UNIVERSITY OF CALIFORNIA
Agriculture and Natural Resources

II. Academic Program Review Dossier Cover Page | 2024 Cycle

Name, Lived Name: **Preferred Pronoun(s):**	Brooke Latack
Academic Title:	Assistant Cooperative Extension Advisor
County/Program:	Livestock – Imperial, Riverside, and San Bernardino Counties
Review Type:	Promotion Indefinite Review
Current Rank/Step:	CE Advisor / Assistant / IV
Requested Rank/Step:	CE Advisor / Associate / I / Indefinite Status
Review Time Period:	October 1, 2022 to September 30, 2023
Thematic Areas:	Food safety and environmental quality Productivity, efficiency, and sustainability of animal agriculture Forage production and quality

Position Description
Brooke Latack
Position Title: Area CE Advisor – Desert Livestock Serving Imperial, Riverside and San Bernardino Counties
Effective Date: 10/02/2017

PURPOSE & CLIENTELE

The Area Cooperative Extension (CE) advisor for desert livestock will conduct a locally-based extension, education and applied research program that will focus on desert livestock production and marketing, food safety, manure composting, and water quality. Other important issues include soil quality, wildlife habitat, forage production and other ecosystem services. With large feedlots in the Imperial Valley, the CE advisor has the ability to collaborate with other researchers to address the risk of movement of potential pathogens such as *Listeria spp.* and *E. coli* from livestock to the vegetable crop industry. The CE advisor needs to have a thorough and practical understanding of desert livestock production, and the constraints in arid ecosystems in order to develop an effective program. This position will primarily address priorities found in the Strategic Plans for the Sustainable Food Systems, Water Quality, Quantity and Security and Sustainable Natural Ecosystems Strategic Initiatives.

Key clientele will include ranch owners and managers, natural resource managers and professionals, food safety representatives and public agencies. The CE advisor will also work with the livestock industry in Riverside and San Bernardino Counties.

This position is headquartered in Imperial County with responsibilities in Imperial, Riverside and San Bernardino Counties.

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 applied research and educational programs to address the identified priority needs of the clientele that are consistent with ANR's Strategic Vision.
    - Conduct applied research designed to monitor changes and solve locally relevant problems.
    - Disseminate useful, science-based information to inform clientele, using extension methods that are responsive to clientele needs and appropriate for the audience and situation.
    - Maintain and promote Cooperative Extension's credibility by providing science-based knowledge and skills independent or 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 research and education programs in clientele, the public and policy makers.

- Maintain a program of continuous self-improvement and professional competence by participating in in-service training, seminars, workshops, work group & program team meetings, short courses, professional society meetings and other relevant opportunities.

- Actively participate in UC and ANR leadership, though work groups & program teams, committees, task forces and other formal or informal university service structures.

- Serve the California public by participating in activities of public agencies and organizations.

- Actively advocate for UC ANR program awareness and support.

PROGRAM LEADERSHIP AND BUSINESS OPERATIONS DUTIES

- *Leadership*: Provide vision, inspire, and motivate others with attitude and actions; sets a high standard for excellence; innovate and foster positive change; model and support a good team working environment; and encourage and be open to explore new ideas and innovative changes, and provide active, ongoing advocacy and support for ANR programs.

- *Local Delivery of Statewide Programs*: Represents UCCE programs locally in professional manner; ensures clientele needs are assessed, supports the development of priority program goals to successfully meet clientele needs, in alignment with ANR's statewide Strategic Vision and initiatives; oversees delivery of UC ANR statewide programs at the local level, works with staff to ensure that outcomes and impacts are measured and communicated; and interacts with UC ANR Program Teams, workgroups, specialists and others within the research/extension network to develop, strengthen and expand the local delivery of statewide programs.

- *Interpersonal Relationships:* Is an effective listener and communicator; takes responsibility for own actions; motivates others; keeps commitments; and cultivates political and industry support for UC ANR.

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 action 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 contacts, quantitative evaluations of benefits realized by clientele, and reports of any special efforts to serve under-represented groups.

RELATIONSHIPS

Responsible administratively to the UCCE Imperial County Director with input from the UCCE Riverside and San Bernardino County Directors for the conduct of the UC ANR program(s).

QUALIFICATIONS

A Masters Degree in disciplines such as animal science, rangeland management or other closely related fields is required. Work experience in livestock management, nutrition and research is preferred. Extension experience is desired. Excellent written, oral and interpersonal communication skills are required.

- 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.

Brooke Latack

Brooke Latack, Area CE Advisor
Desert Livestock

08 Jan 2018

Date

Oli Bachie, UCCE
Imperial County Director

1/8/2018

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: 2018.01.08 13:14:23 -08'00'

Chris Greer, Vice Provost
of Cooperative Extension

1/8/2018

Date

III. Program Summary Narrative

Introduction

I am a 1.0 FTE Assistant Advisor IV seeking a promotion to Associate I and Indefinite Status. I cover livestock production in the desert area of California (Imperial, Riverside, and San Bernardino counties). Livestock production represents approximately 25% of total ag value of the three counties, or approximately $1,081,316,000. Cattle are the number one commodity in Imperial County with 415,000 head of cattle worth $477,421,000, representing approximately 8% of beef and dairy cattle and calves in California. The desert growing areas of California are also critical regions for sheep grazing in the winter months, with thousands of sheep spending October through March grazing forage fields. Many of the large, concentrated livestock operations are located in Imperial County, represented by large feedlots ranging from 1,000 to 100,000+ head of cattle. As a result, feedlot cattle research and extension are a major portion of my program. Mid-to-small acreage livestock operations represent much of the research and extension work in Riverside and San Bernardino Counties. Livestock production is economically important in all three counties, both from the direct products produced and the co-benefits to other industries including manure for compost spread on local fields for vegetable production and grazing for improved forage production.

Since the onset of my program in October 2017, I have worked to become a recognized resource in the area I serve. As time has gone on, the number of producers and industry members reaching out for information, help, and resources has increased. Initially, many in the area were unaware of UC ANR in general or the existence of an advisor specific to livestock. The program I have developed addresses the UC ANR public values of promoting economic prosperity in California, safeguarding abundant and healthy food for all Californians, protecting California's natural resources, developing a qualified workforce for California, and building climate-resilient communities and ecosystems.

Theme #1: Food safety and environmental quality

Background and Goals: The area in Imperial County where most crops are grown and livestock are produced is approximately 29 miles east to west by 43 miles north to south (1,247 mi^2), which represents approximately 28% of the area of the whole county. Fresh crops (i.e romaine, spinach, cabbage, etc) are typically grown in the winter season, the same season that thousands of sheep are brought down to graze adjacent forage fields. In that same area, almost 400,000 head of cattle are being fed in lots. Given the small area of land holding both industries, fresh produce fields are often in close proximity to livestock. In order to reduce the risk of pathogens moving from livestock to produce fields, Leafy Greens Marketing Agreements (LGMA) were developed to identify setback distances that fields must be relative to livestock operations. Since the 2017 outbreak of E. coli O157:H7 in romaine lettuce, these setback distances have increased, despite the little science supporting these changes. Buyers of romaine have also started to go beyond the LGMA, insisting on setback distances of up to 5 miles from livestock operations. Due to the small land area of the Imperial Valley, the sheer number of livestock in the Valley, and the traveling nature of the sheep, these are difficult measures to meet. This has led to a loss of available land for fresh produce and tension between the two industries. The fresh vegetable and melon crop industry is worth $640 million per year; loss of land availability can be economically detrimental.

The goal of this portion of my program was to provide scientific information regarding setback distances and pathogen movement from livestock operations. This information may allow more land to be used in fresh produce production and help reduce the risk of foodborne pathogen outbreaks, protecting the health of California consumers.

Clientele: Livestock operators, fresh produce growers, county officials, consumers

Inputs: In order to meet the goal of this theme, both extension and research were needed. I organized and co-organized two workshops to provide current information for livestock producers and produce growers. Three research studies were also conducted; I was a co-PI of one and a collaborator of two. These research projects addressed methods livestock operators could use to reduce pathogen shedding and the movement of pathogens from manure to nearby fields. Finally, a popular press article was written to provide the public with the background and scientific information available regarding the interaction of

livestock and fresh produce and its impact on food safety. I was active in all projects listed and spent substantial time collecting samples, writing outputs, and organizing the workshops.

Methods, Outcomes, and Impacts

Movement of pathogens from livestock operations

Methods: Following the 2017 E. coli outbreak in romaine, practical research was developed to determine the distance pathogens may move from livestock operations and whether E. coli vaccines will reduce the shedding of E. coli from cattle digestive systems. Pathogen movement was determined from air samples, manure samples, and leafy green samples at different distances from the livestock operations. To determine vaccine efficacy in feedlot cattle, cattle already on trial were vaccinated with either the vaccine or placebo and fecal samples were collected.

There was a need to extend existing information to producers. Misinformation and guesses were circulating, indicating that available information was not reliable. In collaboration with specialists at UC Davis, I coordinated an initial workshop that was developed specifically to provide information that may help livestock organizers navigate the changing system. We brought speakers from the UC and University of Arizona system to discuss current, relevant, and local data. Subsequently, workshops were developed to bring livestock and fresh produce growers together to learn and discuss with the presence of an individual skilled in moderating charged conversations. My role for that workshop was to help coordinate the location at UC DREC and contact livestock producers to encourage their participation and answer questions. Finally, in collaboration with Rebecca Ozeran (UC ANR), a popular press article was developed to provide a broad overview of foodborne pathogens, the traceback method during outbreaks, and the current knowledge that exists surrounding the livestock-produce interface. Regular one-on-one meetings with growers and producers was also a critical part of the extension portion of the program.

Outcomes and impacts: The studies measuring pathogen movement from livestock operations found that pathogen movement does not occur beyond 120 ft in air samples and beyond 300 ft in leafy green samples. This is critical as current LGMA regulations require 1200 ft to a mile from livestock operations. This gives producers scientific evidence to use in discussions with produce buyers to explain that increasing these distances does not equate to safer produce. As mentioned, the fresh produce industry represents an economic value of $640 million per year in Imperial County. Loss of land due to arbitrary setback distances has been a major concern to produce growers. One grower mentioned that even though the LGMA only applies to livestock operations with 1000+ head of animals, their buyers have dictated that they must comply for any livestock operation with 200+ head, making their ability to grow increasingly difficult. Produce growers have indicated that this data will allow them to approach their buyer with evidence and may allow changes to mandates, saving them land, money, and stress. Both livestock operators and produce growers want to collaborate to improve the safety of our food system and this will be a helpful first step. One peer-reviewed paper and one poster abstract were published from this work. We are still working through the data for the vaccine study but feel that the results will help determine if the vaccine will reduce food safety risks while still being economically feasible.

Both workshops were very successful in turn out from feedlot operators. The initial workshop had at least one representative from all feedlots in the Imperial Valley (representing approximately 400,000 head of cattle). The workshop had great discussions between the speakers and participants. It was critical in identifying specific research needs that would help the producer. The second workshop had similar attendance from livestock operators. It was determined through discussions with attendees after that they did not prefer the moderated method of workshop, which helped me identify further extension methods in the future to avoid. The article we wrote in response to the outbreak was successful in distribution and response. The article ultimately won the national award for feature story from the National Association of Agricultural Agents. The outcome of these activities was a better understanding of the needs of livestock and produce growers in the Imperial Valley that led to effective research to meet these needs.

This work will safeguard abundant and healthy food for all Californians through improved food safety.

Theme #2: Productivity, efficiency, and sustainability of animal agriculture

Background and Goals: Animal agriculture in the desert area of Southern California is important not only for meat and milk, but for replacement animals that will end up elsewhere in California as well as the

byproducts, including waste for compost that is critical to the area's organic vegetable production. Improved productivity and efficiency are an important consideration for livestock operators, especially as feed costs increase and regulatory changes create challenges. An issue particularly important to the desert area of California is managing livestock in extreme heat. Average temperatures for the summer are around 110° F with several days approaching 120° F. This can put stress on animals and cause a decrease in productivity. In my programmatic area, livestock owners tend to fall into either extremely large (30,000+) or small acreage. Because of this, I have worked to develop resources for small acreage producers. All of these issues have been identified as critical and make up a major portion of my program. Thus, the goals in this theme were:

- Identify management techniques and/or feed additives to reduce heat load on livestock.
- Identify feed additives or nutrition strategies that improve performance, increase efficiency, and improve meat quality of livestock.
- Develop resources for small acreage livestock owners.
- Develop extension methods to reach a greater number of clientele.

Clientele: Livestock managers/owners, industry, government organizations, and non-governmental organizations.

Inputs: I have worked on 26 projects related to the theme of productivity, efficiency, and sustainability of animal agriculture. Much of the research was supported by industry gift funds and grants. For the 20 projects I am Co-PI, I have contributed heavily to the development, execution, data management, and follow up, including reports and peer reviewed manuscripts. Several interns, supported by funding through other Co-PIs, have been instrumental in maintaining the projects. Extension projects related to this theme have been a podcast developed by Dr. Pedro Carvalho (previously with UC ANR, now with Colorado State University) and an accompanying newsletter. I contributed to the development, preparation, and recording of the podcast as well as the transcribing, writing, development, and publishing of the monthly newsletter.

Methods, Outcomes, and Impacts

Needs Assessment

Methods: When I began my program, one of the first tasks I wanted to accomplish was a needs assessment. The goal for this project was to make livestock producers aware of the program as well as to understand their needs. I developed the assessment to be done face-to-face to improve response rate. The number of large livestock operators is low, particularly feedlot managers, so it would be feasible to do this. I had an opportunity to talk to each feedlot manager in the Imperial Valley while completing Beef Quality Assurance assessments, which gave time to have a discussion about the questions.

Outcomes and impacts: I was able to identify the needs that producers thought were the most important for them at that time: heat stress management, alternative or less expensive feed to decrease the cost of feed, improving the identification of sick cattle, managing labor shortages, and interactions between livestock and fresh produce. This information was critical to shaping how I approached my program. Long term impacts from this information will be improved economic prosperity in California through improved animal management, productivity, and efficiency. The Beef Quality Assurance assessments also allowed the feedlots to continue selling cattle to processing plants as the deadline to accomplish that was approaching resulting in no negative economic impact to producers.

Improved management of feedlot cattle

Methods: Research was conducted on management techniques related to hormonal implants and pen space to determine if any of the techniques improve productivity of cattle in the feedlot. These are particularly important management issues as:

- Feedlots in the area tend to overcrowd their pens, leading to decreased performance and efficiency.
- Hormonal implants are one of the best technologies feedlots can use to improve productivity and feed efficiency and reduce feed intake, ultimately increasing profits. Recent regulatory changes have made it so managers will need to change their implant management.

Outcomes and impacts: In newsletters and podcasts, we discuss the results of the studies as well as the implications for the feedlot managers so they can make a better decision on which implants work best for them and the program that would be most effective with their other management decisions. The results indicated how new regulatory changes will affect the productivity of their livestock and what they should expect, particularly as we saw that the new-standard long duration implants reduce productivity, efficiency, and carcass quality. Overall, these projects will promote economic prosperity in California through improved animal management, productivity, and efficiency.

Livestock Nutrition

Methods: Feed costs are often one of the greatest expenses for livestock managers. Improving feed efficiency or using less expensive feeds can be effective in reducing the cost of feed. 12 research projects were conducted looking at the impact of various nutrition concepts on productivity of feedlot cattle. All studies were conducted at the UC Desert Research and Extension Feedlot, replicating management of feedlots in the Imperial Valley.

Outcomes and impacts: The research successfully indicated what nutritional management strategies worked best for the calf-fed Holstein based feedlots seen in the Imperial Valley. We were able to see success with certain additives like protected amino acids, antimicrobials (even at lower concentrations than previously used), and essential oils (though not when fed with some other additives), while showing that other strategies may not be as effective. In our studies, we found that certain additives can improve efficiency by 4-8%, which could have significant impacts on feed cost. In order to extend this research out to clientele, we spent 33 of our 83 podcast episodes on nutrition management and feed additives. A related article for each episode was published in our monthly newsletter. Adaptation of these techniques is highly dependent on the management strategies of the feedlot since some of the feedlots participate in programs that do not allow all or any additives. The potential productivity and efficiency improvement resulting from these projects will promote economic prosperity in California through improved animal management, productivity, and efficiency.

Extreme Heat Management and Abatement

Methods: Extreme heat can have major impacts on livestock productivity. During periods of high heat, animals tend to eat less to reduce their heat load. This reduction in feed intake can lead to animals just maintaining or losing weight during these periods. Methods to reduce the heat load while still maintaining feed intake is critical. Symptoms of extreme heat stress can also mask symptoms of illness, making it difficult for managers to identify and treat sick animals. All of this is economically unfavorable for the manager. Since 2018, I have worked to identify the extent of heat adaptation of cattle as well as methods to mitigate heat stress. This has been primarily done through boluses in the rumen that take continuous temperatures. This data helps us identify what ambient temperatures are beyond what the animal can handle and disrupts the maintenance of internal body temperature. More recently, I have worked with industry to test boluses that are programmed to alert when temperature changes beyond a threshold, which would indicate a sick animal.

Outcomes and impacts: One additive that we tested did not successfully abate heat for the animal or make it so they were more productive during the high heat periods. This is important because the additives can increase the cost of feeding cattle, so it is important to show managers the effect of the additive so they can make the best decision for their operation. As an example, feeding a similar product at the same rate as dairy cows would cost $1,485,000 per year for a 30,000 head feedlot. With the boluses, we found that Holstein steers are fairly resilient in the summer compared to the crossbred Holstein steers, which are now becoming more popular. This may affect how operators manage crossbred Holsteins in the summer. We have been able to use the rumen temperature boluses to identify when cattle may have symptoms of illness and when they do not. This is important as few bolus companies have data on extreme heat and how it may affect the thresholds they build in. As the boluses are developed, it can be a cost-effective way to identify sick cattle early in the illness as labor shortages are making it extremely difficult for pen riders to effectively identify and treat all of the animals that need it. The boluses themselves have been decreasing in cost from $400 a few years ago to several dollars this year. This is critical since treating cattle can be extremely expensive, but treating early can decrease treatment costs

and mitigate productivity losses. As an example, bovine respiratory disease in feedlots costs the industry $800-900 million per year. A reduction in just a portion of that a year due to early detection would increase profits and improve economic viability for livestock operations in California as well as increased preparedness and resilience to extreme weather and climate change.

Crossbred dairy steers in the feedlot

Methods: The use of beef semen has been one of the fastest developing needs experienced by clientele since the onset of my program. The vast majority of cattle in feedlots in Imperial County are calf-fed Holstein steers. Many of these cattle come from California dairies. Since 2017, there has been a major change in the use of beef semen in dairy cows resulting in beef x dairy cross offspring. In 2022, it was reported that 81% of California dairies were using beef semen on dairy cows in some way in their reproduction program, though 92% of them had only been using beef semen on dairy cows for six years or less. This has led to reduced availability of purebred Holstein steers and an increase in availability of crossbred beef x dairy steers. Unfortunately, most of the crossbred dairy data is dated or unavailable, making it difficult for livestock producers to understand management needs and quality of crossbred Holstein steers. Additionally, crossbred dairy steers tend to cost more than purebred Holstein steers due to the assumed (but not proven) improvement in productivity and quality. Recent prices from a California calf ranch put crossbred dairy steers at approximately $400 more expensive per head than purebred Holstein steers when entering the feedlot. For a 30,000 cattle feedlot, this could increase the cost of cattle by $12,000,000 per year. This change led to the development of many discussions, two research projects, and several newsletter articles and podcast episodes discussing the topic.

Outcomes and impacts: The initial research project was extremely successful in demonstrating the difference between purebred Holstein steers and Angus-Holstein crossbred steers. The crossbred steers demonstrated greater gain efficiency and improved carcass and meat quality. It also demonstrated that Angus-Holstein steers were impacted more during the extreme heat of the summer. Our newsletter updated clientele throughout the research and led to discussions on crossbred beef x dairy, even during meetings related to vegetable production. This topic has led to the most discussions and questions by clientele, which allowed me to extend research-based information at a much more effective rate. We are currently finishing the second research study comparing the two most common beef x dairy crossbred breeds, Angus-Holstein and Charolais-Holstein. We aim to identify any productivity or carcass quality characteristic differences between the two so clientele can better decide which breed would suit their production system best. We are also looking at the impact on high heat on both breeds, especially with the light hide of the Charolais vs the black hide of the Angus. We featured crossbred beef x dairy in 8 podcast episodes and 8 newsletter episodes. I presented the results we found at a national meeting for extension agents, advisors, and specialists, leading to great discussions while presenting and further discussions with agents throughout the US after the conference. Long term impacts of this work will promote economic prosperity in California through improved animal management, productivity, and efficiency as well as increased preparedness and resilience to extreme weather and climate change.

CattleCal Podcast and Newsletter

Methods: In March 2021, Dr. Pedro Carvalho and I developed the CattleCal podcast and newsletter. The goal of these extension methods was to reach a wider audience. The podcast consisted of four episodes per month consisting of a career call with member of cattle industry, a research call with guest from first episode to learn about research or projects they conducted related to cattle production, an overview of a past feedlot research project, and Dr. Zinn (UC Davis) answering listener submitted questions about feedlot management.

The newsletter featured transcriptions of these episodes as well as announcements and current research study updates. Podcasts were published to common podcast sites (i.e. Spotify, ApplePodcast, etc). Newsletters were emailed out monthly as well as uploaded to the UCCE Imperial County website.

Outcomes and impacts: The podcast featured 22 guests representing 12 research, extension, and industry institutions. 50% of guests represented UC ANR programs. We covered 33 topics on the podcast including crossbred beef on dairy cattle, sustainability of cattle production (controlled burns, grazing to reduce fire fuel, grazing for invasive weed management, greenhouse gas quantification), nutrition, and

feedlot management. Since the last published podcast episode, we have had 6,658 plays over 83 episodes with 367 followers on Spotify. Of the listeners, 76% were male and 22% were female. 90% of listeners were 44 years old or younger. Listeners represented 45 US states and 44 countries. We published 21 newsletters with 113 subscribers. All feedlots in Imperial County were subscribers to the newsletter. We found that using both the podcast and newsletter allowed us to reach more clientele. From conversations with feedlot managers, there were distinct groups that preferred to sit and read the newsletter while another group that preferred to listen to the podcast when convenient (i.e. driving to satellite feed yards). This indicated that presenting the same information in two forms was effective in reaching more clientele. It also allowed podcast listeners to read through the transcriptions if the audio was difficult to understand. The onset of the podcast helped develop more relationships as producers reached out to ask questions and discuss topics featured on the podcast. Two local high schools used the podcast as a learning tool, especially the episode focusing on the career of someone in the livestock industry. We have reached 100+ high school students through this use. Unfortunately, Dr. Carvalho left UC ANR in February 2023 leading to a pause in both the podcast and newsletter while Dr. Carvalho settled into his new position. We have plans to continue to collaborate on the podcast and newsletter, but with modifications to reduce the time spent on the project. Long term impacts of this work will promote economic prosperity in California through improved animal management, productivity, and efficiency as well as increased preparedness.

Small Acreage Livestock

Methods: Much of my programmatic work has been with large, commercial livestock operations, but small acreage livestock owners are also important in my area. I began a concentrated effort to include more resources for livestock owners that operate on a smaller scale. Many of my farm calls are related to small acreage livestock managers. I organized one standalone workshop on small ruminant production and collaborated (Julie Finzel, Devii Rao, Theresa Becchetti, and Rebecca Ozeran – UCCE) to organize two webinar series, one on weed management and the other on small acreage management. I presented one webinar during each webinar series on the topics of poisonous plants of California for livestock and livestock/pasture nutrition. The small acreage webinar series developed into an effort to build a webpage that housed information for small acreage clientele to help source information for commonly asked questions for a variety of livestock (Julie Finzel, Devii Rao, Theresa Becchetti, Rebecca Ozeran, Dan Macon, Flavie Audoin, and Sequoia Williams – UCCE). I collaborated and helped develop the beef and dairy sections of the webpage. I also presented about using livestock in home gardens in a local webinar series.

Outcomes and impacts: 100% of attendees of the small ruminant workshop responded that they learned something at the workshop and would be using the information learned within the following 24 months. During the presentation about toxic plants, 27% of participants indicated that they learned a lot and 47% indicated that they learned some new things about toxic plants for livestock. The small acreage webinar series had 113 attendees registered. During the first webinar of the series, I presented about pasture forage nutrition. Before the presentation, 33% of attendees felt not comfortable at all or slightly uncomfortable understanding the nutritional needs of their livestock on their property. After the presentation, 100% of the audience indicated that they feel slightly more comfortable (75%) or a lot more comfortable (25%) in understanding the nutritional needs of the livestock on their property. During the presentation about using livestock in home gardens, several attendees indicated that they planned to use some of what they learned in their own gardens. All efforts demonstrated an increase in knowledge by attendees and indications that the knowledge would be applied. I plan to continue to put effort into providing resources to small acreage livestock owners. I have also spent considerable effort working with CDFA and local industry to meet the needs of Imperial County livestock owners that are currently not met, including veterinary shortages and local, custom cut meat processing. Both issues are causing significant management and economic issues with small scale livestock owners. The potential impacts of this work are the promotion of economic prosperity in California through improved individual and household financial stability through maintenance of their own food sources, improved animal management, productivity and efficiency, improved food safety, improved management and use of land, and increased preparedness and resilience to extreme weather and climate change.

Theme #3: Forage production and quality

Background and Goals: Forage crops in Imperial County represent approximately 281,000 acres of production equating to a gross value of $482,158,000. These are important for feeding the cattle in the local livestock industry as well as being exported to other states and countries. The industry is critical, but the concerns surrounding Colorado River water availability has increased interest in alternative forages. Since most of the water used for agriculture is surface water from the Colorado River, these concerns grew over the past few years. The goal of this theme was to identify effective alternative forages that may exhibit high productivity, ideal nutrient concentrations, water efficiency, and drought tolerance.

Clientele: Forage growers and livestock feeders

Inputs: Three studies were conducted to identify alternative forages and forage production methods that increased efficiency of growth. These projects were funded with advisor funds and CDFA grants. Support came from lab technicians and advisor efforts. Additionally, two workshops were developed to support this research. I was active in all projects with development, writing, data collection, and management and organization of the workshops.

Methods, Outcomes, and Impacts

Moringa

Methods: Moringa is a nutrient dense tree that has been used in South American and Asian countries to feed livestock. While moringa is growing in popularity as a health food for human consumption in the US, it still needs development for commercial use as a forage for livestock. I collaborated with Oli Bachie (UC ANR) to develop research on nutrient quality and productivity of moringa grown in the low desert. We also developed two workshops to extend current information on moringa and develop the needs of local growers. One oral presentation and one poster presentation were completed to explain moringa potential.

Outcomes and impacts: From the workshops we were able to determine the research and extension that would meet the needs of producers, including variety, production methods, and nutrient quality. We began new research on germination and productivity of moringa. 100% of attendees learned something new and improved their knowledge from very low/low/moderate to moderate/high/very high from the beginning to the end of the workshop. Attendees indicated that they would be implementing the information on their crop within the following 12 months. We also developed a study to better understand nutrient quality of moringa for livestock use. We learned which extension methods are preferred by moringa producers that we can implement in the future. After the workshops, two high schools began using moringa as a teaching tool and for research topics and projects for students. The students have expressed excitement in being able to grow a tree they can use for things other than shade. The long-term impacts of this project would be increased agriculture and forestry efficiency and profitability and improved water-use efficiency.

Forage Production

Methods: Two research studies were conducted to identify forage productivity and management methods. One study compared several common and uncommon forages to compare productivity in the low desert. The second study looked at irrigation and fertilization methods and how those practices affected productivity and toxicity of the sudangrass. This study is still ongoing. One oral presentation was given to present results.

Outcomes and impacts: The research studies supplied information on nutrient quality and productivity that will help producers make decisions on forage use. With further study, we will be able to identify best management practices for these forages in the low desert to manage irrigation and nutrient loss. The long term impacts of this project would be increased agriculture and forestry efficiency and profitability and improved water-use efficiency.

University & Public Service

University Service: I supported my local UCCE office by presenting to county officials, attending Farm Bureau meetings, serving as safety coordinator, and serving as a resource to colleagues regarding livestock related issues. I have served on seven search committees for UC ANR positions including one

advisor and one specialist position. I served on the Sustainable Food Systems committee and currently serve on the Desert Research and Extension Center Research Advisory Committee and Desert Research and Extension Center Planning Committee. I served as a committee member and chair for the UC ANR California Renewable Resources Extension Act Technical Advisory Committee.

Public Service: I have been actively serving the public since beginning my program. This included nine presentations to high school and university students about topics related to animal science, animal nutrition, and extension. I judged twelve contests related to youth agriculture research at the local, regional, and state levels. I serve on Agriculture Advisory Committees for two local high school agriculture programs to provide insights on what skills and opportunities would help students as they move into the livestock related workforce. I participated in a certification review for the topic of agriscience to ensure that the program meets realistic research needs. I have served on the Imperial Valley Regional Occupational Program committee and presented twice on the agriculture panel speaking to county officials, educators, and industry members during their annual regional committee meeting. These efforts will help set up youth who will eventually become active clientele of the livestock program with the skills and knowledge that will make them successful. These opportunities have led to the development of stronger relationships with county officials and clientele throughout the county.

Professional Competence

I am an active member of five workgroups (Beef Safety and Quality Assurance, Desert, Livestock Production Systems, Native American Community Partnerships, and Sheep and Goat Herd Health and Production) as well as participating in the Dairy Production and Food Safety program team. I have presented nine posters and one oral presentation at national and regional professional society meetings covering feedlot heat stress, vaccinations, mud accumulation, tannin supplementation, and beef x dairy crossbred cattle. I have served on two committees and acted as a reviewer for one professional society of which I am a member. From this same professional society, I have won one state award, one regional award, and three national awards. I have been invited to present throughout California and Mexico about several topics including feedlot management and extension. I have led several tours for attendees ranging from high school agriculture students to international visits to discuss feedlot production and research. To maintain professional competence and continue to develop my program, I attended 36 professional development and training events. I continue to prioritize learning and development opportunities to best serve my clientele.

Affirmative Action

I have achieved civil rights compliance. I am in parity with the following groups: Hispanic or Latino, American Indian or Alaska Native, Asian, and women. To reach compliance with Black or African American and Native Hawaiian or other Pacific Islander clientele, I used A.R.E methods including personal emails and discussion with clientele, mass emailing and mailing of flyers, social media promotion, inclusion of flyers in newsletters, and presentations of opportunities to groups. Several groups that I am in parity with are numerically small relative to some of the other groups. I believe my increase in work related to small acreage livestock production and alternative forages has been instrumental in reaching these groups and achieving parity. This has indicated that those topics should continue to be a part of my program to continue meeting their needs.

Including and sharing resources in Spanish is an important part for my program. In Imperial County, 25% of the population speak only English while 73% of the population speak Spanish. In Riverside and San Bernardino Counties, 57% of the population speaks only English while 34% speak Spanish. This indicated that it is critical to include resources in Spanish to reach more of the Spanish-speaking clientele group. To meet this need, we translated newsletters and webpages to Spanish as well as found resources in Spanish that were accurate and could be shared with clientele. This has been done through personal efforts, volunteers when time allowed, colleagues translating orally in person, and through paid translation services. My Spanish-speaking skills have increased since the onset of my program, and continued improvement will continue to be a priority so I am able to communicate with more livestock producers in my area.

IV. Supporting Documentation

A. Project Summary

Project Title	Role	Collaborators	Duration	Support and Support Source (if applicable)
Food safety and environmental quality (4)				
Livestock/produce interface and food safety	Co-investigator	Paula Rivendeneira @ University of Arizona Rebecca Ozeran @ UC ANR		
Food borne pathogen movement from feedlots via air	Collaborator	Edward (Rob) Atwill @ UC ANR/UC Davis Xiaohong Wei @ UC Davis Amlan Aggrawal @ UC Davis Ronald Bond @ UC Davis	March 2020	
Food borne pathogens in calf-fed Holstein manure	Collaborator	Michelle Jay-Russell @ UC Davis	April 2020 – March 2021	
Effect of E. coli vaccine on fecal E. coli concentrations in calf-fed Holstein steers	Co-PI	Richard Zinn @ UC Davis Pedro Carvalho @UC ANR/Colorado State University Michelle Jay-Russell @ UC Davis Gaby Maier @ UC Davis Xiang (Crystal) Yang @ UC Davis	May 2021 – December 2021	$50,000 CDFA
Productivity, efficiency, and sustainability of animal agriculture (26)				

Project Title	Role	Collaborators	Duration	Support and Support Source (if applicable)
Effect of pen space on calf-fed Holstein steer	Co-PI	Richard Zinn @ UC Davis	November 2017 – July 2018	
Virginiamycin and implant strategy impact on calf-fed Holstein productivity	Co-PI	Richard Zinn @ UC Davis Lorenzo Buenabad-Carrasco @ Chihuahua University	November 2017 – July 2018	
Calcium supplementation requirements for calf-fed Holstein steers	Co-PI	Richard Zinn @ UC Davis Lorenzo Buenabad-Carrasco @ Chihuahua University	January 2018 – May 2018	
Metabolizable methionine and lysine requirements for calf-fed Holstein steers	Co-PI	Richard Zinn @ UC Davis Martin Montano @ Universidad Autonoma Baja California Jaime Salinas-Chavira @ Autonomous University of Tamaulipas	January 2018 – May 2018	
Heat adaptation in feedlot calf-fed Holsteins during the low-desert summer	Co-PI	Richard Zinn @ UC Davis	July 2018 – December 2018	
Effect of hydrolized yeast cell supplementation on productivity of calf-fed Holstein steers	Co-PI	Richard Zinn @ UC Davis	May 2018 – December 2018	
Effect of supplementing cinnamaldehyde-eugenol and capsicum on productivity of calf-fed Holstein steers	Co-PI	Richard Zinn @ UC Davis Martin Montano @ Universidad Autonoma Baja California	May 2018 – December 2018	

Project Title	Role	Collaborators	Duration	Support and Support Source (if applicable)
		Jaime Salinas-Chavira @ Autonomous University of Tamaulipas		
Effect of supplemental protected amino acids on productivity of calf-fed Holstein steers	Co-PI	Richard Zinn @ UC Davis Martin Montano @ Universidad Autonoma Baja California Lorenzo Buenabad-Carrasco @ Chihuahua University	January 2019 – December 2019	
Effect of heat abatement additive (NutraGen) on performance of calf-fed Holsteins	Co-PI	Richard Zinn @ UC Davis Pedro Carvalho @UC ANR/Colorado State University Marcos Ferraz Jr. @ Universidade Federal do Amazonas Ruben Flores @ Universidad Autonoma Baja California Gerson Sanchez-Cruz @ Universidad Autonoma Baja California Martin Montano @ Universidad Autonoma Baja California	January 2020 - December 2020	
California Ranching Sustainability Self-Assessment	Collaborator	Rebecca Ozeran @ UC ANR Royce Larson @ UC ANR	December 2020 – September 2023	

Project Title	Role	Collaborators	Duration	Support and Support Source (if applicable)
		Mark Brunson @ Utah State University Bill Tietje @ UC Berkeley Devii Rao @ UC ANR Julie Finzel @ UC ANR Matthew Shapero @ UC ANR Sheila Barry @ UC ANR Fadzayi Mashiri @ UC ANR Jeff Stackhouse @ UC ANR John Harper @ UC ANR		
Effect of DDGs inclusion in calf-fed Holstein steer diets in the feedlot on performance	Co-PI	Richard Zinn @ UC Davis Pedro Carvalho @UC ANR/Colorado State University Marcos Ferraz Jr. @ Universidade Federal do Amazonas Martin Montano @ Universidad Autonoma Baja California	February 2021 – May 2021	
Effect of flavomycin on productivity of calf-fed Holstein steers in the feedlot	Co-PI	Richard Zinn @ UC Davis Pedro Carvalho @UC ANR/Colorado State University Martin Montano @ Universidad	May 2021 – December 2021	$24,000 Huvepharma, gift funds

Project Title	Role	Collaborators	Duration	Support and Support Source (if applicable)
		Autonoma Baja California		
Effect of essential oil feed additive (CRINA) plus 25-hydroxy-vit-D3 on production of calf-fed Holstein steers in the feedlot	Co-PI	Richard Zinn @ UC Davis Pedro Carvalho @UC ANR/Colorado State University	February 2021 – December 2021	$45,000 DSM, gift funds
Climate smart agriculture project	Collaborator	Leslie Roche @ UC Davis Tapan Pathak @ UC Davis Vikram Koundinya @ UC Davis Daniele Zaccaria @ UC Davis Mark Cooper @ UC Davis Steven Ostoja @ USDA Dan Macon @ UC ANR Grace Woodmansee @ UC ANR Devii Rao @ UC ANR Rebecca Ozeran @ UC ANR Andre Biscaro @ UC ANR Ruth Dahlquist-Willard @ UC ANR Surendra Dara @ UC ANR Jairo Diaz @ UC ANR		$1,500,000 USDA

Project Title	Role	Collaborators	Duration	Support and Support Source (if applicable)
		Jhalendra Rijal @ UC ANR		
Develop resources for small landowner livestock owners including website and webinars	Collaborator	Julie Finzel @ UC ANR Rebecca Ozeran @ UC ANR Theresa Becchetti @ UC ANR Dan Macon @ UC ANR Flavie Audoin @ UC ANR Devii Rao @ UC ANR Sequoia Williams @ UC ANR	October 2021 - current	Partially UC RREA
Effect of ambient temperature and humidity on respiration rate and pen mud accumulation of calf-fed Holstein steers in the feedlot	Co-PI	Richard Zinn @ UC Davis Pedro Carvalho @UC ANR/Colorado State University	July 2021 – December 2021	Cattle already funded on different trial were used.
Effect of tannin feed supplementation on calf-fed Holstein and Angus-Holstein steers in the feedlot	Co-PI	Richard Zinn @ UC Davis Pedro Carvalho @UC ANR/Colorado State University Marcos Ferraz Jr. @ Universidade Federal do Amazonas	January 2022 – December 2022	$48,000 SilvaFeed, gift funds
Effect of programmed feeding on calf-fed Holstein and Angus-Holstein steers in the feedlot	Co-PI	Richard Zinn @ UC Davis Pedro Carvalho @UC ANR/Colorado State University	January 2022 – December 2022	Cattle already funded on different trial were used.

Project Title	Role	Collaborators	Duration	Support and Support Source (if applicable)
Growth and performance of Angus-Holstein crossbred steers compared to purebred Holstein steers in the feedlot	Co-PI	Richard Zinn @ UC Davis Pedro Carvalho @UC ANR/Colorado State University Marcos Ferraz Jr. @ Universidade Federal do Amazonas	January 2022 – December 2022	
Effect of ambient temperature on respiration rate and ruminal temperature of calves in the feedlot	Co-PI	Richard Zinn @ UC Davis Pedro Carvalho @UC ANR/Colorado State University	May 2022 – December 2022	Cattle already funded on different trial were used.
Lamb weight gain and reproductive performance of post-partum ewes supplemented with palm kernel cake and sexual stimulated by a ram	Collaborator	Lorenzo Buenabad-Carrasco @ Chihuahua University Juan Sicairos-Diaz, Baja California University Paulina Vazquez-Mendoza @ Guerrero University Juan Gonzalez Maldonado @ Chapingo University	January 2022 – October 2023	
Effect of ractopamine and amino acid supplementation on calf-fed Holstein steer performance in the feedlot	Co-PI	Richard Zinn @ UC Davis Pedro Carvalho @UC ANR/Colorado State University	January 2023 – May 2023	$18,000 Adisseo, gift funds
Productivity of Angus-Holstein and Charolais-Holstein calf-fed steers in the feedlot	Co-PI	Richard Zinn @ UC Davis Pedro Carvalho @UC ANR/Colorado State University	February 2023 - current	

Project Title	Role	Collaborators	Duration	Support and Support Source (if applicable)
Effect of ambient temperature on respiration rate and ruminal temperature of Angus-Holstein and Charolais-Holstein calves in the feedlot	Co-PI	Richard Zinn @ UC Davis Pedro Carvalho @UC ANR/Colorado State University	May 2023 – current	Cattle already funded on different trial were used. Boluses donated by Planet IoT ($36,000 estimated value based on similar product from other companies)
Backfat composition of Holstein and crossbred Holstein steers in the feedlot	Collaborator	Richard Zinn @ UC Davis Pedro Carvalho @UC ANR/Colorado State University Payam Vahmani @ UC Davis	December 2022 - current	
Effects of extended colostrum feeding to calf-fed Holstein steers on health, performance, fecal resistome, and carcass characteristics	Collaborator	Pedro Carvalho @UC ANR/Colorado State University	2022 – current	$575,758 CDFA
Forage production and quality (3)				
Forage production in the low desert including Moringa as a novel forage crop	Co-PI	Oli Bachie @ UC ANR	March 2019 – March 2020	
Best management practices for sudangrass production in the low desert	Co-PI	Oli Bachie @ UC ANR Ali Montazar @ UC ANR	January 2022 – current	$243,331 CDFA Fertilizer Research and Education Program
Nutrient quality, productivity, and germination rate of moringa grown in the Imperial Valley	Co-PI	Oli Bachie @ UC ANR	June 2023 – current	Moringa tree in-kind contributions from growers equivalent $4000
General (1)				

Project Title	Role	Collaborators	Duration	Support and Support Source (if applicable)
CPR training for UCCE Imperial and UC Desert Research and Extension Center staff	PI	Kristian Salgado @ UC ANR	November 2022	$1,800 Be Smart About Safety Program

B. Professional Competence and Professional Activity

Professional Development and Training

Begin Date - End Date	Location	Name, Description and Occurrence of Activity
Oct 4, 2017	Holtville, CA	Office On-boarding Safety Training
Oct 17, 2017 - Oct 19, 2017	Davis, CA	UC ANR Programmatic Orientation
Oct 26, 2017	El Centro, CA	Tour of IID Headquarters and Background of Water Use in Imperial County
Nov 21, 2017	Imperial, CA	Tour Imperial Dam, Irrigation, and Drainage System with Imperial Irrigation District
Nov 29, 2017	Sparks, NV	Beef Workgroup Meeting
Nov 29, 2017 - Nov 30, 2017	Sparks, NV	California Cattleman's Association Annual Convention
Jan 24, 2018	Online	Animal Care and Use 101 Training
Feb 21, 2018	San Bernardino, CA	Met with Janet Hartin (UCCE San Bernardino county director) to discuss program and opportunities
Feb 21, 2018	Riverside, CA	Met with Eta Takele (UCCE Riverside county director) to discuss program and opportunities
Mar 22, 2018	Online	Systems Thinking Symposium
Apr 9, 2018 - Apr 12, 2018	Ontario, CA	Statewide ANR Conference

Begin Date - End Date	Location	Name, Description and Occurrence of Activity
Apr 11, 2018	Ontario, CA	Desert Workgroup Meeting
May 23, 2018 - May 25, 2018	San Diego, CA	CCA Feeder Meeting
May 31, 2018	Chino, CA	Mentor meeting and tour through the Chino area with UCCE Specialist Deanne Meyer
Aug 13, 2018	Online	Annual Evaluation training
Aug 20, 2018	Chino, CA	Dairy farm safety seminar
Sep 12, 2018 - Sep 14, 2018	Davis, CA	California Net Energy Symposium
Sep 18, 2018 - Sep 20, 2018	Davis, CA	Meat Production and Food Safety Workgroup bus tour
Apr 9, 2019 - Apr 10, 2019	Hanford, CA	Dairy program team meeting
May 8, 2019	Davis, CA	STEAD training
May 22, 2019 - May 24, 2019	San Diego, CA	California Cattlemen's Association Feeders Meetings
Aug 23, 2019	San Diego, CA	Regional Information Session
Mar 3, 2020 - Mar 4, 2020	Parlier, CA	Crucial Conversations trianing
Mar 5, 2020	Modesto, CA	Dairy Program Team meeting
Jun 5, 2020	Online	Desert Workgroup meeting
Jul 20, 2020 - Jul 24, 2020	Online	American Society of Animal Science Conference
Feb 26, 2021	Online	National Association of County Agricultural Agents - California meeting

Begin Date - End Date	Location	Name, Description and Occurrence of Activity
Mar 25, 2021	Online	Golden State Dairy Conference
Apr 2, 2021 - Apr 30, 2021	Online	Dairy/Livestock Workgroup Meeting webinars
Jul 6, 2021 - Jul 9, 2021	Online	National Association of County Agricultural Agents Annual Conference
Aug 19, 2021 - Aug 20, 2021	San Diego, CA	California Cattlemen's Association Feeder Meeting
Mar 17, 2022 - Mar 18, 2022	Davis, CA	Meat Production Program Team Meeting
November 16, 2022	Holtville, CA	CPR and first aid training
Apr 24, 2023 - Apr 27, 2023	Fresno, CA	UCANR Statewide Meeting – presented two posters at poster session
Apr 24, 2023	Fresno, CA	Livestock program team meeting
Aug 13, 2023 - Aug 18, 2023	Des Moines, IA	National Association of County Agricultural Agents annual conference

Disciplinary Society or Professional Association

Disciplinary Society/Prof. Assoc Name	Membership/Meetings Attended/Activities
American Society of Animal Science	Member 2017-current Attended annual national meetings in 2018, 2020, 2021, 2022, 2023 • 1 poster presentation - 2017 • 1 poster presentation - 2018 • 2 poster presentations - 2021 • 2 poster presentations - 2022 • 2 poster presentations - 2023
National Association of County Agricultural Agents	Member 2021-current Roles held: • Search for Excellence state committee chair – 2021

Disciplinary Society/Prof. Assoc Name	Membership/Meetings Attended/Activities
	• Animal Science state committee chair – 2022 to current • Journal of NACAA reviewer – 2022 to current Attended annual national meetings in 2021 and 2023. • Oral presentation – 2023 Attended western region annual meeting in 2022 • Poster presentation National awards received: • Feature story – 2021 • California Achievement Award – 2023 • Dan Kluchinski Memorial Scholarship Award – 2023 Regional awards received: • Audio recording – 2023 State awards received: • Search for Excellence in Livestock Production – 2023

Evidence of Professional Competency

Begin Date - End Date	Location	Name, Description and Occurrence of Award, Recognition, Professional Presentation, Office or Activity
Feb 22, 2018	Bakersfield, CA	Presented Desert Livestock Update at Kern County UCCE Livestock Symposium
Jul 9, 2018 - Jul 12, 2018	Vancouver, BC, Canada	Presented poster on heat stress in feedlot cattle at annual American Society of Animal Science conference
Mar 26, 2019	Davis, CA	Taped segment for Ranch Water Quality Planning video project
November 1, 2019	Mexicali, Baja California, Mexico	Presented on livestock extension work in the low desert of California to faculty and students in the vet and animal science department of Universidad Autonoma de Baja California
Jan 21, 2020	Holtville, CA	Teacher Environmental Education Tour
Oct 8, 2020	Online	High School Career Q+A

Begin Date - End Date	Location	Name, Description and Occurrence of Award, Recognition, Professional Presentation, Office or Activity
Jul 6, 2021	Holtville, CA	National Award Winner for Feature Story - National Association of County Agricultural Agents
Jul 14, 2021 - Jul 17, 2021	Online	Two poster presentations at American Society of Animal Science Annual Meeting
Sep 27, 2021 (Ongoing)	Holtville, CA	Reviewer for manuscripts submitted to Journal of National Association of County Agricultural Agents
Feb 26, 2022 - Dec 31, 2022	California	State Committee Chair (California/Search for Excellence)
Jun 29, 2022	Oklahoma	Present two research posters at American Society of Animal Science annual conference
Sep 23, 2022	Imperial County	Imperial Valley Regional Occupational Program Annual Regional CTE Advisory meeting panelist for Agriculture panel presenter
Oct 11, 2022 - Oct 13, 2022	Tucson, AZ	National Association of County Agricultural Agents Western Section Meeting Poster Presentation
Jan 1, 2023 (Ongoing)	California	State Committee Chair (California/Animal Science)
Feb 15, 2023	Holtville, CA	Cattle research tour - Ag students
Feb 21, 2023	Holtville, CA	Tour of research feedlot for United Kingdom researchers
Jul 19, 2023 - Jul 21, 2023	Albuquerque, NM	Present two posters at American Society of Animal Science annual conference
Aug 14, 2023	Des Moines, IA	National Association of County Agricultural Agents Dan Kluchinski Memorial Scholarship winner
Aug 15, 2023	Des Moines, IA	National Association of Agricultural Agents California Achievement Award
Aug 15, 2023	Des Moines, IA	National Association of County Agricultural Agents Regional Winner - Audio Recording

Begin Date - End Date	Location	Name, Description and Occurrence of Award, Recognition, Professional Presentation, Office or Activity
Aug 15, 2023	Des Moines, IA	Present research and extension program around crossbred Holsteins at annual conference for National Association of County Agricultural Agents
Aug 22, 2023	Des Moines, IA	National Association of County Agricultural Agents State Winner - Search for Excellence Livestock Production
Sep 22, 2023	Imperial, CA	Imperial Valley Regional Occupational Program Regional Advisory Committee Meeting panelist for Agriculture panel presenter

C. University Service

Begin Date - End Date	Name, Description, and Occurrence of Activity	Org Level	Your Contribution and Leadership Role
May 2, 2018	Presented UCCE projects and impacts to Imperial County Board of Supervisors and CEO	County	Presenter
Oct 10, 2018	Serve on interview panel for SRA at Imperial County office	County	Search committee member
Nov 1, 2018 - Dec 31, 2021	Sustainable Food Systems committee member	Division-wide	Committee member
Jan 23, 2019 - Dec 18, 2019	Serve on Search Committee for UCANR Feedlot specialist position	Division-wide	Committee member
Feb 11, 2019	Serve on interview panel for Climate Smart CES position	Division-wide	Search committee member
Apr 26, 2019 (Ongoing)	Serve on UC ANR Desert Research & Extension Research Advisory Committee	Division-wide	RAC committee member
Nov 14, 2019 (Ongoing)	Safety coordinator for Imperial County office	County	Safety coordinator
Nov 27, 2019 - Dec 17, 2019	Committee chair for SRA 1 position for UC DREC	Division-wide	Committee Chair

Begin Date - End Date	Name, Description, and Occurrence of Activity	Org Level	Your Contribution and Leadership Role
Feb 4, 2020 – December 2023	UC ANR California Renewable Resources Extension Act Advisory Committee member	Division-wide	Committee member 2020-2022 Committee chair 2023
Feb 3, 2021	Serve as search committee chair for lab assistant	County	Committee chair
Jun 2, 2021 - Jun 9, 2021	Search committee chair for Farm Maintenance Worker for UC DREC	Division-wide	Committee chair
May 5, 2022 - Aug 18, 2022	Search committee for Food Safety and Organic Production advisor	Division-wide	Committee member
Jul 29, 2022	Search committee for Climate Smart CES for Imperial County	Division-wide	Search committee member
Aug 3, 2022 (Ongoing)	Planning committee for UC DREC building	Division-wide	Committee member

D. Public Service

Begin Date - End Date	Name, Description, and Occurrence of Activity	Org Level	Your Contribution and Leadership Role
Oct 25, 2017	Present About Career in UC Cooperative Extension to Animal Science and Agriculture Classes Through IVROP at Imperial High School	Community	Presenter
Feb 9, 2018	Present UCCE career information to high school animal science students at Southwest High School	Community	Presenter
Feb 18, 2018	Boys and Girls Club of Imperial Valley Produce Gala and Saladero Contest Benefit	Community	Outreach about UCCE group and role

Begin Date - End Date	Name, Description, and Occurrence of Activity	Org Level	Your Contribution and Leadership Role
Mar 15, 2018	Represented UCCE Imperial at Youth Ag Summit. Explained role of UCCE in the community	County	Presenter
Nov 2, 2018	Imperial Valley College Chemistry Club tour	County	Presenter
Mar 9, 2019	Aid in Imperial County fair livestock auction	County	General help
Mar 11, 2019	Serve as panelist for Interview Panel for Imperial Valley Regional Occupational Program for agricultural program awards	County	Interview panelist
Apr 27, 2019	California FFA Agriscience Fair	State	Judge of papers and posters
Sep 26, 2019	Career Fair	County	Presenter
Jan 15, 2020	Science Fair Poster Judging	County	Judge
Apr 30, 2020	California FFA Agriscience Fair	State	Judge of papers and posters
Jan 11, 2021 - Jan 12, 2021	Science Fair Judge	County	Judge
Mar 1, 2021 - Mar 5, 2021	California FFA Agriscience Fair	State	Poster and Research Paper Judge
Sep 3, 2021	Present to two agriculture classes at Southwest High School	Community	Presenter
Sep 22, 2021 (Ongoing)	Ag Advisory Committee for Imperial High School FFA	Community	Committee Member
Oct 7, 2021	Agriscience Certification Review	State	Agriculture Professional Reviewer
Oct 26, 2021 (Ongoing)	Imperial Valley Regional Occupational Program Annual	County	Committee member

Begin Date - End Date	Name, Description, and Occurrence of Activity	Org Level	Your Contribution and Leadership Role
	Regional CTE Advisory committee member		
Jan 13, 2022	Imperial County Science Fair	County	Project Judge
Mar 7, 2022	FFA Agriscience Fair	State	Research Paper Judge
Mar 11, 2022	Career Informational Video	County	Presenter
Aug 8, 2022	Summer STEAM academy presentation for local community college and University of Arizona - Yuma students	Region	Presenter
Oct 20, 2022 (Ongoing)	Ag Advisory Committee for Calexico High School FFA	Community	Committee Member
Jan 10, 2023	County Science Fair Judging	County	Judge
Jan 24, 2023	GMO Student Development Judge	Community	Judge
Jan 25, 2023	Student Agriculture Interview Judge	County	Judge
Mar 13, 2023	Student Agricultural Award Interviews for IVROP	County	Interviewer
Mar 16, 2023	FFA Agriscience Fair Team Interview	State	Judge

E. Extension Activities

Meetings Organized

Begin Date - End Date	Meeting Name and Type	Topic/no. of repetitions	Role	Location(s)	Total No. of Attendees
Food safety and environmental quality (3)					
Apr 22, 2019	Livestock Food Safety Workshop	Discussions by presenters on the existence and	Organizer	UC Desert Research and	25

Begin Date - End Date	Meeting Name and Type	Topic/no. of repetitions	Role	Location(s)	Total No. of Attendees
		perpetuation of pathogens and the interaction between livestock and produce.		Extension Center	
Jun 11, 2019	Good Ag Neighbors	Conversations about the interaction between livestock and produce. How farmers can work together across different commodities.	Area organizer, help for main organizers	UC Desert Research and Extension Center	50
Feb 6, 2020	Alternative Manure Management Program (CDFA) Workshop	Alternative Manure Management program outline	Presenter/Organizer	El Centro, CA	11
Productivity, efficiency, and sustainability of animal agriculture (12)					
Feb 28, 2018	Desert Ag Symposium	Desert Livestock Update	Organized Livestock section of symposium	Palm Desert, CA	12
May 22, 2018	Meeting and tour at Universidad Autonoma de Baja California with collaborating professors and industry representative	Collaboration efforts and local research collaboration efforts	Organizer	Mexicali, Baja California, Mexico	5
Mar 7, 2019	Field tour of local Imperial county cattle industry for outside companies	Local cattle industry examples	Organizer	Imperial County feedlots	10
Jan 11, 2020	Small Ruminant Workshop	Small ruminant production	Organizer and speaker	Imperial, CA	24

Begin Date - End Date	Meeting Name and Type	Topic/no. of repetitions	Role	Location(s)	Total No. of Attendees
May 25, 2021	Weed Management for Small Acreages Workshop	Toxic Weeds for Livestock in California	Presenter and co-organizer	Online	45
Aug 26, 2021 - Jan 14, 2022	Imperial County Annual Report	Report UCCE Livestock program impact	Co-Writer	Zoom	5
Oct 19, 2021	Feedlot Research Tour	Feedlot Research at UC DREC	Organizer and Presenter	UC DREC	25
Apr 20, 2022 - Jun 1, 2022	Small Acreage Webinar Series	Small Acreage Management with Livestock	Co-Organizer	Online	65
May 18, 2022 - May 20, 2022	Tour of local cattle industry	Local cattle industry tour	Co-organizer	Imperial County, CA	8
Oct 13, 2022	Moringa Production and Awareness Workshop	Moringa Production in the Low Desert	Organizer and Speaker	Holtville, CA	11
Nov 9, 2022	Feedlot Cattle Supplement Industry Tour	Use of supplements in local feedlots and related research	Presenter and organizer	Imperial County, CA	4
Jul 18, 2023	Moringa Roundtable	Moringa Needs and Updates	Organizer and Presenter	Holtville, CA	14

Educational Presentations

Begin Date - End Date	Meeting Name/Event	Presentation Topic/no. of repetitions	Location(s)	No. of Attendees
Food safety and environmental quality (2)				

Begin Date - End Date	Meeting Name/Event	Presentation Topic/no. of repetitions	Location(s)	No. of Attendees
Dec 20, 2017	Presentation at Imperial Valley Vegetable Growers Association Meeting	Introduction to UCCE Imperial livestock program	Imperial, CA	
Nov 6, 2020	Gardening webinar	Using Livestock in Your Garden	Online	150
Productivity, efficiency, and sustainability of animal agriculture (18)				
Oct 4, 2017	Imperial County Farm Bureau Meeting	Introduction of self and background as well as goals for my program	El Centro, CA	28
Jan 17, 2018	Imperial County Fairboard Meeting	Introduction of self and background.	Imperial, CA	13
Feb 7, 2019	Present on Alternative Manure Management CDFA climate smart program	AMMP opportunities and process for Imperial County ranchers	El Centro, CA	7
Apr 18, 2019	Tour for CDFA Environmental Farming Act Science Advisory Panel	Feedlot research performed at UC DREC	Holtville, CA – UC DREC	
May 22, 2019	Imperial County School Food Service Cooperative meeting	Preliminary study on food waste and livestock food waste use	Imperial County	25
Sep 17, 2019	San Bernardino Farm Bureau Meeting	Livestock program in San Bernardino county	San Bernardino, CA	12
Dec 12, 2019	Fall Desert Crops Workshop	The benefits of grazing sheep on productivity and soil health of alfalfa	Imperial, CA	
Feb 6, 2020	Educator Imperial County Ag Bus Tour	Livestock Production in the Imperial Valley	Imperial County, CA	20

Begin Date - End Date	Meeting Name/Event	Presentation Topic/no. of repetitions	Location(s)	No. of Attendees
Oct 9, 2020	UC DREC Feedlot Tour	UC DREC research feedlot	Online	
Dec 10, 2020	Fall Desert Crops Workshop	Biomass productivity and forage quality of new and existing forage crops for the low desert environment	Imperial, CA/Online	
Apr 20, 2022	Small Acreage Webinar #1	Forage nutrition	Online	17
May 19, 2022	Local Cattle Industry Tour and Presentations	Current cattle research at UC DREC and feedlot cattle trends in California	Holtville, CA	8
Jun 16, 2022	Educator tour of UC DREC	Past, current, and future feedlot research at UC DREC - How much estrogen is in our meat?	UC DREC	20
Sep 12, 2022	Imperial County CEO briefing	Current livestock program and impacts	Holtville, CA	6
Nov 30, 2022	Fall Desert Crops Workshop	Moringa, an emerging multi-purpose crop	Imperial, CA	
Jan 14, 2023	Native Sons of the Golden West tour presentation	Imperial Valley livestock production and UC DREC feedlot research	Holtville, CA	20
Apr 13, 2023	Organic Production Workshop	Organic Livestock Production	Imperial	
Apr 19, 2023	AMMP training workshop	Opportunities for AMMP in Southern California	Online	12

Other (including websites, social media, blogs, collaborations with other agencies, organizations, policy engagement)

Begin Date - End Date	Description	No. of Instances
Productivity, efficiency, and sustainability of animal agriculture		
Dec 1, 2018 - Jan 31, 2019	Beef Quality Assurance Assessments	9 (representing approximately 200,000 head of cattle)
Jan 1, 2019 - Dec 31, 2019	CDFA Climate Smart Alternative Manure Management Program technical support provider	
Sep 27, 2019 - Oct 25, 2019	Preparation and testing of CDFA NAHMS questionnaire with local feedlots	
Oct 1, 2019 - current	Addressing of Imperial County veterinary needs by working with CDFA veterinarians to nominate Imperial County as an area for the Veterinary Shortage Medicine Loan Repayment Program to attract veterinarians to the area	Ongoing – aided in successful nomination of Imperial County. Working with CDFA to increase outreach and impact to potentially attract candidates
Oct 15, 2019	CDFA Pre-survey walkthrough with feedlot operators	2
Dec 22, 2020 (Ongoing)	Ranching Sustainability Self-Assessment	Ongoing
Oct 20, 2021 (Ongoing)	Developing a website for small acreage landowners	Ongoing
Nov 12, 2021 (Ongoing)	Southern California Livestock Disaster Access Program Development – Ag Pass	Ongoing
Aug 1, 2022 (Ongoing)	Antimicrobial resistance in agriculture water advisory committee	Ongoing
Sep 12, 2023 (Ongoing)	Antimicrobial resistance using biochar in agriculture water advisory committee	Ongoing
March 2021 - current	CattleCal Newsletter (online) – editor and writer	21 issues

Other (including TV and/or radio interviews/programs, newspaper/trade magazine interviews)

Begin Date - End Date	Interviewed/Written By (optional)	Topic	Name of Media or Publication
Food safety and environmental quality			
Apr 10, 2019	Jesse Staniforth	Safety of agricultural water relative to produce safety	Agricultural Water Safety
May 1, 2020	Tom Willey	E. coli and food safety research needs	Down on the Farm (radio broadcast and podcast) through Fresno radio station KFCF 88.1
Productivity, efficiency, and sustainability of animal agriculture			
Sep 27, 2019	Brian German	The importance of clientele attending meetings	Participating in Agricultural Meetings Creates Long-Term Benefits
Mar 1, 2021 (Ongoing)	Brooke Latack and Pedro Carvalho	Feedlot Management	CattleCal Podcast

F. Publications (Bibliography)

Peer Reviewed	
B - Peer-reviewed scholarly journal publications	16

Non-Peer Reviewed	
A - Popular press articles	158
D - Technical reports and other non-reviewed articles	2
E - Published abstracts	13

TOTAL	189

PEER REVIEWED

B - Peer-reviewed scholarly journal publications

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A - Popular press articles – Newsletters and articles (podcast episodes listed in separate section)

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- Bachie, O.; **Latack, B. C.** (2020). Biomass productivity and forage quality comparison of new and existing forage crops for the low desert environment. *Imperial County Ag Briefs*. 9/8/2020.
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- Carvalho, P.H.V.; **Latack, B.C.** (2021). Career call with Brooke Latack (Episode #2). CattleCal. March. https://open.spotify.com/episode/680fJTM6NUruzVeQxiuf3y?si=39231c8d78dc4e56
- Carvalho, P.H.V.; **Latack, B.C.** (2021). Research call with Brooke Latack (Episode #3). March. https://open.spotify.com/episode/2bzH9EIaDYuPKi7zimyozZ?si=33ba2feb33f24f33
- Carvalho, P.H.V.; **Latack, B.C.** (2021). Feedlot research – Crude protein and amino acid requirements of growing-finishing Holstein steers gaining 1.43 kg per day (Episode #4). March. https://open.spotify.com/episode/3zHM19Dkv22faBK5QGKqUm?si=-K-ruFy2SWuQbm8-xmQmQw
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- Carvalho, P.H.V.; **Latack, B.C.** (2021). Feedlot research – Influence of levels of supplemental urea on characteristics of digestion and growth performance of feedlot steers fed a fat supplemented high-energy finishing diet (Episode #7). April. https://open.spotify.com/episode/5zjFueuE1GIaIb00u5v6O6?si=31e3ae21aaa145c3
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D - Technical reports and other non-reviewed articles

- **Latack, B.;** Ozeran, R. (2020). Hasty responses to foodborne illness outbreaks impact California growers. *California Agriculture*. 74:1.

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- **Latack, B.C.**; Zinn, R.A.; Carvalho, P.H.V.; and Ferraz, M. (2023). Growth performance and carcass characteristics of beef x dairy crossbred cattle in the feedlot: a research and extension campaign. Proceedings, NACAA 108th (2023) Annual Meeting and Professional Improvement Conferences, Aug. 13-17, 2023. Des Moines, Iowa. 255 pp. https://www.nacaa.com/uploads/userfiles/files/Proceedings%202023.pdf
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Summary of Publication Examples

1. Latack, B.; Ozeran, R. (2020). Hasty responses to foodborne illness outbreaks impact California growers. *California Agriculture*. 74:1. https://ucanr.edu/repository/fileAccessPublic.cfm?calag=fullissues/CAv074n01.pdf&url_attachment=N
   In this technical report, UCCE advisor Rebecca Ozeran and I provide a review of all of the current information regarding foodborne pathogen outbreaks, the recent outbreaks affecting California growers and cattlemen, currently available research-based data on the interaction between livestock and fresh produce, and the opportunities for UC ANR to play a role in helping in these issues. This report was intended for a broad range of readers. The goal was to supply information and reduce misinformation circulating about foodborne pathogen outbreaks. Overall, the paper had a positive response, leading to an invitation for Rebecca and me to be featured on a radio segment and podcast called "Down on the Farm". Additionally, this paper won the national award for Feature Story from the National Association of Agricultural Agents in 2021
2. Carvalho, P.H.V; Latack, B.C, et al. (2021). Influences of implant hormone strategy on growth performance of calf-fed Holstein steers fed in excess of 300 days. Applied Animal Science. 37:2, 199-206. https://www.appliedanimalscience.org/article/S2590-2865(21)00041-0/fulltext
   In this peer reviewed paper, we discuss the results of research conducted at the UC Desert Research and Extension Center. This research was initially conducted due to the increasing interest in long-acting hormonal implants in calf-fed Holsteins in the feedlot. We wanted to determine if the long-acting hormonal implants performed similarly to hormonal implants that are not long acting but must be reimplanted during the feeding period. This is critically important since calf-fed Holstein steers spend 300+ days in the feedlot and many long-acting implants are only meant for 200+ days. Another factor that made this research more relevant to clientele was regulatory changes that no longer allows more than one implant while cattle are at one location. This means that cattle owners must find an implant that can last as much of the feeding period as possible. Our results indicated that long-acting hormonal implants are not as effective in improving productivity of Holstein steers in the feedlot compared to hormonal implants that are not long-acting. While this does not help with current issues since the cattle owners no longer have an option, it did clarify the need for a more effective long-acting hormonal implant that may last the entire feeding period. This paper was well received and was featured in the CattleCal podcast and newsletter due to its relevance.
3. **Latack, B.C.;** Carvalho, P.H.V. (2023). How do crossbred Angus-Holstein steers compare to purebred Holstein steers in the feedlot? *Golden State Dairy Newsletter*. 15:2. https://ucanr.edu/sites/Dairy/newsletters/California_Dairy_Newsletter97967.pdf
   In this popular press article, published in the UC ANR California Dairy Newsletter, I discuss the results of our crossbred beef-on-dairy research. It covers both the productivity of crossbred Angus-Holstein steers compared to purebred Holstein steers in the feedlot as well as differences in carcass quality. This research was critically important to report as the number of beef-on-dairy crossbred cattle in the feedlot is increasing every year. It was important to include this data not only to the feedlot managers, but also the dairy managers as they are the ones using the beef semen in their dairy reproduction system. This data will also help them identify the economic value of their calves based on potential performance. This has been by far the most popular topic discussed by livestock owners throughout my area. I regularly have discussions about beef-on-dairy crossbred cattle in person, through email, and through phone calls. Getting this information out via newsletter was critical to answering the common questions producers have. While I do not know the direct impact of the article itself, it is some of the more important research information that I have published.

Goals and Objectives for the Coming Year:
For the Period October 1, 2023 - September 30, 2024

Name:	Brooke Latack
Academic Title:	Assistant Advisor in Cooperative Extension
County/Program:	Livestock – Imperial, Riverside, and San Bernardino Counties
Current Rank/Step:	CE Advisor / Assistant / IV

Part 1. Goals and Objectives for the Coming Year

Specific Goals	Anticipated Collaborators	Anticipated Outcomes and Impacts
Theme 1 (Goal): Productivity, efficiency, and sustainability of animal agriculture		
Objective: Complete current calf-fed Holstein and crossbred Holstein steer feedlot research and begin other relevant studies (biochar supplementation, Angus-Holstein vs Charolai-Holstein steers, and tentatively planned for monoglyceride supplementation, micro-life and rely on supplementation, vitamin B supplementation, and heat adaptation/mud accumulation)	• Richard Zinn – UC Davis • Pedro Carvalho – UC ANR/UC Davis • Martin Montano – Universidad Autonoma de Baja California • Various high school, undergraduate, and graduate students. Livestock operators	Upon completion of the projects initiated in 2022, data will be compiled and written up. These findings will be written in the CattleCal newsletter, discussed on the CattleCal podcast, and presented to clientele. Our aim is for livestock operators to use this information to decide whether the feed additives studied would benefit their management system to improve animal production and reduce the cost of their operation. Research started in 2023 will finish in December 2023 and will be similarly summarized for clientele.
Objective: Provide extension related to small acreage livestock producers.	• Julie Finzel, UC ANR • Devii Rao, UC ANR • Rebecca Ozeran, UC ANR • Theresa Becchetti, UC ANR • Dan Macon, UC ANR • Flavie Audoin, UC ANR	Put together a website of relevant information for small acreage livestock producers to provide information for frequently sought information. This will reduce confusion in finding this information (typically in many places, no one specific place) and drive more small producers to ANR website. This will help small producers better manage their livestock and land through research-based resources.

	• Sequoia Williams, UC Davis • Other advisors and specialists Livestock industry producer	
Objective: Objective: Continue to integrate high school and recent high school graduate interns into research. Allow them the opportunity to lead small research efforts.	• Pedro Carvalho, UC ANR/ UC Davis • Imperial Valley Regional Occupation Program • Agriculture teachers • Local community college students • High school students	Grow interest and knowledge in animal science in high school and recent high school graduate students. Improve understanding of potential jobs related to animal science in Imperial County with the goal of students returning to the Imperial Valley after receiving desired education to bring their expertise back for critically important and short staffed animal science professions in the area.
Theme 2 (Goal): Food safety and environmental quality		
Objective: Objective: Continue to participate in discussions and research surrounding food safety relative to livestock	• Livestock operators • Landowners • Produce growers • Local agencies • Other advisors and specialists	Clientele regularly hold discussions and contact me for information regarding current information surrounding the interaction of livestock and fresh produce. I aim to continue to be a reliable resource with the most up-to-date research and data for those clientele. Participating in these conversations will give participants the opportunity to make decisions using appropriate research and information. This could help the livestock operators and produce growers as they make decisions that could impact the economic viability of their operation.
Objective: Identify food safety personnel I could collaborate on projects with and reach out to begin brainstorming critical research and extension needed.	• UC ANR advisors and specialists • Outside university extension • NGO • Governmental organizations • Growers • Livestock producers	A gap in knowledge about food safety related to the livestock-produce interface still exists even after research. I will reach out to others to identify gaps and needs we can fill. This is especially important as the new UCCE Imperial County Food Safety and Organic Production Advisor develops his program.
Theme 3 (Goal): Forage production and quality		

Objective: Continue research on study looking at best management practices for sudangrass in the low desert. Present interim data.	• Oli Bachie, UCANR • Ali Montazar, UC ANR • CDFA • Sudangrass growers Livestock operators	Critical information will be relayed to producers through newsletters, podcast episodes, and meetings. Because the issues being studied are emerging issues that have been indicated as important to the industry, the producers will be able to use this information when making management decisions in their production systems. This will help increase animal performance and ultimately increase efficiency and economic performance of feedyards in California. Two years have been finished, leaving one year of collection to complete collection.
Objective: Continue moringa nutrient quality survey research throughout the Imperial Valley.	• Oli Bachie, UCANR • Moringa producers • Livestock producers	Previous research done was important to develop baseline forage quality in moringa grown in the Imperial Valley. I will continue this survey in order to develop a more robust data set. This will help moringa growers understand the quality and the economic impact of the crop on their farm.
Objective: Initiate a new moringa forage and seed production study	• Oli Bachie, UCANR • Moringa producers • Livestock producers	More research was a main need of growers as determined at our moringa roundtable. To address this need, we will initiate a trial looking at commercial production of moringa and seed production of moringa to meet the different production needs of the growers throughout the Valley. Growers will be able to make decisions on management based on results.
General/Other		
Objective: Continue to participate in professional development trainings, professional society conferences, program team meetings, etc.	• Other advisors and specialists • UC ANR staff • Professional societies • UC ANR trainers	Participating in these events will help me grow my program and be a more effective advisor. This will give me the tools to affect a greater number of clientele and create more change throughout the system.
Objective: Objective: Continue to improve safety standards of Imperial County UCCE office.	• UCCE Imperial County staff • UC ANR safety staff • Outside training organizations.	I initiated my time as safety coordinator for UCCE Imperial County in 2019. Since that time, most of my work related to safety has been directly related to COVID. As I have had more time to allocate to address other safety issues, co-coordinator and I have

		identified things to improve to ensure safety standards are met and followed. Specific plans include initiating CPR/AED/First Aid training, updating training for all staff, and replacing safety supplies as needed. This will help reduce accidental injuries and improve work throughout all programs. CPR training will also improve programs as staff will be able to aid in any issues if they arise during their programming.
Objective: Continue to serve on committees, collaborate with local organizations, and otherwise contribute my expertise to the public to better serve the community.	• Local organizations (IVROP, ICOE, etc) • State and Nationwide organizations (4H, FFA, etc) • Local schools	Serving on public committees and collaborating with local organizations will allow me to help local ag programs develop and improve through providing my insight as a livestock advisor. I currently serve on the Ag Advisory Committee for Imperial High School and Calexico High School and Advisory Committee member for Imperial Valley Regional Occupation Program. In the future I plan to join more advisory committees as needed and continue to interact with organizations as needed. Potential outcomes are increased understanding of animal science careers, agriculture worker needs, improved high school agriculture programs that reflect the needs of the area, and increased awareness and interest related to agriculture research.
Objective: Continue to serve professional societies including as California president and as a journal peer reviewer for National Association of County Agricultural Agents	• Animal science and agriculture extension journals and professional societies • Other extension and faculty professionals	Grow the California chapter to include more of the impact of California extension on California agriculture. Lead the state chapter to further improvements. Help improve the articles being read by others in similar fields and grow my own knowledge in this area.

Part 2. Anticipated Barriers or Obstacles in Accomplishing Your Goals and Objectives

One barrier anticipated is funding. Funding is always a concern, but with changes to extension personnel, I will need to make a more concentrated effort to finding funding and industry

partners to mitigate some costs associated with research and extension. I plan to continue existing relationships with collaborators and partners and look for additional grants to support my program. I feel that I am gaining traction in funding opportunities and will continue to develop skills in finding and applying for funding.

Part 3. Support from Supervisor(s)
Support from supervisor is as needed.