

**Position title:** Soil Health Cooperative Extension Specialist

**Position description:** Healthy soils are essential to sustainable crop and range production systems and are the foundation of California's ecosystems. Statewide research and extension leadership is needed to protect soil health and discover soil health promoting practices that coincide with the State's diverse cropping systems, natural resources, soils, and climates. A Specialist with training in soil science and agroecology with emphasis on interdisciplinary research is needed serve a diverse clientele network of growers, ranchers, and policy makers.

**Justification:** California is the first state in the nation to establish a healthy soil initiative, yet no CE Specialist exists to lead this effort, inform policies, and extend science. Management decisions made in coming years will strongly influence soil resilience and the ability of soils to function as production systems intensify, forests catastrophically burn, rangelands deteriorate from drought, and yield/quality expectations rise. The concept of soil health as a critical component of food and water security is widely recognized, yet solutions have not been successfully realized in California due to diverse agricultural systems, climates, natural resources and soils that limit application of universal soil health guidelines. Unlike other parts of the country, this complexity imposes limitations and knowledge barriers that have slowed adoption of soil health practices. California is unable to copy what works in other systems. This position will focus on three primary issues linked with goals of maintaining productivity and economically viable operations: 1. Identify, evaluate, and prescribe soil health promoting practices that address limitations inherent to diverse agricultural and ecological systems statewide; 2. Assure soil health promoting practices provide positive outcomes for water- and air-quality protection; and, 3. Evaluate how healthy soils help society mitigate and adapt to climate change. These issues address four ANR condition changes and public value statements. Promoting soil health will safeguard food production systems, protect natural resources, create climate-resilient ecosystems, and promote economic prosperity. As the nexus between air and water, healthy soil directly relates to sustainable agriculture, the State's Climate Action Bills, Sustainable Ground Water Management Act, and reducing greenhouse gases to conform with the Global Warming Solutions Act.

**Extension:** The educational programming aspects of soil health represents an expanding knowledge area with national and international momentum. While there is a great deal of enthusiasm for promoting soil health, there is an equal amount of misinformation, which can be costly to producers, and may lead to a lack of confidence in soil health goals. This specialist will provide leadership and coordination among UC faculty, CE Specialists and UCCE Advisors to deliver effective place-based messaging for soil health. The program will primarily focus on cropland, yet this expertise readily translates to range and natural ecosystems. The program will contribute to current outreach structures (UC Research and Information Centers, Research and Extension Centers, UCCE workgroups and program teams, Commodity Research Boards etc.), and with deliberate cooperation with USDA-NRCS, Resource Conservation Districts, and state agencies, will expand outreach functions and educational programs that engage producers, distributors, and consumers. The Specialist will reach audiences through print, live presentations and demonstrations, interactive web platforms, and social media (blogs, podcasts, and video).

**Research:** There are a myriad of soil health promoting practices, each having differential impacts on soils (carbon storage, fertility, erodibility, compaction, greenhouse gas emissions, and microbial biodiversity). Existing guidelines, however, are one-size-fits-all and are poorly suited to management of California's cropping systems, rangelands and forests. Research will focus on diagnosis of soil health and evaluating how soil health practices can be tailored to California's agricultural systems to maintain productivity and minimize adverse effects on water and air resources. This position may explore new technologies and tools to promote soil health and grower friendly observations to monitor soil health. Holistic assessment of management practices will be implemented to promote strategies to increase resource use efficiency, stimulate resilience,

while promoting productivity. Research will be published via extension bulletins, scientific journals, and industry trade magazines.

**ANR network:** Collaboration among UC and ANR academics is essential when considering the diverse settings of California. This position provides a unique integrative space to draw from and build upon existing ANR network science. The specialist will build multi-disciplinary teams to address complex agronomic and environmental problems associated with ag. production and environmental stewardship. Soil health is directly related to ANR strategic initiatives: Sustainable Food Systems, Sustainable Ecosystems, Water-Quality, Quantity and Security and ties can be made to areas of Endemic and Invasive Pests and Diseases and Healthy Families and Communities. We expect this position will be a strong collaborator within ANR thematic cluster areas, interfacing with the Fire Network (fire effects soil organic matter and erosion); Water Resiliency Network (practices can compete for crop water demand, while others may save water); and, Resilient Food Systems (healthy soils = resilient systems). Healthy soils are a topic in Urban Community Development and associated social injustices.

**Network external to ANR:** This Specialist will supply leadership and collaborative capacity to many institutions: USDA-NRCS, Southwest Climate Hub, CDFA Soil Health Initiative, Farm Bureau, USDA-ARS and the Air Resources Board. Additionally, a number of commodity groups and resource entities (Resource Conservation Districts, Water Quality Coalitions, NGO's, etc.) are actively engaged in soil health, but need expertise and research-based information.

**Support:** The Department of Land, Air and Water Resources (LAWR) at UC Davis will supply business, IT, and travel support through normal process and access to our diverse facilities, networks and industry partners.

**Other support:** The numerous sources of financial and logistical support for this position and program include commodity research boards and state support from the CDFA Fertilizer Research and Education Program, Specialty Crop Program, Water Quality Control Board, Air Resources Board and CDFA Healthy Soils Initiative and several federal USDA grant programs. Projects demonstrating improved practices at the farm scale will also be attractive to NRCS Conservation Innovation Grants. Large agri-businesses including Olam and walnut, almond, and pistachio grower's associations have expressed support for this position.

**Location:** LAWR at UC Davis is uniquely positioned to host a CE specialist in Soil Health to compliment the expertise in crop production, nutrient management, irrigation and soil resources. Other faculty and specialists throughout UC have complimentary interests in plant, animal, and environmental health. UCD provides a range of specialized laboratory services, field facilities, training opportunities, and access to state policy makers in Sacramento.

**Developed and proposed by:** This position was developed by LAWR through consultation and feedback from stakeholder groups including the soil testing industry (Dellavalle Laboratory, Inc.), CDFA, NRCS State Soil Scientist, and CDFA. NRCS is a key partner with ANR in promotion of soil health in California. As partners on an MOU with key stakeholders including CDFA, Association of Resource Conservation Districts, UC Davis and the Farm Bureau, these institutions will explore a unified effort for further adoption of soil health management practices on private working lands. This Specialist will target key needs identified by the MOU steering committee to: promote soil health statewide, increase farmer and rancher awareness, increase adoption, develop localized soil health assessment protocols and build networks with internal and external partners. This proposal incorporated feedback from many county directors, CE advisors, strategic initiative leaders and program teams (Pomology, Diversified Farming and Food Systems, and Water). This position will demonstrate an active commitment by UC ANR to continue to support California as a world leader in agriculture and land stewardship.