

SUSTAINABLE AGRICULTURE

UC Cooperative Extension faces deep cuts in California budget crisis

[Note: The January 31 special edition of ANR Report provided an update on potential budget cuts to UC Cooperative Extension and a fact sheet on what these would mean for Californians. Excerpts from this special issue of the Division's on-line newsletter, and the regular January 2003 issue, follow.]

We can report that Cooperative Extension's share of the \$2.5 million mid-year cut to UC public service programs is \$2.42 million. Vice President for Agriculture and Natural Resources **W.R. "Reg" Gomes** has tentatively approved a budget reduction plan that will avoid layoffs and major disruptions to Cooperative Extension programs this year.

However, next year will be a different story, if the new round of cuts contained in the proposed 2003-04 state budget are approved. Cooperative Extension faces another 25% reduction on top of this year's 5% cut. UC research programs, cut 10% this year, are slated for another 10% reduction.

Steve Nation, executive director for ANR Governmental and External Relations, noted that the Legislature has difficult budget decisions to make in the coming months to close an estimated \$26 billion-\$35 billion shortfall. He said that the Division of Agriculture and Natural Resources is prepared to shoulder its share, but that it is important "to inform our stakeholders and decision makers about the long term consequences" of these cuts and what they will mean to their communities, their friends and neighbors, their livelihoods and their quality of life if approved by the Legislature.



Cooperative Extension programs statewide are at risk. (photo by Dave Pratt)

PROPOSED CUTS TO UC AGRICULTURE & NATURAL RESOURCES PROGRAMS: WHAT DO THEY MEAN FOR CALIFORNIANS?

The Situation

The University of California took significant budget cuts this year; even deeper cuts are proposed for next year. Unless the Legislature acts to reduce the cuts, UC Cooperative Extension (UCCE) will take a 30% budget cut and UC state-funded research a 20% cut.

The Consequences

If the Legislature approves these cuts to Cooperative Extension and research:

- UC will need to close offices and facilities, begin layoffs, and eliminate core Cooperative Extension and agricultural research programs.
- The network of UCCE county-based advisors will be decimated.
- UC research discoveries and innovations—advances that fuel economic growth, sustainable use of agricultural and natural resources, better human health and nutrition—will slow or be lost.
- We will no longer be able to respond to threats from bioterrorism, exotic pests and diseases, and natural disasters.

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BUDGET CUTS CONTINUED FROM PAGE 1

Who Will Be Affected?

Budget cuts of 30% for Cooperative Extension and 20% for UC research will have consequences far beyond the elimination of programs and people and closing of offices and facilities. These consequences will last far beyond today's budget crises.

- In the end, all Californians—whether they live in cities or rural areas, work on farms or in high tech, are long-time residents or newly arrived—will feel the cuts.
- So will the state's economy, as UC programs are shut down—programs that generate new ideas, technological advances, and innovations that California agriculture and other businesses rely on to compete globally.

Here are examples of how the proposed budget cuts to UC programs in Agriculture and Natural Resources will impact Californians:

- **ECONOMIC GROWTH**—Agriculture is one of California's leading industries, contributing substantial income and employment to the state's economy. One of the most stable industries in the state, agriculture is largely immune from the boom or bust cycles that other sectors have experienced in recent years. Studies show that nearly half of the economic growth in California agriculture is directly attributable to UC research and Cooperative Extension. Cuts to these programs will slow economic recovery in California.
- **PUBLIC SERVICE**—A 30% cut to Cooperative Extension will require elimination of statewide and local programs. No decisions have been made as to which ones, but everything will be on the table—statewide programs, such as the Agricultural Issues Center, integrated pest management (IPM), sustainable agriculture,

water resources; nine research and extension centers; extension offices and programs in every county.

- **RIPPLE EFFECTS**—Over 85% of the state dollars in agriculture and natural resources fund salaries and benefits of people in the University who, in turn, generate outside funding for programs and research. For each dollar of state funds lost to UC research programs in agriculture and natural resources, an additional dollar leveraged by our scientists is lost to the California economy.
- **CRISIS RESPONSE**—In the past, UC has responded effectively to threats from exotic pests and diseases—the glassy-winged sharpshooter and Pierce's disease, red imported fire ants, Sudden Oak Death, med flies, etc. With the proposed cuts, our ability to respond to acts of bioterrorism, emerging diseases and natural disasters will be lost.



BUDGET CUTS: SAREP Update

As one of nearly two dozen statewide special programs that will be affected by the cuts, SAREP provides research and education funding through competitive grants on key issues in sustainable agriculture and food systems. SAREP is currently bringing in additional funds to support ag chemical use/risk reduction demonstration projects in biologically integrated farming systems (BIFS), organic farming research and education, and community food security. These extramural funds, which exceed \$3 million, could be lost or made less effective if our state funds are severely reduced. Currently, SAREP receives 2/3 of its budget from Cooperative Extension and 1/3 from Agricultural Experiment Station funds.

For examples of specific recent direct impacts SAREP research projects and activities have made, please see "Success Stories" on the left navigational bar of the <http://ucanr.org> site. (Direct URL: <http://ucanr.org/delivers/>) SAREP Success Stories that will be posted this spring include:

- *California organic growers look for UC Extension help*
(Basic research, resources are revitalizing organic growers)
- *Dairy farmers save money, prepare for regulations using manure as fertilizer*
(BIFS team helps dairy farmers reduce inputs, maintain yields)
- *Direct marketing: Helping farmers farm, communities thrive*
(workshops, publications to help farmers and communities benefit from direct-marketed produce)
- *Organically grown: Help from UC*
(UC ANR Organic Farming Research Workgroup, SAREP's organic farming Web site)
- *What publications are available for organic growers?*
(UC organic farming manuals underway)

For up-to-date information on the state budget situation and its impacts on the University of California, UC Cooperative Extension and UC research, go to <http://ucanr.org/budgetnews.shtml>.

The UC budget is now being heard in Sacramento by the Senate Committee on Budget and Fiscal Review and the Assembly Committee on the Budget. Later this spring the full Senate and Assembly will vote on the state budget before sending it to the governor for his action. You can find information on the members of the budget committees and their progress by logging on to www.sen.ca.gov and www.assembly.ca.gov.

SAREP sponsors first organic strawberry production short course

by Jeri Ohmart, SAREP

California leads the nation in strawberry production, accounting for 82 percent of the U.S. strawberry crop. An intensive crop system, each acre produces an average of 21 tons of berries annually. California's Central Coast and South Coast command the lion's share of organic production and accounted for over \$7.8 million in sales of California's approximately \$12 million total in 2001 (Klonsky, 2003). Statewide production rose in 2002 to \$12.5 million on over 1200 acres.

In response to new regulations, as well as to growing consumer demand for organic products and increased interest in organic research and practices, SAREP, the UC Agricultural and Natural Resources Organic Farming Research Workgroup, and US-EPA Region 9 sponsored the first Organic Strawberry Production Short Course in Salinas Feb. 27-28, 2003. Co-sponsored by UC Cooperative Extension (UCCE), the Ecological Farming Association, the California Strawberry Commission and California Department of Food and Agriculture's Buy California Initiative, the course brought together a diverse group of students and presenters. Attendees included 51 farmer/ranchers, CE personnel, and representatives of state, federal, county and nonprofit agencies, including 14 Spanish-speaking producers who participated using simultaneous translation services.

Rodger Wasson, president of the California Strawberry Commission, and **Dan Legard**, director of research and education, delivered the keynotes, welcoming participants on behalf of the commission. **Karen Klonsky**, UCCE specialist, UC Davis agricultural and resource economics department, and **Laura Tourte**, director, UCCE Santa Cruz County, discussed growth in the organic strawberry industry and presented a new cost of production study for organic strawberries on the Central Coast. Certification and compliance



Short course participants toured Coke Farms in San Juan Bautista. (photo by Keith Warner)

issues were addressed by **Vanessa Bogenholm**, VB Agricultural Services, Watsonville. **Steve Koike**, UCCE Monterey County farm advisor presented on-site selection and soil preparation for organic strawberries. Varieties and cultivars best suited to organic production was the topic of a presentation by **Carolee Bull**, USDA-ARS, Salinas. Additional panel speakers were **Sandra Fischbein**, Speedling Corporation, **Dave Small**, California Giant, and **Curt Gaines**, consultant. **Joji Muramoto**, UC Santa Cruz, and **Richard Smith**, UCCE Monterey County farm advisor, discussed nutrient and fertility management in organic strawberries.

Afternoon sessions focused on soilborne diseases and pest management in organic strawberries. **Frank Martin**, USDA-ARS, Salinas presented on management of soilborne pathogens and **Krishna Subbarao**, UC Davis vegetable crops department, discussed "Effects of Brassica Rotation on Soilborne Diseases." Pest and beneficial arthropods, arthropod pest management materials for organic strawberries, and suppression and trap cropping of lygus bugs in organic strawberries were topics discussed by **Mark Bolda**, UCCE

Santa Cruz County farm advisor, Bogenholm and **Sean L. Swezey**, SAREP director. Day one ended with a grower and consultant panel focusing on production issues, including consultants Bogenholm, **Tom Am Rhein**, **Tim Driscoll**, and grower **Jim Cochran** of Swanton Berry Farm.

The second day included **Jenny Broome**, SAREP associate director and **Steve Koike** speaking on organic management of foliar strawberry diseases. **Steve Fennimore**, UC Davis vegetable crops department spoke on weed management in organic strawberry systems. Growers in the audience were especially interested in the presentation on "Post Harvest Handling of Organic Strawberries" by **Elizabeth Mitcham**, UC Davis pomology department. The morning ended with presentations by **Steve Gliessman**, professor of environmental studies, UC Santa Cruz, and Jenny Broome on "Sustainability Indicators in Organic Strawberries."

For the second half of day two, students toured three organic strawberry farms: **Christine** and **Dale Coke's** Coke Farms in San Juan Bautista, **Clint Miller's** Rancho

See STRAWBERRIES p.5

Special Lecture Series for UC Davis, Spring and Fall Quarters 2003

THE SCIENCE OF SUSTAINABLE AGRICULTURE: Measuring the immeasurable

A major lecture series at UC Davis, *The Science of Sustainable Agriculture: Measuring the Immeasurable*, will feature 17 internationally recognized experts on sustainability in relation to agriculture, the environment, and society. The series began April 4 and continues every Friday in spring and fall quarters.

“We are very honored to have this group of leading social, ecological and biological scientists to address key issues relevant to agricultural sustainability in California,” said **Neal Van Alfen**, dean of the UC Davis College of Agricultural and Environmental Sciences (CA&ES), a major funder of the series. “The series is meant to provide a forum for public discussion of the issues, based on the best information available.”

The series will present research results aimed at increasing the sustainability of food and agricultural systems, as well as ways to measure or assess sustainability in agriculture and natural resource management, according to **Jenny Broome**, associate director of SAREP.

“These findings and ideas will help define the problems and challenges of sustainability more clearly, and also chart possible new directions for education, research and policy,” said Broome, chair of the CA&ES subcommittee that planned the lectures with the UC Davis Sustainability Indicators workgroup.

Broome noted that sustainable agriculture systems are defined as those that serve society in the short and long term, are economically viable and environmentally sound, and promote healthy communities.

The series will begin by looking at the university and the way knowledge is created and extended in the context of academic disciplines and private sector activities. Several talks will address international development and the role of the intensification of production in addressing world hunger, and how intensification and technology affect food access and poverty.

Other lectures will look at the role of globalization and the way specific policy tools such as the Common Agriculture Policy, the U.S. Farm Bill, and the World Trade Organization impact food supplies at regional or national levels.

Additional topics in the series include the development and use of sustainability indicators at the whole food system level as well as in farming systems studies that have developed specific soil- and plant-based indices. The interaction of agriculture and natural resources such as water, soil, and biodiversity will be discussed, as well as key inputs like energy. The dynamic of global climate change and how it will affect, and is affected by, practices in the food and agricultural system will also be addressed.

Several talks will look at what role consumers and citizens play in the food system and how well it nourishes communities. Final talks return the focus to the university and the education and outreach efforts needed to increase the adoption of sustainable farming and food systems.

All lectures are scheduled for Fridays from 12:10 to 1 P.M. in Room 3001 of the Plant and Environmental Sciences (PES) building at UC Davis. Lectures will be videotaped and posted within

24 hours on the SAREP Web site (<http://www.sarep.ucdavis.edu/seminar/>).

UC Davis students attending the lecture series may receive academic credit by enrolling in IAD 290, section 2 (for graduate students) or AMR 190, section 1 (for undergraduates). In addition to attending the lectures, enrolled students will participate in weekly discussions on the Monday following each lecture from 12:10-1 PM in PES room 2005. For further information, contact the organizer of the courses, **Mark Van Horn**, director of the UC Davis Student Farm at mxvanhorn@ucdavis.edu

Fall speakers will be announced later this spring with the first lecture scheduled Friday, October 3, 2003 at the same location. See the SAREP Web site for more details (as well as video archives) or contact Broome at (530) 754-8547 or jcbroome@ucdavis.edu.

Additional support for the lecture series is provided by Unilever Bestfoods Corporation, Kearney Foundation of Soil Science, UC Davis Department of Agronomy and Range Science, UC Davis Department of Land, Air and Water Resources, the UC Davis Center for History, Society, and Culture, and UC SAREP.

Members of the UC Davis College of Agricultural and Environmental Sciences Subcommittee on Sustainable Agriculture speaker series:

- **Janet C. “Jenny” Broome**, associate director, SAREP (chair)
- **Chris van Kessel**, chair and professor, Department of Agronomy & Range Science
- **William Horwath**, associate professor, Department of Land, Air, and Water Resources
- **Leisa Huyck**, Sustainable Agriculture Farming Systems/IA Conservation Tillage project
- **Karen Klonsky**, extension specialist, Department of Agricultural and Resource Economics
- **Wolfgang Pitroff**, assistant professor, Department of Animal Science
- **Kate Scow**, professor, Department of Land, Air, Water Resources; director, Kearney Foundation of Soil Science

SPRING 2003 SUSTAINABLE AGRICULTURE SERIES SCHEDULE

- April 4** **The Science of Sustainable Agriculture in a Context of Disciplinary and Private Knowledge**
William B. Lacy, Vice Provost, University Outreach and International Programs, and professor, Department of Human and Community Development, UC Davis
- April 11** **Intensive Cereal Production Systems for Global Food Security and Protection of Natural Resources**
Kenneth G. Cassman, professor and chair, Department of Agronomy and Horticulture, University of Nebraska Lincoln
- April 18** **Globalization and Its Impact on California Agriculture**
William Friedland, professor emeritus, Departments of Community Studies and Sociology, UC Santa Cruz
- April 25** NO SPEAKER THIS WEEK
- May 2** **Strategies for Sustainability in Agriculture: A European Perspective**
Floor Brouwer, head of Natural Resource Management, Agricultural Economics Research Institute (LEI), The Hague, Netherlands
- May 9** **Measuring Sustainability: Learning by Doing**
Simon Bell, senior lecturer in Information Systems, Center for Complexity and Change, Technology Faculty, The Open University, United Kingdom
- May 16** **Civic Agriculture and Food Citizenship: Sustaining Local Food Systems in a Globalizing Environment**
Thomas A. Lyson, Liberty Hyde Bailey professor, Department of Rural Sociology, Cornell University
- May 23** **Agricultural Production and Climate Changes**
Cynthia Rosenzweig, research scientist, National Aeronautic and Space Administration, Goddard Institute for Space Studies
- May 30** **Economic Policies to Encourage Sustainable Agriculture—Some Examples from Irrigated Crop Production**
Richard E. Howitt, professor, Department of Agricultural and Resource Economics, UC Davis
- June 6** **Intensive Agriculture and the New Malthus: A Perspective from India**
Glenn Davis Stone, associate professor, Department of Anthropology, Washington University, St. Louis

STRAWBERRIES CONTINUED FROM PAGE 3

Royal Oaks Farms in Watsonville, and **Brandon Ross's** Ella Bella Farms in Corralitos.

Lively discussions and questions followed each of the sessions and participants deemed the course a success. Responses to evaluation questions ranged from 4.3 to 4.5 on a five-point scale. In response to the question, "Do you plan to get involved in organic strawberry production, make changes to your current system or recommend practices discussed at this course as a result of what you learned today?" 83 percent of respondents said "Yes, within the next 6-12 months." The remaining 17 percent responded "within the next 12-18 months." Comments included:

"I will use the information to form the basis of future research projects, as well as outreach to local communities working to sustain their agriculture."

"I plan to grow organic nursery stock."

"We plan to increase our certified organic

strawberry production for sale at our local farmers markets. We are going from minor production to approximately 20 percent of our total."

Responses to speakers' presentations were also positive:

"Excellent!"

"All speakers were outstanding and kept on topic well."

"Mix of academic and grower experience maintains interest."

"I can not say more than give them an A+ for sharing all their information. I hope the organizers can continue to have these seminars because I think organic is in more demand from consumers."

Speakers' presentations were compiled into a course binder, which will form the basis for a future UC ANR publication, *Organic Strawberry Production Manual*. The original idea and organization for the

strawberry organic manual grew out of the SAREP strawberry BIFS project that ended in 2001, with funding from US-EPA Region 9 and special one-time state legislative funds for methyl bromide alternatives linked to Assembly Bill 1998 (**Helen Thomson**) with a friendly amendment by former State Senator (now Congressman) **Mike Thompson**. **Sean Swezey** was the original principal investigator of the project until he was appointed SAREP director in 1999.

This organic strawberry production short course is the first of a series of short courses on organic production supported by the Buy California Initiative. Future courses will be focused on organic production in California winegrapes, vegetable crops and olives.

For further information, contact **David Chaney**, SAREP education coordinator, (530) 754-8551 or dechaney@ucdavis.edu.

Humboldt County CE-SAREP collaboration establishes county organic crop program

Although it is a rural county more than 250 miles north of the nearest metropolitan area (San Francisco), Humboldt County is far from lacking in impact on the California scene. Ten state parks and the Redwood National Park contain some of the most unique and diverse natural resources of the Pacific Rim, and the forests and rivers of Humboldt County have been designated as part of a United Nations Biosphere Reserve and World Heritage site. The World Wildlife Fund identifies the Humboldt County area as one of the most diverse eco-regions on the planet. However, like most rural counties in the western United States, Humboldt County has begun a long and difficult transition from reliance on resource extraction industries as an economic base, to eco-tourism and service-based activities that emphasize conservation and sustainability of resource use. The boom forest harvest years of the 1950s and early 1960s are slowly giving way to a more long-term vision of resource stewardship.

With a population of only 130,000 residents, Humboldt County hosts over a million annual tourist visitors, many of whom revel in the environmental sensitivity of the region, and the balance of economic and environmental conservation. However, in the midst of this natural beauty, per capita incomes of residents remain among the lowest in California, and new resource-based economic activities are necessary. One visible area of growth and new support for Humboldt County stewardship is the emergence and strengthening of a successful organic production community. In 2001, Humboldt County ranked thirteenth among all California counties in number of registered organic producers (65). That year organic growers and processors declared a farmgate sales value of nearly \$1 million in Humboldt County. Dairy products, herbs, and vegetables are at the top of the list of organic crops in the county.



Annie Eicher, Humboldt County organic program coordinator, monitors garden symphytan plots at Redwood Roots Farm in Bayside. (photo by Janet Czarnecki)

In January 2002, under the leadership of UC Cooperative Extension County Director **Deborah Giraud**, SAREP made a three-year grant of \$150,000 available to support research and extension activities related to organic farming systems. The Clarence E. Heller Charitable Foundation provided the funds to SAREP. The goals of the new Humboldt County Cooperative Extension Organic Farming Program are to increase knowledge about organic and sustainable agricultural practices and to make this information easily accessible. **Annie Eicher**, a biologist who holds a master's degree in plant science from Humboldt State University, was hired in January 2002 as program coordinator.

As a first step in the planning and development of the Organic Farming Program, Eicher gathered information on Humboldt County organic farmers to better understand and meet their needs. She examined records on file with the Humboldt County Agricultural Commissioner and obtained additional information from the Humboldt County Farm Bureau, the North Coast Growers Association, the Fortuna Market Association, and the Southern Humboldt Farmers Market Association. Eicher assessed information on types of crop produced, acreage, revenue, and trends over the last ten years and summarized the findings in a booklet and made available to the public.

She then developed a questionnaire as a planning tool, which was distributed to Humboldt County growers. The form listed a number of potential services the new Organic Farming Program could provide, with checkboxes to indicate how useful each service would be. A checklist of topics, with space provided for write-in suggestions, was included to determine which topics farmers would like to learn more about or would like to see as the subject of research. About 70 percent of those responding thought that on-farm research would be a "very useful" service, and most indicated an interest in participating in the program. Educational workshops were also ranked "very useful"; weed management, pest and disease resistance, and soil fertility management ranked the highest as potential research topics.

Based on the questionnaire responses, Eicher initiated a research project with three organic farmers and the producer of a liquid fish fertilizer and liquid kelp extract. The study was designed to assess the effects of these fertilizers on nutrient uptake and yield in strawberries, cantaloupes and potatoes, and to assist organic farmers in the selection and use of fertilizers approved for use in certified organic production. Soil samples and plant tissue samples were sent to the DANR Analytical Lab for analysis. The farmers participating in the study weighed the yield

harvested from each study plot. The research project is in progress, and plots have been established for next season.

In response to the increasing level of interest in organic dairy production in Humboldt County, Eicher also gathered information on organic livestock management and on the new federal regulations for organic livestock management. A packet of handouts was prepared for those considering a transition to organic production. Eicher and **Ken Andersen**, the new Humboldt County Cooperative Extension dairy advisor, made site visits at local dairies interested in making the transition to organic milk and cheese production to review the process.

In November 2002, I had the pleasure of attending an all-day workshop led by Eicher on "Organic Certification and Compliance Issues" for farmers and retailers in Arcata that informed participants about the recently enacted federal regulations and addressed their concerns and questions about the certification process. More than 90 participants filled the Bayside Grange Hall for speakers and panel discussions. Meeting evaluations received were positive and enthusiastic, with most participants noting, in particular, that their individual questions were answered.

As this first-ever collaboration among SAREP, the Clarence E. Heller Charitable Foundation, and UC Cooperative Extension in Humboldt County continues, I would like to take this opportunity to recognize the important work that has begun in support of organic farming research and extension in Humboldt County. SAREP will continue to support and leverage these partnerships and will continue to advocate that university programs play a central role in the demonstration of successful extension models in the organic production community.—*Sean L. Swezey, director, University of California Sustainable Agriculture Research and Education Program*

(IN OUR NEXT ISSUE: SAREP, Small Farms Program and County Cooperative Extension collaborate on eight new county organic programs.)

HUMBOLDT COLLABORATION

Those participating in the collaboration among SAREP, the Clarence E. Heller Charitable Foundation, Humboldt County and UC Cooperative Extension are glad to be a part of it. Here is what they say:

"The new organic farming coordinator integrates well with our region's economic development efforts to enhance the competitive edge of local industries and to protect agricultural lands and ways of life. Humboldt County is so readily suited to organic farming and those niche markets. Having [organic coordinator] Annie Eicher here adds tremendous capacity in coordinating our efforts to building stronger, more financially and strategically savvy farm businesses in Humboldt County." —**Jacqueline Debets**, Humboldt County economic development coordinator

"I can tell you, in the six months [Annie Eicher] has been on the job we are already making advances we hadn't been able to do previously simply because she's focused on organic techniques. One of the things the organic researcher has been doing for us is tapping into organic resources across the country, spending more time than I ever could, and has been able to pull all that information together in a form I can use. Also, the organic manuals are very helpful to me. I am one of those folks who read this stuff. I'm not Internet-connected." —**John LaBoyteaux**, organic farmer (corn, tomatoes, melons, hay), Redcrest (Humboldt County)

"When I was a farm advisor in Central Oregon and Central California, organic wasn't a big industry. But that has changed, especially on the North Coast. Annie Eicher has been really helpful giving us ideas about our organic research plot. During a fish fertilizer trial, she was able to help us with an unrelated pest problem. She determined that it was wireworms, brought us handouts and helped us figure out how to control them. What's great is to have someone focused on organic farming, looking out for fertilizers and pest control products. There are always new products on the market, but until now we hadn't had someone who could tell us if they were worthwhile." —**Franz Rulofson**, farm manager, College of the Redwoods Sustainable Agriculture Farm

"I'm thrilled that Humboldt County has an organic farming coordinator, and even more thrilled that it's Annie Eicher, who is very easy to work with and a good scientist. Because of her attitude and talents, I agreed to cooperate in on-farm research on the effects of soil management practices on symphytan populations with Annie and UC Davis researchers Mark Van Horn and Toby O'Geen." —**Janet Czarnecki**, organic farmer, Bayside, Humboldt County (vegetables, herbs, berries)

"A sustainable and organic agriculture coordinator working in tandem with SAREP, Clarence E. Heller foundation, and UC Cooperative Extension office in Humboldt County is an exciting and welcome opportunity for many of us in the organic fields of Northern California. I can't overemphasize the importance and need for local technical support and assistance for many of the small-scale organic farmers in this region. Annie Eicher plays a critical support role in disseminating vital information on getting certified under the new National Organic Program for the 75 plus registered organic farmers in Humboldt county, and with her assistance, CCOF hopes to continue expanding the number of certified organic farms in this region. Demand for organic products continues to increase at more than 20 percent annually. The support of small-scale farmers in tapping into this growing market will serve a multi-functional role of supporting sustainable and diverse agricultural systems, preserving the small-scale family farm, and will help to meet the expanding demand for certified organic products." —**Elizabeth Whitlow Inman**, California Certified Organic Farmers regional service representative, Camp Meeker, Humboldt County

New report highlights BIFS program 2001-2002

by Jenny Broome, Jeri Ohmart, Bev Ransom and Marco Barzman, SAREP

[Note: Since 1995, SAREP has provided funding for ten BIFS projects in nine different crops. SAREP submits a progress report on the BIFS program to the California State Legislature every two years. The following is the executive summary of the January 2003 BIFS Biennial Report. The full report is available on SAREP's Web site at www.sarep.ucdavis.edu/BIFS/bifs03/. A limited number of printed copies are available from the SAREP office at (530) 752-7556; sarep@ucdavis.edu.]

In 2002 the Biologically Integrated Farming Systems (BIFS) program, administered by the UC Sustainable Agriculture Research and Education Program (SAREP), entered its seventh year supporting on-the-ground agricultural chemical risk/use reduction projects. Assembly Bill 3383 provided the first state funds for the program, followed in 1998 with AB 1998 which expanded the program and provided new state funds. Since 1995, the U.S. Environmental Protection Agency (US-EPA, Region 9) has also provided matching federal funds to the program and currently is the only source of funds as no new state funds have been provided since 1998. As of January 2003, SAREP has obtained a total of \$3,079,272 in outside funding for the BIFS program. This report covers the BIFS program from January 2001 through December 2002. During this time, the program was funding seven on-going projects in seven different major commodities. By December 2002, four of the seven projects had ended (rice, citrus, walnut, and strawberry), and apples and dairy/forage crop BIFS projects ended in March 2003. SAREP released a new Request for Proposals in July 2001 which resulted in funding two projects: the prune (dried plum) BIFS project was granted up to three additional years of funding and a new winegrape project was funded for three years (April 2002–March 2005).

California growers continue to face major challenges on two fronts: declining profit margins and increased environmental regulations that threaten to reduce the number of chemical pest controls as well as restrict fertility and general crop management practices. Recent pesticide regulations that affect California agriculture include the 1996 Food Quality Protection Act and the Department of Pesticide Regulation's new

ground water protection standards which, beginning in January 2004, will create further restrictions on the use of pre-emergence herbicides as well as add expense in hiring specially trained and certified pest control advisers. US-EPA has revised the Clean Water Act permit requirements (finalized in December 2002) and effluent guidelines, which will require most dairy farms to prepare comprehensive nutrient management plans to document all nutrient application on fields. This will require improvements and changes in the way in which manure nutrients are managed as they are utilized by forage crops, and necessitate reductions in commercial fertilizer use on these crops. The Clean Air Act and the Montreal Protocol call for the elimination of methyl bromide use by 2005. And finally, the 1994 CALFED agreement to provide ecosystem protection for the Bay Delta estuary provides agricultural water users a guaranteed, if reduced, water supply (CALFED 1997).

BIFS projects help farmers implement biologically integrated farming systems, bringing long-term benefits to California growers by reducing the environmental impact of agriculture on natural resources, reducing production costs, and maintaining yields and quality (Swezey & Broome, 2000). BIFS growers, in partnership with researchers, extensionists, and consultants, have demonstrated and fine-tuned research-based alternative farming practices in the areas of soil building, cover cropping, alternative pest management approaches, and optimized use of inputs including fertilizer, manure, water, and pesticides. The BIFS approach promotes farm management decisions based on monitoring. Local management teams of farmers, researchers, extensionists and other agriculture professionals meet regularly and collaborate to

develop and disseminate these alternative methods (Mitchell et al. 2001).

SAREP, in collaboration with other UC colleagues and researchers, has been evaluating the BIFS program, through developing and conducting commodity-focused grower surveys and analyzing the California Pesticide Use Report (PUR). Over half of San Joaquin County's walnut growers responded to SAREP's countywide survey in 2002, representing almost 75 percent of the total bearing walnut acres in the county. The results showed that almost half of the respondents had been exposed to the BIFS walnut project. The results also indicated that a majority of respondents were willing to use practices that reduce their chemical and fertilizer use even when it takes a little more time or expense. SAREP also conducted a statewide survey of rice growers in 2001, and has developed statewide surveys of prune growers and dairy producers that will be conducted in 2003. Analysis of California's PUR database conducted by UC Davis researchers has revealed trends from 1992 to 2001 in use patterns for several BIFS commodities. Key agricultural chemicals being targeted for reduction by BIFS projects such as in-season organophosphates like chlorpyrifos or phosmet have been decreasing over the past nine and five years, respectively, on walnuts in San Joaquin County. Methyl parathion use has increased on this county's walnut acres starting in 1996; however, by 2001 BIFS walnut growers were only treating five percent of their acres with this chemical and the rest of the county was treating 25 percent of their acres. In addition, the miticide propargite was used on only 10 percent of BIFS acres in 2001 in San Joaquin County, but on over 40 percent of the rest of the county acres. The

dormant season organophosphate (OP), diazinon, known for contaminating California's surface waters, was applied to 30 percent of Sutter County prune acres but to only 2.5 percent of BIFS prune acres in 2001, the latest year that data is available. Analysis of the temporal and spatial patterns of pesticide use will continue.

Nine peer-reviewed publications, 11 abstracts, and several conference proceedings have been published that present results of BIFS projects or related research. Publications have ranged from a paper by Andrews et al. 2002, a landmark study in cotton that describes the development of a soil quality index to help researchers, educators and growers to understand how on-farm practices affect soil quality and yields, to the (in press) paper by Grant et al. 2003 that describes the pest management practices and achievements of the walnut BIFS project.

In addition to funding key demonstration projects through the BIFS program, SAREP has created a BIFS Workgroup with funding from the UC Division of Agriculture and Natural Resources to support increased cross-commodity cooperation on pressing research and educational needs of California agriculture. Workgroup support funds have enabled researchers, federal and state regulators, consultants, and commodity and nonprofit organizations to share resources and ideas about how to increase the adoption of environmentally sound farming in California. In addition, the BIFS Workgroup is supporting a social science research project to look at the role that partnerships and participation play in the ability of the BIFS and BIFS-like projects to accomplish their environmental and economic objectives.

With only federal funds to support the BIFS program, SAREP is seeking to obtain additional funding to continue support of new BIFS projects. SAREP successfully obtained a specialty crops block grant from the California Department of Food and Agriculture to extend the key successes of four recent BIFS projects (walnuts, prunes, dairy/forage crops, citrus) to a statewide audience. With the idea of building on the



Walnuts

strong foundation of this ag chemical use/risk reduction program, SAREP is working to develop a consortium for on-farm conservation biology and restoration ecology. This collaborative effort will seek key research support to develop the information needed to assist growers to incorporate on-farm conservation and restoration strategies and wildlife-friendly farming practices.

PROJECT SUMMARIES

Walnut BIFS:

January 1999—December 2001

In December 2001, the San Joaquin County walnut BIFS team successfully completed a three-year project demonstrating the use of a biologically integrated orchard system for farming walnuts in the northern San Joaquin Valley. The project reduced on-farm disruption and off-site pollution from the routine use of OP insecticides that are under review due to the Food Quality Protection Act. In addition, this project demonstrated practices to reduce synthetic nitrogen fertilizer on California's 200,000 acres of walnut orchards. To accomplish this, the project developed a farming system that used an insect pheromone for mating disruption, natural enemies of pests, cover crops, and monitoring. Twelve enrolled growers established demonstration blocks for BIFS implementation, and designated conventionally managed blocks for side-by-side comparisons. The project showed that it is possible to greatly reduce the use of conventional pesticides and maintain comparable



Prunes

yields (average yields of 1.6 to 2.5 dehydrated in shell tons per acre). The use of pheromone mating disruption to control codling moth, the major walnut pest, reduced applications of OP insecticides to 17 percent of the BIFS orchards as compared to 88 percent of the growers' conventionally managed orchards. Further, the project reduced synthetic nitrogen use on 324 acres of walnuts by 57 lbs/acre between 1998 and 2000 with no decline in yields. Growers maintained yields by planting cover crops and lowered nitrogen inputs by monitoring leaf nitrogen and using this crop-based information to make judicious use of fertilizers. A countywide survey revealed that almost 40 percent of San Joaquin County walnut growers used a nitrogen budgeting approach to estimate their fertilizer requirements. Project growers were highly motivated to successfully adapt cover cropping in their orchards, which has been shown to improve water penetration, reduce the need for mowing and increase beneficial insects in the orchards. Outreach to area farmers and collaboration with the Community Alliance with Family Farmers and the walnut Pest Management Alliance insure wide dissemination of project results.

Prune (Dried Plums) BIFS:

January 1999—December 2004

The prune BIFS project, called the Integrated Prune Farming Practices (IPFP) program, completed its first three-year cycle in December 2001. Project managers have emphasized that for this statewide project

[Continued on next page](#)

to succeed, support for five to ten years of work is needed. Project managers applied to SAREP and were successful in obtaining additional years of support based on the accomplishments of their first three years and the recognized importance of the projects goals. It is continuing under a new round of funding for 2002-2004. The first phase of the project developed and demonstrated alternative reduced-risk farming practices on 33 prune farms in nine counties. During this time, winter applications of diazinon, an OP insecticide, were eliminated from 877 acres of the 33 enrolled farms in the demonstration/ research sites, while in 2000 in Sutter County, 30 percent of prune acres received an application. Average yields were the same between the two farming systems and ranged from 4387 to 5139 lbs/acre. Growers and the management team collaborated with PCAs to develop fifteen monitoring decision guides, or protocols, for optimizing the use of pesticides, water, nitrogen and potassium applications. Ten of these are now ready for use by growers and pest control advisers, and have the potential to greatly reduce the use of OP insecticides, synthetic fertilizers and excess applications of irrigation water. The IPFP is truly a commodity-based statewide initiative, funded by the BIFS program as well as California Department of Food and Agriculture's Department of Pesticide Regulation, the California Dried Plum Board, and USDA.

**Apple BIFS:
January 2000—March 2003**

The apple BIFS project focused on reducing the use of controversial, broad-spectrum insecticides in pome fruits (apples and pears). Rapid urbanization around apple orchards in Contra Costa County has increased concerns about pesticide use in this region. A key component of the project was the use of mating disruption to reduce the numbers of codling moth, the most critical pest in apple and pear production. During this three-year project, a team of growers, pest control advisers and UC researchers used supplemental sprays in addition to mating disruption to reduce codling moth populations to very low levels. The project made substantial progress in identifying and demonstrating the products and procedures in orchard monitoring that are necessary for the successful implementation of pheromone mating disruption to control codling moth in pome fruit. BIFS fields received 33 percent less OP insecticides than the conventional fields with similar control levels.

**Citrus BIFS:
October 1998—June 2002**

The citrus BIFS project focused on reducing the use of the herbicide simazine (a known groundwater contaminant), reducing OP insecticide and fertilizer use, improving irrigation efficiency and increasing the use of cover crops. The use of pre-emergence herbicides such as simazine (Princep), diuron

(Karmex) and oryzalin (Surflan) can be reduced by relying on more frequent post-emergence herbicide applications, by narrowing the area in the “middles” that the herbicide is applied to, and by growing a cover crop. It is a common belief among citrus growers that cover crops will increase the risk of frost damage in citrus orchards. However, two years of data from the citrus BIFS project show that an appropriately managed cover crop does not increase frost damage. Cover crops are beneficial to citrus orchards in providing habitat for beneficial insects, reducing soil erosion, and reducing off-site movement of agricultural chemicals. The project also showed that monitoring with moisture sensors improves irrigation efficiency, reduces costs and the likelihood of run-off.

**Dairy BIFS:
July 1999—March 2003**

The dairy BIFS project worked with 11 dairy and forage crop farmers in the San Joaquin Valley in an effort to develop and demonstrate improved liquid manure management practices. Project managers developed ways to measure nutrients in lagoon water, enabling them to reduce or eliminate applications of synthetic fertilizers to their forage crops. Average use of fertilizer by BIFS growers on their forage crop fields went from 149, 71, and 45 lbs/acre of N, P2O5, and K2O, respectively, before the project to 20, 0 and 0 lbs/acre after three years of the project. The results were cost savings to growers of on average

Apples



Citrus



Dairy



\$55/acre and as high as \$116/acre, and reductions in groundwater contamination from both chemical fertilizer and dairy manure water. Growers also maintained their forage crop yields with this method. A crucial accomplishment of the project was the development of easy-to-use flow meters to measure the amounts of liquid dairy manure to be used as fertilizer on the crop and nitrogen “quick tests,” which determine the exact amounts of nutrients in the liquid manure. This will become increasingly important, as future environmental regulations for concentrated farm animal operations will require accurate record-keeping and finely controlled management practices, as well as the development of a comprehensive nutrient management plan.

Rice BIFS:

January 1999—December 2001

Several environmental and regulatory issues face California rice growers: air pollution from rice straw burning; movement of pesticides into the Sacramento River; production problems arising from herbicide resistance; and high production costs. The rice BIFS project addressed these by demonstrating the viability of a variety of practices such as soil incorporation of straw, winter flooding, reduced synthetic nitrogen, deep water and dry down, drill seeding and winter cover crop. Fifteen demonstration fields in Butte County were enrolled; collectively, participating growers control over 12,000 acres of rice. Participating BIFS growers

used less herbicides compared to the Butte County average use rates. For weed control, the alternative non-chemical treatment of deep water and dry down were demonstrated. This resulted in substantial cost savings during two of the three years of the project. The rice BIFS growers also reduced nitrogen applications by 30 lbs/acre by using straw incorporation and winter flooding. This practice holds promise for widespread adoption, since, based on the project’s statewide survey, approximately one-third of rice growers are already practicing it.

Strawberry BIFS:

January 1999—March 2001

The strawberry BIFS project focused on exploring a variety of biologically based alternatives to the soon-to-be-banned fumigant methyl bromide, as well as above-ground pests like lygus. Based on intensive one-on-one scientist-grower interactions, this project enrolled 21 acres of strawberries on 14 farms. Project demonstrations showed that three cultivars, Aromas, Seascape and Pacific, are better adapted to non-fumigated conditions. In attempting to determine mulches, soil inoculants and other cultural practices beneficial to commercial strawberry production, the project showed that bacterial and mycorrhizal inoculants tested and corn gluten meal do not appear to generate benefits. Also, soil solarization is not economical in California because the soil does not get hot enough in the strawberry growing regions. In seeking

alternatives to insecticides, the project revealed that periodic vacuuming of alfalfa/mustard plus “trap” crops on the borders of the strawberry plots is a potentially viable organic control against lygus bug.

Winegrape BIFS –

Central Coast Vineyard Team:

April 2002 – March 2005

This project has just completed its first growing season. The Positive Point System (PPS) developed by the Central Coast Vineyard Team (CCVT) describes an integrated farming system appropriate for California’s Central Coast. This point system allows an evaluation of the extent of sustainable practices incorporated by a farm manager. A higher score indicates more environmentally friendly management. The project will be collecting agricultural chemical use data to determine whether there is a correlation between a high score on the PPS and reduced use of agricultural chemicals. This project has strong grower support and represents a collaborative partnership of growers, wineries, farm advisors, researchers and consultants. The project has potential not only for chemical use/risk reduction, but also to support reduction in the off-site movement of soils and water. The CCVT also recently obtained a Clean Water Act Section 319(h) grant that will enable monitoring and assessment of off-site soil movement and how adoption of sustainable practices might affect such movement.

Rice



Strawberries



Grapes



Agriculture affects amphibians (PART 1)

Climate change, landscape dynamics, pollution

by Robert L. Bugg, SAREP, and Peter C. Trenham, postdoctoral research fellow, Section of Evolution and Ecology, UC Davis

[Note: Part 2, focusing on vegetation destruction, erosion and pathogenic microorganisms, will appear in *Sustainable Agriculture*, Vol. 15, No. 2, Summer 2003.]

INTRODUCTION

The class of animals called Amphibia comprises the frogs and toads (order Anura), salamanders and sirens (order Urodela), and Caecilians or serpentlike Amphibia (order Ophiomorpha or Gymnophiona). The amphibians are generally distinguished by having no scales, by having eggs and embryos similar to those of fishes, by undergoing complete metamorphosis, and by the young having gills.

Over the past decade, there have been troubling reports worldwide on disappearing amphibian populations, with the declines sometimes associated with malformations. California has seen massive declines of many once-common native species (Fisher and Shaffer 1996). Six California native amphibians are sufficiently rare that they receive protection under the federal Endangered Species Act; others may be granted that status in the near future (Table 1). Researchers are working to deter-

mine why amphibians are disappearing; several potential factors have been implicated, including some related to agriculture (Fisher and Shaffer 1996, Alford and Richards 1999, Blaustein and Kiesecker 2001).

Based on findings of studies summarized here, many species of amphibians are considered at risk because of a complex of issues including:

- Global climatic change and changes in ultraviolet radiation;
- Landscape and metapopulation dynamics, including fragmentation of native habitats and creation of barriers to dispersal, such as heavily trafficked roads;
- Changed hydrology due to drainage of wetlands, development and management of dams, catchments, confined streams, and other human-produced structures and modifications;
- Pollution by nutrients, pesticides, and various natural and synthetic endocrine disruptors;

- Destruction of native vegetation, other upland habitat modifications, and concomitant erosion and downstream sedimentation and siltation;
- Transport, establishment, or facilitation of pathogenic microorganisms (e.g. chytrid and oomycete fungal pathogens) and of fauna (e.g. various introduced and native fish and frogs);
- Interactions of the above factors.

Amphibians may have relatively great vulnerability to environmental perturbation due to several factors. Each species has a complex of specific habitat and dietary needs related to complete metamorphosis, including the transitional period between larva and adult. Problems with pollutants may be exacerbated because amphibians' permeable skin makes transdermal movement of toxins easy. Eggs of many species require pure, well-oxygenated water and are susceptible to siltation, pollution, and predation. Predators may be especially damaging because amphibian lar-

TABLE 1: Native Amphibia that are listed as threatened, endangered or of special concern.

Common Name	Scientific Name	Federal Status
Arroyo toad	<i>Bufo californicus</i>	Endangered
California red-legged frog	<i>Rana aurora draytonii</i>	Threatened
Cascades frog	<i>Rana cascadae</i>	Forest Service Sensitive
Foothill yellow-legged frog	<i>Rana boylei</i>	Forest Service Sensitive
Mountain yellow-legged frog	<i>Rana muscosa</i>	Endangered (S. Calif.) Warranted but precluded (Sierra)*
Northern leopard frog	<i>Rana pipiens</i>	Forest Service Sensitive
Northern red-legged frog	<i>Rana aurora aurora</i>	Forest Service Sensitive
Spotted frog	<i>Rana pretiosa</i>	Forest Service Sensitive, Federal candidate
Yosemite toad	<i>Bufo canorus</i>	Candidate
California tiger salamander	<i>Ambystoma californiense</i>	Endangered (Santa Barbara & Sonoma counties)
Santa Cruz long-toed salamander	<i>Ambystoma macrodactylum croceum</i>	Endangered
Desert slender salamander	<i>Batrachoseps aridus</i>	Endangered

*SPECIES WARRANTING PROTECTION, BUT FOR WHICH LISTING IS CURRENTLY PRECLUDED BY HIGHER PRIORITY LISTINGS.



California tiger salamander (endangered in Santa Barbara and Sonoma counties). (photo by Peter Trenham)

vae often are awkward and lack effective defensive or escape mechanisms; thus amphibians may require breeding habitat that affords temporal or spatial isolation from predators. A key problem arises in that the aquarium trade includes several species of introduced, exotic fish, amphibians, and reptiles that may be released into the wild, inadvertently dispersing parasites and pathogens that affect native amphibians. In light of their apparent great sensitivity, amphibians may serve as an early warning system for environmental degradation.

Modern industrial farming systems lead to emission of greenhouse gases (such as NO_x resulting from fertilizer application), use of ozone-depleting technology (e.g. methyl bromide fumigation), destruction of native vegetation and general simplification of the landscape (e.g. removal of dead wood, rocks, rodents), changed hydrology (irrigation and drainage needs must be met), and use of pesticides and nitrate fertilizers. All of these actions may adversely affect amphibians, and some may be allayed or mitigated.

In this two-part article we summarize the hypothesized threats to amphibians; highlight important findings from the international scientific literature; summarize the situation for a few key species with different primary threats and ranges in California: red-legged frog (*Rana aurora draytonii*), California tiger salamander

(*Ambystoma californiense*), and mountain yellow-legged frog (*Rana muscosa*); and recommend management options for farmers, to benefit amphibians and other wildlife.

Global Climatic Change And Ultraviolet Radiation

Because many populations of amphibians disappeared or declined essentially synchronously from regions of North America, Central America, and Australia, globally distributed potential causes have been sought, including climatic and other atmospheric issues (Blaustein et al. 2001, Beebee 2002).

In Costa Rica, climate change has been convincingly implicated in the well-documented declines of many species, apparently due to changes in precipitation and temperature. In temperate regions amphibian breeding has been shifting to earlier dates in response to climate warming (Gibbs and Breisch 2001, Corn and Muths 2002). The distributions of mobile species such as birds are predicted to change in response to shifting climates, however, many less-mobile species such as amphibians may disappear completely if the climate changes dramatically.

Numerous experiments have shown that exposure to ultraviolet radiation results in elevated mortality and malformations in developing embryos and larvae of some species (Tietge et al. 2001; Ankley et al. 2002). Because the amount of ultraviolet

radiation reaching the Earth's surface has increased in recent years, there is suspicion that ultraviolet radiation may have caused or contributed to amphibian declines.

Metapopulation Dynamics and Landscape Ecology

Although many salamander species live their entire lives on land, our most familiar amphibians begin life as aquatic larvae, and then metamorphose into adults. Adults return to aquatic habitats to breed, but many of these species live the majority of their lives distant from water. As a result, modifications to either aquatic or terrestrial habitats can negatively impact amphibian populations. Ideal landscapes for these amphibians contain abundant aquatic habitats, situated close enough to one another that animals can move among them, and nested within upland habitats suitable for adult survival. Amphibians may require distinct habitats for breeding, adult feeding, hibernation, and aestivation (summer dormancy).

A metapopulation has been defined as a set of local populations connected by migrating individuals and with varying degrees of isolation from one another. Local populations, besides being depleted by emigrants and augmented by immigrants, may be subject to extinction through stochastic (probabilistic) events or deterministic events, resulting from habitat degradation. Locales where extinctions occur can also be re-colonized, if habitat remains or becomes suitable. Marsh and Trenham (2001) wrote that in systems where stochastically driven extinctions prevail, landscape-ecological considerations are essential to conservation planning (e.g. patches and corridors must be considered to allow re-colonization). In cases where deterministic extinctions prevail, the emphasis should be on local habitat conservation. An interpretive difficulty lies in the distinction between "landscape" and "local" scales, because dispersal, homing, and colonizing abilities and tendencies vary among species and are still poorly understood.

Marsh and Trenham (2001) emphasized the importance of terrestrial habitat to the

Continued on next page

typical amphibian life cycle, and cautioned that plans that focus strictly on maintaining breeding habitat (e.g. ponds and wetlands) will probably fail to conserve populations. In related work, Pope et al. (2000), studying northern leopard frog (*Rana pipiens*) in Ontario, Canada, found that inclusion of non-breeding summer habitat (meadows) in a statistical model was essential in discerning metapopulation structure; data for frog occurrence in breeding habitat (ponds) were insufficient by themselves.

Semlitsch (2000) presented a conceptual overview of principles for managing populations and communities of aquatic-breeding amphibians, emphasizing (1) the number or density of individuals dispersing from individual wetlands; (2) the diversity of wetlands with regard to hydroperiod or timing and duration of inundation; and (3) the probability of dispersal among adjacent wetlands or the rescue and re-colonization of local populations. A special concern was the loss of small, ephemeral wetlands (<4.0 ha) because they harbor high abundances and species diversities; loss of these wetlands can interfere with metapopulation dynamics of re-colonization and is expected to lead to more local extinctions. Wetlands can be impaired as amphibian habitat through changes in hydrologic cycles. For example, increased predation may occur if hydroperiod (time of flooding) is lengthened or fish are allowed to enter through anthropogenic connections with other bodies of water. By contrast, early drying may prevent amphibians from completing metamorphosis. Natural habitats can be fragmented through logging, farming, road-building, canal construction, and urbanization.

In Minnesota, Lehtinen et al. (1999) evaluated amphibian assemblages in wetlands occurring in tallgrass prairie and northern hardwood forest, using a geographic information system with land-use variables quantified at scales of 500, 1000, and 2500 m. Ten species of amphibians were found; the three commonest were northern leopard frog (*Rana pipiens*), tiger salamander (*Ambystoma tigrinum*), and American toad (*Bufo americanus*). Increasing wetland isolation and road

density were correlated with lower amphibian species richness at all scales in both ecoregions. Proportion of urban land use showed a negative relationship with species richness at all scales in the hardwood forest ecoregion.

Knutson et al. (1999) found that the presence of urban land was negatively correlated with abundance and species richness of frogs and toads. Positive associations were found for upland and wetland forests and emergent wetlands. Edge and diverse habitats that included wetlands showed positive correlations. For Iowa, length of wetland/forest edge showed the greatest positive correlation, whereas the presence of urban land showed the greatest negative. For Wisconsin, the two most significant associations with relative abundance were positive correlations with forest area and agricultural area. Frogs and toads were positively associated with agriculture in Wisconsin but not in Iowa.

In southern California, Griffin and Case (2001) studied arroyo southwestern toad (*Bufo microscaphus californicus*) attached by external belts to radiotransmitters to assess seasonal preferences by males vs. females for different areas of differing substrate, land form, land use, and vegetation types. In general, the toads foraged in and dispersed through a wide range of habitat types found in southern California. The observed patterns showed that female toads preferred terrace and channel habitats over campground, agricultural, or upland habitats, and that male toads occupied channel habitats during breeding season. Toads burrowed preferentially in sand as opposed to other soil types; above-ground activity was not limited by substrate type. Males occurred on agricultural lands increasingly after the breeding season. This toad appears to avoid dense, tall vegetation for burrowing.

In Connecticut, Gibbs (1998) used drift fences fitted with pitfall traps to explore the concept of filters and conduits governing movement by amphibians. This work suggests that dispersal by some but not all frogs and salamanders is influenced by forest borders and streambeds and that edges between forests and roads are less permeable than forest/open land edges.

As reviewed by Trombulak and Frissell (2000), roads have a range of influences on terrestrial and aquatic life. Fahrig et al. (1995) found that road traffic was an important mortality factor for amphibians in Ontario, Canada, and that intensity of traffic on adjoining roads was correlated with reduced density and reduced chorus intensity of frogs and toads. Ashley and Robinson (1996) in Ontario, Canada, near Lake Erie, found that road kill of amphibians was significantly associated with adjacent roadside vegetation, that dispersing young of the year were the principal victims, and that leopard frog (*Rana pipiens*) was the amphibian most commonly killed. Carr and Fahrig (2001) in Ontario, Canada, found that populations of a more vagile (=mobile) species, northern leopard frog, was more adversely affected by road traffic than were populations of the less vagile green frog (*Rana clamitans*). Both species move among habitats during the year, but leopard frog requires three types of habitat, whereas green frog makes use of two.

Gibbs (1998), working in southern Connecticut, correlated traits of various amphibians with their apparent tolerance of habitat fragmentation. He suggested that species with low density, coupled with habitat restrictedness and high mobility could predispose for local extinction due to habitat fragmentation.

In a coastal watershed of Santa Cruz County, Calif., Bulger et al. (2003) documented the seasonal dispersal behavior of radio-tagged adult California red-legged frog showing that adults traveled to and from breeding sites by night and in approximately straight lines, irrespective of topographic or vegetational features. This study occurred mainly within a matrix of diverse native vegetation and did not formally assess the role of roads or other anthropogenic disturbances.

Changed Hydrology

As indicated by Blaustein and Kiesecker (2002), in the arid West extensive seasonal wetlands have been drained or replaced by small permanent ponds. In California, many extensive wetlands have been converted to farmlands, sometimes with associated small

catchments. This pattern may not only remove sensitive amphibian species outright, but it may also exacerbate the interference by non-native invaders that fare better and have greater negative impacts on native species in the new environments.

California owes its agricultural productivity and competitiveness in large part to irrigation technology that enables farmers to put water where they want it when they want it. In turn, irrigated agriculture in California is enabled by a vast and intricate system of dams, reservoirs, canals, catchments, ditches, and irrigation systems. This infrastructure and its management have greatly affected temporal and spatial patterns of water availability to natural communities in much of California (Bugg et al. 1998). Water districts alter flow patterns in all the major rivers flowing into the Great Central Valley except the Cosumnes River. The presence and management of dams affect not only flow but also sediment size and texture, and impact stream dynamics both upstream and downstream. Recharge of groundwater in flood plains can also be impaired. All this can affect the viability of native plants and animals. Reduced groundwater recharge as a result of stream channel incision and reduced flooding has been invoked as a partial explanation for the decline of valley oak (*Quercus lobata*). Also, dam releases cause unnaturally high flows in late spring and early summer, washing away eggs and larvae of foothill yellow-legged frog (*Rana boylei*), a species that reproduces in channels with low flow (Ashton et al., year unspecified).

Dam removal is becoming an accepted practice in river management; although this can reverse some of the trends mentioned above, it carries its own set of potential problems (Stanley and Doyle 2003).

In some cases, artificial wetlands and catchments that enable or result from agricultural water use may seem to mimic natural features of California, yet there are important differences. For example, due to patterns of impoundment, re-channeling, and release, the seasonal abundance of water in many areas may differ profoundly

from natural patterns: Many artificial wetlands and ponds contain water during seasons when it is lacking in nearby, more natural, systems. The converse may also be true. Moreover, wide and rapid fluctuation in water levels, caused by drawdown and refill of catchments, may inhibit the development of native emergent and riparian vegetation, both of which are important in the ecology of amphibians.

Adams (2000), in the Puget Lowlands of Washington state, used enclosure cages to test survival of native northern red-legged frog (*Rana aurora sp. aurora*) or Pacific tree frog in permanent vs. temporary ponds, in combination with bullfrog (*Rana catesbeiana*) larvae or bluegill sunfish (*Lepomis macrochirus*). Native frog larvae survived better in temporary ponds. There was no survival when larvae were caged with sunfish. Caging with bullfrog larvae did not affect Pacific tree frog (*Hyla regilla*) larval survival, and showed mixed results with northern red-legged frog larvae. Pond permanence and introduced species led to reduced survival of native amphibians, but neither explained all the variability in frog larval survival.

Hazell et al. (2003) compared historical and current conditions of stream morphology and dynamics in New South Wales, Australia, to determine changes that have occurred since European colonization, and how these are likely to influence survival of native frogs. The earliest written accounts by European settlers in New South Wales show that streams appeared as chains of permanent ponds with short, shallow, grassy connecting channels that flowed seasonally. Winter flooding created adjoining ephemeral wetlands. The permanent ponds and ephemeral wetlands would have supported differing complexes of frogs, with differing times required for larval development. Flooding also provided wet soil and associated vegetational cover, which are important to newly metamorphosed frogs. Under management by the European colonists, stream management changed: channels are now typically incised, flooding restricted, and vegetation altered. Thus, conditions now differ profoundly from those under which many native frogs are presumed to have evolved.

Kolozsvary and Swihart (1999) in the midwestern U.S. found that the greatest amphibian species diversity was correlated with the presence of wetlands of intermediate permanence.

Tailed frog (*Ascaphus truei*) requires shaded, rocky headwaters for breeding. Increased water temperatures, siltation, and in-channel woody debris associated with clear-cut logging greatly diminish reproduction, according to a study by Dupuis and Steventon (1999), who recommend that creeks with favorable substrates and temperatures be protected by old-growth buffers.

Mineral Nutrients

Nitrogen enrichment of freshwater aquatic systems can occur as the result of land-use patterns and farming systems (Honisch et al. 2002). Data from Marco et al. (1999) suggest that larval amphibians may be especially sensitive to such perturbations, and that adverse effects occur below the thresholds recommended by the U.S. Environmental Protection Agency. This should be considered in recommending practices for agriculture in the region.

In Pennsylvania, Laposata and Dunson (2000) found that, in contrast to natural ponds, ponds with 14-year histories of addition of treated wastewater had higher median conductance, pH, and concentrations of Na, K, Ca, Mg, and N-NO₃. Such ponds developed mats of duckweed (*Lemna* spp.) and, for three amphibian species, had lower densities of egg masses, hatching success, and larval survival.

De Solla et al. (2002), working in the Sumas Prairie of the Lower Fraser Valley of British Columbia, Canada, implicated agricultural runoff and correlated increased ammonia, total phosphate, and biological oxygen demand with decreased hatching of eggs of northwestern salamander (*Ambystoma gracile*) and northern red-legged frog (*Rana aurora sp. aurora*).

[Note: In the next issue of Sustainable Agriculture, this two-part article will continue with discussion of pesticides, associated organisms (e.g. parasites, pathogens, plants, predators, and competitors), and on-farm modifications that may favor native amphibians. The list of references will also be provided.]

SAREP-USDA partnership assists organic feed crop research

Last fall, SAREP was contracted to conduct a survey of organic producers in the western states, in order to evaluate claims concerning the supply and price of certified organic feed crops. SAREP is one of three contractors nationwide providing the United States Department of Agriculture (USDA) with data on acreage trends, crop type, and pricing of certified organic crops used as feed ingredients. SAREP has now begun providing USDA with production data that will help inform policy actions. In March 2003, SAREP submitted a final report to USDA on certified organic feed grain production in the western United States. The report, representing initial results of a survey conducted by SAREP postgraduate researcher **Samuel Prentice** and director **Sean L. Swezey**, characterizes organic feed grain production over the past two years in the western states. The USDA will use SAREP's report as it makes decisions concerning organic regulations. National organic product sales are currently approaching \$12 billion annually, and sales of organic poultry and beef are one of the fastest growing segments.

On Feb. 13, 2003, a last minute rider was added to the Omnibus 2003 Congressional Appropriations Bill that permits organic livestock producers to feed their organic animals conventional feed and still label the products meat, dairy and eggs "organic." The rider was inserted by Georgia Congressman **Nathan Deal** on behalf of Fieldale Farms to exempt the Georgia poultry producer from having to raise its organically marketed poultry on 100 percent organic feed under certain conditions (if the cost of certified organic feed exceeds twice the cost of conventionally-produced feed).

The Congress-approved rider (Section 771 of the Fiscal Year 2003 Consolidated Budget Bill) does not allow funds to be used to enforce the 100 percent organic feed requirement for certified organic livestock operations unless a report prepared by the Secretary of Agriculture confirms that organically produced feed is commercially available at no more than twice the cost of conventionally produced feed. This exemption is in direct contrast to the Organic Foods Production Act of 1990 and the National Organic Standards implemented in October 2002, which require that organically labeled meat, poultry, eggs or dairy products be from livestock fed 100 percent organic feed.

On Feb. 26, 2003, Agriculture Secretary **Ann Veneman** criticized the rider included in the spending bill President Bush signed in mid-February. She said "It is important to maintain a strong organic program that ensures the integrity of the organic label placed on consumer products. The best way to do that is by maintaining the organic standards as we implemented them in October 2002."

Senate (Leahy) and House (Farr) bills were introduced February 26 for the repeal of Section 771 of the Omnibus Appropriations Bill.

[Editor's Note: As this newsletter went to press, the U.S. Senate repealed the exemption that allowed chicken farmers to call their product organic under certain conditions even if the animals ate conventional feed. Approval from the House of Representatives is pending.]

SAREP updates organic farming research Web site

by David Chaney, SAREP

As part of its ongoing efforts to provide ready access to information and resources on sustainable agriculture, SAREP is pleased to present a revised and updated Organic Farming Research and Information section on its Web site (**visit www.sarep.ucdavis.edu/organic/index.htm**). This new section has something for nearly everyone. From one central place, consumers can visit the USDA's National Organic Program Web site and find out more about the law behind the new label. Or they may be interested in reading about the county-based research and extension activities currently underway in California. Farmers and ranchers can access an array of resources to help them develop and refine their organic production systems and stay in compliance with the new national rule, including links to the California state organic program and certifiers operating in California, several databases with organic research results, publications (many items listed are available online free of charge), workshop announcements, and a directory of people involved in organic research in California. Researchers and consultants may benefit from visiting the Organic Farming Research Workgroup page to review the wide range of research activities in organic production and marketing in California, and to participate in online discussions and sharing of ideas and resources. As the new national organic program unfolds this year, we will be adding new information and resources to this section. Stay tuned.

Sustainable ag course offered

Sustainable Agriculture: Principles and Practices, an intensive eight-week summer program, will be offered June 23-August 14, 2003 at the UC Davis Student Farm. Twelve hours of field activities per week are combined with lectures, discussions and field trips to provide an in-depth introduction to sustainable agriculture. UC student status not required for enrollment. Contact **Mark Van Horn**, (530) 752-7645, mxvanhorn@ucdavis.edu.

STAFF ACTIVITIES

SAREP and the UC ANR Organic Farming Research Workgroup coordinated the first UC program focused on organic strawberry production in February at the UC Cooperative Extension, Monterey center in Salinas. SAREP director **Sean L. Swezey**, associate director **Jenny Broome**, education coordinator **David Chaney**, and program assistant **Jeri Ohmart** were joined by other UC and USDA researchers and industry speakers in the presentation of information on organic strawberry certification, economics and production. (See p. 3 for story.)

Sean L. Swezey presented a talk on "Pest management in organic strawberries" and participated in the panel discussion "What's going on in organic research in the land grants?" with **Ron Walser** of New Mexico State University and **Carol Miles** of Washington State University at the Ecological Farming Conference in Asilomar in January. In February he was part of a panel on "Structure and development of California organic production and research" moderated by **Will Horwath** of the UC Davis land, air and water resources department at the American Society of Agronomy's annual Plant and Soil conference in Modesto.

Jenny Broome and her cooperators received a second year of funding from the US-EPA Region 9 FQPA Initiative to conduct research on the use of her grape Botrytis infection risk model on California strawberries. Since January she and her cooperators have been setting up weather stations and research plots. She also finalized the UC Davis College of Agriculture and Environmental Sciences seminar series, *The Science of Sustainable Agriculture: Measuring the Immeasurable*, that begins April 4 and runs through the fall quarter (see story on p. 4).

David Chaney attended the steering committee meeting of the Sustainable Agriculture Network (SAN) in March in Dallas, Texas. SAN, based in Washington, D.C. is the outreach arm of the national USDA-SARE program. Chaney serves as co-chair of the committee, which provides input to SAN on program direction, publication planning and outreach strategies.

Gail Feenstra, SAREP food systems analyst, has been named an associate editor of the *American Journal of Alternative Agriculture* by editor **John Doran**, USDA-ARS soil scientist, Lincoln, Neb. Feenstra joins former SAREP director **Bill Liebhardt** as one of the 32 associate editors.

Gail Feenstra, **Jeri Ohmart**, and **David Chaney** coordinated the final meeting of the five-state leadership team (Calif., Idaho, Ore., Colo., Hawaii) for the USDA Western SARE funded project, "Sharing Resources to Help Connect Farmers to Direct Marketing Niches." They reviewed the impacts of the project and outlined a final *Direct Marketing Workshop Design Handbook*.

Bev Ransom, SAREP BIFS coordinator, worked with the California Dried Plum Board and members of the dried plum (prune) BIFS project management team to conduct a survey of California dried plum growers this winter. She is currently working with dairy BIFS farm advisors and specialists to develop a spring survey of Central Valley dairy producers. The results of these studies, which address current farming practices and knowledge of sustainable practices, will help the BIFS program, as well as industry and UC Cooperative Extension, target research and extension programs to best serve the needs of California growers.

Robert L. Bugg, SAREP senior analyst, was one of 14 science advisers asked to provide independent evaluation of the Eastern Merced County Natural Community Conservation Plan and Habitat Conservation Plan. Bugg also made presentations to 30 Marin County organic farmers on "Integration of the Whole Farm Plan" at a November event organized by Marin Cooperative Extension organic coordinator **Steve Quirt** and **Ellie Rilla**, UC Cooperative Extension farm advisor in Point Reyes Station, and to 100 attendees on "Influencing pest, parasite and predator populations via covercrop management" at a November Mendocino College pest management seminar in Ukiah organized by **Jim Xerogeanes** of the College.

Sam Prentice, SAREP postgraduate researcher, is in the final stages of coordination of the first round of Technical Advisory Panel (TAP) reviews for the National Organic Program (NOP). The TAP review process is part of the NOP's mandate to develop a comprehensive set of national standards governing certified organic systems. Completed TAP reviews are now posted on the Organic Farming Information section of the SAREP Web site under Organic Materials Review Information (<http://www.sarep.ucdavis.edu/Organic/materials.htm>) as well as on the NOP Web Site, which can be accessed from the SAREP site.

VISITORS

Robert Bugg presented a slide presentation on organic agriculture and tour of U.C. Davis Vineyard (in collaboration with vineyard manager **Richard Hoenisch**) to 16 agricultural researchers from Jiangsu Province, People's Republic of China in February. Also in February, Bugg hosted and gave a tour of local farms to **Stefanie Aschmann** of the USDA Natural Resource Conservation Service, Lincoln, Neb.

PRINT PUBLICATIONS

ORGANIC DAIRIES

The Organic Decision: Making the Transition to Organic Dairy Production, 40 pages, 2002, Cornell University Small Farms Program. A new workbook is available to help farmers develop a plan for making the transition from conventional dairy farming to organic production. Cornell Cooperative Extension specialists in consultation with the Northeast Dairy Producers Alliance developed the workbook, which examines the stability and trends of organic milk market, the cost of making the transition (includes budget worksheets), forage yield reductions (includes an inventory balance calculator), and herd health considerations (cull rate, disease incidence, veterinary costs). Those completing the workbook will have a business plan, a budget, and an action plan for the transition. To order, contact **Faye Butts** at (607) 254-7412 or email fsb1@cornell.edu. The cost is \$12.

CALIFORNIA FARMS/BUSINESSES PROFILED

Fruits of Progress: Growing Sustainable Farming and Food Systems, by **Ann Thrupp**, World Resources Institute, 85 pages, April 2002. This study examines the benefits of the "green" transformation in farming and food systems, including certified organic practices and many sustainable approaches. The study is based on case studies in the western region of the U.S., including studies of Del Cabo Farms, Durst Growers, Fetzer Vineyards, Frog's Leap, Full Belly Farm, Lagier Ranches, Lodi Woodbridge Winegrape Commission, Lundberg Family Farms, Natural Selection Foods, Robert Mondavi Winery, Sherman Thomas Ranch, and

Small Planet Foods. The studies reveal how ecologically based practices can generate profits while contributing to the broader goals of sustainable development. \$20. Contact the World Resources Institute, 10 G Street N.E., Suite 800, Washington, DC 20002; www.wri.org.

COMMUNITY-BASED FOOD, AG

Growing Home: A Guide to Reconnecting Agriculture, Food and Communities, **Joanna Green** and **Duncan Hilchey**, Community, Food and Agriculture Program, Cornell University, 151 pages, 2003. Recognizing the economic, ecological and social benefits of food and agriculture systems initiatives, *Growing Home* is designed to provide agriculture development specialists, economic developers, planners, Extension educators, community development advocates, and others interested in strengthening communities with the tools they will need to turn visions into realities. To order the \$25 book (\$17.50 bulk rate), contact **Gretchen Gilbert** at (607) 255-9832 or gcg4@cornell.edu or visit the program Web site at <http://www.CFAP.org>

TWO NEW SAREP PUBLICATIONS ON FARM-TO-SCHOOL LUNCH PROGRAMS AND DIRECT MARKETING VALUE-ADDED PRODUCTS ARE NOW AVAILABLE

- *CRUNCH LUNCH MANUAL: A case study of the Davis Joint Unified School District Farmers Market Salad Bar Pilot Program and A Fiscal Analysis Model*, by **Renata Brillinger**, **Jeri Ohmart** and **Gail Feenstra**, UC SAREP, 54 pages, 2003. This manual is part of an effort to support other school districts interested in piloting a salad bar project. It describes the Davis, Calif. case in detail, including the planning, fundraising and organizing phase, the implementation phase, the expansion and institutionalization phase and modifications to move toward sustainability. Appendices offer practical information such as an equipment list, weekly produce demand lists, a guideline for daily food quantities ordered, sample menus, etc. The manual also includes a fiscal analysis model including an overview of nutrition services finances, sources of revenue, a profit/loss analysis, and calculating the break-even point. Each section offers lessons learned from the Davis experience. The manual also includes a list of resources for farm-to-school efforts in California and nationwide. Printed copies of the manual are available from SAREP and Occidental College. At SAREP contact Gail Feenstra, gwfeenstra@ucdavis.edu, or Jeri Ohmart, jlomart@ucdavis.edu. At Occidental contact **Mark Wall**, mwall@oxy.edu, at the Center for Food and Justice. The manual will be available on SAREP's Web site (www.sarep.ucdavis.edu) in PDF format by June 2003.
- *Direct Marketing with Value-Added Products (or "give me the biggest one of those berry tarts!")*, by **Jeri Ohmart**, is now available on SAREP's Web site at <http://www.sarep.ucdavis.edu/CDPP/valueadded.htm>. This case study is one of six cases (three of farmers markets and three of direct marketing strategies) included in a tri-state study (California, New York and Iowa) examining the ways farmers markets encourage rural enterprises and small farm businesses. This particular case showcases a variety of farmers who use value-added products to enhance their businesses at farmers markets.

SUSTAINABILITY IN OREGON

Looking for Oregon's Future: What is Sustainability? Oregon State University Extension Service Publication EM 8784. This award-winning, free, tabloid-format publication uses 33 newspaper-style stories to explore issues and examine citizen efforts linked to Oregon's future. **Peter Bloome**, associate director of the OSU Extension Service said the events of September 11 helped underscore the importance of all dimensions of sustainability: economic, environmental and social. The publication is available free of charge for multiple copies, including shipping and handling. To order, call (800) 561-6719, email puborders@orst.edu, or write to Publication Orders, Extension & Station Communications, OSU, 422 Kerr Administration, Corvallis, OR 97331-2119. A brief study guide also is available.

WESTERN SARE GRANTS PRE-PROPOSALS, PROPOSALS

The USDA's Western Sustainable Agriculture Research and Education (WSARE) program is releasing calls for proposals (and in one category pre-proposals) for its competitive grants in research and education, professional development and farmer and rancher projects. A pre-proposal format is required for research and education grants; the call for pre-proposals was released Apr. 1, 2003, with pre-proposals due **June 9, 2003**.

Pre-proposals are not required for farmer/rancher or professional development program grants. Those calls for proposals were announced Apr. 1, with deadlines of **Oct. 1, 2003** for the farmer/rancher grants and **Oct. 15, 2003** for the professional development grants. The farmer/rancher grants encompass three subcategories: the basic farmer/rancher grants, marketing systems grants and organic systems grants. In a separate call for proposals, agricultural professionals may apply for "Ag Professional + Producer" grants, in which a producer, or several producers, serves as an advisor to the grant applicant, who may be extension or National Resource Conservation Service personnel, consultants or other ag professionals.

Calls for pre-proposals and proposals, as well as funded project results, are available at the program's Web site <http://wsare.usu.edu>, or by contacting the Western SARE office at Utah State University at (435) 797-2257 to request an application.

Four regional councils implement the national SARE program, which was mandated by Congress in the 1985 and 1990 Farm Bills and extended by the 1995 Farm Bill reauthorization. Western SARE is coordinated by Utah State University soil scientist **V. Philip Rasmussen** and led by an administrative council that represents diverse agricultural, business, producer, and public interests in the West. The Western Region includes Alaska, American Samoa, Arizona, California, Colorado, Guam, Hawaii, Idaho, Micronesia, Montana, Nevada, New Mexico, N. Mariana Islands, Oregon, Utah, Washington, and Wyoming.

EPA GRANTS FOR FQPA TRANSITION

The U.S. Environmental Protection Agency (EPA) Region 9 (California, Nevada, Arizona, Hawaii, Pacific Trust Islands) is continuing a grant program to help implement the Food Quality Protection Act (FQPA) and support "transition" efforts by growers. State agencies, universities, Cooperative Extension, Tribes, and non-profit organizations are eligible to submit proposals. Both new and existing projects will be considered. Proposals must be postmarked by **April 25, 2003**. For more information, contact **Cindy Moore Wire** at (415) 947-4242, or

ORGANIC RESEARCH GRANTS

The Organic Farming Research Foundation offers research grants of up to \$15,000; applicants are invited for consideration in its twice-yearly funding cycle. Funds are offered for organic farming research, dissemination of research results to organic farmers and growers interested in making the transition to organic production and consumer education on organic farming issues. The foundation's on-farm research guide gives an overview of the research process and is accessible through OFRF's Web site (www.ofrf.org) under "research program" or can be ordered free of charge by calling OFRF at (831) 426-6606. The deadlines for proposal consideration are

July 15 for the fall funding cycle and **January 15** for the spring funding cycle. Contact **Jane Sooby** at OFRF, PO Box 440, Santa Cruz, CA 95061 or email research@ofrf.org or jane@ofrf.org

ORGANIC RESEARCH & EXTENSION INITIATIVE

The 2002 Farm Bill mandated \$15 million for the Organic Agriculture Research and Extension Initiative to be spent at \$3 million a year from FY 2004 to FY 2008. The purpose of the program is to fund research that will enhance organic producers' and processors' ability to grow and market high quality organic food, feed and fiber. The program will be managed at the USDA Cooperative State Research, Education, and Extension Service (CSREES). CREES will be requesting applications approximately October 2003, which will likely be due in December, or in January 2004. Farmers may apply independently, but are strongly encouraged to have a county Extension Specialist connection to a university or other institution. For more information, see administrative recommendations compiled by the Organic Farming Research Foundation and Scientific Congress on Organic Agricultural Research at: <http://ofrf.org/policy/index.html>. Or contact **Tom Bewick**, tbewick@reeusda.gov (202) 401-3356.

SAREP REQUEST FOR PROPOSALS

SAREP has released a Request for Proposals (RFP) to support research and education projects on sustainable food systems. Targeted topic areas include: direct or regional marketing/distribution systems (demonstration or pilot projects) and social and economic analyses of conventional or alternative food systems. Proposals are due **May 1, 2003**. Total funding available is approximately \$80,000 with typical awards of \$10,000 to \$20,000. Grants are available to individuals affiliated with California public or private educational institutions, with California non-profit, tax-exempt organizations, or with federal or state government agencies. For complete guidelines on how to apply, see the full RFP on SAREP's Web site at: www.sarep.ucdavis.edu/grants/RFP/2003/RFP2003.htm. SAREP's Web site also has information about previously funded projects. A print version of this RFP may be requested by calling (530) 752-7556. Questions about these grants may be directed to **Gail Feenstra**, food systems analyst (gwfeenstra@ucdavis.edu, 530-752-8408) or **Bev Ransom**, grants manager (baransom@ucdavis.edu, 530-754-8546).

CALENDAR

*SAREP WEB CALENDAR AND ONLINE COURSE

SAREP offers a regularly updated sustainable agriculture calendar on our World Wide Web site at: www.sarep.ucdavis.edu (click "Calendar" on top menu bar). Please feel free to add sustainable agriculture events. In addition, we offer an online course for pest control advisers and others titled *Ecological Pest Management in Grapes*. Up to 11 CE credits for California PCAs. See www.sarep.ucdavis.edu/courses/grapes/

*NATIONAL/INTERNATIONAL CALENDAR

The National Agricultural Library maintains a calendar as part of AgNIC at www.agnic.org. It links to more than 1,200 major national and international agricultural conferences.

*MONTHLY MEETINGS

Lighthouse Farm Network. The Community Alliance with Family Farmers Foundation sponsors informal monthly meetings for growers to discuss issues related to pesticide use reduction. Contact: Molly Johnson, (530) 756-8518, ext. 30, molly@caff.org; www.caff.org

APRIL

4 Sustainable Ag Series, UC Davis. 1st in a series Fridays, spring/fall qtrs. @ UCD. "The Science of Sustainable Agriculture in a Context of Disciplinary & Private Knowledge," William B. Lacy, UCD vice provost/prof. All lectures are 12:10 to 1 P.M., Rm. 3001, Plant & Environmental Sciences bldg., UCD. (See story p. 4)

8-10 Artisan Cheese Production Workshop, Orland. 3-day workshop for novice & experienced cheese makers, focusing on commercial cheese making. Hands-on experience in small-scale cheese production; information on safe production of a food product on the farm, demands of vertical integration of a business, design/maintenance of curing rooms, equipment selection/layout, plant design, cost of production analysis, artisan cheese marketing & market research, challenges of direct marketing/promotion. Hands-on cheese making at Pedrozo Dairy & Cheese Company; classroom lectures at Glenn County Cooperative Extension office. Contact Barbara Reed, (530) 865-1107, bareed@ucdavis.edu.

8-10 4th Nat'l IPM Symposium/Workshop, Indianapolis, IN. "Building Alliances for the Future of IPM." Register online: www.conted.uiuc.edu/ipm or <http://nautilus.outreach.uiuc.edu/conted/conference.asp?ID=244>. Speakers include SAREP's Sean Swezey, Jenny Broome. Information: ipmsympo-sium@ad.uiuc.edu.

11 Sustainable Ag Series, UC Davis. "Intensive Cereal Production Systems for Global Food Security & Protection of Natural Resources," Kenneth Cassman, University of Nebraska. See Apr. 4 listing.

18 Sustainable Ag Series, UC Davis. "Globalization & Its Impact on California Agriculture," William Friedland, UC Santa Cruz. See Apr. 4 listing.

25-29 California Grazing Academy/Low-Stress Livestock Handling School, UCCE Sierra Research and Extension Center, Browns Valley. Emphasizes practical application of controlled grazing principles to improve environment, increase ranch profit. Maximum hands-on experience. Cost: \$295 includes meals, lodging and course materials. Contact: Roger Ingram (530) 889-7385; rsingram@ucdavis.edu; http://ceplacemevada.ucdavis.edu/Livestock/California_Grazing_Academy_-_Low-Stress_Livestock_Handling_School.htm

MAY

2 Sustainable Ag Series, UC Davis. "Strategies for Sustainability in Agriculture: A European Perspective," Floor Brouwer, Ag Economics Res. Institute, The Hague, Netherlands. See Apr. 4 listing.

9 Sustainable Ag Series, UC Davis. "Measuring Sustainability: Learning by Doing," Simon Bell, Center for Complexity & Change, The Open University, UK. See Apr. 4 listing.

16 Sustainable Ag Series, UC Davis.. "Civic Agriculture & Food Citizenship: Sustaining Local Food Systems in a Globalizing Environment," Thomas Lyson, Cornell University. See Apr. 4 listing.

23 Sustainable Ag Series, UC Davis. "Agricultural Production & Climate Changes," Cynthia Rosenzweig, NASA, Goddard Institute for Space Studies. See Apr. 4 listing.

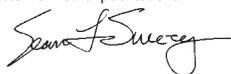
30 Sustainable Ag Series, UC Davis. "Economic Policies to Encourage Sustainable Agriculture--Some Examples from Irrigated Crop Production," Richard Howitt, Agricultural & Resource Economics, UCD. See Apr. 4 listing.

JUNE

6 Sustainable Ag Series, UC Davis. "Intensive Agriculture & the New Malthus: A Perspective from India," Glenn Davis Stone, Washington University, St. Louis. See Apr. 4 listing.

18-20 American Society for Enology & Viticulture 54th Annual Meeting, Reno, NV. Includes all-day session "Science of Sustainable Viticulture," June 20, including talks by SAREP's Jenny Broome, Chuck Francis, Cliff Ohmart, Kris O'Conner, Glenn McGourty, Paul Dolan, Mitchell Klug, John Williams, Kendra Baumgartner, John Reganold. For more information contact American Society for Enology and Viticulture, (530) 753-3142, society@asev.org or on the Web <http://www.asev.org>

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