



CALIFORNIA DEPARTMENT OF FOOD AND AGRICULTURE FERTILIZER RESEARCH AND EDUCATION PROGRAM

2024 Request for Pre-Proposals

The California Department of Food and Agriculture's (CDFA) Fertilizer Research and Education Program (FREP) funds and facilitates projects to advance the environmentally safe and agronomically sound use and handling of fertilizing materials.

FREP is now accepting pre-proposals for projects that will begin in January 2025. Pre-proposals must focus on at least one of the priority areas listed below. Applicants are required to utilize the pre-proposal template (.docx). Pre-proposals are due by 5:00 p.m. (PST) on Monday, December 18, 2023.

Grant funding of \$75,000 per year for up to three years is available. Projects requesting more than \$75,000 per year or lasting longer than three years will be considered on a case-by-case basis. Projects leveraging other sources of funding are strongly encouraged.

FREP does not support proprietary product development, testing or promotions.

CDFA encourages projects that include demonstrable benefits for socially disadvantaged farmers and farmworkers. Socially disadvantaged groups include those whose members have been subjected to racial, ethnic, or gender discrimination. Socially disadvantaged groups are defined in the [Farmer Equity Act of 2017](#).

This solicitation, as well as information about FREP activities and projects, is available by contacting FREP at FREP@cdfa.ca.gov or by visiting www.cdfa.ca.gov/go/FREP.

Grant Timeline

Request for pre-proposals announced.....	November 2023
Pre-proposals due.....	December 18, 2023
Advancement of pre-proposals announced.....	February 2024
Full proposals due.....	April 12, 2024
Award notification by.....	July 2024
Project initiation.....	January 1, 2025

2024 Funding Categories

1. Outreach, Education, and Demonstration Projects

Projects in the outreach, education, and demonstration category focus on increasing the adoption of efficient nutrient and irrigation management practices and technologies. Outreach, education, and demonstration projects should include an evaluation of project outcomes and impact on practice adoption.

2. Research and Demonstration Projects

Projects in the research and demonstration category focus on investigating innovative practices and technologies and understanding processes related to nutrient and irrigation management. All research and demonstration projects should have strong scientific merit and must include outreach to end-users.

Outreach, Education, and Demonstration Funding Priority Areas

1. Nutrient and Irrigation Technical Education

The implementation of optimal nutrient and irrigation management practices depends on skilled and knowledgeable growers, managers, and field staff. Technical trainings and education as well as demonstration projects will increase grower and field staff knowledge, leading to improvements in on-farm management practices.

Projects may include, but are not limited to:

- Development of educational and/or certification programs
- Evaluation of impacts of different educational and outreach techniques and methods
- Conducting technical training for agricultural staff at all levels
 - Including, but not limited to training on the use of sensing tools to improve crop and soil management
- Development of outreach and training materials for non-English speakers and underserved growers
- Development of online trainings and/or outreach materials
- Demonstration projects focused on increasing awareness and adoption of research-backed irrigation and nutrient management practices
- Development of extension materials related to nutrient management in alternative production systems, such as certified organic, regenerative, climate smart.

Research and Demonstration Priority Funding Areas

1. Improving Nutrient and Irrigation Management

A. Evaluating Challenges and Barriers to Adoption of Management Practices

A variety of money and time-saving management practices that improve environmental outcomes are available; however, many of these practices have not been adopted on a large scale. Projects focused on evaluating barriers to widespread adoption of improved management practices may include:

- Evaluating scalable incentives or programs that may increase grower implementation of practices to optimize water and fertilizer use
- Analyzing the costs, benefits, and economic thresholds associated with adoption of various improved management practices, including perceived and modeled costs of specific practices and how they are affected by different farm characteristics
- Quantification of environmental, climate, social, and economic costs and benefits of increased nutrient and irrigation water use efficiency
- Evaluating the impacts of fertilizer prices on the adoption of improved nutrient management practices

B. The Role of Organic Input Materials in Soil Nutrient Management

Across California, organic materials are applied to agricultural soils to improve physical, chemical, and biological properties of soil. More information on plant-available nutrients (specifically nitrogen) from organic sources is needed for management decisions, and to help growers estimate mineralization rates for nutrient budgeting.

These organic materials include, but are not limited to:

- Wood chips from whole orchard recycling
- Nitrogen-containing soil amendments
- Organic fertilizers
- Manure by-products

C. Demonstrating and/or Validating Management Practices that Optimize Nutrient and/or Irrigation Water Use

Innovative management practices must be implemented on farms to promote agriculture sustainability and address agricultural challenges in California. Extension efforts that improve nutrient and/or irrigation management practices in growers' fields are a high priority.

Examples include but are not limited to:

- Field–scale demonstration of improved management practices
 - Demonstration of episodic vs high frequency fertigation events to implement the 4 R's principle
 - Demonstration and/or evaluation of irrigation monitoring tools and practices appropriate to specific cropping systems
- Field validation of, or improvements to existing decision support tools
- Evaluation of remote and proximal sensing tools to improve management practices in precision agriculture
- Exploring the use of Artificial Intelligence and other techniques, such as hyperspectral techniques, to better sense nutrient status and overall field spatial variability

D. Filling Knowledge Gaps for Nutrient and Irrigation Management

Identifying and filling knowledge gaps related to irrigation and nutrient management is a key factor to increasing efficiency. Although irrigation and nutrient management guidelines are well established for some California crops, there are still several crops for which guidelines are outdated or lack sufficient data specific to California's climate and cropping systems.

The following include but are not limited to some of the crops/topics that need to be studied:

- Evaluation of impact of fertilizers on soil health indicators and crop productivity
- Berries: strawberry, blackberry, blueberry, and raspberry
- Optimal crop rotations: information is needed to optimize fertilizer applications for crops in rotation, and research is needed to describe how the previous crop (including cover crops) affects nutrient availability to the current crop
- Permanent crops: specifically related to timing and application rates, at the beginning and end of the growing season
- Evaluation of rootstock performance in nutrient use and irrigation efficiencies
- Nutrient use in alternative production systems
- Emerging and under-studied crops such as agave, citrus, date, and avocado
- Small scale, diversified cropping systems

2. Evaluating Nutrient Loss Pathways

A. Understanding Nutrient Movement from the Root Zone

Our understanding of nutrient movement from the root zone is insufficient (e.g., nitrogen losses to groundwater and atmosphere). This lack of information has resulted in incomplete modeling of the transport and fate of nutrients through agroecosystems and uncertainties in quantification of losses from fertilizers.

Research may include, but is not limited to:

- Managed aquifer recharge: timing and effect on nutrient/salt management and losses
- Nonproprietary research using instruments and sensors to measure nutrient losses
- Research addressing gaseous losses from fertilizers (e.g., nitrous oxide, ammonia, NO_x)
- Studying surface nutrient losses through runoff (e.g., nitrogen, phosphorus)
- Understanding other potential loss pathways

B. Mitigation Strategies to Reduce Nutrient Losses

There are technologies and practices that may mitigate nutrient losses via various loss pathways. Research is needed to better understand the technologies and strategies that can minimize nutrient losses and maximize nutrient use efficiency.

Examples include but not limited to:

- Testing and verification of management practices and alternative delivery systems and products to reduce nitrate leaching from the root zone
- Studying mitigation strategies to reduce gaseous losses from fertilizer application (e.g., nitrous oxide, ammonia, NO_x)
- Novel fertilizer sources including but not limited to enhanced efficiency fertilizers (e.g., urease inhibitors, nitrification inhibitors, and slow and controlled release fertilizers)

How To Apply

Applicants are required to utilize the pre-proposal template (.docx). Follow the prompts in each section to complete the pre-proposal. Please follow these formatting requirements:

- Use 12 pt Arial font throughout the pre-proposal.
- Set paragraph line spacing to single space and double space between paragraphs. Do not indent the first lines of paragraphs.

Pre-proposals are due by 5:00 p.m. (PST) on December 18, 2023. No exceptions granted. Pre-proposals must be submitted via email to: FREP@cdfa.ca.gov.

FREP staff will reply with a confirmation email when pre-proposals are received. If you have not received a confirmation email within two business days of your submission contact FREP by calling (916) 900-5022. FREP is not responsible for incomplete email transmissions. Pre-proposals that are incomplete, late, or do not utilize the pre-proposal template will be returned and eliminated from consideration.

FREP staff are available to answer questions about the proposal process; however, to ensure fair competition, we do not provide guidance on the development of proposals. Examples of successful pre-proposals from previous years are available on the FREP Grant Program website:

<https://www.cdfa.ca.gov/is/ffldrs/frep/CompetitiveGrantProgram.html>

Evaluation Process

The Fertilizer Inspection Advisory Board (FIAB) has a Technical Advisory Subcommittee (TASC) consisting of subject matter experts who are responsible for the evaluation of submitted pre-proposals. TASC selects pre-proposals to be developed into full proposals based on alignment with the program's priority research areas, project concept, scientific merit, impact, methodology, and feasibility. FREP staff notifies applicants of the TASC decision and invites selected applicants to submit full proposals. Full proposals are evaluated by TASC. TASC then sends its recommendations to FIAB, which determines whether to approve TASC's recommendations for proposed funding.