CALIFORNIA DEPARTMENT OF FOOD & AGRICULTURE

FERTILIZER RESEARCH AND EDUCATION PROGRAM

California Department of Food and Agriculture
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2015 DEMONSTRATION OF ADVANCED, WEATHER-BASED IRRIGATION MANAGEMENT ON CALIFORNIA TREE CROPS

The Fertilizer Research and Education Program (FREP) of the California Department of Food and Agriculture (CDFA) is initiating a series of demonstration trials to showcase recommended best management practices and new techniques in irrigation and fertilization. FREP is requesting proposals for projects that will be conducted in grower fields under typical conditions and may be implemented in any of several different crops and regions across California.

Objective

- Demonstrate advanced irrigation management to improve nutrient and water use efficiency in tree crops in California.
- Create a platform promoting widespread adoption of best irrigation management practices by tree crop growers.

Proposed demonstration crops:

- Citrus
- Almond
- Walnut
- Pistachio
- Grape (excluding deficit irrigated)
- Stone fruits (cherry, apricot, plum, nectarine)
- Apple
- Pear
- Avocado

Preference will be given to projects that will be implemented in three or more crops and in multiple locations.

Treatment List

1. Grower practices typical of those in the region regarding irrigation and fertilizer management that do not currently include weather-based irrigation scheduling or soil monitoring equipment to infer irrigation requirement.
2. Weather-based irrigation scheduling using data provided by the California Irrigation Management Information System (CIMIS). The irrigation scheduling must also take soil evaporative losses or vegetative ground cover evapotranspiration rates and coefficients into account.

Duration of Demonstration

This will be a three-year project.

Site description

This demonstration must be performed across two irrigation blocks that have reasonably similar soil

types, tree sizes and tree ages. When irrigating, both blocks must be appropriately pressurized throughout the irrigation system and have no significant difference in water volume delivery across all nozzles. The water application rate of the system should not exceed soil infiltration rate and the application volume of each set should not exceed soil water holding capacity. To adjust for discrepancies between these, irrigation run times and frequency should be adjusted. When leaching is intended to occur (e.g. to move salts), it must be scheduled when the soil nitrate concentration is minimal.

The plots must be representative of an average irrigation block under normal growing conditions.

Irrigation considerations

Irrigation efficiency is a primary factor in nutrient efficiency, especially when fertigating, because it is the fertilizer delivery system. The objective of this demonstration project is to exemplify similar crop yield and monetary savings on pumping and fertigation after implementing an efficient irrigation practice that appropriately meets crop water requirement. Standard irrigation maintenance will be performed on both blocks including, but not limited to:

- Flushing the lines
- Walking the block to check and repair:
    - leaks
    - broken nozzles
    - any other issues that may affect irrigation performance

Methods

Irrigation blocks will be instrumented with water meters to accurately measure water application. Water meters will either be regularly monitored or have respective data loggers to best assess irrigation run times. While Treatment 1 blocks will be irrigated under normal grower practices throughout the project, Treatment 2 blocks will be irrigated to crop requirement based on losses due to crop evapotranspiration, soil evaporation and vegetative ground cover evapotranspiration (if applicable). Reference evapotranspiration values must be collected from CIMIS stations utilizing the spatial CIMIS tool via the CIMIS website (http://www.cimis.water.ca.gov/Default.aspx), or an onsite weather station. Crop coefficients will be provided via the FREP program by the end of 2015, or they may be calculated using canopy measurements.

Deliverables

The grantee will provide two reports annually and a final report after the completion of the demonstration trial. The data required in the reports are as follows:

1. The crop requirement and the water volume applied across each of the blocks over the course of the project
2. Applied nitrogen fertilizer within each of the demonstration blocks
3. All relevant management practices across blocks including, but not limited to, soil amendments, compost applications, cover crop or other organic matter application
4. Crop yield of each block, including appropriate measures of grading or quality
5. If the grantee opts to measure crop coefficients, rather than using the values in the table provided, the coefficients used must be reported
6. Data analysis to inform future outreach activities.

The project manager must be available to tour the demonstration sites and to discuss interim results and ongoing activities with FREP staff and, through FREP, other interested parties. FREP will be responsible for all field days and other outreach activities. Grower cooperators must be amenable to allowing these outreach activities (e.g. field days).

All significant orchard management information and basic orchard conditions will be reported, including, but not limited to, location, age, tree spacing, varieties and variety pattern, soil type, a detailed analysis of the irrigation system (including system type, distribution uniformity, output, monitoring and maintenance practices, and other design details), and any other pertinent information. A record of plant nutrition and soil fertility practices will be reported for each of the two treatments, including fertilizer and soil amendment application timing, quantity, materials and methods, and any cover crops.

Proposal Submission

To submit a proposal, send an electronic copy of your proposed budget (use the FREP budget template), budget narrative, and CVs with relevant experience for all of the personnel who will be significantly involved in the project to FREP@cdfa.ca.gov. Proposals should be a maximum 15 pages, excluding CVs, budget, and budget narrative. The FREP budget template and the 2015 Grant Procedures Manual, which contains information about travel per diem and other topics, are available at the "Special Request for Proposals" link on the FREP website at http://www.cdfa.ca.gov/is/ffldrs/frep.html.

Proposed budgets are due by 5:00 p.m. on March 3, 2015, NO EXCEPTIONS GRANTED.

Proposals that are incomplete or late will be returned and eliminated from consideration. Proposals must be submitted via e-mail; mailed and faxed copies will not be accepted. FREP staff will reply with a confirmation e-mail when 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 email transmissions.

Grant Cycle Timeline

Full proposals due: March 3, 2015
Award notification: June 1, 2015
Project start date: July 1, 2015