



## CALIFORNIA DEPARTMENT OF FOOD AND AGRICULTURE FERTILIZER RESEARCH AND EDUCATION PROGRAM

### 2023 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 fertilizer materials.

FREP is now accepting pre-proposals for projects that will begin in January 2024. Pre-proposals must focus on at least one of the priority areas listed below. Pre-proposals are due by 5:00 p.m. (PST) on Monday, December 19, 2022.

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.

Pre-proposals may originate from outside of California, but all work must be relevant to California agriculture. FREP does not support proprietary product development, testing or promotions.

California's agricultural communities are diverse, and many have historically lacked access to resources and information needed to successfully run their businesses. Thus, 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.

This solicitation, as well as information about FREP activities and projects, is available by contacting FREP at [FREP@cdfa.ca.gov](mailto:FREP@cdfa.ca.gov) or by visiting [www.cdfa.ca.gov/go/FREP](http://www.cdfa.ca.gov/go/FREP).

### Grant Timeline

Request for pre-proposals announced.....	November 2022
Pre-proposals due.....	December 19, 2022
Advancement of pre-proposals announced.....	February 2023
Full proposals due.....	April 14, 2023
Award notification by.....	July 2023
Project initiation.....	January 1, 2024

## **2023 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.

## **2023 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
- 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

## **2023 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 could 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 sensing tools to improve management practices in precision agriculture

- Evaluation of impact of fertilizers on soil health and crop productivity

#### **D. Filling Knowledge Gaps for Nutrient and Irrigation Management in Specific Crops**

Identifying and filling knowledge gaps related to irrigation and nutrient management is a key factor to successfully develop and implement guidelines for each crop and increase efficiency of fertilization and irrigation. Although irrigation and nutrient management guidelines are well established and/or updated for some California crops, there are other crops for which literature lacks sufficient data to either develop new guidelines or update the existing, outdated ones based on the management practices and specific climatic conditions for each crop.

Following include but are not limited to a few examples of the crops/topics that need to be studied:

- Berries: strawberry, blackberry, blueberry, and raspberry
- Vegetable crop transplant nursery production systems
- 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

## **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<sub>x</sub>)
- 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 root zone
- Studying mitigation strategies to reduce gaseous losses from fertilizer application (e.g., nitrous oxide, ammonia, NO<sub>x</sub>)
- Novel fertilizer sources including but not limited to enhanced efficiency fertilizers (e.g., urease inhibitors, nitrification inhibitors, and slow and controlled release fertilizers)

## **Content and Formatting**

Pre-proposals must not exceed two pages. Please include the following information:

- Project title, location, duration, amount of funding requested, proposal type (research or outreach) and project leader(s) name, title, affiliation, and email address. Limit to ½ page.
- A simple and concise summary of the problem to be addressed and hypothesis.
- Description of the target audience.
- Objective(s) of the proposed project.
- A description of the general approach to be used.
- Plans for outreach and measurable outcomes.
- Estimated funding that will be requested. (A budget is not required)

Please follow these formatting requirements:

- Do not use logos or a letterhead.
- Use Arial font throughout the proposal as follows:
  - 12-point bold for project title and section headings
  - 12-point regular font for body text
- Use 1-inch margins on all sides and set alignment to left.
- Set paragraph line spacing to single space and double space between paragraphs. Do not indent the first lines of paragraphs.
- Add page numbers as a footer; align right.

## How To Apply

Pre-proposals are due by 5:00 p.m. (PST) on December 19, 2022. No exceptions granted. Pre-proposals must be submitted via email to: [FREP@cdfa.ca.gov](mailto: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 exceed two pages will be returned and eliminated from consideration.

FREP staff is 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>) under the Regular Request for Proposals drop-down.

## 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. FIAB recommendations are forwarded to CDFA's Secretary for final approval and granting of awards.