cdfa

CALIFORNIA DEPARTMENT OF
FOOD & AGRICULTURE

FERTILIZER RESEARCH AND EDUCATION PROGRAM

FREP

2018-2019 Annual Report

The Fertilizer Research and Education Program (FREP) was established in 1990 through legislative action to provide funding for basic and applied research, education and outreach to progress our understanding, development, and improvement of nutrient and water management practices in California agriculture. FREP is funded through a mill assessment ($0.001 per dollar) on fertilizer sales.

Letter from the Secretary

California leads the nation in agricultural production and exports, owing to its unique microclimates and innovative growers and ranchers. We have a responsibility to meet the food, fiber and energy demands of our growing population, while simultaneously protecting California's precious resources and ensuring rural residents are not impacted. We need to utilize innovative management practices, developed through research, which are customized to the specific crops and local conditions on the ground.

CDFA is investing in improved farming practices through the Fertilizer Research and Education Program (FREP). FREP research, education and training projects aim to make the use of fertilizing materials as efficient and environmentally friendly as possible. As you will see in this brochure, FREP is helping to place California at the forefront of agriculture sustainability through projects that develop and extend innovative management practices and farming methods.

I am proud of the steps FREP has taken to support and promote California farmers and agriculture, and I look forward to the advances this program will bring in the future.

Sincerely,

Karen Ross

Secretary of CDFA

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Top to bottom: 1) Fertigation session at the Irrigation Training & Research Center, 2) Solar panel in greenhouse for Dr. Gazula's research project, 3) Field tour at 2018 Biochar Field Day, 4) Dr. Geisseler's tomato research project.

FREP Initiatives

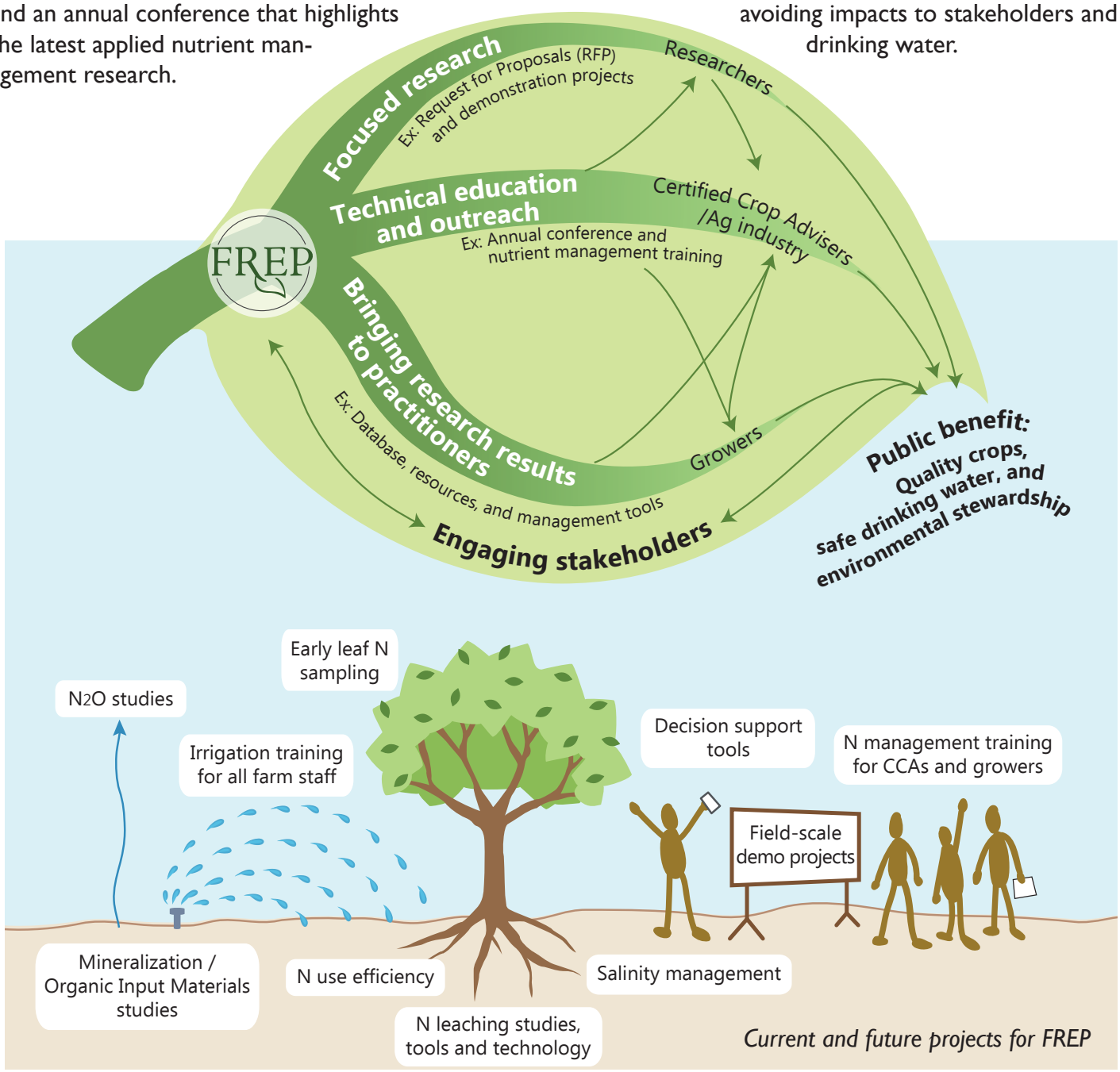
FREP activities are designed with the goals of quality crops, safe drinking water, and environmental stewardship, each of which benefit people and society.

Focused Research – With over 230 projects funded for more than $17 million, FREP has developed a greater understanding of nutrient requirements of many California crops. FREP research plays a key role in establishing nutrient management practices that improve the performance of fertilizers while minimizing their environmental impact.

Technical Education and Outreach – FREP provides growers and crop advisors with timely, technical education, including nitrogen management training and an annual conference that highlights the latest applied nutrient management research.

Bringing Research Results to Practitioners – FREP has developed an online searchable database, crop fertilization guidelines, and many decision-making tools that assist growers and crop advisors with their nutrient and irrigation management decisions.

Engaging with all stakeholders – FREP continues to work closely with stakeholders affected by the presence of agricultural nitrogen in groundwater and facilitate improvements in management practices that maximize irrigation and nutrient efficiency, while avoiding impacts to stakeholders and drinking water.



Current and future projects for FREP

FREP Outreach

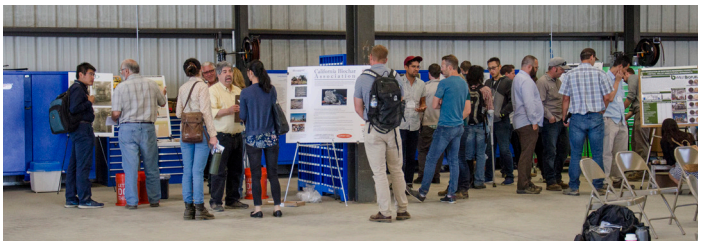
FREP outreach serves to highlight the latest applied nutrient management research and to help improve irrigation and nutrient management practices.

Annual Nutrient Management Conference

Every year, FREP hosts a conference about agricultural nutrient management. Since 2007, FREP has collaborated with Western Plant Health Association (WPHA) to create a conference that balances technical research with practical application. The conference hosts over 200 attendees. In 2018, a farm tour was added for the first day of the conference.

The 2019 FREP/WPHA Conference is on October 28-30 in Fresno, CA.

Biochar Field Day

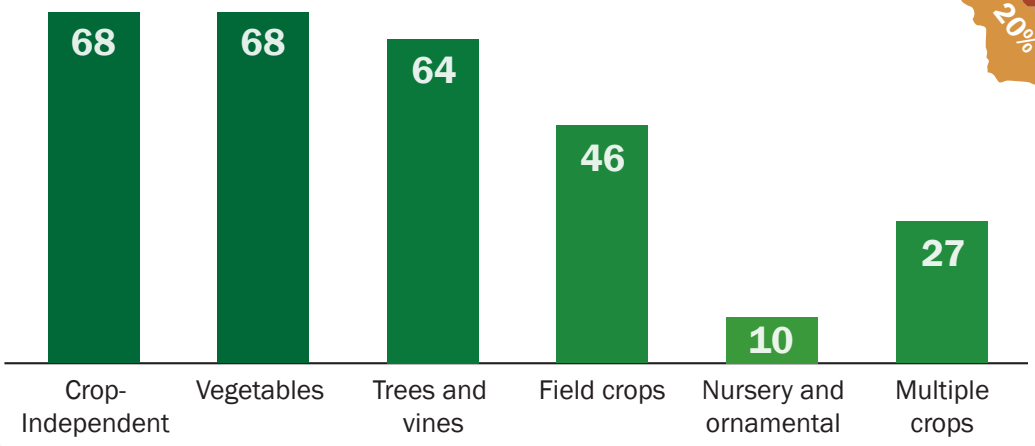


In June 2018, FREP teamed up with the Department of Land, Air and Water Resources and the Agricultural Sustainability Institute of the University of California, Davis, to host a Biochar Field Day. The event brought together over 100 stakeholders from industry, academia, and government to discuss and learn about research with biochar applications in agriculture. Presentations, a field tour, and a poster session provided attendees with opportunities to learn and network.

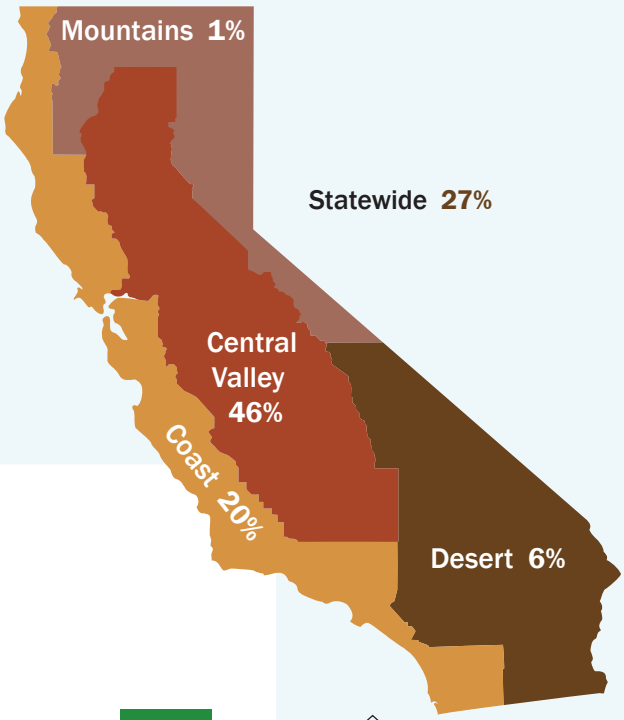
Successful Projects Making a Difference

FREP has funded over 230 research and education projects focused on nutrient and irrigation management of various crops across California.

Several recent projects are highlighted on the next two pages.



The distribution of FREP projects by commodity. Some projects address more than one commodity.



Locations where FREP projects have been conducted.

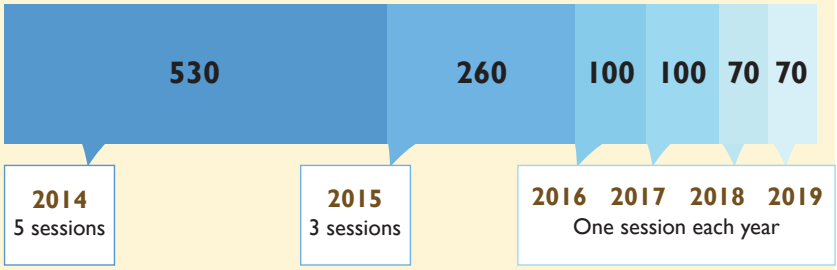
Nitrogen Management Training

In California, the Central Valley Water Quality Control Board's Irrigated Lands Regulatory Program requires growers in areas with high-vulnerability for nitrogen leaching to have their Nitrogen Management Plans (NMPs) certified by an expert, such as a Certified Crop Adviser (CCA) who has completed FREP-funded nitrogen management training for CCAs. Alternatively, growers can self-certify their own NMPs upon completing a grower training program supported by FREP. See more at ciwr.ucanr.edu/NitrogenManagement/.

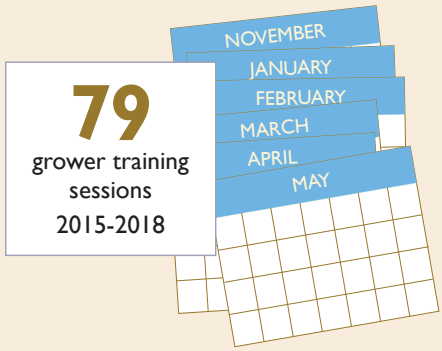
Certified Crop Adviser (CCA) Training

There are over 1,200 CCAs in California.
Since 2014, over 1,000 have been trained through 11 one-and-a-half-day sessions held in various locations throughout the state.

# of attendees (Some attend more than once):

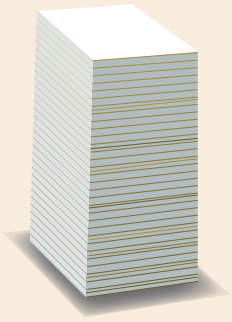


Grower Training



79 grower training sessions 2015-2018

32 CCAs trained to lead the sessions



3,739 grower certification exams graded

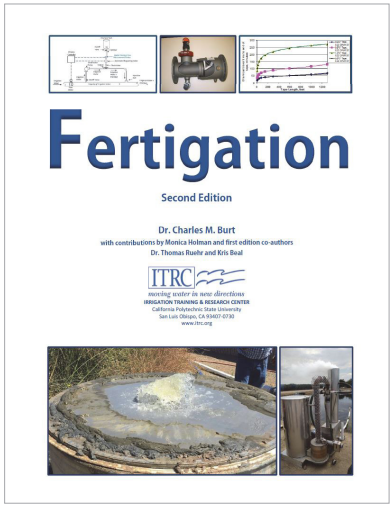
80% passing rate

Sources: University of California Agriculture and Natural Resources (UC ANR), Coalition for Urban/Rural Environmental Stewardship (Cures), and California Association of Pest Control Advisers (CAPCA). Funding provided by FREP.

Fertigation Book and Trainings

This FREP research and education project aims to improve the understanding of fertigation practices through an updated Fertigation Book and a series of short courses.

The book material and courses cover new techniques for control and application of fertilizers through irrigation systems, as well as strategies to comply with new nitrogen regulations in California. The updated fertigation book is now available on the Cal Poly Irrigation Training & Research Center (ITRC) website.



Managing Nitrate and Salinity

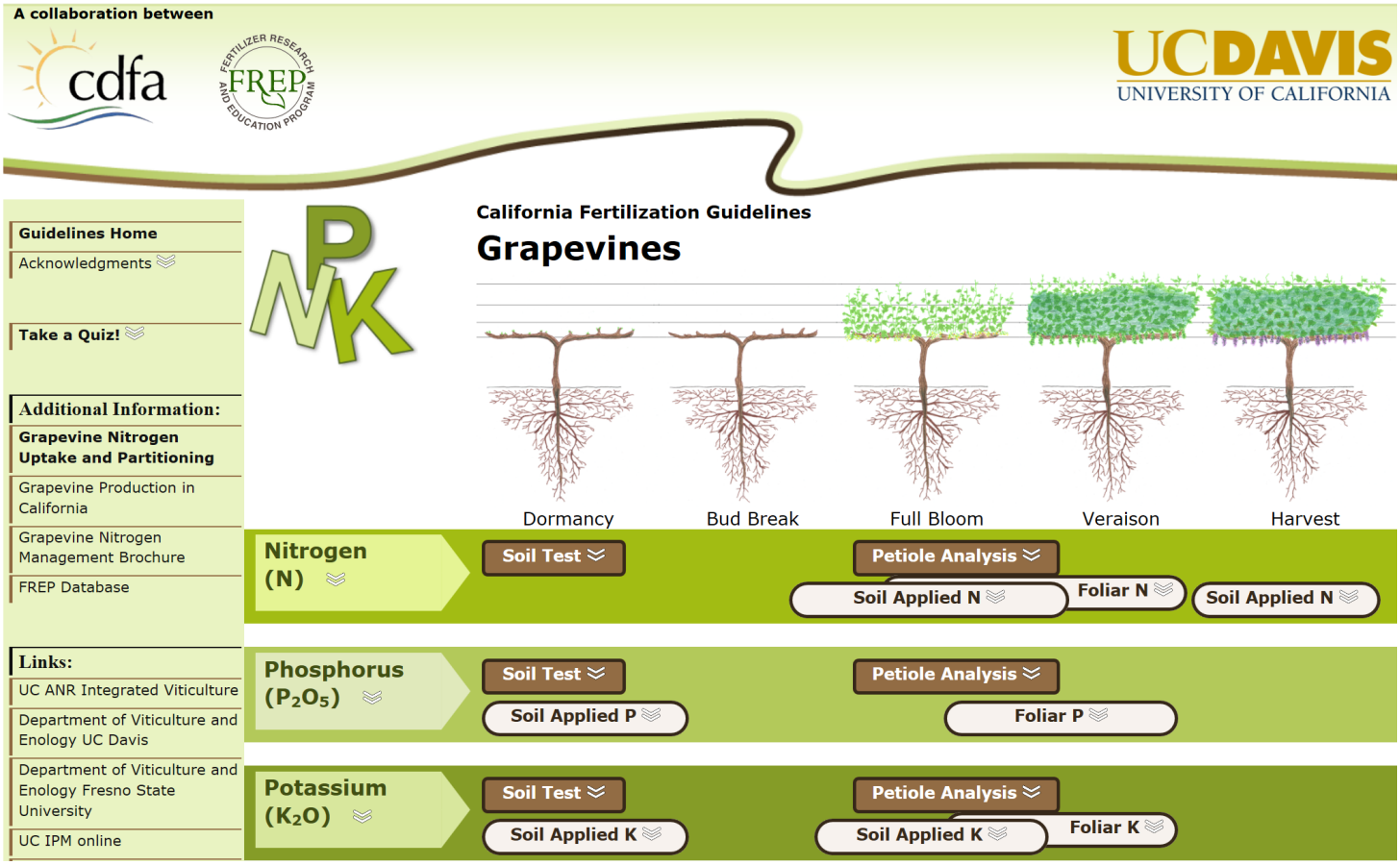
This project is designed to develop best management practices (BMPs) for California almonds grown with micro-irrigation. The BMPs will explain how to effectively leach salts while minimizing nitrate loss below the root zone, which will be especially impactful in areas where irrigation is relatively saline, water supply is limited, and/or during drought years when rainfall is not adequate for salt leaching.

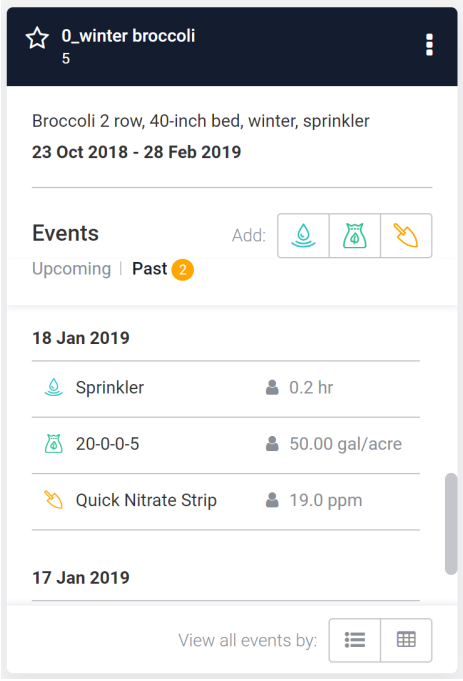
To follow the progress of this project and others, read the FREP blog at www.blogs.cdfa.ca.gov/FREP.

Crop Fertilization Guidelines

Online crop fertilization guidelines give growers and advisors access to information on how much, when, and the methods to best apply fertilizers.

Guidelines for 28 crops are available, including 19 field crops and vegetables and nine tree crops. The crops included in the Guidelines cover over 6.5 million acres of irrigated cropland in California.





CropManage

An example of FREP-funded projects making a difference is the CropManage decision-making tool developed by UC Cooperative Extension.

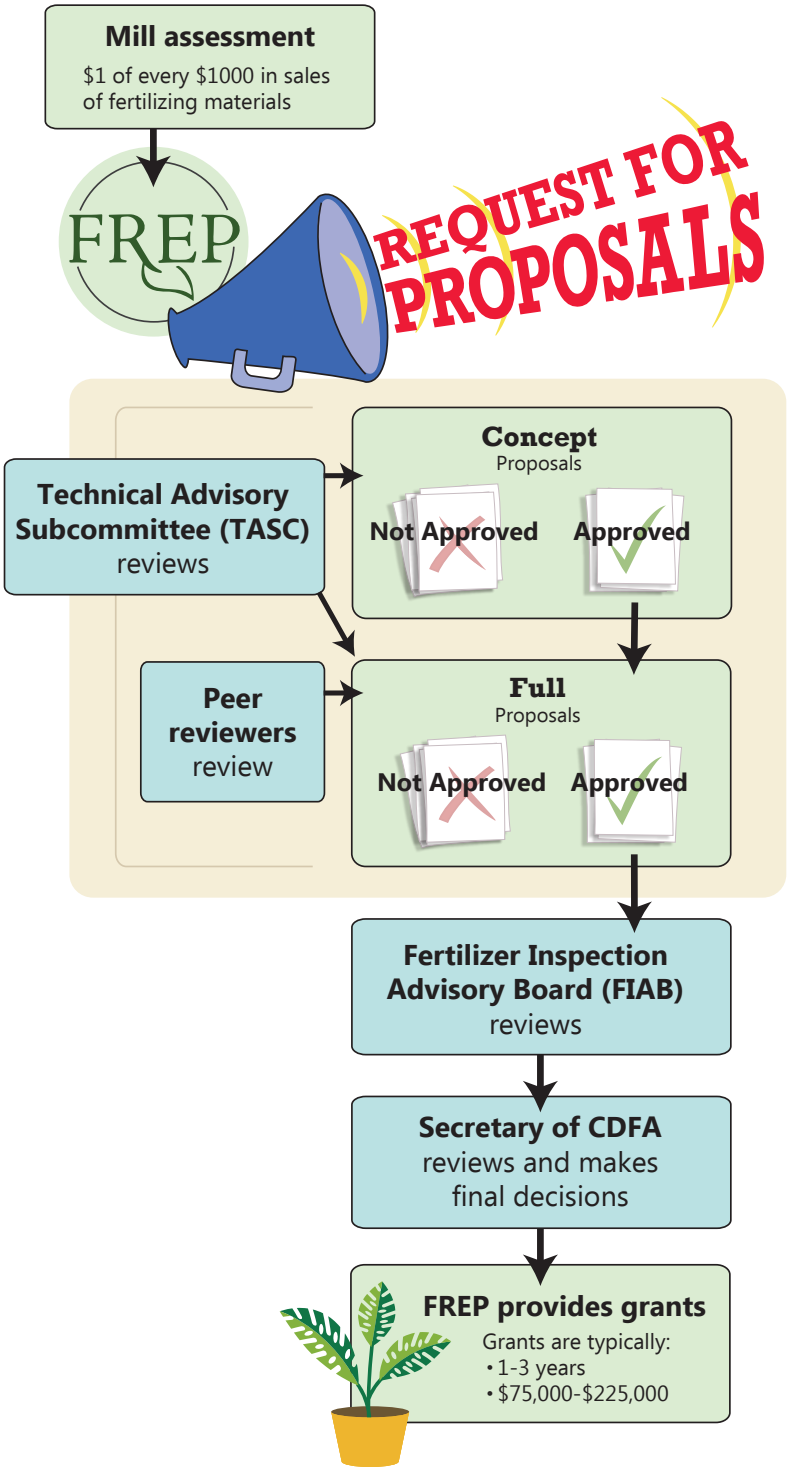
Integrating publicly available soil and climate data with in-field measurements, growers can create efficient irrigation and fertilization schedules based on crop demand. *(See chart.)* There are more than 900 registered users of CropManage, who have received more than 6,000 fertilizer recommendations and 10,000 irrigation recommendations. CropManage currently supports recommendations for 15 major Central Coast crops. Studies show that growers using this software in lettuce reduced average nitrogen use by 33% and water use by 20% without yield penalty.

While FREP is the initial funding source for CropManage, the software is receiving increasing interest and matching funds from industry for further development. New modules are being developed for the program to include additional crops, including tomatoes.

Grant Process

Annually, FREP releases a Request for Proposals (RFP) for research, education, and outreach priorities. The RFP is usually a two-phase process, including concept proposals and full proposals, but occasionally, a Special RFP is released, requesting full proposals for more specific topics.

The program receives funds through a mill assessment, not to exceed 1 mill ($0.001) per dollar of sales of fertilizing materials. The mill assessment is paid by any fertilizer licensee who sells or distributes packaged or bulk fertilizing materials to unlicensed purchasers (growers) in California.



Fertilizer Inspection Advisory Board

The Fertilizer Inspection Advisory Board (FIAB) is a statutory body advisory to the CDFA Secretary on fertilizer issues. The Board consists of nine people appointed by the Secretary of Agriculture. One person is a public member and eight are licensed with CDFA to manufacture or distribute fertilizing materials, including organic inputs.

Technical Advisory Subcommittee

FIAB established the Technical Advisory Subcommittee (TASC) to advise FIAB on the funding of FREP projects. TASC serves as an expert panel on matters concerning plant nutrition and on environmental effects related to the use of fertilizing materials. Additionally, TASC assists in setting research priorities, reviews research proposals, and makes recommendations on projects for funding.

Upcoming TASC vacancies are announced in early summer each year. If you are interested in applying to serve on TASC, please email FREP@cdfa.ca.gov.