter J., Zaragoza I., Wang T., Patron E., Duque J., Rosevelt C., Cahn M., Smith R., Temesgen B., Trezza R., Eching S., Frame K. (2018) The

Satellite Irrigation Management Support (SIMS) System: Applications of Satellite Data to Support Improvements in Irrigation Management in California. California Plant and Soil Conference February 6-7, 2018 2018 Fresno CA 49-51
<http://calasa.ucdavis.edu/files/278374.pdf> **C Role** I was a collaborator on the project described in the abstract and helped edit the abstract.

609. Moyne A., Murphy L.A., Cahn M.D., Koike S.T., Harris L.J. (2018) Impact of Irrigation Run-off Water on the Survival of Salmonella and Escherichia coli in Soil and on Lettuce Plants. International Association for Food Protection July 8-11 Salt Lake City Utah
<https://iafp.confex.com/iafp/2018/abstracts/papers/index.cgi?username=18449&password=405777> **C Role** I collaborated on this project by assisting with field trials.
610. Smith R., Cahn M., Hartz T., Geisseler D. (2018) Evaluation and demonstration of nitrogen and phosphorus management in organic leafy green vegetable production on the central coast 26th annual CDFA Fertilizer Research and Education Program Conference October 22-24 , 2018 2018 Seaside CA 32-35
https://www.cdfa.ca.gov/is/flldr/frep/pdfs/2018_Proceedings_FREP.pdf **C Role** I was a collaborator on this project
611. Smith R., Hartz T., Geisseler D., Cahn M., Love P. (2018) Evaluation of Residual Mineral Nitrogen for Managing Nitrogen Fertilizer Applications for Organic Cool Season Vegetable Production 2018 ASA CSSA meeting November 4-7, 2018 2018 Baltimore, MD
<https://scisoc.confex.com/scisoc/2018am/meetingapp.cgi/Person/517664> **C Role** I was a collaborator on the project
612. Bateni S., Deenik, Golabi M.H., Gurr I., Cahn M., Neale C. (2019) Conserving Water Resources in the US Pacific Islands Region by Optimal Irrigation of Farmlands 74th SWCS International Annual Conference July 28 - 31, 2019 2019 Pittsburgh, Pennsylvania **C Role** I collaborated on a project to adapt CropManage to Pacific Island vegetable crops.
613. Biscaro A., Cahn M., Hartz T., Grattan S. (2019) Evaluation of Salinity Effects of Irrigation Water on Strawberry Cultivars 2019 ASHS Annual Conference July 21-25, 2019 2019 Las Vegas, NV. <https://ashs.confex.com/ashs/2019/webprogramarchives/Paper31343.html> **C Role** I was a collaborator on this project and assisted with trial design and data interpretation.
614. Cahn M., Johnson L., Smith R. (2019) Using CropManage decision support tool for improving irrigation and nutrient efficiency of coastal vegetables and berries California Plant and Soil Conference February 5-6, 2019 2019 Fresno CA 55-59
<https://ucanr.edu/sites/calasa/files/301066.pdf> **C Role** I wrote the abstract for this conference.
615. Cahn M., Fulton A., Brown P. (2019) Adapting CropManage Irrigation and Nitrogen Management Decision Support Tool for Central Valley Crops 27th annual CDFA Fertilizer Research and Education Program Conference October 28-30, 2019 2019 Fresno CA 20-23
https://www.cdfa.ca.gov/is/flldr/frep/pdfs/2019_Proceedings_FREP.pdf **C Role** I was the

lead PI on the project and wrote the abstract.

616. Cahn M., Johnson L., Benzen S., Qin Z., Chambers D. (2019) Optimizing water management in celery using weather-based scheduling 2019 ASHS Annual Conference July 21-25, 2019 Las Vegas, NV.
<https://ashs.confex.com/ashs/2019/webprogramarchives/Paper30407.html> **C Role** I was a co-PI on the project, led field trials and data analysis, and wrote the abstract.