

# SUSTAINABLE AGRICULTURE

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## Energy and Greenhouse Gas Emissions in the Food System: Identifying Hotspots, Trade-offs, and Solutions for Consumers and the Food Industry

by Sonja Brodt, senior researcher, ASI/SAREP

Food miles, packaging, paper or plastic, local or organic – these are a few of the most commonly heard terms in the emerging lexicon of debate about how our choices as consumers affect climate change. Responding to increasing interest from within and outside food industries, as well as to California's landmark Global Warming Solutions Act of 2006, the Agricultural Sustainability Institute (ASI) at UC Davis is pursuing a new research initiative in energy and greenhouse gas footprinting of food systems to answer complex questions about which stages in the food system produce the most greenhouse gases and what steps consumers and industry players can take to address these “hotspots.”

A key feature of this research is seeing the food system not just as a final product but as a chain of processes through which a food product travels on its way from “farm to fork.” In such an approach, also known as *life cycle assessment*, energy use and greenhouse gas emissions are accounted for at every stage, or link, in the supply chain. In addition, all upstream energy and emissions associated with the inputs at each stage are also accounted for. For example, in a life cycle assessment of a final produce item, such as a tomato, researchers measure not only the energy used and emissions created during tractor and harvester operations on the field, but

**See ENERGY on p.2**

Rice harvest in Butte County. Rice is the focus of the first ASI “life cycle assessment.”  
(photo by Randall Mutters)



## ENERGY CONTINUED FROM PAGE 1

also during the extraction and transportation processes required to get the diesel fuel to the farm, and in the factory processes required to produce the fertilizer and pesticides and transport them to the farm. In this way, all the “embedded” energy and emissions are accounted for, in addition to the direct energy use and emissions.

This life cycle assessment approach is essential for understanding the impact of different technologies and consumer choices on emissions arising from the overall system. Often, a change in one element along the supply chain results in unexpected consequences at some other point in the chain, which can only be detected by examining the entire chain. For example, researchers at Washington State University found that, while the process of drying milk into powder requires almost twice as much energy as processing fresh, fluid milk, the subsequent transport and storage of that milk powder saves a much larger amount of energy than is used in processing because the powder is lightweight and requires no refrigeration. As a result, the energy use in the entire supply chain for powdered milk, including home storage, is only about 85 percent of the energy required by the supply chain for fluid milk. It is important to understand such systemwide impacts in order to recommend industry interventions and consumer choices that will make a real difference in stemming fossil fuel dependence and climate change.

Using a life cycle assessment approach, UC Davis researchers are conducting a prototype study of fossil fuel use and greenhouse gas emissions in rice production and milling in Northern California. Leading the project is **Alissa Kendall**, assistant professor in civil and environmental engineering, in collaboration with **Sonja Brodt**, ASI senior researcher, **Juhong Yuan**, graduate student in civil and environmental engineering, and **Jim Thompson**, Cooperative Extension specialist in biological and agricultural engineering. **Aslihan Arslan**, postdoctoral scholar in 2008, also contributed to data collection.

The team is constructing a computer-based model that tracks fossil fuel use as well as emissions of methane, nitrous oxide, and carbon dioxide, all of which have significant global warming potentials. Rice is a particularly high contributor to human-induced greenhouse gas emissions, because flooded rice fields create anaerobic conditions that lead to the formation of methane, a gas that is 25 times as powerful as carbon dioxide in global warming. California is a major U.S. rice producer, accounting for 22 percent of U.S. production, or almost two million tons per year.

Once the baseline model of emissions at each stage of production and milling is complete, the research team plans to use it to address key issues that will impact the future of rice production and consumption in California. For example, a new rice variety (M206) developed at the California Rice Experiment Station can be harvested at a lower moisture content than older varieties, which may cut energy needed for post-harvest drying by 30 to 50 percent. It will also allow for earlier field drainage, which can impact overall water use and change the dynamics of methane and nitrous oxide emissions. While flooded conditions promote more methane emissions, other studies have shown that drainage during the growing season releases more nitrous oxide, which is almost 300 times as powerful as carbon dioxide in inducing global warming. Using the model will help the research team understand how these trade-offs affect the overall greenhouse gas emissions of the rice supply chain.

Other questions the team hopes to address with future additions to the model include what the impact of organic production methods are on the overall emissions profile. Application of synthetic nitrogen fertilizer tends to be one of the biggest sources of greenhouse gas emissions in crop farming, due to the high natural gas demand in manufacturing the fertilizer, as well as the nitrous oxide released from the field after the fertilizer is applied. Organic farming eliminates

the use of this type of fertilizer, but organic sources of nitrogen such as manures and cover crops, can have their own negative impacts on emissions. For example, manure is a heavy material with low nitrogen density, resulting in relatively higher fuel use and emissions when transported to the field. Rotations of non-marketed cover crops can reduce the overall yields of rice coming from a given field over the years, thereby reducing the relative efficiency of inputs like fuel used for crop production. This reduction increases the relative emissions of greenhouse gases, when measured on the basis of quantity of emissions per unit of rice produced. Will these increases in relative emissions per pound of rice be large enough to offset the savings achieved by eliminating synthetic fertilizers? Other studies have suggested that, for many crops, the answer is no, and that organic production comes out with lower overall emissions in the final analysis. However, rice, with its complicated dynamics of methane and nitrous oxide emissions, has not been studied much in this context, and only a systems-based approach like life cycle assessment will provide an accurate answer to such questions.

Insights obtained from the rice model will also help ASI move forward on a planned collaborative project with researchers at Cornell University, which recently obtained funding from the W.K. Kellogg Foundation. In this project, ASI researchers will investigate the impacts on greenhouse gas emissions and water use when a selected set of food commodities is produced and distributed only within the southwestern U.S., as compared to the same commodities produced and distributed according to the current conventional system (i.e., grain produced in the Midwest, produce items like tomatoes and oranges sourced from California or Florida, etc.). This study will help answer questions about what it would take, and what the environmental impacts would be, for populations in the Southwest to become more food self-sufficient on a regional basis.



## New UC strip-tillage online publication for farmers

Ground-driven implements, which are dragged through the field, require less horsepower and operate efficiently at faster speeds, reducing in-field time. (photo by Dennis Bryant)

based systems in the San Joaquin Valley, Russell Ranch researchers have developed energy efficient strip-till equipment for transplanted tomato systems. The strip-till, ground-driven (dragged rather than powered through fields) incorporator sequence for reducing energy inputs is part of the tillage progress at Russell Ranch, he said.

“Our current emphasis on tillage in conventional and organic food production systems is focused on the development and evaluation of management techniques that require less horsepower or fuel consumption, reduce in-field time, build soil structure and are applicable to farms of all sizes,” he said. “We’re particularly pleased that the immediate impact from the Russell Ranch work is that farmers are aggressively putting these techniques in place on regional farms, including some of our cooperating farmers.”

Bryant said organic and conventional farmers are excited about the expected cost savings of these innovative tools. He noted that tillage equipment has been tested as part of a sequence of implements and modified/prototype tools aimed at reducing energy inputs in whole systems. Photos of some of the equipment are included in the new online publication.

“It is great to be able to provide farmers who have supported agricultural research at UC Davis with tillage strategies to reduce energy inputs,” Bryant said.

*Strip-Tillage in California’s Central Valley* was co-authored by **Jeff Mitchell**, UC Cooperative Extension Specialist in the UC Davis Department of Plant Sciences and the Kearney Agricultural Center in Parlier; **Anil Shrestha**, California State University, Fresno Department of Plant Science; **Marsha Campbell-Mathews**, UC Cooperative Extension, Stanislaus County; **Dino Giacomazzi**, Giacomazzi Dairy, Hanford; **Sham Goyal**, UC Davis Department of Plant Sciences; **Dennis Bryant**, and **Israel Herrera**, ASI at UC Davis.

by Lyra Halprin, ASI/SAREP

A new University of California online publication outlines strip-tillage, a management practice with potential to save farmers money in fuel, labor and equipment costs while decreasing the amount of soil disturbed and dust generated as fields are prepared for planting. The eight-page publication, *Strip-Tillage in California’s Central Valley*, may be downloaded in pdf format free at <http://ucanr.org/strip-till>.

Strip-tillage is a form of conservation tillage that was first used in the southern United States to break up the naturally settling subsoil layers while leaving the soil surface and crop residue relatively undisturbed, according to **Dennis Bryant**, a co-author of the publication and crop production manager at the Russell Ranch Sustainable Agriculture Facility, part of the Agricultural Sustainability Institute (ASI) at UC Davis.

“Less disturbed soil allows beneficial soil food web communities to thrive, which can improve soil conditions and potentially reduce herbicide use,” he said

Bryant noted that while the publication focuses primarily on dairy/forage



## Of leadership and agriculture— changing the world in our time

I am pleased to announce a new endowment for an award to recognize leaders in sustainable agriculture. The *Eric Bradford and Charlie Rominger Agricultural Sustainability Award* will honor students, faculty, cooperative extension specialists, farm advisors and others affiliated with UC Davis who exhibit the leadership, work ethic and integrity epitomized by **Eric Bradford** and **Charlie Rominger** (see sidebar). The endowment was funded through gifts from the Bradford and Rominger families and their friends. The first award will be given in 2010. Others wishing to donate to the fund in honor of Charlie or Eric may contact **Melissa Haworth** at (530) 754-8562 or [mdhaworth@ucdavis.edu](mailto:mdhaworth@ucdavis.edu).

As director, I am very proud to be have this endowment affiliated with ASI. Charlie was a dear friend of mine from the time we were roommates as undergraduates here at UC Davis in the 1970s, and we remained close until his death two years ago. I first met Eric when I arrived for my job interview in 2006, but his efforts on behalf of ASI began in 2004 when he led the committee that recommended the establishment of ASI to address the long term sustainability of agriculture. Eric was the principal author of the resulting *Agricultural Sustainability Implementation Report* that provided a solid foundation for the launch of ASI and continues to be a part of our strategic planning. I miss them, and often think about the qualities that characterized each of them. We will use those exceptional qualities as criteria to choose the recipients of the annual award honoring them.

“Education and Leadership” is one of our themes at ASI. Like the families of Eric Bradford and Charlie Rominger, we at ASI hope this award will provide a lasting legacy to the unique contributions that each of these men made in the world and to the field of agricultural sustainability. We will honor and recognize individuals exhibiting similar leadership as they aim to improve the world through their contributions to agriculture.



As part of our commitment to agricultural leadership and in the tradition of public accountability of the original program and technical advisory committees of the ASI-affiliate Sustainable Agriculture Research and Education Program,

we are proud to announce our first External Advisory Board. These 21 distinguished leaders represent diverse stakeholder interests (see “External Advisory Board helps guide ASI,” page x). Their inaugural meeting in December was exhilarating and extremely successful by all accounts. (Hear some of the first-hand reports from board members **Richard Rominger**, **Craig McNamara**, **Judith Redmond** and **Jonathan Kaplan** at <http://asi.ucdavis.edu/board/meeting-2008/audio/>.)

As a result of the meeting, I believe we have created a group that is dynamic, engaged, supportive, and ready to advocate for ASI. “We’ve been waiting for this to happen!” is, for me, one of the most memorable quotes from the meeting. The deep commitment from the board is gratifying and their high expectations for ASI are both appropriate and challenging. Board members moved smoothly through the “big picture” to focus most of their attention on sketching a vision for ASI as a developing institution. In a follow up telephone call with board members **Ashley Boren** and **Rich Rominger**, we discussed the parallel development of three other important initiatives in California: *Roots of Change*, the agricultural vision being developed by California Department of Food and Agriculture and the State Board of Food and Agriculture, and ongoing strategic planning by UC’s Agriculture and Natural Resources. ASI board members have central roles in each of these initiatives and I look forward to their input on how our plans fit within this complex and exciting set of opportunities.

Happily, we are now advertising for two academic coordinators positions, which may be filled by the time you read this, and five postgraduate Fellows funded by the Packard Foundation (see “UC sustainable agriculture programs receive gift from Packard Foundation,” page 8.). We look forward to “ramping up” as fast as possible and following through on the many emerging opportunities with a strong sense of urgency.

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

# The Eric Bradford and Charlie Rominger Agricultural Sustainability Award



Eric Bradford



Charlie Rominger

This fund will provide an annual award for one or more graduate students, faculty members, UC Cooperative Extension specialists, or UC farm advisors for their work toward agricultural sustainability. On occasion, there may be an outstanding UC Davis graduate who would be appropriate to honor with this award and they may also be considered.

We wish for this award to provide a lasting legacy of the unique contributions **Eric Bradford** and **Charlie Rominger** made in academia and agriculture and to the field of agricultural sustainability. Through this award, it is our intent to recognize and honor individuals exhibiting the leadership, work ethic and integrity epitomized by Eric and Charlie. Specifically, awardees should demonstrate leadership with a passion for service as they aim to improve the world through their contributions to agriculture. A committee appointed by the ASI Director and consisting of at least two ASI faculty and two ASI External Advisory Board members shall accept nominations and recommend recipient(s) to the ASI director for approval, based on the leadership qualities and characteristics of Eric and Charlie listed here:

- This award recognizes a person who has a broad understanding of agricultural systems and the environment, takes the long view, and aims high to make a difference in the world.
- This person's work in agriculture and its sustainability is both science-based and grounded in agricultural reality.
- The awardee has the courage to step outside of conventional thinking, values an interdisciplinary approach to problems, and seeks collaboration. This leader listens to others and can bring consensus out of a disparate group.
- This award honors the recipient's high standards of integrity, service, and respect for all. It also affirms the selflessness of the recipient, who focused on achieving a good outcome, not personal credit.

—*from the wording in the gift letter from the Bradford and Rominger families.*

## Notable events

Compiled by Lyra Halprin, ASI/ SAREP



Margaret Lloyd

### Honors

**Margaret Lloyd**, UC Davis plant pathology and international agricultural development graduate student and a member of the ASI-affiliate Students for Sustainable Agriculture, is a nominee for “White House farmer.” Propelled in part by the success of a flourishing salad garden in front of a UC Davis campus building, Lloyd may be taking her mission of fresh food for all to the White House, according to results from a nationwide online poll taken during the last two weeks of January. Lloyd and three other U.S. farmers—**Will Allen**, Milwaukee, Wis.; **Claire Strader**, Madison, Wis.; and **Carrie Little**, Pierce Valley, Wash.—are nominees for a position that has been proposed by **Michael Pollan**, author of “The Omnivore’s Dilemma,” but does not yet exist. The online competition was launched at [WhiteHouseFarmer.com](http://WhiteHouseFarmer.com), a Web site created by a farm family in central Illinois. “We were inspired by author Michael Pollan’s call last fall for a White House farmer,” said Lloyd, who spearheaded the campus salad garden experiment. “By raising produce at the White House, **President Obama’s** promise of change can include the food Americans eat.” Lloyd was quoted in the Feb. 26, 2009 issue of the *Economist* magazine in “Victory Gardens: Digging their way out of recession,” [http://www.economist.com/displaystory.cfm?story\\_id=13185476](http://www.economist.com/displaystory.cfm?story_id=13185476).

### AAAS

**Tom Tomich**, ASI/ SAREP director, made two presentations at the February meeting of the American Association for the Advancement of Science (AAAS) in Chicago. He participated in a roundtable discussion on sustainability science curriculum development where he discussed ASI’s new proposed Sustainable Agriculture and Food Systems major. Tomich also gave a presentation on climate change, in which he talked about the most effective ways to engage science in the development and implementation of new climate policy over the next two to four years. “The challenge is to make it relevant in timelines that work for politicians,” he said. Tomich noted that it took 30 years for rice straw burning to move from a concern to a solution in California, and that it takes preparation and commitment to collaborate with policymakers on solutions.

### Ag pollinators

**Robert L. Bugg**, ASI/SAREP senior analyst, attended the First National Ag Pollinators Forum in February near Arlington, Va. The forum was organized by the Native Pollinators in Agriculture Project ([www.agpollinators.org](http://www.agpollinators.org)); Bugg has served on the steering committee of the project since 2006. The project is run by National Resource Solutions, LLC, a conservation planning and consulting firm, with funding from the Turner Foundation. Presentations addressed the role of native pollinators in production agriculture, honeybee colony collapse disorder, the importance of habitat for native bees and techniques for enhancement, using native bees on farms, and informational resources.

### Local food systems

Tomich welcomed participants at the statewide Sustainable Agriculture Research and Education Program’s (SAREP) *Local Food Systems Symposium* in December at UC Davis. SAREP is an ASI affiliate. The conference, which was coordinated by ASI/ SAREP’s food systems analyst **Gail Feenstra**, was an opportunity for local food proponents from Northern and Central California to exchange ideas surrounding the current trends and challenges involved in creating a sustainable food system. Cooperative Extension specialists, researchers, non-profit personnel, farmers, nutritionists, and community members participated in the two-day event, which presented 2007-08 SAREP research grants and facilitated roundtable discussions on local foods issues. **David Campbell**, director of the UC Davis-based California Communities Program, and **Kimberly A Rodriguez**, UC ANR North Coast and Mountain regional director, were co-sponsors of the event.

Feenstra was a panelist on “How Communi-

ties Support Their Region's Agriculture" at the March California Small Farm Conference in Sacramento. The panel was moderated by **Shermain Hardesty**, director of the UC Small Farm Center, and included farmer **Paul Muller** of Full Belly Farm and Capay Valley Grown, and **Kate Stille** of Nugget Markets. Feenstra also presented a lecture on "How Institutional and Retail Food Purchasing Decisions Can Promote More Sustainable Food and Farming Systems," during the Alternatives in Agriculture Seminar at UC Davis winter quarter.

### Ecological Farming Conference

Bugg moderated two workshops and Feenstra was a speaker at the Ecological Farming Association's 29th annual conference in Pacific Grove, Calif. in January. Bugg moderated "Innovations in Tillage" and "Weed Control for Organic Vegetable Growers," while Feenstra was part of a panel on regional food sheds.

Three members of ASI-affiliate Students for Sustainable Agriculture (SSA) received scholarships from ASI defraying the costs of attending the Ecological Farming conference. **Maggie Lickter**, **Libby O'Sullivan** and **Katie Cooper** attended and wrote reports about their experiences.

Cooper said the most important "take away" value of EcoFarm was "inspiration": "There is simply nothing better than being in a room full of gung-ho, wanting-to-change-the-world farmers. It was incredibly inspiring to be amongst them- talking, listening, thinking, eating, dancing- and to be reminded that a sustainable food system is cared about by so many – by many who have already made considerable progress in the movement but are not ready to stop."

O'Sullivan was most inspired by sessions that underscored the importance of marketing and business plans for sustainable agriculture. She said the university will need to add a course in the marketing/business management of alternative agriculture to

its degree program. "Many of the conversations between EcoFarm sessions centered on the question of how can we make what we love—farming in an ecologically sustainable manner—economically viable."

Lickter said that three EcoFarm workshops stood out: water, backyard gardening, and spirituality and sustainable agriculture. "The water workshop described the shocking statistics of the current water shortage and explored different methods of water use and conservation that may be necessary. I think ASI and UC Davis could be helpful in exploring these possibilities. More important may be examining water laws and distribution, and encouraging policymakers to create policies that offer incentives for water conservation rather than support the status quo water rights that penalize a farmer for not using all their allotted water."

### Food service meeting

Feenstra was a speaker at the Sodexho *Sustainability and Environmental Expert Development* (SEED) meeting at UC Davis in February. She discussed farm-to-institution research and ways food service directors can reduce their contributions to greenhouse gas emissions. SSA members participated in a SEED conference panel on campus sustainability. The panel discussed UC Davis' sustainability and environmental stewardship "best practices." SSA representatives included undergraduate Lickter, who talked about support for local farms, social justice and labor issues, corporate transparency, and ways Sodexho can make an impact on the food system. Other UC Davis participants included **Sid England**, vice chancellor of environmental stewardship and sustainability; **Mike Sheehan**, associate director of facilities and student housing; **Gina Rios**, general manager for Sodexho University Dining Services, and **Linda Adams**, dietician and sustainability coordinator for University Dining Services. Sodexho is an international food service and facilities management corporation; managers and corporate leaders from throughout the U.S. attended the event, including **Arlin**

**Wasserman**, vice president of Sodexho's Corporate Citizenship office, and senior director of training and innovation **Holly Fowler**. The SEED event included tours of the campus that featured the Student Farm's Market Garden, which is a source of fresh organic vegetables for some of Sodexho's services on campus.

### Short course in Italy

After having hosted different groups of visitors from the University of Gastronomic Sciences in recent years, **Mark Van Horn** taught a short course in agriculture and food system sustainability at the university's campus in Colorno, Italy in December 2008.

### ASI visitors

**M. Jahiruddin**, a professor in the soil science department at Bangladesh Agricultural University visited the Sustainable Agriculture Farming Systems (SAFS) plots at ASI's Russell Ranch Sustainable Agriculture Facility in January. **Damodhara Mailapalli**, postdoctoral researcher, and **Z. Kabir**, former SAFS research manager, gave Jahiruddin a tour of the facility. Jahiruddin is particularly interested in the SAFS projects.

**Raoul Adamchak**, market garden and CSA coordinator at the Student Farm, gave a tour of the ASI facility to a group of visiting faculty members from The College of The Bahamas. The six researchers are interested in developing a sustainable agriculture program at their campus, and took the tour in December.



## UC sustainable ag program receives gift from Packard Foundation

The Agricultural Sustainability Institute (ASI) at UC Davis has been awarded a \$1.5 million grant from the David and Lucile Packard Foundation to carry out research aimed at reducing greenhouse gas emissions and nitrogen pollution in California agriculture, and to help establish ASI as a global center of excellence for sustainability science.

“This funding will allow us to focus on a pilot California nitrogen assessment to encourage interdisciplinary research teams to investigate greenhouse gas emissions, support the next generation of leaders in science, and help our communication efforts with the farm community, policy makers, extension advisors and the public,” said **Tom Tomich**, ASI director and director of the statewide UC Sustainable Agriculture Research and Education Program (SAREP).

“It is our hope that we can continue to build on the work of UC Davis scientists including **Kate Scow**, ASI deputy director, who led research on soil carbon at the Kearney Foundation,” said Tomich “We believe it possible to make concrete contributions in federal and international efforts to improve carbon and nitrogen management to help move agriculture toward sustainability in significant ways. We look forward to a vigorous partnership with the Packard Foundation and many others.”

This philanthropic grant to ASI complements the David and Lucile Packard Foundation’s ongoing support for UC Davis, which includes support for the environment, education and other areas of societal importance.

In addition to ASI, which was established in 2006, and SAREP, which has been part of the UC legacy since 1987, UC’s sustainable agriculture resources include the UC Davis Student Farm, UC Davis Long Term Research on Agricultural Systems project, and Sustainable Agriculture Farming Systems project, as well as programs at UC Santa Cruz and other campuses. The ASI Web site is [asi.ucdavis.edu](http://asi.ucdavis.edu).



Cynthia Kallenbach (right) shares carbon assessment data at the UC Davis Russell Ranch Sustainable Agriculture Facility.

# RESOURCES

## Agricultural policies, nutrition, obesity links

*Are Agricultural Policies Making Us Fat? Likely Links between Agricultural Policies and Human Nutrition and Obesity, and Their Policy Implications*, by **Julian M. Alston**, professor, UC Davis Department of Agricultural and Resource Economics; **Daniel A. Sumner**, **Frank H. Buck Jr.** Professor, UC Davis Department of Agricultural and Resource Economics and director, UC Agricultural Issues Center; and **Stephen A. Vosti**, adjunct associate professor, UC Davis Department of Agricultural and Resource Economics, Program in International and Community Nutrition, UC Davis. These researchers review the options, with special attention paid to the role of agricultural policies in causing obesity, and to using agricultural policy to combat the problem. Review of Agricultural Economics, Vol. 28, No.3, pps. 313-322. For more information, go to the journal Web site at <http://www.aaea.org/fund/pubs/rae/>.

*Farm subsidies and obesity in the United States: National evidence and international comparisons*, by **Julian M. Alston**, professor, UC Davis Department of Agricultural and Resource Economics; **Daniel A. Sumner**, **Frank H. Buck Jr.** Professor, UC Davis Department of Agricultural and Resource Economics and director, UC Agricultural Issues Center; and **Stephen A. Vosti**, adjunct associate professor, UC Davis Department of Agricultural and Resource Economics, Program in International and Community Nutrition, UC Davis. The countries that support their farmers most strongly tend to have relatively low obesity rates. The researchers explore the larger effects that agricultural research and agricultural policies appear to have on the price of food. Food Policy, Vol. 33 (2008), pps. 470-479. Information at [www.elevator.com/locate/foodpol](http://www.elevator.com/locate/foodpol).



## ASI recruiting for new positions

ASI is recruiting two Sustainable Agriculture Academic Coordinator II positions for the statewide UC Sustainable Agriculture Research and Education Program (SAREP), a unit of the Agricultural Sustainability Institute (ASI) at UC Davis, and five postgraduate fellowships in sustainability science at ASI. For detailed information on the positions, please see the ASI recruitment Web site at: <http://asi.ucdavis.edu/recruitment/>.

Here are short descriptions of the positions:

### Academic Coordinators

Two full-time scientific leadership positions to coordinate efforts within thematic areas for UC SAREP Academic Coordinator II positions in *Food and Society* and *Agriculture, Resources, and the Environment*. Full position descriptions are available at <http://asi.ucdavis.edu/recruitment/>. To ensure consideration, applications should be received by Monday, April 6, 2009. The positions will remain open until filled. For more information, contact **Bev Ransom**, ASI/SAREP program manager, at [baransom@ucdavis.edu](mailto:baransom@ucdavis.edu).

The individuals in these positions will work closely with the director and teams of faculty and staff to coordinate efforts within the main thematic areas. Some of the major responsibilities of these positions will include: 1) providing leadership, coordination, and organizational support to the research, engagement and communication efforts within the thematic area, 2) interfacing with campus faculty and students, Cooperative Extension specialists and farm advisors, and a diverse range of other partners, 3) coordinating and maintaining contact with scientists working in agricultural sustainability at other institutions, 4) coordinating efforts to obtain extramural funds to support research, engagement, and communication activities in the thematic area, and 5) supervising staff and managing budgets associated with projects and initiatives in the thematic area. The academic coordinators will be responsible for the distribution of information through conferences, short-courses, workshops, publications and on-farm demonstrations; and providing leadership in communicating with stakeholders.

### Packard Fellows

ASI, with the support of the David and Lucile Packard Foundation, has launched a new interdisciplinary initiative to assess the tradeoffs involved in agricultural nitrogen (N) management in California agroecosystems. ASI will collaborate with a diverse set of institutions and stakeholders to assess trends in N usage in California, evaluate priorities for research, policy and action, and develop tools and information useful to a wide range of stakeholders. (see "UC sustainable agriculture programs receive gift from Packard Foundation," page 8.). In conjunction with this initiative, ASI is recruiting five postgraduate fellowships in sustainability science.

Detailed descriptions of each position and full application procedures are available at the ASI recruitment Web site at: <http://asi.ucdavis.edu/recruitment/>. All positions will remain open until filled. Interested candidates for those positions should contact **Todd Rosenstock**, [trosenstock@ucdavis.edu](mailto:trosenstock@ucdavis.edu), to inquire if the positions have been filled.

# SOURCES OF FUNDING



Morgan Doran

## Morgan Doran leads California SARE

**Morgan Doran**, the UC Cooperative Extension livestock and natural resources advisor and acting UCCE director of Napa County is the new California representative for the USDA's Western Sustainable Agriculture Research and Education (SARE) program. Doran replaces former ASI/SAREP education coordinator **David Chaney**, who served in that position for 13 years. Since 1995, Western SARE's Professional Development Program has made grants to designated state coordinators for ongoing professional development efforts and promotion of SARE grant opportunities in each state, as well as for coordination of regional activities.

Doran, who has participated in several SARE grants, has a longstanding interest in agricultural sustainability. His specialties are beef cattle, sheep, nutrition, range and natural resources in Solano, Napa and Yolo counties. He is also involved in the UCCE Integrated Hardwood Range Management Program.

In his role as California SARE representative, Doran is working with ASI/SAREP faculty and staff, including **Tom Tomich**, director; **Bev Ransom**, program manager; and others. Western SARE will be hosting a regional conference in California in late 2009.

## 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 still open for 2009 are:

**Research and Education (Chapter 1) Grants** - Pre-proposal applications due June 12, 2009

**Farmer/Rancher Grants** - Applications due: December 4, 2009

**Professional Producer Grants** - Applications due: December 4, 2009

**Professional Development Program** - Applications due: November 3, 2009

**Graduate Student Grants** - Applications due: May 29, 2009

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

## Sustainable ag, food systems, organic farming

The Network for a Healthy California is soliciting applications from community-based, non-profit organizations to conduct innovative nutrition education among diverse, low-income populations. The RFA, attachments, resources for applicants and contract information are available at <http://www.cdph.ca.gov/programs/cpns/Pages/LFNERFA.aspx>. Or contact **Edye Kuyper**, program manager, at (916) 319-9164, [www.networkforahealthycalifornia.net](http://www.networkforahealthycalifornia.net).

## Organic Farming Research Foundation

[ofrf.org](http://ofrf.org)

OFRF is dedicated to promoting organic farming through funding of on-farm research and dissemination of the results. Proposals are considered twice a year. See their Web site for most current deadlines. For more information, contact **Jane Sooby** at (831) 426-6606, [jane@ofrf.org](mailto:jane@ofrf.org).

## EXTERNAL ADVISORY BOARD

The Agricultural Sustainability Institute at UC Davis, established in 2006, is happy to introduce members of its External Advisory Board.



Back row: Jonathan Kaplan; Richard Rominger; Craig McNamara; Howard Shapiro; Jennifer Ryder Fox; Greg Drescher; Tom Tomich; Front Row: Margaret Worthington; Judith Redmond; Martha Guzman Aceves; Ashley Boren; Noelle Cremers (for Paul Wenger); Cornelius Gallagher; Maggie Lickter.

The Board was created to advise ASI and SAREP on mission and goals and long-term planning. It includes individuals actively involved in agricultural production, as well as representatives from government, public, organizations, and institutions of higher education.

“Our advisory board members are helping us translate the needs and concerns of those we are trying to reach throughout the state into action,” said **Tom Tomich**, ASI/SAREP director.

The following individuals are members of the inaugural Board:

### **Marcus Benedetti**

#### **President, Clover Stornetta Farms**

Marcus Benedetti grew up in Petaluma and received his business degree at the University of Alaska, Fairbanks. He returned to Petaluma to work at Clover Stornetta Farms, working in the chilled warehouse, delivering milk and other dairy products to schools and restaurants. As a sales representative, he had accounts in Sonoma and Mendocino counties. As demand for Clover products grew, he helped establish markets in Sacramento and Los Angeles. He became president in 2006.

### **Ashley Boren**

#### **Executive Director, Sustainable Conservation**

Ashley Boren directs the strategy, growth, and operations of San Francisco-based Sustainable Conservation. Previously, she worked at Smith & Hawken, a mail order and retail gardening company, and at The Nature Conservancy. Boren chaired the board of Stanford Business School's Alumni Consulting Team and serves both as a Trustee of the Robert and Patricia Switzer Foundation and as a board member of the California State Board of Food and Agriculture; she's also on the Dean's Advisory Council for the College of Agricultural and Environmental Sciences at UC Davis. Boren received her undergraduate degree at Stanford University, and an MBA at the Stanford Business School.

### **John Diener**

#### **President, Red Rock Ranch**

John Diener began farming on the Westside of the San Joaquin Valley in 1980, where he continues to farm both conventionally and organically managed land. He raises processing crops for canneries and agronomic crops for certified seed production. Diener has been active in conservation and reclamation efforts and developed a pilot Integrated On-Farm Drainage Management prototype that helps farmers recycle water through a series of fields that allows them to reclaim land, harvest runoff water, produce marketable crops, and mine salts for commercial use.



# EXTERNAL ADVISORY BOARD

## Daniel Dooley

### **Vice President, Agriculture and Natural Resources, University of California**

Dan Dooley is the systemwide vice president for the University of California Division of Agriculture and Natural Resources (ANR). His duties include leading a statewide research and public service organization responsible for activities in agriculture, natural resources, environmental sciences, family and consumer sciences, forestry, human and community development, and 4-H/ youth development. Dooley is a member of the National Academy of Sciences' Board on Agriculture and Natural Resources and former chair of the Farm Foundation Round Table. He also served as vice chair of USDA's National Agricultural Research, Extension, Education and Economics Advisory Board and as a member of the U.S. Trade Representative's Agricultural Technical Advisory Committee for Trade.

## Greg Drescher

### **Senior Director for Strategic Initiatives, Culinary Institute of America**

Greg Drescher is executive director of strategic initiatives and creator of the Culinary Institute of America's (CIA) Worlds of Flavor International Conference & Festival, and annual Worlds of Healthy Flavors Leadership Retreat presented in partnership with the Harvard School of Public Health. In 2005, Drescher was inducted into the James Beard Foundation's Who's Who of Food & Beverage in America. In 2006, he was honored with Food Arts Magazine's Silver Spoon Award, and in 2007 shared a James Beard Award for his work in developing the CIA's Savoring the Best of World Flavors DVD and Webcast series.

## Mable Everette

### **CEO and Founder, Community Nutrition Education Services**

#### **2007 Roots of Change Leadership Fellow**

Mable Everette, DrPH, registered dietitian, is the founder and CEO of Community Nutrition Education Services (CNES), Inc. in Inglewood, Calif. CNES, Inc. was established in 2006 to promote healthy nutrition and obesity prevention through community-based collaborative research, service, training and mentoring of the general public, health care professionals, and students. Everette has been a college nutrition instructor, and has consulted on projects for nutrition programs targeting senior citizens, adults, pregnant women, children, and preschoolers and their families. She completed a fellowship with Roots of Change in 2007 that resulted in CNES focusing more efforts on educating consumers about the importance of agriculture and food sustainability.

## Cornelius Gallagher

### **Agribusiness Executive, Bank of America**

Cornelius (Corny) Gallagher is the Global Agribusiness executive for Bank of America, and is part of a national team that manages the Bank's \$18 billion agribusiness and food products portfolio. Gallagher is on state and national agricultural leadership committees, boards and advisory councils. He was appointed by **Governor** Arnold Schwarzenegger to the California Exposition and State Fair Board of Directors and is a commissioner on the UC President's Advisory Commission on Agriculture and Natural Resources. He joined the Bank 39 years ago and has served the agricultural industry all his life.

## Martha Guzman Aceves

### **Legislative Advocate, California Rural Legal Assistance Foundation**

Martha Guzman Aceves is legislative advocate for the California Rural Legal Assistance Foundation in Sacramento, focusing on farmworker health and safety issues, and environmental justice, including environmental and occupational hazards of heat-related illness and pesticide exposure. She previously served as legislative coordinator for the United Farm Workers, AFL-CIO, covering labor and environmental issues. She is a member of the Environmental Justice Coalition for Water, and a board member of Ag Innovations Network, Sierra Institute and Community to Community Development. She was a member of the California Water Commission, the California Agricultural Leadership Program, and on the board of directors for the North American Pesticides Action Network.

## **Carl Johnson**

### **Senior Vice President, Chief Strategy Officer, Campbell Soup Company**

Carl Johnson is senior vice president and chief strategy officer for Campbell Soup Company. Previously, he headed three divisions at Kraft Foods, and the Consumer Goods consulting practice at Marketing Corporation of America, and held senior management positions at Polaroid and Colgate-Palmolive. Johnson is a trustee of the Adelpic Educational Fund, Wesleyan University and is a member of the steering committee of the Kilts Center for Marketing, University of Chicago Graduate School of Business.

## **Jonathan Kaplan**

### **Director, Sustainable Agriculture, Natural Resources Defense Council**

Jonathan Kaplan is a senior policy specialist at the Natural Resources Defense Council (NRDC) where he directs projects to reform government policy, and create market incentives for sustainable farming systems and environmentally friendly urban pest control. Previously, Kaplan directed programs at San Francisco BayKeeper and Environment California on protecting public health and the environment from pesticides. He is on advisory groups for Environment California, the California Department of Pesticide Regulation, the Dean of the College of Agriculture and Environmental Sciences at UC Davis and the San Francisco Estuary Institute. Kaplan received a bachelor's degree from Cornell University and a master's degree in environmental management at the Yale School of Forestry and Environmental Studies.

## **A.G. Kawamura**

### **Secretary, California Department of Food and Agriculture**

Governor Schwarzenegger appointed A.G. Kawamura Secretary of the California Department of Food and Agriculture in November 2003. Kawamura is a produce grower and shipper from Orange County, where his family grows strawberries, green beans and other specialty crops. He is widely known for his passion for education and for his commitment to the issues of hunger and nutrition. As president of Orange County Harvest, a non-profit promoting agricultural partnerships with organizations combating hunger, he arranged for thousands of volunteers to harvest and glean over a million pounds of produce for area food banks. His nationally recognized urban projects, such as the 7-acre Common Ground project in San Juan Capistrano and 4-acre Incredible Edible Park in Irvine, are agricultural paradigms linking nutritional education and interaction with local schools and food banks.

## **Maggie Lickter**

### **Student, UC Davis**

Maggie Lickter is an undergraduate student at UC Davis fulfilling an individual major in sustainable agriculture. A native of Nevada City, Calif., she interned on organic farms in the U.S. and abroad between high school and college. At UC Davis she is involved with Students for Sustainable Agriculture, an ASI affiliate, and California Student Sustainability Coalition. She serves on the administrative committee for the Real Food Challenge, a national campaign that calls for real food on college campuses. Lickter received a Sustainable Agri-Food System Fellowship from the Center for Agroecology and Sustainable Food Systems at UC Santa Cruz, which encourages UC students to work for more sustainable food systems on campus. She plans to focus on social justice, advocacy and education in sustainable food systems, and growing food.

## **Craig McNamara**

### **President, Sierra Orchards**

### **Co-Founder, Center for Land-Based Learning**

Craig McNamara is the president and owner of Sierra Orchards in Winters, a farming operation that includes field, processing, and marketing operations, producing primarily walnuts. He is also the founder of the Center for Land-Based Learning, which focuses on helping high school students become lifelong learners, overcome barriers to change, and build greater social and human capital in their communities. McNamara is a graduate of the California Agricultural Leadership Program and a senior fellow of the American Leadership Forum. His professional activities include board member of the California State Board of Food and Agriculture, member of the Foundation Board of Trustees UC Merced, and the UC Davis CA&ES Dean's Advisory Council. He is the recipient of the Leopold Conservation Award, the 2003 Governor's Environmental and Economic Leadership Award, the UC Davis Award of Distinction, and the Profile in Leadership Award.

# EXTERNAL ADVISORY BOARD

## **Amparo Perez-Cook**

### **Vice President and General Manager, Bustos Media, LLC**

Amparo Perez-Cook is the vice president and general manager of Bustos Media of California. She began her media career in 1985 and has held senior management and sales positions in four major Hispanic broadcasting companies. In 1999, she formed Aztec Media with two partners and launched KTTA 97.9FM and KBBU 93.9FM before selling the stations to Bustos Media. A recipient of the California Hispanic Business Woman of the Year Award in 2003, she is on the Board of the California Exposition and State Fair and is a trustee for the Leukemia Lymphoma Society.

## **Michael Pollan**

### **Writer/Author**

### **Knight Professor of Science and Environmental Journalism, UC Berkeley**

Michael Pollan is the author of “In Defense of Food: An Eater’s Manifesto.” His previous book, “The Omnivore’s Dilemma: A Natural History of Four Meals,” was named one of the ten best books of 2006 by the New York Times and the Washington Post. It also won the California Book Award, the Northern California Book Award, the James Beard Award for best food writing, and was a finalist for the National Book Critics Circle Award. He is also the author of “The Botany of Desire: A Plant’s-Eye View of the World,” “A Place of My Own,” and “Second Nature.” A contributing writer to the New York Times Magazine, Pollan is the recipient of numerous journalism awards and his articles have been anthologized in Best American Science Writing, Best American Essays and the Norton Book of Nature Writing. Pollan served as executive editor of Harper’s Magazine and is now the Knight Professor of Science and Environmental Journalism at UC Berkeley.

## **Judith Redmond**

### **Co-owner, Full Belly Farm**

### **President, Community Alliance with Family Farmers**

Judith Redmond is one of four partners of Full Belly Farm, a 250-acre diversified organic farm in the Capay Valley. Full Belly Farm markets its products at three Bay Area farmers markets each week, sells to wholesale and retail outlets and delivers CSA boxes to 1400 families. Redmond is also president of the board of the Community Alliance with Family Farmers, a non-profit organization that promotes family farm-based sustainable agriculture. She received a master’s of science degree from UC Davis in plant pathology and was awarded the 2007 Women Chefs and Restaurateurs “Woman Who Inspire Golden Plow Award.”

## **Richard Rominger**

### **Rominger Farms**

Richard Rominger is a fourth generation Yolo County, Calif farmer, and is active in farm organizations and cooperatives. He served six years as Director (Secretary) of the California Department of Food and Agriculture, and was the Deputy Secretary at the U. S. Department of Agriculture in Washington, DC for eight years. Improving farm policy, including conservation programs, and establishing the National Organic Standards, were among his responsibilities. He served as a production agriculture advisor at UC Davis, UC Riverside, California State University Fresno, and Cal Poly San Luis Obispo, and continues to serve as a special advisor to the Chancellor at UC Davis. He is chairman of Marrone Organic Innovations, a biopesticide company, is a member of the UC President’s Advisory Commission on Agriculture and natural Resources, and the California Roundtable on Agriculture and the environment, and serves on the board of directors of the American Farmland Trust and Roots of Change Council. He completed a term on the UC Board of Regents.

## **Jennifer Ryder Fox**

### **Dean, College of Agriculture, California State University, Chico**

Jennifer Ryder Fox was appointed Dean of the College of Agriculture at California State University, Chico in 2006; prior to that she was head of the horticulture and crop science department at Cal Poly, San Luis Obispo. Previously she was a vice president at AgraQuest, a biotechnology agricultural product development company. She has also been a regional regulatory affairs manager for FMC Corp. and for the Western Crop Protection Association. Fox received her master’s of science in soil microbiology and doctorate in woody plant physiology from New Mexico State University. She received a bachelor’s of science in soil science at Cal Poly, San Luis Obispo.



## Howard-Yana Shapiro

**Global Director, Plant Science & External Research, Mars Incorporated**

**Co-founder, Seeds of Change**

Howard-Yana Shapiro has been involved with sustainable agricultural and tree cropping systems for 35 years in the U.S., the EU, Mexico, Latin America, South America, West Africa, and South East Asia. A two-time Ford Foundation Fellow, Fulbright Scholar, and recipient of a National Endowment for the Humanities Award, he is a former university professor and was the vice president for agriculture for Seeds of Change, an organic seed and food company. Mars, Inc. purchased Seeds of Change in 1997, and since then he has served as senior scientist in plant science, agroforestry and agroecology; research manager, and global director at M&M/Mars. In 2008 he was appointed to lead an international consortium including Mars, Inc., USDA-ARS and IBM to sequence and assemble the *Theobroma cacao* genome. An author of three books, Shapiro is an adjunct professor in the College of Agriculture and Environmental Sciences at UC Davis.

## Neal Van Alfen

**Dean, College of Agricultural & Environmental Sciences, UC Davis**

A native of Modesto, Neal Van Alfen received a bachelor's of science in chemistry and a master's of science in botany from Brigham Young University, and a doctorate in plant pathology from UC Davis. Van Alfen started his professional career as a plant pathology research scientist at the Connecticut Agricultural Experiment Station in New Haven studying tree diseases. He went to Utah State University to be a Cooperative Extension plant pathology specialist and a member of the faculty of the Department of Biology, where he was also a professor of biology and molecular biology and biochemistry. In 1990 he moved to Texas A&M University, College Station to serve as head of the Department of Plant Pathology and Microbiology. In 1999, Van Alfen returned to UC Davis to become dean of the College of Agricultural and Environmental Sciences. Van Alfen's research interests have focused on controlling plant disease using low input, sustainable methods, including biological control strategies for fungal diseases. He has extensive experience as a consultant on effects of air pollution on environmental health.

## Paul Wenger

**First Vice President, California Farm Bureau Federation**

**Farmer**

Paul Wenger is the first vice president of the California Farm Bureau Federation. A third-generation farmer, he farms almonds and walnuts on the family farm, which includes property purchased by his grandfather in 1910. His farming operations also include sharecropping, custom farm work and walnut hulling, and processing and marketing almonds and walnuts through Wood Colony Nut Co., which provides an opportunity for fourth generation family members to vertically integrate the farming operation. Wenger serves on the Salida Volunteer Fire Department, the Hart-Ransom School Board of Trustees, and the Stanislaus Land Trust and Agricultural Pavilion boards.

## Margaret Worthington

**Graduate Student, UC Davis**

Margaret Worthington is a graduate student in International Agricultural Development at UC Davis. After receiving a bachelor's degree in environmental science at Duke University, Worthington apprenticed at the North Carolina State University Center for Environmental Farming Systems, volunteered at an organic vineyard in New Zealand, and hiked the entire Appalachian Trail. She was awarded a 2006 Fulbright Fellowship to India where she studied intellectual property rights protection and crop biodiversity conservation. Worthington is studying Oaxacan bean landrace diversity and farmers' risk mitigation strategies. She hopes to return to North Carolina to advocate for sustainable agriculture in the American South.

# CALENDAR

## APRIL

**24-26** *International Public Market Conference*, San Francisco. Sponsor: Project for Public Spaces. Focus: to set new direction for role markets play in transforming local economies, communities. Speakers, workshops, breakout sessions. Contact: [dkitzes@pps.org](mailto:dkitzes@pps.org). Information: [http://www.pps.org/markets/info/public\\_market\\_conference/](http://www.pps.org/markets/info/public_market_conference/).

**27-30** *ANR Statewide Conference "Defining Our Future,"* Sacramento. For all ANR academics, staff. Doubletree Hotel, 2001 Point West Way Sacramento 95815. Planning, advocacy implementation, new regs & computer-based business. Includes hands-on training & speakers. Contact: Sherry Cooper, (530) 224-4902, [slcooper@nature.berkeley.edu](mailto:slcooper@nature.berkeley.edu). <http://groups.ucanr.org/statewidemeeting2009/>.

## MAY

**28-31** *Agriculture, Food & Human Values & Assoc. for the Study of Food & Society join meeting*, Penn State Conference Center, Penn State College, State College, Penn. Information & registration: <http://wagn.cas.psu.edu/conference/>

## JUNE

**June 30-July 1** *FoodMed '09—3rd Conference on Local, Sustainable Healthcare Food*, Detroit, Mich. Topics: obesity & food system; protecting antibiotics through sustainable food procurement; sustainable meat production/nutrition; food waste management, bioplastics serviceware; farmers markets, CSAs & on-site gardens; understanding food certification ecolabels; food miles, seasonal menu planning & local procurement; implementing Green Guide for Health Care; case studies. For healthcare providers, dieticians, food service directors, food procurement, distribution professionals. Information: [www.foodmed.org](http://www.foodmed.org).

## OCTOBER

**13th Annual Community Food Security Coalition Conference—From Commodity to Community: Food Politics, Policy, and Projects in the Heartland**, Polk County Convention Center, Des Moines, Iowa. Information will be available in April at <http://www.foodsecurity.org/events.html>.

SUSTAINABLE AGRICULTURE is a publication of the UC Sustainable Agriculture Research and Education Program (SAREP). SAREP provides leadership and support for scientific research and education to encourage farmers, farmworkers, and consumers in California to produce, distribute, process and consume food and fiber in a manner that is economically viable, sustains natural resources and biodiversity, and enhances the quality of life in the state's diverse communities for present and future generations. SUSTAINABLE AGRICULTURE is published three times yearly by SAREP staff from its UC Davis offices, with assistance from ReproGraphics, UC Davis. Mailing address is: UC Sustainable Agriculture Research & Education Program, University of California, One Shields Ave., Davis, CA 95616-8716. **Web site:** <http://www.sarep.ucdavis.edu> **Email:** [sarep@ucdavis.edu](mailto:sarep@ucdavis.edu), **Telephone:** (530) 752-7556, **Fax:** (530) 754-8550. Material in this publication may be reprinted with credit, except articles that have been reprinted from other publications.

*Tom Tomich*

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