

# SUSTAINABLE AGRICULTURE

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## Slowing diversity loss: DIVERSITAS conference at UC Davis

Unprecedented changes in biological diversity at the genetic, species and ecosystem levels was the impetus behind the creation of DIVERSITAS, an international partnership to promote scientific research on biodiversity. For more than 10 years this multidisciplinary network of scientists has worked to address scientific priorities for biodiversity research in four core projects: bioGENESIS (genetic diversity), bioDISCOVERY (evolutionary biology), ecoSERVICES (ecosystem services) and bioSUSTAINABILITY (societal benefits).

**Louise Jackson**, a professor and affiliate of the UC Davis Agricultural Sustainability Institute (ASI), UC Extension Specialist and the John B. Orr Endowed Chair in Environmental Plant Sciences in the UC Davis Department of Land Air and Water Resources, recently hosted an international DIVERSITAS meeting at the UC Davis campus.

“Hosting the 2008 DIVERSITAS meeting on agrobiodiversity in Yolo County gave us the opportunity to show international experts the innovative landscape-scale research we’re doing on crop rotations, farmscaping, and ramifications for climate change,” said Jackson.

Her work focuses on using and conserving biodiversity within agricultural ecosystems, reducing the impacts on wildland ecosystems, and developing policies for sustaining biodiversity in agricultural landscapes. She is a member of the UC Davis Sustainable Agriculture Farming Systems (SAFS) project team that has been comparing Central Valley crop rotations

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## SLOWING CONTINUED FROM PAGE 1

and various sustainable farming practices since 1988.

DIVERSITAS is a partnership of inter-governmental and non-governmental organizations formed to promote scientific research on biodiversity – its origin, composition, ecosystem function, maintenance and conservation. The April 2008 week-long conference at UC Davis included participants from Brazil, Mexico, Italy, The Netherlands, Great Britain, India, France and Germany.

“One of the most important goals of DIVERSITAS is to provide accurate scientific information and predictive models of

cycling and resistance to climate and other environmental changes.

“Assessing the role of biodiversity in agricultural landscapes, and understanding how to conserve and use biodiversity as a management tool for sustainable agriculture, are major scientific challenges of our time,” she said.

Jackson is co-chair of the DIVERSITAS agroBIODIVERSITY network, which encompasses six projects where scientists have joined local stakeholders working toward a biodiversity-friendly agricultural model based on concerns about agricultural intensification

and the conviction that worthwhile alternatives exist and can be promoted. This involves an ecosystem approach in which integrated biophysical and socio-economic disciplines of sci-

ence reach out to understand the spectrum of patterns and processes that define certain kinds of systems, enhance the functions and services of these systems, and allow replication of innovation elsewhere. The main focus is on the tradeoffs between production of agricultural goods vs. agrobiodiversity utilization and conservation in agricultural landscapes, and the pathways by which both can be used to their best advantage.

Global comparisons also are relevant at a larger scale. Agrobiodiversity has, up until now, been under-represented in the policy debates concerning tradeoffs between environmental quality, human health, agricultural productivity, and livelihoods, Jackson said. This work will stimulate more academic awareness of the need for integrative biophysical and socioeconomic science, which will generate more policy-relevant studies in additional regions.

The UC Davis series of events included a week of seminars and a tour of the region. The first event was, “Biodiversity and

Ecosystem Services in Agricultural Landscapes Symposium,” in which members of the DIVERSITAS agroBIODIVERSITY network [diversitas-international.org/](http://diversitas-international.org/) gave presentations to the UC Davis community. Symposium sessions included functions of biodiversity in agricultural landscapes, societal benefits and rewards provided by agrobiodiversity, agrobiodiversity and social-ecological “sustainability,” and incorporating agrobiodiversity in modeling social-ecological resilience. The symposium ended with a panel discussion on agrobiodiversity and climate change. PDF files of the presentations are posted at <http://agrobiodiversity2008.com/symposium.html>.

Symposium participants toured Yolo County organic farms operated by **Bruce Rominger, Jim** and **Deborah Durst**, the Audubon Bobcat Ranch, and Quail Ridge UC Natural Reserve, all of which represent different research and management efforts to conserve biodiversity. Also included was a visit to the UC Davis Russell Ranch Sustainable Agriculture Facility, site of the Long Term Research on Agricultural Systems (LTRAS) project, to discuss potential research opportunities.

The workshop was supported by BESTnet, [ecoservices.asu.edu/bestnet/](http://ecoservices.asu.edu/bestnet/), a National Science Foundation (NSF)-supported Research Coordinating Network. BESTNet aims to bring the benefits of international interdisciplinary research on biodiversity, ecosystem services and human well-being to research students in U.S. universities through a set of networked research and research training activities. Additional funding was from DIVERSITAS, the UC Davis College of Agricultural and Environmental Sciences, the ASI, the campus Department of Land, Air and Water Resources, and the Kearney Foundation of Soil Science.

For more information about the DIVERSITAS conference and the papers presented, please see the link on the ASI Web site: [http://asi.ucdavis.edu/publications/papers\\_presentations.htm](http://asi.ucdavis.edu/publications/papers_presentations.htm).

## Assessing the role of biodiversity in agricultural landscapes, and understanding how to conserve and use biodiversity as a management tool for sustainable agriculture, are major scientific challenges of our time.

the status of biodiversity,” Jackson said. “We can then use those models to find ways to support a more sustainable use of the Earth’s biotic resources. These models add value to national and regional biodiversity research projects like ours.”

Jackson said one of the most useful outgrowths of DIVERSITAS has been the establishment of international, multidisciplinary networks of scientists that look at specific topics of global importance. The organization is also a founding member of the Earth System Science Partnership.

“The main reason we care about this biodiversity loss is not only because of the aesthetic, ethical or cultural values, but also because it could have numerous far-reaching – and often unanticipated – consequences for our life-support system,” she said.

Jackson noted that one of the most worrisome possibilities is a reduction in the capacity of natural and managed ecosystems to deliver ecological services, such as production of food and fiber, carbon storage, nutrient

# Measuring healthy soil communities

by Tianna DuPont, UC Davis Integrated Pest Management Graduate Group



[NOTE: The ASI/SAREP newsletter occasionally highlights research by graduate students working with ASI-affiliates and affiliated faculty. **Tianna DuPont** worked with **Howard Ferris**, professor in the UC Davis Department of Nematology. Ferris has developed soil health indicators that measure nematode communities in various farming systems. DuPont worked with Ferris on two projects aimed at better understanding prairie grassland and other natural ecosystems. Their cover crop work was done at the UC Davis Student Farm, an ASI-affiliated program.]

Soils are dynamic living interfaces, rich with millions of species of organisms. Diverse- active communities of soil bacteria, fungi, protozoa, nematodes and insects are critical to healthy soil systems and healthy plants. For example, soil organisms rip and tear, digest and decay organic material, providing a biotic fertilizer to feed crops. Other communities attack pest organisms, regulating their numbers and protecting crops.

**Howard Ferris** and I are using soil biology to help identify sustainable agricultural systems. Working with **Mark Van Horn**, UC Davis Student Farm, and the Land Institute, Salina, Kansas, we have focused on microscopic soil-dwelling nematodes. More than 500 nematodes can be found in just one teaspoon of soil. Diverse and abundant, nematodes tell us about the size and activity of soil biological communities.

A model agroecosystem would produce nutrient rich food without outside imports. Tall grass prairie meadows in Kansas are unique in their ability to produce a crop, annually mowed hay, for over 75 years with no fertilizers or decreases in production. In contrast, adjacent wheat fields require up to 100 pounds of nitrogen fertilizer per acre. We are working with a team of researchers from the Land Institute and six collaborating universities to study which organisms and processes make it possible for prairies to maintain production sustainably.

The group has found that prairies maintained higher soil quality and supported diverse populations of soil organisms associated with greater pest suppression and nutrient cycling. Aboveground, perennial fields harbored greater numbers and diversity of insect pollinators and decomposers. With no fertilization, prairie yields were comparable to those of high input wheat with only eight percent of infield-energy costs. Throughout the entire watershed, prairies were associated with less water pollution from riverine nitrate. The group has proposed that harvested perennial grasslands may provide important ecological benchmarks for agricultural sustainability.

At the UC Davis Student Farm, we tested ways to maintain healthy soil communities found in prairies and other natural systems in our crop rotations today. Cover crops are a useful tool for farmers. Grown before cash crops, cover crops add nitrogen and organic matter to the soil. We grew three combinations of cover crops providing varying levels of carbon and nitrogen to soils and biological communities. We learned that growing a cover crop increases the number of beneficial nematodes by up to 70 percent. Cover crop mixtures containing legumes increased the activity of nematode communities associated with nitrogen cycling, indicating enriched soils with sufficient resources and active decomposition. Release of nitrogen by active biological communities under cover crops may increase crop productivity and increase profits to farmers.



Compost, seen here at the UC Davis Student Farm, is a useful way of adding organic matter to soil. Organic matter provides food for all soil organisms, including bacterial- and fungal-feeding nematodes, which are integral components of healthy soils. (photo by Mark Van Horn)

## Sustainability science: Not an ivory tower

Most of us have noticed that interest in “sustainability” has exploded, in part because of mounting scientific evidence of emerging sustainability challenges at the global scale. Right here in Davis in April, ASI colleague **Louise Jackson**, a professor and UC Extension Specialist in the land, air and water resources department, hosted an international meeting of DIVERSITAS, a partnership of scientific organizations worldwide working to slow biodiversity loss so drastic many call it the “Sixth Extinction” (see, “Slowing diversity loss: DIVERSITAS conference at UC Davis,” page 1).



A.G. Kawamura

Our own California Department of Food and Agriculture (CDFA), headed by innovator **A.G. Kawamura**, has talked about how our state’s agriculture won’t be sustainable unless there is a comprehensive effort to understand the fundamentals that will determine future productivity. At the same time, he has happily welcomed the growing relationships among California’s diverse stakeholders, and has called on the State Board

of Food and Agriculture to create a strategic vision for California agriculture that engages the public, farmers and ranchers, and recognizes and highlights the importance of the sustainability of agriculture. Listening sessions are now scheduled throughout the state. For information on how to get involved, go to [www.cdfa.ca.gov/agvision](http://www.cdfa.ca.gov/agvision). The remaining sessions are scheduled in July.

At the campus level, we at the Agricultural Sustainability Institute are focusing on two areas we hope will supply some of the science that may be useful to Secretary Kawamura’s initiative. I’d like to share some information here about two useful tools, assessments and indicators, which I have developed with graduate students **Kelly Garbach** and **Alida Cantor**. We presented this information at the California Agroecosystem Services workshop last fall at UC Davis, which was co-sponsored by ASI, the UC Agricultural Issues Center, the California Institute for the Study of Specialty Crop at Cal Poly San Luis Obispo, CDFA and the state Resources Agency. We believe the way we examine and assess issues and indicators will lead us to sustainability solutions.

We have our work cut out for us.

California is viewed throughout the world as a leader in

agriculture, science, policy and action for sustainability. But, we have lagged behind international practice in the application of proven integrated assessment methods that can produce information needed to make changes. An integrated assessment of California’s agriculture and food system, building on lessons from successful international assessments, could provide a practical, science-based framework to organize data on sustainability trends and help us tackle the big sustainability issues in California’s food system.

We need a set of scientifically validated indicators that could be used by many stakeholders to benchmark trends in sustainability in California’s agriculture and food system. These indicators will reveal where there has been progress and where there are problems, whether there are tradeoffs across some objectives, which strategies and responses can be most effective in addressing problems and balancing tradeoffs, and where knowledge gaps matter most. Indicators will also create the ability to monitor changes, assess risks, and anticipate emerging sustainability challenges and opportunities.

Use of these indicators provides a means to engage across a range of stakeholders, and thereby contributes to an evolving consensus on the practical meaning of agricultural and food system sustainability in California. In addition to providing the scientific foundation for an operational definition of sustainability for California’s agriculture and food system, the sets of sustainability indicators could contribute to development of standards and a long-term strategic vision for the future of California’s food system.

One of the most important pieces of our work in sustainability is the need to conduct regular consultations with a wide range of stakeholders to ensure the necessary focus on “real world” issues and opportunities. Specifically, through ongoing consultations with policymakers, the agricultural community, environmentalists, and a variety of other users, we’ll be able to ensure that assessment questions respond to users’ information needs and that indicators are measured in ways that not only are scientifically valid but also are useful and meaningful to policymakers and the public.

At the ASI, faculty researchers and both graduate and undergraduate students are working with stakeholder groups in jointly framing the assessment agenda. Based on the assessment of user needs, we will convene scientific working groups to analyze driving forces (i.e., population and migration, urban/suburban expansion, climate change, price trends in energy and other commodities, technologi-

cal change, changing consumer preferences) and assess available scientific data on conditions and trends for a comprehensive range of products and environmental services from California agriculture.

At UC Davis and with our statewide UC partners, we're building capacity and are providing an institutional home for a cumulative, continuous process of expansion, updating, quality control, synthesis and translation of sustainability indicator sets of credible, useful knowledge on sustainable agriculture and food systems in California. Through regular contact with other national and international groups and institutions we expect to expand the understanding of best practices and broaden perception of workable alternatives. To that end, we are preparing Web-based platforms and other media for widespread communication and dissemination of sustainability indicator sets and other assessment products. Stay tuned!



I am very happy to invite you to join us Tuesday, June 17 at UC Davis' Russell Ranch Sustainable Agriculture Facility for the annual field day of the venerable Sustainable Agriculture Farming Systems (SAFS) project, now in its 21<sup>st</sup> year. **Len Richardson**, the highly respected editor of *California Farmer* magazine, is the keynote speaker. Our own ASI deputy director **Kate Scow** has been involved in the SAFS project for nearly 20 years, as have many of the ASI affiliates. The SAFS project coordinator, **Will Horwath**, was recently appointed the inaugural holder of the J.G. Boswell Endowed Chair in Soil Science in the land, air and water resources department, a high honor. The field day will include an equipment demonstration and a delicious local, seasonal lunch. For more information on joining us, see "Sustainable agriculture field day," page 10.

— Tom Tomich, director, UC Davis Agricultural Sustainability Institute,  
and director, University of California Sustainable Agriculture  
Research and Education Program

## Ecosystem assessment in Kuala Lumpur

by Kelly Garbach, UC Davis Ecology Graduate Group

Kuala Lumpur was perhaps the perfect spot in April for a group of international scientists to meet and discuss ecosystem assessment. The city is a jumble of different styles of architecture, food, and cultures. Yet somehow the result is delightful and engaging combination. Pedestrians in the city center bustle below the slick Petronas Towers and immaculate fountains in the central park, giving the impression of an ultra modern, almost space-age city. Just a few blocks away a Buddhist temple, replete with smooth tile floors and golden statues, offers a very different image. A reminder of an unhurried era, the temple has numerous visitors, many who stop in on a break between downtown errands. Even a short ride on the metro results in "full-on" sensory stimulation: Many ads are in English, and passengers chat in Bahasa Malay, Mandarin and several other languages.

Meeting participants were working on Sub-Global Ecosystem Assessments, a portion of the *Millennium Ecosystem Assessment* (MA). The MA was initiated in 2001 by the United Nations to assess the consequences of ecosystem change for human well-being and the action needed to enhance the conservation and sustainable use of those systems; it has involved the work of more than 1,360 experts worldwide. People from all over the world came to talk about the state of ecosystems in our home countries and how we understand and evaluate them. Men and women of all ages and cultural backgrounds worked together to facilitate group discussions and presentations for attendees. The most frequent theme was how to successfully merge local knowl-

edge systems, cutting-edge science, and assessment techniques to serve both communities and decision makers. It's no small feat to diplomatically facilitate debates on such socially and scientifically charged topics. Perhaps that's why the attitude of respect and careful listening that dominated the meetings felt so noteworthy. I wondered if some of Kuala Lumpur's remarkable qualities of integration were working their magic—it is called home by international jetsetters, night hawkers at food markets, and pilgrims alike.

Upon returning home, I found that many of the same elements are being echoed in **Tom Tomich's** graduate seminar on Agroecosystem Assessment. Critical debate revolves around how to bridge gaps among science, policy, and community groups. Faculty sponsor Tomich leads and moderates discussions, along with the students in the class. Graduate student participants are reviewing the Ecosystem Assessment Manual, a guide for practitioners that was written by a working group that met in Kuala Lumpur. The approach for both the graduate seminar and professional meeting is to find points of commonality and overlap in our experiences and perspectives. Somehow everyone is remarkably patient and engaged with the process. Perhaps Kuala Lumpur's exotic cultural backdrop wasn't the main force behind our desire to work and learn from each other. Maybe the timeliness of ecosystem assessment and growing awareness of our roles in shaping the health and longevity of these critical systems is its own motivation.

## Notable events

Compiled by Lyra Halprin, ASI/ SAREP

### Honors

**Will Horwath**, of the UC Davis land, air and water resources has been appointed the inaugural holder of the J.G. Boswell Endowed Chair in Soil Science. Horwath, a professor of soil biogeochemistry, has written more than 80 peer-reviewed papers and has secured millions of dollars in research grants from highly competitive state and federal funding sources. He has participated in many research projects at the UC Davis Russell Ranch Sustainable Agriculture Facility, where he is the associate director, and is the project coordinator of the Sustainable Agriculture Farming Systems (SAFS) project that has now been combined with the Long Term Research on Agricultural Systems (LTRAS) plots at the Russell Ranch. He is also vice chair of the land, air, and water resources department. His teaching focus is on nutrient dynamics in farming systems.



Ryan Galt

**Ryan Galt**, ASI affiliate and assistant professor in the UC Davis human and community development department, received the Eric Wolf Prize from the Political Ecology Society of the Society for Applied Anthropology. The annual prize is given to the best paper from dissertation research submitted to the *Journal of Political Ecology*. His entry was, “It just goes to kill Ticos’: national market regulation and the political ecology of farmers’ pesticide use in Costa Rica.” Galt’s paper, “Pesticides in export and domestic agriculture: Reconsidering market orientation and pesticide use in Costa Rica,” has been published in the journal *Geoforum* [Geoforum 39 (3):1378–92].

### New ASI staff

**Karen Thomas** has joined ASI as the new proposal coordinator/grant writer. Thomas, a native of Saint John, New Brunswick, Canada, comes to ASI from Toronto, where she worked as a senior advisor for the Ontario Ministry of the Environment managing grant projects, developing a new funding program for communities impacted by environmental spills, and contributing to research and policy analysis on topics such as children’s environmental health, source water protection, and air quality. She has a doctorate in comparative public policy from McMaster University. At ASI, Thomas will have primary responsibility for coordinating the development and submission of multidisciplinary and collaborative grant proposals. She will also track ongoing grant funding opportunities, monitor and support grant reporting requirements, and assist the UC Davis College of Agricultural and Environmental Sciences Advancement Office in developing ASI’s fundraising proposals to philanthropic organizations. She is working out of the main ASI office, 143 Robbins Hall.

### Terrestrial speakers

**Tom Tomich**, ASI director, and **Gail Feenstra**, ASI/SAREP food systems analyst, participated in the Monterey Bay Aquarium’s *Cooking for Solutions* conference in May aimed at national and international chefs and food and environmental media. The conference features what organizers call “aqua- and terrestrial-experts”; Tomich and Feenstra were among “the terrestrials.” Tomich participated in the panel “Environmental Change & the Future of Food: Part 1 (The Science),” while Feenstra was on the panel “Local vs. Sustainable: Sourcing & Supporting Sustainable Farming & Seafood.”

### Co-authors

**Pamela Ronald** and **Raoul Adamchak** are co-authors of *Tomorrow’s Table: Organic Farming, Genetics and the Future of Food*, published in April by Oxford University Press. Adamchak, an ASI-affiliate, is coordinator of the Market Garden at UC Davis’ Student Farm. He has grown organic crops for more than 20 years and has been a partner in Yolo County’s Full Belly Farm, and an inspector for California Certified Organic Farmers. Ronald is a professor in UC Davis’ plant pathology department; her laboratory produced rice that is genetically engineered for resistance to diseases and flooding. A husband-wife team, their book explores the juncture where genetic engineering and organic farming can meet to ensure environmentally sustainable food production.

### Meeting

**Tom Tomich**, ASI director, organized and led a special open session gathering of 29 academic leaders at the annual W.K. Kellogg Foundation Food and Society Gathering at Wild Horse Pass near Phoenix, Ariz. at the end of April to plan a national university network on sustainable food systems.

### Feenstra keynotes

**Gail Feenstra**, food systems analyst for ASI and the statewide Sustainable Agriculture Research and Education Program (SAREP), was the keynote speaker at a food system assessment conference, “Planting Prosperity, Harvesting Health: Trade-offs and Sustainability in the Oregon-Washington Regional Food System,” in Portland, Oregon in April.



Gail Feenstra

The Institute of Portland Metropolitan Studies, Portland State University, just completed a two-year comprehensive food system assessment of its metropolitan area.

## EPA grants

**Marshall W. Johnson**, of the UC Riverside entomology department, and **Kent Daane**, Cooperative Extension Specialist, UC Berkeley environmental science, policy and management department, were recipients of grants from the U.S. Environmental Protection agency Region 9 through its Strategic Agricultural Initiative/Food Quality Protection Act Grant Program for two projects that include ASI affiliates.

Johnson's project, "A Biorational Alternative to High-Risk Pesticides Aimed at Oriental Fruit Moth in California Canning Peaches," received \$98,844 for 2008. ASI affiliates working on the project are **Robert L. Bugg**, agricultural ecology analyst at SAREP and ASI, and **Ryan Galt**, ASI affiliate and assistant professor in the UC Davis human and community development department.

Daane's project, "Developing Biologically Integrated Farming Systems for Romaine Lettuce on California's Central Coast," received \$99,800 for 2008. Bugg, Galt and ASI-affiliate **Pierre Mérel**, an assistant professor in the UC Davis agricultural and resource economics department, are working on the project.



Katherine Cooper (left) and Amber Ma, SSA members, at Local Food Week. (photo by Danielle Lee)

## Local food week success

A bike tour of the Student Farm, taste-testings, a photo exhibit, films and the campus farmers market were among the free events open to the public during Local Food Week at the end of April at the UC Davis campus. Sponsored by ASI-affiliate Students for Sustainable Agriculture (SSA), the week is part of their efforts to engage the campus and community in an approach to agriculture that balances social justice and ecology. "Eating locally decreases the number of 'food miles,' helps support small-scale family farms and strengthens the local economy," said **Danielle Lee**, SSA member and a Local Food Week organizer. "We were thrilled with the community participation in 2008."

# Ag secretary, board invites farmers, public to participate in California ag vision

The California State Board of Food and Agriculture and the California Department of Food and Agriculture (CDFA) are conducting a series of listening sessions that will provide a forum for the agriculture industry and public to provide input into California's strategic agricultural vision planning. This vision will be used to guide public policy and investment priorities at the state and national level for the next 20 years.

"California has always been the land of innovation and opportunity – now is the time to be innovative and bring many different voices and views together to create a mutual understanding of food, fiber and fuel policy and how it can be beneficial to all," said **A.G. Kawamura**, CDFA secretary.

He said that public input is essential for the agricultural vision to fully represent California, including farmers, ranchers and processors as well as nutrition, conservation and rural development groups. The state board and CDFA are hosting statewide listening sessions that began in May and continue through July (see sidebar at right).

More information about the California Agricultural Vision process and session venues can be found at [www.cdfa.ca.gov/agvision](http://www.cdfa.ca.gov/agvision).

## Listening Session Schedule

### San Luis Obispo Listening Session

Tuesday, July 1  
12 p.m. – 3 p.m.  
San Luis Obispo County Farm Bureau  
651 Tank Farm Road  
San Luis Obispo, CA 93401

### Tulare Listening Session

Wednesday, July 2  
10 a.m. – 1 p.m.  
Agricultural Heritage Center  
4500 S. Laspina Street  
Tulare, CA 93274

### Oxnard Listening Session

Monday, July 7  
12 p.m. – 3 p.m.  
Oxnard Performing Arts & Convention Center  
Thousand Oaks Room  
800 Hobson Way  
Oxnard, CA 93030

### Escondido Listening Session

Tuesday, July 8  
9 a.m. – 12 p.m.  
San Diego County Farm Bureau  
1670 East Valley Parkway  
Escondido, CA 92027



Davis Joint Unified School District chefs Renee Hannah (left), Davis Senior High School, and Rita Harvey, Holmes Junior High School, visit Davis Farmers Market during Chef's Walk. (photo by Jen Ohmart)

## Farmers market project ends, but market is here to stay

by Jeri Ohmart, ASI/SAREP, Student Farm

How do we gauge sustainability? With grant-funded projects, we often look for evidence of the project's continuation after the grant has ended. By this measure, "Improving Farmer Profitability by Forging Community Partnerships in Education" a project funded by USDA Agricultural Marketing Service's Farmers Market Promotion Program is a success story.

The goals of this project were to increase consumption of farm-fresh fruits and vegetables by students in kindergarten through college, provide alternative markets for local farmers, and explore creative ways to enhance the health and wellness on campuses. The project was a collaboration among the Davis Farm to School Connection (DF2SC), the Davis Farmers Market, Davis Joint Unified School District (DJUSD), and UC Davis Cowell Student Health Center Wellness Committee. UC Sustainable Agriculture Research and Education Program (SAREP) coordinated the evaluation of the project.

**Gail Feenstra**, food systems analyst at the UC Davis Agricultural Sustainability Institute (ASI) and the statewide Sustainable Agriculture Research and Education Program (SAREP), has coordinated the evaluation of the Davis project. Feenstra and I have been evaluating the Davis Farm-to-School Program for the last eight years.

A satellite farmers market on the UC Davis campus was a prominent feature of this project. Each Wednesday in the fall and spring, farmers from the city's farmers market set up their booths and sold fresh-picked veggies, fruit, nuts, olive oils, fresh squeezed apple juice, and more. Cherries, apricots and strawberries in the spring were a big draw, as were apples in the fall. Customers were just as keen to buy bok choy, kale, spinach and sugar snap peas. The UC Davis College of Agricultural and Environmental Sciences' Student Experimental Farm has been among the dozen vendors participating in the market.

Dubbed the "East Quad Farmers Market" (EQFM), the market quickly became a recognizable part of the campus landscape. Students, faculty and staff alike were enthusiastic and appreciative. Sample comments included, "The market should be a mainstay here on campus," and, "We never had this in 2002 when I was a student—it's great!"

Farmers saw increased profits as the market became more recognized, and they acknowledged its value, not just for themselves, but for educating students and other consumers about farms and farm-fresh food. When we interviewed them for our evaluation, comments included, "Selling people plants and vegetables brings people back to their connection with the foods they eat," and "This market has been fantastic for relationships with new customers."

Through the efforts of **Randii MacNear**, Davis Farmers Market manager, and **Michelle Johnston**, director of UC Davis Cowell Student Health Center Wellness Committee, the market will now be a permanent feature on campus. In fall 2007, a visit from the UC Davis Chancellor **Larry Vanderhoef** underscored the university's commitment to maintaining the EQFM. Vanderhoef, who stops by the campus market when it's part of his route, is a regular at the Davis Farmers Market.



Another focus of the project was to develop innovative strategies for increasing the use of fresh fruit and vegetables in the Davis Joint Unified School District (DJUSD) K-12 school food program. During the grant period, purchasing of local produce by DJUSD increased from approximately 15 percent to 22 percent of total produce purchases.

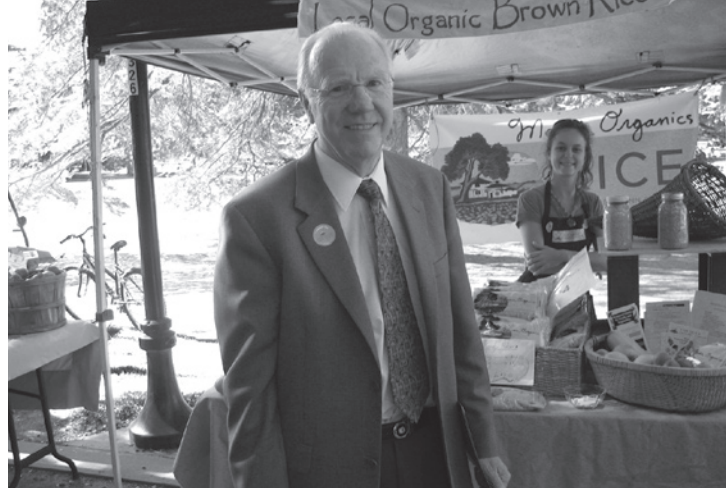
While these results are notable and accomplished the goals of the grant, the institutional changes that resulted from activities related to the grant are even more significant. In November 2007, DJUSD food service staff visited the Davis Farmers Market in a “Chefs’ Walk,” a meeting with local restaurateurs, chefs, and caterers arranged by Davis Farm to School Connection. All decked out in their “whites,” food service staff and other culinary professionals toured the farmers market, met with farmers, learned about new products, and shared ideas on how to use various produce as ingredients in recipes. The Chef’s Walk event concluded with a visit to nearby Pacific Star Farm.

This innovative event led to changes within the culture of the food service staff. Culinary classes were designed specifically for DF2SC food service staff and taught by internationally renowned cookbook author, **Georgianne Brennan**. Brennan meets with staff monthly to introduce them to new

ingredients and ways of preparing food. In these fun and informative classes, Brennan and staff together develop recipes that use fresh, local and seasonal ingredients and are also appropriate for the scale and scope of their operation within a K-12 context. “From Scratch Soup,” basil and fresh tomato pasta, Indian and Thai dishes are among the recipes developed thus far. These classes have been extremely popular among food service staff, and have given them a renewed sense of professionalism.

Projects developed with grant funding are wonderful, but where does the funding come from once the grant comes to an end? Probably the most impressive result of this project is the way the Davis Farm to School Connection negotiated a funding strategy to ensure the sustainability of the school program.

Every four years, the citizens of Davis vote on a Parcel Tax, which allocates money to the school district for a variety of programs. This year, with the Parcel Tax due for a renewed vote, the DF2SC conducted a survey of the community to see whether they were interested in supporting a portion of the



UC Davis Chancellor Larry Vanderhoef stops by the campus farmers market. (photo by Jeri Ohmart)

tax going to the school lunch program. The answer was overwhelmingly positive, and as a result of the vote, \$70,000 per year will be allocated to the school lunch program specifically to support the purchase of local produce. As far as we know, this kind of support for local purchasing has never been accomplished before, and we view it as a model that can be replicated by school districts across the state and nation.

The outcomes of “Improving Farmer Profitability by Forging Community Partnerships in Education” have far exceeded expectations. The goals, which seemed ambitious and laudable at the time, have resulted in much deeper and more long-lasting changes within the culture of the university, school and city communities. It is a true testament to the power of engaging the community in the local food system.

## First food systems course at UC Davis

UC Davis is offering its first undergraduate course specifically about food systems in the fall quarter 2008 through the Department of Human and Community Development.

“The course will focus on contemporary agri-food systems and assess the possibility for agricultural sustainability and equity,” said course instructor **Ryan Galt**, assistant professor in the Department of Human and Community Development, and one of the new faculty affiliated with the Agricultural Sustainability Institute.

Galt said the course will include examination of commodity chains in historical and geographical context, and the importance of environmental and social outcomes at various scales, including

impacts on the environment, producers’ livelihoods, citizens, and communities.

Students will document various aspects of the food system in specific locales, conducting interviews and observations, analyzing data, and creating multimedia reports. The course will include field trips to meet with different stakeholders in the food system.

The food systems course will become the introductory social science course of the new sustainable agriculture and food systems major, which is expected to be approved within the next 18 months. The food systems course will meet Tuesdays and Thursdays from 4:10 to 5:30 p.m. in 226 Wellman Hall. For more information, contact Galt at [regalt@ucdavis.edu](mailto:regalt@ucdavis.edu).

# Sustainable farming systems field day June 17

by Lyra Halprin, ASI/SAREP

A 21-year-old farming comparison project at the UC Davis Russell Ranch Sustainable Agriculture Facility that has shown subsurface drip irrigation decreases water use and cuts greenhouse gas emissions, will be in the spotlight at an annual field day and open house, 8 a.m. to 1:30 p.m. June 17.



Len Richardson

The Russell Ranch, seven miles west of the main campus, is home to long-term agriculture studies and provides a living laboratory for students and UC Davis' Agricultural Sustainability Institute (ASI) and the sustainable agriculture farming systems project.

Hay wagons will transport participants through the research site to see field presentations, a grower panel, and an update on energy-efficient equipment.

**Len Richardson**, editor of *California Farmer Magazine*, will be the field day keynote speaker. He will discuss farmers' special relationship to the land and the challenges they face in their profession and lives.

"In addition to the obvious economic connection to the land, farmers have emotional connections to the land," Richardson said. "That's something we can all identify with, even someone like me who only grows roses and a few trees. That connection is related to the way I define sustainability—it's basic stewardship. I admire the farmers who take care of the land. Ethically we want to do what's right for the land and treat it sustainably, which means keeping it fertile and productive over our life times, and for our children and grandchildren."

Richardson, who has been an agricultural journalist for more than 35 years, has been the editor of *California Farmer* for 27 years. A regular presence at farm field days, equipment shows and state agriculture hearings, Richardson is known for his monthly editorials as well as his reporting.

"Collaborative research like the UC Davis sustainable agriculture farming systems project is particularly important because farmers are key members of the research team," he said. "Their experience is critical to the scientists, while data that shows how subsurface drip irrigation reduces weeds and saves money or that demonstrates the water-cleansing effects of cover crops can help farmers be both economically sustainable and good stewards."

**Will Horwath**, project coordinator

of the Russell Ranch facility's sustainable farming systems project and UC Davis professor of land, air and water resources, will share data that indicates winter cover crops, conservation tillage and subsurface drip irrigation may help growers increase yields while improving soil quality and reducing water runoff from their fields. Horwath and hydrology professor **Wes Wallendar** will present research on water management and runoff with postdoctoral researcher **Inmyoung Park**.

"We're hoping that our recent research results will help growers evaluate the tradeoff between ecological benefits and economic costs in a sustainable system," Horwath said.

Furrow irrigation, which is the most common irrigation practice in California row crop systems, wets a large area of the soil profile. Subsurface drip irrigation limits the water delivery to a small area, which reduces the activity of soil microorganisms and processes related to trace gas emissions. Project research manager **Martin Burger** and junior specialist **Cynthia Kallenbach** will talk about strategies to reduce trace gas emissions from agricultural soil.

**Karen Klonsky**, UC Cooperative Extension specialist in the UC Davis agricultural and resource economics department, will report 2007 results on the economics of drip irrigation to help growers evaluate the benefits of alternative irrigation systems. Nematologist **Howard Ferris**, plant microbiologist **Kate Scow** and ecology graduate student **Steve Fonte** will compare soil ecology in various farming systems, while Russell Ranch crop production manager **Dennis Bryant** and agricultural technician **Israel Herrera** will present an equipment demonstration.

Pre-registration for the field day is requested by June 10. The \$5 registration fee (free for growers and students) covers the cost of a local, seasonal lunch and refreshments. PCA and CCA continuing education units will be offered. Registration and directions are on the Web at <http://safs.ucdavis.edu>. For more information, contact Burger at (530) 754-6497, [mburger@ucdavis.edu](mailto:mburger@ucdavis.edu) or **Patricia Lazicki** at (530) 220-2319 or [patricia.lazicki@gmail.com](mailto:patricia.lazicki@gmail.com)



## Funding Sources for Projects in Sustainable Agriculture, Food Systems, and Organic Farming

### Western Region SARE program [wsare.usu.edu/](http://wsare.usu.edu/)

The Western Sustainable Agriculture Research and Education (SARE) program invites proposals for its 2009 competitive grants program. Areas of funding are:

- Farmer/Rancher grants — Applications due: December 5, 2008
- Professional + Producer grants — Applications due: December 5, 2008
- Professional Development projects — proposals due November 3, 2008 (Graduate Student Grants — Applications were due: May 30, 2008)

People with disabilities or without Internet access may call Western SARE at (435) 797-2257.

### Organic Farming Research Foundation [ofrf.org/research/index.html](http://ofrf.org/research/index.html)

OFRF is dedicated to promoting organic farming through funding of on-farm research. Proposals are considered twice a year. Contact **Jane Sooby** at OFRF, PO Box 440, Santa Cruz, CA 95061 or email [research@ofrf.org](mailto:research@ofrf.org) or [jane@ofrf.org](mailto:jane@ofrf.org).

### Packard Foundation: Agriculture Sub-Program Area [packard.org/categoryDetails.aspx?RootCatID=4&CategoryID=252](http://packard.org/categoryDetails.aspx?RootCatID=4&CategoryID=252)

Funding available for projects in three categories: U.S. Agriculture, Nitrogen Science, and Biofuels. Letters of Inquiry due no later than August 15, 2008.

### Western Region IPM Center Funding Opportunities List [wrpmc.ucdavis.edu/Research/index.html](http://wrpmc.ucdavis.edu/Research/index.html)

List of funding opportunities and grant programs for Western Region researchers and educators.

### USDA CSREES Funding Opportunities List [csrees.usda.gov/fo/funding.cfm](http://csrees.usda.gov/fo/funding.cfm)

Sort by due date to get current Requests for Proposals.

### US EPA Region 9 [epa.gov/region09/funding/rfps.html](http://epa.gov/region09/funding/rfps.html)

Calls for proposals on a variety of target issues and topics; variable funding cycles.

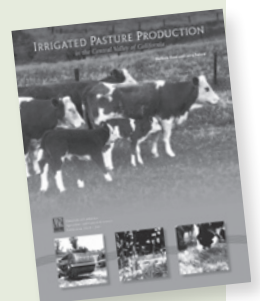
## New UC publications address aphid biological control, irrigated pasture production

### Biocontrol

*Flower Flies (Syrphidae) and Other Biological Control Agents for Aphids in Vegetable Crops*, by **Robert L. Bugg**, UC SAREP/ASI agricultural ecology analyst. University of California Agriculture and Natural Resource (ANR) Publications, 2008. Flower flies, also known as hoverflies, are effective predators against aphids in California vegetable fields. The free 25-page publication explains how to recognize aphid eaters and encourage them to help with pest management; many color photographs are included. Download PDF for UC ANR Publication 8285 at: <http://anrcatalog.ucdavis.edu/Items/8285.aspx>.

### Pasture publication

*Irrigated Pasture Production in the Central Valley of California*, by **Barbara Reed** and **Larry Forero**, UC Cooperative Extension dairy and livestock farm advisors, Northern Sacramento Valley. UC ANR Publications, 2008. Irrigated pastures, a mixture of perennial grasses and legumes, can be grown successfully in most areas of the Sacramento and San Joaquin valleys. This 69-page paperback is a guide to establishing and maintaining irrigated pastures. It explains how to plan in advance for an irrigated pasture, select plant species and prepare the seedbed, and describes the special fertilization, weed control and irrigation issues of irrigated pastures. Also included are chapters on hay making, forage and grazing management, leases and grazing economics. UC ANR Publication 21628, \$12. See <http://anrcatalog.ucdavis.edu/FieldCrops/21628.aspx>, or call (800) 994-8849.



## RESOURCES

# 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](http://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 advisors and others titled *Ecological Pest Management*. Up to 11 CE credits for California PCAs. See [www.sarep.ucdavis.edu/courses/](http://www.sarep.ucdavis.edu/courses/)

## \* NATIONAL/INTERNATIONAL CALENDAR

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

## JUNE

17 - 20 *Annual Sustainable Agriculture Field Day*, UC Davis' Russell Ranch Sustainable Agriculture Facility. Keynote speaker: Len Richardson, editor, California Farmer magazine. 7 miles west of main UC Davis campus on Road 32. \$5 includes lunch (growers, students free). Information and map: [safs.ucdavis.edu/](http://safs.ucdavis.edu/)

## SEPTEMBER

14 - 18 *Biodiversity in Agriculture: Domestication, Evolution, and Sustainability*, UC Davis. Three themes: Crop & animal domestication scenarios on Monday (15 Sept.); Processes of agricultural evolution on Tuesday (16 Sept.); & Agricultural biodiversity & sustainability: the global implications of California agriculture on Wednesday (17 Sept.) Symposium banquet set Tuesday, 16 September. Post-Symposium tours on Thursday (18 September). Information: see <http://harlanii.ucdavis.edu/index.htm>

## NOVEMBER

5 *Napa Valley Viticultural Fair*. 8:00 a.m. - 4:00 p.m. Sponsored by Napa Valley Grapegrowers. Presentation of latest services, products available. PCA credits available at various seminars. Networking opportunities for growers, suppliers, equipment exhibitors. Demonstrations throughout. Information: [www.napagrowers.org](http://www.napagrowers.org)

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- UC ANR Sustainable Agriculture Research and Education Program (SAREP)
- UC Davis Russell Ranch Sustainable Agriculture Facility
- UC Davis Student Farm

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