California Department of Food and Agriculture

FERTILIZER RESEARCH AND EDUCATION PROGRAM

The Fertilizer Research and Education Program (FREP) within the California Department of Food and Agriculture's (CDFA) Division of Inspection Services is currently accepting concept proposals. Proposals must focus on at least one of the priority areas listed below, and may focus on research and/or education projects to provide growers and industry with cost-effective practices to improve the efficient use of fertilizer and minimize environmental impacts.

FREP does not support proprietary product development, testing, or promotion. Grant funding of $75,000 per year for up to three years is typical for projects, but projects over $75,000 and over three years will be considered on a case-by-case basis. Multiple concept proposals will be accepted. Concept proposals leveraging other sources of funding are strongly encouraged and are welcomed. Concept proposals may originate from outside California, but proposals must be relevant to California growing conditions.

Concept proposals are due by 5:00 p.m. on Tuesday, January 31st, 2017. NO EXCEPTIONS GRANTED.

2017 PRIORITY RESEARCH AREAS

FREP invites research and education project proposals in three major priority areas: improving input management, understanding soil-plant processes, and loss pathways.

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1. IMPROVING INPUT MANAGEMENT:

Developing Integrated Decision Support Tools

Increasing concerns over the potential environmental impacts of California agriculture require efforts that optimize the use of fertilizers and water. Managing fertilizers, especially nitrogen in all forms, is challenging. Overcoming this challenge requires the integration of various aspects of agriculture, including crop development, soil fertility, soil and water monitoring technologies, irrigation, and fertigation management practices into decision support tools for growers and other Ag decision makers. These management tools should provide a platform for customizing management practices to local conditions on farms, coping with drought, and empowering crop consultants and growers to make on-farm decisions that accommodate these complexities.

Education and Outreach (Technical Education)

There is an increasing demand for applied technical trainings for agricultural workers at all levels that empower staff to employ irrigation and nutrient management practices that support agronomic production and optimize environmental outcomes. Development of educational and/or certification materials and programs to increase awareness and improve management of fertilizing materials and/or proper use and maintenance of irrigation systems is encouraged. Potential training topics include nitrogen management training for growers (located outside of the Central Valley), irrigation training for agricultural staff at all levels, and/or nutrient management training for agricultural workers at all levels. Ideally, these programs will be developed for implementation statewide.

Improving and/or Promoting Adoption of Management Practices that Optimize Nutrient and/or Irrigation Water Use

Innovative management practices need to be employed on farms that are compatible with sustainable agriculture and provide solutions to agricultural challenges in California. Extension efforts to improve

management practices and to help implement efficient nutrient management on growers' fields are of high priority. Important activities include:

- Promoting adoption of already existing decision support tools (e.g. CropManage)
- Support of peer-to-peer and community based learning
- Field–Scale demonstration of recommended practices related to management of fertilizing materials. These can include, but are not limited to, demonstrations of the 4 Rs, tissue and soil sampling to guide fertilizer scheduling, irrigation management to improve nutrient use efficiency, nitrogen recovery and fixation with cover crops.
- Demonstrating and evaluating strategies to increase crop N use efficiency

Addressing Challenges and Barriers to Adoption/Improvement of Management Practices

There are significant knowledge gaps in California agriculture in identifying the barriers to growers implementing best management practices on their farms and ranches. A variety of management practices are already available that can save money, time and improve environmental outcomes; however, many of these practices have not been adopted on a larger scale. Addressing knowledge gaps on barriers to a wider adoption of improved management practices would include research studying:

- The costs, benefits and economic thresholds associated with adoption of various practices that can reduce negative environmental impacts (e.g. improved management practices), including perceived and modeled costs of specific practices and how they might be affected by different farm-level characteristics.
- The regulatory or institutional barriers that limit the development, implementation or success of practices that maximize irrigation and nutrient efficiency.
- The types of incentives or programs may increase grower implementation of practices that optimize water and nutrient use?
- Human behavior related to decision making and adoption. This may include, but is not limited to, studies that address fertilization and agricultural management decisions and the social, economic, and political variables driving adoption of effective practices that improve fertilizer management.

2. UNDERSTANDING SOIL-PLANT PROCESSES:

Filling Knowledge Gaps for Nitrogen Management in Specific Crops

- Corn: Very little California-specific information is available to guide the nutrient management of corn.
- Pima cotton: Anecdotal evidence indicates that Pima nutrient requirements differ from that of Acala varieties.
- Processing tomatoes: More information is needed on nutrient management practices for tomatoes grown with buried drip.
- Baby lettuce: There is very little known about the nutrient and irrigation management of these varieties and within these agronomic systems.
- Citrus: There are knowledge gaps pertaining to California citrus for determining temporal soil N status (quantity of additions and losses), validating leaf nutrient critical values (CVs) for citrus, improving leaf sampling protocols, developing a monthly nutrient demand model for citrus and developing BMP's to share the findings.
- Root crops: Carrot is an example of a root crop often grown on sandy soils using sprinkler irrigation. While carrot can scavenge nitrogen at depths, there is little information concerning nitrogen management.

The Role of Soil Organic Matter and Organic Fertilizing Materials on Nutrient Management in Soil

Across California agriculture, numerous organic materials are added to agricultural soils to improve soil physical, chemical and biological properties. However, there is limited information on the role that these materials have in nutrient and water management, particularly pertaining to nitrogen mineralization within these agricultural systems. Growers are required to estimate mineralization rates to complete the mandatory nitrogen management plans submitted to the Regional Water Boards. These organic materials include, but are not limited to, nitrogen-containing soil amendments, manure-based fertilizing materials, cover crops and compost.

3. LOSS PATHWAYS:

Understanding of Nitrate Movement below the Root Zone in Relation to Management Practices

There is a significant information gap in understanding nitrogen movement and distribution in soil as it moves to groundwater. This lack of information has led to incomplete analyses of the transport and fate of nitrate through agroecosystems and the quantity of nitrate from nitrogen fertilizers accumulating in groundwater. Additionally, well-defined scientific studies are required to understand how management practices influence the movement and distribution of nitrate below the root zone. These studies can be conducted within any region of California or in collaboration with Central Valley agricultural water quality coalitions to address the need for Management Practices Evaluation Program BMP testing and verification.

Development of Easy-to-Use and Cost-Effective Technologies for Field-Scale Management of Water and Nitrate Leaching

Increasingly, growers are using a wide variety of sensors in their fields to help inform their decisions on irrigation and nutrient management. However, few growers have adequate tools to provide actionable intelligence and interpret sensor data so that they may maximize water and nutrient use efficiency and minimize nitrate leaching past the root zone. Development of easy-to-use and cost effective technologies to provide intuitive sensor data is needed to effectively manage water and nitrogen use and application in agricultural operations.

HOW TO APPLY

Concept proposals may not exceed two pages. Please include the following information:

- Project title, location, duration, and project leader(s) contact information (name, title, affiliation, mailing address, telephone number, and e-mail address).
- A simple and concise summary of the problem to be addressed.
- Description of the target audience.
- Region or County location where concept work would be performed.
- Objectives of the proposed project
- A description of the general approach to be used.

(Note: A budget is not required for concept proposals.)

Concept proposals are due by 5:00 p.m. on January 31, 2017. NO EXCEPTIONS GRANTED. Concept proposals must be submitted via e-mail; mailed and faxed copies will not be accepted.

Proposals that are incomplete, late, or exceed two pages will be returned and eliminated from consideration. Examples of successful concept proposals from previous years are available on the FREP website. 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.

SENDING CONCEPT PROPOSALS

Submit an electronic version of your proposal to: FREP@cdfa.ca.gov

FREP staff will reply with a confirmation e-mail when concept proposals are received; contact us by calling (916) 900-5022 if you have not received a confirmation e-mail within two business days of your submission. FREP is not responsible for incomplete e-mail transmissions.

EVALUATION PROCESS

FREP has a Technical Advisory Subcommittee (TASC) consisting of subject matter experts who review submitted concept proposals. The TASC selects concept proposals to be developed into full proposals based on project concept, impact, methodology, feasibility, and alignment with the program's priority research areas. FREP staff notifies applicants of the TASC decision and provides a deadline for submission of full proposals. Full proposals go through a peer review process and are then evaluated by the TASC. The TASC then sends their recommendations to the Fertilizer Inspection Advisory Board (FIAB). The FIAB deliberates and discusses the TASC recommendations and decides in an up/down vote whether to accept the TASC recommendations of full proposals. The FIAB recommendations are forwarded to the Secretary for approval and award of FREP grants. FREP staff initiates the grant agreement for the project.

TIMELINE

Request for concept proposals announced..... December 1, 2016
Concept proposals due..... January 31, 2017
Advancement of concepts to full proposals announced..... March 20, 2017
Full proposals due..... May 16, 2017
Award notification..... October 2, 2017
Project Initiation..... January 1, 2018

ADDITIONAL INFORMATION

FREP funds and facilitates research to advance the environmentally safe and agronomically sound use and handling of fertilizer materials. FREP serves growers, agricultural supply and service professionals, extension personnel, public agencies, consultants, and other interested parties.

This solicitation, as well as other information about FREP activities and sponsored projects, is available by contacting FREP staff at FREP@cdfa.ca.gov or (916) 900-5022, and by visiting the FREP website at http://www.cdfa.ca.gov/go/FREP.