

University of California  
Division of Agriculture and  
Natural Resources

## **Biennial Report**

On the UC Sustainable Agriculture Research and  
Education Program  
To the California State Legislature  
In response to SB 872  
(Chapter 1188, Statutes of 1986)

July 1999 – June 2001

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# **From the Director: SUSTAINABLE AGRICULTURE MUST CONTINUE TO GROW IN CALIFORNIA**

California agriculture enters the new millennium under the most uncertain and contradictory economic, environmental, and social conditions in a generation. California farmers and ranchers confront record low prices for many of the mainstay animal, field, and orchard commodities that we supply to the rest of the nation and the world. At the same time, they face increased global competition and dumping of foreign agricultural commodities, expanded demands for land and water by a growing urban population, and increased regulations to improve water quality, protect wetlands and other endangered habitats and preserve endangered species. Yet we expect these same farmers and ranchers to maintain increasing levels of productivity and efficiency that have been emblematic of California agriculture over the last half century. Under these conditions, some academics suggest the dismal prospect of the abandonment of agriculture in California's economic future.

It is in these difficult times when the concept of sustainable agriculture, in the broadest sense, prompts critical questions: What should agriculture's role in our economy and society be, and how should we plan to ensure this role for the future? What human partnerships will be required to shape a sustainable future for California's diverse communities? Why is the future sustainability of California agriculture one of our most important environmental issues of the 21<sup>st</sup> century?

California's farmers and ranchers manage nearly one-fourth of the state's surface area, a resource far larger than the state's wilderness areas, state and national parks, and other public natural preserves combined. The majority of this area is urban edge or metropolitan in character. The public is far more familiar with the managed agroecosystems at the edge of all major coastal and valley urban areas than it is with our national parks! This agricultural open space is the next frontier in the future stewardship of California's natural and human resources. While much environmental conservation has been successfully advocated and funded on public wildlands, the vast stewardship potential and positive environmental impact to be gained on largely privately-held California agroecosystems has been overlooked. I believe that only farmers and ranchers, in proactive partnership with sustainable agriculture researchers, consultants, industry representatives, public agencies, farm workers, consumers, and other food system stakeholders, can solve the serious challenges of environmental quality, loss of open space, economic viability, and quality of life facing California. The alternative to sustainable agriculture partnerships is increasingly costly, dubious, and difficult to enforce environmental regulations which will continue to have negative economic and social impacts on farm communities. The concept of sustainable agriculture has never been more important as a guide to action.

In 1986, The University of California established the Sustainable Agriculture Research and Education Program to fund, demonstrate, and manage research-based models of sustainable agriculture in California. It was the first program of its kind at a land grant institution in the nation. Since that time, we have established the importance of the partnership approach in achieving the goals of sustainability. I am pleased to report the following major accomplishments during my first two years (1999-2001) as SAREP director:

- SAREP's research and education grants program awarded a total of nearly \$175,000 to research and education projects covering diverse themes ranging from cover crops, hedgerow plantings, to farm-to-school lunch programs featuring locally grown produce. These projects generated successful resource conservation and community development models and demonstrations.
- SAREP's Biologically Integrated Farming Systems (BIFS) grants program awarded over \$450,000 in new grants to apple and dairy waste management research and demonstration partnerships, in addition to the continued funding of walnut, prune, citrus, rice and strawberry projects. Nearly all these projects reported significant elimination or reduction of risk in agricultural chemical use and increased use of biological sources of pest control and soil fertility.
- SAREP's grants program for alternatives to methyl bromide continued to fund six projects in the search for biologically-based alternatives to methyl bromide use, scheduled to be phased out in 2005. The projects reveal that a single substitution solution to methyl bromide use is elusive, and that taking an integrated, multi-tactic approach will yield the best results in a wide variety of production and postharvest contexts.
- SAREP-funded grants for educational events attracted more than 1,500 attendees to 26 events on topics ranging from marketing locally grown produce, enhancing local food security, intergenerational farm transfer, conservation tillage, and sustainable agriculture to strawberry production for Spanish-speaking farmers, and other unique topics of relevance to sustainable agriculture.
- SAREP co-sponsored major regional and multi-state sustainable agriculture conferences, most notably the millennial sustainable agriculture conference *Farming and Ranching for Profit, Stewardship, and Community* in Portland, Ore. March 7-9, 2000, and the California-focused conference *Partnerships for Sustaining California Agriculture: Profit, Environment, and Community* in Woodland, Calif. March 27-28, 2001, which together attracted a total of over 630 participants.
- SAREP-sponsored ratification and funding of UC-DANR BIFS and Organic Farming Research Workgroups has integrated the efforts of over 120 members including over 20 UC departmental academics from four campuses, specialists from 12 academic departments, farm advisors from over 20 counties, and nearly 40 external

stakeholders in issue-oriented planning meetings and co-sponsored research, demonstration, and extension initiatives.

These activities and results continue to demonstrate the acceptance and strength of sustainable agriculture goals in our farm and food communities. We have recently estimated that the majority of California's farmers and ranchers will be using biologically integrated and organic production systems by 2025 [see Swezey and Broome, *California Agriculture* 54 (4) 26-35, 2000].

If these trends are to continue, new resources must be directed toward sustainable agriculture research and education in California. At this time, no new state or UC funds are in the pipeline to support new grant initiatives or to continue the BIFS, alternatives to methyl bromide, or organic farming research and education programs at SAREP. The continuation of successful extension and demonstration models with clear environmental and community benefits is at risk. Assemblywoman Helen Thomson (D-Davis), author of the state's most recent sustainable agriculture bill (AB 2663 signed by Governor Davis, September 2000), said in requesting the Regents of the University of California to adequately fund sustainable agriculture programs:

UC SAREP has evolved into one of the nation's leading centers for on-farm research and assistance to growers who are seeking ways to make their agricultural operations more sustainable and improve their business long-term profitability.

California's citizens, especially farmers and ranchers under multiple economic, environmental, and social pressures, urgently need and deserve increased support from our public institutions to ensure the future sustainability of agriculture in California.

Sean L. Swezey, Director

# Mission and Goals

The *UC Sustainable Agriculture Research and Education Program (SAREP)* was created through the grass roots efforts of organizations and individuals concerned about the environmental impacts of agriculture, the health of rural communities, and the profitability of family farming operations in California. As a result of a legislative process and with UC leadership, the program was established by the UC Regents with three mandates: to administer competitive grants for research on sustainable agricultural practices and systems, to develop and distribute information through publications and on-farm demonstrations, and to support long-term research in sustainable farming systems on UC lands.

## MISSION STATEMENT

SAREP provides leadership and support for scientific research and education in agricultural and food systems that are sustainable; that is, are economically viable, conserve natural resources and biodiversity, and enhance the quality of life in the state's communities. SAREP serves farmers, farmworkers, ranchers, researchers, educators, regulators, policy makers, industry professionals, consumers, and community organizations across the state. SAREP is a Statewide Special Program within the UC Division of Agriculture and Natural Resources.

**Based on our overall mission and the founding legislation, SAREP has two goals:**

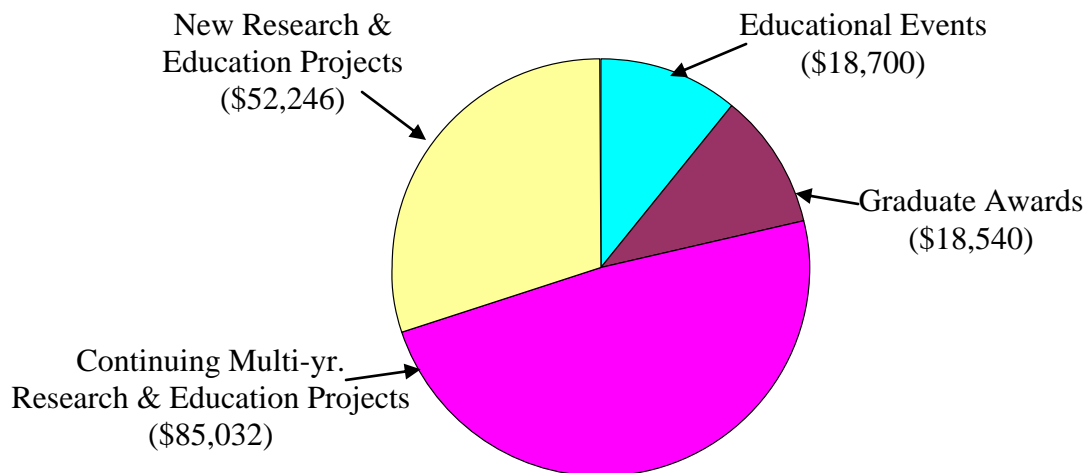
- To assist California farmers and ranchers in developing and implementing sustainable production and marketing systems; and
- To support California's rural and urban communities in understanding the concept and value of sustainable agriculture and participating in sustainable food and agricultural systems.

# Program Overview

## COMPETITIVE GRANTS

SAREP administers several competitive grants programs for research and education in sustainable agriculture. Grant criteria and requests for proposals are available at the SAREP Web site ([www.sarep.ucdavis.edu](http://www.sarep.ucdavis.edu)) or by calling SAREP at (530) 752-7556. During FY 1999-2001, SAREP dedicated \$174,518 of state funds to its research and education competitive grants program.

### **SAREP Allocation of FY 99-01 State Funds to Competitive Grants (Total = \$174,518)**



For the reporting period, FY 1999-2001, SAREP funded:

- 26 educational events in 2000/2001 totaling \$18,700, and
- 7 sustainable agriculture graduate awards in 2000/2001 totaling \$18,540.

In addition, SAREP used \$85,032 to fund 7 continuing multi-year research and education projects.

SAREP also selected new research and education projects in April 2001, which will be partially funded (\$52,246) by FY 00/01 reserve funds. (The balance will be funded by SAREP's FY01/02 grant funds.) These projects include:

- 4 new crop and livestock production projects totaling \$96,159,
- 4 community development and public policy projects totaling \$60,272, and
- 17 educational events totaling \$19,920.

During FY 1999-2001, SAREP also used extramural funds for new and continuing BIFS projects, Alternatives to Methyl Bromide projects and additional crop and livestock production projects.

## STAFF RESEARCH AND EDUCATION ACTIVITIES

Since 1999, SAREP has received approximately \$900,000 in extramural funds (see Financial Information, page 33) for research and education projects. Staff members have participated as program chairs, speakers, moderators, and organizers in workshops, conferences and educational events throughout the state. Results of SAREP's staff work have been published in peer-reviewed articles, books, extension bulletins, and databases. Staff profiles are available on SAREP's website. A staff list appears on page 31 of this report.

## SAREP ADVISORY COMMITTEES

The **Program Advisory Committee** (PAC) reviews grants for relevance to SAREP's mission and assists in long-range program planning. The **Technical Advisory Committee** (TAC) makes recommendations about the scientific merit of grant applications. The **BIFS Program Advisory Review Board** advises SAREP on the BIFS Program and makes recommendations about the funding of BIFS project proposals. Current lists of the PAC, TAC and BIFS committees are available on SAREP's web site and on page 32 of this report.

## NEWSLETTER AND WEB SITE ([www.sarep.ucdavis.edu](http://www.sarep.ucdavis.edu))

Three times a year, SAREP publishes the newsletter, *Sustainable Agriculture*. The newsletter includes reports on research projects, workshops and meetings funded by SAREP, as well as commentaries, updates on research and extension activities, technical reviews, and funding sources. The newsletter is available at the web site or by contacting the SAREP office.

The SAREP web site has recently been revised and updated. It includes an interactive events calendar, the most recent biennial report, past and current issues of the newsletter, and information on topics such as biologically integrated farming systems, organic farming research, community food security, cover crops, and soil quality. New to the site is a searchable database of all research and education projects funded by SAREP.



# Ensuring the Long-Term Viability of California Agriculture through Research and Education

California farmers and ranchers face a tremendous challenge as stewards of the state's land resource. As producers of a wide array of high-quality agricultural commodities valued at \$25 billion in 1999, California farmers are expected to sustain high productivity with minimal environmental impact. However, observers of the environmental and social conditions of agriculture and food systems in California are concerned with the sustainability of these systems. High urban growth rates have led to increased competition for the land, water and air resources necessary for production agriculture. Consumers are increasingly concerned about food security issues and are demanding roles in shaping sustainable food and agricultural systems. Farmers face increasing restrictions and prohibition of farming practices considered commonplace even five years ago. At the same time, production costs are rising and many commodity prices continue at low levels.

One of SAREP's major goals is to help the state's farmers and ranchers manage their land and businesses in ways that are profitable and protect the environment. The program does that through two means: 1) funding research and education projects that address critical needs and problems in our agricultural systems; and 2) developing and extending information on sustainable farming and ranching practices.

## ACCOMPLISHMENTS

Projects funded by SAREP continue to provide growers with key information on many components of sustainable farming. Some examples include:

- Chuck Ingels (UC Cooperative Extension, Sacramento County) compared the effects of several cover crop mixes in a Sacramento County vineyard in his project, **Effects of Cover Crops on a Vineyard Ecosystem in the Northern San Joaquin Valley**. Results showed that cover crops have little if any effect on fruit yield or quality. However, in some cases, a native grass cover may reduce vine vigor. This study also showed that growers should be cautious with the use of clovers, to which pocket gophers were strongly attracted. As confirmed by other cover crop research, the choice of cover crop species, and attentive management of the cover are critical components of developing a successful system.
- Rachael Long (UC Cooperative Extension, Yolo County) studied the activity of beneficial insects in hedgerows in her project, **Quantifying Pest and Beneficial Insects in Insectary Hedgerows**. Long's results showed that insectary hedgerows favored beneficial insects over pests by a ratio of three to one, in both years of the study. Buckwheat consistently had the highest numbers of beneficial insects per square foot, ceanothus, the lowest. Some pests were found in the hedgerows, but usually

mid- to late in the season, so the hedgerow plants were not contributing to the build-up of early season pests.

- Marsha Campbell Mathews (UC Cooperative Extension, Stanislaus County) developed a practical system for dairy operators to apply targeted amounts of nitrogen on their forage crops in her project, **“Use of Dairy Lagoon Water in Production of Forage Crops.”** Most dairies in California clean their holding pens using a flush system to wash the manure into a storage pond, commonly called a lagoon. The improper application of lagoon nutrients has the potential to result in contamination of groundwater. This lagoon water management system, using a nitrogen quick test, flow meter, and throttling valve, is being demonstrated in the BIFS dairy project (see BIFS section, page 20) to confirm that adoption of these practices will not result in loss of yields. Thomas Harter’s (UC Cooperative Extension, Kearney Agricultural Center) tandem project, **“Impact of Dairy Waste and Crop Nutrient Management on Shallow Groundwater Quality,”** monitored the groundwater quality responses to the improved manure management.
- James MacDonald (UC Davis Plant Pathology) is evaluating alternatives to methyl bromide for the ornamental industry in coastal California in his project, **Alternatives to Methyl Bromide for Control of Soil-borne Fungi, Bacteria and Weeds in Coastal Ornamental Crops.** MacDonald is researching the efficacy of biofumigation, an effect created by the decomposition of Brassicaceae (e.g., broccoli, cauliflower, mustards) in soil to release isothiocyanates (ITCs). An important component of this research focuses on identifying plant species that produce the most biologically-active decomposition products, and the periods in a plant’s development when the products peak. Through experiments carried out at Davis and Watsonville, researchers have found a beneficial effect of biofumigation, but the effect is inconsistent and efficacy does not approach that of metam sodium, the chemical treatment routinely used as a control standard. Continued work in this area will help better characterize the Brassicaceae and their ITCs to improve the reliability of biofumigation.

## COMPETITIVE GRANTS PROGRAM

SAREP has held closely to its mandate to support research and extension efforts relevant to the state’s farmers and ranchers. These projects address issues, problems, and opportunities in a variety of production systems across the state. Major project categories include soil management, pest management, livestock and dairy production, and cropping systems (see SAREP Funded Projects, below). The Biologically Integrated Farming Systems (BIFS) grants program is covered separately in this report.

In 1999, SAREP launched a special grants program targeting alternatives to methyl bromide. Methyl bromide has been identified as an ozone-depleting substance, and the U.S. Environmental Protection Agency has prohibited the production and importation of methyl bromide starting January 1, 2005. Although several potential chemical and non-chemical alternatives to methyl bromide have been identified, none have been adequately evaluated for their effectiveness within California farming systems. SAREP is supporting

six biologically based projects aimed at filling that information gap and helping producers prepare for the changes ahead. More information on the projects funded through this program can be found on the SAREP Web site at <http://www.sarep.ucdavis.edu/mebralt/>

## **GRANTS FOR GRADUATE STUDENTS AND EDUCATIONAL EVENTS**

In addition to grants for production-oriented research, SAREP also provides grants for graduate student research and for educational events.

### ***Sustainable Agriculture Graduate Awards***

The Sustainable Agriculture Graduate Awards (SAGA) complement existing graduate support funds within the university and help graduate students address critical issues facing agricultural producers and society. In FY 2000/2001, seven graduate students were awarded a total of \$18,540 for sustainable agriculture projects. A list of the SAGA grants funded in this reporting period appears later in this section.

### ***Educational Events***

Educational grants are awarded to individuals and organizations to conduct workshops, field days, and other instructional events related to sustainable agriculture. In 2000/2001, SAREP supported 26 educational events by providing a total of \$18,700 in grants to Cooperative Extension personnel and non-profit educational organizations. Grants of \$1,200 maximum per event supported workshops, field days, conferences and other educational activities addressing sustainable farming and ranching and community economic development. An additional 17 events were selected for funding in the 2001/2002 fiscal year for a total of \$19,920. A portion of the 2001/2002 funds were provided by the UC Statewide Integrated Pest Management (IPM) Project and the International Tree Crops Institute. As an indicator of the outreach effectiveness SAREP has achieved through these grants, final reports from 2000/2001 grants show that approximately 1,500 individuals participated in the events funded that year. Lists of the educational events funded in 2000/2001 and the new projects selected for 2001/2002 are included at the end of this section.

## **SAREP FUNDED PROJECTS: RESULTS**

The latest information on SAREP funded projects is available on our Web site in two locations.

### **Funded Projects Database**

<http://www.sarep.ucdavis.edu/grants/database>

The database includes summaries of Progress or Final reports on all SAREP funded projects.

### **Project Reports**

<http://www.sarep.ucdavis.edu/grants/Reports>

This page has links to full reports of selected projects.

### New Projects Selected in 2001

During the spring of 2001, four new research and education projects related to crop and livestock production were selected for funding in 2001-2003 for a total of \$96,159.

These projects, which will be partially funded by FY 00/01 reserve funds, were chosen in the priority topic area: *Optimizing organic and biologically integrated farming systems*. Descriptions of the projects, principal investigators, contact information and amounts awarded follow.

- Chris van Kessel, Professor, UC Davis, agronomy and range sciences, **“Rice Straw Management as a Means to Control Weed and Pest Pressure in California Rice Fields”**: \$37,956 (July 01 - June 03). This project will fully explore the use of alternative straw management practices, such as incorporation of rice straw back into the soil, as a stimulant for biological pest and weed control in rice fields. Researchers will: 1) characterize the impact of winter flooding and straw incorporation on invertebrate pest populations and determine the potential for increased reliance on biological controls; and 2) quantify the impact of waterfowl on the size of the weed seed bank and the weed populations at harvest. The results will serve as the basis to evaluate current pest management practices, and provide the necessary scientific foundation for additional on farm demonstrations of alternative pest management practices emphasizing biological control. (530) 752-4377; cvankessel@ucdavis.edu
- Marsha Campbell Mathews, UC Cooperative Extension farm advisor, Stanislaus County, **“Protecting Groundwater Quality on Dairies by Proper Lagoon Nutrient Management”**: \$21,580 (July 01 - June 03). Most dairies in California clean their holding pens using a flush system to wash the manure into a storage pond, commonly called a lagoon. The improper application of the nutrients in the lagoon water has the potential to result in contamination of groundwater. In a previous SAREP funded project conducted by Mathews (98-01), techniques were developed which enable dairy operators to measure the organic nitrogen in the lagoon water, and to apply lagoon nitrogen at rates very close to crop uptake. This project will continue to study the precise application of lagoon nutrients to determine if it is possible to achieve drinking water quality in shallow groundwater in a situation with a prior history of overapplication of manures. A second research site will be established in a location with minimal history of manure application to confirm that dairy lagoon nutrients can be used as a sustainable nutrient source for crops without compromising groundwater quality or yields in the absence of high background nitrogen in the soil. (209) 525-6800; mcmathews@ucdavis.edu
- Milton E. McGiffin, Jr., UC Cooperative Extension Specialist, UC Riverside, botany and plant sciences, **“The Organic Effect in Desert Vegetable Production”**: \$20,000 (July 01 - June 02). This project will quantify what is often called “the organic effect,” i.e., the positive changes that result from the transition to organic production practices. By documenting the differences in production systems, this project will address the frequent questions about the effect of organic farming on yield, fertility, and costs. This research is part of a multidisciplinary effort that also investigates soil

microbial ecology and weed population dynamics. (909) 560-0839;  
milt@ucrac1.ucr.edu

- David J. Lewis, UC Cooperative Extension watershed management advisor, Sonoma County, **“Management of Corrals and Pastures to Reduce Pollutant Loading to Coastal Watersheds”**: \$16,623 (July 01 - June 02). The goal of this project is to evaluate the effectiveness of animal waste management practices (vegetative buffers, dry lot and corral management, and other pasture management improvements) to reduce pollution. Researchers will sample and analyze storm runoff from corrals and pastures with different management practices including scraping and seeding for corrals and variation in quantity and timing of field-applied manure to pastures. Samples will be analyzed for fecal coliform, nutrients, total suspended solids, pH, electrical conductivity and turbidity. (707) 565-2621; djllewis@ucdavis.edu

### **Continuing Projects Funded in 1999-2001**

#### Production Agriculture Research and Education

- Thomas Harter, UC Cooperative Extension Hydrogeology Specialist, Kearney Agricultural Center, **“Impact of Dairy Waste and Crop Nutrient Management of Shallow Groundwater Quality,”** \$44,000 (Jan. 98 - July 01).
- Chuck Ingels, UC Cooperative Extension Farm Advisor, Sacramento County, **“Effects of Cover Crops on a Vineyard Ecosystem in the Northern San Joaquin Valley,”** \$18,272 (Jan. 98 - July 01).
- Rachael Long, UC Cooperative Extension Farm Advisor, Yolo/Solano Counties, **“Quantifying Pest and Beneficial Insects Associated with Insectary Hedgerow Plantings,”** \$14,000 (July 99 - June 01).
- Marsha Campbell Mathews, UC Cooperative Extension Farm Advisor, Stanislaus County, **“Use of Dairy Lagoon Water in Production of Forage Crops,”** \$46,210 (Jan. 98 - July 01).
- Jeff Mitchell, UC Cooperative Extension Vegetable Crops Specialist, Kearney Agricultural Center, **“Conservation Tillage Systems for the San Joaquin Valley’s West Side,”** \$38,322 (July 98 - June 02).
- Steve Temple, UC Cooperative Extension Specialist, Agronomy & Range Sciences, UC Davis, **“The Transition from Conventional to Low-Input or Organic Farming Systems: Soil Biology, Soil Chemistry, Soil Physics, Energy Utilization, Economics and Risk,”** \$24,393 (July 99 - June 00); \$526,690 (July 88 – June 00).

#### Alternatives to Methyl Bromide

- Greg Browne, Research Plant Pathologist, USDA, UC Davis, plant pathology, **“Cultural Control and Etiology of Replant Disorder of Prunus spp.”** \$165,702 (Aug. 00 - July 02).
- John Duniway, Professor and Plant Pathologist, UC Davis, plant pathology, **“Microbiological Improvement of Root Health, Growth, and Yield of Strawberry,”** \$130,658 (July 00 - June 02).
- Howard Ferris, Professor and Nematologist, UC Davis, nematology, **“Development of Grape Rootstocks with Multiple Nematode Resistance,”** \$110,818 (July 00 - June 02).
- Kirk Larson, UC Cooperative Extension Pomologist, South Coast Research and Extension Center, Irvine, **“Containerized Strawberry Transplants as a Replacement for Methyl Bromide Soil Fumigation in California Strawberry Nurseries,”** \$90,836 (July 00 - June 02).
- James MacDonald, Plant Pathologist, UC Davis, plant pathology, **“Alternatives to Methyl Bromide for Control of Soil Borne Fungi, Bacteria and Weeds in Coastal Ornamental Crops,”** \$83,851 (July 00 - June 02).
- Elizabeth Mitcham, Postharvest Pomologist, UC Davis, pomology, **“Acetaldehyde and Carbon Dioxide Fumigation for Postharvest Control of Insects on Strawberry Fruit,”** \$83,585 (July 00 - June 01).

#### **COLLABORATIVE RESEARCH AND EXTENSION ACTIVITIES**

SAREP works with a variety of clients and stakeholders both within and outside the University of California to educate producers, extension professionals, public policy makers and others about sustainable farming and ranching practices. SAREP staff have put a high priority on working collaboratively with colleagues in the UC Division of Agriculture and Natural Resources as well as with farmers, community organizations, and government agencies, to address issues of the sustainability of California’s agriculture. These outreach efforts complement and extend SAREP-funded research projects. Activities during the last two years include the following:

##### ***Director’s Research and Extension Activities***

The SAREP director allots 20 percent of his effort as an extension specialist in his research program in cooperation with the University of California, Santa Cruz Center for Agroecology and Sustainable Food Systems. SAREP Director Sean L. Swezey is actively involved in sustainable agriculture research and extension activities in the Central Coast region. These projects are designed to: 1) provide successful reduced-risk and organic farming principles to organic, transitional and conventional farmers considering conversion to sustainable practices and/or production for certified organic

markets; and 2) demonstrate the ongoing agronomic and economic feasibility of these new production technologies in an on-farm, whole-systems research approach. Practices demonstrated by the program include: release of insectary-reared natural enemies, conservation of native natural enemies; “farmscaping” for the support of biological control agents; and intensive monitoring and threshold-based decision-making to reduce pesticide applications. Staff-led research includes farm-level conversion from conventional to organic production systems (apples, artichokes, and cotton); biological control and non-crop farmscape vegetation for pesticide use reduction (cotton and strawberries); codling moth mating disruption (apples); and biointensive and organic production (strawberries).

### ***Adding Value to County Research and Extension Activities in Organic Farming Systems***

In cooperation with Cooperative Extension offices in Marin, Humboldt, and Stanislaus counties, SAREP, with environmental foundation support, developed new cooperative agreements supporting three-year county-based research associates in organic farming and soil health.

### ***New DANR Organic Farming Research Workgroup***

SAREP’s request for funding a new organic farming research workgroup was approved in 2001. Workgroup funds will support meetings, workshops, conferences, organic production manuals and support for the growing research needs of the organic farming community. Current membership includes 27 Division of Agriculture and Natural Resources (DANR) and 25 non-DANR representatives.

### ***Weather-Driven Plant Disease Risk Models***

With funding from US-EPA Region 9, SAREP is using PestCast weather data to improve the integrated management of Botrytis gray mold of strawberries and potentially reduce the reliance of the California strawberry production system on several fungicides under review due to the Food Quality Protection Act (FQPA) of 1996. PestCast is a regional weather network that supports the development, validation and implementation of plant disease models. A Botrytis infection model based on the interaction of hours of surface wetness and the average temperature during the wetness event was developed for use on grapes in the mid 1990s. It has undergone preliminary evaluation for its use in strawberries and shows great promise. Further independent validation and demonstration work is being planned in cooperation with growers involved in the Biological Agriculture Systems in Strawberries (BASIS) project.

### ***National Academy of Sciences Committee***

SAREP Associate Director Jenny Broome was selected in fall 2000 for a National Academy of Sciences (NAS) committee evaluating the quality, relevance and effectiveness of federally funded agricultural research, particularly agencies within the USDA’s Research, Education, and Economics mission (REE) area. Broome is a member of the subcommittee assessing research on environmental quality and harmonization of natural and agricultural resources. Other areas being evaluated include food and fiber

supply; food safety, diet and nutrition; and economic and social development in a global context.

### ***Professional Development Program***

With funding from the Western Region USDA Sustainable Agriculture Research and Education (SARE) program's Professional Development Program, SAREP has produced a variety of educational resources that advisors and Natural Resources Conservation Service field staff can use in working with their clientele around the state. Initial projects focused on developing educational materials on cover cropping and soil quality (see Selected Resources and Publications at the end of this report). A new project funded in 1999 is aimed at providing educational opportunities for pest control advisers (PCAs) interested in learning more about sustainable agriculture and ecological pest management. The focal point of the project is an online course titled *Ecological Pest Management in Grapes*. This interactive course provides PCAs a unique opportunity to enhance their skills and earn continuing education credits. With Professional Development Program funds, SAREP also provided several small grants to support professional development activities organized by UC personnel. Grants funded in 1999/2000 included workshops on vegetable production in the Salinas Valley, and organic farming in the San Joaquin Valley.

### ***Sustainable Management of the UC Davis Vineyard***

The UC Davis Department of Viticulture and Enology manages lands that are located along the Putah Creek Ecological Preserve, which comprises a riparian zone supporting many native plant and wildlife species. Since 1999, SAREP has assisted the vineyard manager, Richard Hoenisch, in the planning and implementation of a transition to more sustainable management. Practices include a range of cover cropping options, including different perennial and annual grasses, clovers, and other herbs. Currently, 60 of the total 140 acres are under some sort of cover-cropping regime, and the plan is to add at least another 20 acres in the fall of 2001. Hedgerow habitat plantings were added to approximately 1/2 acre of land during 2000-2001. Other features to be added through the proposed project include roadside and wetland plantings of native vegetation, medicinal and culinary herbs, detailed seasonal monitoring of pests, an evaluative system similar to that used in the "Positive Points System" of the Central Coast Vineyard Team, and interpretive brochures and signs to aid visitors.

### ***Native Pollinator Insects***

SAREP collaborated with Claire Kremen of the Center for Conservation Biology, Stanford University on a study, funded in part by the National Fish and Wildlife Foundation and the Mead Foundation, to investigate pollination ecology on organic vegetable farms in Yolo County. This study is assessing flower visitation by native solitary and bumblebees to strawberries, melons, and other crops. Also being evaluated are effects of wildlands and hedgerows on on-farm abundance and diversity of pollinators, with emphasis on native bees. Early data indicate that the native solitary bees *Halictus ligatus* and *Halictus tripartitis* frequently attend strawberry and watermelon flowers, with visitation rates often exceeding those for the domestic honeybee (*Apis mellifera*). There are positive statistical relationships between crop visitation by solitary



bees to the proximity of wildlands and to the vegetational diversity on adjoining field margins. Emphases during 2001 have been on use of chaparral, riparian, and other wildland plants by native bees, and foraging patterns of a native bumblebee through use of marked bees in containerized colonies.

### ***USDA Western Region SARE Conference***

SAREP had a significant role in the planning of a major sustainable agriculture conference, *Farming and Ranching for Profit, Stewardship, and Community*, held in Portland on March 7-9, 2000. SAREP Director Sean L. Swezey served as program co-chair and proceedings editor. SAREP worked with the sponsor of the event, the Western Region USDA Sustainable Agriculture Research and Education (SARE) program, to organize several breakout sessions, and also to produce the conference proceedings. The event brought together over 680 nationally known speakers, producers, researchers, agricultural extension agents and others from the Western U.S. and around the nation to share their sustainable agriculture successes, experiences and research results. The conference highlighted diverse research and education projects funded by the SARE effort, including university-based, on-farm and producer-directed work. The proceedings of this event, "Sustainable Agriculture: Continuing to Grow..." are available on the WSARE Web site ([www.wsare.usu.edu](http://www.wsare.usu.edu)).

### ***SAREP/FREP Conference***

In November 1999, SAREP co-sponsored the annual conference of the California Department of Food and Agriculture's Fertilizer Research and Education Program (FREP). The conference featured presentations and reports from projects funded through SAREP and FREP, focusing on the relationship between nutrient management and soil and environmental quality. Conference highlights included a panel on Total Maximum Daily Loads (TMDLs), the latest trend in water quality regulation, and breakout sessions on nutrient management for orchard crops, organic matter management, integrated vineyard management, and managing nutrients through irrigation technologies.

## **LISTS OF GRANTS FOR EDUCATIONAL EVENTS AND SAGA AWARDS**

### **2000-2001 Grants for Educational Events [16 grants (26 events); \$18,700]**

- John Anderson, California Native Grass Association. \$1,200. **"Techniques and Strategies for Using Native Grasses and Graminoids in Restoration Projects: A Practical Training Workshop."** Dates: 2-day workshop, September 2000. Location: San Diego. (530) 759-8458, [hedgefarm@aol.com](mailto:hedgefarm@aol.com)
- Janet Brown, Marin Food Policy Council. \$1,200. **"Marin Food Policy Council Facilitated Process for Revision of the Marin Countywide Plan."** Date: 1-day workshop in July 2000. Location: San Dominico School Conference Center, San Anselmo. (415) 488-9464, [janet@ecoliteracy.org](mailto:janet@ecoliteracy.org)
- Ken Churches, UC Cooperative Extension, Calaveras County. \$700. **"Calaveras GROWN Farm Conference."** Date: 1-day workshop, February 17, 2001.

- Location: Calaveras High School, San Andreas. (209) 754-6477, [cecalaveras@ucdavis.edu](mailto:cecalaveras@ucdavis.edu)
- Bill Frost, UC Cooperative Extension, Amador County. \$600. **“Noxious Weed Management in Amador County,”** Date: 1-day workshop in January 2001. Location: Amador County Fairgrounds, Plymouth. (530) 621-5509, [wefrost@ucdavis.edu](mailto:wefrost@ucdavis.edu)
  - Elaine Hiel, San Diego Hunger Coalition. \$2,400. **“Sustainable Home and Community Gardens.”** Dates: 1-day field trip in September 2000 and workshop series (6 days) fall 2000. Location: Chula Vista. (619) 692-8390, [ehiel@aol.com](mailto:ehiel@aol.com)
  - Carol Hillhouse, Department of Pomology, UC Davis. \$1,000. **“Capital Region School Gardens Share Day.”** Date: 1-day workshop on October 28, 2000. Location: Sacramento County. (530) 752-7655, [jchillhouse@ucdavis.edu](mailto:jchillhouse@ucdavis.edu)
  - Stephanie Larson, UC Cooperative Extension, Sonoma and Marin Counties. \$600. **“Maintaining Sustainable Coastal Beef Cattle Operations by Developing Local, Innovative Marketing Programs.”** Date: 1-day workshop held December 12, 2000. Location: Petaluma. (707) 565-2621, [slarson@ucdavis.edu](mailto:slarson@ucdavis.edu)
  - Diane Metz, UC Cooperative Extension, Solano County. \$1,200. **“Fairfield-Suisun Food Security Harvest Faire.”** Date: 1-day workshop on September 16, 2000. Location: St. Mark’s Lutheran Church, Fairfield. (707) 421-6792, [dlmetz@ucdavis.edu](mailto:dlmetz@ucdavis.edu)
  - Jeff Mitchell, Department of Vegetable Crops and Weed Science, UC Davis. \$1,200. **“Conservation Tillage Equipment Demonstrations: Innovative Strategies for Reducing Tillage in California’s Central Valley Row Crop Production Systems.”** Dates: Two 1-day conferences, May 2001. Locations: UC West Side Research and Extension Center, Five Points and UC Davis campus. (559) 646-6593, [mitchell@ucdavis.edu](mailto:mitchell@ucdavis.edu)
  - Richard Molinar, UC Cooperative Extension, Fresno County. \$1,200. **“IPM, Fertilizantes, y Cosechas para El Agricultor en el Valle.”** Date: 1-day workshop on December 12, 2000. Location: Andersen’s Pea Soup, Selma. (559) 456-7555, [rhmolinar@ucdavis.edu](mailto:rhmolinar@ucdavis.edu)
  - Kris O’Connor, Central Coast Vineyard Team. \$1,200. **“Exploring Environmental Labeling and Certification Programs for Sustainable Agriculture.”** Date: 1-day workshop, Winter 2000. Location: Paso Robles. (805) 462-9431, [info@vineyardteam.org](mailto:info@vineyardteam.org)
  - Kosal Ou, Central California Forum on Refugee Affairs. \$1,200. **“Community Gardens for Self-Sufficiency and Food Security: Sharing Best Practices and Models.”** Dates: Six 1-day workshops, September 2000 through May 2001. Locations: Fresno and Clovis. (559) 681-6603, [soulhikr@aol.com](mailto:soulhikr@aol.com)
  - Steve Schwartz, California FarmLink. \$1,200. **“Business Planning and Innovative Financing Strategies to Promote Intergenerational Farm Transitions.”** Date: Seminar, Winter 2001. Location: Northern California. (916) 443-4225, [farmlink@tomatoweb.com](mailto:farmlink@tomatoweb.com)
  - Catherine Sneed, The Garden Project. \$600. **“Open Garden 2000.”** Date: 1-day workshop, July 2000. Location: Bay View Hunter’s Point area, San Francisco. (415) 243-8558, [cathrinesneed@yahoo.com](mailto:cathrinesneed@yahoo.com)

- Steve Temple, Department of Agronomy and Range Science, UC Davis. \$1,200. **“Farming Systems Alternatives: Highlights of SAFS 12 Years.”** Date: 1-day workshop, July 7, 2000. Location: Agronomy Field Headquarters, UC Davis. (530) 752-8216, [srtemple@ucdavis.edu](mailto:srtemple@ucdavis.edu)
- Sujaya Udayagiri, UC Cooperative Extension, Santa Cruz County. \$2,000. **“Insect, Disease and Weed Monitoring and Identification Workshops for Limited-Resource Strawberry Growers on the Central Coast - 3 separate events.”** Date: 1-day workshop, March 23, 2001. Location: UC Cooperative Extension Auditorium in Salinas/Watsonville. (831) 763-8040, [sujaya@ucdavis.edu](mailto:sujaya@ucdavis.edu)

## **2001 Grants for Educational Events [12 grants (17 events) for \$19,920]**

### **Integrated Pest Management (funding through UC IPM)**

- Bruce Badzik, National Park Service, \$1,500. **“Urban Rodent Summit.”** Date: March 2002. Location: Fort Baker, Marin County. (415) 561-4831, [Bruce\\_a\\_badzik@nps.gov](mailto:Bruce_a_badzik@nps.gov)
- David Chang, Santa Barbara County Agricultural Commissioner’s Office, \$900. **“Noxious Weeds Workshop.”** Date/Location: TBA. (805) 681-5600, [Dchang@co.santa-barbara.ca.us](mailto:Dchang@co.santa-barbara.ca.us)
- Emily Chase Bueermann, Mariposa Elementary School PTA, \$1,500. **“All S.Y.S.T.E.M.S. Go! IPM in School Gardens Workshop.”** Date: September 29, 2001. Location: Redlands, CA. (909) 875-5945

### **Community Development / Community Food Systems (funding through UC SAREP)**

- Bob Roan, PlacerGROWN, \$1,500. **“PlacerGROWN Farm Conference.”** Date: February 3, 2002. Location: Lincoln, CA. (916) 823-7385
- Christina Carpenter, \$1,500. Sustainable Sonoma County, **“Sonoma County Food System/Farm-to-School Coalition Building 2001.”** Date: September 2001. Location: Santa Rosa. (707) 824-9791, [Sustain@sonic.net](mailto:Sustain@sonic.net)
- Robin Crown, Area Agency on Aging Serving Napa and Solano, \$1,500. **“A Community Forum: Framing the Future of Nutrition & Meal Delivery Services in Napa & Solano Counties.”** Date: October 26, 2001. Location: Fairfield, CA. (707) 644-6612, [Rlcrown@napanet.net](mailto:Rlcrown@napanet.net)
- Janine Hasey, UC Cooperative Extension Sutter-Yuba Counties, \$1,280. **“Certified Organic Tree Crops: Transition, Growing Practices & Markets.”** Date/Location: TBA. (530) 822-7515, [Jkhasey@ucdavis.edu](mailto:Jkhasey@ucdavis.edu)
- Steve Schwartz, California FarmLink, \$1,500. **“Business Planning & Innovative Financing Strategies to Promote Intergenerational Farm Transitions.”** Date/Location: TBA. (916) 443-4225, [Info@californiafarmlink.org](mailto:Info@californiafarmlink.org)
- Jennifer Baumbach, University of California Cooperative Extension Solano County, \$1,500. **“Solano County Jr. Master Gardener Educator Training.”** Date: October 6, 2001. Location: Fairfield, CA. (707) 435-2803, [Jmbaumbach@ucdavis.edu](mailto:Jmbaumbach@ucdavis.edu)
- Miguel Altieri, ESPM-Division of Insect Biology, \$1,450. **“Community Gardening & Seed Saving Workshop.”** Date: October 2001. Location: Berkeley, CA. (510) 642-9802, [Agroeco3@nature.berkeley.edu](mailto:Agroeco3@nature.berkeley.edu)

**Agroforestry (supported from a special donor-directed fund established through a grant from the International Tree Crops Institute USA Inc.)**

- Stephanie Larson, University of California Cooperative Extension Sonoma County, \$1,500. **“Designing Riparian Buffers for Rangelands to be used for Addressing TMDLs & Water Quality Issues in Sonoma & Marin Counties.”** Dates/Location: 3 meetings TBA. (707) 565-2621, [Slarson@ucdavis.edu](mailto:Slarson@ucdavis.edu)
- Vance Howard, Yolo County Resource Conservation District, \$4,290. **“Bringing Farm Edges Back to Life!”** (2 Field Meetings); **“Conservation Practices for Sustainable Agriculture & Riparian Buffer Strip Creation/Restoration,”** (2 meetings). Dates: TBA. Location: Yolo County. (530) 662-2037, [Howard@yolorcd.ca.gov](mailto:Howard@yolorcd.ca.gov)

**2000-2001 Graduate Student Awards (7 projects; \$18,540)**

- Emily Blanco, **"Investigation of Nest Trapping as a Means of Suppression of Argentine Ant (*Linepithema humile*) Populations,"** \$3,000. Department of Entomology, UC Davis. (530) 752-9977, [etblanco@ucdavis.edu](mailto:etblanco@ucdavis.edu)
- Peichen Chen, **"Analysis of Virulence in Root-Knot Nematode (*Meloidogyne hapla*) that Impacts Durability of Host Plant Resistance,"** \$2,890. Department of Nematology, UC Riverside. (909) 787-4436, [peichen@ucr.ac1.ucr.edu](mailto:peichen@ucr.ac1.ucr.edu)
- Yolanda Chen, **"Evaluating the Efficacy of a Native Parasitoid on its Lepidopteran Host on Wild and Domesticated Sunflower, *Helianthus annuus*,"** \$2,650. Division of Insect Biology, UC Berkeley. (510) 642-3989, [yoche@nature.berkeley.edu](mailto:yoche@nature.berkeley.edu)
- Eileen Cullen, **"IPM Decision Support to Reduce Reliance on Organophosphates for Stink Bug Control in Processing Tomatoes,"** \$3,000. Department of Entomology, UC Davis. (530) 752-4785, [emcullen@ucdavis.edu](mailto:emcullen@ucdavis.edu)
- Nicholas Madden, **"Conservation Tillage and Cover Crop Systems for Organic Processing Tomatoes,"** \$2,000. International Agricultural Development Graduate Group, UC Davis. (530) 754-8993, [nmmadden@ucdavis.edu](mailto:nmmadden@ucdavis.edu)
- Theresa Ward, **"Riparian Grazing Project: Identifying Riparian Grazing Management that Works,"** \$3,000. Department of Agronomy and Range Science, UC Davis. (530) 754-8988, [taward@ucdavis.edu](mailto:taward@ucdavis.edu)
- Keith Warner, **"From the Outside Looking In: Perspectives on California Sustainable Agriculture Movement from Key Policy Makers and Opinion Leaders in the State,"** \$2,000. Department of Environmental Studies, UC Santa Cruz. (831) 635-7302, [keithdw@cats.ucsc.edu](mailto:keithdw@cats.ucsc.edu)

# Engaging Farmers in Biologically Integrated Farming Systems (BIFS)

The BIFS program strives to demonstrate and expand the use of integrated farming systems that have been proven to reduce natural resource degradation of agricultural origin in economically viable ways.

BIFS projects use a systems approach to develop and disseminate innovative farming practices. This means that pest management, soil building, wildlife habitat, waste management, irrigation, and other crop and livestock management concerns are addressed in combination whenever feasible.

Demonstrations and adaptive research are conducted on-farm through partnerships that make full use of the expertise of farmers, advisors, extensionists and researchers.

## ACCOMPLISHMENTS

The BIFS program has funded nine projects in nine different farming systems. The adoption of biologically integrated systems has generated a number of benefits such as improved soil fertility, decreased erosion and nitrogen leaching, and increased populations of beneficial insects, fishes, migrant birds, and game. The BIFS Biennial Report (January 2001) is available on SAREP's website at <http://www.sarep.ucdavis.edu/BIFS/bifs01/>. Some of the achievements documented in the projects' November 2000 annual reports include:

- The successful elimination of wintertime sprays of diazinon—an organophosphate insecticide that has contaminated California rivers—on 877 experimental acres farmed by 33 prune growers statewide.
- A 57-pound per acre reduction in synthetic nitrogen fertilizer use between 1998 and 2000 on 324 acres of walnuts managed by 10 growers with no effects on yields. The use of cover crops and other organic sources of nitrogen in conjunction with monitoring of leaf nitrogen allowed growers to avoid yield reductions and to lower leaf nitrogen levels to healthy rates.
- Savings of approximately \$28 per acre and a probable reduction in nitrate leaching due to a 103-pound per acre reduction in synthetic nitrogen use without yield losses on 228 acres of silage corn in nine dairy operations.
- Three successive years of soil incorporation of rice straw and winter flooding allowing a 30-pound per acre reduction of synthetic nitrogen use on 45 acres of rice managed by four farmers without yield losses.
- The use of pheromone mating disruption on 311 acres in 11 apple orchards allowing a reduction in the use of organophosphates and carbamates of 59 and 92 percent, respectively.

Positive changes in farming practices are actually occurring on a much larger scale than reported above. Farmers participating in our projects will often change practices on most

of their acreage, not just in their demonstration plots. Additionally, many non-participating growers have been exposed to these innovative practices through BIFS projects' outreach efforts. Future grower surveys and analyses of pesticide use report data will show the extent to which these trends have extended to non-participating growers.

The BIFS program is part of a larger set of initiatives to which it has contributed significantly. Since 1993, the Community Alliance with Family Farmers (CAFF) has administered and continues to administer BIFS-like projects in almonds and walnuts. In 1998, the California Department of Pesticide Regulation began to fund the Pest Management Alliance, a program largely modeled on BIFS. The West Side BIFS project was instrumental in initiating a growing interest in conservation tillage among California growers.

### **COMPETITIVE GRANTS PROGRAM**

Three-year on-farm demonstration projects are selected for funding through the BIFS competitive grants program. Projects are selected based on clearly defined criteria outlined in a Request for Proposals. A 13-member advisory board reviews proposals and makes recommendations for funding to the SAREP director.

### **SAREP FUNDED PROJECTS**

A brief summary of projects funded during the FY1999-2001 reporting period is given below. More detailed information on each project is available at [www.sarep.ucdavis.edu/BIFS/](http://www.sarep.ucdavis.edu/BIFS/)

- Stuart Pettygrove, UC Cooperative Extension soils specialist in the Department of Land, Air and Water Resources at UC Davis, **“Integrating Forage Production with Dairy Manure Management in the San Joaquin Valley,”** \$300,484 (July 99 - June 02). In California's Central Valley, dairy manure has been identified as a source of nitrate contributing to groundwater pollution. By encouraging dairy farmers to manage manure as a valuable source of nutrients for forage crops grown and used in the same dairy, the project reduces environmental pollution while decreasing dairy production costs. Project farmers have been able to drastically reduce and in some cases, completely forego the application of synthetic nitrogen to their crops without affecting yields.
- Janet Caprile, UC Cooperative Extension Contra Costa County farm advisor, **“Integrated Pome Fruit Production in Contra Costa County,”** \$116,457 (Jan. 00 - Dec. 02). Rapid urbanization around apple orchards in Contra Costa County has led to agricultural-urban interface problems, with the use of pesticides being the primary concern. This project focuses on reducing the use of broad-spectrum insecticides in apple orchards through the use of mating disruption for codling moth control. With this approach, the project is able to reduce grower reliance on organophosphates, carbamates and other ecologically disruptive materials.
- Randall Mutters, UC Cooperative Extension Butte County farm advisor, **“Biologically Integrated Farming Systems in Rice,”** \$300,000 (Jan. 99 - Dec. 01).



Environmental issues such as air pollution from rice straw burning and the movement of pesticides into the Sacramento river as well as production problems arising from herbicide resistance and high production costs are requiring innovations in California rice farming. The rice project addresses these issues by demonstrating the viability of a variety of practices such as soil incorporation of straw, winter flooding, reduced synthetic nitrogen input, deep water and dry down, drill seeding, and winter cover crop. These practices reduce reliance on insecticides, herbicides and synthetic nitrogen, and offer a viable alternative to straw burning.

- Joseph Grant, UC Cooperative Extension San Joaquin County farm advisor, **“Expansion of the Biologically Integrated Orchard Systems Model to Northern San Joaquin Valley Walnut Orchards,”** \$154,160 (Jan. 99 - Dec. 01). To reduce pollution from the routine use of organophosphate insecticides and excessive use of synthetic nitrogen fertilizer on California’s 200,000 acres of walnut orchards, the project has developed a farming system which relies on insect pheromone, natural enemies of pests, cover crops, and monitoring. Outreach to area farmers and collaboration with the Community Alliance with Family Farmers and the walnut Pest Management Alliance ensures wide dissemination of project results.
- Thomas Chao, UC Riverside Extension Horticulturalist, **“Citrus Biologically Integrated Farming Systems,”** \$238,700 (July 99 - June 02). Certain citrus production practices in California’s Sierra foothills are thought to play a role in water pollution and soil erosion. The practices involved include the use of persistent pre-emergent herbicides and broad-spectrum insecticides, ground applied nitrogen, low irrigation efficiency and the year-round maintenance of bare orchard floors. The project is working with citrus growers to develop and disseminate alternative practices that rely on vegetative ground cover, natural enemies, least toxic pesticides, innovative fertilization and irrigation methods, and the systematic monitoring of nutrients, water and pests to improve farm management decision-making and optimize the use of natural resources.
- Gary Obenauf, Project Manager, **“California Prune Board, Integrated Prune Farming Practices,”** \$270,000 (Jan. 99 - Dec. 01). The prune BIFS project is a part of the larger Integrated Prune Farming Practices Program working with 33 prune growers in 10 counties in the Sacramento and San Joaquin valleys. The project focuses on reducing the use of dormant season organophosphate pesticides, increasing orchard monitoring activities, and reducing applications of synthetic nitrogen fertilizers.
- Carolee Bull, Research Plant Pathologist, USDA/Agricultural Research Service, **“Biological Agriculture Systems in Strawberries,”** \$300,000 (Jan. 99 - Dec. 01). Until recently and for the last 50 years, strawberry production in California was based on the use of methyl bromide, an ozone-depleting fumigant that is now nearly completely phased out. This project is identifying and promoting the use of strawberry cultivars, mulches and other cultural practices, and beneficial soil

microbes and arthropods that are compatible with the commercial production of strawberries in the absence of methyl bromide.

### ***Funding Sources***

The success of CAFF's Almond BIOS, a collaborative and interdisciplinary project in which SAREP participated, led the California Legislature to request the establishment of the BIFS program with Assembly Bill 3383 (Bornstein, Brown, and Snyder) in 1994. Since 1994, funds have been provided by the California Department of Pesticide Regulation's Food Safety Account, the U.S. Environmental Protection Agency, and the UC Division of Agriculture and Natural Resources. Further legislation (AB 1998, Thomson) signed in September 1998 expanded the goals and extended the time frame of the existing program and allocated additional state funding.

### **BIFS-RELATED COLLABORATIVE RESEARCH AND EXTENSION ACTIVITIES**

Since BIFS projects emphasize a collaborative and interdisciplinary approach, SAREP staff work closely with them, assisting with project outreach efforts and providing natural and social science technical support. Staff also provide technical assistance by presenting at field days, assisting with customized farm plans, and reviewing and editing publications. SAREP also cooperates in applied research and extension activities with BIFS and BIFS-like projects around the state. Recent projects include the following:

#### ***The BIFS Workgroup***

SAREP is a Statewide Special Program of the University of California Division of Agriculture and Natural Resources (DANR). DANR provides funding and institutional support for workgroups in high priority areas of research and extension. Workgroups bring together Agricultural Experiment Station (AES) and Cooperative Extension (CE) personnel along with non-DANR partners to work on emerging and continuing priority issues in DANR program areas. In 1999, DANR ratified a BIFS Workgroup and has provided funding so that it can serve as a forum for BIFS and other similar projects (not funded by SAREP) to share ideas, resources, and experience. Under the auspices of this workgroup, SAREP has set up a BIFS Workgroup email listserv ([bifs@ucdavis.edu](mailto:bifs@ucdavis.edu)) which facilitates communication among projects. Workgroup meetings also encourage the sharing of experiences among BIFS, CAFF and California Department of Pesticide Regulation personnel, and UC faculty and specialists with interests in non-traditional agricultural extension. The workgroup currently has 109 BIFS listserve members and 43 active members, 25 of whom are UC DANR staff or faculty. Archives of listserv communications can be viewed at <http://listproc.ucdavis.edu/archives/bifs/>. Due to the intensive data management aspects of these agricultural chemical risk/use reduction regional demonstration projects, the workgroup has focussed on database training and also support for the creation of commodity-specific databases to handle monitoring and agricultural chemical data. The purpose of the databases is to increase the efficiency and ease of intensive monitoring and reporting activities by Field Scouts and Pest Control Advisors using biologically integrated farming methods. In addition, project impact assessment activities have been supported by the workgroup, such as the development of a pilot survey instrument for the rice BIFS project. Currently, the results of this farming



practices survey are being analyzed. Additional surveys of prune, dairy and walnut growers are under development. Pesticide use reporting analysis for BIFS projects has also been partially funded by the BIFS Workgroup, although the majority of funds are being provided by US-EPA.

### ***Partnerships with the Pest Management Alliance (PMA) and Biologically Integrated Orchard Systems (BIOS)***

SAREP collaborates and shares experiences in a variety of ways with programs from other organizations that have goals similar to those of the BIFS program. Staff from the BIFS program, the BIOS projects of the Community Alliance with Family Farmers and the Pest Management Alliance of the California Department of Pesticide Regulation sit on each other's advisory boards and project management teams, and participate in the BIFS Workgroup. These three programs sometimes maximize their impact by administering projects in the same commodity, as is the case, for example, with walnuts. More information on the PMA program is available at:

[www.cdpr.ca.gov/docs/empm/alliance/overview.htm](http://www.cdpr.ca.gov/docs/empm/alliance/overview.htm) and on the BIOS program at [www.caff.org/caff/programs/ag\\_community.html#bios](http://www.caff.org/caff/programs/ag_community.html#bios)

SAREP serves as a technical advisor to the Department of Pesticide Regulation's (DPR) Statewide Pest Management Alliances (PMA) in Winegrapes. The target of this three-year project is sulfur and weed management. There have been incidences of sulfur dust drifting into sensitive areas including school zones and public highways, and herbicides used in grape production have been found in groundwater in some areas of the state. This program aims to develop more sustainable practices through building on past successful efforts like the Biologically Integrated Farming Systems (BIFS) project of the Lodi Woodbridge Winegrape Commission. The PMA will focus its first efforts on demonstration and outreach related to sustainable sulfur use and reduced-risk weed management. In addition to the funding from DPR, more than 50 percent of the project costs are shared by the California Association of Winegrape Growers (CAWG) and by in-kind contributions of time and expertise from regional winegrape organizations. CAWG is providing administrative leadership for the project.

### ***Agricultural Partnerships Conference***

SAREP joined with U.S. Environmental Protection Agency (Region 9), California Department of Pesticide Regulation, California Department of Food and Agriculture, USDA Western Region Sustainable Agriculture Research and Education (SARE) program, and the Clarence E. Heller Charitable Foundation to sponsor a conference on *Partnerships for Sustaining California Agriculture: Profit, Environment and Community* on March 27-28, 2001. The conference, attended by over 230 participants, highlighted innovations in agricultural production, research and extension activities that are profitable as well as environmentally friendly. BIFS projects were highlighted and profiled throughout the conference. Speakers, panel discussions, and workshops focused on efforts to implement "win-win" strategies that merge agricultural and environmental concerns. Audio files of keynote presentations are available at [www.sarep.ucdavis.edu/events/](http://www.sarep.ucdavis.edu/events/). Proceedings from the conference will be available in January 2002 at [sarep@ucdavis.edu](mailto:sarep@ucdavis.edu).

### ***Pesticide Use Reporting Conference***

The California Department of Pesticide Regulation (DPR) sponsored the first ever conference on pesticide use reporting in California entitled “California's Pesticide Use Reporting System: Public Access, Data Quality, and Utilization.” SAREP was a co-sponsor of the conference, which took place on May 8, 2000 at the California State University, Sacramento. Additional co-sponsors included the U.S. Environmental Protection Agency, California Department of Food and Agriculture, California Agricultural Commissioners Association, and the University of California's Pesticide Impact Assessment Program, the UC Statewide IPM Project, and the College of Agriculture and Environmental Sciences at UC Davis. DPR's Pesticide Use Report (PUR) is the largest and most complete database on pesticide use in the world. Since 1990, DPR has collected information on every pesticide application by growers and commercial pesticide control operators in California. Many other states and countries are looking to this pesticide use reporting system and the resulting database as a model. The conference highlighted how the PUR is used for a wide variety of environmental and public health purposes including risk assessments, promoting farm worker health and safety, analyzing human exposure patterns, protecting threatened and endangered species, monitoring and investigating environmental issues, improving pest management, and evaluating the impact of reduced-risk and use demonstration projects. In addition, the conference addressed issues such as the meaning of the data fields, how the data were collected, and the quality and completeness of the data. It was attended by over 200 interested individuals including state and federal regulators, county agricultural commissioners, university and other academic organizations, environmental and public health organizations, commodity groups and growers, and pest control operators and advisors as well as other interested parties.

### ***Regional Initiatives in Sustainable Vineyard Management***

SAREP has worked with the Central Coast Vineyard Team (CCVT) since 1995. The CCVT is a tri-county grower group whose mission is to promote sustainable vineyard practices along California's Central Coast. CCVT members own or manage over 30,000 acres of Central Coast winegrapes. The CCVT has developed the Positive Points System (PPS) — a 1,000-point assessment system for evaluating adoption of sustainable farming practices for a single farm or region and over time. The PPS, through a series of questions, outlines a model vineyard that integrates soil, water, pest, and viticultural practices. The model vineyard is designed to be less dependent on chemical inputs and rely on biological systems. This integrated production system could eventually be used as the basis for a regional “eco” label for winegrapes. For more information see the Web site at [www.vineyardteam.org/index.html](http://www.vineyardteam.org/index.html)

### ***Earthworms and Other Decomposers in BIOS Organic Walnut Orchards***

SAREP collaborated with Birgitta Rämert of the Swedish Agricultural University in Uppsala and several other scientists on a study involving the role of nightcrawler earthworm (*Lumbricus terrestris*) in residues of leguminous cover crops. The work included laboratory and field components, and the data indicated that the addition of *L. terrestris* to the resident complex of earthworms significantly increased the rate of

disappearance of woolypod vetch (*Vicia villosa* ssp. *dasycarpa*) litter. Other decomposers that feed on vetch litter included various isopod Crustacea and European earwig.

***Increasing the Adoption of Sustainable Agriculture in the Central Valley***

SAREP is collaborating with the Community Alliance with Family Farmers, the Lodi-Woodbridge Winegrape Commission and UC researchers in a project funded by USDA's Fund for Rural America to study why farmers adopt sustainable agriculture practices and how community links might be strengthened to support adoption. Farmers in the Biologically Integrated Orchard Systems (BIOS) program and community stakeholders in Stanislaus and Merced counties have been interviewed to identify current and potential links in the areas of farmland preservation and local marketing. A community outreach project that is building bridges between a school food service director in Atwater and local farmers is underway. Other outreach efforts include the Small Farm Celebration in the fall 2001 in Modesto, and discussion with UC Merced planners about their agricultural policy.

***Reduced Disturbance Agriculture For Field Crops In California***

A grant from the US Environmental Protection Agency Pesticide Environmental Stewardship Program has supported SAREP work on this subject. The work has involved farm visits in the Sacramento, San Joaquin, and Salinas Valleys to assess farmer innovation to reduce tillage and add non-crop, field-border biodiversity to their operations. SAREP staff are preparing a detailed report that will profile the farmers as well as scientific literature on these and related subjects.

# **Linking Farmers, Consumers and Communities through Sustainable Community Development and Public Policies**

Since 1991, SAREP has provided resources for sustainable community development and public policies that forge creative links between farmers, consumers and communities.

SAREP supports collaborative efforts that shape community food systems and policies in which sustainable food production, processing, distribution and consumption are integrated to enhance the economic, environmental and social health of a particular locale.

Such projects include: direct or local marketing activities; consumer education about local sustainable agriculture; community food security projects; economic development that creates local food and agriculture related enterprises; urban agriculture projects; food policy council development; land, water or pesticide use policy analyses; food- or watershed analyses that involve local residents in decision-making; farm labor analyses; and economic or policy analyses that encourage growers, processors, retailers and others to support a transition to sustainable food and agricultural systems.

## **ACCOMPLISHMENTS**

Community development and public policy projects have benefited farmers, consumers and communities by helping to maintain small- and medium-scale family farm income; bringing fresh fruits and vegetables to urban areas, including low-income neighborhoods; teaching youth about sustainable farming systems and where their food comes from; and providing data on land use options to citizens and policymakers. Recent accomplishments during FY1999-2001 include:

- The Willard Greening Project in Berkeley contributed to the development of the Berkeley Food Systems Project, a national model of a farm-to-school program in which school districts purchase foods directly from the region's farmers. Not only does this program provide quality produce for school children's lunches, it also provides a stable institutional market for local agricultural producers.
- GIS maps to assess present and future patterns of vineyard development in Sonoma County were used to evaluate proposed and adopted regulations and the risk of habitat loss and fragmentation. This information was used by a multi-stakeholder committee charged with developing Sonoma County's Vineyard Erosion and Sediment Control Ordinance, the County Board of Supervisors, and disseminated to the public through the press and peer reviewed publications.

## **COMPETITIVE GRANTS PROGRAM**

Research and education grants are funded for one to three years and range from \$5,000 to \$25,000. SAREP also funds smaller grants for graduate students and educational events

in these areas. Requests for Proposals can be downloaded from the Web site at [www.sarep.ucdavis.edu/grants/request.htm](http://www.sarep.ucdavis.edu/grants/request.htm).

## **SAREP FUNDED PROJECTS: RESULTS**

The latest information on SAREP funded projects is available on our Web site in two locations.

### **Funded Projects Database**

[www.sarep.ucdavis.edu/grants/database](http://www.sarep.ucdavis.edu/grants/database)

The database includes summaries of progress or final reports on all SAREP funded projects.

### **Project Reports**

[www.sarep.ucdavis.edu/grants/Reports](http://www.sarep.ucdavis.edu/grants/Reports)

This page has links to full reports of selected projects.

## **New Projects Selected in 2001**

During the spring of 2001, four new research and education projects related to community development/public policy were selected for funding in the period 2001-2003 for a total of \$60,272. These projects, which will be partially funded by FY 00/01 reserve funds, are summarized below.

- Patricia Allen, assistant director, UC Santa Cruz Center for Agroecology and Sustainable Food Systems, **“Perspectives and Strategies of Alternative Food Initiatives in California”**: \$19,360 (July 01 - June 02). This project will examine the range of new civic organizations addressing alternative food systems issues in California. Researchers will seek to discover what participants have learned through their practices about how the food system works, how to change it, and how participants view their efforts within the history of development of these initiatives. Different visions of food system alternatives that these organizations propose will be assessed, as well as the issues and problems confronted and the methodologies used. (831) 459-4243; [rats@cats.ucsc.edu](mailto:rats@cats.ucsc.edu)
- Aaron Shonk, resource manager, Davis Joint Unified School District, Davis, CA, **“Davis Joint Unified School District Farm-to-School Program”**: \$10,000 (July 01 - June 02). In collaboration with local farmers and organizations such as the Davis Farmers’ Market, the Davis Joint Unified School District developed a pilot project for a Farm-to-School program in three elementary schools. The Farm-to-School program provides children with a lunch choice of a farmers’ market salad bar known as the “Crunch Lunch,” which is a complete balanced school meal with seasonal fresh fruit and vegetables grown on local sustainable farms. The program links school curriculum with an instructional garden, recycling activities, a vermicomposting (worm) food waste diversion system, farm visits, and cooking in the classroom. Through participation in these activities, students learn to understand and appreciate the source of their food. This project enables the school district to educate the public

about sustainable agriculture practices and work toward a districtwide food policy. (530) 757-5300 ext. 121; [ashonk@djusd.k12.ca.us](mailto:ashonk@djusd.k12.ca.us).

- Toni Martin, food service director, Winters Joint Unified School District, Winters, CA “**Linking Education, Agriculture and Foodservice (LEAF)**”: \$15,872 (July 01 - June 02). In order to extend direct marketing options for local family farmers, improve students’ food choices during lunch, and educate young consumers and their parents about the agricultural systems that produce the food they eat, this pilot project tests the feasibility of beginning a farm-to-school salad bar at a local elementary school as a one-day-per-week option to the regularly served hot lunch. At the end of the year, a planning team of parents, teachers, school district and food service personnel will assess the program and determine whether it can be expanded. (530) 795-6160; [tmartin@winters.K12.ca.us](mailto:tmartin@winters.K12.ca.us)
- Dana Harvey, director, Environmental Science Institute, Oakland, “**West Oakland Food Security Council Model**”: \$15,040, (July 01 - June 02). The first goal of this project is to create a food security council model that will serve as a public voice to raise awareness and understanding of food security. The council, organized with an active advisory board, community agency representatives, and community members from seven West Oakland neighborhoods, will bring sustainable agriculture into the community through community- and entrepreneurial-based demonstration projects, and through a comprehensive education and outreach campaign. The council will also develop a comprehensive food system plan and work to implement the identified strategies to improve access to food and revitalize the community. Using a variety of outreach methods including workshops and community meetings, the council will mobilize food security action. (510) 534-7657; [envsciinst@earthlink.net](mailto:envsciinst@earthlink.net)

### **Continuing Projects Funded in 1999 - 2000**

- Yolanda Huang, Project Coordinator, **The Willard Greening Project**, Willard Middle School, Berkeley, \$66,107 (Jan. 98 - July 01)
- Adina Merenlender, Area Natural Resource Specialist, Hopland Research and Extension Center **Mapping and Forecasting Expanding Vineyards: Integrating Agricultural, Economic, and Environmental Data at a Landscape Scale to Improve Land-Use Decision-Making**, \$80,200 (Nov. 96 - June 00)

### **COLLABORATIVE RESEARCH AND EXTENSION ACTIVITIES**

SAREP is engaged in applied research and extension projects that support the development of sustainable agriculture and community food systems. SAREP staff are partnering with community-based organizations, university researchers, and Cooperative Extension personnel throughout California and nationwide to support, assess and document local food and agriculture systems. Some of the recent research and extension activities include:

### ***Food Systems Partnership in Alameda County***

SAREP has partnered with Alameda County Cooperative Extension and the Expanded Food and Nutrition Education Program (EFNEP) to share resources for a new food systems analyst in Alameda County. The analyst, Sheila Duffy, will work collaboratively with university researchers and community groups to enhance community food security for Alameda County residents through research, education, outreach and technical assistance. SAREP is providing technical assistance, guidance, support, resources and important connections between urban and farming communities. SAREP is also assisting with fundraising for local and statewide collaborative activities.

### ***Farm-to-School Project***

SAREP is a partner with Occidental College, the Community Food Security Coalition, Pennsylvania State University, Cornell University, Rutgers, the California Department of Education, the Davis Joint Unified School District and the Community Alliance with Family Farmers in a \$2.1 million USDA-funded project to pilot and evaluate farm-to-school projects in three states. SAREP will also analyze policy and institutional barriers, provide outreach, training and technical assistance to school districts, farmer groups and communities, and identify future farm-to-institution opportunities. SAREP's role is to evaluate the Yolo County effort, currently in schools in Davis and Winters.

### ***Connecting Farmers to Direct Marketing Niches***

SAREP is collaborating with five western states (Idaho, Oregon, Hawaii, Guam and Colorado), to conduct statewide direct marketing workshops, establish marketing networks and develop a resource guide and curriculum. SAREP will conduct two workshops in California in 2002, one in conjunction with the well-known California Farm conference. SAREP has developed a database for direct marketing resources and will collaborate with the Sustainable Agriculture Network to expand it to a national tool.

### ***Community Food Security***

SAREP is an active partner in the UC Division of Agriculture and Natural Resources (DANR) Food Security Workgroup. A successful statewide symposium and tour included more than 100 participants at UC Berkeley in October 2000. Since 1997, SAREP has been an active partner with the Community Food Security Coalition and the USDA in facilitating training workshops about community food security practices and projects in California and throughout the nation. SAREP is collaborating on an evaluation of another USDA-funded project in West Sacramento, the *Project Field: Promoting Cross-Cultural Community Food Security*, an ethnic school garden project that includes a job training component and small-scale farming opportunities.

### ***Farmers Markets as Small Business Incubators***

With a USDA Fund for Rural America grant, SAREP collaborated with researchers at Cornell University and Iowa State University to study the role of farmers markets in promoting community development and stimulating the growth of small businesses. The three-phased study included surveys of market managers, market vendors and case studies of innovative markets in each state. Three California case studies appear on SAREP's Web site (Community Development/Public Policy section); and an article on

the California market managers survey appeared in *California Agriculture* (Nov/Dec 1999).

### ***Increasing the Adoption of Sustainable Agriculture in the Central Valley***

SAREP is collaborating with the Community Alliance with Family Farmers, the Lodi-Woodbridge Winegrape Commission and UC researchers in a project funded by USDA's Fund for Rural America to study why farmers adopt sustainable agriculture practices and how community links might be strengthened to support adoption. Farmers in the Biologically Integrated Orchard Systems (BIOS) program and community stakeholders in Stanislaus and Merced counties have been interviewed to identify current and potential links in the areas of farmland preservation and local marketing. A community outreach project that is building bridges between a school food service director in Atwater and local farmers is underway. Other outreach efforts include the Small Farm Celebration in the fall 2001 in Modesto, and discussion with UC Merced planners about their agricultural policy.

### ***Local Food Systems and Sustainable Community Indicators***

SAREP is part of a national study with 18 other land grant universities to examine local food systems in a global environment. Foodshed studies will be completed in three counties in California—Placer, Stanislaus and Alameda. Each county study includes an assessment of the current food and agricultural system, an analysis of sustainable food system initiatives and policies, and the selection of sustainable food system benchmarks for measuring progress toward a more sustainable community. A data template has been completed for those in other counties or states interested in gathering similar indicators. This study is funded through USDA Hatch Act funds.

### ***Berkeley Food Security Project Evaluation***

SAREP completed an evaluation of the Berkeley Food Systems Project, a three-year USDA-funded Community Food Security project, which is forming a local food policy council and incorporating more produce from regional farmers into the Berkeley Unified School District's school food service. For a brief summary of the project, see the article in *California Agriculture* (Sept/Oct 2000).

### ***Mutual Assistance Network's Entrepreneurial Nursery/Garden Project***

SAREP is providing technical assistance to the Mutual Assistance Network in Sacramento on the development and implementation of a neighborhood nursery and school gardens. Youth are being trained in urban agriculture, horticulture and marketing and business development.



## **SAREP Staff**

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†Part-time position.

**2001 Program Advisory Committee**

Dante Benedetti	Clover-Stornetta Farms, Petaluma
Stacie Clary	California Sustainable Agriculture Working Group, Santa Cruz
Tess Dunham	California Farm Bureau Federation, Sacramento
William Lacy	University Outreach & International Programs, Davis
David Lighthall	California Institute for Rural Studies, Davis
Mark Lipson	Organic Farming Research Foundation, Santa Cruz
Craig McNamara	Sierra Orchards, Winters
Art Naldoza	La Cooperativa, Sacramento
Karen Ross	California Association of Winegrape Growers, Sacramento
Frank Tamborello	Coalition to End Hunger & Homelessness, Los Angeles
Diego Vasquez	AMO Organics, Salinas

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Edith Allen	Botany & Plant Sciences, UC Riverside
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Holly Brown-Williams	California Policy Research Center (UC systemwide), Berkeley
Kent Daane	Biological Control, Kearney Agricultural Center, Parlier
Maria de la Fuente	UC Cooperative Extension, Santa Clara County
Melanie DuPuis	Sociology, UC Santa Cruz
Lucrecia Farfan-Ramirez	UC Cooperative Extension, Alameda County
William Horwath	Land, Air & Water Resources, UC Davis
Jim Oltjen	Animal Science, UC Davis
Phil Osterli	UC Cooperative Extension, Stanislaus County
John Phillips	Crop Science, Cal Poly, San Luis Obispo
Mike Stanghellini	Plant Pathology, UC Riverside
Rachel Mabie Surls	UC Cooperative Extension, Los Angeles County
Cheryl Wilen	UC Cooperative Extension, San Diego County

**2001 BIFS Program Advisory Review Board**

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Sherman Boone	Almond Grower, Denair
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Stephen Griffin	Misionero Vegetables, Salinas
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Judy Stewart-Leslie	Pest Control Adviser, Exeter
Kathy Taylor	US-EPA Region 9, San Francisco
Steven Weinbaum	Pomology, UC Davis
Dawit Zeleke	The Nature Conservancy, Sacramento River Project, Chico

**Alternate Members**

Ann Thrupp	US-EPA - Region 9, San Francisco
Belinda Messenger	California Department of Pesticide Regulation, Sacramento
Nan Gorder	California Department of Pesticide Regulation, Sacramento
Bob Elliott	California Department of Pesticide Regulation, Sacramento

# FINANCIAL INFORMATION

	<u>FY99/00</u>	<u>FY00/01</u>
<b>EXPENSES</b>		
Grants	\$76,305	\$45,967
Grants (Reserved for 01-02)		\$52,246
Program Expenses	\$113,758	\$116,519
Information Development and Dissemination	<u>\$430,546</u>	<u>\$411,694</u>
<b>Total Expenses</b>	<b>\$620,609</b>	<b>\$626,426</b>

<b>INCOME</b>		
Permanent State and UC Funding	\$520,391	\$526,208
Temporary C.E. Specialist Funds	<u>\$100,218</u>	<u>\$100,218</u>
<b>Total State/UC Funding</b>	<b>\$620,609</b>	<b>\$626,426</b>

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<b>EXTRAMURAL FUNDING</b>		
SARE (Professional Development State Grant)	\$10,000	\$10,000
SARE (Western Region Professional Development Direct Marketing)		\$96,578
SARE (Western Region Professional Development PCA Education)	\$36,362	
U.S. Environmental Protection Agency (Pollution Prevention Incentives for States)	\$92,100	\$40,000
U.S. Environmental Protection Agency (Region 9 Food Quality Protection Act Funds)	\$94,000	\$225,000
California Department of Pesticide Regulation (Ag Partnerships Conference Proceedings)		\$15,000
The Clarence E. Heller Charitable Foundation		\$5,000
UC Davis/California Department of Health Services	\$5,000	
USDA-CSREES Regional Research	\$15,954	\$16,436
Mutual Assistance Network of Del Paso Heights	\$89,921	
Occidental College/United States Department of Agriculture		\$118,610
SARE (Millennium Conference Proceedings)	\$20,600	
California Association of Winegrape Growers	\$8,000	
Various Donors (Gifts)	<u>\$125</u>	
<b>Total Extramural Funding</b>	<b>\$372,062</b>	<b>\$526,624</b>

<b>OTHER FUNDING</b>		
Sales of Publications and Other Misc Income	\$2,961	\$2,344
ANR Temporary Funds-Enhancement of Shared Technology Infrastructure (SAREP, Small Farm Center, Genetic Resources Conservation Program)	\$17,184	
ANR Workgroup Funds-Biologically Integrated Farming Systems	<u>\$5,000</u>	<u>\$15,600</u>
<b>Total Other Funding</b>	<b>\$25,145</b>	<b>\$17,944</b>

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<b>TOTAL SAREP INCOME</b>	<b>\$1,017,816</b>	<b>\$1,170,994</b>
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# Publications and Videotapes

## ORDERING INFORMATION

### *Sustainable Agriculture*

To subscribe, send your name, address, and occupation to: [sarep@ucdavis.edu](mailto:sarep@ucdavis.edu)

Also available on SAREP's Web site at <http://www.sarep.ucdavis.edu/>

### **Progress Reports**

Available from SAREP's Web site, <http://www.sarep.ucdavis.edu/pubs/pubs.htm>

- SAREP Biennial Report 1997-1999
- SAREP Biennial Report 1995-1997
- SAREP Biennial Report 1993-1995
- BIFS Biennial Report 1999-2000
- BIFS Biennial Report 1997-1999
- BIFS Biennial Report 1995-1997

### **Other Publications**

Available Directly From SAREP [[sarep@ucdavis.edu](mailto:sarep@ucdavis.edu)]

- Growers' Guide to Environmental Regulations & Vineyard Development (2000)
- Growing a Community Food System (1999)
- Exploring Eco Labeling for California Winegrapes: A Working Conference (1998)
- Soil Quality Topics: A Selection of Resources for Education and Extension (1999)
- Cover Crops: Resources for Education and Extension (1998)
- Sustainable Farming Systems: A Guide to the Transition (1997)
- How to Stabilize Your Farm Work Force (1995)
- A Guide to Spanish Language Sustainable Agriculture Publications (1995)
- What is Sustainable Agriculture? (1997)

### **Available From DANR Communications Services**

Complete publications catalog online at <http://anrcatalog.ucdavis.edu>

- Organic Apple Production Manual (2000) - #3403
- Entrepreneurial Community Gardens: Growing Food, Skills, Jobs and Communities (1999) - #21587
- Community Food Systems in California: Profiles of 13 Collaborations (1998) - #21547
- Cover Cropping in Vineyards: A Grower's Handbook (1998) - #3338
- How to Find Agricultural Information on the Internet (1997) - #3387
- Protecting Groundwater Quality in Citrus Production (1994) - #21521
- The Dairy Debate: Consequences of Bovine Growth Hormone and Rotational Grazing Technologies (1993) - #SA001
- Organic Soil Amendments and Fertilizers (1992) - #21505

**Available From Other Sources**

- Organic Farming Cost of Production Studies (1992-1997)  
[Available at: <http://www.agecon.ucdavis.edu/outreach/crop/cost.htm>]
- Enhancing Biological Control: Habitat Management to Promote Natural Enemies of Pests (1998)  
[Available from: University of California Press fulfillment service at Tel: (800) 777-4726, Fax: (800) 999-1958 or order it from book stores.]

**Videotapes**

Complete publications catalog online at <http://anrcatalog.ucdavis.edu>

- Creative Cover Cropping in Annual Farming Systems (1993) – V93-W
- Creative Cover Cropping in Perennial Farming Systems (1993) – V93-W
- Cultural Weed Control in Vegetable Crops (1993) – V93-E
- Alive and Well: Sustainable Soil Management (1992) – V92-D