

## **Assistant Professor of Cooperative Extension in Dairy Cattle Production, Health, & Management Economics**

### **Position Title: Dairy Cattle Production, Health, & Management Economics**

Full-time Assistant Professor of Cooperative Extension (CE) focused on enhancing dairy cattle production systems in California through discovery, development, and application of economic knowledge and tools needed to support farm-level decision making and improvement of health, productivity, welfare, competitiveness, and sustainability of dairy cattle herds.

### **Position Description:**

Sustainability of dairy cattle production systems requires balance among multiple environmental, social, and economic factors. On one hand, increased challenges have put enormous pressure on California dairy producers, such as limited and costly labor supply, restricted water availability and environmental regulations, consumer perceptions, increased milk price fluctuations, and lower operating margins. On the other hand, many opportunities exist for evaluating feasibility of automation and precision technologies, water conservation on the dairy farm, and discovering viable alternatives to antibiotics while focusing on animal welfare and production efficiencies. This position will be responsible for researching and communicating the economic outcomes associated with different aspects of dairy management, such as health, welfare, environmental impact, and new technologies, and to support dairy farmers' decision-making and promote their economic sustainability. Specifically, this Assistant Professor of CE will develop information to support economically sound management decision-making not only for conventional dairies across a range of herd sizes, but also for organic dairies, small scale processing dairies, and other niche-market dairies. As economic knowledge is gained, solutions and user-friendly economic tools will be developed and shared through outreach to promote economic feasibility within the framework of sustainable dairy cattle health, environmental management, and production efficiency. From an outreach perspective, this Assistant Professor of CE will be actively engaged in providing knowledge for UCCE Advisors, academic, regulatory, and private practice veterinarians, herd owners and managers, and other dairy decision makers in areas including policy, economic analysis, and financial management. This information can then be used by stakeholders to facilitate practical, science-based decision making with respect to capital budgeting decisions and other management choices related to short and long-term investment for dairy cattle health and production at the farm level. By making significant outreach contributions that combine scientific research and modern technology, this Assistant Professor of CE position will provide needed information for making science-based decisions to secure and advance sustainable dairy farms in California. An advanced degree related to animal health and production management economics (e.g., MPVM, MBA, MS, or PhD) is required; a DVM or equivalent degree is preferred.

### **Justification:**

With 1.7 million dairy cows located across 1,200 dairy farms producing 41.3 billion pounds of milk annually, California ranks #1 in the US for both dairy cows and milk production. Milk and cattle sales generated combined cash receipts in 2020 of more than \$10.2B, representing more than 20% of all California agricultural commodity value. To maintain its leadership in dairy production, California must advance knowledge and apply practical technologies and management strategies that will achieve preferred outcomes in three dimensions: economic, environmental, and social. **This position is crucial for the development of the Food Systems Network, as economically resilient dairies can provide safe, affordable dairy products and beef to the people of California, across the nation, and around the world while fostering a feasible existence for the producers and their employees.** Furthermore, societal expectations for sustainable animal production must be met such as increased animal welfare and reduced use of antibiotics. ANR has significant resources invested in environmental management, but a need exists to focus on economic impacts associated with the ongoing changes regarding labor availability and management, environmental management, dairy cattle health promotion, animal welfare and new housing alternatives, disease prevention activities and alternatives to antibiotics, use of precision technologies and automation, and water-saving technologies, within the context of economic sustainability. Ultimately, the producer needs to make a return on investment to remain in business, and production strategies need to improve cattle health and return earnings above their costs to be successful. This position will provide support for optimal economic decision-making by dairy producers, their veterinarians, and other advisors. Contributions by this Assistant Professor of CE will have a significant impact on increasing knowledge about the management economics of sustainable dairy cattle production, a critical element if California is to maintain its leadership position.

### **Extension:**

This position will provide statewide extension and outreach education activities and resources using both conventional and technology-based delivery methods. There is an opportunity for the development of user-friendly, online tools and 'apps' that will supply dairy stakeholders with tools to support decision-making. These tools will be developed in collaboration with farmers, private companies, and other stakeholders. Key clientele groups will be diverse including UCCE Advisors, dairy producers, consumers, processors, and public policy makers. Practicing veterinarians are a unique extender for this position and will play a major role in transferring knowledge to producers. This Assistant Professor of CE will focus on answering economic cost and benefit questions as well as considering the economic implications for improving animal and environmental health and the resulting impact on dairy sustainability.

### **Research:**

The key research areas will be related to dairy cattle health and production issues and their economic implications. Current areas of importance include cost and returns of dairy cattle housing systems including housing systems for young calves and mature cattle,

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use of automation such as milking robots, the economics of precision devices for reproductive management, methods for mitigating heat stress challenges in California, and economical alternatives to the use of antibiotics in dairy herds. The economic feasibility of mastitis control programs is also an important area of focus as this is the most expensive disease in dairy herds. This position will serve in a consultative role with campus groups, state agencies, veterinarians, and producers to identify other critical applied research needs. Traditional publication outlets would include Cooperative Extension newsletters, California Agriculture, 4-H publications, dairy producer publications, social media outlets, and peer-reviewed scientific journals. Software programs, including mobile 'apps' and computer dashboards, would be important technology-based applications for extending research knowledge and its benefits.

### **ANR Network:**

Ultimately, the adoption of new technologies or management practices depends upon their economic feasibility. This position directly supports the capacity building of strategic areas for UC ANR, such as the food systems resilient network and the water resilient network, and significantly increases the impact and network capacity of the ANR network because it gives the opportunity for other Professors of CE, dairy advisors, and other scientists and stakeholders to add the economic dimension to their projects and extension activities. The best examples of expansion of ANR network capacity and its impact are provided by the leadership and collaboration of the recent holder of the Assistant Professor of CE for Dairy Cattle Production Health Management. Through her position, she has spearheaded collaborative projects evaluating the economic feasibility of investments in automated milking systems, exploring the profit center for strategic use of beef semen in dairy herds, and predicting which cows in a herd at dry-off would likely have subclinical mastitis and would economically benefit from selective dry cow antimicrobial therapy as an alternative to treating each cow in the herd at dry-off with antibiotics. Collaborators have included a data science professor at UCD, business economists at Wageningen University in the Netherlands, UCANR dairy advisors, and a professor of dairy cattle production and well-being at the University of Minnesota, just to name a few, in addition to collaborators in the UC Davis School of Veterinary Medicine (SVM) and the UC Davis College of Agriculture and Environmental Sciences. Most importantly, this work and these collaborations have led to the **Dairy Tech News** as a joint extension publication of UCANR, UC Davis SVM, and the Department of Animal Science at the University of Minnesota. ([https://ucanr.edu/sites/Dairy/newsletters/Dairy\\_Tech\\_News91118.pdf](https://ucanr.edu/sites/Dairy/newsletters/Dairy_Tech_News91118.pdf) - the most recent issue of Dairy Tech News)

### **Networks External to ANR:**

The individual hired in this position will collaborate with various external networks including, but not limited to, California Dairy Quality Assurance Program, California Dairy Research Foundation, Western United Dairywomen, Milk Producers Council, Dairy Cares, and California Farm Bureau Federation. Besides, there is a huge opportunity for collaborating with private companies focused on new technologies and automation.

### **Support:**

This position will be located at the Veterinary Medicine Teaching and Research Center (VMTRC) in Tulare. This location can provide full access to information technologies (IT) for electronic research and outreach collaborations throughout the state and beyond, as well as other infrastructure support services. The School of Veterinary Medicine, the Department of Population Health & Reproduction, and the VMTRC will provide administrative and research support.

### **Other support:**

The dairy industry, allied industries, and USDA have competitive funding programs which can support this program. As an Assistant Professor of CE in the SVM, this individual would be expected to serve as both a principal investigator and a collaborator for USDA grant funds (Animal Health Formula Funds; Hatch Funds; Multi-State Research Funds) administered by the School's Center for Food Animal Health. Grant funding success of the recent holder of this position, with project awards from sponsors that include the California Dairy Research Foundation and USDA National Institute of Food and Agriculture, underscores the feasibility, and realized potential for project funding success to support this position.

### **Headquarters and Coverage Area:**

This position would be strategically located at UC Davis Veterinary Medicine Teaching and Research Center in Tulare, in the center of California's dairy industry, providing access to an abundant number of dairy farms, and milk and beef processing facilities. (See Figure 1.) The VMTRC's Dairy Production Medicine Program includes the Milk Quality Laboratory and delivers clinical services to core herds including 8 dairy farms and 1 calf ranch, providing major opportunities for in-depth research with these clients as cooperators. Applied dairy health management economics research conducted with these and other potential cooperators in the state and through collaboration with the Dairy Health and Production Workgroup is important for providing relevant solutions and new knowledge to meet the needs of California as the leading dairy-producing state.

### **Developed and proposed by:**

SVM Extension and the SVM Dean's Office. Stakeholder input on needs and priorities for food animal research related to this position has been provided through the External Stakeholders' Advisory Committee for the School's Center for Food Animal Health. This position is under review by the Dairy Production and Food Safety Program Team to maximize its impact on the California dairy industry.