

**University of California
Agriculture and Natural Resources**

Competitive Grants Program 2017

Request for Proposals

Released January 2017

I. Overview

The University of California (UC), Agriculture and Natural Resources (ANR) conducts critical food, agricultural and natural resources research and public outreach activities that serve Californians, the nation and the world. ANR's mission is to maintain and enhance connections that fully engage the University with the people of California to achieve innovation that supports:

- Sustainable, safe, nutritious food production and delivery
- Economic success in a global economy
- A sustainable, healthy, productive environment
- Science literacy and youth development programs

By 2025, California will face many complex challenges related to increases in global and domestic populations, in addition to changes in climate and land use patterns. To tackle some of these challenges, ANR developed the Strategic Vision¹ to address the scientific, technological, social, and economic demands facing California presently and in the future. ANR identified five strategic initiatives (SI) of critical importance to California best equipped to achieve maximum results and focus on pressing issues facing the state. The five initiatives are:

- Endemic and Invasive Pests and Diseases (EIPD)
- Healthy Families and Communities (HFC)
- Sustainable Food Systems (SFS)
- Sustainable Natural Ecosystems (SNE)
- Water Quality, Quantity and Security (Water)

The purpose of UC ANR's competitive grants program is to support research and extension projects that address the priorities identified by the five strategic initiatives, and align with the goals of ANR and the Strategic Vision using the criteria outlined in this RFP.

ANR continues to invest in short-term, high-impact research, education and outreach projects that address high-priority issues that are consistent with the Strategic Vision; encourage collaboration among academics from diverse disciplines and across initiatives; strengthen the research-extension network; and demonstrate relevance and likelihood of impact on significant agricultural, economic, environmental and social issues in California and beyond. ANR will be investing approximately \$1.8 million in this grant cycle.

II. Criteria

Alignment with strategic initiatives

- To what extent does the proposal address one or more of the strategic initiative priority areas that are articulated in this RFP?

¹ *Strategic Vision 2025* (<http://ucanr.org/sites/anrstaff/files/1006.pdf>)

Scientific merit

- Is the science sound?
- Are the design and methods adequate and appropriate?
- Are extension/outreach/engagement plans adequate and appropriate with measurable outcomes and impact?

Relevance to California and likelihood of broader impact

- How important are the issues being addressed in light of California needs, issues, and concerns?
- Will the project lead to significant, broader implications that are applicable beyond the strategic initiative and/or discipline area addressed?
- Will the project generate a product or lead to recommendations that have relevance to California's residents and decision makers?
- Will the project support science-based decision making and delivery of useful findings to inform policy and outreach efforts?

Feasibility

- Does the project team have the expertise and capacity to contribute to the success of the project?
- Is the project doable?
- Can the work produce results/outcomes over the duration of the project?
- When appropriate, does the project convey an achievable plan to sustain programmatic efforts after the grant has ended?

Collaboration and integration

- Does the proposed project build connections that strengthen the research and extension network within and across the strategic initiatives?
- Does the project bring in additional outside resources that can be sustained?
- Does the project use existing ANR resources (human capital, infrastructure) appropriately?
- Does the project foster collaborations with key stakeholders?

III. Eligibility

- Proposals must be submitted by someone that holds an academic appointment in ANR with Principal Investigator (PI) status, such as Cooperative Extension (CE) Advisors, CE Specialists, or Agricultural Experiment Station (AES) Faculty. Early career academics are strongly encouraged to apply.²
- SI leaders may not apply as PI/Co-PIs of a proposal, but they are eligible to serve on projects as collaborators. SI leaders may not receive funds directly from this competitive grants program.
- SI panel members are eligible to apply as PIs and/or Co-PIs on proposals, but will not be involved in the review of their own proposals.
- We encourage non-ANR UC academics to collaborate on project proposals.

²Early career academics have held their current appointments with ANR 6 years or less

IV. Projects and Funding

Investigators may select a project start date from two options—April 2018 or August 2018. The flexibility in start date is intended to provide the time needed to find graduate students, modify project goals to align with seasonal considerations, and facilitate the collaboration between PIs and partners, both internal and external.

- Applicants may request funding for projects of \$5,000 up to \$200,000 for a term not to exceed five years.
- Projects may address research or extension work. All research proposals must include an effective outreach component.

V. Timeline and Process

Please note: the following deadlines and processes are applicable for both the April 2018 and August 2018 project start dates.

Letter of Intent (LOI) due March 20, 2017

Applicants must submit LOIs no later than March 20, 2017 by 5pm (Pacific Time) in the Universal Review System (URS). Submission and approval of an LOI is required to submit a full proposal to this RFP. The LOI is reviewed by the appropriate strategic initiative panel(s) to determine applicability to initiative priority area goals.

Applicants notified of LOI decisions April 26, 2017

Notifications will be generated from the Universal Review System (URS), sent via email to PIs, and circulated in ANR Update.

Full proposals due June 19, 2017

Applicants must submit all requirements via the Universal Review System (URS) by June 19, 2017, 5pm (Pacific Time).

After PIs have been notified of their approved LOIs, PIs will be granted access to the full application cycle and templates in the URS, found within the ANR Portal.

The online submission system will have materials and instructions that address technical and application requirements.

Technical reviews (mid-June to early September, 2017)

Reviewers that are deemed to have a conflict of interest (COI) with lead project PIs/ Co-PIs will not assess those grants.

For this process, reviewers are deemed to have a conflict of interest if they have been a co-author of a published paper within the last three years with the lead PI or Co-PI of the proposal, or have been a PI or Co-PI on a funded grant with the lead PI or Co-PI of the proposal. To facilitate the recruitment of technical reviewers, applicants will be asked to recommend five potential reviewers that do not share a COI during the LOI and application submission phases.

Strategic initiative leader reviews (end of September, 2017)

The strategic initiative (SI) leaders will collectively discuss technical reviews, and categorize proposals into priority groups using the criteria outlined in this RFP.

Program Council reviews and makes recommendations (October/November, 2017)

All proposals will be reviewed by Program Council review teams. The review teams will consist of primary and secondary reviewers, in addition to utilizing the expertise of the respective strategic initiative leader.

Program Council will also use the criteria outlined in this RFP to generate a list of recommended projects to fund for the Vice President's consideration.

Vice President announces awards (November/December, 2017)

Applicants will be notified via the Universal Review System (URS) and email of the funding decisions, in addition to disseminating the information via ANR Update.

Contracts and agreements executed (January to February, 2018)

The office of Program Planning and Evaluation (PPE) will contact PIs to undergo relevant post-award processes.

VI. Solicited Targeted Areas

Proposals must clearly apply to one of the priority issue areas described by the strategic initiatives listed below. Additional projects that demonstrate high priority impacts will be considered.

For questions about the appropriateness of your proposed work, please contact the strategic initiative leaders:

- Endemic and Invasive Pests and Diseases (EIPD)—Cheryl Wilen, cawilen@ucanr.edu
- Healthy Families and Communities (HFC)—Keith Nathaniel, kcnathaniel@ucanr.edu
- Sustainable Food Systems (SFS)—David Doll, dadoll@ucanr.edu
- Sustainable Natural Ecosystems (SNE)—John Harper, jmharper@ucanr.edu
- Water Quality, Quantity and Security (Water)—Doug Parker, doug.parker@ucop.edu

ENDEMIC AND INVASIVE PESTS AND DISEASES

This strategic initiative seeks proposals that address detection, biology, and management of pests and diseases that can impact human, livestock or plant health, stored products, postharvest products, buildings, or those that affect natural systems such as wildlands and waterways. We are interested in proposals that address one or more of the priority issue areas identified in our [EIPD strategic initiative plan](#).

Priority Issue Areas

Exclusion of Pests and Pathogens

Exclusion of pests, pathogens and diseases includes diagnostics, detection, interception, response and mitigation. Lack of early detection may result in expensive pest and disease management costs in the long-term, disruption in commerce and industry prosperity, and human and animal health impacts if diseases are involved. However, eradication of pests and diseases may be feasible if an early detection system is in place.

Emerging and Re-emerging Pests and Diseases

Emerging problems can arise from endemic or newly established invasive species and these must be addressed to minimize their impacts on agriculture, natural resources and urban systems. In contrast, *re-emerging* pests and diseases are those that were once major problems and then declined dramatically but are again becoming significant problems whose impact is increasing due to human activities or climatic and ecological changes (National Institutes of Health). This includes: a) pests and pathogens whose host and/or geographic range is still in significant expansion and possibly undergoing adaptive changes to better colonize California hosts ("established and evolving"), and b) pests and pathogens that, although not of recent introduction, undergo frequent endemic and epidemic cycles, and thus require longer and repeated studies to be fully understood ("re-emerging"). This priority also includes emerging threats from native species with the increasing potential to be classified as pests due to human activities or climatic and ecological changes.

Integrated Management of Established, Evolving, and Re-emerging Pest and Disease Threats

Integrated management approaches are used to reduce the impact of pests and diseases on agriculture, natural resources and urban systems through the development of science-based pest management programs that are economically and environmentally sustainable, and socially appropriate. This priority addresses threats established in California. These approaches should address conventional and organic systems on both large and small scales. This priority also addresses "neglected threats", those pests and pathogens, that have a recognizable significant impact on agricultural, animal, and natural resources in California but that historically have not been sufficiently studied due to technical limitations (e.g. causal agent was unknown until recently or technically difficult to investigate) or due to their distribution in underserved areas (due to the lack of UC research teams) or spatially limited portions of the state.

Special consideration will be given to projects listed below as identified by the EIPD Strategic Initiative Panel. The [EIPD strategic initiative plan](#) includes suggestions for research, extension, and policy development that relate to these issues. Additional projects that demonstrate high priority impacts will also be considered.

For this RFP, we seek proposals that:

- Develop or improve knowledge of pest and pathogen biology, epidemiology, and ecology
- Determine pest response to spatial, temporal and environmental changes including impacts of climate change and/or drought on pest establishment and management
- Improve pest and pathogen diagnostic and monitoring techniques and methods
- Develop integrated pest management programs (incorporating biocontrol, physical, mechanical, chemical or other practices) to avoid the spread or impact of emerging, re-emerging or endemic pests and diseases
- Develop and/or improve decision support models for prevention or management of endemic and invasive pests and diseases
- Identify economic and environmental impacts resulting from pests and/or pest and disease management tactics
- Facilitate adoption of integrated pest management practices through technology and knowledge transfer to end-users and other stakeholders

HEALTHY FAMILIES AND COMMUNITIES

The Healthy Families and Communities (HFC) initiative is interested in research and extension projects that address emerging issues and opportunities. The HFC plan gives a deeper understanding of these issues.

In pursuing this work, the panel is committed to address cutting edge public priorities by integrating work across all four HFC priorities. Recognizing that healthy communities do not exist in isolation of healthy natural environments and thriving local and regional economies, we are also committed to working with the other four ANR strategic initiatives, as well as with our partners throughout California and beyond. Systems thinking and a holistic perspective on problems and solutions should undergird all aspects of our work, which is located at the critical nexus of agriculture, environment, food, health, and the economy. The best thinking from all these areas must inform our applied research and community extension activities.

Four intertwined areas of emphasis under our broad mandate to promote health and well-being at multiple scales and across all racial, ethnic and socio-economic groups will be considered. These **priority issue areas** are:

- Community Development and Public Policy
- Food Literacy and Healthy Lifestyles
- Positive Youth Development
- Scientific Literacy (youth and adult)

Community Development and Public Policy

Research and education aimed at changing individual behaviors must be complemented by a deliberate focus on the community structures and policy choices, which facilitate or impede needed changes.

Special considerations for this priority issue area:

- supporting community economic development and workforce development
- catalyzing community coalitions, helping them with both content information on particular policies but also with knowledge about coalition building practices and civic engagement processes
- equipping communities and individuals with the data they need to advocate for sound, equitable public policy
- convening and/or facilitating discussion of public issues

Food Literacy and Healthy Lifestyles

While childhood obesity is still of great concern, we seek to promote a broader culture of health and food literacy across the developmental spectrum, for young children to aging adults. In part, this shift reflects what we have learned to date about the interrelated nature of making changes in this area. It also reflects the reality that a range of food and lifestyle choices and related environmental conditions are among the leading causes of chronic diseases.

Special considerations for this priority issue area:

- Formulating concrete recommendations for improving food literacy and physical activity opportunities in counties across California, working with youth and their families, schools, youth-serving organizations, recreation departments, and other community partners
- Creating and evaluating comprehensive school and community interventions in counties across California

Promoting Positive Youth Development

Our commitment is to transform risk and uncertainty into positive youth development supported by thriving, resilient, adaptive communities. Key issues we are addressing include: college readiness; work force preparedness; diversity, equity and inclusion; civic engagement (activism); health and wellness; authentic youth leadership (i.e., peer mentoring, conflict mediation); supportive relationships (youth and adult); and food systems (i.e., food security).

Special considerations for this priority issue area:

- Develop innovative 4-H youth development programs to serve all the youth population in the state, respecting and appreciating different cultural perspectives and heritage
- Direct delivery of high quality positive 4-H youth development program in diverse communities. Partnerships to support the delivery of high quality 4-H youth development programs in diverse communities

Scientific Literacy

Traditionally, scientific literacy was thought of as an individual manifestation; however, it must be recognized that individuals are nested within communities, which are further nested inside societies, and therefore scientific literacy can be expressed collectively.

Special considerations for this priority issue area:

- Professional development for science educators
- Environmental and health science education research and extension
- Science program adaptation and development for diverse audiences

SUSTAINABLE FOOD SYSTEMS

The challenges facing California's food system are significant. Increase in demand from state and world population expansion coupled with a decrease in farm ground from urbanization has led to less arable land and water resources. Reduction of available labor and increased costs are impacting traditional harvesting systems. Lack of infrastructure development has reduced the availability and increased costs of fresh and nutritious foods to urban areas and low income communities. Pesticide and fertilizer use is under increasing scrutiny due to environmental, regulatory, and public concerns. Finally, the changing climate and growing conditions are impacting our ability to produce food.

With these challenges in mind, the Sustainable Food Systems (SFS) initiative panel has worked to define and prioritize areas of effort using a five-year planning horizon. These efforts incorporate concepts outlined and developed within the "four pillars" of the developing Strategic Vision, which include research and extension of sustainable production practices, determining UC ANR's role in influencing market development, policies, and economics, utilizing food systems to assist in community development, and revitalizing and improving extension and education components.

Priority issue areas include:

Urban Food System Development. Production, access, safety, and affordability of fresh fruits, vegetables, and animal products within and around urban areas needs to be increased. Urban areas have difficulty in allocating resources which impact the economic viability of food production operations. Production practices or systems that increase the profitability of urban food production systems, management and handling practices that reduce food safety and food waste concerns, as well as policy practices that increase the feasibility of urban agriculture should be researched.

Addressing the Challenges of California's Changing Agricultural Labor Force. Many farming operations struggle to secure labor to assist with harvest and other farm operations. At the same time, many farm-workers struggle to find secure jobs with fair and safe working conditions. ANR aims to simultaneously address the labor supply issues facing growers and the challenges farm-workers face in achieving a sustainable and secure livelihood. Research might include innovations in cropping systems and technologies, policy initiatives, and market-based strategies.

Adapting to Climate Change within Agricultural Production Systems. Identification of climate change sensitive crops and production areas and identifying mitigating strategies will be critical to California's food systems. These include the development of animal production systems that decrease animal stress, grazing or diet strategies that increase milk or meat production, development of better models for production prediction, increased water use efficiency of crops, and understanding the impact of changes in chill unit accumulation or heat units on crop development.

Managing and Preserving Natural Resources in Agriculture. Due to the increased strain on resources within food systems, practices that conserve soil, water, energy, or other inputs while maintaining or increasing production need to be developed. This includes research or outreach efforts that reduce energy or resource use, increase crop diversity and animal production systems that preserve ecosystems, or practices that enhance farm ground.

Development of Extension Capabilities and Rejuvenation of Extension Science. Increasing the academic footprint of UC ANR is critical to maintaining the mission of the organization. This process, however, is not limited to the placement of Advisors, Specialists, or AES Faculty. Internal efforts to hire, better train, and develop employees who will become suitable candidates for extension positions are necessary. Furthermore, researching, determining, and implementing more effective extension methodologies are needed.

We seek proposals that address one or more of the priority issue areas. Proposals that incorporate economics when appropriate, and are collaborative efforts among AES, Specialist, faculty, or Advisor academics are strongly encouraged. Small to medium sized projects (<\$100K) should focus on single concepts, while larger, longer projects should incorporate multiple priority areas.

SUSTAINABLE NATURAL ECOSYSTEMS

The Sustainable Natural Ecosystems (SNE) initiative works to preserve forests, rangelands, and wetlands. SNE research and extension efforts aim to identify and prioritize issues and solutions affecting these regions. Some of those issues include understanding and valuing ecosystem services, maintaining working landscapes, biodiversity, energy, water quality and quantity, climate change, regulations, land use change and fragmentation, and education. These are detailed in the [SNE strategic plan](#).

Priority Issue Areas

- Balancing multiple ecosystem services and biotic diversity on California's landscapes
- Causes and consequences of changes in community composition, biodiversity and species range shifts, and species interactions in a changing environment
- The shifting spatial structure of California's natural resources under environmental change
- Tools for applying land change science
- Promote the understanding and importance of ecosystem services provided by California's working landscapes and assist land managers with regulatory compliance
- Promote additional collaborations and discussions between natural resource/conservation managers/restorationists and research and extension professionals to help build, evaluate, or strengthen relationships between them, and to improve the whole natural ecosystems extension network to include working, leisure and urban landscapes

In this RFP, special consideration will be given to projects addressing the following areas identified by the SNE panel:

- Development of best practice methods for linking existing networks of field data with remote sensing measurements to assess range productivity through the growing season, to estimate RDM, and to correlate patterns of plant productivity across space and time.
- Large-scale tree mortality is expanding northward in the Sierra Nevada forests. Large-scale and local-focused monitoring of conifer condition and mortality from drought and beetle infestation is needed. Field and remote sensed estimates of mortality need to be driven by and delivered to local communities to better help forest management, disease mitigation, and risk reduction.
- Development of decision support tools for California landowners and land managers to help plan for changing precipitation, temperature, water supply and plant productivity. Systems span regions that integrate diverse datasets including agricultural, climate, economic, and natural resource data. This provides intuitive interfaces for simulations and visualization as powerful decision aids. Target audiences will include California ranchers, resources agencies, conservation organizations, and other land managers; local, regional and state planning commissions; economic development organizations; and educational and financial institutions. These and other audiences have already expressed interest in the development and dissemination of these kinds of tools.
- Linking horticulture and restoration/conservation. There is a lot of landscape design/horticulture going on that is not well linked to ecological matching or sustainability and is not taking advantage of the opportunities to improve ecosystem services, diversity, etc. On

the flip side, most restoration/conservation practitioners have very little horticultural background and are not necessarily choosing the right plant materials or propagating them well, etc. This is a critical link in managed landscapes (urban, ag) as well as for natural areas.

- Conservation and restoration in a changing climate. Areas of concern are migration of species, fostering new corridors and types of landscape connectivity, ecotypes we should be planting, designing restoration for changing conditions, and how to prioritize conservation and restoration actions as well as knowing which ones are losing battles.
- Understanding and managing resilience. It is likely that many of the key ecosystem changes and potential crashes will be due to extreme events and/or combinations of unique conditions rather than changes in the average temperature, etc. Specifically, what types of extreme events (or combinations) are likely to lead to irreversible changes to our natural and managed ecosystems? What are the mechanisms that can trigger ecosystem change or collapse vs. what mechanisms can be manipulated to avoid ecosystem change?

WATER QUALITY, QUANTITY, AND SECURITY

The Water initiative plan seeks proposals that increase system understanding and characterization of water quality and quantity conditions; develop and implement management practices to achieve water quality and quantity objectives; and facilitate integrative research and extension program delivery. The plan also details four key areas of inquiry—surface water quantity, groundwater quantity, surface water quality, and groundwater quality. Each area of inquiry identifies preferred areas for research and extension projects and areas in which to engage in policy and decision making. These are detailed in the Water Quality, Quantity and Security Strategic Plan.

Priority Issue Areas

In this RFP, special consideration will be given to projects addressing the following priority issues:

- Increase drought preparedness
- Promote sustainable groundwater management
- Develop options for increasing use of low quality water in agricultural and urban environments
- Lessen impacts to surface water and groundwater from nitrogen use in agricultural and urban environments
- Assess water management strategies in response to climate change and their impacts on water supply, water quality and cropping patterns

Potential topics that address one or more of the priority issue areas above include:

- Improve agricultural irrigation water management, including irrigation scheduling and irrigation system operation and management
- Improve urban water use efficiency with emphasis on landscape irrigation water management
- Improve management of recycled water contaminants in urban and agricultural irrigated lands
- Develop effective mitigation methods to manage nitrate and salt leaching to groundwater
- Evaluate integrated management practices to address various contaminants in agricultural runoff
- Assess and develop urban landscape management practices that reduce offsite movement of salts, nutrients, pesticides, and emerging contaminants
- Assess the interaction between surface water and groundwater, including conjunctive management
- Develop new groundwater banking alternatives, particularly in agricultural regions
- Evaluate socioeconomic aspects of water management systems
- Evaluate impacts of climate change on hydrological and ecosystem functioning
- Evaluate vulnerability of Sierra snowpack in relation to climate change, land use and forest management
- Advance understanding of the role forest and rangeland watershed management has in providing California's surface water and groundwater
- Improve management practices for concentrated animal feeding operations and their accumulated manure to minimize discharge and leaching

Letter of Intent Submission Instructions

Submission and approval of a letter of intent (LOI) is required to submit a full proposal to this RFP. The deadline for submitting an LOI via the Universal Review System (URS) is **March 20, 2017 by 5pm (Pacific Time)**. Once the LOI is approved, applicants will be notified of their eligibility to submit a full proposal by April 26, 2017. The deadline for submitting a full proposal is June 19, 2017.

Required elements for the LOI:

Name of Principal Investigator (PI) and affiliation (e.g. UCCE County Office or Campus and Department)

Name of Co-PI(s) and affiliation (if applicable)

Name(s) of **collaborator(s) and affiliation (if known)**

Title of proposed project

Strategic Initiative(s): Describe the target area(s) the proposed work will focus on and choose a strategic initiative priority issue area with which your proposal best fits.

Estimated Start and End Date: Indicate an estimated start and end date for the entire duration of the project. Projects in this RFP are expected to start April 2018 or August 2018.

Estimated Budget: Specify the estimated total budget for the proposed project and a brief summary explaining the allocation and use of funds over the course of the entire project.

Key Words: List 3-5 keywords most relevant to your proposed project.

Potential Technical Reviewers: Please provide a list of five potential reviewers that can evaluate your proposed project. Reviewers may be UC or non-UC. You will need to provide reviewer name, affiliation/organization, and email.

Please note: Do not recommend reviewers if you anticipate that someone may potentially serve as a Co-PI or collaborator on your project or you are aware of a known conflict of interest. In addition, please be aware that only initiative panel members review LOIs; technical reviewers evaluate the full proposals.

Reviewers that are deemed to have a conflict of interest (COI) with lead project PIs/ Co-PIs will not review those grants. **COI Policy:** Reviewers are deemed to have a conflict of interest if they have been a co-author of a peer-reviewed published paper within the last three years with the lead PI or Co-PI of the proposal, or have been a PI or Co-PI on a funded grant with the lead PI or Co-PI of the proposal also within the last three years.

Project Summary: Please provide a one-page summary that presents an overview of the proposed project. It is not necessary to discuss the specific scientific components; rather the LOI should address how the project meets the criteria specified in the RFP, in addition to the points below. Be sure to include the following in your one-page summary:

- descriptive title
- rationale
- overall hypothesis or goal
- specific objectives
- research and outreach approach
- potential impact and expected outcomes

To begin your LOI, please log into your ANR Portal and locate the Universal Review System (URS). Under Open Systems you can click on [ANR Competitive Grants 2017](#) to begin your submission.

If you have questions about the proposal solicitation process and/or technical requirements you may contact Melanie Caruso at (530) 750-1254 or mmcaruso@ucanr.edu.

For questions related to the strategic initiative priority issue areas please contact:

- (EIPD) Cheryl Wilen: cawilen@ucanr.edu
- (HFC) Keith Nathaniel: kcnathaniel@ucanr.edu
- (SFS) David Doll: dadoll@ucanr.edu
- (SNE) John Harper: jmharper@ucanr.edu
- (Water) Doug Parker: doug.parker@ucop.edu