

Academic Program Review Dossier Cover Page

Name:	Nicholas Clark
Academic Title:	Assistant Cooperative Extension Advisor
County/Program:	Kings (HQ) , Fresno & Tulare Counties, Agronomic Cropping Systems and Nutrient Management
Review Type:	Accelerated Promotion
Current Rank/Step:	Assistant IV
Requested Rank/Step:	Associate I
Review Time Period:	October 26, 2015, to September 30, 2022
Thematic Areas:	<ul style="list-style-type: none">• Agronomic Crop Production• Agricultural Nutrient Stewardship• Integrated Pest Management

Position Description Addendum: CD

Nicholas Clark

Area Agronomic Cropping Systems and Nutrient Management Cooperative Extension Advisor

UCCE – Kings, Tulare, and Fresno Counties

Interim County Co-Director – UCCE Kings and Tulare Counties

Effective 07/11/2019 - 09/30/2019

PURPOSE & CLIENTELE

The County Director (CD) is administratively responsible for the overall operation of the University of California Cooperative Extension (UCCE) in Kings and Tulare Counties, supervising staff and the development of research and extension programs serving local clientele, while implementing ANR's Strategic Vision for healthy food systems, environments, communities, and Californians. The CD creates sustainable community partnerships with Kings and Tulare Counties Governments, Kings and Tulare Counties Administrative Officers (CAO), Kings and Tulare Counties Boards of Supervisors, and local city governments in order to support and promote ANR's Strategic Vision and Initiatives. The CD assists staff with program evaluation and long-range planning to ensure that ANR's extension programs are directed toward needs that are consistent with the mission of the UC ANR's Strategic Vision.

ADMINISTRATIVE RESPONSIBILITIES

Leadership: Provide vision, inspire, and motivate others with attitude and actions; set a high standard for excellence; innovate and foster positive change; model and support a team-working environment; explore new ideas and innovative changes. Actively promote UC programs through actions and supervision.

Administration: Understand and uniformly apply UC and County policies; provide useful and timely feedback; take timely disciplinary action within UC and County procedures, if necessary; work with staff in advance of deadlines for required records and reports.

Budget: Secure county resources, as well as other sources of support; manage and equitably allocate resources among programs and established priorities; monitor the use of resources and comply with all relevant policies; maintain effective working relationships with internal and external partners to form strong support for UCCE.

Programs: Represent UCCE programs locally in a professional manner; recognize clientele needs and impacts of current and potential UCCE programs as established in the Strategic Vision and Strategic Initiatives; establish program priorities that successfully deliver UC ANR Statewide Programs at the local level; make effective use of staff expertise to strengthen the team; assure that information is shared to support program growth and professional development of all staff.

Interpersonal Relationships: Have effective listening and communication skills; take responsibility for his/her own actions; motivate others; keep commitments; cultivate political and industry support for UC ANR.

Academic, Research, and Administrative Staff: Demonstrate concern for all staff; invest in improving all staff expertise and support professional development. Effectively manage all personnel supervision, oversight, annual evaluations, merits and promotions, and take appropriate disciplinary actions.

RELATIONSHIPS

This position is responsible administratively to the Vice Provost of Research and Extension. The County Director is a liaison between UCCE and Kings and Tulare Counties, serving as a Department Head, responsible to the Kings and Tulare Counties Administrative Officers and Boards of Supervisors for county-related functions and operations.



Nicholas Clark
Advisor and County Director

11-14-19

Date



Mark Lagrimini
Vice Provost of Research and Extension

11-14-19

Date

Position Description Nicholas Clark

Area Agronomic Cropping Systems and Nutrient Management Cooperative Extension Advisor

Effective Date: 10/26/2015

PURPOSE & CLIENTELE

The purpose of this position is to conduct a multi-county-based extension, education and applied research program with a focus on production issues in California's Central Valley for crops including alfalfa, corn, grain legumes, oilseeds, and biofuels, with emphasis on nutrient management linked to animal agriculture and fertilizer use, as well as irrigation management and water quality issues. Expected impacts are optimized agronomic practices which maximize production and improved water and nutrient use efficiencies.

Clientele are producers, consultants, federal, state and local agencies, allied industry representatives, pest control advisors, and non-profit environmental groups within Kings, Tulare, and Fresno Counties for issues pertaining to production and/or nutrient management in cropping systems of alfalfa, corn, grain legumes, and field crops including oilseed and biofuel crops. This position is headquartered in the UCCE office of Kings County in Hanford, CA. The program developed within this position will have an advisory and academic emphasis on animal agriculture waste, fertilizer, and irrigation management and quality issues. Agronomy extension and research will focus on crop production practices including cultural, variety selection, pest management, irrigation, economics, plant nutrition, and nutrient management with a primary focus on nitrogen.

ACADEMIC PROGRAM MAJOR RESPONSIBILITIES

- Conduct and report regular needs assessments to identify priority issues or problems relevant to the local clientele groups being served.
- Develop and implement effective UC ANR Cooperative Extension educational programs and applied research to address the identified priority needs of the clientele that are consistent with ANR's Strategic Vision.
 - Disseminate useful, science-based information to inform clientele, using extension methods that are responsive to clientele needs and appropriate for the audience and situation.
 - Conduct applied research designed to monitor changes and solve locally relevant problems.
 - Maintain and promote Cooperative Extension's credibility by providing science-based knowledge and skills independent of personal or parochial interests.
 - Evaluate programs and report accomplishments, results, and potential or actual impacts to scientific and lay audiences.
 - Develop collaborative teams with other UC ANR academics, campus-based specialists and faculty and/or others, to address priority issues for UC ANR.
 - Act as a facilitator in the public policy arena to effectively bridge divergent interests around issues that impact subjects within the UC ANR purview.
- Participate in professional organizations and collaborate with federal, state and county governmental agencies, non-government organizations and others by providing independent science-based information and leadership.

- Foster an increased understanding of Cooperative Extension's education and research programs in clientele, the public and policy makers.
- Maintain a program of continuous self-improvement by participating in in-service training, seminars, workshops, work group & program team meetings, short courses, professional society meetings and other relevant opportunities.
- Participate in UC and ANR leadership, through work groups & program teams, committees, task forces and other formal or informal structures.
- Serve the California public by participating in activities of public agencies and organizations.
- Actively advocate for UC ANR program awareness and support.

AFFIRMATIVE ACTION

- Comply with all applicable federal and state laws and regulations, and all University policies regarding affirmative action, including prohibition of discrimination on the basis of race, color, national origin, religion, sex, sexual orientation, physical or mental disability, age, veteran status, medical condition, ancestry or marital status.
- Promote, in all ways consistent with other responsibilities of the position, accomplishment of the affirmative action goals established by UC ANR.
- Take all measures necessary to assure that any employee or volunteer workers supervised by this position fulfill their affirmative action responsibilities.
- Develop a statement of program mission and definition of potential program clientele that embody a commitment to serve diverse ethnic and gender groups.
- Plan and conduct programs in such a manner as to provide equitable service to all ethnic and gender groups that comprise the potential clientele population for the program.
- Identify any barriers to clientele participation related to ethnicity, gender, or other characteristic of concern under the University's affirmative action policies, and take corrective active as needed to remove such barriers.
- Collect, and keep current, demographic data identifying the ethnic and gender distribution of the potential clientele populations for the program, and describing other characteristics of the population relevant to the pursuit of the Division's affirmative action goals.
- Compile and maintain documentation of service to each ethnic and gender group within the clientele population served by the program, including statistical records of clientele contracts, quantitative evaluations of benefits realized by clientele, and reports of any special efforts to serve under-represented groups.

RELATIONSHIPS

Responsible administratively to the county director of Kings County for the conduct of the UC ANR program.

QUALIFICATIONS

A minimum of a master's degree is required in a discipline such as agronomy, crop science, soil science, water management, pest management, crop production, and/or plant nutrition. Expertise to address nutrient management issues, especially linked to the dairy-forage system is important. Excellent written, oral and interpersonal communication skills are required. A demonstrated ability in extension and applied agricultural research is desirable. Specialty and/or professional experience must demonstrate capacity or potential to accomplish team-based education and research programs consistent with the values of Cooperative Extension.

- Must demonstrate:
 - The ability to communicate and extend technical information in an understandable manner.
 - Knowledge of human relations is required including the ability to work with people with a diversity of views and values, to motivate people and adapt to changing situations.
 - Literacy in internet communications and with software to support research and education programs.



Nicholas Clark, CE Advisor

10-18-16

Date



Kevin Day, County Director

20 OCT 2014

Date

Christopher
A. Greer

Digitally signed by Christopher A. Greer
DN: cn=Christopher A. Greer, o=University
of California, ou=ANR,
email=cagreer@ucanr.edu, c=US
Date: 2016.10.18 09:29:28 -0700

10/18/2016

Chris Greer, Vice Provost
of Cooperative Extension

Date

NICHOLAS CLARK, EXTENSION ADVISOR: REQUEST FOR ACCELERATED
PROMOTION FROM ASST IV – ASSOC I, 2021-22

ACCELERATION STATEMENT

In the 2021-22 review period, I have been exceptionally productive in the area of research and creative activity and worked above expectations in university and public service, and extension.

I have expanded my collaborative research efforts to address issues of irrigation efficiency innovation (**Automation of Surface Irrigation Systems in Dairy Production Systems in the Central Valley**, 2021-2023), soil greenhouse gas emission mitigation through innovative dairy manure uses coupled with scaled up conservation soil tillage and cover-cropping (**Dairy Soil and Water Regeneration**, \$1.3 million, 2021-2026), and weed management (**Herbicide Resistance in Weeds of Small Grains of California**, \$5,000, 2021-Ongoing). While these projects have technically begun just prior to the start of the 2021-22 review period, research has just begun picking up in earnest. These projects on which I am Co-PI, an expectation of Full Title, not Assistant rank Advisors, exemplify my skills in adapting my applied research program to meet changing clientele needs as well as build multi-institutional teams of experts to address multi-disciplinary problems. In my work on **Dairy Soil and Water Regeneration**, funded by the Foundation for Food and Agriculture Research, I employ and lead a team of three core (up to eight) technicians innovative field and lab research in collaboration with UC Davis, Texas A&M, U of Wisconsin, U of Vermont, Cornell, the Soil Health Institute, and the Dairy Research Institute to achieve the national dairy industry's 2050 goal of becoming carbon neutral partly through innovations in cropping system and manure management practices. In the project **Herbicide Resistance in Weeds of Small Grains of California**, I have led my peers in confirming the first discovery of acetolactate synthase inhibitor resistant common chickweed west of the Rocky Mountain range in North America – a likely inevitability but a discovery nonetheless. This discovery is guiding further expanded investigations into alternative weed management practices for small grains and potentially other field crops. I have co-authored four peer reviewed publications in this last review period of six total in the rank of Assistant – again an expectation of Associate and Full Title Advisors.

In my extension activities, 22% of my presentations in the Assistant rank (since Oct 2015) have been in this last year, and 26% of the meetings I've organized in the Assistant rank have been in this last year demonstrating productivity above expectations.

In the 2021-22 review period I have served the University and the public as the Agronomy Program Team Co-Chair, and I serve as the Co-Liaison for UC ANR to the CA Dry Bean Advisory Board, as a committee member on the Sustainable Food Systems Strategic Initiative Panel, as elected Secretary-Treasurer on the Executive Committee of the CA Chapter of the American Society of Agronomy, and as a member of the CA Dairy Research Foundation Environmental Science Technical Advisory Committee. I also am on the thesis committee of a CSU Fresno Master's student and am currently mentoring a Hanford High School Ag Leadership Program student to enter the Future Farmers of America state research championships.

These acts of above average service, extension, and exceptional research are demonstrable of my above average professional competence in skill and in recognition by my peers and clientele. For the reasons above and following in my summary narrative, I deserve to have my promotion from Assistant CE Advisor IV to Associate CE Advisor I accelerated.

III. PROGRAM SUMMARY NARRATIVE

INTRODUCTION

As the Area Agronomy and Nutrient Management Assistant Cooperative Extension (CE) Advisor Step IV serving Fresno, Kings, and Tulare Counties at 1.0 FTE, I conduct needs-based applied research and education to support holistically sustainable (economic, environmental, and social) production of large acreage crops which are traditionally grown with relatively low natural resource use efficiency, specifically water, carbon and nitrogen. In so doing, I aim to help my clientele: 1) **improve economic prosperity** through *increased animal waste and agricultural efficiency*, 2) **protect natural resources** by *improving air and soil quality and water quality and use efficiency*, and 3) **build climate resilient agro-ecosystems** by *preparing for extreme weather and climate change*. To strategically leverage my expertise for achieving the above condition changes, I have conceptually organized my research and extension efforts into three often interconnected themes: Agronomic Crop Production, Agricultural Nutrient Stewardship, and Integrated Pest Management.

At the end of this seven-year review period of 10/26/15 – 9/30/22, I am applying for an accelerated promotion to Associate Advisor I. In my years within the Associate rank, I have conducted extensive needs assessments of my clientele, established long-lasting collaborations and partnerships with academics and other professionals, been identified as a reliable and trustworthy information source within my field, and provided leadership among my peers and to the general public through service. In the latest two review periods my program has reflected balance as well as the productive trajectory required for achieving the condition changes stated above.

THEME #1: AGRONOMIC CROP PRODUCTION

Clientele: The primary people served by my collaborative agronomic crops production program are farmers (Table 1) and their consultants – approximately 1,894 Pest Control Advisers (PCA's) (<https://www.cdpr.ca.gov/docs/license/currlic.htm>) and 81 Certified Crop Advisers (CCA's) with specialized nitrogen management training (<https://www.certifiedcropadviser.org/certifications/professional-search/#>). Collectively, these professionals manage at least 618,000 cropped acres (Figure 1) typically growing crops year-round. The crops grown and managed by my clientele are typically alfalfa, corn, sorghum, and small grains for animal forage, minor forage crops, safflower for commodity oil, and dry beans for canning.

Table 1. 2018 grower clientele in assigned counties

County	# Grower clientele
Kings	379
Tulare	447
Fresno	468
Total	1294

NICHOLAS CLARK, EXTENSION ADVISOR: REQUEST FOR ACCELERATED PROMOTION FROM ASST IV – ASSOC I, 2021-22

Data provided by County Agricultural Commissioners

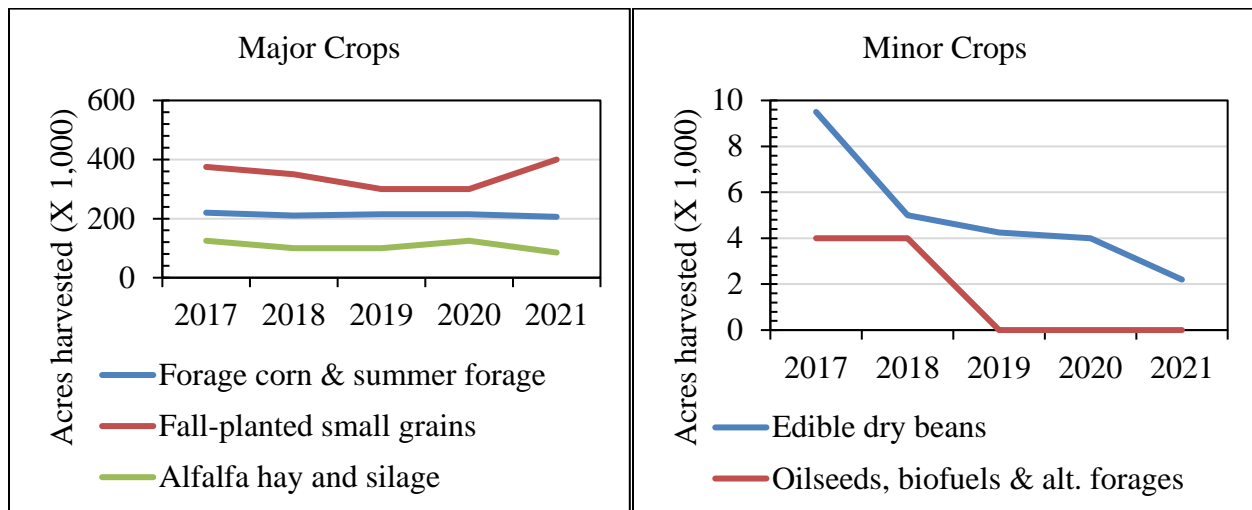


Figure 1. Harvested acreage trend of major and minor crops in Fresno, Kings & Tulare Counties. Data provided by County Agricultural Commissioners. Under-reporting in all categories, especially “Edible dry beans” and “Oilseeds, biofuels & alt. forages” due to lumping in annual crop reports.

Goal: Based on two major needs of these clientele identified through a recent statewide needs assessment survey (Kanter et al., 2021; <https://www.uccesurveyresults.com/#/>) – irrigation water quantity and market economics – I strive to help these clientele improve water use efficiency which can have the effect of conserving expensive inputs as well as increasing production profitability as well as be resilient under severe weather and climate change conditions which are likely to effect extreme drought conditions. It’s important to note that adoption of the 2014 Sustainable Groundwater Management Act (SGMA) and the implementation of the respective Groundwater Sustainability Plans (GSP’s) in 2020 intend to curb aquifer overdraft and degradation. This law makes it certain that irrigation water in the Tulare Lake Basin watershed (where my clientele operates) will be too scarce to farm as per usual.

Methods: Through multiple funded research projects, I collaborate with my peers to investigate promising improvements in crop water use efficiency. Recently, as Co-PI on a grant secured through the CA Dairy Research Foundation to fund the project **Automation of Surface Irrigation Systems in Dairy Production Systems** (2021-23) my peers and I seek to demonstrate on-farm implementation of sensor and computer-logic based irrigation delivery automation to reduce wasteful applications while delivering precise amounts of water to the crop. This can also save labor costs for farmers. Alternatively, I collaborated on research funded by the CA Institute of Water Resources (CIWR) to investigate **Alfalfa Flood Managed Aquifer Recharge (MAR)** (2018-2021), or the application of excess stream water in winter and spring on dormant alfalfa fields to refill underlying groundwater. This project aimed to show reasonable best practices with potential to increase regional irrigation and drinking water resources which could relieve local pressure on these natural resources during periods of drought. For crop selection, I collaborated to secure grants from UC ANR (2016-2018) and CDRF (2019-2022) to fund the projects **Alternative forages in CA dairies – sorghum research** and **Growing and Feeding Sugar Beets and Safflower on CA Dairies**, respectively, to investigate the best

NICHOLAS CLARK, EXTENSION ADVISOR: REQUEST FOR ACCELERATED
PROMOTION FROM ASST IV – ASSOC I, 2021-22

management practices and feasibility of replacing conventional forage crops such as corn and small grains with alternative drought tolerant crops which could also feed dairy cows. All of the above research was conducted on farmer fields with the exception of the **Alfalfa Flood MAR** project which was conducted on the Kearney Agricultural Research and Extension Center (KAREC).

Since 2016, I've delivered 10 extension presentations to 313 people on topics related to optimal crop water use efficiency practices and selection of water-wise crops at meetings I've co-organized or was invited to. Similarly, I have authored or co-authored 15 popular press articles addressing these issues in a combination of UC newsletters, trade magazines, and UC blogs.

Outcomes: We have observed farming practice changes among 4 growers with whom we've demonstrated the feasibility of growing and feeding sugar beets and safflower to dairy cows. These growers continued to grow and feed these crops after our direct involvement, increased their planted acres of these crops, and continue to innovate practices to fit the crops into their particular farm and dairy management operations. Acres of these crops are still too small to be discoverable in official data sources.

The project on surface irrigation automation is still too new for measured outcomes, but after significant outreach efforts to identify a collaborator, we have secured an agreement with an innovative and excited grower who will install automated irrigation technology on his farm.

At 8 extension meetings I co-organized with colleagues between 2020-2022 (322 attendees) where I or colleagues presented on topics of crop water use efficiency, groundwater recharge innovation, surface irrigation automation, or selection of water-wise crops, a majority of attendees indicated they learned something they would use in their farm management operations when polled after the presentations.

Impacts: I have not been able to measure impacts from my research and extension programs focusing on *Agronomic Crop Production*, as the reasonably inferred impacts such as economic sustainability of farming operations and the environmental sustainability of water resource quantity are longer-term impacts than my program has operated. It's likely these impacts will be measureable if successful in 5-10 years from now, especially as assessments of the effects of SGMA are reported publicly.

THEME #2: AGRICULTURAL NUTRIENT STEWARDSHIP

Clientele: The clientele groups directly served by my agricultural nutrient stewardship program are primarily CCA's (identified above) and agency staff concerned with water quality according to federal drinking water nitrate pollution standards. Lately, growers who are licensed by the CA Dept. of Food and Ag to self-certify their annual Irrigation and Nitrogen Management Plans, a requirement of the Central Valley Regional Water Quality Control Board, have benefited from this program.

Goal: Based on needs assessed through survey (noted above) and review of secondary data (CCA knowledge and performance standards) and regulatory material outlined in any one of four

NICHOLAS CLARK, EXTENSION ADVISOR: REQUEST FOR ACCELERATED
PROMOTION FROM ASST IV – ASSOC I, 2021-22

CA regulations with water quality nitrate standards, I have geared my *Agricultural Nutrient Stewardship* programs toward providing the technical information required by licensed consultants, growers and agency staff to work together in compliance with state and federal drinking water nitrate concentration standards. These programs are the Dairy General Order (farms receiving manure), the Irrigated Lands Regulatory Program (all irrigated farms not receiving manure), 2014 Sustainable Groundwater Management Act (all farms), and the recently adopted Salt and Nitrate Management Plan amendments to the Sacramento/San Joaquin River – Tulare Lake Basin Water Quality Control Plan proposed by the Central Valley Salinity Alternatives for Long-Term Sustainability program (all farms). The intent of these regulations on agricultural nitrogen is to generally improve groundwater quality by minimizing nitrate pollution, which is a chemical hazardous to humal health. Yet, unintended benefits of improving agricultural nitrogen management are improved air quality by reducing ammonia nitrogen emissions and reduced greenhouse gas emission by lowering nitrous oxide and methane emissions. Through research, I am also beginning to connect fertilizer and manure nitrogen management practices to climate benefits that may be brought forth by innovative ag producers who adopt improved nitrogen management practices.

Methods: With objectives of improving fertilizer and manure nutrient crop use efficiency through education about existing best management practices and investigation of potential fertilization improvements, I have collaborated and co-investigated on a number of research projects and participated in many education events.

A new research project in collaboration with 5 land grant universities across the US, the USDA Ag Research Service in ID, and the Soil Health Institute, funded by the Foundation for Food and Ag Research (<https://ucanr.edu/blogs/blogcore/postdetail.cfm?postnum=48954>), **Dairy Soil and Water Regeneration**, brought \$3.2 million to the UC with \$1.3 million (2021-2026) awarded to me to address resource-conservation oriented cropping and dairy manure management practices on a commercial farm to investigate and demonstrate the feasibility of the US dairy industry achieving the goal of becoming carbon neutral by the year 2050. This project investigates farm scale management practice systems which include varying degrees in intensity of soil tillage, crop rotation, and manure fertilizer utilization. Through two research projects titled **Nitrogen Application Rate by Timing in CA Wheat** and **Achieving Efficient Nitrogen Fertilizer Management in California Wheat**, I collaborated and co-led research and demonstration activities to investigate optimal small grain nitrogen fertilization practices and improved fertilizer management through use of innovative crop and soil measurement techniques and novel web-based decision support interfaces. My collaboration or co-investigation on research projects focused on improved utilization of manure and soil organic matter as crop fertilizer has been funded by donors (**Dairy Farm Nitrogen Use Efficiency Improvement**, 2016-Ongoing), CIWR & CDFA (**CA Soil Nitrogen Mineralization**, 2016-Ongoing; **Sorghum and Corn Nitrogen and Water Use Efficiency**, 2016-2021), and CDRF (**Characterization of Dairy Manure**, 2020-2022). All of the above projects were conducted on commercial farms with the exceptions of **Nitrogen Application Rate by Timing in CA Wheat** and **Sorghum and Corn Nitrogen and Water Use Efficiency**, which were conducted at KAREC and the West Side Research and Extension Center (WSREC).

NICHOLAS CLARK, EXTENSION ADVISOR: REQUEST FOR ACCELERATED
PROMOTION FROM ASST IV – ASSOC I, 2021-22

Since 2015 I have co-organized 21 extension meetings where topics relating to *Agricultural Nutrient Stewardship* were presented to over 1,700 attendees. In the same timeframe, I have personally delivered 29 educational presentations about improved nutrient use efficiency practices to more than 2,700 clientele individuals. Finally, I have authored or co-authored four peer-reviewed journal articles and 19 popular press articles in UC newsletters, trade magazines, or UC blogs reporting research results from projects mentioned above or on nutrient use efficiency best management practices.

I also helped in the co-development and training sessions on how to use wheat nitrogen management tools (<https://smallgrain-n-management.plantsciences.ucdavis.edu/>; https://smallgrains.ucanr.edu/Nutrient_Management/N-rich_reference_zones/; and https://smallgrains.ucanr.edu/Nutrient_Management/snqt/).

Outcomes: A recent report (unpublished) from a research partner on a project called **Next Generation Nitrogen Management Training for Certified Crop Advisers** (2020-23) confirmed that since our collaborative efforts to train and certify CCAs to meet higher regulatory standards of agricultural nitrogen management consulting, 57 CCAs registered for the latest licensing exam and 90% passed, meaning approximately 54 better trained CCAs entered the CA workforce. At the Small Grains and Alfalfa/Forages Virtual Field Day (5/12/21) showcasing the wheat nitrogen management web-tool, 76 ag industry professionals indicated their knowledge about this tool was increased on average and were likely to explore use of the tools. At the same field day, the participants indicated that their knowledge was increased on the field methods required to use the nitrogen management tool and that they were more likely to experiment on their own with these methods in their own fields. In a focus group with grower collaborators (7/22/21), all three participants indicated their knowledge of the nitrogen management tool and practices have been increased through participation in the project and that they had a higher likelihood of changing their management practices as a result of what they had learned. At training events focusing on wheat nitrogen management improved practices, participants ($n = 42$) indicated they had increased knowledge about using improved nitrogen use efficiency practices and were likely to use these methods. Crop outcomes were measured at project field demonstration sites, and when in-season nitrogen fertilizer applications were recommended by the webtool we developed, there was an average yield increase of 28% (~1500 lb/ac) ($p = 0.01$, $n = 6$). Yield increase at these sites ranged from 14%, or 1,088 lb grain/ac, to 75%, or 3,672 lb grain/ac. When no fertilizer application was recommended, yields in the grower field were equal to the control ($p = 0.80$, $n = 4$). We estimated an average savings of \$40/ac in fertilizer costs for the growers at these sites.

Impacts: Reasonably expected impacts for this program, which are yet to be measured, are **improved living and working conditions for all Californians** depending on groundwater as a drinking source as quality regarding nitrate pollution in agricultural areas above vulnerable aquifers is improved. This is expected to occur as more dairies and other irrigated annual crop growers come into compliance with environmental regulatory requirements by improving their crop nitrogen use efficiency as a result of utilizing more precise nitrogen fertilizer budgets, adopting new nitrogen fertilizer decision management tools, and exercising best practices while applying manure nutrients. Additionally, it's reasonable to expect **increased climate resiliency and improvements to air quality** as the dairy industry becomes carbon neutral, significantly

NICHOLAS CLARK, EXTENSION ADVISOR: REQUEST FOR ACCELERATED
PROMOTION FROM ASST IV – ASSOC I, 2021-22

reducing the contribution U.S. agriculture has on greenhouse gas emissions, by improving soil conservation and manure nitrogen stewardship practices

THEME #3: INTEGRATED PEST MANAGEMENT

Clientele: The clientele groups served by my integrated pest management (IPM) program are growers, PCA's, CCA's, and pesticide industry professionals and seed producers. Likewise, our recent needs assessment survey or agronomic crops professionals indicated weed and insect pests control as high priorities. There are two main drivers of need among this clientele: loss of pesticide options (commonly due to regulatory restrictions or pest species evolution of resistance to the pesticide) and the regular invasion of pests to this agricultural production region. These two drivers culminate in three basic needs of my IPM clientele:

1. Improved crop varieties with greater pest resistance
2. Effective, non-pesticide based pest management practices
3. Applied research to support changes to existing pesticide labels to expand uses as needed

Methods: My collaborative IPM program addresses these three needs through research supported by various organizations. Most recently, I have shifted my research focus to investigate more weed management issues in direct response to my clientele's stated priorities. As such, donors have funded two projects on which I am the PI or Co-PI: **Herbicide Resistance in Weeds of Small Grains in CA** (2021-Ongoing) and **Herbicide safety in safflower of pre-plant glufosinate broadcast** (2020-2021). The former project focuses on the simple task of expanding legal herbicide use possibilities on a popular herbicide label in safflower by demonstrating the safety of such applications to the crop, information necessary for CA Dept. of Pesticide Regulations and the US EPA to consider approving such a label change. The latter project addresses observations of failures to control common Chickweed in small grain fields in CA using conventional herbicides. Our investigation has focused on identifying the extent of genetic resistance to acetolactate synthase inhibiting herbicides in common chickweed in CA to reset expectations and priorities for integrated weed management strategies and research moving forward in CA. I have also conducted four research trials under the project titled **Integrated Pest Management of Insects in Safflower and Cotton Systems** (2019-Ongoing) in response to priority calls from the IR-4 Project, an agency responsible for coordinating pesticide efficacy and crop safety trials in US specialty crops. These trials have focused on the purpose of collecting data which may support the legal registration of at least two insecticides to be used in safflower in CA in the future and mitigate evolution of insecticide resistance among key pests in safflower and cotton. Donor funded research in the project **Sorghum Sugarcane Aphid Management** (2017-2019) was carried out in five research trials on University property to investigate common and novel insecticide uses to control the CA invasive species, sugarcane aphid, and protect sorghum crop productivity and the biodiversity of natural beneficial insects.

Since 2015, I have organized one pest management extension meeting with 15 attendees, but I have given 17 oral and 2 poster presentations on topics of insect and weed management strategies to more than 1,500 individual clientele members. Finally, I have authored or co-authored one peer reviewed journal article and 16 popular press articles in UC newsletters or

NICHOLAS CLARK, EXTENSION ADVISOR: REQUEST FOR ACCELERATED PROMOTION FROM ASST IV – ASSOC I, 2021-22

blogs on topics of weed and insect management and selection of disease and pest resistant blackeye pea varieties.

Outcomes: Original research on Sugarcane Aphid control contributed to the emergency exemption use of sulfoxaflor on sorghum as well as the fully approved label use of afidopyropen on sorghum, and a new use of flupyradifurone with soil applications, expanding growers' options for pesticide mode of action rotation which can reduce the risk of insecticide resistance development. Extension education presentations and blog posts on Sugarcane Aphid control measures assisted a transition away from ineffective, less selective insecticide use in sorghum in CA, with flupyradifurone, a more effective and selective insecticide, use replacing most of the insecticide use (Figure 2). Collaborative research in the project **Blackeye Pea/Cowpea Line Testing for Variety Improvement – Disease and Aphid Resistance** (CA Dry Bean Advisory Board, 2016-Ongoing) has resulted in the official registration and public release of cowpea aphid resistant blackeye pea variety, CB77 (<https://access.onlinelibrary.wiley.com/doi/full/10.1002/plr2.20176>).

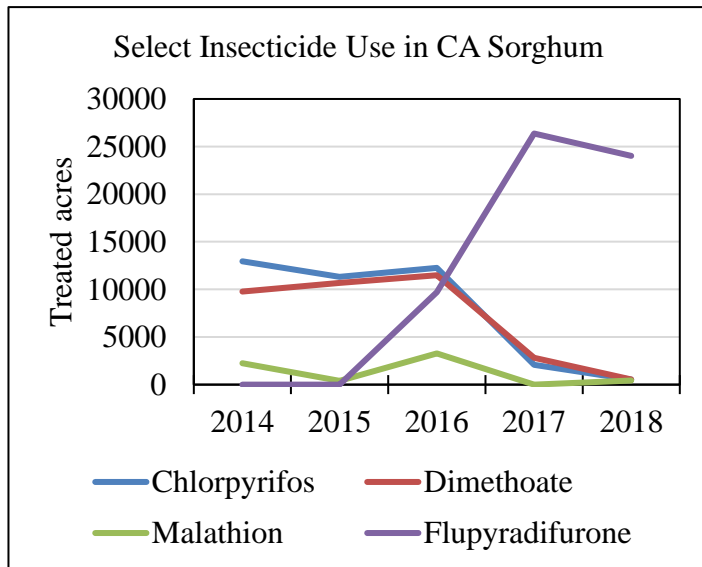


Figure 2. Annual usage of select insecticides in sorghum in CA (CA DPR CalPIP, 2018). UC involvement in Sugarcane Aphid control measures began in late 2016, shortly after the pest was confirmed in CA. Early promotion of evidence-based practices and shared results from UC research trials confirming the greater effectiveness of Flupyradifurone quickly affected proportional insecticide use in CA. Note that Chlorpyrifos use declined largely because of regulatory restrictions which banned its use.

Impacts: Expected impacts yet to be measured for this program are **increased ecological sustainability of agriculture** and **increased agricultural efficiency and profitability** as insect biodiversity is maintained through the reduction of non-target insect mortality. Research collaborators have observed increased insect biodiversity in plots treated with flupyradifurone compared to less-selective insecticides malathion and dimethoate. Increased biodiversity corresponded with observed predation of Sugarcane Aphids by beneficial insects. Further, as registration of several new pesticide uses to control insects and weeds in safflower proceeds, yields should improve and pesticide resistance risk should decrease. Finally, as growers adopt use of improved Blackeye Cowpea varieties, the need for insecticides reduces and crop yield and quality will be protected.

PROFESSIONAL COMPETENCE

NICHOLAS CLARK, EXTENSION ADVISOR: REQUEST FOR ACCELERATED
PROMOTION FROM ASST IV – ASSOC I, 2021-22

My peers and the general public have recognized my expertise in the academic fields of agronomy and agricultural nutrient management up to the national level. Most recently, I was elected to serve as Secretary-Treasurer on the Executive Board of the CA Chapter of the American Society of Agronomy (CA-ASA). Additionally, I earned the leadership role of Co-PI on a multi-state, multi-agency Foundation for Food and Agriculture Research (FFAR) grant to address climate change mitigation through dairy farming soil carbon and nitrogen management efficiency improvements with the financial responsibility of \$1.3 million awarded to my program. While as an Assistant Advisor I've met expectations of an Associate Advisor by 1) demonstrating my commitment to professional growth through completion of 78 trainings and 2) actively participating as a content expert in 7 professional conferences, the earlier examples of professional competence – CA-ASA Executive election & Co-PI status on the FFAR grant – are expectations of a Full Title Advisor.

In examples of recognition of my regional and statewide leadership, I have been called upon, and continue to serve, as a subject matter and education expert by my colleagues at the CA Dept. of Food and Agriculture (CDFA) to serve on the Grower Training Ad Hoc Committee. With my colleagues on this committee, I help create, evaluate, and validate training and testing material for CA farmers who wish to become licenced to self-certify their annual irrigation and nitrogen use efficiency reports required by the State Water Quality Control Board. Further, my peers at CA State University, Fresno, have recently included me as a Master's thesis committee member for a student currently studying nitrogen fertilization in garbanzo beans, a recognition of my subject matter expertise both in dry bean cropping systems as well as agricultural nutrient stewardship. Last, I continue to serve on the CA Dairy Research Foundation (CDRF) Environmental Science Technical Advisory Committee as a subject matter expert in forage production and input natural resource input management with the purpose of assessing stakeholder needs and developing research priorities for the CA dairy check-off program – the CA Milk Advisory Board.

Finally, of the 53 extension presentations I've delivered in my current rank, 12 have been through invitation by my peers in areas outside my assigned geographic region in order to provide the needed expertise in extension events they were organizing.

UNIVERSITY & PUBLIC SERVICE

My University Service focuses on “People” and “Programs.” I strive to increase the visibility, relevance, and institutional strength of UC ANR through participation and leadership in activities that 1) acquire and retain qualified extension people and 2) ensure the integrity of research and extension programs that UC ANR offers the public.

Most recently I have been serving as Co-Liaison and research advisor to the CA Dry Bean Advisory Board on behalf of UC ANR to assist with research priority setting and managing research requests for proposals and peer review. Additionally, I started serving as a committee member on the Sustainable Food Systems Strategic Initiative Panel with the purpose of facilitating communication between administration and program staff and academics, most

NICHOLAS CLARK, EXTENSION ADVISOR: REQUEST FOR ACCELERATED PROMOTION FROM ASST IV – ASSOC I, 2021-22

recently regarding matters of professional development and networking opportunities, personnel recruitment, and new-hire onboarding and mentoring protocols.

I have now served as chair of three CE Advisor and one Asst. Specialist search committees and as a member on two CE Advisor, one CE Specialist, one REC Director, and one REC Superintendent search committees. I served the role of Agronomic Crops Program Team Co-Leader with Dr. Mark Lundy, during which time we led efforts to conduct a formal, statewide collaborative needs assessment of agronomic crops professionals with the assistance of Program Planning and Evaluation and in collaboration with CE Specialist Dr. Vikram Koundinya. I continue to serve on Research Advisory Committees for both the West Side Research and Extension Center and the Kearney Agricultural Research and Extension Center with the expectation that research programs conducted at these institutions will meet the highest standards.

In my Public Service I promote youth science literacy. I do this through career day presentations, mentorship on student research and presentation projects, and volunteer judging for student and Future Farmers of America competitions. This year, I am mentoring a Hanford High School student in a weed management research project through the school's Ag Leadership Program in preparation for her entry into the Future Farmers of America research state championship.

AFFIRMATIVE ACTION AND CONTRIBUTIONS TO DEI

To ensure that I can continue to serve the University's affirmative action goals I use promotional materials, mass-media, and letter writing outreach making all reasonable efforts to invite participation by underserved clientele. In the past, to improve outreach to underserved members of society, I've served on the Workforce Diversification Committee of the Diversity, Equity and Inclusion Alliance at UC ANR to assist in reviewing staff and academic recruitment, hiring, and onboarding practices. I was also fortunate to collaborate with a colleague in outreach and a citizen-science project partnered with the African American Farmers of CA to learn about and promote heritage blackeye pea cultivation practices to improve cultural awareness and competency of Fresno youth. Besides targeted outreach, I emphasize communication tactics which are designed to reach wide which include at least 15 interviews with press to promote participation in my research and extension programs (Table E. Sub-table "Public Media Outreach and Extension").

IV. SUPPORTING EVIDENCE TABLES

A. SUMMARY OF RESEARCH AND EDUCATION PROJECTS

Project Title	My Direct Roles	Project Collaborators	Support Amount/Duration	Support Source
THEME: Agronomic Crop Production (7 projects)				
Research & education: <i>Alternative forages in CA dairies - sorghum research</i>	Collaborator Data collection and summarization, report review	Deanne Meyer @ UC Davis, Jennifer Heguy @ UC ANR, Jeffery Dahlberg @ UC ANR, J. P. Martins @ UC ANR	Project total \$250,650/3 years since 12/20/2016 My responsibility all in-kind	UC ANR Competitive Grant
Research & education: <i>Growing and Feeding Sugar Beets and Safflower on CA Dairies</i>	Collaborator Grant co-writing, Cooperator outreach, experimental design and trial layout, data collection and summary, report writing and review	Stephen Kaffka @ UC Davis, Peter Robinson @ UC Davis	Project total \$188,260/3 years since 1/1/19 My responsibility \$48,717	CA Dairy Research Foundation
Research & education: <i>Alfalfa Flood Managed Aquifer Recharge</i>	Collaborator Cooperator outreach, experimental design and trial layout, data collection and summary, report review, manuscript drafting	Daniel Putnam @ UC Davis, Helen Dahlke @ UC Davis	8/1/2018 - ongoing My responsibility all in-kind	CA Institute of Water Resources
Research: <i>Small Grain Varietal Testing</i>	Collaborator Data collection	Mark Lundy @ UC Davis	3/20/2019 – ongoing My responsibility all in-kind	CA Wheat Commission, seed

Project Title	My Direct Roles	Project Collaborators	Support Amount/Duration	Support Source
				company donations
Research: <i>Nutritive and Toxicological Effects of Wildfire Ash on California's Forage Crops</i>	Collaborator Grant draft review, cooperater outreach, data collection, report review	Betsy Karle @ UC ANR, Jennifer Heguy @ UC ANR	\$10,000 9/5/2018 – 2/6/2020 My responsibility all in-kind	UC ANR Opportunity Grant
Research: <i>CA Agronomic Crops Statewide Collaborative Needs Assessment</i>	Co-PI Co-conception of research, stakeholder outreach, team-building, data validation, report drafting/review, manuscript drafting/review	Robert Hutmacher @ UC Davis, Rachael Long @ UC ANR, Daniel Putnam @ UC Davis, Katherine Webb-Martinez @ UC ANR, Bruce Linqvist @ UC Davis, Michelle Leinfelder-Miles @ UC ANR, Mark Lundy @ UC Davis, Whitney Brim-DeForest @ UC ANR, Vikram Koundinya @ UC ANR, Sarah Light @ UC ANR, Jessica Kanter @ UC Davis, Cameron Pittelkow @ UC Davis	6/27/2019 - ongoing	In-kind contributions from all collaborators
Research: <i>Garbanzo Crop Insurance Risk Assessment Update</i>	Co-PI	Rachael Long @ UC ANR	\$22,420 5/19/20 – 12/31/22	Industry donations

Project Title	My Direct Roles	Project Collaborators	Support Amount/Duration	Support Source
	Experimental design and trial layout, data collection and summary, report writing		My responsibility \$11,620	
Research: <i>Automation of Surface Irrigation Systems in Dairy Production Systems in the Central Valley</i>	Co-PI Co-writing of grant application Experimental design and trial layout Identification of project cooperators	Khaled Bali, Deanne Meyer, and Daniele Zaccaria @ UC ANR	\$164,846 1/1/21 – 12/31/23 My responsibility all in-kind	CA Dairy Research Foundation
THEME: Agricultural Nutrient Stewardship (10 projects)				
Research and education: <i>CDFA FREP N rate by timing in wheat study</i>	This research project was undertaken at four UC ANR Research and Extension Centers or Campus: IREC, UC Davis, KAREC, & WSREC. As a collaborator, my duties were to 1) assist in creating the experimental design and treatment protocols for all sites, but principally at the WSREC site, 2) coordinate WSREC, Tulare County, and UC ANR field staff at the WSREC site to perform treatment applications and data collection, 3) perform treatment application and data collection, 4) assist in the analysis of data collected from all sites, but principally from the WSREC site.	1) Steve Wright (Co-PI) - CE Agronomy Advisor - Tulare & Kings Counties 2) Bob Hutmacher (Co-PI) - CE Specialist UC Davis Plant Sci. 3) Steve Orloff (Co-PI, deceased) - CE Agronomy Advisor Siskiyou County 4) Mark Lundy (Co-PI) - CE Specialist UC Davis Plant Sci.	\$225,000 11/15/2015 – 7/1/2016 My responsibility all in-kind	CA Dept. of Food & Agriculture, Fertilizer Research & Education Program

Project Title	My Direct Roles	Project Collaborators	Support Amount/Duration	Support Source
Research and education: <i>Dairy Farm Nitrogen Use Efficiency Improvement</i>	Co-PI Idea co-conception, cooperators outreach, experimental design and trial layout, data collection and summary, report writing and review	Robert Hutmacher @ UC ANR, Louann Waldner @ College of the Sequoias, Till Angermann @ Luhdorff and Scalmanini Consulting Engineers	\$1,898,600 1/20/2016 – ongoing My responsibility \$365,000	Central Valley Dairy Representative Monitoring Program
Research: <i>CA Soil Nitrogen Mineralization</i>	Collaborator Grant review, cooperators outreach, data collection and summary, report review, manuscript co-writing and review	Brenna Aegerter @ UC ANR, Richard Smith @ UC ANR, Rob Wilson @ UC ANR, Michelle Leinfelder-Miles @ UC ANR, Daniel Geisseler @ UC Davis, Kenneth Miller @ UC Davis, Eugene M. Miyao @ UC ANR, Konrad Mathesius @ UC ANR, Sarah Light @ UC ANR	\$250,000 1/1/2016 – ongoing My responsibility all in-kind	CA Institute of Water Resources (\$25K), CDFA-FREP (\$225K)
Research and education: <i>Sorghum and Corn Nitrogen and Water Use Efficiency</i>	Co-Investigator Grant writing, experimental design and trial layout, data collection and summary, report writing	Robert Hutmacher @ UC Davis, Jeffery Dahlberg @ UC ANR	\$25,000 1/1/16 – 12/31/21	CA Institute of Water Resources
Research and education: <i>Wheat Nitrogen Fertilizer</i>	Collaborator Grant co-writing, cooperators outreach, trial demonstration, data collection and	Michelle Leinfelder-Miles @ UC ANR, Mark Lundy @ UC Davis, Thomas Getts @ UC	\$300,000 1/1/20 – 12/31/22 My responsibility \$7,500 and in-kind	USDA-CIG (\$75K), CDFA-

Project Title	My Direct Roles	Project Collaborators	Support Amount/Duration	Support Source
<i>Management Decision Making</i>	summarization, extension planning, report draft review	ANR, Konrad Mathesius @ UC ANR, Sarah Light @ UC ANR, Giuliano Galdi @ UC ANR		FREP (\$225K)
Research and education: <i>Characterization of Dairy Manure</i>	Co-PI Grant co-writing, experimental design and trial layout, cooperators outreach, data collection and summary, report writing, extension planning and execution	Deanne Meyer @ UC Davis, Patricia Price @ UC Davis, Joyce Pexton @ UC Davis, Joy Hollingsworth @ UC ANR, Anthony Fulford @ UC ANR	\$131,597 1/1/20 – 12/31/22	CA Dairy Research Foundation
Education: <i>Next Generation Nitrogen Management Training for Certified Crop Advisers</i>	Collaborator Development of new Certified Crop Adviser core competencies and performance objectives Development and validation of licensing exam material	Doug Parker @ UCOP, Sat Darshan Khalsa, Patrick Brown, & Daniel Geisseler @ UC Davis, & Sarah Light, Mae Culumber, Khaled Bali, Dan Munk, Ben Faber, Allan Fulton, Katherine Jarvis-Shean, Andre Biscaro, George Zhuang, Michelle Leinfelder-Miles, Phoebe Gordon, Sonia Rios, Michael Cahn, Luke Milliron, & Jairo Diaz @ UC ANR	\$232,802 1/1/20 – 12/31/23 My responsibility \$2,200	CA Dept. of Food & Agriculture, Fertilizer Research & Education Program

Project Title	My Direct Roles	Project Collaborators	Support Amount/Duration	Support Source
Research: <i>Garbanzo sub-surface drip irrigated N fertilization optimization</i>	Co-PI Grant co-writing, experimental design and trial layout	UC ANR, Dr. Ranjit Riar @ California State University, Fresno	\$10,000 5/19/21 – ongoing My responsibility all in-kind	CSU Faculty Education SEED Grant
Research: <i>Dairy Soil and Water Regeneration</i>	Co-PI Grant co-writing, team building, cooperater outreach, experimental design and trial layout, data collection and analysis	Khaled Bali @ UC ANR, William Horwath @ UC Davis, Deanne Meyer @ UC Davis, Dennis Busch @ University of Wisconsin - Platteville, Shannon Cappellazzi @ Soil Health Institute, Andrew Cartmill @ University of Wisconsin, Platteville, Kenneth Casey @ Texas A&M University, Karl Czymmek @ Dairy Management Inc., Joshua Faulkner @ University of Vermont, Randall Jackson @ University of Wisconsin-Madison, Quirine Ketterings @ Cornell University, April Leytem @ USDA-ARS, Kimberly, ID, Daniel Liptzin @ Soil Health	\$3.2 million 7/1/21 – 12/31/26 My responsibility \$1.3 million	Foundation for Food and Agricultural Research

Project Title	My Direct Roles	Project Collaborators	Support Amount/Duration	Support Source
		Institute, Christine Morgan @ Soil Health Institute, Eric Roy @ University of Vermont, Matthew Ruark @ University of Wisconsin-Madison, Gregg Sanford @ University of Wisconsin-Madison, Kirsten Workman @ University of Vermont, Sat Darshan Khalsa @ UC Davis, Carol Adair @ University of Vermont, Brent Auvermann @ Texas A&M University, Jourdan Bell @ Texas A&M University, Bert Bock @ BR Bock Consulting, Inc.		
Research: <i>Nitrogen Management for Industrial Hemp Cannabidiol and Essential Oils</i>	Collaborator Grant co-writing, trial design	Robert Hutmacher @ UC Davis, Daniel Putnam @ UC Davis, Daniel Geisseler @ UC Davis, Sarah Light @ UC ANR, Geoffery Koch @ UC Davis	\$225,000 1/1/21 – 12/31/23 My responsibility all in-kind	CDFA-FREP

Project Title	My Direct Roles	Project Collaborators	Support Amount/Duration	Support Source
THEME: <i>Integrated Pest Management (7 projects)</i>				
Research and education: <i>Alfalfa Weevil - Soil, Water, and Air Quality and Crop Sustainability</i>	Collaborator Cooperator outreach, experiment trials, data collection, data summarization, report review	Larry Godfrey @ UC Davis, Rachael Long @ UC ANR, Daniel Putnam @ UC Davis, Michael Rethwisch @ UC ANR, Rob Wilson @ UC ANR, Thomas Getts @ UC ANR, Ian Grettenberger @ UC Davis	\$281,864 8/15/2016 – 2/3/2020 My responsibility all in-kind	CA Dept. of Pesticide Regulations
Research and education: <i>Sorghum Sugarcane Aphid Management</i>	Co-PI Fund acquisition, cooperator outreach, trial design, data collection and summarization, reporting and writing, manuscript writing	David Haviland @ UC ANR, Brian Marsh @ UC ANR, Jeffery Dahlberg @ UC ANR	\$32,000 4/8/2017 – 12/20/2019 My responsibility \$15,000	Industry donations
Research and education: <i>Blackeye Pea/Cowpea Line Testing for Variety Improvement - Disease and Aphid Resistance</i>	Collaborator Cooperator outreach, trial experiments, data collection, report summarization and review, manuscript review	Rachael Long @ UC ANR, Philip Roberts @ UC ANR, Ruth Dahlquist-Willard @ UC ANR, Sarah Light @ UC ANR, Bao Lam Huynh @ University of California	\$120,000 5/11/2016 – ongoing My responsibility all in-kind	CA Dry Bean Advisory Board
Research to policy: <i>Integrated Pest Management of Insects</i>	Co-PI	Grettenberger @ UC Davis	\$24,000 3/1/2019 – 11/16/2021	IR-4 Program

Project Title	My Direct Roles	Project Collaborators	Support Amount/Duration	Support Source
<i>in Safflower and Cotton Systems</i>	Cooperator outreach, trial experiment, data collection and summary, report writing		My responsibility \$16,000	
Research and education: <i>Blackeye/Cowpea New Pathogen Characterization</i>	Co-PI Cooperator outreach, data collection, student mentoring	Cassandra Swett @ UC ANR	9/1/2017 – 9/30/2019 My responsibility all in-kind	none
Research to policy: <i>Herbicide safety in safflower of pre-plant glufosinate broadcast</i>	PI Cooperator outreach, experimental design and trial layout, data collection and summarization, report writing	Leigh Ann Harrison @ BASF Chemical Company	\$9,500 2/13/2020 – 9/2/2021	Industry donations
Research and education: <i>Herbicide Resistance in Weeds of Small Grains in California</i>	Co-PI Cooperator outreach Experimental design and trial layout Data collection and summarization Student mentoring Report writing	Bradley Hanson @ UC ANR, Mark Lundy @ UC ANR, Konrad Mathesius @ UC ANR, Anil Shrestha @ CSU Fresno, Jose Dias @ University of Arizona	\$10,000 2/1/2021 – ongoing My responsibility \$5,000 & in-kind	Industry donations

B. PROFESSIONAL COMPETENCE AND PROFESSIONAL ACTIVITY

PROFESSIONAL DEVELOPMENT AND TRAINING (78 TRAINING AND COMPETENCY BUILDING ACTIVITIES IN CURRENT RANK)

Begin Date - End Date	Location	Name, Description and Occurrence of Activity
Oct 10, 2017	Online	Program Review/Merit training attendance
10/24/2015 - 9/30/19	Fresno, CA	Attend staff conference meetings to be updated on Fresno County Cooperative Extension administration issues as well as notes from County Director meetings regarding Statewide administration issues of Cooperative Extension; periodically provide program updates and supply program summaries as contribution for Multi-County Partnership meeting CE activities updates.
10/24/2015 - 9/30/19	Tulare and Hanford, CA	Attend staff conference meetings to be updated on Tulare and Kings County Cooperative Extension administration issues as well as notes from County Director meetings regarding Statewide administration issues of Cooperative Extension
10/24/2015 - 9/30/19	Tulare, CA	Meet with extension and research mentors, Shannon Mueller, Steve Wright, Carol Frate, and/or Bob Hutmacher, and periodically with my county director, Kevin Day, to discuss how to conduct effective extension and research in agronomy and nutrient management
10/27/2015	Parlier, CA	Attended UC ANR Programmatic Training to learn fundamentals and issues with developing extension and research programs as a new extension advisor
11/10/2015	Davis, CA	Attended UC ANR New Academic Orientation to learn about ANR statewide programs and statewide administrative units and their supportive roles for Cooperative Extension.
4/12/2016 - 4/13/2016	Parlier, CA	Voluntarily completed Crucial Conversation's training to improve professional, interpersonal relation skills

Begin Date - End Date	Location	Name, Description and Occurrence of Activity
6/17/2016	Davis, CA	Attended ANR sponsored Practical Methods to Measuring Outcomes training to improve knowledge about extension impact measurement planning and execution
8/25/2016	Davis, CA	Attended UC ANR sponsored Needs Assessment training to gain and improve skills in performing an effective needs assessment for my clientele
9/8/2016	Internet	Attended via the web a UC ANR sponsored Annual Evaluation training webinar
9/21/2016	Parlier, CA	Attended UC ANR sponsored Impact Writing training to improve skills in writing impact statements for annual evaluation as well as for outreach to public groups and stakeholders in my extension and research programs
10/7/2016	Internet	ANR Academic Program Review Training
1/11/2017	Tulare, CA	CE Tulare Office safety training re: navigating EH&S website for finding information and training resources
1/18/2017	Hanford, CA	CE Kings Office safety training re: safe winter driving tactics and information resources
1/21/2016	Parlier, CA	Attended UC IPM Pesticide Policy Training to be updated on recent and upcoming changes to CA and federal laws and UC policies regarding the handling and application of pesticides in research plus continuing education to maintain my Qualified Applicator Certificate
1/25/2017	KAREC	UC Pesticide Policy and Safety Training (annual repeat)

Begin Date - End Date	Location	Name, Description and Occurrence of Activity
5/19/2017	Five Points, CA	Half face air filtering respirator safety training for use with pesticide application and agriculture dust
9/22/2017	Davis, CA	Half face air filtering respirator safety training for use with pesticide application and agriculture dust with fit test (refresher to include fit testing)
11/5/2015 - 11/6/2015	Seaside, CA	Attended CA Dept. of Food & Ag. - Fertilizer Research & Education Program Annual Conference for in service learning about CA fertilizer management/crop production issues
11/17/2015	Davis, CA	Attend Soil and Water Short Course, sponsored by the UC Vegetable Research & Information Center, for in service learning about current acceptable methods of soil, plant, and water nutrient analyses and interpretations.
12/1/2015	Bakersfield, CA	Attended CA Association of Pest Control Advisers Nutrient Management Seminar for in service education about field level nutrient management decision making for crop production - continuing education to maintain my Qualified Applicator Certificate
12/17/2015	Tulare, CA	Attend CDQAP mtg. for training on how to utilize online learning resources, update on dairy effluent nutrient management monitoring and reporting requirements and methods
6/28/2016 - 6/30/2016	Burlingame, CA	Attended the International Groundwater Conference for in service learning about groundwater amount and quality sustainability issues in agricultural production

Begin Date - End Date	Location	Name, Description and Occurrence of Activity
8/12/2016	Internet	CA Nitrogen Assessment summary webinar - be updated on report details in order to understand implications of review and answer questions for clientele
3/1/2017 - 3/3/2017	Reno, NV	Attend Western Nutrient Mgmt. Conference for in service learning about crop fertility, regulatory, and environmental protection issues
12/2/2015 - 12/4/2015	Reno, NV	Attended Western Alfalfa and Forage Symposium for in service learning about alfalfa production issues.
2/2/2016 - 2/3/2016	Visalia, CA	Attend annual CA Chapter Agronomy Society of America Plant and Soil Conference for in service learning about local agronomy and crop production research and relevant regulatory updates.
3/8/2016 - 3/10/2016	Seaside, CA	Attended Golden State Dairy Management Conference, sponsored by UC Davis Animal Science, for in service learning about CA dairy management systems particularly regarding forage and manure handling systems
3/29/2016	Tulare, CA	Attended Tule Irrigation Co. sponsored workshop on interpretation of data from Tule Irrigation weather station to be informed on applications and limitations in agronomy research
4/18/2016	Five Points, CA	Attend Garbanzo Field Day - in service learning about garbanzo production issues
4/29/2016	Parlier, CA	Attend Almaco Harvester operation and safety training for operators and supervisors

Begin Date - End Date	Location	Name, Description and Occurrence of Activity
5/2/2016	Visalia, CA	Attend small grains field day - in service learning about small grains silage production issues
8/30/2016	Fresno, CA	Attended Almaco Co. sponsored training on use of small plot forage chopper and combine to be used in subsequent Cooperative Extension agronomy research, facilitated by Jeff Dahlberg and hosted at the Fresno State research farm
11/6/2016 - 11/9/2016	Phoenix, AZ	Attend seminars at Joint Agronomy Society of America, Crop Science Society of America, and Soil Science Society of America International Conference for in-service training on current issues in agronomy
11/29/2016 - 12/1/2016	Reno, NV	Attend 2016 CA Alfalfa and Forage Symposium for in-service learning about alfalfa and forage production, economic, and regulatory issues of CA and western US
1/31/2017 - 2/1/2017	Fresno	Attended CA Plant & Soil Conference sessions for in-service learning about CA agronomy and crop production research and regulatory updates
3/17/2017	WSREC	Equipment training (use and supervise) - Carter harvester
5/26/2017	KAREC	Irrigation theory and practice training for CE advisors & specialists
6/6/2017	WSREC	Benefits of soil mgmt. for farming systems - soil management and tillage workshop for in-service learning about issues and needs in conservation tillage based agronomic operations in the SJV

Begin Date - End Date	Location	Name, Description and Occurrence of Activity
Nov 1, 2017	Kearney REC	Contracts and Grants Training attendance. Learn processes of basic and advanced contracts/grants application and processing. Meet Contracts and Grants personnel.
Nov 2, 2017	Online	CASA training attendance. Learn definitions, rules, and rationale for establishing clientele demographic baseline, and collecting and reporting demographic data.
Jan 10, 2018	Online	Program Review/Merit training attendance
Jan 18, 2018	KAREC	Respirator fit test and training. Maintaining ability to use respirator for pesticide research activity.
Jan 29, 2018	St. Louis, MO	Sorghum Improvement Conference of North America: Sugarcane Aphid Management Workshop attendance for in-service learning and networking.
Feb 6, 2018 - Feb 7, 2018	Fresno	2018 CA Plant and Soil Conference attendance. In-service learning for agronomy, pest management, and nutrient management. Networking.
Feb 23, 2018	Online	Research Conflict of Interest training
Mar 7, 2018	Fresno, CA	CAPCA Educational Seminar: Nitrogen Management Training attendance for in-service learning and networking.
Apr 9, 2018 - Apr 12, 2018	Ontario, CA	UC ANR Statewide Conference: Water quality, wildfire impact, new academic peer cohort training attendance.
May 16, 2018 - May 18, 2018	CA Bay Area	Water Education Foundation Tour, Bay-Delta. Attended in-service learning re: Delta water delivery infrastructure and social, environmental, and economic concerns.
Jul 16, 2018	Fresno	FIS Decision Support Training attendance for in-service learning about how to manage University accounts.
Aug 23, 2018	Davis, CA	UC Davis Dry Bean Day attendance for in-service learning and peer networking

Begin Date - End Date	Location	Name, Description and Occurrence of Activity
Oct 23, 2018 - Oct 24, 2018	Seaside, CA	CDFA FREP Annual Conference - in-service training on crop nutrient management research and practices
Jan 18, 2019 - Nov 15, 2019	Remote	2019 UC People Management Networking Cohort - Ongoing training and workshop attendance to gain and improve skills in UC personnel management and ANR mission alignment.
Jan 31, 2019	KAREC	Respirator fit test and training. Maintaining ability to use respirator for pesticide research activity.
Mar 7, 2019 - Mar 8, 2019	Reno, NV	Western Nutrient Management Conference, International Plant Nutrition Institute: In-service training on crop nutrition research and practices
Apr 16, 2019	Fresno, CA	Central Valley Dairy Representative Monitoring Program Summary Representative Monitoring Report Workshop: Water Quality Control Board, Region 5 - in-service training and workshop to gain understanding or regulatory compliance recommendations for dairy
Jun 21, 2019	Remote	Physical Science Responsible Conduct of Research Course - successfully completed
Jul 2, 2019	Rancho Cordova, CA	Central Valley Salinity Alternatives for Long-Term Sustainability Workshop: State Water Quality Control Board
Aug 14, 2019	Davis, CA	Collaborative Needs Assessment Training and Workshop: Agronomic Crops PT mtg.
Mar 2, 2020 - Mar 3, 2020	Davis, CA	Grant Essentials Summit
Mar 10, 2020	Virtual	Heat Illness Prevention Training
Apr 2, 2020	Virtual	How to Safely Use and Handle Paraquat-Containing Products
Apr 21, 2020	Virtual	Collaborative Institutional Training Initiative: Research Involving Human Subjects. Social and behavioral responsible conduct of research.

Begin Date - End Date	Location	Name, Description and Occurrence of Activity
Oct 28, 2020	Virtual	CDFA FREP Annual Conference - in-service training on crop nutrient management research and practices
Nov 5, 2020 - Nov 6, 2020	Virtual	2020 CA Dairy Sustainability Summit - attended for in-service learning. Focus on manure mgmt., water quality and quantity, and greenhouse gas emission mitigation
Mar 18, 2021	Virtual	Healthy Soils Virtual Field Day - dairy manure product amendment of orchards. Attended for in-service learning
May 6, 2021 - Jun 3, 2021	Virtual	UC Short Course: Intro to Groundwater, Watersheds, and Groundwater Sustainability Plans. Attended for in-service learning to serve clientele facing water quantity and quality problems and regulatory compliance challenges
Oct 27, 2021	Virtual	UC Laboratory Safety Fundamentals Refresher

DISCIPLINARY SOCIETY OR PROFESSIONAL ASSOCIATION

Disciplinary Society/Prof. Assoc Name
Member since 2015, American Society of Agronomy
Member since 2015, American Phytopathological Society
Member since 2022, Soil Science Society of America
Member since 2022, California Weed Science Society

EVIDENCE OF PROFESSIONAL COMPETENCY (22 RECOGNITIONS OR INSTANCES DEMONSTRATING MY PROFFESIONAL COMPETENCY IN THE CURRENT RANK; 4 BRAND NEW IN 2021-22; 7 CONTINUED INTO 2021-22)

Begin Date - End Date	Location	Name, Description and Occurrence of Award, Recognition, Professional Presentation, Office or Activity
Nov 30, 2015 (Ongoing)	CA	Qualified Applicator Certificate. Maintaining QAC, required certification of position and to apply and supervise pesticide handlers and applicators by fulfilling credentialed continuing education requirements.
2/27/2017	CA	Accepted request to review CA Dry Bean Advisory Board Research Proposals
Mar 1, 2017 – Sep 26, 2022	Tulare	Accepted invitation and served as member on COS-Tulare Plant Science Dept. Curriculum Advisory Committee
6/6/2016 - 12/8/2016	Central Valley, CA	Accepted invitation and served as member on Nutrient Mgmt. Committee to review CRWQCB-CV draft Bovine General Order
11/8/2016	Phoenix, AZ	Abstract was accepted and delivered a talk at the 2016 Joint American Society of Agronomy, Crop Science Society of America, and Soil Science Society of America International Meeting on San Joaquin Valley wheat nitrogen fertilizer management research findings
Dec 11, 2017 - Jan 8, 2018	CA	Reviewed section of Central Valley Dairy Representative Monitory Program report for recommendations to Regional Water Board
May 7, 2018 (Ongoing)	CA	Certified Crop Adviser. Obtained and continue to maintain CCA license by fulfilling license continuing education requirements.
Feb 6, 2019	Fresno, CA	Invited presentation at 2019 CA Chapter - American Society of Agronomy, Plant and Soil Conference. Macro-nutrient management of forage crops (manure)
Feb 6, 2019 - Feb 3, 2022	CA	Nominated by my peers and elected to serve as general board member for CA Chapter - American Society of Agronomy

Begin Date - End Date	Location	Name, Description and Occurrence of Award, Recognition, Professional Presentation, Office or Activity
Mar 1, 2019 (Ongoing)	CA	Invited service on California Dairy Research Foundation Environmental Steering and Technical Advisory Committee
Jul 19, 2019	Monterey, CA	Invited presentation to Land-O-Lakes Producer Meeting. Sorghum forage production best management practices
Dec 9, 2019 - Sep 15, 2021	Remote	Invited to serve on funded project to support CA Dept. of Food and Agriculture regulatory requirements of irrigated farmland operators to have irrigation and nitrogen management plans certified by licensed, trained professionals. I participated in defining performance objectives and competency areas for educational material to be studied by prospective licensees, CA Certified Crop Advisers. I also participated in exam writing and editing.
Feb 26, 2020	Parlier, CA	Invitation to UC ANR - USDA NRCS Joint Meeting to identify common goals and synergy opportunities
Mar 21, 2021 (Ongoing)	Fresno, CA	MS Plant Science Thesis Committee member / accepted request to serve as a M.S. thesis committee member for a CSU Fresno Plant Sciences student Master's thesis research project
Jun 18, 2021 (Ongoing)	Online	CA Dept. of Food & Ag - Fertilizer Research and Education Program: Grower Training Ad Hoc Committee / Invited as committee member to create, evaluate, and validate educational and testing material for CA growers wishing become certified to self-certify annually required Irrigation and Nitrogen Mgmt. reports
Jun 28, 2021	Virtual	Western Extension Directors Association Award of Excellence in recognition of contributions to program "CA Dairy Quality Assurance Program - Environmental Stewardship: A Public Private Partnership" with Betsy Karle, Daniela Bruno, David Lewis, Deanne Meyer, Denise Mullinax, Jennifer Heguy, Randi Black, and Jeff Stackhouse

Begin Date - End Date	Location	Name, Description and Occurrence of Award, Recognition, Professional Presentation, Office or Activity
Nov 9, 2021	Salt Lake City, UT	2021 Joint ASA, CSSA, SSSA Poster Presentation / Challenges, Strategies, and Success with Dairy Nutrient Mgmt. Information Dissemination during a Pandemic
Nov 9, 2021	Salt Lake City, UT	2021 Joint ASA, CSSA, SSSA Oral Presentation / Nutrient Management Information Dissemination during a Pandemic
Feb 1, 2022	Tulare, CA	2022 World Ag Expo United Sorghum Checkoff Program Assist / consulted USCP Agronomy Dir. on CA sorghum production issues for his presentation to public
Aug 8, 2022	Online	Invited as panel speaker to Flood-Managed Aquifer Recharge (MAR) Network Workshop - Engaging the Ag Community: panel discussion with crop and pesticide advisors

C. UNIVERSITY SERVICE

COMMITMENTS TO UNIVERSITY SERVICE GROUPED BY ORGANIZATIONAL LEVEL AND SORTED FROM EARLIEST TO LATEST END DATE (65 COMMITMENTS IN CURRENT RANK; 10 BRAND NEW COMMITMENTS IN 2021-22; 7 COMMITMENTS MADE PRIOR TO 2021-22 CONTINUED INTO 2021-22)

Begin Date - End Date	Name and Description of Activity	My Contribution or Leadership Role
ORG LEVEL: County (17 commitments in current rank; 2 brand new in 2021-22)		
Jan 19, 2016	Leadership Tulare County talk	I presented to a local business advocacy group the benefits that UC ANR and UCCE bring to the community of Tulare County.

Begin Date - End Date	Name and Description of Activity	My Contribution or Leadership Role
Feb 19, 2016	Dairy Advisor interviews	I set up the A/V equipment for candidate presentations, and I guided area orientation tours for candidates.
Apr 20, 2016	Tree Nut Advisor Interviews	I guided an area orientation tour for a candidate.
May 19, 2016	Garlic White Rot Field Day, Five Points, CA	I assisted in the setup and breakdown of the field day in support of Tom Turini's extension activities
May 24, 2016	Fresno/Madera Multi-County Partnership	I provided my Agronomy & Nutrient Mgmt. program summary slide for Fresno - Madera Multi-County Partnership presentation of CE activities and progress by MCP Director, Shannon Mueller.
Jul 26, 2016	Livestock Advisor interviews	I setup A/V support for the candidate presentations and hosted an area orientation tour for a candidate.
Jul 29, 2016	Nutrition education specialist II interview panel	I served as an interview panel member and helped decide who should be hired to that position.
Oct 14, 2016	Fresno/Madera Multi-County Partnership progress update	I provided my Agronomy & Nutrient Mgmt. program summary slide for Fresno - Madera Multi-County Partnership presentation of CE activities and progress by MCP Director, Shannon Mueller.
Nov 17, 2016	Fresno Dairy Advisor interviews	I set up the A/V equipment for candidate presentations.

Begin Date - End Date	Name and Description of Activity	My Contribution or Leadership Role
Sep 21, 2017	Kings County 4-H Program Coordinator search	I served as an interview panel member and helped decide who should be hired to that position.
Feb 7, 2019	Kings County Grand Jury Cooperative Extension Department Periodic Report. Delivered programmatic updates for Kings and Tulare Counties Cooperative Extension delivered programs and communicated positive impacts to Grand Jury for their periodic audit of department services to the county public.	Presenter
Jun 1, 2017 – Jul 10, 2019	CE Kings Assistant County Director. In absence of County Director, I serve as Kings County and UC ANR signatory, provide support and guidance to Kings CE County and University staff, assist in hiring County personnel, represent UC ANR at Kings County Department Head meetings, and report regularly to County Director on administrative outcomes and issues requiring attention.	Asst. County Director
Oct 14, 2020 - Jul 12, 2021	Tulare County Farm Bureau Newsletter UCCE Updates. Three articles written	Author
Aug 8, 2016 - Sep 30, 2021	CE Fresno Office Space Committee	Committee member
Oct 20, 2015 - Sep 30, 2021	CE Kings County Office Safety Coordinator. Address staff safety concerns, communicate UC ANR and other required safety procedures, provide staff safety training.	Coordinator

Begin Date - End Date	Name and Description of Activity	My Contribution or Leadership Role
Oct 6, 2021 – Feb 14, 2022	UCCE Updates: Authored 2 articles for Tulare Farm Bureau newsletter to maintain visitability of Tulare CE	Author
Feb 14, 2022 - Aug 1, 2022	Asst. County Director Madera and Fresno Counties: backup signatory, backup representative to county Admin	Assistant County Director - Madera and Fresno Counties
ORG LEVEL: Multi-County Region (11 commitments in current rank; 3 brand new in 2021-22; 1 more continued into 2021-22)		
Jul 5, 2017 – Dec 31, 2017	Dairy Advisor Search Committee	Committee Member
Mar 29, 2018	Dairy Quality Assurance Work Group: Session moderation at 2018 Golden State Dairy Management Conference	Member Session moderator
Jul 11, 2019 - Sep 30, 2019	Interim County Co-Director, Kings and Tulare Counties Cooperative Extension	Interim Director
Nov 13, 2019 - Jan 29, 2020	Chair Search Committee - Small Farm Asst. Specialist	Chair
Feb 19, 2020	2020 Tulare-Kings Master Gardeners Training: Soils and Fertilizers	Presenter
Apr 29, 2020	County Boards of Supervisors update on UCCE Agronomy CoVID resilience update letter	Author
Apr 14, 2020 - Jul 24, 2020	Search Committee - Agronomy & Weed Mgmt. Area Advisor	Committee Member
Oct 21, 2021 – Dec 14, 2021	Assist with needs assessment: Agricultural Land Acquisition Academic Coordinator	Mentor to new academic

Begin Date - End Date	Name and Description of Activity	My Contribution or Leadership Role
Mar 1, 2022 - Mar 15, 2022	Dairy Production and Food Safety Program Team. Writing Tulare Dairy Advisor Position Description	Co-author, reviewer of position description
Oct 1, 2019 - Oct 19, 2022	Asst. County Director: backup signatory, backup representative to county Admin	Assistant County Director - Kings and Tulare Counties
Mar 21, 2022 - Jan 24, 2023	Search Committee: AP# 22-06 Agronomy & Weed Mgmt. Advisor - Merced etc.	Chair
ORG LEVEL: <i>Division-wide (17 commitments in current rank; 3 brand new in 2021-22; 2 more continued into 2021-22)</i>		
Sep 15, 2016	CA Association of Pest Control Advisors - Grape IPM	I covered for CE Advisor, Allison Ferry-Abee, when she was out by presenting a talk she had committed and prepared on grapevine winter IPM in order to present a unified cohort within ANR.
Jul 28, 2017	Strategic Plan Goal 5 workshop at KAREC	I offered input to ANR regarding implementing Goal 5 from the perspective of a County-based CE Advisor and user of the Research and Extension Centers.
Jul 11, 2017 - Nov 1, 2017	Area Extension Advisor Dairy search, Madera & Fresno Counties	Committee member
Oct 25, 2017 - Nov 22, 2017	Peer Reviewer: Chapter on irrigation and nutrient management in UC publication "Efficient nutrient management in CA vegetable production"	Reviewer
Nov 12, 2017 - Mar 7, 2018	Area Extension Advisor, Soil Quality/Nutrient Management, San Joaquin, Stanislaus, Merced	Committee Chair

Begin Date - End Date	Name and Description of Activity	My Contribution or Leadership Role
	Counties. Served as chair of search committee of new, NRCS/UCANR jointly funded position.	
Apr 9, 2018	Dairy Production and Food Safety Program Team: Meet to discuss ongoing and upcoming activities; rank positions in recent call for academic positions	Member Participant
Apr 9, 2018	Agronomic Crops Program Team: Meet to discuss ongoing and upcoming research activities; rank positions in recent call for academic positions.	Member Participant
Apr 11, 2018	Entomology Work Group Meeting: Discuss ongoing and upcoming research activities	Member Participant
Apr 12, 2018	Pest Management Program Team: Discuss ongoing and upcoming research activities. Rank positions in recent call for academic positions	Member Participant
Jan 9, 2018 - May 1, 2018	Peer Reviewer: Reviewed UC publication "Efficient nitrogen and irrigation management of corn grown on CA dairies"	Reviewer
Nov 12, 2017 - Feb 15, 2019	Area Extension Advisor, Soil Quality/Nutrient Management, Madera, Fresno, Kings, Tulare Counties. Serve as chair of search committee for new, NRCS/UCANR jointly funded position.	Committee Chair
Oct 30, 2020	Peer review: ANR publication on forage yield and nutrient measurement	Reviewer

Begin Date - End Date	Name and Description of Activity	My Contribution or Leadership Role
Oct 25, 2021 - Dec 10, 2021	UC President Advisory Commission on ANR tour: Co-organized and presented	Co-organizer, presenter
Sep 15, 2016 (Ongoing)	Research Advisory Committee, Row Crop Sub-Committee, KAREC. Participating sub-committee member to review and recommend proposed research projects	Committee member
Nov 3, 2017 (Ongoing)	Research Advisory Committee: WSREC. Participating committee member to review and recommend proposed research projects	Committee member
Nov 17, 2021 (Ongoing)	UC Grain Legume Workgroup Co-chair	Co-Chair
May 16, 2022 (Ongoing)	Sustainable Food Systems Strategic Initiative Panel member: assisting with SI communication to and from Admin, suggesting recruiting, onboarding and mentoring protocols.	Committee member
ORG LEVEL: State (14 commitments in current rank; 2 brand new in 2021-22; 2 more continued into 2021-22)		
Mar 8, 2016 – Mar 10, 2016	Dairy Management and Food Safety Program Team	I participated by evaluating and ranking proposed position descriptions.
Mar 22, 2016 – Mar 23, 2016	Agronomic Crops Program Team Meeting	I participated in reviewing position descriptions, planning future extension activities, prioritizing and coordinating research activities, recapitulating recent UC ANR agronomy research and extension activities.

Begin Date - End Date	Name and Description of Activity	My Contribution or Leadership Role
Jun 7, 2017	Pest Management Program Team	I offered input on upcoming and potential research and extension activities as well as future Program Team leadership structuring during a statewide Program Team meeting.
Jun 7, 2017	Entomology Workgroup	I offered input on upcoming and potential research and extension activities, especially with regard to filling gaps left by the passing of CE Entomology Specialist, Larry Godfrey.
Jun 8, 2017	Dairy Prod & Food Safety Program Team	I offered input on upcoming and potential research and extension activities, reported on my relevant research projects progress, and identified areas of potential collaboration within and beyond the program team members.
Apr 9, 2019 - Apr 10, 2019	Dairy Production and Food Safety Program Team: Meet to discuss ongoing and upcoming activities; begin planning 2020 Golden State Dairy Management Conference	Participant
Aug 15, 2019	Small Grains Workgroup - SWOT analysis for needs assessment	Participant as member
Mar 4, 2020 - Mar 5, 2020	Dairy Production and Food Safety Program Team Mtg.: Grantsmanship professional development training	Member, PT mtg. presenter on
Apr 30, 2021 - Jun 1, 2021	Search Committee: WSREC Superintendent	Committee member

Begin Date - End Date	Name and Description of Activity	My Contribution or Leadership Role
Jul 1, 2021	Dairy Production and Food Safety Program Team: Writing readability training offered for colleagues	Presenter
Apr 15, 2022	CE Newsletter Editorial Review: CA Dairy Newsletter	Reviewer
Aug 14, 2019 – May 13, 2022	Agronomic Crops Program Team Leadership. Needs assessment, positions prioritization.	Co-Chair
Aug 25, 2021 – Nov 16, 2022	Dairy Production and Food Safety Program Team. Prioritization of advisor and specialist positions	Co-author, reviewer of position description
Nov 17, 2021 (Ongoing)	UC ANR Co-Liaison to CA Dry Bean Advisory Board	Co-Liaison and Board research advisory panel member
ORG LEVEL: National (1 commitment in current rank)		
Jan 5, 2016	Beltwide Cotton Conference	I delivered presentation of cotton Fusarium pathology research previously done as part of research with PI Bob Hutmacher to provide continuity of his program's extension at the conference in New Orleans, LA.
ORG LEVEL: International (5 commitments in current rank; 2 continued into 2021-22)		
Feb 10, 2016	Tulare World Ag Expo	I staffed the UC ANR booth for 1/2 day and answered questions of local and international visitors about the organization, purpose, and activities of UC ANR programs.
Aug 15, 2017	International ag student tours	I provided farm tours for international ag students in cooperation with local growers and PCA's involved in the

Begin Date - End Date	Name and Description of Activity	My Contribution or Leadership Role
		production of dairy forage crops to orient the students to local production practices and industry needs as well as highlight ongoing UCCE research projects.
Sep 7, 2017	International Nufield Farming Scholar orientation	I provided an orientation to the southern San Joaquin Valley dairy cropping system's manure nutrient management challenges and research being performed by UC ANR academics for British International Nufield Farming Scholar to promote international research partnership and collaboration.
Aug 2, 2021 - Dec 6, 2021	Search committee member: Abiotic Stress Assistant CE Specialist	Committee member
Apr 15, 2021 - Dec 23, 2021	Search Committee: Director for Kearney REC and West Side REC academic and KREC and WSREC Director/Academic Program Manager (2 concurrent searches to fill 1 position)	Committee member

D. PUBLIC SERVICE

COMMITMENTS TO PUBLIC SERVICE (25 COMMITMENTS IN CURRENT RANK; 2 BRAND NEW IN 2021-22; 1 COMMITMENT CONTINUED INTO 2021-22)

Begin Date - End Date	Name and Description of Activity	Org Level	My Contribution or Leadership Role
April 14, 2016	STEM Cafe, Santa Rosa High School, Santa Rosa, CA, Student mentorship	Statewide	I taught a seminar and created and facilitated a workshop in collaboration with Piner High School about plant pathology research, plant disease challenges faced by growers, and how to use microscopes in plant pathology diagnostics and analytics to local students, parents, and school faculty.
April 23, 2016	FFA Statewide Championship Field Day, Fresno State	Statewide	I volunteered as a contest judge for FFA students competing in the statewide championship alfalfa hay judging contest. I also provided example seed for the statewide championship seed identification and quality judging contests.
April 22, 2017	FFA Statewide Championship Field Day, Fresno State	Statewide	I volunteered as a contest judge for FFA students competing in the statewide championship alfalfa hay judging contest. I also provided example seed for the statewide championship seed identification and quality judging contests.
Jan 20, 2016	UC Master Gardeners Tulare/Kings Counties volunteer training seminar	County	I put together and presented the <i>Introduction to Horticulture</i> lecture to incoming Master Gardener trainees.
Feb 22, 2016	Sunnyside High School Ag Pathway Classroom	County	I provided in-class and web-based assistance with literature reviews and issues-based writing involving contemporary ag industry issues to high school students in an ag science pathway program
March, 31, 2016	Sunnyside High School Ag Pathway Annual Ag Showcase	County	I judged student presentations of contemporary ag issues debates at an ag pathway student-teacher organized community showcase event.
Feb 8, 2017	Master Gardener Tulare-Kings presentation - scouting for pests	County	I put together and presented a seminar on pest and disease scouting for Master Gardener volunteers.

Begin Date - End Date	Name and Description of Activity	Org Level	My Contribution or Leadership Role
Sep 12, 2017	Sunnyside High School Ag Pathway Classroom	County	I taught four classes to ag pathway students about agriculture career readiness.
Oct 17, 2017	College of Sequoias, Tulare, Plant Science student field day: Promoting agricultural science proficiency through research demonstration	Region	Facilitator Presenter
Nov 20, 2017	Fresno State Plant Science Graduate Seminar lecture and extension promotion. Deliver lecture to regular class and discuss/promote career training and opportunities in Cooperative Extension.	Region	Presenter
Jan 17, 2018	Tulare/Kings Counties Master Gardener Volunteer Training. Presented "Introduction to Horticulture" lesson to incoming volunteers.	County	Presenter
Apr 21, 2018	Future Farmers of America: Statewide Championship Judge volunteer	State	Volunteer judge
Sep 19, 2018	Avenal High School, Wonderful Company Ag Leadership Alfalfa Field Day Hosting: promoting ag science careers for youth	Community	Host Main contact
Feb 6, 2019 - Feb 5, 2020	2020 CA-ASA Plant and Soil Conference	State	Co-organizer, and session chair and moderator
Mar 25, 2019	UC Davis Career Trek - promoted ANR values and career options in Cooperative Extension to a range of college students.	State	Presenter
Mar 29, 2019	Parlier Junior High Career Day. Promoted science literacy, college readiness, and agricultural sciences careers among youth.	Region	Presenter

Begin Date - End Date	Name and Description of Activity	Org Level	My Contribution or Leadership Role
Apr 23, 2019 - Jun 9, 2021	USDA National Agricultural Statistics Service - CA Crop Progress Report	Region	Contributor
Nov 20, 2019 - Feb 18, 2020	FFA Student Research Program. Mentored high school student in blackeye pea agronomy research experiment and competition.	Region	Mentor
Feb 5, 2020 - Feb 3, 2021	2021 CA-ASA Virtual Plant and Soil Conference	State	Co-organizer, chair of two sessions
Jul 31, 2020	Pesticide re-labeling support letter	State	Co-author
Nov 7, 2020 - Nov 9, 2020	FFA 2020 State Championship Competition Judge. Judged students giving reasons for ranking cotton quality.	State	Judge
Feb 3, 2021 - Feb 3, 2022	2022 CA Plant and Soil Virtual Conference Planning	State	Co-organizer, 2 sessions chair
Mar 23, 2021 - May 13, 2021	2021 CA FFA State Championship Judging. Essay and oral presentation competitions.	State	Judge
Feb 4, 2022 – Feb 8, 2023	2023 CA Plant and Soil Conference Planning	State	Co-organizer, session co-chair
Sep 5, 2022 (Ongoing)	FFA Student Researcher Mentorship: Mentoring Hanfor High School student in weed management research in preparation for state championship entry	Community	Co-PI, mentor

E. EXTENSION ACTIVITIES

MEETINGS ORGANIZED (23 IN CURRENT RANK; 6 IN 2021-22)

Begin Date - End Date	Meeting Name and Type	Topic/no. of repetitions	Role	Location(s)	Total No. of Attendees
THEME: Agronomic Crop Production (17 in current rank; 3 in 2021-22)					
9/14/2016	Field Day <i>Alfalfa and Forage Field Day</i>	San Joaquin Valley alfalfa and forage production issues with research and regulatory updates/ 1	Co-organizer, presenter	KAREC, Parlier, CA	65
Mar 7, 2017 – Mar 9, 2017	Seminars <i>Sorghum Silage for California Dairies</i>	Sorghum silage production and management issues research and best management practice recommendations / 2	Co-organizer Presenter	Madera, CA Tulare, CA	60
Sep 20, 2017	Field Day <i>Alfalfa and Forage Field Day</i>	San Joaquin Valley alfalfa and forage production issues with research and regulatory updates/ 1	Co-organizer, presenter	KAREC, Parlier, CA	65
Nov 30, 2017	Symposium <i>Western Alfalfa Symposium</i>	Alfalfa and forage production research and best management practices recommendations for western United States audience / 1	Co-organizer Presenter	Reno, NV	311
Sep 19, 2018	Field Day <i>2018 Kearney Alfalfa and Forage Field Day</i>	San Joaquin Valley alfalfa and forage production issues with research and regulatory updates/ 1	Co-organizer Presenter	KAREC	40

Begin Date - End Date	Meeting Name and Type	Topic/no. of repetitions	Role	Location(s)	Total No. of Attendees
Sep 27, 2018	Field Day <i>San Joaquin Valley Agronomic Crops Field Day</i>	Research updates on field crops of the San Joaquin Valley / 1	Co-organizer Presenter	Five Points, CA	30
Sep 19, 2019	Seminar <i>Feeding Beets on CA Dairy Farms</i>	Sugar beet production and feeding management issues / 1	Co-organizer	KAREC	10
Sep 19, 2019	Field Day <i>2019 Kearney Alfalfa and Forage Field Day</i>	Agronomic crop production management issues / 1	Co-Organizer Presenter	KAREC	55
Sep 30, 2019 - Sep 23, 2020	Field Day <i>2020 Alfalfa and Forage Field Day</i>	Alfalfa and Forage Virtual Field Day, 2020 / 1	Co-organizer	Virtual	54
Nov 21, 2019	Symposium <i>2019 Western Alfalfa and Forage Symposium</i>	Alfalfa and forage production research and best management practices recommendations for western United States audience / 1	Co-organizer Session co-chair	Reno, NV	300
Dec 2, 2019 - Mar 4, 2020	Conference Seminars <i>2020 UC Golden State Dairy Management Conference</i>	2020 Dairy animal, facility and forage production issues: Biennial Conference / 1	Co-organizer, session chair	Modesto, CA	35
Dec 19, 2019 - Feb 11, 2020	Seminars <i>2020 UC Golden State Dairy Management</i>	Crop Production: Growing sustainable feed in a regulated environment / 1	Co-organizer, session chair	Tulare, CA	17

Begin Date - End Date	Meeting Name and Type	Topic/no. of repetitions	Role	Location(s)	Total No. of Attendees
	<i>Conference at the World Ag Expo Seminar Series</i>				
Mar 25, 2021	Conference Seminars <i>2021 UC Golden State Dairy Management Conference</i>	Dairy animal health, milk quality, forage production, and environmental stewardship / 1	Co-organizer, presenter	Webinar	41
Sep 23, 2021	Field Day <i>2021 SJV Alfalfa and Forage Field Day</i>	Pest, nutrient, irrigation, and varietal selection management solutions for forage production / 1	Co-organizer, presenter	Parlier, CA	23
Feb 3, 2022 – Feb 9, 2022	Seminars <i>Golden State Dairy Management Conference at the Farm Show: two days, four sessions</i>	Four sessions: "Feeding the CA Dairy Herd," "Nutrient Mgmt. & Manure Treatment Tech," "Water-Wise Dairying," & "Manure Mgmt. Options on Your Dairy" / 1	Co-organizer, moderator	Tulare, CA	50
Mar 23, 2022	Conference Seminars <i>UC Golden State Dairy Management Conference: one day, six sessions</i>	Six sessions: "Nutrition," "Manure Mgmt.," "Hot Topics 1," "Hot Topics 2," "Herd Health," & "Agronomy." / 1	Co-organizer, session moderator, presenter, co-author to two presentations	Modesto, CA	77
Sep 29, 2022	Field Day <i>2022 SJV Alfalfa and Forage Field Day</i>	Alfalfa and forage production research updates / 1	Co-organizer, presenter	Parlier, CA	48

Begin Date - End Date	Meeting Name and Type	Topic/no. of repetitions	Role	Location(s)	Total No. of Attendees
THEME: Agricultural Nutrient Stewardship (5 in current rank; 3 in 2021-22)					
Feb 24, 2017	Seminar and Panel Discussion <i>San Joaquin Valley Nitrogen Management: How agriculture is meeting the challenge</i>	Research, regulatory, and management practice challenges of agricultural nitrogen in the San Joaquin Valley of California / 1	Co-organizer Presenter	Hanford, CA	44
Nov 27, 2018 – Nov 28, 2018	Workshop <i>2018 CA Alfalfa and Forage Symposium: Soil Health Workshop</i>	Research and educational updates in the field of soil health relevance to forage production in CA / 1	Co-organizer Facilitator Presenter	Reno, NV	150
May 6, 2021 – Nov 18, 2021	Symposium <i>Western Alfalfa and Forage Symposium</i>	Alfalfa and forage production research and best management practices recommendations for western United States audience / 1	Co-organizer	Reno, NV	200
Nov 4, 2021	Webinar <i>Using N-Rich Reference Zones to Guide N Management in California Small Grains / for CA growers and crop consultants engaged in N mgmt. in small grains</i>	Small grain N management technical training and case study presentations / 1	Co-organizer Presenter	Online	20
Apr 20, 2022	Field Day <i>Achieving Efficient Nitrogen Fertilizer Management in California Wheat</i>	Small grain N management technical training, case study presentations, and field demonstrations / 1	Co-organizer Presenter	Corcoran, CA	10

Begin Date - End Date	Meeting Name and Type	Topic/no. of repetitions	Role	Location(s)	Total No. of Attendees
THEME: <i>Integrated Pest Management (1 in current rank)</i>					
Sep 7, 2015	Field Day <i>Sugarcane Aphid in Sorghum Tailgate Meeting</i>	Notification of new CA invasive insect species pest in sorghum and best management practices recommendations / 1	Co-organizer	Pixely, CA	15

EDUCATIONAL PRESENTATIONS (53 IN CURRENT RANK; 11 IN 2021-22)

Begin Date - End Date	Meeting Name/Event	Presentation Topic/no. of repetitions	Location(s)	No. of Attendees
THEME: <i>Agronomic Crop Production (7 in current rank; 3 in 2021-22)</i>				
Mar 9, 2016	Golden State Dairy Management Conference	Oral <i>Corn production management with limited water and improved nitrogen use efficiency / 1</i>	Seaside, CA	50
Mar 1, 2019	Santa Clara Hay Days Workshop	Oral <i>Small grain establishment practices / 1</i>	Morgan Hill, CA	20
Mar 4, 2020	2020 UC Golden State Dairy Management Conference	Oral <i>Sorghum Silage Production and Quality in California / 1</i>	Modesto, CA	15
Sep 23, 2021	2021 SJV Alfalfa and Forage Field Day	Oral <i>San Joaquin Valley Forage Grower and Consultant Needs and Priorities / 1</i>	Parlier, CA	23
Feb 9, 2022	UC Dairy Series at the 2022 World Ag Expo	Oral	Tulare, CA	25

Begin Date - End Date	Meeting Name/Event	Presentation Topic/no. of repetitions	Location(s)	No. of Attendees
		<i>Dairy feed sugar beets and safflower: Yield and water use / 1</i>		
Mar 23, 2022	UC Golden State Dairy Management Conference	Oral <i>Sorghum as a Water Saver / 1</i>	Modesto, CA	25
Sep 29, 2022	2022 SJV Alfalfa and Forage Field Day	Oral <i>Growing and Feeding Sugar Beets and Safflower to Dairy Cows in the San Joaquin Valley of CA / 1</i>	Parlier, CA	48
THEME: Agricultural Nutrient Stewardship (29 in current rank; 5 in 2021-22)				
Feb 2, 2016 – Feb 3, 2016	CA Plant and Soil Conference	Poster <i>Wheat N fertilization rate and timing effect on grain yield and protein/ 2</i>	Visalia, CA	75
Sep 22, 2016	Sustainable Cotton Project Continuing Education Mtg.	Oral <i>Use of dairy manure in alfalfa as a fertilizer amendment best management practices / 1</i>	Dos Palos, CA	40
Jan 1, 2017 – Feb 1, 2017	CA Plant and Soil Conference	Poster <i>Corn and sorghum nitrogen fertilization rate by irrigation level effects and interactions on crop yield and soil reserves of nitrogen and water / 2</i>	Fresno, CA	50
Feb 24, 2017	San Joaquin Valley Nitrogen Management: How agriculture is meeting the challenge	Oral <i>San Joaquin Valley Wheat Nitrogen Management for Maximum Economic Return / 1</i>	Hanford, CA	44

Begin Date - End Date	Meeting Name/Event	Presentation Topic/no. of repetitions	Location(s)	No. of Attendees
Mar 29, 2017	Exeter CA Association of Pest Control Advisors - Certified Crop Advisers' continuing education seminar	Oral <i>Forage crops fertility management / 1</i>	Exeter, CA	60
Nov 28, 2017	2017 Western Alfalfa and Forage Symposium	Oral <i>Fertilizing Alfalfa for High Yields / 1</i>	Reno, NV	311
Mar 18, 2018	UCCE/Almond Board of CA Nitrogen Management Plan Workshop	Oral <i>Current CA Water Quality Regulations, Rationale, Requirements, and Future Direction for Farmers / 1</i>	Bakersfield, CA	45
Mar 29, 2018	2018 Golden State Dairy Conference	Oral <i>Nitrogen removal and use efficiency in manured SJV corn / 1</i>	Stockton, CA	40
Apr 4, 2018	Exeter CCA Seminar	Oral <i>Manure Nutrient Management for SJV Forage Crops / 1</i>	Exeter, CA	33
Jul 25, 2018	Sustainable and Organic Production in the Central Valley	Oral <i>Fertilization of Dairy Forage Crops with Manure / 1</i>	Clovis, CA	60
Sep 19, 2018	2018 Alfalfa Forage Field Day	Oral <i>Manured Corn-Wheat N, P, & K Budgeting / 1</i>	Parlier, CA	52

Begin Date - End Date	Meeting Name/Event	Presentation Topic/no. of repetitions	Location(s)	No. of Attendees
Nov 27, 2018	2018 California Alfalfa and Forage Symposium & Soil Health and Fertility Workshop	Oral <i>Methods for Soil Sampling and Plant Sampling for Alfalfa and Forage Crops / 1</i>	Reno, NV	27
Mar 13, 2019	CDFA Nitrogen Management Training for Certified Crop Advisers	Oral <i>Wheat and Corn Nitrogen Management / 1</i>	Fresno, CA	22
Jul 30, 2019	Sustainable and Organic Production in the Central Valley - OFAC	Oral <i>Irrigation & Nitrogen Mgmt. for Corn and Sorghum Forage in the San Joaquin Valley, CA / 1</i>	Easton, CA	33
Aug 8, 2019	Sustainable and Organic Production in the Central Valley - OFAC	Oral <i>Fertilizing Dairy Forage Crops with Manure / 1</i>	Tulare, CA	39
Sep 19, 2019	2019 Kearney Alfalfa and Forage Field Day	Oral <i>Manure N, P, & K Cycling in Corn-Wheat Rotation / 1</i>	KAREC	55
Oct 29, 2019	2019 FREP-WPHA Nutrient Management Conference	Oral <i>Nitrogen and Irrigation Management Planning Workshop: Soil Nitrate Quick Test demonstration / 1</i>	Fresno, CA	25
Nov 20, 2019	2019 Western Alfalfa and Forage Symposium	Oral <i>Corn and Sorghum as Forages: Water and N Implications / 1</i>	Reno, NV	21

Begin Date - End Date	Meeting Name/Event	Presentation Topic/no. of repetitions	Location(s)	No. of Attendees
Jan 10, 2020	SJC and Delta Field Crops Meeting	Oral <i>Fertilizing Corn and Wheat with Manure: Research Results / 1</i>	Stockton, CA	45
Mar 4, 2020	2020 UC Golden State Dairy Management Conference	Oral <i>Fertilizing Corn and Wheat with Dairy Manure / 1</i>	Modesto, CA	20
Nov 5, 2020 - Nov 6, 2020	2020 CA Dairy Sustainability VIRTUAL Summit	Virtual oral <i>Manure nutrient recycling in grain forage double crop / 1</i>	Webinar	unknown
Mar 25, 2021	2021 UC Golden State Dairy Management VIRTUAL Conference	Virtual oral <i>Getting the most fertilizer value from your manure / 1</i>	Webinar	41
May 12, 2021	Small Grains/Alfalfa-Forages VIRTUAL Field Day	Virtual oral <i>Using N-Rich Reference Zones to Guide N Fertilizer Mgmt. for Irrigated Triticale in the SJV / 1</i>	Webinar	112
Aug 12, 2021	Organic Fertilizer Association of CA - Sustainable & Organic Production in the Central Valley Seminars	Oral <i>Dairy manure as a fertilizer in CA / 1</i>	Tulare, CA	61
Oct 17, 2021	2021 CA Association of Pest Control Advisers Statewide Conference and VIRTUAL Agri-Expo: Online	Oral <i>Nitrogen Management of Forage Crops / 1</i>	Online	995
Nov 18, 2021	Organic Fertilizer Association of California November Seminar	Oral	Fresno, CA	75

Begin Date - End Date	Meeting Name/Event	Presentation Topic/no. of repetitions	Location(s)	No. of Attendees
		<i>Dairy manure as a Fertilizer in California / 1</i>		
Feb 8, 2022	UC Golden State Dairy Conference Series at the 2022 World Ag Expo	Oral <i>Nutrient Management with “Other” Advanced Treatment Technologies / 1</i>	Tulare, CA	25
Apr 12, 2022 – Apr 14, 2022	California Dairy Sustainability VIRTUAL Summit 2022	Virtual oral <i>Physical and chemical composition of settled sludge in a drained manure lagoon / 1</i>	Online	350
Aug 11, 2022	Sustainable and Organic Production in the Central Valley – OFAC	Oral <i>Updated dairy manure as a fertilizer in CA / 1</i>	Tulare, CA	75
THEME: Integrated Pest Management (17 in current rank; 3 in 2021-22)				
Feb 2, 2016 – Feb 3, 2016	CA Plant and Soil Conference poster	Poster <i>Fusarium wilt of cotton, race 4, symptom severity-based selection of disease resistance / 2</i>	Visalia, CA	75
Mar 7, 2017 – Mar 9, 2017	Sorghum Silage Research Seminars	Oral <i>Effective IPM methods for controlling the Sugarcane Aphid of sorghum epidemic in the San Joaquin Valley / 2</i>	Fresno & Madera, CA	30
Aug 10, 2017	Tulare CA Association of Pest Control Advisors - Continuing education seminar	Oral <i>Integrated pest management in organic alfalfa / 1</i>	Tulare, CA	140

Begin Date - End Date	Meeting Name/Event	Presentation Topic/no. of repetitions	Location(s)	No. of Attendees
Sep 20, 2017	Alfalfa and Forage Field Day	Oral <i>SCA epidemic update, control methods, and original research results presentation / 1</i>	Parlier, CA	75
Nov 9, 2017	CAPCA ED Tulare CE Seminar	Oral <i>Management of Sugarcane Aphid in CA Forage Sorghum / 1</i>	Tulare, CA	80
Mar 22, 2018	CAPCA Educational Seminar	Oral <i>Pest and Disease Challenges in SJV Dairy Forage Crops / 1</i>	Fresno, CA	211
Mar 27, 2018	PAPA Seminar	Oral <i>Management of some insect pests of alfalfa and sorghum / 1</i>	Fresno, CA	148
Sep 27, 2018	SJV Agronomic Crops Field Day	Oral <i>Sorghum Sugarcane Aphid Pest Control Research Update / 1</i>	UC WSREC	42
Mar 1, 2019	Santa Clara Hay Days Workshop	Oral <i>Small Grain Rust Disease Management / 1</i>	Morgan Hill, CA	20
May 15, 2019	Small Grains/Alfalfa-Forages Field Day	Oral <i>Forage Sorghum Production and Sugarcane Aphid Control / 1</i>	Davis, CA	21
Nov 7, 2019	CAPCA Educational Seminar Series	Oral <i>Managing Diseases and Arthropod Pests in Dairy Forage Crops / 1</i>	Tulare, CA	50

Begin Date - End Date	Meeting Name/Event	Presentation Topic/no. of repetitions	Location(s)	No. of Attendees
Nov 20, 2019	2019 Western Alfalfa and Forage Symposium	Oral <i>Sugarcane Aphid & Potential Control Strategies oral presentation / 1</i>	Reno, NV	52
May 12, 2021	Small Grains/Alfalfa-Forages VIRTUAL Field Day	Virtual oral <i>Sugarcane Aphid Control in Forage Sorghum / 1</i>	Webinar	112
Sep 22, 2021	Tulare-Kings Chapter, CA Pest Control Adviser Association Educational Seminar Series	Oral <i>Emerging weed issues in SJV Small Grains / 1</i>	Tulare, CA	108
Jan 14, 2022	San Joaquin County and Delta Field Crops VIRTUAL Meeting	Virtual oral <i>Updated emerging weed issues in SJV small grains / 1</i>	Online	22
Sep 8, 2022 – Sep 22, 2022	Fresno-Madera and Tulare-Kings Counties Chapters of the CA Association of Pest Control Advisers Continuing Education Days	Oral <i>SJV Small Grains Weed Management / 2</i>	Fresno, CA Tulare, CA	365
Sep 29, 2022	2022 SJV Alfalfa and Forage Field Day	Oral <i>SJV Small Grains Weed Management Issue: herbicide resistance in Common chickweed / 1</i>	Parlier, CA	48

WEB AND SOCIAL MEDIA OUTREACH AND EXTENSION (16 IN CURRENT RANK; 3 IN 2021-22)

Begin Date - End Date	Description	No. of Instances
THEME: Agronomic Crop Production (6 in current rank; 2 in 2021-22)		
Jan 1, 2016 (Ongoing)	Online presentation slides and supplemental materials posting Kearney Alfalfa and Forage Field Day Presentations Online Posting on UC Davis Alfalfa Website: http://agric.ucdavis.edu/2020_Alfalfa_Forage_Virtual_Field_Day/ http://agric.ucdavis.edu/2019_Alfalfa_-_Forage_Field_Day/ http://agric.ucdavis.edu/2018_Alfalfa_-_Forage_Field_Day/ http://agric.ucdavis.edu/Alfalfa_-_Forage_Field_Day_September_20th_2017/ http://alfalfa.ucdavis.edu/FieldDay/2016/KAC.aspx	5
Oct 24, 2017 (Ongoing)	Blog editing Co-editing <i>Alfalfa and Forage News</i> blog. For announcement of annual SJV (Kearney REC) Alfalfa and Forage Field Day schedule and online postings of field day presentation materials.	9
Nov 5, 2020 - Nov 6, 2020	Online video recordings 2020 CA Dairy Sustainability Summit - Recorded and produced video presentation for Growing and Feeding Sugarbeets on CA Dairies: Production and Quality at Harvest, presented by Stephen Kaffka	1
Jun 3, 2021	Online video recordings Co-organizer of seminar series and presenter for <i>2021 Word Ag Expo Seminars - Golden State Dairy Management Series</i> : https://www.youtube.com/watch?v=eV-ucVNgpVo&t=8631s	1
Jan 6, 2022	Blog editing Co-editing <i>CA Dry Bean</i> blog. For announcement of CA Dry Bean Advisory Board research RFPs	1

Begin Date - End Date	Description	No. of Instances
Jun 1, 2022	Website <i>Critical Needs for Agronomic Crop Production in California</i> / an interactive site to filter results of the 2020 statewide collaborative needs assessment performed through the UC ANR Agronomic Cropping Systems Program Team: https://www.uccesurveyresults.com/#/	1
THEME: Agricultural Nutrient Stewardship (9 in current rank; 1 in 2021-22)		
Dec 4, 2016	Online video recordings Main presenter in <i>Management of Phosphorus and Potassium for Alfalfa Production</i> : https://lecture.ucanr.edu/Mediasite/Play/f926611d7a8f42c0a045ac8fb-d9d13441d	1
Nov 30, 2017	Online video recordings Main presenter in <i>Fertilizing Alfalfa for High Yields</i> : http://lecture.ucanr.edu/Mediasite/Play/cae8ebd99a08428998c08163d09b259e1d	1
Nov 29, 2018	Online video recordings Main presenter in <i>Methods for Soil Sampling and Plant Sampling for Alfalfa and Forage Crops</i> : http://lecture.ucanr.edu/Mediasite/Play/fbda32cb894e4757a05648aad-cdbd0ba1d	1
Nov 21, 2019	Online video recordings Main presenter in <i>Corn and Sorghum as Forages: Water and N Implications</i> : https://www.youtube.com/watch?v=XPd1bOgs4Fc&feature=youtu.be	1
Apr 3, 2020	Website Assisted in development of <i>UC Small Grains Soil Nitrate Quick Test</i> / interactive training and calculator tool for soil nitrate testing to	1

Begin Date - End Date	Description	No. of Instances
	improve N use efficiency: https://smallgrains.ucanr.edu/Nutrient_Management/snqt/	
Apr 3, 2020	Website Assisted in development of <i>N-rich reference zones for in-season N fertilizer management</i> / a site for cataloging interactive informational and training resources for using improved N fertilizer management practices in small grains production: https://smallgrains.ucanr.edu/Nutrient_Management/N-rich_reference_zones/	1
Nov 9, 2020	Online video recordings Presenter in <i>CDFA Online Irrigation and Nitrogen Management Training Program - Annual Crops Nutrient Management</i> : https://www.cdfa.ca.gov/is/fldrs/frep/continuing_education.html https://www.youtube.com/watch?v=Dg7f_IUnYY	1
Jan 28, 2021	Website Assisted in development of <i>The Nitrogen Fertilizer Management Tool for California Wheat (Beta)</i> / interactive web tool for developing site-specific N fertilizer recommendations in CA small grains: https://smallgrain-n-management.plantsciences.ucdavis.edu/	1
Oct 12, 2021	Online video recordings Main presenter and editing assistant for <i>N-Rich Reference Zones Virtual Field Day (Kings County)</i> / Youtube video demonstrating activities: https://www.youtube.com/watch?v=9bnsNYVG1BA	1
THEME: <i>Integrated Pest Management (1 in current rank)</i>		
Nov 21, 2019	Online video recording Main presenter for <i>Sugarcane Aphid and Potential Strategies for Control</i> :	1

Begin Date - End Date	Description	No. of Instances
	http://lecture.ucanr.edu/Mediasite/Play/72aaca0228674b1e9be130d5f7fc4b371d	

PUBLIC MEDIA OUTREACH AND EXTENSION (15 IN CURRENT RANK; 1 IN 2021-22)

Begin Date - End Date	Interviewed/Written By (optional)	Topic	Name of Media or Publication
THEME: Agronomic Crop Production (5 in current rank, 1 in 2021-22)			
Aug 30, 2019	Brian German	Public invitation, radio to and description of extension event about agronomic crops production management issues	<i>AgNet West Radio</i>
Aug 30, 2019	Brian German	Public invitation, radio to and description of extension meeting to cover growing and feeding sugar beets on CA dairies	<i>AgNet West Radio</i>
Jul 28, 2020	Brian German	Public invitation, radio to participate in Agronomy Needs Assessment Survey if received.	<i>AgNet West Radio</i>
Sep 9, 2021	Brian German	Public invitation, radio to attend 2021 SJV (KREC) Alfalfa and Forage Field Day	<i>AgNet West Radio</i>

Begin Date - End Date	Interviewed/Written By (optional)	Topic	Name of Media or Publication
Dec 16, 2021	UC ANR Staff, unidentified	Press announcement of alfalfa managed aquifer recharge research results	<i>Western Farm Press:</i> https://www.farmprogress.com/conservation-and-sustainability/groundwater-could-get-recharge-from-alfalfa-farms
THEME: Agricultural Nutrient Stewardship (7 in current rank)			
Aug 10, 2018	Matthew Malcom	Video interview recapping UCCE Manure N Study Update in Dairy Feed Crops: https://www.youtube.com/watch?v=bTEX4XVruU&t=186s	<i>CA Dairy Magazine</i>
Nov 1, 2018	Kathy Coatney	Press announcement of alfalfa macronutrient fertility management	<i>Ag Alert</i>
Apr 13, 2020	Jeannette Warnert	Press announcement of multiple research and extension projects emphasizing UC advisors help dairy operations protect groundwater	<i>Western Farm Press:</i> https://www.farmprogress.com/farm-life/uc-advisors-help-dairy-operations-protect-groundwater
Jun 16, 2021	Brian German	Radio interview encouraging participation in CA Dairy Research Foundation funded	<i>AgNet West Radio</i>

Begin Date - End Date	Interviewed/Written By (optional)	Topic	Name of Media or Publication
		<i>Research Project Takes Closer Look at Potential Value of Manure</i>	
Jul 12, 2021	Brian German	Radio interview updating listeners of CA Dairy Research Foundation funded project results: <i>Efforts to Understand Nutrient Composition of Vacuumed Manure</i>	<i>AgNet West Radio</i>
Jul 12, 2021	Pam Kan-Rice	Press announcement of new Foundation for Food and Agriculture Research funded project: <i>Dairy's Net Zero Initiative gets \$10 million boost</i>	<i>Western Farm Press:</i> https://www.farmprogress.com/dairy-cattle/dairy-s-net-zero-initiative-gets-10-million-boost
Aug 2, 2021	Brian German	Radio interview announcing new Foundation for Food and Agriculture Research funded project: <i>Research Grant of \$10 Million Will Support Dairy Industry's Net Zero Initiative</i>	<i>AgNet West Radio</i>
THEME: <i>Integrated Pest Management (3 in current rank)</i>			
Oct 3, 2017	Cecelia Parsons	Press announcement Sugarcane Aphid in SJV,	<i>Ag Alert</i>

Begin Date - End Date	Interviewed/Written By (optional)	Topic	Name of Media or Publication
		2017 news, upcoming extension/research promotion	
Feb 26, 2018	Brian German	Radio interview recapping Sugarcane Aphid of Sorghum Management	<i>AgNet West Radio</i>
Mar 19, 2020	Brian German	Radio interview recapping results and recommendations from sugarcane aphid in sorghum research	<i>AgNet West Radio</i>

NICHOLAS CLARK BIBLIOGRAPHY

Peer Reviewed	
B - Peer-reviewed scholarly journal publications	6
C - Other peer-reviewed publications	1
TOTAL in latest single year term (2021 – 2022)	4
TOTAL in Assistant Rank (2015 – 2022)	7

Non-Peer Reviewed	
A - Popular press articles	65
D - Technical reports and other non-reviewed articles	23
E - Published abstracts	22
TOTAL in latest single year term (2021 – 2022)	17
TOTAL in Assistant Rank (2015 – 2022)	110

TOTAL in latest single year term (2021 – 2022)	21
TOTAL in Assistant Rank (2015 – 2022)	117

Notes on Formatting	
Entries added since last review period are highlighted yellow for distinction and consideration in current application.	
Bold text in entries is used to distinguish my name in list of authors and my role in authorship.	

PEER REVIEWED

B - Peer-reviewed scholarly journal publications

- Geisseler, D.; Miller, Kenneth; Aegerter, Brenna J.; **Clark, Nicholas**; Miyao, Eugene M. (2019). "Estimation of Annual Soil Nitrogen Mineralization Rates using an Organic-Nitrogen Budget Approach." *Soil Sci. Soc. Am. J* 83(4): 1227-1235. **Acquisition of data; draft revision.**
- Miller, Kenneth; Aegerter, Brenna J.; **Clark, Nicholas**; Leinfelder-Miles, Michelle; Miyao, Eugene M.; Wilson, Rob; Geisseler, D. (2019). "Relationship between soil properties and nitrogen mineralization in undisturbed soil cores from California agroecosystems." *Communications in Soil Science and Plant Analysis* 50(1). **Acquisition of data; draft revision.**
- Miller, Christine M. F.; **Clark, Nicholas E.**; Meyer, Deanne (2021). "Optimizing accuracy of measurement protocols for nitrogen application in dilute dairy manure." *Journal of Environmental Quality*. **Conception of work; interpretation of data; and drafting and revising.**

- Huynh, Bao Lam; Duong, Tra; **Clark, Nicholas E.**; Long, Rachael; Light, Sarah E.; Dahlquist-Willard, Ruth M.; Ehlers, Jeffrey D.; Close, Timothy J.; Roberts, Philip A. (2021). "Registration of aphid-resistant 'California Blackeye 77' cowpea." *Journal of Plant Registrations* 16(1): 8. **Acquisition, analysis, and interpretation of data; drafting and revising.**
- Kanter, Jessica; **Clark, Nicholas**; Lundy, Mark Edward; Koundinya, Vikram; Leinfelder-Miles, Michelle; Long, Rachael; Light, Sarah E.; Brim-DeForest, Whitney B.; Linquist, Bruce; Putnam, Dan; Hutmacher, Robert B.; Pittelkow, Cameron M. (2021). "Top management challenges and concerns for agronomic crop production in California: Identifying critical issues for extension through needs assessment." *Agronomy Journal* 113(6): 17. **Conception and design of work; acquisition and interpretation of data; drafting and revising.**
- Santiago, Suzette; Light, Sarah; **Clark, Nicholas**; Wang, Zheng; Mathesius, Konrad; Geisseler, D. (2022). "Seasonal Net Nitrogen Mineralization in the Topsoil of Subsurface Drip Irrigated Fields." *Communications in Soil Science and Plant Analysis* 54(5): 13. **Acquisition of data; draft revision.**

C - Other peer-reviewed publications

- Long, Rachael; Leinfelder-Miles, Michelle; Mathesius, Konrad; Bali, Khaled; Light, Sarah E.; Galla, Mariano; Mueller, Shannon; Fulton, Allan; **Clark, Nicholas**; Meyer, R. D. (2019). *Garbanzo Bean (Chickpea) Production in California*. Regents of the University of California. **Drafting and revising.**

NON-PEER REVIEWED

A - Popular press articles

- Wright, Steve; Dubcovsky, Jorge; Jackson, Lee; Mayo, Phil; Prato, Diane; Parry, Sarah; **Clark, Nicholas**; Padilla, Eddie; Giron, Isaac; Martinez, Walter (2015). Fresno County Small Grain Variety Performance Trials. *Small Grain News: Tulare County*. S. Wright. University of California Cooperative Extension. 11:2, 1-6. September 2015. **Draft revision.**
- Wright, Steve; **Clark, Nicholas**; Parry, Sarah; Martinez, Walter; Taylor, Bill; Frigulti, TariLee; Padilla, Eduardo; Giron, Isaac (2015). Small Grain Silage Variety Trial 2015. *Small Grain News: Tulare County*. S. Wright. University of California Cooperative Extension. 7. **Draft revision.**
- **Clark, Nicholas**. (2016). 2015 Annual Western Alfalfa & Forage Symposium - Reno, NV: Three take-home messages for those who couldn't attend. *Field Crops and Nutrient Notes*. N. Clark. Regents of the University of California.
- Dahlberg, Jeffery; Hutmacher, Robert; Wright, Steve; Putnam, D. H.; George, Nicolas; **Clark, Nicholas**; Heguy, J.; Meyer, D.; Robinson, P.; Hollingsworth, Joy; Sievert, Julie (2016). 2016 Field Research on Sorghum Forages for the California Dairy Industry. J. Dahlberg. University of California Agricultural and Natural Resources. **Draft revision.**
- **Clark, Nicholas**; Goodell, Pete; Godfrey, Larry (2016). Flea Beetles a Possible Nuisance in San Joaquin Valley Small Grains near Sorghum. *Agronomy News*. D. Putnam. California, Regents of the University of California. **Drafting and revising.**
- Putnam, D. H.; **Clark, Nicholas**; Bachie, Oli (2016). "Forage Road Trip – April 2016, 2016." *Hay and Forage Grower*. **Drafting and revising.**
- **Clark, Nicholas**. (2016). "Forage Road Trip – July 26, 2016." *Hay and Forage Grower*
- **Clark, Nicholas**. (2016). "Forage Road Trip – June 21, 2016." *Hay and Forage Grower*

- **Clark, Nicholas.** (2016). “Forage Road Trip – May 17, 2016.” *Hay and Forage Grower*
- **Clark, Nicholas.** (2016). “Forage Road Trip – August 20, 2016.” *Hay and Forage Grower*
- **Clark, Nicholas.** (2016). Growing and Harvesting Corn in Water Limiting and Nitrogen Monitoring Times. *Field Crops and Nutrient Notes*. N. Clark. Regents of the University of California. July 12, 2016.
- **Clark, Nicholas;** Wright, Steve (2016). Milk Your Water for All the Corn It's Worth. *Field Crops and Nutrient Notes*. N. Clark. Regents of the University of California. **Drafting and revising.**
- **Clark, Nicholas;** Frate, Carol; Sumner, Daniel; Klonsky, Karen; Stewart, Donald; Gutierrez, Christine (2016). Sample Costs to Establish and Produce Alfalfa: Tulare County, Southern San Joaquin Valley 300 Acre Planting. *University of California Cost of Production Studies*. D. Sumner. University of California Agricultural and Natural Resources. **Data acquisition and interpretation; drafting and revising.**
- **Clark, Nicholas;** Frate, Carol; Sumner, Daniel; Klonsky, Karen; Stewart, Donald; Gutierrez, Christine (2016). Sample Costs to Establish and Produce Alfalfa: Tulare County, Southern San Joaquin Valley 50 Acre Planting. *University of California Cost of Production Studies*. D. Sumner. University of California Agricultural and Natural Resources. **Data acquisition and interpretation; drafting and revising.**
- **Clark, Nicholas;** Wright, Steve (2016). Spring Water and Nutrient Management in Dairy Corn. *California Dairy Newsletter*. J. Heguy and N. Silva-del-Rio. April. **Drafting and revising.**
- Wright, Steve; Lundy, Mark; Martins, J. P.; Mayo, Phil; Prato, Diane; Parry, Sarah; Frigulti, T.; **Clark, Nicholas;** Padilla, Eddie; Giron, Isaac; Martinez, Walter (2016). Tulare/Kings/Fresno Small Grain Variety Performance Trials. *Small Grains News*. S. Wright. Regents of the University of California. **Draft revision.**
- **Clark, Nicholas.** (2017). 2016 Tulare County Blackeye Cowpea Strip Trials. *Field Crops and Nutrient Notes*. N. Clark. Regents of the University of California. **Conception and design of work; acquisition, analysis, and interpretation of data; drafting and revising.**
- Dahlberg, Jeffery; Hutmacher, Robert; Putnam, D. H.; **Clark, Nicholas;** Heguy, J.; Meyer, D.; Robinson, P.; Hollingsworth, Joy; Sievert, Julie; de Ben, Chris; Solorio, Rafael (2017). 2017 Field Research on Sorghum Forages for the California Dairy Industry. J. Dahlberg. University of California Agricultural and Natural Resources. **Draft revision.**
- **Clark, Nicholas.** (2017). Be on the Lookout for Sugarcane Aphid This Summer. *Field Crops and Nutrient Notes*. N. Clark. Regents of the University of California.
- Lundy, Mark; **Clark, Nicholas;** Mathesius, Konrad; George, Nicolas (2017). California Small Grain Disease Notes from the Field. *UC Small Grains Blog*. M. Lundy. California, Regents of the University of California. April 10, 2017. **Acquisition and interpretation of data; drafting and revising.**
- **Clark, Nicholas;** Orloff, S. B.; Ottman, Mike (2017). Fertilizing High Yielding Alfalfa in California and Arizona. *Better Crops with Plant Food*. Peachtree Corners, GA, International Plant Nutrition Institute. 2017:4, 3. **Drafting and revising.**
- **Clark, Nicholas;** Dahlberg, Jeffery (2017). Sugarcane Aphid a New Pest in California Sorghum. *California Dairy Newsletter*. J. Heguy and N. Silva-del-Rio. January. **Drafting and revising.**
 - *Additional bibliographical citation: republished as* Protect your Sorghum Feed Crops. *California Dairy Magazine*. California, Malcom Media. 17:17.
- Lundy, Mark; Orloff, S. B., ... **Clark, Nicholas,** et al. (2017). Topdress of nitrogen at tillering stage is something to seriously consider over the coming weeks. *UC Small Grains Blog*. Mark Lundy. California, Regents of the University of California. January 27, 2017. **Acquisition, analysis, and interpretation of data; drafting and revising.**
- **Clark, Nicholas.** (2018). 2017 Tulare County Blackeye Cowpea Strip Trial. *Field Crops and Nutrient Notes*. N. Clark. Regents of the University of California.

- *Additional bibliography citation: Vegetables West Grower & PCA Magazine. July 2017. California, Malcom Media.*
- Hollingsworth, Joy; Dahlberg, Jeffery; Hutmacher, Robert; Putnam, D. H.; **Clark, Nicholas**; Bachie, Oli; Sievert, Julie; De Ben, Chris; Solorio, Rafael; Holder, Brady (2018). 2018 Field Research on Sorghum Grain Hybrids for California. J. Dahlberg. UC ANR. **Draft revision.**
- **Clark, Nicholas**; Heguy, J. (2018). Considerations for a Successful Sorghum Silage Crop. *California Dairy Newsletter*. J. Heguy and N. Silva-del-Rio. **Drafting and revising.**
- Dahlberg, Jeffery; Hutmacher, Robert; Putnam, D. H.; George, Nicolas; **Clark, Nicholas**; Heguy, J.; Meyer, D.; Robinson, P.; Hollingsworth, Joy; Sievert, Julie; De Ben, Chris; Solorio, Rafael (2018). Final Report: 2018 Field Demonstrations of Sorghum Forages for the California Dairy Industry. J. Dahlberg. UC ANR. **Draft revision.**
- **Clark, Nicholas**; Haviland, David; Dahlberg, Jeffery; Marsh, Brian; Hutmacher, Robert; Heguy, J.; Rill, Stephanie; Angeles, Jorge (2018). Forage Sorghum: Sorghum bicolor (L.) Monenich 'SiloMilo'. The Effects of Flupyradifurone Application Method on Sugarcane Aphid, Yield and Feed Quality of Forage Sorghum in California, 2018.J. Dahlberg. UC ANR. **Conception and design of work; acquisition, analysis, and interpretation of data; drafting and revising.**
- Light, Sarah E.; Leinfelder-Miles, Michelle; Long, Rachael; **Clark, Nicholas**; Stewart, Donald; Sumner, Daniel (2018). Sample Costs to Produce Garbanzo Beans in the Sacramento Valley and the Northern San Joaquin Valley. *University of California Cost of Production Studies*. D. Sumner. University of California Cost of Production Studies. **Acquisition and interpretation of data; drafting and revising.**
- **Clark, Nicholas**; Light, Sarah E.; Leinfelder-Miles, Michelle; Long, Rachael; Stewart, Donald; Sumner, Daniel (2018). Sample Costs to Produce Garbanzo Beans in the Southern San Joaquin Valley. *University of California Cost of Production Studies*. D. Sumner. University of California Agricultural and Natural Resources. **Acquisition and interpretation of data; drafting and revising.**
- Long, Rachael; Grettenberger, Ian; Putnam, D. H.; Dahlberg, Jeffery; **Clark, Nicholas**. (2018). Sugarcane Aphid - an Unwelcome Visitor to California's Central Valley. *Alfalfa and Forage News*. D. Putnam. Regents of the University of California. **Draft revision.**
- **Clark, Nicholas**; Haviland, David; Marsh, Brian; Dahlberg, Jeffery (2018). Sugarcane Aphid of Sorghum - Insecticide Efficacy. *Field Crops and Nutrient Notes*. N. Clark. Regents of the University of California. **Conception and design of work; acquisition, analysis, and interpretation of data; drafting and revising.**
- **Clark, Nicholas**; Haviland, David; Dahlberg, Jeffery; Marsh, Brian; Rill, Stephanie (2018). The Effects of Insecticide Treatments on Sugarcane Aphid, Yield and Feed Quality of Forage Sorghum in California, 2018.J. Dahlberg. UC ANR. **Conception and design of work; acquisition, analysis, and interpretation of data; drafting and revising.**
- **Clark, Nicholas**. (2019). Starting out Right with this Year's Irrigated Double Crop of Small Grains Forage. *California Dairy Newsletter*. UC ANR. 11:4.
- **Clark, Nicholas**; Haviland, David; Dahlberg, Jeffery; Marsh, Brian; Rill, Stephanie; Angeles, Jorge (2019). "The Effects of Flupyradifurone Application Method on Sugarcane Aphid Forage Sorghum, 2018." *Arthropod Management Tests* 44(1). **Conception and design of work; acquisition, analysis, and interpretation of data; drafting and revising.**
- Haviland, David; **Clark, Nicholas**; Dahlberg, Jeffery; Marsh, Brian; Rill, Stephanie (2019). "The Effects of Insecticide Treatments on Sugarcane Aphid in Forage Sorghum in California, 2018." *Arthropod Management Tests* 44(1). **Conception and design of work; acquisition, analysis, and interpretation of data; drafting and revising.**
- Dahlberg, Jeffery; Hutmacher, Robert; Putnam, Daniel; **Clark, Nicholas**; deBen, Chris; Solorio, Rafael; Allison, Cayci (2020). 2019 Field Research on Sorghum Grain Hybrids for California. <https://ucanr.edu/sites/sorghum/files/320053.pdf>. **Draft revision.**

- Dahlberg, Jeffery; Hutmacher, Robert; Putnam, Daniel; **Clark, Nicholas**; Heguy, Jennifer; Meyer, Deanne; Robinson, Peter; Allison, Cayci; de Ben, Chris; Solorio, Merf (2020). Final Report: 2019 Field Research on Sorghum Forages for the California Dairy Industry. <https://ucanr.edu/sites/sorghum/files/320042.pdf>. **Draft revision.**
- **Clark, Nicholas**; Getts, Thomas; Galdi, Giuliano C.; Nelsen, Taylor; Leinfelder-Miles, Michelle; Light, Sarah E.; Mathesius, Konrad; Lundy, Mark (2020). Hand-held electronic devices help you make better nitrogen fertilizer decisions. *UC Small Grains Blog*. Mark Lundy. California, UC ANR. June 30, 2020. <https://ucanr.edu/blogs/blogcore/postdetail.cfm?postnum=42903>. **Drafting and revising.**
- Leinfelder-Miles, Michelle; **Clark, Nicholas**; Light, Sarah E.; Mathesius, Konrad; Getts, Thomas; Galdi, Giuliano C.; Nelsen, Taylor; Lundy, Mark (2020). Implementing N-Rich Reference Zones to Inform In-Season Fertilization Practices. *UC Small Grains Blog*. Mark Lundy. California, UC ANR. May 27, 2020. <https://ucanr.edu/blogs/blogcore/postdetail.cfm?postnum=42576>. **Draft revision.**
- Lundy, Mark; Nelsen, Taylor; Mathesius, Konrad; Leinfelder-Miles, Michelle; **Clark, Nicholas**; Light, Sarah; Galdi, Giuliano C.; Getts, Thomas (2020). N management case studies: Utilizing N-rich reference zones in California small grain crops. *UC Small Grains Blog*. Mark Lundy. California, UC ANR. October 16, 2020. <https://ucanr.edu/blogs/blogcore/postdetail.cfm?postnum=43958>. **Draft revision.**
- Dahlberg, Jeffery; Al-Khatib, Kassim; Mesgaran, Mohsen; Ceseski, Alex; **Clark, Nicholas**. (2020). New Apps Available for Controlling and Tracking Johnsongrass, a Top Ten Worldwide Weed. *UC Weed Science*. Brad Hanson. California, UC ANR. May 4, 2020. <https://ucanr.edu/blogs/blogcore/postdetail.cfm?postnum=41357>. **Draft revision.**
- Lundy, Mark; Nelsen, Taylor; Mathesius, Konrad; **Clark, Nicholas**; Light, Sarah E.; Leinfelder-Miles, Michelle; Getts, Thomas; Galdi, Giuliano C. (2020). New resources available for conducting and interpreting soil nitrate quick tests. *UC Small Grains Blog*. Mark Lundy. California, UC ANR. May 13, 2020. <https://ucanr.edu/blogs/blogcore/postdetail.cfm?postnum=41422>. **Draft revision.**
- Dahlberg, Jeff; Hutmacher, Robert; Putnam, D. H.; **Clark, Nicholas**; Pedraza, Julie; Allison, Cayci; de Ben, Chris; Solorio, Merf (2021). 2020 Field Research on Sorghum Forages for the California Dairy Industry. *Reports - Forage*. J. Dahlberg. California, UC ANR. <https://ucanr.edu/sites/sorghum/files/342257.pdf>. **Draft revision.**
- Dahlberg, Jeffery; Hutmacher, Robert; Putnam, D. H.; **Clark, Nicholas**; de Ben, Chris; Solorio, Rafael; Pedraza, Julie (2021). 2020 Field Research on Sorghum Grain Hybrids for California. *Reports - Grain*. J. Dahlberg. California, UC ANR. <https://ucanr.edu/sites/sorghum/files/341413.pdf>. **Draft revision.**
- Nelsen, T.; Grover, Salvador; Lundy, Mark; Reynoso, Leonardo; Shydrowski-Besmer, Maya; **Clark, Nicholas**; Mathesius, Konrad; Halleck, B.; Muraka, Chaitanya Lakshmi (2021). 2020-21 UC Small Grain Variety Testing Results. *UC Small Grains Blog*. Mark Lundy. UC ANR. October 8, 2021. <https://ucanr.edu/blogs/blogcore/postdetail.cfm?postnum=50633>. **Acquisition of data; draft revision**
- **Clark, Nicholas**; Heguy, Jennifer (2021). "Don't Stress (Too Much) Over Drought-Stressed Corn." *Golden State Dairy Newsletter* 13(3): 2. **Drafting and revising.**
- Mathesius, Konrad; Lundy, Mark E.; **Clark, Nicholas**; de Souza Dias, Jose Luiz Carvalho (2021). Irrigation for wheat and other small grains in a drought year. *UC Small Grains Blog*. Mark Lundy. California, UC ANR. June 11, 2021. <https://ucanr.edu/blogs/blogcore/postdetail.cfm?postnum=47628>. **Draft revision.**
- Meyer, D.; Fulford, Anthony; Hollingsworth, Joy; Heguy, J.; **Clark, Nicholas**. (2021). "Moisture Content of Compost Bedded Pack Barns." *Golden State Dairy Newsletter* 13(4): 1. **Conception and design of work; acquisition, analysis, and interpretation of data; drafting and revising.**

- Lundy, Mark; Nelsen, T.; **Clark, Nicholas**; Leinfelder-Miles, Michelle; Mathesius, Konrad; Light, Sarah; Galdi, G.; Getts, Thomas (2021). New Tools to Improve N Management in California Small Grain Crops. *UC Small Grains Blog*. Mark Lundy. UCANR. October 21, 2021. <https://ucanr.edu/blogs/blogcore/postdetail.cfm?postnum=50718>. **Draft revision.**
- **Clark, Nicholas**; Fulford, Anthony; Hollingsworth, Joy; Meyer, Deanne (2021). "Nutrient Content of Anaerobic Digester Digestate." *Golden State Dairy Newsletter* 13(3): 1. **Conception and design of work; acquisition, analysis, and interpretation of data; drafting and revising.**
- **Clark, Nicholas**; Fulford, Anthony; Hollingsworth, Joy; Meyer, Deanne (2021). "Nutrient Content of Vacuumed Manure." *Golden State Dairy Newsletter* 13(2): 1. **Conception and design of work; acquisition, analysis, and interpretation of data; drafting and revising.**
- de Souza Dias, Jose Luiz Carvalho; **Clark, Nicholas**, et al. (2021). Poor control of common chickweed with ALS-inhibitor herbicides reported in multiple small grain fields in the southern San Joaquin Valley. Is it a new case of herbicide resistance in California? *UC Weed Science*. Brad Hanson. California, UC ANR. August 4, 2021. **Conception and design of work; acquisition, analysis, and interpretation of data; drafting and revising.**
 - *Additional bibliographical citation:*
<https://ucanr.edu/blogs/blogcore/postdetail.cfm?postnum=50181>; *UC Small Grains Blog*. Mark Lundy. California, UC ANR. August 4, 2021. <https://ucanr.edu/blogs/blogcore/postdetail.cfm?postnum=50186>.
- Nelsen, Taylor; Lundy, Mark E.; Grover, Salvador; Reynoso, Leonardo; Shydrowski-Besmer, Maya; **Clark, Nicholas**; Mathesius, Konrad; Solorio, Rafael M.; Halleck, Ben; Muraka, Chaitanya Lakshmi (2021). Preliminary yield results from fall-planted 2020-21 small grain variety results. *UC Small Grains Blog*. Mark Lundy. California, UC ANR. August 11, 2021. <https://ucanr.edu/blogs/blogcore/postdetail.cfm?postnum=50239>. **Acquisition of data; draft revision.**
- Hollingsworth, Joy; Fulford, Anthony; **Clark, Nicholas**; Meyer, Deanne (2021). "Properties of Manure as a Nitrogen Fertilizer." *On the Soil Horizon* 4(3): 3. **Conception and design of work; acquisition, analysis, and interpretation of data; drafting and revising.**
- Leinfelder-Miles, Michelle; **Clark, Nicholas**; Nelsen, Taylor; Getts, Tom; Mathesius, Konrad; Light, Sarah; Galdi, Giuliano; Lundy, Mark (2021). Using N-Rich Reference Zones to Inform In-Season Nitrogen Fertilization Practices in California Small Grains. *Progressive Crop Consultant*. JCS Marketing. March/April 2021. March 12, 2021. <https://progressivecrop.com/2021/03/using-n-rich-reference-zones-to-inform-in-season-nitrogen-fertilization-practices-in-california-small-grains/>. **Design of work; acquisition, analysis, and interpretation of data; draft revision.**
- **Clark, Nicholas**. (2022). "Common ALS inhibitor herbicides not controlling common chickweed in small grains?" *Sacramento Valley Field Crops Newsletter*: 4.
- **Clark, Nicholas**; Fulford, Anthony; Hollingsworth, Joy; Pexton, Joyce; Meyer, D. (2022). Digesters make more than methane. *Journal of Nutrient Management*. W. D. Hoard & Sons Co. 2022, 2. March 4, 2022. <https://issuu.com/hoardsdairyman/docs/22-jnm-q1>. **Conception and design of work; acquisition, analysis, and interpretation of data; drafting and revising.**
- Dahlke, H.; Ganot, Y.; **Clark, Nicholas**. (2022). "Management strategies to address drought and limited water supplies." *Progressive Forage* 2022(April). April 30, 2022. <https://www.agproud.com/articles/55373-management-strategies-to-address-drought-and-limited-water-supplies>.
- Meyer, D.; **Clark, Nicholas**; Heguy, J. (2022). "How to Calculate the Nutrients from Manure Applied to Fields." *Golden State Dairy Newsletter* 14(2): 1. **Drafting and revising.**
 - *Additional bibliography citation: Milk Producers Council Friday Report, May 21, 2022, Milk Producers Council,*
https://www.milkproducerscouncil.org/_files/ugd/318cfl_e3be811b66894cc1aed49ce0d3a33013.pdf.

- Heguy, J.; **Clark, Nicholas.** (2022). "Troubleshooting Dry Matter Results." *Golden State Dairy Newsletter* 14(2): 2. **Drafting and revising.**
 - *Additional bibliographic citation: Milk Producers Council Friday Report, May 21, 2022, Milk Producers Council, https://www.milkproducerscouncil.org/_files/ugd/318cf1_e3be811b66894cc1aed49ce0d3a33013.pdf.*

D - Technical reports and other non-reviewed articles

- PRIOR TO DATE OF HIRE: Frigulti, T.; Zheng, Z.; **Clark, Nicholas**; Wallis, C.; Keremane, M.; Bushoven, J.; Chen, J (2014). In *Planta Maintenance, Enrichment, and Whole Genome Sequence Analyses of 'Candidatus Liberibacter solanacearum' Strain R1 from California. 2014 Zebra Chip Annual Reporting Session Proceedings*. Specialty Crops Research Institute. **Conception and design of work; acquisition, analysis, and interpretation of data; draft revision.**
- Roberts, Philip A.; Huynh, Bao Lam; **Clark, Nicholas**; Matthews, C.; Frate, Carol (2016). *Blackeye Varietal Improvement - 2016 Progress Report. California Dry Bean Advisory Board Research Progress Reports. Design of work; acquisition, analysis, and interpretation of data; draft revision.*
- Roberts, Philip A.; Huynh, Bao Lam; **Clark, Nicholas**; Matthews, W. C.; Frate, Carol (2017). "Blackeye Varietal Improvement - 2017 Progress Report." *California Dry Bean Advisory Board Research Progress Reports. Design of work; acquisition, analysis, and interpretation of data; draft revision.*
- Long, D. L.; Getts, Thomas; Goding, Kevin; Stevens, Nicole; **Clark, Nicholas**; Putnam, D. H.; Mostafa, Ayman (2017). "Controlling Alfalfa Weevil Efficacy, Thresholds, and Future Needs." *2017 Western Alfalfa and Forage Symposium Proceedings. Design of work; acquisition, analysis, and interpretation of data; draft revision.*
- Parry, Sarah R.; **Clark, Nicholas E.**; Padilla, Eduardo; Giron, Isaac; Hanson, Brad; Shrestha, Anil; Wright, Steven D. (2017). Glyphosate-resistant junglerice control in corn. *2017 Research Progress Report*. T. Rauch. Western Society of Weed Science. **Draft revision.**
- Sarah R. Parry; **Nicholas E. Clark**; Eduardo Padilla; Isaac Giron; Kevin R. Day; Brad Hanson; Anil Shrestha; Steven D. Wright (2017). Postemergent weed control in walnuts within weeds of different maturity levels. *2017 Research Progress Report*. Traci Rauch. Western Society of Weed Science. **Draft revision.**
- Sarah R. Parry; **Nicholas E. Clark**; Eduardo Padilla; Isaac Giron; Brad Hanson; Anil Shrestha; Steven D. Wright (2017). Preemergent control of junglerice and Palmer amaranth. *2017 Research Progress Report*. Traci Rauch. Western Society of Weed Science. **Draft revision.**
- Sarah R. Parry; **Nicholas E. Clark**; Eduardo Padilla; Isaac Giron; Walter Martinez; Brad Hanson; Steven D. Wright; Anil Shrestha (2017). Preemergent control of junglerice and Palmer amaranth in a greenhouse. *2017 Research Progress Report*. Traci Rauch. Western Society of Weed Science. **Draft revision.**
- Roberts, Philip A.; Huynh, Bao Lam; **Clark, Nicholas**; Matthews, W. C.; Frate, Carol (2018). "Blackeye Report 2018." *California Dry Bean Advisory Board Research Progress Reports. Design of work; acquisition, analysis, and interpretation of data; draft revision.*
- Putnam, D. H.; **Clark, Nicholas**; Geisseler, D. (2018). "Management of Phosphorus and Potassium Fertilization in Alfalfa." *2018 California Plant and Soil Conference Proceedings. Draft revision.*
- Long, Rachael; Bonilla, Jasmin Ramirez; Wilson, Robert; Rethwisch, Michael; **Clark, Nicholas**; Putnam, D. H.; Grettenberger, Ian (2018). "Managing Weevils in Alfalfa Hay." *2018 CA Alfalfa and Forage Symposium Proceedings. Design of work; acquisition, analysis, and interpretation of data; draft revision.*

- Roberts, Philip A.; Huynh, Bao Lam; **Clark, Nicholas**; Matthews, W. C.; Light, Sarah; Long, R. F. (2019). "Blackeye Varietal Improvement - 2019 Progress Report." *California Dry Bean Advisory Board Research Progress Reports*. **Design of work; acquisition, analysis, and interpretation of data; draft revision.**
- Dahlke, Helen; **Clark, Nicholas**; Putnam, Daniel (2019). Experiments with Flooding Tolerance of Alfalfa for Groundwater Recharge. *2019 Western Alfalfa and Forage Symposium Proceedings*. **Design of work; acquisition, analysis, and interpretation of data; draft revision.**
- **Clark, Nicholas**; Haviland, David; Marsh, Brian; Dahlberg, Jeffery (2019). "Management of Sugarcane Aphid in CA Forage Sorghum." *2019 CA Plant and Soil Conference Proceedings*. **Conception and design of work; acquisition, analysis, and interpretation of data; drafting and revising.**
- Long, R. F.; Bonilla, Jasmin Ramirez; Rethwisch, Michael; **Clark, Nicholas**; Putnam, D. H.; Grettenberger, Ian (2019). *Managing alfalfa weevils in California in the 21st century*. Western Alfalfa and Forage Symposium Proceedings, Reno, NV. **Design of work; acquisition, analysis, and interpretation of data; draft revision.**
- **Clark, Nicholas**. (2019). "Nutrient Management of Forage Crops." *2019 CA Plant and Soil Conference Proceedings*
- Lundy, Mark; Nelsen, Taylor; **Clark, Nicholas**; Galdi, Giuliano; Getts, Thomas; Leinfelder-Miles, Michelle; Light, Sarah E.; Mathesius, Konrad (2020). Achieving Efficient Nitrogen Fertilizer Management in California Wheat. *2020 FREP/WPHA Nutrient Management Conference Proceedings*. **Design of work; acquisition, analysis, and interpretation of data; draft revision.**
- Roberts, Philip A.; Huynh, Bao Lam; **Clark, Nicholas**; Matthews, W. C.; Light, Sarah; Long, R. F. (2020). "Blackeye Improvement CDBAB report 2020." *California Dry Bean Advisory Board Research Progress Reports*. **Design of work; acquisition, analysis, and interpretation of data; draft revision.**
- Huynh, Bao-Lam; **Clark, Nicholas**; Light, Sarah; Long, Rachael; Dahlquist-Willard, Ruth; Yang, M; Bullard, V.; Smither-Kopperl, M.; Matthews, W. C.; Ploeg, A. T.; Close, T. J.; Roberts, Philip A. (2020). California Cowpea Blackeye-Grain, Vegetable and Cover-Crop Improvement Program. *2020 CA-ASA Plant and Soil Conference Proceedings*. **Design of work; acquisition, analysis, and interpretation of data; draft revision.**
- Lundy, Mark; Nelsen, T.; **Clark, Nicholas**; Galdi, G.; Getts, Thomas; Leinfelder-Miles, Michelle; Light, Sarah; Mathesius, Konrad (2021). "Achieving Efficient Nitrogen Fertilizer Management in California Wheat." *29th Annual FREP/WPH Nutrient Management Conference: 3*. **Design of work; acquisition, analysis, and interpretation of data; draft revision.**
- Roberts, Philip A.; Huynh, Bao Lam; **Clark, Nicholas**; Matthews, W. C.; Light, Sarah; Long, R. F. (2021). "Blackeye Varietal Improvement - 2021 Progress Report." *California Dry Bean Advisory Board Research Progress Reports*. **Design of work; acquisition, analysis, and interpretation of data; draft revision.**
- Geisseler, D.; Parikh, Sanjai; **Clark, Nicholas**; Leinfelder-Miles, Michelle; Light, Sarah; Mathesius, Konrad; Wilson, Rob (2021). "Development of Site-Specific Nitrogen Fertilization Recommendations for Annual Crops." *29th Annual FREP/WPH Nutrient Management Conference: 4*. **Design of work; acquisition, analysis, and interpretation of data; draft revision.**
- Hutmacher, Robert; Putnam, D. H.; Light, Sarah; **Clark, Nicholas**; Geisseler, D.; Koch, Geoffrey (2021). "Nitrogen Response of Industrial Hemp Cultivars Grown for CBD, Essential Oils." *29th Annual FREP/WPH Nutrient Management Conference: 4*. **Conception and design of work.**

E - Published abstracts

- **Nicholas E. Clark**; Robert Hutmacher; Steve Wright; Steve Orloff; TariLee Frigulti; Mark Lundy (2016). ABSTRACT: The effects of rate and application timing of urea fertilizer on yield and grain protein between wheat varieties and residual soil nitrate in the San Joaquin Valley. *2016 California Plant and Soil Conference*. Richard Smith. Visalia, CA, American Society of Agronomy California Chapter. February 2 & 3, 2016. **Acquisition, analysis, and interpretation of data; drafting and revising.**
- Frigulti, TariLee; **Clark, Nicholas E.**; Ulloa, Mauricio; Hutmacher, Robert; Wright, Steven D.; Keeley, Mark; Roberts, Philip A.; Nichols, Robert L. (2016). Recurrent selection performance for FOV race 4 in selected germplasm progeny. *Beltwide Cotton Conferences*. New Orleans, Louisiana, National Cotton Council of America. **Acquisition, analysis, and interpretation of data; drafting and revising.**
- **Clark, Nicholas E.**; Frigulti, TariLee; Ulloa, Mauricio; Hutmacher, Robert; Wright, Steven D.; Keeley, Mark; Nichols, Robert (2016). The use of disease severity variables in predicting efficacy of FOV4 resistance selection. *Beltwide Cotton Conferences*. New Orleans, Louisiana, National Cotton Council of America. **Acquisition, analysis, and interpretation of data; drafting and revising.**
- Heguy, J.; Meyer, D.; **Clark, Nicholas**; Martins, J. P. (2018). "ABSTRACT: Nutrient composition and fermentation characteristics of sorghum preserved as silage in California." *2018 ADSA Annual Meeting Proceedings* **Acquisition, analysis, and interpretation of data; drafting and revising.**
- Angeles, Jorge; **Clark, Nicholas**; Hutmacher, Robert (2018). "ABSTRACT: Plant Macronutrient Fertility and Removal in San Joaquin Valley Corn and Wheat." *2018 CA Dairy Sustainability Summit*. **Conception and design of work; acquisition, analysis, and interpretation of data; draft revision.**
- Hutmacher, Robert; **Clark, Nicholas**; Dahlberg, Jeffery; Angeles, Jorge (2019). "ABSTRACT: Evaluation of Nitrogen Fertilization and Drip Irrigation Levels on Yields of San Joaquin Valley, California, Forage Corn and Sorghum Cultivars." *13th Western Nutrient Management Conference Proceedings 2019*. **Conception and design of work; acquisition, analysis, and interpretation of data; draft revision.**
- Bourquin, Andrea; **Clark, Nicholas**; Swett, Cassandra (2019). "ABSTRACT: Fusarium falciforme is a Previously Unrecognized Pathogen of Cowpeas, Present in California." *2019 CA Plant and Soil Conference Proceedings 2019*. **Conception and design of work; acquisition, analysis, and interpretation of data; draft revision.**
- Heguy, J.; **Clark, Nicholas**; Meyer, D. (2019). "Abstract: Physical and chemical characteristics of sorghum silage in California." *American Dairy Science Association Proceedings 2019*. **Acquisition of data; draft revision.**
- Angeles, Jorge; **Clark, Nicholas**; Hutmacher, Robert; Angermann, Till (2019). "ABSTRACT: Soil and Tissue N Cycling in Corn-Wheat Silage Rotation on Manured Soil." *2019 CA Plant and Soil Conference Proceedings 2019*. **Conception and design of work; acquisition, analysis, and interpretation of data; draft revision.**
- Hutmacher, Robert; **Clark, Nicholas**; Wright, Steven; Angeles, Jorge; Solorio, Rafael (2019). Response of Sorghum and Corn Cultivars to Different Sub-Surface Drip and Nitrogen Fertilizer Applications. *2019 CA-ASA Plant and Soil Conference Proceedings*. **Conception and design of work; acquisition, analysis, and interpretation of data; draft revision.**
- Karle, Betsy; Forero, Larry; Davy, Josh; Harper, John; Macon, Dan; Heguy, Jennifer; **Clark, Nicholas**; Stackhouse, Jeff; Shohr, Tracy; DePeters, Ed; Lile, David; Meyer, Deanne; Poppenga, Robert (2020). ABSTRACT: Effects of Wildfire Ash on California's Forage Crops. *American Dairy Science Association Proceedings*. **Design of work; acquisition, analysis, and interpretation of data; draft revision.**
- Hutmacher, Robert; **Clark, Nicholas**; Dahlberg, Jeffery; Angeles, Jorge (2020). Forage Sorghum and Corn Responses to Nitrogen and SDI Irrigation Rates. *2020 CA-ASA Plant and Soil*

Conference Proceedings. Conception and design of work; acquisition, analysis, and interpretation of data; draft revision.

- Kaffka, Stephen; Aksland, Gene; Robinson, Peter; **Clark, Nicholas.** (2020). Growing and Feeding Sugar Beets on California Dairies, Part 1: Production and Quality at Harvest. 2020 California Dairy Sustainability Summit Proceedings. Conception and design of work; acquisition, analysis, and interpretation of data; draft revision.
- Robinson, Peter; Aksland, Gene; **Clark, Nicholas;** Kaffka, Stephen (2020). Growing and Feeding Sugar Beets on California Dairies, Part 2: Silage Quality and Feeding. 2020 California Dairy Sustainability Summit Proceedings. Conception and design of work; acquisition, analysis, and interpretation of data; draft revision.
- **Clark, Nicholas;** Hutmacher, Robert; Angermann, Till; Curtis, Chris; Angeles, Jorge; Halleck, Benjamin (2020). Manure Nutrient Recycling in a Corn-Wheat Silage Double Crop. 2020 California Dairy Sustainability Summit Proceedings. Conception and design of work; acquisition, analysis, and interpretation of data; drafting and revising.
- Angeles, Jorge; **Clark, Nicholas;** Hutmacher, Robert; Angermann, Till (2020). Nitrogen Fertility and Removal in San Joaquin Valley Corn and Wheat Silage Rotations. 2020 CA-ASA Plant and Soil Conference Proceedings. Conception and design of work; acquisition, analysis, and interpretation of data; draft revision.
- **Clark, Nicholas;** Nelsen, T.; Lundy, M. (2020). N-Rich Reference Zone Case Study: Kings County 2019-20. *UC Small Grains*. UCANR. October 14, 2020. <https://ucanr.edu/sites/small-grains/files/337600.pdf>. **Design of work; acquisition, analysis, and interpretation of data; drafting and revising.**
- Halleck, Benjamin; Angeles, Jorge; **Clark, Nicholas.** (2020). Performance of Cyclanilprole against Lygus in Safflower. 2020 CA-ASA Plant and Soil Conference Proceedings. Conception and design of work; acquisition, analysis, and interpretation of data; draft revision.
- Kanter, Jessica; **Clark, Nicholas;** Lundy, Mark; Leinfelder-Miles, Michelle; Light, Sara E.; Linqvist, Bruce; Brim-DeForest, Whitney; Putnam, Daniel; Long, Rachael; Koundinya, Vikram; Pittelkow, Cameron (2020). Statewide Collaborative Needs Assessment for California Agronomy. 2020 ASA-CSSA-SSSA International Annual Meeting Proceedings. Conception and design of work; acquisition and interpretation of data; draft revision.
- **Clark, Nicholas;** Heguy, J.; Karle, Betsy; Meyer, D. (2021). "Challenges, Strategies, and Success with Dairy Nutrient Management Information Dissemination during a Pandemic (Abstract)." 2021 ASA-CSSA-SSSA International Annual Meeting Proceedings. Conception and design of work; acquisition, analysis, and interpretation of data; drafting and revising.
- **Clark, Nicholas;** Nelsen, T.; Lundy, M. (2021). N-Rich Reference Zone Case Study: Kings County 2020-21. *UC Small Grains*. UCANR. October 20, 2021. <https://ucanr.edu/sites/small-grains/files/359221.pdf>. **Design of work; acquisition, analysis, and interpretation of data; drafting and revising.**
- **Clark, Nicholas;** Heguy, J.; Karle, Betsy; Meyer, D. (2021). "Nutrient Management Information Dissemination during a Pandemic (Abstract)." 2021 ASA-CSSA-SSSA International Annual Meeting Proceedings. Conception and design of work; acquisition, analysis, and interpretation of data; drafting and revising.
- Light, Sarah; **Clark, Nicholas;** Nelsen, T.; Galdi, G.; Getts, Thomas; Leinfelder-Miles, Michelle; Mathesius, Konrad; Lundy, Mark (2021). "Remote Education and Demonstrations of Advanced Nitrogen Management Tools for Small Grains Growers in California." 2021 ASA-CSSA-SSSA International Annual Meeting Proceedings. Design of work; acquisition, analysis, and interpretation of data; draft revision.
- Pexton, Joyce; **Clark, Nicholas;** Meyer, D. (2022). "Impact of Dairy Sludge Management on Nutrient Management Plans (Abstract)." 2022 ASA-CSSA-SSSA International Annual Meeting Proceedings. Conception and design of work; acquisition and interpretation of data; draft revision.

Digesters make more than methane

The nutrient content of anaerobic digester effluent serves as a valuable fertilizer source.

by Nicholas Clark, Anthony Fulford, Joy Hollingsworth, Joyce Pexton, and Deanne Meyer

More and more anaerobic digesters are being built on dairies. These digesters capture carbon from manure as biogas. The gas is then processed and used to power vehicles, improving the greenhouse gas footprint of the dairy industry.

Out of the digesters comes treated water that still has a high nutrient content, much like lagoon water, which can be applied to cropland as a fertilizer source. It is important for dairy operators and forage crop producers to understand the chemical makeup of this digester effluent before making decisions about how to apply it to cropland.

Changing with the seasons

Data from a current project funded by the California Dairy Research Foundation provides insight into the nutrient content of digestate, the effluent coming out of the digester (Figure 1). Samples were taken at six freestall dairies with anaerobic digesters. Samples were collected from each dairy under summer and winter conditions. Four to eight samples from each digester were collected over several days in each season. Cows had feedline soakers and access to corrals in summer. During winter, cows did not have corral access and soakers did not run.

An early analysis of the data shows a distinct seasonal change in the chemical and physical makeup of digestate.



Low solids digester effluent was sampled in September 2020.

The physical and chemical components of digestate were lower in summer than winter (Table 1). This was expected, as herd management typically changes with the seasons. In summer, water from soakers was used to cool cows, and less manure was collected because cows spent less time in the barn. Bedding of freestalls occurs more frequently in winter, increasing the liquid stream nutrient contribution. That's why the flush-lane collection in summer is more diluted than in winter.

The greatest differences in manure characteristics occurred between seasons on each dairy. Results were consistent within a season from each dairy and did not exhibit a lot of variability.

The solids side

Total solids are everything in the digestate besides water. This includes inert solids (or ash) and volatile, organic solids. Carbon in the organic matter is

what is converted in part to methane and carbon dioxide and captured as a biogas. Carbon coming out of a digester in effluent escaped methane production. When digestate is land-applied, it can add to the carbon stock of soil, which has potential benefits for soil quality.

The two primary nitrogen sources in digestate are organic nitrogen and ammonium. Organic nitrogen isn't immediately plant available, but ammonium is. However, organic nitrogen will eventually be decomposed by soil microbes and become plant available, so both sources are beneficial to plants.

In the winter, we observed the ammonium to be a lower proportion of all the nitrogen found in the digestate (Figure 2), meaning less of the digestate nitrogen was immediately plant available.

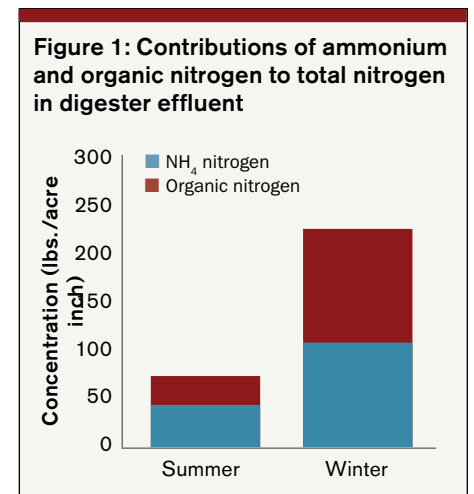


Table 1. Characteristics of manure digestate samples from anaerobic digester systems across six commercial dairies in the San Joaquin Valley of California*

Measured	Average		Range (low to high)	
	Summer	Winter	Summer	Winter
Total solids	1,177	4,086	659 to 3,030	2,126 to 7,102
Volatile solids	560	2,675	325 to 1,228	1,193 to 4,707
Carbon	73	185	43 to 103	95 to 292
Organic nitrogen	39	126	5 to 124	63 to 244
Ammonium nitrogen	89	150	33 to 169	85 to 276
Total phosphorus (P ₂ O ₅)	44	104	23 to 82	71 to 226
Total potassium (K ₂ O)	164	244	99 to 264	185 to 387
Electrical conductivity (dS/m) ²	5.8	7.3	3.4 to 9.8	4.9 to 9.4

* Expressed in pounds per acre-inch¹ of water unless noted otherwise. ¹An acre-inch of water is 27,154 gallons. To quickly convert acre-inches to 1,000-gallons, multiply by 27.154. To convert 1,000-gallons to acre-inches, divide by 27.154. ²deci-Siemens per meter

This is important to know. Keep in mind that in winter, microbes are less active, so they are slower to decompose the organic nitrogen.

Phosphorus is largely found in fine solids in the digestate while potassium stays dissolved in the water. Both elements are essential for plant growth and development and are found in abundance in the digestate. The electrical conductivity is a measure of salinity, which is the property of how much salt is dissolved in water. Essential plant nutrients as well as solutes toxic to plants contribute to salinity. So, it's important to remember that having a high nutrient content in the digestate can also mean having high salinity, which can cause stress to plants when land applied.

Using the effluent

Understanding seasonal variability of digestate is important for proper manure sampling and utilization. Consider the range of electrical conductivity values above. Forage corn has an average salinity tolerance threshold of 1.8 deci-siemens per meter (dS/m) and a yield reduction slope of 7.4. That is, forage corn yield is expected to decline by 7.4% for every dS/m above 1.8 in irrigation water. If a corn crop were fully irrigated with only the least saline effluent shown above, we would expect a yield reduction of at least 11.8% due to season-long salinity stress.

Table 2. Macro-nutrient removal from the soil by corn silage at 30% dry matter

Yield (tons/acre)	Nutrient (lbs/acre)		
	N	P ₂ O ₅	K ₂ O
20	152	66	152
30	228	99	228
40	304	132	304

Higher saline waters are more likely to cause an acute salinity injury called specific ion toxicity. This injury is commonly known as “salt burn” and looks like dried leaves starting at the bottom of the plant. Knowing the expected ranges of nutrient and salinity concentrations means you can make better fertilizer value and crop safety predictions when blending the digestate with irrigation water.

Notice the rates of macro-nutrient removal from the field when corn silage is harvested (Table 2) and refer back to the macro-nutrient concentrations shown in Table 1. If you were ambitiously farming for 40-ton silage corn on phosphorus and potassium sufficient soils, you could replace those elements with three acre-inches per acre of the average digester effluent in summer, and you'd likely be overfertilizing with potassium by 188 pounds per acre of K₂O.

That same amount of digester effluent applied in season to the corn would also add 267 pounds per acre of plant available ammonium nitrogen and 114

pounds per acre of plant unavailable organic nitrogen. However, in summer we expect that 50% of the organic nitrogen applied from liquid manure sources will become plant available, so about 57 pounds per acre are likely to convert to plant available ammonium. A total of 324 pounds per acre of plant available ammonium nitrogen could be expected as a contribution from that water source. That's only 20 pounds more than what is expected to be removed per acre in the harvested silage corn.

Since nitrogen is so reactive in the environment, many inefficiencies exist. It's possible that some of the crop's nitrogen demand will need to be met with other nitrogen sources such as manure solids, compost, or synthetic fertilizer. ■

The authors are all affiliated with the University of California. Clark is an agronomy and nutrient management farm adviser; Fulford and Hollingsworth are soil quality and nutrient management farm advisers; Pexton is a junior specialist in the Meyer Lab; and Meyer is a livestock waste management specialist.

Summary of Publication Examples

- Huynh, Bao Lam; Duong, Tra; Clark, Nicholas E.; Long, Rachael; Light, Sarah E.; Dahlquist-Willard, Ruth M.; Ehlers, Jeffrey D.; Close, Timothy J.; Roberts, Philip A. (2021). "Registration of aphid-resistant 'California Blackeye 77' cowpea." *Journal of Plant Registrations* 16(1): 8.
<https://access.onlinelibrary.wiley.com/doi/10.1002/plr2.20176>.

This peer-reviewed paper marks the milestone of several years of collaborative work between UC Riverside, UCCE, CA growers, and the CA Dry Bean Advisory Board to improve blackeye pea varieties available for growing in California with resistance to devastating diseases and pests. This publication symbolizes a capstone of my applied research and extension career with UC ANR, as it announces the public release of a new variety of blackeye pea with aphid resistance. This is in part a direct result of my collaboration in research and extension efforts and promises to improve the lives of farmers in CA.

- Clark, Nicholas. (2022). "Common ALS inhibitor herbicides not controlling common chickweed in small grains?" *Sacramento Valley Field Crops Newsletter*: 4.
https://cesutter.ucanr.edu/newsletters/Agronomy_Notes94973.pdf.

This article in a colleagues newsletter is the result of my ability to rapidly respond to my clientele's needs and adapt my research and extension skills to generate the expertise their priorities demand. Pest control advisers observed failure to control an important weed with conventional herbicides, and my clientele have recently indicated that weed control was a top priority for them. I was able to form a team of experts between UC Davis, CSU Fresno, and U of Arizona as well as industry professionals to rapidly respond to what was obviously a new instance of genetic herbicide resistance in CA. This article is a sign post in the progress of this ongoing research and extension effort to identify the extent of this emerging herbicide resistance problem in CA and find practical solutions for growers and pest control advisers.

- Clark, Nicholas; Fulford, Anthony; Hollingsworth, Joy; Pexton, Joyce; Meyer, D. (2022). *Digesters make more than methane*. *Journal of Nutrient Management*. W. D. Hoard & Sons Co. 2022, 2. March 4, 2022. <https://issuu.com/hoardsdairyman/docs/22-jnm-q1>.

This article written for a popular trade magazine circulated nationwide was requested by the magazine editor after reading about the research summarized therein. I selected this article because it signifies the recognition that the ag industry has of my team's expertise in conducting and extending research in the field of dairy nutrient management. On a project for which I am a Co-PI, we investigated manure quality from sources that had previously not been described in California. The purpose was to generate information which can support further development of dairy waste stream treatment for generating clean water, organic fertilizers, and renewable energy. Publication in this magazine extended the results we had found to a national audience.

Anna N Lee

From: Nicholas E Clark
Sent: Thursday, February 2, 2023 10:51 AM
To: Kit Alviz; Anna N Lee
Subject: Re: Reminder to complete uploading materials and submit your Program Review Dossier packet, Annual Evaluation, Goals in WFA
Attachments: Clark Summary of Publication Examples 2015-2022 Promotion Asst IV- Assoc I.pdf
Categories: 1st Priority

Here you go (attached).

Thanks for the help.

Sincerely,

Nicholas Clark, CCA
Farm Advisor, Agronomy and Nutrient Management
UCCE Kings, Tulare, & Fresno Counties
680 Campus Drive, Ste. A
Hanford, CA 93230
Office (559) 852-2788
<http://ceklings.ucanr.edu/>

From: Kit Alviz <Kit.Alviz@ucop.edu>
Sent: Thursday, February 2, 2023 10:27 AM
To: Nicholas E Clark <neclark@ucanr.edu>; Anna N Lee <anlee@ucanr.edu>
Subject: Re: Reminder to complete uploading materials and submit your Program Review Dossier packet, Annual Evaluation, Goals in WFA

Sorry Nicholas – We see now that one of the PDFs is also the 3rd hyperlinked example.

Do you have hyperlinks to all 3 examples? If so, it would be cleanest to just revise your “summary of publications examples” doc to include all 3 hyperlinks and Anna can re-upload.

From: Nicholas E Clark <neclark@ucanr.edu>
Date: Thursday, February 2, 2023 at 10:26 AM
To: Kit Alviz <Kit.Alviz@ucop.edu>, Anna N Lee <anlee@ucanr.edu>
Subject: Re: Reminder to complete uploading materials and submit your Program Review Dossier packet, Annual Evaluation, Goals in WFA

Thank you!

Sent from my phone

Nicholas Clark, CCA

Farm Advisor, Agronomy and Nutrient Management
UCCE Kings, Tulare, & Fresno Counties
680 Campus Drive, Ste. A
Hanford, CA 93230
Office (559) 852-2788
<http://cekkings.ucanr.edu/>

From: Kit Alviz <Kit.Alviz@ucop.edu>

Sent: Thursday, February 2, 2023 10:25:34 AM

To: Nicholas E Clark <neclark@ucanr.edu>; Anna N Lee <anlee@ucanr.edu>

Subject: Re: Reminder to complete uploading materials and submit your Program Review Dossier packet, Annual Evaluation, Goals in WFA

Hi Nicholas,

I'm on the call with Anna right now and am responding to your question. The "publication examples" upload field is optional because the E-Book recommends to just hyperlink the 3 examples in the "summary of publication examples" upload field. We see that you provided a hyperlink in the 3rd publication of your "summary of publication examples" doc – that's great. So in total, between the 2 uploaded examples and the 1 hyperlink, the reviewers will have access to all 3 of your examples. If you want to re-upload anything, you'll have to send the new uploads and instructions to Anna, but at this point, you shouldn't need to. Hope that helps!