

California Department of Food and Agriculture
2012 Specialty Crop Block Grant Program**Research- Environmental Concerns and Conservation***Almond Board***\$337,746****Title:** Dust Control in Almond Production

Abstract: This project will investigate the potential of using reduced rates of a liquid magnesium chloride (MgCl₂) product to control dust on almond orchard roads and floors. This product is an inorganic, safe, proven dust suppressant and regionally available from various sources. More information is needed on the behavior of MgCl₂ in orchards with various soil types, climate, and management/disturbance regimes, especially because of new and more restrictive air quality regulations. The project focuses on MgCl₂ fate in natural media, pertinent research and regulations, and proven methods of measuring emissivity. Field trials will be used to study 1) MgCl₂ migration, 2) rates, 3) positive and negative effects on plant and soil health and water quality, and 4) long-term impacts. Results will be used to determine orchard floor rates of MgCl₂ in different managed soil and climate regimes that achieve an acceptable level of performance, coupled with agronomic and environmental protection.

*Calaveras Winegrape Alliance***\$104,563****Title:** Improving Water Use Efficiency in High Elevation Vineyards, Phase II & III

Abstract: High temperature episodes in high elevation (HE) vineyards are very problematic for HE growers, making it difficult for growers to simultaneously balance irrigation efficiency, plant performance, plant health and crop yield. During Phase I of this project, funded through the 2011 Specialty Crop Block Grant program, it was anticipated that high elevation (HE) vines using irrigation schedules based on 10 day predictive high temperature forecasts would benefit differently than HE vines using traditional low elevation irrigation guidelines. Therefore, this project will follow through with Phase II and III. In Phase II, the Irrigation models that were developed in Phase I will be tested with alternate sites being used; adding any necessary variables to improve performance. Results will be recorded and evaluated. If any Phase II models are deemed promising, they will be tested in Phase III. Upon completion, if a model proves successful, a Best Management Practices manual with recommended irrigation guidelines will be devised.

*Coalition for Urban Rural Environmental Stewardship***\$348,377****Title:** Establishing cost efficient methods to measure nitrate movement beyond the root zone when using nutrient BMPs in California Specialty Crops

Abstract: This project will identify and pilot test methods for measuring movement of nitrates beyond the root zone of irrigated crops with implementation of a nutrient management plan (NMP). Researchers use several methods for this purpose: lysimeters, ion exchange cartridges, soil core analyses, nitrate-specific probes. A literature search and interviews with researchers/private entities that use these methods will identify a scientifically acceptable and cost effective method to measure leaching of nitrate past the root zone. This project's field studies will test the selected method in tomatoes and walnuts. Samples will be collected where growers use NMPs to reduce nitrogen loading to groundwater. Study results will verify the effectiveness of NMPs or inform their modification if they are deficient. The method will serve as the standard protocol for evaluating nitrogen use efficiency in other crops under various soil/field conditions as growers work to comply with groundwater regulations.

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Northwest California Resource Conservation & Development Council

\$133,220

Title: Sustainable Easter Lily Production

Abstract: Northwest California Resource Conservation and Development Council's (RC&D) long-term goal is to collaborate with those involved in the Easter lily industry to generate new plant material that will meet regulatory and economic challenges. RC&D proposes to eliminate the most costly and pesticide intensive 3rd year of lily growth, producing superior commercial sized bulbs in the 2nd year. In the current bulb growing system, 15% of the growers' annual acreage is dedicated to the 1st year scale up crop, 35% is dedicated to the 2nd year yearling crop, and 50% to the 3rd year commercial crop. Only the 3rd year bulbs are currently being marketed. The need addressed by this proposal would be to lower the cost of production and to lower the acreage and pesticide requirements of raising this crop. A 2 year old lily is naturally smaller. The shorter plant will benefit the greenhouse production phase by eliminating the need for growth regulating chemicals and providing the ability to produce more plants per square foot.

Project Apis m.

\$344,124

Title: Building California Bees for California Specialty Crops

Abstract: Building honey bee populations is accomplished by building food resources. California (CA) lacks sustainable food resources to build and maintain adequate bee populations within the state. Over 1.5 million honey bee colonies are needed to pollinate CA's specialty crops. CA beekeepers supply only one-third of the need. To enhance the production of CA specialty crops and ensure their long-term viability, a sustainable supply of bees is required. Most bees pollinating CA specialty crops come from out-of-state where nutritional resources are more available. Beekeepers incur costs for transportation and preparing loads for CA border inspections; resulting in higher colony rental fees for growers. Keeping more bees in CA would better service the CA specialty crop industry. This project intends to identify, develop, and test low-water-use wildflower and oilseed mixtures as a means of providing sustainable nutritional sources for the building and retention of honey bees in California.

Regents of University of California, Davis

\$398,963

Title: Life Cycle Assessment of Air Emissions and Greenhouse Gas Offset Potentials in Perennial Fruit and Nut Crops

Abstract: The Regents of the University of California, Davis (UCD) will assess greenhouse gas (GHG) and pollutant emissions in production of California (CA) tree fruit and nut crops and will quantify the potential for alternative orchard practices to offset emissions. UCD will adapt an existing life cycle assessment (LCA) model for almond production and existing tree growth models for peaches and almonds to study life cycle emissions in peach, almond, prune, and walnut production. Field data on orchard biomass accumulation and N₂O emissions with different nutrient and irrigation practices will enhance the models. LCA models will quantify potential GHG offsets and pollution tradeoffs from changing practices and using orchard biomass for power generation. Geospatial analysis will assess potential emissions impacts of sourcing biomass for power generation in different growing regions. Outreach efforts will help growers learn about alternative management practices and income streams, and policymakers to learn about net GHG offsets possible from CA orchard acreage.

Regents of University of California, Davis

\$230,078

Title: Cultivar trait selection to improve tomato water use efficiency and yield under low water availability

Abstract: Adaptation to climate uncertainty is a challenge, especially for water issues that pose risks for the competitiveness of specialty crops. In a Yolo County survey, farmers preferred adaptation practices

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for their current specialty crops rather than change to new crops. High irrigation demand by processing tomatoes (~3 acre feet) makes growers very vulnerable to shortages. Tomatoes have great potential to increase Water Use Efficiency (WUE), but this must be achieved with no decrease in yield. A previous University of California, Davis (UCD) study funded under the Specialty Crop Block Grant Program on alternate furrow irrigation showed that a 25% decrease in irrigation volume did not affect yields. This project will 1) survey tomato growers' irrigation concerns for climate change adaptation; 2) identify cultivar traits desirable for new crop management strategies under low irrigation water availability (drip or furrow); and 3) convey the identification of beneficial trait plus management options to stakeholders for improving WUE with no yield decrease.

Regents of University of California, Davis

\$227,102

Title: Using Targeted High Frequency Nitrogen (N) Applications to Diminish Reactive N Mobilization in Micro-irrigated Perennial Crops and Modeling Applications

Abstract: The proposed project will develop an application for the hydrological model HYDRUS to estimate N mobilization from fertigation and improve N use efficiency (NUE) for perennial crops. Ground monitoring will quantify reactive N mobilized from alternative fertigation using high frequency low N (HFLN) versus conventional practice where higher amounts of N are applied. N fertilizer cost has increased 100% since 2004, and mobilization of reactive N is of primary concern for environmental quality in California. Reactive N includes NO₃- to ground water, the greenhouse gas N₂O and smog-producing NO_x. Increased global competitions for fossil fuels to generate N fertilizers and regulatory mandates that basically tax use of N indicate no future relaxation of increased cost for N use. Thus, adoption of practices to improve NUE improves competitiveness and green marketing opportunities. The results apply to a broad range of California perennial crops fertilized with N using micro-irrigation systems.

Resource Conservation, District of Santa Cruz County

\$310,740

Title: Performance-Based Conservation Incentives for Berries

Abstract: The Performance-Based Conservation Incentive Project is a joint project of the Resource Conservation District of Santa Cruz County and Driscolls Strawberry Associates. The purpose of this proposal is to help move the project from pilot phase to full implementation by working with a group of 15-25 growers from the berry industry in the Pajaro Valley to: 1) Improve the berry industry's conservation outcomes for water quality and quantity in the Pajaro Valley; 2) Create tools to provide growers with information regarding strategies to meet conservation targets and create new economic opportunities for farmers by quantifying nutrient reduction.

Robert Mondavi Institute for Wine and Food Science

\$396,737

Title: Sustainable Technologies for Olive Mill Wastewater Management

Abstract: This project will develop integrated approaches to improve water quality, increase water conservation, and accelerate Best Management Practices for olive processing waste water. In September 2011, UC Davis Olive Center assembled a research team of growers, processors, researchers, and manufacturers to address this issue. The team agreed to (1) develop an environmentally and economically viable integrated strategy for the management of olive processing wastewater, and (2) extract high-value nutraceutical products from olive waste. This project provides an integrated approach to olive processing water management, including membrane filtration, drying processes, and resin separation to carry out the strategy identified by the research team. The project will identify and disseminate Best Management Practices to assist olive processors to maximize water conservation, quality and byproduct value of olive oil byproducts.

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2012 Specialty Crop Block Grant Program*U.S. Department of Agriculture, Agricultural Research Services***\$258,429****Title:** Infrared Heating for Improved Drying Efficiency and Quality of Almonds and Pistachios

Abstract: California produces about a million tons of almonds and pistachios each year and is ranked as the number one producer of tree nuts in the United States. However, it is estimated that there is about three percent loss due to adverse weather conditions. For almonds, the Almond Board of California (ABC) has expressed an urgent need to develop a quick drying method to remove the moisture caused by rain during harvest season to reduce quality deterioration and improve product safety. For pistachios, before air drying, they are sorted in water bath which cause significant gain in moisture on pistachio surface. Since air drying is low in energy efficiency and drying rate, the aim of this project is to develop a quick drying method using Infrared (IR) for partial drying of almonds and pistachios with reduced energy and drying time, but improved product quality and safety. The drying method can also be extended to drying of other tree nuts and benefit the entire tree nut industry.

*University of California Cooperative Extension, San Luis Obispo***\$152,835****Title:** Improving vineyard irrigation efficiency within the Paso Robles Groundwater Basin

Abstract: The full economic impact of the San Luis Obispo County wine grape industry is estimated to be \$1.8 billion. The majority of the county winegrape acreage overlies the Paso Robles Groundwater Basin, and relies solely upon it for irrigation. However, the water level in the basin has been declining significantly, threatening the viability of the winegrape economy which depends upon it. Improved irrigation management information will enable growers to maximize their vineyard water use efficiency and thus increase the sustainable use of the groundwater resource. This project will improve water use efficiency by continuing and expanding the UC Cooperative Extension (UCCE) vineyard irrigation study currently underway at 84 cooperating vineyards; by creating bilingual English/Spanish vineyard irrigation management guides; by demonstrating modern irrigation management tools; by validating the Spatial California Irrigation Management Information System (CIMIS) data to improve local irrigation scheduling; and by improving water management for local salinity-affected soils.