



## **California Department of Food and Agriculture FERTILIZER RESEARCH AND EDUCATION PROGRAM SPECIAL REQUEST FOR FULL PROPOSALS**

### **2015 SPECIAL REQUEST FOR FULL PROPOSALS**

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The Fertilizer Research and Education Program (FREPP) within the California Department of Food and Agriculture's (CDFA) Division of Inspection Services is currently accepting full proposals to address the issues of nitrogen fertilizer management, nitrates in groundwater and nitrous oxide greenhouse gases in environmentally sensitive areas of California. Listed below are several potential areas of research and education opportunities that would support addressing environmental issues related to nitrogen fertilizer use in the state.

#### **Nitrous Oxide Research**

Nitrous oxide is a greenhouse gas from nitrogen fertilizers that is significantly more potent than carbon dioxide. Comprehensive research has been completed on nitrous oxide emission factors for the top 10 crops in California. The findings of this research can be used to test models that predict nitrous oxide emissions from different crops grown on numerous soil types under various irrigation/fertilization management practices in California. Mitigation practices need to be developed based on the results of these findings. Additional research is needed on N<sub>2</sub>O to N<sub>2</sub> conversion rates, as well as N<sub>2</sub>O emission under various fertilizer applications, to calibrate and improve the performance of current models. Reliable models that predict nitrogen emissions from agricultural lands under real world scenarios and effective science-based management practices are needed to incentivize adoption of best management practices by growers and for use in potential nitrogen market trading systems in California.

#### **Nitrogen Management Training Program for Growers**

The Waste Discharge Requirements General Orders for the Central Valley allows growers to self-certify their own nutrient management plans if they attend a California Department of Food and Agriculture or other Executive Officer approved training program. CDFA has taken the lead on developing a grower training program based on the Certified Crop Advisor training funded by FREPP. Additional funds are required to further develop the grower education component.

#### **Demonstration Projects on the Multiple Benefits of Nitrogen Management Practices with Growers**

Demonstration projects are a key strategy to ensure FREPP-funded scientific research results are implemented and adopted by growers at the farm level. There is a need for several demonstration projects in both the Northern and Southern parts of the state. Demonstration projects must involve scientific experts from the University system, actual field plots, already completed FREPP findings, or other well documented nutrient management research and close involvement of growers and other field professionals. Management practices with multiple benefits have a good chance of adoption compared to a management practice with a single benefit. This aspect of the research initiatives should be completed in coordination with the CDFA Environmental Farming Act Science Advisory Panel. The Science Panel is currently evaluating the multiple benefits of management practices and has encouraged the implementation of demonstration projects to show proof of concept. Potential treatments include, but not limited to:

- Strategies in timing of fertilizer applications
- Leaf sampling to guide fertilizer recommendations
- Fertilizer sources and additives that enhance nutrient use efficiency
- Advanced irrigation management to improve nutrient use efficiency

- Comparison of irrigation technologies as related to nutrient use efficiency
- Nitrogen recovery and fixation with cover crops
- Soil organic matter effects on nutrient use efficiency
- Fertilizer timing and leaf sampling in almonds: A final proposal that will be designed by FREP to demonstrate the fertilizer timing and leaf sampling in almond fields will be released at a later date.

### **Understanding and Quantification of the Movement of Nitrates in Deep Soil**

There is a significant information gap in understanding nitrogen behavior, movement and distribution from nitrogen fertilizers as it moves through the soil down to groundwater. This lack of information has led to incomplete analyses of the quantity of nitrates from nitrogen fertilizers accumulating in groundwater. Well-defined scientific studies are required to understand the movement and distribution of nitrate below the root zone in several locations throughout California's major agricultural regions.

### **Development of Easy-to-Use Technologies for Field-Scale Management of Water and Nitrate Leaching**

Increasingly, growers are using soil sensors in their fields to manage irrigation. However, some growers lack adequate tools to utilize sensor data to minimize water and nitrate leaching past the root zone. Development of easy-to-use protocols to interpret sensor data is needed to effectively manage water and nitrogen use and application in agricultural operations.

### **Developing Integrated Water and Nutrient Management Tools**

As concerns rise over shortage of fresh water and environmental effects of agriculture in California, a major challenge facing the agriculture industry is to optimize the use of fertilizers and water. This needs to be done in such a fashion that crop yield and soil productivity is maximized while leaching of nitrate to groundwater, gaseous N losses, runoff, and salt accumulation are minimized. Overcoming this challenge requires integration of various aspects of agriculture including crop development, soil fertility, soil and water monitoring technologies, irrigation scheduling, and fertigation management practices into decision support tools for growers and decision makers. Such management tools should provide a platform for customizing management practices to local conditions on farm as well as cope with droughts.

FREP will not support proprietary product development, product demonstration, or marketing projects. Grant funding of \$75,000 per year for up to three years is typical for projects, but **projects over \$75,000 per year could be considered depending on the experimental approach and scope of the proposal**. Multiple full proposals will be accepted from different combinations of applicants. A full proposal leveraging other sources of funding are strongly encouraged and welcomed.

## **WHO MAY APPLY**

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Given the scientific needs of this grant solicitation, this request for full proposal is open to research institutions (e.g., University of California system, California State University system, USDA research entities such as ARS, and other similar institutions as well as private firms). Coordination among research institutions and private firms to leverage expertise is strongly encouraged.

## **HOW TO APPLY**

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Applicants must submit a full proposal to FREP by the date specified below. Please consult Full Proposal Submittal Requirements (attached).

Full proposal are due by 5:00 p.m. Tuesday, March 3, 2015. **FREP WILL NOT GRANT ANY EXEMPTIONS.**

Full proposals that are incomplete or late will be returned and eliminated from consideration. **Proposals may be submitted by email only.**

The FREP has a Technical Advisory Subcommittee (TASC), which consists of growers, representatives of institutions of higher education, the fertilizer industry, CDFA, U.S. Department of Agriculture and other governmental agencies. The TASC reviews the submitted full proposals to determine whether they are aligned with the special request for full proposals. The TASC then sends their recommendation 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 recommendation of special request for full proposals. The FIAB then forwards their decision to the Office of the Secretary. CDFA staff then initiates a grant agreement with the grantee to begin the grant approval process and project.

## **TIMELINE**

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Special request for full proposals announced .....	January 7, 2015
Full proposals due .....	March 3, 2015
Award notification .....	June 1, 2015
Project start date .....	July 1, 2015

## **SEND FULL PROPOSALS TO**

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Proposals will only be accepted if submitted by email.  
Send email submissions and questions to: [frep@cdfa.ca.gov](mailto:frep@cdfa.ca.gov)  
Tel: (916) 900-5022

## **ADDITIONAL INFORMATION**

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The FREP funds and coordinates 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 and other information about FREP are available on the FREP website at <http://www.cdfa.ca.gov/is/ffldrs/frep/competitivegrantprogram.html>.