

Job Announcement: Two Postdoctoral Researcher positions in water resources and climate change; and water management and economics

The Challenge: Since the initial settlement of the American West, water has been both fundamental and instrumental to environmental, agricultural, social and cultural activities. Increasing demand and dwindling supply necessitate novel approaches and decision-support systems that enable water management adaptation actions, water sharing and transfers; even within the rigid structure of water compacts and the Prior Appropriation doctrine. Agricultural applications in the West are either solely water dependent as rainfed systems or nearly entirely water input dependent. Climate change is stressing agriculture across the west, and this is expected to become more acute in the years and decades to come. Temperatures are on the rise, as are the number of heat waves. More frequent, severe, and longer lasting droughts are expected, which lead to increased plant stress and water demand. And while average precipitation may not change substantially, we are seeing an increase in extreme rainfall events, and a shift from snow to rain resulting in shrinking of our natural water reservoir - winter snowpack. Collectively, these shifts will strain and, in some cases, force change for agriculture requiring a multi-faceted approach to adapt to future conditions. This is forcing western states to contemplate the reality of a water scarce future.

Position Summary: The USDA California and Southwest Climate Hubs have two openings for postdoctoral fellows to launch a program in western water adaptation. The objective is to develop, implement and share a geospatially referenced database of water adaptation and associated management techniques to support future water scarcity management in the western United States. The database will combine data on federal, state, and local programs supporting water scarcity adaptation throughout the West with an extensive literature review to build WATR: Water Adaptation Techniques Resource to highlight examples of novel water-saving or management efforts at the farm, irrigation district, and watershed level. Both positions will focus on water adaptation techniques, but one position will focus on **geospatial analyses** and the second position will focus on **econometric analyses**. We envision this effort occurring over a set of interrelated steps which both postdoctoral fellows will contribute to:

- I. Literature and adaptation techniques review: A literature and adaptation review will include peer reviewed and gray literature highlighting novel approaches to enhance water use efficiency and productivity including but not limited to sensor technologies, irrigation application systems, water management practices (e.g. deficit irrigation, water banking, managed aquifer recharge), cropping and system design efficiencies. The project team will also engage with relevant water resource stakeholders (e.g., irrigation district managers, state water management agencies, etc.) to supplement the literature review and inform the design of WATR. We expect this portion of the effort will culminate in at least one peer reviewed publication.

- II. Development of WATR: The decision-support tool will highlight key insights from the literature review with the goal of providing a platform for knowledge transfer to foster future adoption of water resilience strategies. WATR will synthesize geospatial data on water stress, surface water supply and water management district service areas, historical water efficiency efforts, and irrigated cropland to describe the current state of water management in the West. A subset of the water scarcity adaptation and management efforts featured in WATR will be further explored using economic modeling techniques to characterize water use impacts and the relative efficiency of differing adaptation strategies. We expect these additional modeling efforts to culminate in at least one peer reviewed publication ideally published in an economics journal.

Requirements:

The ideal candidates for the positions will possess excellent organizational, written, and oral communication skills, analytical expertise, and the ability to work as part of a large, interdisciplinary team. The applicants should have training and demonstrated experience in integrating a variety of climate, water resources, and hydrologic scientific findings. The successful candidate will work with a diverse team of leading scientists and administrators in the USDA Climate Hub Network, UC Davis and Berkeley, New Mexico State University, the National Drought Mitigation Center, and the USDA Economic Research Service.

The two positions focus on unique aspects of the program:

1. Compiling and sharing water scarcity adaptation/management techniques: Develop the adaptation literature review, including community-based examples, database development, and stakeholder engagement. While the ideal candidate will hold a Ph.D. with relevant expertise stemming from a variety of disciplinary backgrounds (e.g. ecology, geography, sociology, etc.), familiarity with western water resources and geospatial / database development skills are critical to this position.
2. Assessing water adaptation and management impacts: Work with the project team on the development of the water adaptation database. Identify a representative subset of water adaptation and management efforts and apply econometric modeling techniques to assess economic and water use impacts. The postdoctoral fellow will work with the project team to tailor modeling activities to their own research agenda and the objectives of the project. Modeling results will be integrated into the WATR tool and disseminated through publication in peer-reviewed journals. Applicants are expected to have some graduate-level economics or related social science coursework and experience using statistical models to gain causal inference using observational and survey data. An ideal candidate will have a Ph.D. in agricultural economics, environmental and resource economics, public policy, or a closely related field.

Disciplinary expertise

- PhD in ecology, geography, hydrology/soils/water resources, engineering, economics, forestry, sociology, human dimensions of natural resources, environmental science and policy or closely related fields.

- Understanding of water resources management, climate impacts to hydrology, effects of water scarcity in the western United States and common adaptation techniques (e.g., water pricing, water banking, groundwater recharge, technology adoption).
- Familiarity with state, federal, and local policies related to water management.

Communication and extension

- Excellent interpersonal skills, strong written and verbal communication skills, ability to work under pressure with tight deadlines.
- Skilled in analyzing information and activities to identify gaps between the needs of stakeholders and available science and tools.
- Demonstrated publication record.

Additional Valued Skills

- Research experience and knowledge in remote sensing, computing, database development, web-based tool and/or code development for hydrologic management applications.
- Research experience and knowledge in qualitative methods and analyses.

To Apply: Please send (1) a cover letter describing: experience, which position postdoctoral position is of interest and why, professional/research interests, and general career goals (no more than a single page), (2) a CV, (3) copies of unofficial transcripts and (4) contact information for 3 professional references (one being your dissertation advisor and current supervisor) in **a single PDF**. Materials received by **Nov 15, 2021** will receive full consideration. Send the complete package of materials to Dr. Emile Elias (emile.elias@usda.gov) under the subject heading “WATR Postdoctoral Application” for full consideration.

Salary: Begins at \$54,540 + benefits; but is commensurate with experience.

Location: Davis, California ([USDA CA Climate Hub](#) and UC Davis [Sustainable Agricultural Water Management Research Group/Dr. Kisekka’s Lab](#)) or Las Cruces, New Mexico (New Mexico State University). Remote positions may be available for the preferred candidate.

Start date: Negotiable – duration of position is 1 year with the possibility of an extension. Candidates interested in more information on this position can contact: Emile Elias (emile.elias@usda.gov), Director, USDA Southwest Climate Hub or Steven Ostoja (steven.ostoja@usda.gov), Director, USDA California Climate Hub.

NOTE: To be appointed at the Postdoctoral Researcher title, it is necessary to have the Ph.D. in hand at time of appointment. Appointments made without a diploma or certified transcript indicating an earned doctorate are conditional hires and are appointed on an acting basis not to exceed six months. Upon verification of degree the appointment will be extended to its full duration.