Rural Community Water Resilience

Cooperative Extension Specialist Position

Highest Priority: Dept. of Land, Air, and Water Resources at UC Davis and the UCANR Water Program Team

Position Description

This position addresses water quantity, access, affordability, and quality (including geochemistry and contaminants) of groundwater and surface water, water treatment, and the design of safe, clean and affordable water supply and treatment systems for rural communities. The specialist will advance emerging practices such as drinking water and wastewater system consolidations, portable treatment, and alternative water strategies (e.g., managed aquifer recharge) to strengthen community water resilience statewide.

The appointee holds a Ph.D. in hydrology, environmental sciences, civil and environmental engineering, water chemistry, or chemistry, with a strong research background in drinking and wastewater systems, water storage and capture, water policy, community engagement, and economic analysis. Demonstrated facilitation, engagement, and leadership skills are required for a successful outreach and extension program.

The CE Specialist serves as the statewide scientific and technical lead for drinking water resilience, treatment technologies, and community water solutions within UC ANR, a role and expertise that will support the Health Resilience Network, Urban Community Development Network, and Water Program Team. This position is uniquely positioned to bridge rigorous applied research with on-the-ground community needs and differs from existing UC ANR and UC Davis faculty by its explicit focus on rural and small water system resilience, treatment engineering, hydrogeochemistry, small wastewater treatment plants and onsite wastewater treatment systems.

The specialist will anchor an emerging ANR cluster (proposed Water and Community Resilience Area Advisor in Kern County; Water Justice Policy and Planning CE position at UCB) and collaborate with community groups, technical assistance providers (RCAC, Self-Help Enterprises), environmental justice organizations, disadvantaged communities and tribes, county/regional advisors, UC ANR program teams (Water Program Team, Native American Community Partnerships Program Team), NGOs, and local, regional, state, and federal agencies. **This position was ranked the highest priority by both the UC ANR Water Program Team and the LAWR Department,** reflecting a recognized statewide expertise gap in drinking water resilience for rural and small community water systems.

Justification

Widespread urgency: Approximately 600,000 Californians lack safe, clean, affordable, and accessible drinking water and sanitation (SB 685), and roughly 1.6 million lack adequate sanitation. Over 1 million people rely on domestic wells, many of which are vulnerable to contamination. More than 300 communities are served by water systems with chronic violations, predominantly low-income, rural, and agricultural communities. Nitrate contamination affects an estimated 300,000 residents in the San Joaquin Valley alone. Arsenic, chromium, uranium, PFAS, and salinity compound these threats across the state.

Capacity gap in rural communities: Rural, low-income, and agricultural communities lack the applied research, extension education and training, technical capacity, institutional resources, and financial strength to address these water threats. Without targeted scientific and extension support, the economic and public health costs to individual community members will intensify.

Alignment with California's Human Right to Water and state investments: California has made historic financial commitments to safe drinking water (e.g., Safe and Affordable Funding for Equity and Resilience Program, Proposition 1, ARPA funds). This position directly supports implementation of the Human Right to Water (AB 685, SB 685) and will help communities navigate and access these emerging funding opportunities—an area where targeted technical assistance is critically needed.

Innovation in research, solutions and technology: Addressing these challenges requires innovative solutions grounded in research and novel assessment of emerging water quality threats and deep community engagement. Better measurement, monitoring, and assessment of hydrogeochemical processes, combined with improved treatment systems, are needed to develop viable solutions for rural communities and small water systems.

Clientele

This position will support through research, education and service a wide range of rural communities and groups, technical assistance providers (e.g. RCAC, Self-Help Enterprises), private well owners, tribal communities, local groundwater sustainability agencies, water districts, small water systems, and other local, regional, state, and federal planning and regulatory agencies and decision makers. This position will develop research and outreach programs to support rural communities in understanding, evaluating, and protecting source water quality and providing safe, reliable, and affordable drinking water solutions and adequate wastewater treatment.

Extension Program

The extension program will provide education and decision support on drinking water and wastewater system design (stand-alone and consolidation), portable treatment, alternative water supply strategies, subsurface geochemical processes, contaminant fate and treatment, operation and maintenance of drinking water systems (including domestic wells) and wastewater systems (including septic tanks).The extension program is expected to support development and operation of best drinking water solution practices. Extension modes include workshops, conferences, technical advisory committees, and electronic and multilingual media.

For example, this position can develop a professional education program “Well Owner - Drinking Water Program” (similar to the Master Gardener program) that would train community members and local technical assistance providers as peer educators. This train-the-trainer model has the potential to reach thousands of domestic well owners and rural communities across California, building lasting local capacity and well stewardship. The program ideally would be multilingual and co-developed with rural communities for their water resilience.

Research Program

Research will focus on measuring, understanding, and monitoring water quantity, quality, and affordability of small community water systems; hydrogeochemical processes in California aquifer and surface water settings; and developing innovative drinking water and wastewater solutions for rural communities and well owners. Research will interface with state and regional regulatory programs on water quality control, nonpoint source pollution, consolidation of drinking water and sewer systems, septic systems, and rural community drinking water resilience.

Findings will be disseminated through peer-reviewed journals (*Environmental Science & Technology, Water Research, Water Resources Research, Journal of Contaminant Hydrology, California Agriculture*), ANR publications, stakeholder-oriented white papers, and translated materials in multiple languages.

Expected Position Outcomes and Impact

- Develop applied research and practical solutions that will improve the drinking water and sewer access, quality and reduced contaminant exposure in rural communities and small water systems
- Develop outreach programs that will increase the adoption of adequate practices, affordable treatment technologies and alternative water strategies by small water systems and domestic well owners, as well as adequate and affordable wastewater treatment plants and on-site treatment systems (e.g. septic tanks)
- Develop training programs for technical assistance provider that will increase successful applications for drinking water system consolidations, reducing the number of chronically non-compliant small systems
- Develop policy research to enhance community access to state and federal drinking water funding programs
- Strengthened technical capacity of local technical assistance providers, county advisors, and community water advocates

ANR Network and External Partnerships

Within UC ANR: CE Specialists, AES and non-AES UC/CSU faculty working in water and environmental justice, watershed/groundwater science, water pollution geochemistry, emerging water treatment, rural community development, and agricultural management effects on water quality. The position adds critical expertise to the Water Resilience Network, Urban Community Development Network, Health Resilience Network, and Food System Resilience Network.

External: State and Regional Water Boards (Division of Drinking Water), Lawrence Livermore and Lawrence Berkeley National Laboratories, USGS, NGOs (Community Water Center, Self-Help Enterprises, Environmental Coalition for Water Justice), consulting firms, and technical assistance providers collaborating with small communities on drinking water infrastructure and environmental justice.

Support and Headquarters

The position will be housed in the Department of Land, Air, and Water Resources (LAWR) at UC Davis, which will provide office space, laboratory facilities, and administrative support consistent with other departmental faculty. Annual base funding will support computing, office supplies, and research operations. Extramural funding sources include USDA, USEPA, USGS, NIH, State Water Board, DWR, CDFA, DPR, DTSC, and Regional Water Boards. UC Davis offers exceptional strengths in water and environmental sciences, analytical chemistry, community development, and environmental justice research, which is an ideal institutional home for this position.

Developed and proposed by

Developed by: UC Davis CE Specialist in Dept. LAWR, Water Resources Program Teams, and UC ANR Water Institute. External Stakeholders who have expressed interest in this position: Self Help Enterprise, RCAC, Community Water Center, Central Valley Partnership, State Water Resources Control Board, among others.